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THE

Colliery Guardian,

AND

JOURNAL

OF THE

COAL AND IRON TRADES.

---

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# THE COLLIERY GUARDIAN

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## EXHAUST STEAM PLANT AT SCOTTISH COLLIERIES.

An important question in connection with the electrical installation at collieries is the utilisation of exhaust steam. Two noteworthy installations have been carried out at Scottish collieries by Messrs. Mavor and Coulson Limited, Glasgow. One is at the Montgomeryfield Colliery, owned by Messrs. A. Kenneth and Sons, Dreghorn, and the contract included the low and high pressure steam pipe work, steam receiver,

condenser is a low-level jet type, and capable of dealing with 12,000 lb. of steam per hour, maintaining a vacuum of 28 in. (bar. at 30 in.) with cooling water supply at 73 degs. Fahr.

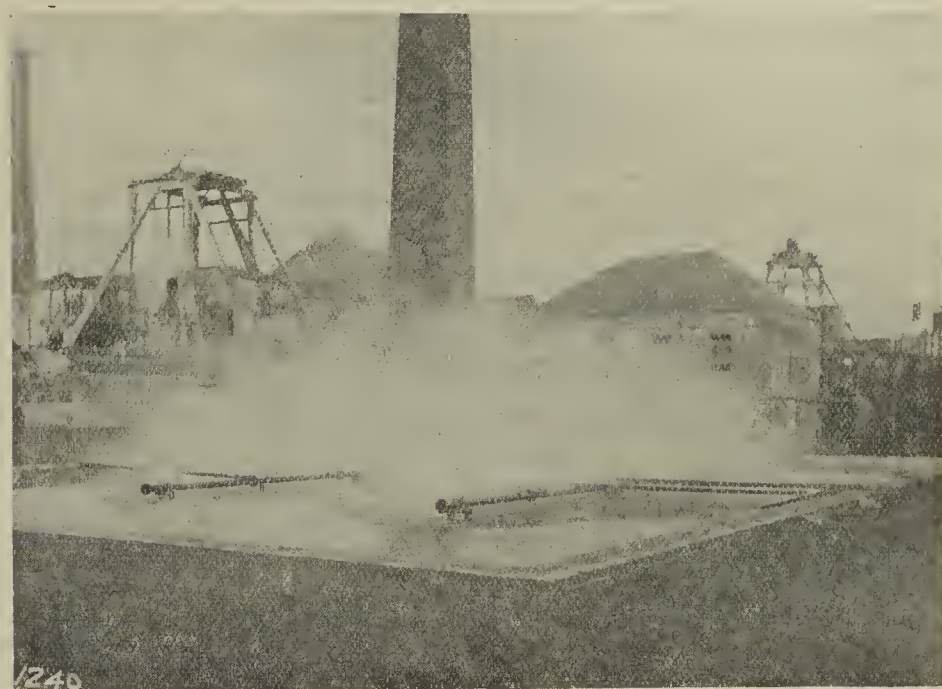
Fixed in the basement are the circulating and dry-air pumps, driven by a 32 B.H.P. motor. The spray cooling plant receives the discharge water from the condenser at a temperature of approximately 100 degs. Fahr., and re-cools to 73 degs. Fahr. A by-pass is taken off the discharge pipe to the boiler feed pump, and the make-

a vacuum of 28 in. The condenser is of the Korting multi-jet ejector pattern, capable of dealing with 16,000 lb. of steam per hour, and maintains a vacuum of 28 in., barometer at 30 in.

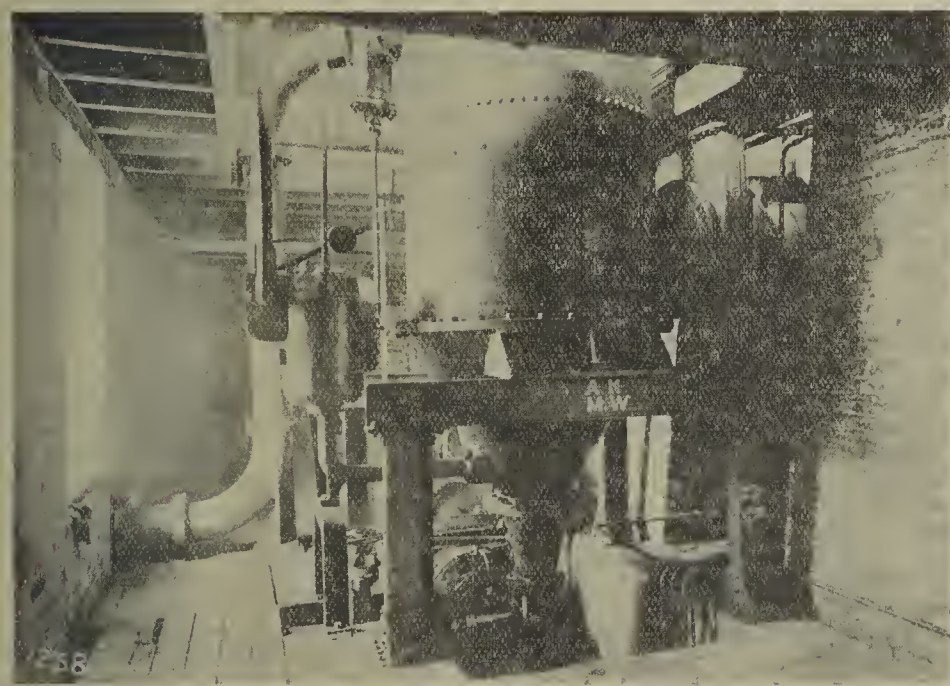
Cooling water is obtained from a stream near the colliery. It is brought to a well at the engine-room by gravity, and from the well it is put into the condenser at a pressure corresponding to 25 ft. per head, by means of a centrifugal pump driven by a direct-current electric motor. The electrical switchboard is supplied with



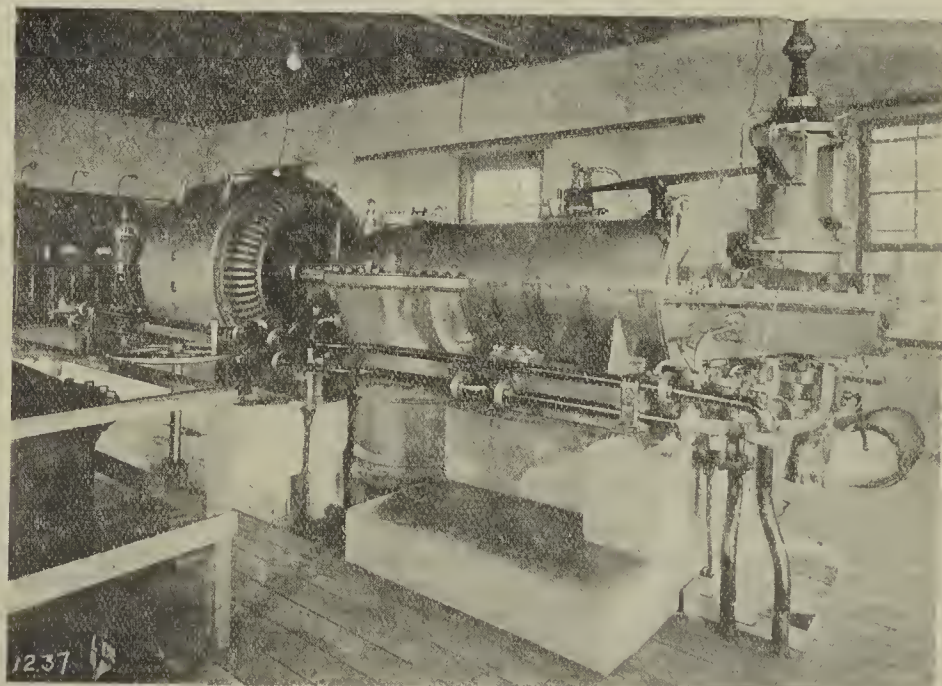
INSTALLATION AT GLENCRAIG COLLIERY:  
Low-pressure steam receiver, with automatic blow-off valve and oil separator.



SPRAY COOLING POND AT MONTGOMERYFIELD COLLIERY.



LOW-LEVEL JET CONDENSER AT MONTGOMERYFIELD COLLIERY.



TURBO-GENERATOR AT MONTGOMERYFIELD COLLIERY, LOOKING TOWARDS SWITCHBOARD.

300 kw. turbo generator, low-level jet condenser, and accessories, together with the pond and spray cooling plant, also the main switchboard, cables, &c.

The turbo-generator is a 300 kw. direct-current set, generating current at a pressure of 550 volts when running at a speed of 3,300 revolutions per minute.

In addition to supplying the whole of the current for fully 14 coal-cutters, also all pumps, haulages, screens, &c., at Montgomeryfield Colliery, the station sends current by an overhead cable to Schewalton Colliery, about three-quarters of a mile away, where it is utilised at this pit also for coal-cutters, haulages, and pumps. The turbine is capable of doing full load with a pressure of 1 lb. above atmosphere or 16 lb. absolute when exhausting into a vacuum of 28 in. w.g. The consumption of low-pressure steam is 36 lb. per kilowatt-hour on full load when exhausting into a vacuum of 28 in. The

up water is supplied to the cooling pond from the river about 500 yards distant from the colliery. The supply of low-pressure steam is collected from two winding engines, fan, brickwork, and washer engines. This steam, after passing through the receiver, is taken through an oil separator before entering the turbine.

At the Glencraig Colliery, Fife (Wilson and Clyde Coal Company Limited) a 500 kw. mixed pressure turbo-generator was installed by Messrs. Mavor and Coulson. This turbine is arranged to give an output of 500 kw., but 300 kw. of this output is obtained with exhaust steam only. The generator is direct current, and wound to give a pressure of 500 volts, the speed of the combination being 2,700 revolutions per minute. The consumption of low pressure steam is 36 lb. per kw. hour on full load, when exhausting into

automatic switchgear on generator panel and feeder panels, and fitted with collapsible gates. The low pressure steam is derived from the exhaust of two winding engines, fan, and washer engines, and after passing through the receiver is taken through an oil separator with an automatic oil discharge arrangement. All the electric power used in the colliery is supplied by this plant, which is giving complete satisfaction.

At a meeting of the Durham County Education Committee, held last week, it was stated that the sub-committee had decided that a number of evening scholarships (not exceeding 40, including renewals) be reserved for the special course for miners at Armstrong College for the session of 1913-14, tenable by candidates who had obtained the Board of Education first-class certificate in the lower stage of mining or its equivalent.



**DRAFT GENERAL REGULATIONS.****Proceedings before the Referee.***(Continued from page 1393, vol. cv.)*

The fifth day's proceedings opened on Monday, 23rd ult.

**Rule 46.**

This rule reads: "He shall not allow any ventilation door to be fastened or propped back on its hinges, and shall see that every door is so fixed and maintained that it will fall to and close automatically."

Sir THOMAS RATCLIFFE-ELLIS said there was an agreed amendment adding the words "to the best of his power."

The REFEREE said he would put it in, but his own opinion was that it was quite unnecessary, because often people would do things beyond their power. It was said sometimes that when a corresponding expression was not to be found in another rule, a man had to perform the duty whether he could do it or not.

Sir THOMAS RATCLIFFE-ELLIS said they had evidence a little while ago in a prosecution in Yorkshire, when the inspector said it was not a question of safety, but it was a question of the law, and where they had to work by the card in that way they had to be careful. When a man had to see that somebody else did it, he should do it to the best of his power, but if he had to do it himself he must do it.

In line 2, after "every," it was agreed to insert "such."

**Rule 50.**

Rule 50 reads as follows: "At the termination of work of a shift in a district, the fireman, examiner or deputy who is in charge of the district, before he himself leaves the district, or other competent person appointed by the manager or under-manager for the purpose, shall ascertain that all unnecessary lights are extinguished, that all main doors are closed, and that the ventilation is taking its proper course. This requirement shall not apply where the shift is succeeded by another shift, so that work is carried on without any interval in the district."

There was an amendment in line 9 to leave out the three words "in the district."

Mr. POPE said the intention of the rule was that it should apply to the district, and not to the mine as a whole.

Sir THOMAS RATCLIFFE-ELLIS said they objected to the words because there might be some work going on at the pit bottom.

Mr. EVAN WILLIAMS said the shifts did not actually change in the district itself. The men coming out might pass the men coming in at the pit bottom. There might be an interval of only five minutes. The object he had in putting in the words was to make it unnecessary for a fireman to go all round his district in cases where the other men were coming in immediately if not actually before the other shift left the district.

Mr. REDMAYNE said they might have an outgoing shift and an incoming shift changing at the bottom of the shaft; that meant that the working places would have no one in them for possibly two hours, and that they regarded as a danger. If the change was in the district then the interval between the actual working in that place would be only a short time, possibly five minutes, ten minutes, or a quarter of an hour.

The REFEREE said he could conceive a case where there might be an interval of five minutes between the two shifts, and the question was whether this rule, which obliged people to put out all the lights during that five minutes, was a wise rule.

Mr. BLACKETT said this rule provided for an examiner at the end of a shift going round the district to ascertain if the lights were out. If the examiner went down to one place to search the place and it took him an hour and a-half he would be an hour and a-half in ascertaining whether in a certain place a candle was burning. They must have more time than that. Again they were in a difficulty with regard to the Eight Hours Act, and with respect to leaving these men more than eight hours underground. Two shifts came in, and they wanted the whole work to spread out over the time of two eight-hour shifts. Then they must change them at the shaft bottom, because there were two eight hours from coming underground to going out again. On the other hand, there were certain places where they changed after they had had half-an-hour's walk in the place.

Eventually, the REFEREE suggested the wording: "This requirement, so far as it refers to doors and ventilation, shall not apply where the shift is succeeded by another shift, so that work is carried on without any interval in the district, nor shall it apply to lights in cases where the second shift is timed to enter the district within 15 minutes of the preceding shift leaving," and this was agreed.

**Proposed New Regulation.**

A new regulation was put in as follows: "Every fireman, examiner or deputy shall observe such directions as may be given to him by any official of the mine superior to him. The foregoing regulation was asked for as being conducive to safety and as being in accord with existing practices. It had been agreed except as regards the Home Office.

Sir THOMAS RATCLIFFE-ELLIS suggested that the word "lawful" should be inserted before the word "directions," to which the REFEREE said he had no objection, although it was quite unnecessary.

Mr. POPE said their difficulty was that this proposed new regulation repeated the provisions of section 74, but that the limiting words which Parliament had put in were necessary to the clause. The words omitted were "with a view to comply with this part of this Act with a view to safety."

Sir THOMAS RATCLIFFE-ELLIS said they did not want a fireman to say to an under-manager or to an official above him, "I have nothing whatever to do with you; the manager gives me my directions." With regard to the miners, except in Northumberland and Durham, it was specifically defined what they had to do, and a man could not give them directions unless he was entitled to do so. Sir Thomas Ratcliffe-Ellis eventually withdrew the suggested regulation.

**Rule 52.**

Mr. CHARLTON asked that Rule 52, which refers to the examination of engines, &c., by the winding engine-man, be amended by inserting after the word "engine-man" the words "or some competent person appointed by the engineer with the consent of the manager."

The REFEREE and Sir THOMAS RATCLIFFE-ELLIS suggested the wording "Every winding engine-man unless some other person is especially appointed for the purpose by the manager," which Mr. CHARLTON said he would accept.

Mr. HARVEY, for the miners, said they had had instances brought to their notice that engine-men had found defects in their engines, and they had reported them; but they had been told to go on with the winding. The men who had responsibility and the charge of over half-a-million men ascending and descending the mine should examine their own engines. He should make the examination before lowering down the shift, and he ought to satisfy himself before those men were lowered down, because he was responsible.

Mr. WEEKS pointed out that hitherto the rule had been once in 24 hours. The object of this rule was to see that it was examined once in every eight hours.

The REFEREE allowed the words "Shall at the commencement of or during his shift carefully examine." There was a further amendment to leave out after "discovered" to the end and insert: "He shall cease winding until the matter has been reported to a superior official, and shall not resume winding until such official instructs him to do so."

The amended reading, as suggested by the Home Office, was settled as follows: "If any defect likely to affect the proper working of the engine is discovered then or at any other time, he shall not commence or continue winding until the matter has been reported to the manager or under-manager, or to the official under whose direction he works, and shall not resume winding until the manager or under-manager or official as aforesaid instructs him to do so."

**Rules 59 and 60.**

These rules, which were taken together, read as follows:—Rule 59: "The person in charge of any ventilating machinery driven by mechanical power shall not, except in the case of an emergency, leave the same without the permission of the manager, under-manager, or official under whose direction he works." Rule 60: "He shall keep the machinery running at the speed ordered by the manager or under-manager, and for that purpose shall from time to time observe the indicator."

Sir THOMAS RATCLIFFE-ELLIS said the owners' amendment was to omit those two clauses 59 and 60, and insert in substitution for both the paragraph "The person in charge of any main ventilating machinery driven by mechanical power shall keep the machinery running at the speed ordered by the manager or under-manager, and for that purpose shall from time to time observe the indicator."

Mr. POPE said the whole point turned on what was meant by the words "main ventilating machinery." He also drew his lordship's attention to the heading to Rule 58, which showed that there was a qualification already governing all the regulations, and that the regulations should not apply to any auxiliary fan placed underground.

Mr. CHAMBERS stated that since the adoption of electricity as a motive power a great many fans had been installed actuated by motors instead of steam engines. In that case there was no variation in the speed where a full current was used. If there was any stoppage in the running of the motor it was immediately indicated in the power-house, where there was a man in attendance at the switchboard, and he saw it at once. The bearings were self-oiled, and they did not require attention for weeks together. If a man were in attendance in a case of that kind he would simply have to sit in the engine house with absolutely nothing for him to do. A main ventilating machine was a fan driven by a motor.

Mr. FORGIE said he agreed very much, as far as the electrically-driven fans were concerned, with Mr. Chambers, but in Scotland they had a very large number of small pits, at which ventilation was required, and they had fan engines at most. Five or 10 minutes in the day would be quite sufficient for all the attention that was required. There might be a man employed close by, and there was no great difficulty or danger in having that man employed at other work outside the house where the fan was controlled. The speed of the fan was controlled in the majority of cases by a governor which kept it going at a regular speed, so that there was no danger of the fan running at too low a speed.

Further evidence in support of the amendment was given by Mr. PHILLIPS and Mr. BLACKETT. The latter said they did not for a moment wish to leave the fan without any observation whatever, but where they had had another room immediately near the engine-room where they had had other little engines running, the fan engine-men had gone from one room to another and looked after these other engines, and all their arrangements which had been made as regards watches took this into consideration. It was ridiculous to enforce that after all the precautions that had been taken in having automatic oilers, automatic watchers and diagrams, automatic governors and governors of speed, &c. Even if the fan was stopped, there was next to no danger for the time being in the mine. The ventilation went on automati-

cally. The engineman was, in effect, present with the engine in the case of the steam engine, except when he went away to attend to another engine or something of that kind. The electrically-controlled fan was different altogether. Witness had had a fan now running for several years controlled from the dynamo house because the whole fan, in effect, could be seen there. The measure of the current was one of the most complicated things possible, and as long as a man could see that, he knew whether the machine was running all right; and besides, if a manager who was certified by the Government after examination to be competent to look after his business was not to be trusted to say when an important fan engine should not be left, and when an important engine could be left, it was going to be a very troublesome thing indeed to get managers to manage the work.

Mr. DIXON (representing Cleveland) said he agreed with all that had been said about electrical fans. Their particular position was that they did not have men there during the whole 24 hours, and what they specially wanted relief for was during the hours when there were no men in the pit at all. They kept the fan running at intervals during those hours, and they absolutely required no attention whatever. There was a man on the place who could give the signal if there was anything wrong.

Mr. REDMAYNE said the view of the Home Office on this matter was that there should be a responsible person within sight and hearing of the ventilating machinery that ventilated the mine, whether it was placed on the surface or underground. The view was very fairly put by Mr. Blackett when he stated that it should be the exception when a man was absent from the engine-house, and not the rule. The case divided itself into two. The Act of 1911 allowed of the ventilating apparatus being below ground, always provided that there was an apparatus kept at the surface, which, in the event of the underground apparatus going wrong, might be turned on so that the mine might be ventilated. But they had to take the case of a colliery in which either all or a great part of the ventilating apparatus was working below ground. It might be that all these ventilating engines were electrically driven, in which case they could be varied in rapidity of revolution, or they might be driven by steam. They had a class of ventilating engine in South Wales in which they could actually vary the revolutions at which the fans were driven, it might be 100 per cent. As a matter of fact where the speed of a fan had to be varied, a fan was kept at the surface, and it was driven by steam with a pair of engines which could be turned on at any moment if the fan engine failed. The man who watched an engine ought not to be absent under the conditions of a mine which was subject to sudden inrushes of gas. If the mine was not so subject, it was possible to have these fans underground. It was not necessary to have a man continually watching in the case of naked light mines, but it was distinctly advisable that he should periodically visit the fan.

The REFEREE suggested that the rule should be confined to contrivances for main ventilation, or for general ventilation either of the mine or of the district, viz.: "The person in charge of any ventilating machinery" (and ventilating machinery there meant all machinery which was used for ventilating either the mine or the district) "driven by mechanical power should keep the machinery running at the speed ordered by the manager or under-manager, and should from time to time at intervals of not more than half-an-hour examine the machinery and observe the indicators."

Sir THOMAS RATCLIFFE-ELLIS asked that the matter should be allowed to stand over until the following morning, so that the coalowners might talk it over.

This was agreed to, and it was arranged that Mr. Dixon and Mr. Hughes should attend, on behalf of the Cleveland and South Staffordshire districts respectively, with a view to an exemption.

**Rule 66.**

This rule was agreed as follows: "He shall maintain the water in each boiler as nearly as practicable at the proper working level, but if it becomes too low, he shall at once lower the dampers, and either draw the fire or damp it down, and report the circumstance to the official under whose direction he works. He shall also see that the pressure of steam fixed by the manager is on no account exceeded."

**Rule 67.**

An objection by the Bristol coalowners was raised on the ground that in the non-fiery mines, at some places 100 yards from the coal face the air-current, though ample for efficient ventilation, would not be sufficiently powerful to register on the instrument. This was supported by Mr. DIXON, in regard to Cleveland, and by Mr. McMURTRIE, in respect of Somerset and the Forest of Dean, but the REFEREE decided that the rule should stand unaltered.

In the hearing: "Use of electric lamps. Section 32," it was agreed that after the words "use of electric lamps" the words should be inserted "other than locked safety lamps."

**Rule 68.**

In Regulation 68, which refers to the limits within which electric lamps may be used, it was agreed to insert, instead of "Where" at the beginning, "In any mine or part of a mine in which."

Sir THOMAS RATCLIFFE-ELLIS next proposed to leave out from "air" to end of sub-paragraph (a), making the latter read, "On main intake airways and haulage roads ventilated by intake air," and crossing out "Up to within 300 yards of the first working place at the working face which the air enters."

Mr. POPE said there were two cases where electric lamps—not electric safety lamps, but electric lamps—might be taken nearer the face than the limits fixed in the regulation, but this was a general regulation applicable



to all the mines which were more or less dangerous. It was not possible to fix by a large regulation limits which would be equally applicable to all cases. In connection with those cases upon which evidence might be advanced that it was reasonable to carry electric lights nearer the face than the regulations fixed, the Home Office suggested that those were exactly the conditions which Parliament intended to meet when it provided section 87, subsection (1), for dealing with the matter—a special regulation.

Sir THOMAS RATCLIFFE-ELLIS pointed out that in accordance with section 60 of the Act, electricity, could be prohibited if the inspector thought it was not safe, and whether he approved it or not, the percentage of gas in the air exceeded  $1\frac{1}{2}$  per cent., must be cut off and cease to be used. In accordance with this section, regulations had been made for the use of electricity by the Home Office, and everything was there prescribed which the Home Office might think necessary, or the owners might think necessary, to make the use of electricity in a mine as safe as it could possibly be. They had done this in such a way that they could take electricity in the form of a light much nearer to the face than was suggested in this regulation. There were electrical appliances close up to the face—conveyors and coal-cutters and other appliances of that kind driven by electricity—and that being admitted, the better the light they had, the safer would be the operations with these machines.

Mr. WILLIAMS said the places where these lights were generally put underground were on double partings—that is, sidings and junctions where traffic was heavy, and wherever they had electric machines working. Where there was an electrical machine working in a fixed position, there should always be an electric lamp there, if for no other purpose than to indicate to everybody that the current is on. The junctions were much nearer the face than 300 yards. It might be at the face, and practically was. With regard to the 300 yards, in the first place section 29 of the Act said that up to 100 yards of the face they must keep their intake airway absolutely free from gas altogether. That being so, he thought that in itself knocked out the 300 yards at once. He could conceive a case where might be danger at a distance of 300 yards from the face, but it would be very rare, and the Act provided for all cases of that kind. Assuming that there was an outburst of gas in the workings, which was scarcely conceivable, it might bring the percentage of gas at the first working face up to  $1\frac{1}{2}$  per cent., and then the electric current would have to be cut off completely, not only from the lights but from every part of the cable and apparatus—every kind of current would have to be cut off in such a case, but that case would be one of exceeding rarity. Supposing one of these lamps were to break with  $1\frac{1}{2}$  per cent. of gas in the mine, there was no danger at all.

Sir THOMAS RATCLIFFE-ELLIS said he would take the next amendment, in which the return airway was dealt with. They contended that in the intake airways electric lamps might be used anywhere subject to the general law as to the use of electricity, and in the return airways except where there was  $1\frac{1}{2}$  per cent. of gas in the air, in which case the general regulations required the current to be cut off altogether.

Mr. WILLIAMS said in the return airways the Home Office proposed that within 300 yards of the pit bottom they should be allowed to use electric lamps. He did not know on what principle they had gone there because it was the same air within 300 yards. It was only at any point within 300 yards of the bottom they were allowed the use of electric lamps, and then only for the purpose of lowering men or minerals. If they had an electric pump at the bottom of an upcast shaft which was not used for raising men or minerals, they would not be allowed to light the pump room. Then as to the distance from the pit bottom, it was the same air that came along the main return airway 1,000 yards in as it was at 300 yards in, and they considered that this  $1\frac{1}{2}$  per cent. standard of safety which had been laid down by the Government and the Act left a very ample margin. In South Wales they had had a very large number of main haulage roads in the return airway, and he did not know of any explosion in South Wales that had originated in a return airway. There was quite as much risk of damage in an ordinary safety lamp as there was in any of these lamps, and considerably more. He should say a haulage road ventilated by intake air could not extend beyond the first working place. A lamp of that kind would not be fixed up in a permanent position except under a good roof or under proper timber. He had no doubt there were cases where it would be inadvisable to take lamps of that kind within 300 yards of the face, but there was a far larger number of cases where it would be perfectly safe to do so. No manager would do it under unsafe conditions. If the roof was bad he would not do it.

Mr. PERCY GREAVES (West Yorkshire) said that if this regulation was passed he would have some men injured and probably killed.

Sir THOMAS RATCLIFFE-ELLIS stated that on haulage roads the fatal accidents from being run over and crushed by trams in 1911 was 204; non-fatal, 26,104. The deaths from explosions in that year were only 34. The number of injured by explosions—a large number in naked light mines—was 190.

The rule was still under consideration when the proceedings were adjourned.

On the resumption on Tuesday the same rule was under consideration.

Mr. REDMAYNE said an explosion of gas which broke away 100 yards back from the face would undoubtedly kill the men at the face. There was, indeed, no limit to coaldust. There were two factors which entered into consideration with the Home Office. One was that in the great majority of cases 300 yards would be a fair point to take as being outside the area of moving strata; the

other point was that they had selected that distance as being a fair average point to take with a view to flooding by gas. That was a rare occurrence, but still it was an occurrence which had to be taken into consideration, and within the last year or two there had been two very serious cases of that. There were sudden eruptions of gas which they might call temporary blowers, and that would back out the air for a considerable distance, and even beyond 300 yards. But the fact that it would be known 300 yards from the face would give the officials of the mine time to shut off the electricity affording the light. There were cases where it would not be fair to put it at 300 yards, and those could, in their opinion, be met by a special regulation. Mr. Redmayne admitted that this rule was inconsistent with there being a good light. He mentioned that there was at present being submitted for approval a safety lamp of 7-candle power.

Sir THOMAS RATCLIFFE-ELLIS said that if there were such a lamp the coalowners would use it, if it gave sufficient light, and if a lamp were invented which would give sufficient light and was safe, the coalowners would not require any order from the Home Office to use that in preference to a lamp as to which there might be a question of danger; but until such a lamp was invented which gave a safe light they said that they were using a safe lamp which was practically free from risk.

Mr. REDMAYNE said on haulage roads in very few cases now were electric lamps being used so near the face as 300 yards. He was referring to the whole of the haulage all over the mine, and the haulage was not, for obvious reasons—possibly in many cases because of the unsteadiness of the strata—carried so far as that point, but recently they had begun to adopt a system of secondary haulage roads, and it was necessary in some cases that they should do it.

Sir THOMAS RATCLIFFE-ELLIS said they did not agree that it was only recently that these lights had been used. They had been used for 10 years.

Mr. SMILLIE said the miners were with the Home Office in this matter, but it was desirable to have a good electric light much nearer than 300 yards in some cases, where the haulage went up close to the face. As to the number of accidents, however, it could not be said that there were 26,000 accidents in that 300 yards. That he took to be in all the haulage roads. Only a very small percentage of mechanical haulage, he thought, was carried to within 300 yards of the face at the present time.

Mr. BLACKETT said it was not the largest proportion, but it was a very considerable proportion—10 per cent. would be much nearer than 1 per cent., but Mr. Smillie forgot that exactly the same argument could be applied to the number of explosions. Sir Thomas Ratcliffe-Ellis had quoted a number of explosions, but there was just a very trifling proportion of those that could be alleged to have been caused by an electric light; in fact, witness declared there would be none. It was only a proportion in both cases. These electric lights gave a great light. One of them now was giving at least 16-candle power. If they had to reduce the light for any such purpose as that lamp was provided for, then they must have more lamps than one safety lamp. They would probably have to hang about six or seven safety lamps, which would be decidedly less useful than one 8-candle power lamp. Hundreds of safety lamps were broken accidentally in this country almost daily, for no other reason than that of a pick point, and the rules (which were intended to provide for safety) said that the men must not hang the lamps within 2 ft. He would rather take his risk with a lamp that, when smashed, went out instantaneously, as they would not be absolutely certain of an explosion.

Mr. REDMAYNE said it did not matter whether it was an instant or an hour. The damage was done. He would not undertake to say that the lamp would always on every occasion fire gas, but it would on nearly every occasion. But the trouble was not only with gas that would apply to that type of lamp, but the trouble was also with the wire. Again, safety lamps were in the care of the man.

Mr. BLACKETT said the other was in the care of nature which put the light out, and which was far better than any human being. The safety lamp was a much more dangerous lamp than the other, and he had to hang up six or seven lamps.

Mr. REDMAYNE took it that Mr. Blackett would bunch all his lights together.

Mr. BLACKETT said he did not think he would do anything so undesirable. He would get the lights spread over a greater area. He would not deny that there was more danger with a collapsing or a falling roof within, say, 100 yards of the face than there was within 300 yards of the face in some pits where they were taking the coal out in longwall working. But there was a great amount of mining that went on without conditions of that kind. They proposed to hang these lamps, and they were especially guarded with an iron cover and protected in accordance with Rule 129. The lamp Mr. Redmayne was speaking about would be a most unreasonable thing. To produce 8-candle power it would be an enormous thing. At these busy places they had machinery to look after, a pumping engine to look after, haulage engines with busy people all round them, cog-wheels for men to get their fingers in, and ropes in which men could get entangled, all of which were required to bring to one focus the work of a great number of people along the face. All these places they wanted to be well lighted. It was shown in the rules how electricity could be safely applied, and they were merely adding to safety by giving at that point a better light. At the point where they had that machinery they had taken greater precautions to prevent the roof from falling.

Sir THOMAS RATCLIFFE-ELLIS pointed out that in section 50 of the Coal Mines Act, 1911, there was a special provision in subsection (3) that in those places where they wished to put good lights, special precautions had to be taken to prevent the roof from coming down.

Mr. BLACKETT said that, as to the wires, the Home Office had provided in the electric rules for having the wires surrounded by a section of metal so that the electricity, instead of going outside the cables, remained inside, went back to the earth, and was automatically shut off altogether.

Sir THOMAS RATCLIFFE-ELLIS also pointed out that section 32 of the Act said: "Subject always to the provisions of this Act and any regulations made thereunder as to the use of electricity in mines, electric lamps, if enclosed in airtight fittings and having the lamp globes hermetically sealed, may be used on main haulage roads or elsewhere within such limits as may be fixed by the regulations of the mine." Therefore they recognised that there should be some limit, and it was a question of fixing what the limit should be. Section 49 said: "The roof and sides of every travelling road and working place shall be made secure, and a person shall not, unless appointed for the purpose of exploring or repairing, travel on or work in any travelling road or working place which is not so made secure." So that not only did the owner for his own sake keep these roads safe so far as they could be kept safe, but this section expressly provided that he should do it.

Mr. BLACKETT said they thought more ought to be left to the judgment of the trained manager. They were placing the manager in so many difficulties that he hardly dared breathe; he was more afraid of the law than he was of the mine.

The REFEREE: I think there is a good deal of truth in that.

Mr. REDMAYNE said there were just two points he would like to draw attention to. One point was that the great majority of the putters carried their own lights with them and they would be entirely unaffected by any regulation of this sort. The other point was with regard to the protection of the roof and the sides. Of course by the regulations they sought to protect these areas as far as possible, but they had to consider the sudden pressure.

Mr. SMILLIE said the unions were opposed to the use of electric lamps because 100 men might be working in the mixture of firedamp, which is an explosive mixture, and they would know nothing about it. They knew perfectly well that the ventilation would not be attended to so long as the man could have a light to see to work.

Mr. BLACKETT said at Murton Colliery they had been using that form of lamp in the face for the last 20 years, and such an instance as Mr. Smillie had given had never been known to occur. In the case of firedamp coming in in quantities which would be prejudicial to the welfare of the miner he would begin to pant very severely long before he was risking his life.

Mr. EUSTACE MITTON, general manager of the Butterley Collieries, in Derbyshire, said he used electricity in his pits to a very large extent. In their return airway they had four or five pumping stations. In some stations the roof was arched, and in other stations the roof was girdered and supported between the girders by iron sheets. A good light there was necessary for the safe working of the pumping station. In a mine at Kirkby, which was visited by Mr. Nelson and himself, they had a system of underground haulage for conveying minerals from the face to the shaft, and the difficulty with that mine was this. It was a very common case that these mines dipped away to the east, and in order to get the coal they had to drive a main haulage road out in advance of the coal face, and then work the coal back to that haulage road on the face, so that the collier was working with the coal rising instead of sinking. One of the most important things in these haulage roads was that they had junctions, and when they had a large number of tubs coming through the junction they wanted the best light possible. In order to get it they suspended these lamps above the men at the junctions so that the whole of the light was thrown down, and thus got the very best lighting of the junction. They had been in use for 11 years, and they had never had a single case of an accident. The main haulage was carried right to the face in a great many cases. At the present moment the pumping station was about 230 yards from the working face.

The REFEREE said he thought, although he had considerable doubt about it, that he must adopt the Home Office rule. He had no doubt whatever that there must be many cases where it would be right to permit these lamps to be used even close to the face and within 300 yards from the face, but he must leave this general regulation as it was, leaving those particular clauses to be dealt with by special applications with reference to them by the mineowners to the Home Office.

#### Rule 69.

Mr. TRYON said he had an objection to this rule which reads, "In every mine which is not a small mine the apparatus for raising and lowering persons to or from the surface, hereinafter called the winding apparatus, in any shaft which is more than 150 ft. in depth, shall be worked by mechanical power." He wanted inserted at the end: "This rule shall not apply to auxiliary winding appliances installed for emergency purposes."

On Mr. REDMAYNE stating, however, that the rule did not apply to the emergency shaft at all, Mr. Tryon withdrew his objection.

#### Rule 72.

Rule 72 is: "All cage chains shall be annealed once at least in every six months, and detaching hooks shall be cleaned and refitted once in every three months."

Sir THOMAS RATCLIFFE-ELLIS moved—after "chains" to insert "in regular use for raising or lowering persons."

Following Mr. REDMAYNE's suggestion, the REFEREE decided to adopt the wording "All cage chains in general use shall be annealed."



## Rule 73.

The subject of "Capping" was then reached.

Mr. POPE said that both as regards winding and haulage ropes there was a statutory requirement that they should be capped. Then as regards the capping, under section 46 it said that they were to be recapped in accordance with the general regulations under this Act. The regulation is based upon the general findings of the Special Committee.

Sir THOMAS RATCLIFFE-ELLIS referred his lordship to the end of Regulation 76 where there were these words: "This regulation shall not apply to hauling ropes if mineral only is hauled, or if the gradient is less than 45 degs." He proposed that the whole of these regulations under capping of winding and hauling ropes should not apply which were not used for conveying men to or from their work, but only apply to ropes which are used for hauling or raising men. He would cite the objections to the various sections. Rule 73 reads: "No mode or type of capping shall be used which fails to withstand a strain of at least 75 per cent. of the breaking strain of the rope."

Mr. BLACKETT said their first argument was that 75 per cent., instead of being applied to the breaking strain of the rope, should have relation to the load the rope must carry, because their ropes varied very much according to the actual requirements. They might at one time be using different material. For instance, if they had one size of rope to deal with, and provided a type of socketing for that size of rope, they might have provided for a certain reason a steel of a less breaking strain than they might wish to put on at other times for other reasons. The capping of the rope only had the cage to carry, and not the rest of the rope. If they made the strength of the socket in relation to the strength of the rope, then they had an unnecessarily high standard considering that the socket has only the cage to carry.

Mr. REDMAYNE pointed out that one of the weakest points was that where the capel was attached to the rope, because it was subject to the action of the rope when the cage went down on the chain, and when the chain was at the bottom it fell. It would be no use having such a strong rope if at any moment the capel was drawn out. The chain was no stronger than its weakest part. They wished to make the capel as nearly as possible the strength of the rope. Particulars were obtained from leading manufacturers as to the strength of capels, and they had not put it as high as the manufacturers put it, but within 75 per cent. of the breaking strain. Some of the manufacturers broke the rope before they drew the capel off—over 100 per cent.

Mr. BLACKETT asked if Mr. Redmayne did not know of the deeper pits they were contemplating having to sink in this country, which might be 400 or 500 fathoms deep—was not one of the difficulties they had in front of them to get ropes strong enough throughout their length to carry their own weight as well as the cages?

Mr. REDMAYNE said he thought they were magnifying the difficulty. Take Michigan in the United States, where it was 5,100 feet. He had inspected that winding apparatus himself, and they had had no mechanical difficulty in winding, or preparing rope to wind from that depth. The greatest depth at which coal was being worked in Europe was 4,000 feet. There was no place in Britain approaching that depth. He did not think there was a tapered rope in use at present in the United Kingdom. Mr. Blackett himself had stated in writing that it was folly to have a capel that was not equal to the strength of the rope. He did not think there was anything between them really on this point, and if the owners would accept any words that Mr. Blackett would put before them it would be agreeable to the Home Office. He suggested the form "which fails to withstand a strain of at least eight times the weight of the maximum load carried at any time by rope."

Mr. BLACKETT thought seven and a-half times the load was a reasonable amount, and not eight times.

Mr. DIXON, for the Cleveland mineowners, pointed out that the custom undoubtedly was to take the factor of safety eight times the load. At present the Home Office had it that the capping should be equal to 75 per cent. of that, which was six times the load. He wanted it to be accepted that eight times the weight of the load was a safe working factor for the rope, and that three-quarters of that, equal to six times the load, was a safe working factor.

The REFEREE said he would try and settle this difficulty and make it seven. Seven did not agree with any theory. After the adjournment, the Referee said the alteration which Sir Thomas suggested had been put before him. It was to leave out "75 per cent. of the breaking strain of the rope" and insert "seven times the weight of the maximum load carried at any time by the capping."

## Rules 59 and 60.

Before proceeding with the rest of the rule, Sir THOMAS RATCLIFFE-ELLIS said they had had a conversation with Mr. Redmayne, and had come to the following conclusion in regard to Rules 59 and 60:—The interval between the inspection of the machinery in a pit where safety lamps were required to be used was not to exceed half-an-hour, unless the inspector gave power to extend that time in any particular case where he thought it ought to be given, and where safety lamps were not required to be used the interval was not to exceed two hours.

## Rule 73.

Sir THOMAS RATCLIFFE-ELLIS next referred to underground haulage ropes. He suggested a formula depending on the inclination, to arrive at the safety factor. He should say anything from 4 to 5 per cent. would be a very strong factor of safety. It was arranged that the parties should consult.

## Rule 75.

This rule reads as follows:—"In no case shall the capel be attached to the rope by the use of rivets passing through the rope." It was suggested after "capel" to insert "of a round winding rope."

Mr. PHILLIPS, in support, said that there were comparatively few flat ropes winding now. In putting the rivets through with a flat rope, they could very easily get between the stitches without damaging the strands of the rope.

Mr. WALKER put in a rough sketch of an actual capel which was in use with flat ropes at four different collieries in Ayrshire. He gave instances of other designs without rivets.

Mr. PHILLIPS said properly constructed capping for haulage ropes must show itself for inspection better than it would if they had a socket. He wished to be able to use riveted round ropes for hauling. A socket capping would be larger than a riveted capping, and was apt to get on to the rollers. They could not make a white metal capping underground, but if they had a capping by rivets they could do that underground.

The REFEREE said he was disposed to introduce this qualification and to limit the rule to the cases of a round winding rope, and allow the haulage ropes to be riveted.

Mr. POPE pointed out that the owners introduced the qualification with regard to conveying men. It was, therefore, decided to return to the subject.

## Rules 76 and 77.

Sir THOMAS RATCLIFFE-ELLIS said the first part of Rule 76 was agreed. That is: "In those forms of capping in which the wires at the end of the rope are bent back on the rope itself to form a cone, wedges of a soft metal shall be placed between the rope and that portion which is bent back."

Rule 77 was passed as it stood.

## Rule 78.

This reads: "Where white metal is used in the capping of ropes the untwisted wires shall be thoroughly cleaned and dusted with resin, and before the white metal is poured into the socket the latter shall be heated or warmed." It was suggested that the whole regulation should be left out.

Mr. BLACKETT said he objected to the soldering by means of resin.

Mr. REDMAYNE agreed to delete the words "dusted with resin" and "thoroughly."

A return was now made to the beginning: "Capping of winding and hauling ropes. The following regulation shall not apply to ropes used for hauling mineral or self-acting inclines from the face." Sir THOMAS RATCLIFFE-ELLIS said they wanted to leave out after "for" to the end of the sentence, and make it read: "The following regulation shall not apply to ropes used for haulage where such haulage is not used for conveying men to or from their work. The matter, however, was postponed for redrafting, in view of the alterations already made in Rules 73 to 78.

## Rule 79.

Rule 79 refers to the exemptions from the provision in section 42, subsection (1) of the Act, requiring two main intake airways. The first amendment was to leave out "greatly" in description (a).

Sir THOMAS RATCLIFFE-ELLIS said their suggestion was that if it would increase the risk of fire at all—not greatly—that it should be exempted.

Mr. POPE said the Home Office wanted to use something definite and somewhat qualifying.

Mr. REDMAYNE said their point was that there were well defined mines liable to spontaneous combustion. The very fact that they were liable to spontaneous combustion rendered a second means of exit—a second intake road—more necessary. It was a balance of dangers.

Sir THOMAS RATCLIFFE-ELLIS said they thought it was very much better to prevent these fires than assume they must bring about a fire by increasing the air and make a rule for people to get out.

Mr. REDMAYNE said that in the Committee sitting on the whole question of spontaneous combustion of which he had the honour to be chairman, it had been ascertained that there were mines scattered throughout the country—notably in South Staffordshire and South Yorkshire and Warwickshire—which were very prone indeed to spontaneous combustion—where in some cases to drive a road actually in the head of the coal itself was liable to spontaneous combustion. But it did not increase the risk at all in those cases.

The REFEREE, however, decided to eliminate "greatly." Turning to exception (b) which is: "To any seam where, owing to the character of the strata or the nature of the pressure, the cost of maintaining two main intake airways in that seam might be so great as to prevent the mine being worked at a profit" there was an amendment to insert "making or" before "wanting."

Sir THOMAS RATCLIFFE-ELLIS said there might be cases in which these roadways had to be driven through practically a rock.

Mr. REDMAYNE said they had no objection to the addition if their words in the latter portion stood.

Mr. SMILLIE said the regulations were going to prevent the intention of Parliament being carried out. They would like all these exceptions struck out, and no regulations made at all under section 42.

The REFEREE decided to take (b) and (c) together. In (b) there was a further suggestion to insert "would be excessive," at the end, leaving out "might be so great as to prevent the mine being worked at a profit."

Sir THOMAS RATCLIFFE-ELLIS said his object was to substitute something for these words, "as to prevent the mine being worked at a profit," because whether they were working a mine at a profit or not depended upon the state of trade. They could not ascertain that until the time came when they could not work at a

profit, and then they would have expended all the money in making the second road.

The REFEREE said "excessive" appeared to him to be the same thing as "so great as to prevent the mine being worked at a profit." If the mine could still be worked at a profit then they could not say that the cost was excessive.

Mr. SMILLIE protested that the Act itself did not give power to give any exemption on the ground of profit at all. Again, under that particular clause, if they opened a seam in any pit—although the seam itself might be profitable if the mine were not profitable—the whole mine would be exempted.

The REFEREE said he thought there might be something in that, and that the word "mine" in the last line but one of (b) ought perhaps to be altered and the word "seam" inserted instead. He thought also that "cost of making or maintaining two main intake airways in that seam" depended upon the character of the mine. It appeared to him to come within the meaning of the words "natural condition of the seam." If a dispute arose, and if the men said: "The cost of making this passage or airway is not such as would render the mine unprofitable," and the masters said: "Yes, it is," then there should be a reference, though he really did not understand why it was not competent for the mineowner to say: "I will not take the risk, and I will not work this seam at all."

Sir THOMAS RATCLIFFE-ELLIS pointed out that he might have a lease which compelled him to pay for it if he did not work it. He would ask his lordship's permission to withdraw the objection to the last words of the clause and leave it as it stood: "might be so great as to prevent the mine being worked at a profit."

The REFEREE decided to alter the word "mine" to "seam."

To (c) there was no objection; (d) refers "to mines of stratified ironstone in the Cleveland district or to mines in any other district as respects which the Secretary of State is satisfied that similar conditions prevail." The Mining Association wished to add after "district" "to mines of oil shale."

Mr. SMILLIE said the Home Office was doing something which Parliament would have done if it thought wise, because it had done so in section 50, subsection (6), and Parliament deliberately left them out of this clause. Now, the Home Office, without any instructions from the Act itself—that is to say, section 50, subsection (6)—was leaving out the Cleveland district.

Mr. REDMAYNE said it was a question of natural conditions, and taking the instance of Cleveland—where the natural conditions were similar to those elsewhere than in Great Britain—if the Secretary of State was satisfied, mines might be opened elsewhere. In the island of Raasay they were opening mines similar to those of Cleveland.

The REFEREE said he observed a judgment of Mr. Justice Pickford, in which he had decided that Lord St. Aldwyn had no jurisdiction to make a particular rule under the Minimum Wage Act, and it might be, if Mr. Smillie was fond of litigation, that at some time or other many of the rules and regulations that he was settling now might come before the Court upon a question as to whether he had any jurisdiction or power to make any of them.

Mr. SMILLIE said he had not precluded himself from raising that point. Parliament would not and could not have got a majority to carry some of the things which the Home Office was getting through without legislation.

Mr. POPE said those words about the Secretary of State were put in in deference to the views of the owners on the matter, and they were prepared to let them be omitted, and, if his lordship thought proper, that these new cases should be dealt with under special regulations.

The REFEREE said he very much doubted whether he had any jurisdiction to make a rule or an exception which took off his own shoulders and put on to those of the Secretary of State the duty of enquiring whether the exception should apply or not.

Sir THOMAS RATCLIFFE-ELLIS said he would have to address his lordship upon it on the following day. The next clause was one with regard to which he wanted to ask him to alter the Act of Parliament, and then he wished to point out exactly what his lordship's functions were in this matter. With reference to the suggested inclusion in the exception of oil shale mines, he called Mr. A. H. Crichton, managing partner of James Ross and Co., of the Philpstoun Oilworks, Scotland.

Mr. CRICHTON said they wished to be exempted from this section owing to the natural conditions of shale-mines. Witness said shale occurred as a stratified mineral, and was hard and tough. The seams were from 5 to 10 feet thick. The airways and travelling roads were high, and ventilation good. The provision in section 42 subsection (1) of the Act requiring two main airways was evidently intended only for dry and dusty coalmines and fiery mines. These conditions did not obtain in shale-mines, gas being only met with in small quantities. There was no inflammable dust. Shale did not burn readily, and even when kindled the flame readily went out. The dust produced in the workings was quite inexplorative. Good ventilation was obtained comparatively easily on account of the large size of the workings. The risk of fire in a mine of that character was small. There had been slight ignitions of firedamp, and there had been no explosion.

Mr. REDMAYNE said the oil shale was not combustible in the ordinary sense, and he agreed with what Mr. Crichton said. As compared with the Cleveland ironstone the mines were somewhat more liable to the issue of gas. They were satisfied that similar conditions prevailed to those in the Cleveland district in respect to the liability of fire being caused, and he would leave him



to bring his case before the Home Secretary and say that the conditions were similar to those in the Cleveland district.

Mr. CRICHTON said he would like to press their claim before his lordship as Referee. Quite frankly, they had some experience of appealing to the Home Office and sympathised with the experts at the Home Office in being diffident in granting special applications of this kind. The Home Secretary was not a mining expert, and naturally referred to Mr. Redmayne, and Mr. Redmayne naturally referred to the superintending inspector. Of course it was natural that an inspector took the line of least resistance, and it was much easier to say "no" than "yes." If he said "yes" he took responsibility, and if he said "no" his responsibility was ended. The statute and the practice at the Home Office in the past justified this application. It had been in the past generally recognised that mines of oil shale should be exempt from certain regulations applicable to coal-mines.

The matter was left over until the following session.

On June 25, the question of the exemption of the Scottish shales from the operation of Rule 79 was still under discussion.

Mr. SMILLIE said that so far as the Miners' Federation was concerned they recognised that there was no inflammable dust in connection with shales, and that there was not the same necessity for the two intake airways like there was in coalmines.

Under the circumstances the REFEREE said he considered the words "or to mines of oil shale" should be added. As to the expression "or to mines in any other district as respects which the Secretary of State is satisfied that similar conditions prevail," he had a strong objection to putting that in at all.

The next exceptions were (e) "To any mine in which a number of persons employed below ground does not at any time exceed one hundred," (f) "To any seam which is naturally wet throughout."

Mr. POPE said that was required to be put in by the statute.

The REFEREE observed that there was a leading article in *The Times* that morning objecting to judges making observations on Acts of Parliament, but he was very much inclined to make observations upon this Act. If there was statutory provision which was plain and distinct why was it necessary to incorporate it in a rule? Anyway, although it was only surplusage, it had better stop.

Mr. BENNETT appeared on behalf of the Bristol coal-owners, with an objection to Regulation 79 (d). The point was that the Bristol coalfield was quite exceptional in its condition, and many of the intakes and returns in the coalfield, owing to the inclination, were in cross measures or in stone drifts.

Sir THOMAS RATCLIFFE-ELLIS said he had an amendment to add, another clause, (g), which would meet this, the words are these: "To any case where the intake airways are or either of them is in stone measures." It was suggested that if the road leading from the pit before they got to the working of the coal was in stone measures the two roads should start from the end of that drift.

Mr. SMILLIE said a stone tunnel of that kind might be covered with coaldust. Although it was driven in stone there might be an accumulation of coaldust from one end of it to the other, and then it was just as dangerous as if it was driven in the coal.

Mr. POPE thought in paragraph (b) the introduction of the words "making or" might meet the objection.

With regard to Mr. Smillie's point, Sir THOMAS RATCLIFFE-ELLIS pointed out that if some of the coaldust came from some part of the workings it would be mixed up with the stonedust, which was the very remedy now proposed to prevent explosions from coaldust.

Mr. SMILLIE said if Sir Thomas's amendment was accepted, in 30 years' time there would not be a single seam in Great Britain in which there were two intake airways. As the roof came down, the roads that would be opened out would be in stone drifts.

Mr. REDMAYNE said there might be a very short drift, only 100 or 50 yards of that nature, which would not be covered by (b).

Mr. EVAN WILLIAMS said there was no intention of applying this to ordinary roads in longwall working, but something quite different, where the seam was won by driving the measures through the pit bottom, and between one seam and another; but in those cases where it was driven in stone it should not be liable to be blocked up under any circumstances so as to prevent the egress of the men from the workings. These tunnels were not timbered at all, and there was not anything like the room for the accumulation of dust in them. Even assuming an explosion had been carried along one of these tunnels, it would not have the effect of blocking up the tunnel. Some of these roads were as long as 1,000 yards.

The REFEREE said he could not make rules for every possible contingency. If there was an exceptional condition of things they must go to the Home Secretary. The Home Secretary might, of course, disregard the application altogether. The difficulty with regard to all these regulations was that the system devised by this Act for the protection of mines and miners was, in his lordship's opinion, wrong, but they had to do the best they could. He had no power to deal with the matter. If he had he would have no rules and no Act of Parliament and let the men and masters, who understood it far better than anybody else, do it themselves.

#### Rule 80.

There was an amendment to Rule 80 ("The distance from the downcast shaft within which the two main intake airways shall not be required to be provided shall be the distance between the shaft and the edge of the

shaft pillars") to insert after "pillars" "or the end of the main tunnel or stone drift as the case may be."

Mr. EVAN WILLIAMS said in some cases it happened in South Wales that a seam was not won by a vertical shaft, but by an inclined shaft. Sometimes the seam came to the surface, and it was won through the seam itself. They asked in the case of an inclined shaft of that kind that the same principle might apply to any pillar that supported that, as in the case of a vertical shaft.

The REFEREE said he thought the parties had come together more or less about the matter, but both agreed that it would be desirable for them to draft a new Rule 80 altogether which would meet to some extent the difficulty. Therefore Rule 80 would be passed over at present for Mr. Redmayne and Mr. Williams to draft another rule.

#### Rule 81.

Sir THOMAS RATCLIFFE-ELLIS suggested that this might be a convenient time, because the next amendment might involve an alteration in the Act, to address to his lordship a few observations upon that question. He asked his lordship to look a little more closely into section 86 of the Act and the Second Schedule which must be read to it. According to section 86 alone it was quite clear, he submitted, that the Secretary of State could make an order providing regulation for the conduct and discipline of workmen and the safety of workmen, and he could vary or amend any of the provisions in Part II. of the Act or of the Schedule. But he could not make an order as provided in section 86 unless he complied with the provision in Second Schedule:—"Before the Secretary of State makes an order he shall publish in such manner as he may think best adapted for informing persons affected, notice of the proposal to make the order, and of the place where copies of the draft order may be obtained, and of the time (which shall not be less than 30 days) within which any objections made with respect to the draft order by or on behalf of the persons affected must be sent to the Secretary of State;" and subsection (3) of section 86 said: "The provisions contained in Part I. of the Second Schedule of this Act shall have effect with respect to the procedure for making orders under this section." Now according to subsection (8) of Part I. of the Second Schedule an individual could not make an objection, but a general objection must be made by persons or associations representing a certain proportion of persons affected by the Order. As to the notice of objections, going back to clause 2 of the Schedule it said: "Every objection must be in writing and state:—(a) the specific grounds of objection; (b) the omissions, additions, or modifications asked for." Thus an objection might be made by way of omitting something which was in the proposal or by way of adding something to it, or modifying something which might be in it. Then subsection (3) said: "The Secretary of State shall consider any objection made by or on behalf of any persons appearing to him to be affected which is sent to him within the required time, and he may, if he thinks fit, amend the draft order, and the foregoing provisions shall apply to the amended draft in like manner as they apply to the original draft." Then the next paragraph, subsection (4), was as to the publication of the notice: "If after the publication of the notice with respect to any such draft order (whether an original or amended draft), any general objection, as hereinafter defined, is made within the required time with respect to the draft and not withdrawn, the order shall not be made by the Secretary of State until that objection has been referred to such one of the panel of referees appointed under this Act as may be selected in manner provided by the rules for the purpose." If his lordship looked at the next paragraph he would see that his powers and duties were defined:—"If on any such reference the Referee considers that the draft order should be varied to meet the objection, he shall recommend any variation which he considers necessary or expedient, and effect shall be given to those recommendations in the order, if made." That meant that any recommendation that his lordship might make upon the objections which he had to consider might be adopted by the Secretary of State and must be adopted if he made the order, but if he chose he might not make the order. This was part of the Act of Parliament, and therefore he respectfully submitted that his lordship's duty was to make a recommendation with respect to every objection that was made, unless there was something in the objection which was out of order, and when he had made that recommendation the Home Secretary might adopt it or not, but if he made an order at all he must adopt it. He did not ask his lordship to decide that the Act should be altered, because he could not do that, but he had power to recommend to the Home Secretary that he should act.

Sir Thomas now referred to section 42, subsection (3), of the Act, which reads: "In the case of every mine or seam newly opened after the commencement of this Act, all stoppings between main intake airways and main return airways and all air-crossings shall, so far as practicable, be so constructed as not to be liable to be destroyed in the event of an explosion, and general regulations may be made under this Act providing for the manner in which such stoppings and air-crossings are to be constructed." He proposed to put forward evidence to show that to make stoppings so that they could not be destroyed by an explosion was a most dangerous thing. The effect of the section was that if they had an explosion happening near the bottom of the shaft and some men were there, if the stoppings could not be blown out by the explosion then all the effect of the explosion passed on to the workings, but if the stopping could be blown out it left air for the men in the distant part of the workings.

At this point Mr. POPE said it seemed to him that Sir Thomas was attempting to get his lordship to reopen a

matter which was deliberately settled by Parliament when the Bill was before them in Committee. Again, as regards the variation or amendment of the Act, it did not say that the Home Secretary repealed these decisions; if that had been intended, he submitted that the power of repeal would have been included in the clearest possible words; it did not say that he might repeal or revoke, but it only said that he might vary or amend these decisions.

The REFEREE: What is "vary or amend"? I should call it an amendment if you decided that a provision of the Act should be struck out of it.

Mr. POPE said he thought that that would be rather described as an amendment to the Act and not as an amendment to the provisions. It was an amendment of the provisions contained in the Act which was referred to. To put in after "shall" the word "not" would be more than a variation—it would be a complete revocation. Another point he wished to make was that these proposals which were put forward by Sir Thomas Ratcliffe-Ellis were not objections within the meaning of the Schedule. These new proposals offended against the provision as regards publication, which would have enabled other persons, who might have wanted to say something upon them, to come before his lordship and discuss them.

The REFEREE said he did not think there was very much in the last point, because he thought everyone was there.

Mr. POPE, continuing, said the power to make general regulations under section 86 was confined to the Secretary of State. These particular proposals had not been referred to his lordship by the Secretary of State. They were brought there gratuitously by the Mining Association, and they asked his lordship to reopen and discuss the merits of questions which the Home Office said were determined in the clearest way by the statute itself. What the owners were asking for here was not that the Referee should vary the draft order of the Secretary of State, but that he should make a recommendation that he should amend the Act, or repeal some section of the Act. It seemed to him that "vary and amend" had a restricted meaning, and what was intended was that the Secretary of State might keep abreast of the times, and without going to Parliament for a new power he might make provisions.

The REFEREE said he thought it would be better for him to hear the facts. He knew that it would have the effect of lengthening the enquiry, but he was contemplating the possibility of these people going to the King's Bench and getting a mandamus to order him to consider these matters, and, if necessary, to make these recommendations. At present he did not think it was at all likely that he would recommend variations or amendments—especially as these matters had already been thrashed out before another tribunal when the Bill was being considered in Committee.

Mr. TRYON said his evidence would be that this rule would enormously increase that risk of spontaneous combustion. His case was a perfectly different one from Sir Thomas Ratcliffe-Ellis's. He submitted that the whole scheme of the Act was, that as regards the provisions in Part II. of the Act, so to speak, to put them in the melting pot before his lordship, who had the fullest power as regards any particular district to make such rule, after hearing the evidence, as he thought would be most effective to give safety to the miners. The provisions in Clause 2 as to additions and omissions clearly showed that the proposals of the owners could be considered from that point of view.

The REFEREE said he was going to hear the evidence, but the notion that he could sit there to hear this subject exhaustively discussed was not practicable. In his opinion it would take him far too long to sit there and instruct himself sufficiently to enable him to make a recommendation that was of very much value.

Mr. REDMAYNE said he was present throughout the whole of the proceedings in Grand Committee, and the case was put for and against very ably indeed. The point that Sir Thomas Ellis took was put before the Committee.

Sir THOMAS RATCLIFFE-ELLIS said he was there every day and he could not say he heard any argument of that sort before the Committee, but he was not sure the Grand Committee was the best tribunal to decide it. He had not then the information about this matter which he now had. After the regulations were published, when they were discussing Regulation 81, which provided for the way stoppings would have to be made, his experts explained that the Act of Parliament was wrong. The Mining Association made no amendment to this clause.

The REFEREE pointed out that there was a third course, which was one that he might take. He might say he had not sufficient evidence before him to be able to express an opinion one way or the other. That was a sort of harbour of safety.

Mr. BLACKETT then gave his experience on the subject. He said that over 30 years ago he began to go to the scene of the recovery of the mine immediately after an explosion, either with a view to try to get men out, or to restore the mine. He saw the Trimdon Grange, Tudhoe, Wingate Grange, Washington, Whitehaven, and West Stanley pits, and the whole of his experience was to this effect, that it was due to the giving way of stoppings that so many men had been rescued as had been rescued, and unless these stoppings had given way the death-rate would have been greater than it was. It was not the explosion itself that killed the greatest number of men but the gases generated by it, the afterdamp, and carbon monoxide. This gas was generated by the explosion, and owing to the ventilation being carried forward by the stoppings it was carried on to men in the different parts of the workings that were not affected by the violence of the explosion. He had a very clear recollection of what took place at Wingate Grange Colliery where a whole district of men, probably 30, were saved



olutely by the stoppings giving way. These men were in a further district of the mine. If these stoppings gave way, and this was what they had always done in experience, the pit gas, instead of going in, came with great force, because it had less distance to go and less friction with air, back to the upcast without going any further. There were other reasons why they became objectionable, if he might compare the huge gallery as being a big gun which, along its whole length, was filled with explosive. Out of the sides of the gun were holes, and that gun could not project its contents with such force out of its muzzle because it vented its strength out of these holes at the sides. If they filled in these holes the gun would develop greater violence, and project its contents further than it otherwise would have done, and the very putting in of those stoppings would make the explosion of the gas in the pit go off with greater force, a force they did not know yet. They had not yet ascertained the force that could be developed in a pit if the stoppings did not give way. He was afraid of the results. The only further remark which he had to make was that he did not know how to make a stopping not liable to destruction.

Mr. REDMAYNE said there were two schools of thought in this matter, but he declared, without the slightest fear of contradiction, that in every large explosion that he had investigated not one single person had been saved by these stoppings being blown out. In one case, and in one case only, the stoppings were so strongly built that they resisted the explosion—that was at West Hulton, the largest colliery explosion that there had ever been in this country, where 344 men lost their lives. In that explosion the mine was restored to a greater extent than in any other case that had ever come within his knowledge, because they had not to re-erect the stoppings as they went in. There were two reasons for erecting these strong stoppings; first of all, that they could get in to recover anybody that was recoverable, but that was a very small chance. But if they had strong stoppings, stoppings that stood, and had not to be built by the rescuers, they got very much quicker into the face. Furthermore, if there was a standing fire caused by the explosion, as at Whitehaven, if the stoppings stood they could reverse their ventilation and get in to the scene of the fire and rescue people. He believed at Whitehaven, if there had been permanent stoppings—they were blown out—they could have reversed the air and would have saved about 60 to 63 lives. Those were the arguments that, he thought, if memory served him right, were brought before the Grand Committee, and convinced Parliament that this was the right method of procedure. Nine-tenths of the explosions commenced at the face and the stoppings were blown out. Furthermore, they did not require that these in-by stoppings should be of that character, only the stoppings between the main intake and the main return, so that he thought, with all deference, Mr. Blackett's argument went to the ground. They made no rule with regard to air-crossings or as to the doors, which would still be blown out, as at Hulton.

Mr. BLACKETT said it seemed to him Mr. Redmayne had argued in favour of a colliery which destroyed all its men but one. He could not see how there was any illustration of lives being saved in the case of Hulton. Before allowing the men to have a chance to come out, he placed first the importance of the recovery of the mine. He (Mr. Blackett) was not thinking of the recovery of the mine, but of the men having a chance. He ventured to say that if an explosion took place at the face of any colliery, and it was as big as Hulton, no man would have a chance under those circumstances of getting out alive at all, owing to the generation of these foul gases; but where explosions did take place other than at the face (and it was not true to say that the majority of explosions had taken place at the face, because neither Seaham, Tudhoe, West Stanley nor Wingate took place at the face), then the men under these circumstances had a chance to get out alive. The Home Office report on the Wingate explosion said: "The persons rescued from the Five-quarter and Low Main seams were all engaged in their ordinary work near the faces when the explosion occurred, and, like their fellow-workmen from the faces who lost their lives, were fully clothed and had their lighted lamps with them." That would always be the case, even in such pits as Hulton. It could not take place in more than one face if there was another a long way off: "The reason of their escape was that they had been later in coming out, and the afterdamp was sufficiently diluted, or swept away, through the damaged stoppings and air-crossings into the return airways to allow of their passing through the dangerous zone." Then the report went on to say: "Had all the persons working at the faces in the Low Main seam remained there, it is not improbable that they would all have been rescued." They did not all remain there, but came out and met the gas. Mr. Blackett added that his school had never had any opportunity of putting their views before the Grand Committee.

Mr. POPE said they had a report of the evidence before the Grand Committee, and the only amendment he could see was one made by Col. Hickman that the stoppings should be made as far as practicable. That was moved on behalf of the Mining Association of Great Britain.

The REFEREE read further extracts from the minutes. From these it appeared that Sir Arthur Markham asked for an explanation of the clause and as to why it had been brought in. Mr. Masterman said he thought largely the authority for it was the experience of explosions, especially in Whitehaven and Hulton. He added that it was only to provide for stoppings, and general regulations were to be made under the Act providing for it, against which there was an appeal. Sir Arthur Markham said he had been through the report of the Commission, and there was no recommendation, although a great amount of evidence was heard. Any of the engineers of great eminence, he said, held

the view that when they were dealing with this clause they should not put in an Act of Parliament what might constitute danger. Mr. Masterman then agreed before the report stage to consult experts with regard to the matter.

Mr. REDMAYNE said a conference was held of the divisional and district inspectors, which Mr. Masterman attended, and they satisfied him of the necessity for this regulation. The coalowners were not consulted. They could have raised the question.

Mr. BLACKETT said the truth was that there was no mining engineer in active practice, who made his livelihood out of mining in this way, who ever had an opportunity of putting his views before Parliament or the Grand Committee, because there was no such person in Parliament. On one occasion he could remember that after they had tried to get into the head of a member of Parliament what they wanted him to say he actually moved the amendment they wanted on another clause.

Mr. WILLIAM BRACE said that after this conference with the mines inspectors, when it was left to the Grand Committee, it was understood that on the report stage a further opportunity would be given for either the coalowners or the miners or anybody else who might feel they ought to have an amendment, to table amendments; but the coalowners allowed the report stage to go through without attempting to alter this clause in any particular, because they put in no amendment on the report stage.

Sir THOMAS RATCLIFFE-ELLIS next called Mr. WALLWORK, who carried out explorations after the Hulton explosion. He said the air-crossing near the bottom of the shaft was blown away, and the result and the destruction of the stopping described by Mr. Blackett and agreed to by Mr. Redmayne was that, in his opinion—it prevented the afterdamp going down the shaft where there were some 200 or 300 men working, and only one man was lost by the afterdamp. The rest of the men in that mine were saved owing to the air-crossing giving way. Some of the stoppings gave way and some of them did not. The force of the Hulton explosion did not go down the Arley mine at all; but the afterdamp went down from the Plodder mine, which was a mine some 160 yards above the Arley mine; it went down the shaft, and the effects of it were felt by the men in the Arley mine and some died, but the remainder were brought up in safety. If the stoppings and air-crossings had not given way, in his opinion, the whole of those men would have been dead. The force of the explosion expended its force in crossing the airways, and to some extent the crossings. At Maypole, if they could have broken down the air-crossing that they tried to get to, they would have saved the lives of 15 men in one district. It was found that these men were on their way to the shaft, and because the crossing held the afterdamp it overcame them.

Mr. REDMAYNE asked whether at Hulton the reason the force of the explosion did not go down the shaft was that there was no coaldust, and that the force of the explosion was due to the fact that the screens were so far from the top of the shaft as to prevent the coaldust going down the shaft.

Mr. WALLWORK said they thought there was coaldust going down the shaft. The fact of working at the mouthing caused the coal to be disturbed and it caused coaldust to float about.

Mr. GRIFFITHS said that during the last 40 years in South Wales he thought he had explored after 17 explosions. He was opposed to a fast stopping. At Park Slip a stopping was put up, but was blown out by the force of the explosion. A man named William Davis brought a number of men—his working face was on the return side—and in consequence of the short-circuiting of the air he reached this crossing and saved a number of lives. In their system in South Wales they had in long work no crossings at all. They had cross roads between the intakes and the return, and on these cross roads they placed double doors. The object of these cross roads was to enable the horses to take the tramways into the return airway. They had to keep that return airway in proper repair, which could not be done unless they took the tramways through from the intake into the return airway. Witness also referred to the explosion at Dinas Main, at the Gilfach Goch Colliery, in the No. 3 Rhondda seam. That was a small colliery, but, nevertheless, it was an instance of where a stopping was blown out by the force of the explosion. He believed he was right when he stated that on the inside of this stopping there were 26 men, but they managed to come out alive, and the reason why they came out alive was that the force of the explosion blowing this stopping away diverted the afterdamp into the return airway. There was a stable with a number of horses on the inside of this stopping, and the officials of that colliery closed up this stopping, and after they had closed it up all those horses died as the result of the afterdamp. That was after the 26 men came out alive.

Mr. REDMAYNE said that instead of having stoppings they might have doors. Of course, if they had nothing but doors all the way in an ordinary mine, the leakage would be so great as to render it impossible to comply with the requirement of the Act as to ventilation, but certain doors were necessary. It was not proposed that those doors should be replaced by permanent walls. It was open to any mineowner to put doors instead of stoppings so long as he complied with the requirements of the Act with regard to ventilation. If they did put doors instead of stoppings throughout their mine they would not get the air on to the face.

Mr. GRIFFITHS said they had five or six sets of doors from the shaft to the working place. The cross-cuts had been stopped up—gobbed up in the ordinary course of working. After an explosion the air would be short-circuited through these short cuts where the doors were. As a rule when an explosion occurred these doors were

either blown in or blown out, but up to any one of those doors they would be able to reverse their ventilation.

Mr. WEEKS said his view was that stoppings and crossings were the most dangerous things that could be put into a mine. In 1854 he took part with other people in exploration after an explosion, and upon that occasion they saved 28 men through the fact that the crossings were blown out on both sides by the explosion. He knew of nothing in his experience that would be more dangerous to the workmen under his care than if this rule was made absolute.

Mr. TRYON said his case was that their coal was peculiarly liable to spontaneous combustion, and if any hard material such as was described by Mr. Blackett was put into it it created fissures, with the result that air was let in and fire was created.

Mr. HUGHES said in South Staffordshire the thickness of the seam precluded them from working the coal out through one of those shut pillars they had heard about, and made them drive their roads first of all to the boundary, and then to work the coal from the boundary back towards the pit bottom, the idea being to leave behind them the formation of a roof, because of the impossibility of packing such a thick seam of coal. In driving out those roads they had to make a considerable number of cross drifts between the main intake and return, and those drifts in their case had to be packed or fitted with stoppings. Now the coal itself differed from the great majority of coals, inasmuch as it was what was called a highly oxygenised coal. What happened if they put in a hard or a thick stopping was that the solid coal on each side of this stopping squeezed on to the stopping, and small breaks or fissures were created. In the first place they were filled with small powdered coal, which absorbed oxygen more rapidly than the large lumps; and in the second place they made the small fissures through which the air could escape from the one side to the other; in other words, the short-circuiting followed the path of least resistance. It had been customary to build stoppings which in themselves were efficient so far as preventing an escape of air was concerned, but they were not sufficient, or would not be sufficient if there was oxidation. In the first place they held that the length which it was proposed to put in would in itself be a source of danger by allowing the coal to squeeze on to it; in the second place, if there were any general signs of preliminary heating they could not get the stopping out; and in the third place, if they replaced them with a wall of masonry 14 or 18 inches thick, as was proposed, they would introduce one danger which they feared and which all statistics would show was more prevalent. He had been present whenever there had been an accident practically in every place in their coalfields, and he could quote innumerable instances where if these stoppings had been constructed of thick material and made explosion-proof they would have killed a great many more men than had been killed from that cause, because in many instances they had been able to take out these stoppings very rapidly when a fire had broken out, they had short-circuited the airways, and had been able to keep the products of combustion from going round into districts and in to the men who were not got out. They had instances where the pit had been carefully examined at four o'clock in the afternoon, and before the morning shift at six o'clock had gone to work the pit had been on fire and the mine had been lost.

Mr. HOLLAND, the manager of the Hamstead Colliery, said that if they put dirt stoppings at the back of brickwork and the crush came on to the brickwork it caused a fracture in the coal, and the dust collected in the cracks of the coal. If they had a dirt backing at the end of the brick wall the heat was confined at the back of that packing and they very soon get fire. They could not devise a stopping which would stand an explosion if an explosion occurred and which would not be productive of fires. The most serious fires within his experience had been at the back of strong brick archings, strong brick air-crossings, and stoppings or dams. There were isolated cases where it might be advisable to put in much longer stoppings than are required by the Act, but not of stone or dirt, and in any case strong masonry would not be employed. Moreover, he was strongly of the opinion that the nature and extent of the stoppings should be left to the judgment of the management, so that each case might be dealt with on its merits, and the experience of conditions and behaviour which were peculiar to a mine might be brought into use.

The REFEREE: There is the real point in my opinion. Points of that kind, which are very practical and very workable, should be left in each case to the management of the mine to decide—that is, if points of that kind under this hard-and-fast Act of Parliament and regulations ever arise. Good sense and good reason very often are excluded by reason of these provisions. However, I have nothing to do with that.

Evidence was thereafter called by Mr. TRYON from working miners in the district.

Mr. POPE next made reference to the position of the subsidiary authority for making laws with reference to repealing statutory enactments. He suggested that the general construction of the position had been that the subsidiary authority could not by their rules contradict or do anything repugnant to the enactment under which they were constituted, and under which the rules were made, in the absence of very explicit terms. After quoting authorities, he said on the general question as to whether section 86 and the words used in it "vary or amend" would, if it came up for discussion before a legal tribunal, be decided to imply that the power went so far as to override an express statutory enactment, there was great doubt. The effect seemed to be that if the Secretary of State drafted a regulation, the substance of which was to contradict the express provision of Parliament, he would run a great risk of being held to be *ultra vires* by the courts if it came before



them upon the general rules governing the interpretation of statutes and rules made by a subsidiary authority. He submitted that at any rate for this tribunal there was not power to make such recommendations as in effect would call upon the Secretary of State to do something which ultimately would be held to be *ultra vires*.

The REFEREE said the point that Sir Thomas Ratcliffe-Ellis took was that it was not a violation of the Act of Parliament, because he said the Act of Parliament contemplated the recommendation being made, the recommendation being of a character which suggested a varying and an amendment of the Act itself.

Mr. POPE admitted that, but said that power was very closely guarded by the provisions in the Schedule.

The REFEREE asked Sir Thomas if he suggested that he could make an objection for him (the Referee) to deal with that the whole Act ought to be repealed.

Sir THOMAS RATCLIFFE-ELLIS thought he could make that objection. If he could satisfy his lordship or a referee that, for the purposes mentioned in section 86—that was, as to safety and so on—it was necessary to amend or vary either the whole or any part of Part II., he could do it, and his lordship would be competent to make a recommendation to that effect. Whether the Home Secretary would adopt it or not was a matter for him. If he did not adopt it, the whole of these rules might drop. Mr. Pope's argument came to this—that, although the Home Secretary might amend or vary any part of Part II. of the Act, because he had not chosen to do so, he (Sir Thomas) could not make an objection in the same direction. His contention was that he was entitled to make any objection to anything which section 86 would entitle the Home Secretary to do, and he asked his lordship, having made that objection, to omit a section in the Act.

On Thursday, June 26, at the commencement of the proceedings, the REFEREE gave his decision on the points raised, and said he understood that the 4th clause of the Second Schedule meant this: The Referee was to hear the evidence and make his recommendation, and then if the Secretary of State made up his mind to make the order he must incorporate into it the recommendation of the Referee, but it was not incumbent upon the Secretary of State to make the order at all; he might drop it, in which case both the order, which was the work of the Secretary of State, and the recommendation, which was the work of the Referee, became abortive. In the particular case before him, an amendment was proposed by the Mining Association to alter the Coal Mines Act, 1911, by deleting subsection (3) of section 42, but if that provision should not be omitted from the Act, it was stated, there was a very strong opinion on the part of the mining engineers that the methods proposed in the regulation of carrying out the requirements of section 42 of the Act were not conducive to safety, and on that ground the amendment proposed the omission of the regulation. The next objection was this: "The method of construction of stoppings is a matter of great controversy, and it is not considered desirable that a hard and fast line should be drawn as is suggested in this paragraph. If paragraph 81 is to be omitted as suggested, it will be necessary to amend section 42 (3) Coal Mines Act, and to omit the whole of paragraph 81 (a), (b), and (c)." That objection was carried in by the colliery managers. Then there was a third objection: "It is proposed on the ground that the provisions of the Coal Mines Act are sufficient: (1) the entire omission of this clause 81 (a), (b), and (c); alternatively (2) delete the words from 'packing' in second line to end of subsection (a); or (3) delete 'side, top, and bottom, of which shall be let, where practicable, into the firm ground, and the face covered with a coat of mortar so as to prevent leakage of air.'" That objection was carried in by the South Staffordshire and East Worcestershire coalmasters. These objections, said his lordship, if they could be called objections at all, really amounted to a request to him to make a recommendation, which, if adopted by the Secretary of State, would have the effect of repealing subsection (2) of section 42. It was said by the mineowners that inasmuch as the Secretary of State had power under section 86, when making general regulations, to vary or amend any of the provisions of Part II. of the Act which related to safety, he, as Referee, had a similar power when recommending a variation under the second paragraph of section 4 of the Second Schedule, and they argued that the expression "vary or amend" was wide enough to include a complete repeal of so much of the statute as relates to safety. He was not going to decide that point, but he did decide this, namely, that even if he had the power to do such a thing he ought not to make a recommendation which might have the effect of nullifying the plain provisions of the statute. Addressing Sir Thomas Ratcliffe-Ellis, he intimated that he could deal with this objection in whatever way he liked, but he was not going to recommend the Secretary of State to delete it.

Sir THOMAS RATCLIFFE-ELLIS said he had nothing further to say after that. He could not ask his lordship to make any other recommendation with reference to that objection. He, however, had an objection to the regulation. He wished to call a witness to say that if a stopping had to be made fast this was not the way to do it. In doing so he pressed upon his lordship that some little discretion should be given to mining engineers, and that they should not be told from the Home Office everything they had to do. These gentlemen knew perfectly well how to make a stopping in a mine, and that they could do it quite as well as any adviser that the Home Office might be able to command. He was going to ask his lordship to omit that regulation from the code altogether as being unnecessary.

The REFEREE said he thought it was a proper thing to make regulations under subsection (3) of section 42 of the Act.

Sir THOMAS RATCLIFFE-ELLIS said they had not done that. They had made a regulation with reference to part of it, but not with reference to the whole of it. They had made a regulation as to stoppings, but not as to air-crossings. His objection to this regulation was that it should not be there at all. If his lordship recommended that it should be omitted it would not affect the rest of the regulations.

Mr. PHILLIPS, who was called, said the specification given in the regulation could not be adopted entirely. There were very many places where big stoppings could be put in with effect, but there were very many places where big stoppings would not be of service. As a rule no colliery manager would build a stopping through which one part of the ventilation could short circuit into the return without doing the service it was intended to do. The stopping which ought to be put in should be governed by the conditions existing. In the general conditions applicable to stoppings in the majority of mines—mines which were not subject to spontaneous combustion—a good thick dirt stopping would be certainly more explosion-proof, and it could be made sufficiently tight; in fact, it could be made bottletight against the entrance of air. Again, in some mines, where a brick wall would involve the cutting of the roof, it would undoubtedly set up a source of mischief, and it would be very detrimental to the interests of the men.

The REFEREE asked Mr. Redmayne who were his advisers in drawing up the regulation.

Mr. REDMAYNE said the whole staff of mining inspectors. The regulations were sent out in draft to the inspectors throughout the country after they had been drafted at the Home Office. Regulation 81 had been altered very considerably, but he doubted whether they had the original draft. The rules had been redrafted scores of times, and he had destroyed a great many of the drafts.

The REFEREE said he would be willing to order that the correspondence and documents in the possession of the Home Office should be at Sir Thomas Ratcliffe-Ellis' disposal for inspection, so that they might see what suggestions had been made by the different officials.

Mr. MALCOLM DELEVINGNE said the Home Office documents, of course, were confidential, and they would have to ask for authority to produce them.

The REFEREE said there ought to be no difficulty whatever in showing the documents upon which this rule had been passed. He himself would very much like to see the documents. Continuing, he said he was loth to make one specification apply to all mines unless he was satisfied that it was a reasonable thing to bring about the stoppings which were contemplated by the section of the Act.

Mr. REDMAYNE said all they were desirous of seeing was first, that the stoppings should be, as far as practicable, airtight, and, secondly, capable of resisting explosive force.

The REFEREE said he could not help feeling that if this was to be carried out in every mine it would place upon the mineowners a very great burden in expense, and it might be that when the money was expended it would not do what the Act required. He wanted to see these documents, and he thought Sir Thomas and Mr. Tryon ought both to see them, but he could not help thinking that if they would discuss the matter they would be able to come to some sort of arrangement which would probably be better than anything he (the Referee) could decide, because he had no knowledge about these matters, and if he were to sit there to learn the subject sufficiently well to be able to deal with it, he should probably be there a long time.

Mr. REDMAYNE suggested that if the owners chose three of their leading experts from the districts including South Staffordshire and they met three of the Home Office experts they might evolve something.

The REFEREE agreed, but said they must start on the assumption that they had to provide a regulation for the construction of stoppings which should be explosion-proof.

Sir THOMAS RATCLIFFE-ELLIS said they had to provide, according to this regulation, something which would resist an unknown force.

Mr. REDMAYNE said the stoppings laid down in the regulations were based on the result of stoppings that had withstood explosions and that had been built more or less on these lines. The stoppings at Hulton Colliery which withstood the explosion were built somewhat on these lines.

The REFEREE said at present his doubt about it was this: It appeared to put upon the mineowners a considerable burden, and he had not the means of satisfying himself whether the requirements were too stringent or not.

Mr. SMILLIE suggested that there ought to be a representative of the miners also at the conference.

The REFEREE thought if there were two representatives from the mineowners and two from the men it might do.

Sir THOMAS RATCLIFFE-ELLIS said he would like to see the document first before they had a meeting, because it might be unnecessary to meet.

#### Rule 82

Sir THOMAS RATCLIFFE-ELLIS said the same point arose on Rule 82 as to signals, but not quite to the same extent. The provision in the Act of Parliament which they asked to have altered was that there should be a uniform code of signalling. It was section 53 of the Act. This question as to the uniformity of the code was raised, he thought, first by some evidence given before the Royal Commission, and it was put forward on the ground that with an enginewinder going from one

place to another it might be a source of danger if he had had other signalling to work by than that to which he had been accustomed to work by before. The enginewinders themselves strongly pressed upon the Home Office that that was a necessary condition, and the result of that was that the Royal Commission referred this question of signalling to the committee of three, and they made a report, that it might be desirable in the case of winding enginemen that there should be, if possible, some uniform code of signalling, and that brought it into the Act of Parliament. The owners had always felt that it was very dangerous indeed to make this change, but the winders at that time asked for it. However, there was a change, and the actual winders, who were represented by those gentlemen who made these representations to the Royal Commission and to the Home Office, stated that they could not undertake the responsibility of making a change of this kind in the signalling. A meeting took place between the representatives of the Miners' Association and the winders, and at that meeting Mr. Charlton and Mr. Parker, who represented practically all the winders between them, both agreed that it was very desirable, if they could manage it in the interests of safety, that they should get this provision as to the uniformity of signals struck out.

Mr. CHARLTON said the matter had become a very serious question. They had appealed to the men in the Forest of Dean, Bristol, and South Yorkshire as to what their mind was on the question of signals, and they had very emphatically told them that they were with them in all that they could do to avoid risks.

Sir THOMAS RATCLIFFE-ELLIS said the only thing put forward in support of this system was that a man coming from one district to another would find the same system of signalling to work by. He wished to show his lordship how danger like that was guarded against. In South Wales, when a man was at one colliery he stopped there, but if he went to another pit where there was another code, everything was changed; and not merely the signals and the engines, but the whole of the surroundings were changed, and, in order to prevent any accident happening, precautions were taken by his having a man with him who was accustomed to the engine, the signals, and the surroundings, and he stayed there until the man had got accustomed to the new engines the new signals, and the surroundings. What would happen if this code were established would be this—that without any precautions every engineman would be working to an entirely different code of signalling. They dared not face that responsibility—regulation or no regulation—and dared not undertake that. There was nothing in the Act to say that even if there was a uniform code, it should be anything approaching what was put forward in these regulations. What section 53 (1) of the Act said was: "The general code of signals in mines shall be such uniform code as may be prescribed by general regulations," and it was surely in his lordship's power, if he thought two signals would be sufficient, to provide that that should be the uniform code. In the report of the committee appointed by the Royal Commission of Mines there was a suggested code. Sir Thomas next pointed out the disadvantage they were under when they were before the Committee in the House of Commons. They could not expect to find experts on those committees, and they never had an opportunity of having them before a tribunal that could consider it. It was impossible to get members of Parliament, who were engaged in a great variety of matters, to understand the technicalities of a mine, and he did not know any tribunal which was less qualified to settle the details of an Act like this than a Committee. Another disadvantage was this. A Bill like this was under the direction of the Home Secretary, and there was a sort of feeling that anything the Home Office thought must be in the direction of safety. There was also a further feeling in Committees, on the part of men who knew nothing about it and took very little interest in it, that the Home Office was advised by the very best advisers that could be got.

Mr. CHARLTON, representing the enginemen, said they were largely responsible for this provision. As officials of the Colliery Enginemen's Association they assented to uniform signals as an abstract proposal. The objections were never considered by the Royal Commission or by the House of Commons, and were not considered by the Enginemen's Association until the draft came into the hands of their men, and then there was revolt, fear, and dread. Their pronouncement on the question of a uniform code was, that the embarrassment which might be experienced in changing from pit to pit was not to be compared with the risk and danger which they believed would result from the change to uniform signals to the lives of their kith and kin who were lowered into and raised from the mines, it being estimated that on each working day the engine winders represented by them wound down and up the shafts something like half a million persons, and they dared not take the risk which they were satisfied they would be exposed to if the uniform code was established. Where a change was made and a winding engineman went to a new pit his whole environment was changed—the engine room, the engine, the seat on which he sat, the faces and forms of the bauksmen were new and strange, and possibly the signal code was new and strange. All this strangeness begat a special alertness, a straining tension till the winder had mastered the whole of the changed conditions. When this was done he had mastered the signals as well, and until this was done a practised winder was attending all the movements of the new man, advising compliance with signals, and aiding him by all means possible properly to discharge his duties. To order after a prescribed date that all signals which had been used for all the past at hundred of mines in the kingdom should not be used, and a code entirely different established, was bound in the very



the change to bring serious results. Men who for 20 years had served their particular code at busy pits were still doing the same work in the same way with the same engine, without any practised hand prompting them. In the General Regulation Code 4 signals required the cages to be raised steadily. The old code was "Cages clear." As Sir Thomas had pointed out, the period when those signals were most likely to be used was after a night shift was ended. In the event of the signal (4) being responded to in accordance with the old code instead of the new, the cages would not be raised steadily but violently, and serious consequences might result. In the Home Office code they had made the 1 signal for "Draw away men." At 121 collieries in Durham the signal (1) was to draw away coals. Regulation 55 made the enginemen entirely responsible for the proper compliance with all signals given. That responsibility they accepted, but they did crave that they should not be placed in such perils, and that the lives of their fellows should not be exposed to such dangers as they believed would follow the establishment of a uniform code of signals. Mr. Charlton added that their people and the Enginemen's Society of Scotland appealed to the Home Office to move that a provision be put into the general regulations that all signals might be registered until complied with—that after the sound hammer had gone the indicator would show the signal which had been given. But the Home Office said that if the owners would agree to such a provision they would have no objection, and it might be submitted here for his lordship's consideration. The Federation then appealed to the owners, and asked them if they had any objection to this question of an indicative signal being considered before him. They said no. After the sound of a signal hammer had died away, much of the perplexity of the persons changing from one pit to another would be removed. There were many devices which did this—devices well known to the employers. If section 82 (a), (b) and (c) were deleted, and the words "That there shall be provided in connection with winding in shafts a device for the registering of signals given until complied with" were inserted, a better provision for safety would be made than the enforcement of a uniform code.

Mr. WEATHERLEY drew attention to the frequency of these signals. At the colliery at which he was employed they had drawn over 1,000 tons in eight hours. That meant that they had over 500 runs in those eight hours, which meant more than one a minute. They had three or four signals every minute. The onsetters at the bottom had also to be acquainted with them.

Sir THOMAS RATCLIFFE-ELLIS said there was a way by which they might get out of this difficulty if the Home Office appreciated the danger, and that was section 53 of the Act: "The general code of signals in mines shall be such uniform code as may be prescribed by general regulations under this Act." If the Home Office did not exercise their right to prescribe, things remained as they were.

The REFEREE said he thought it was the duty of the Home Office to set out a code so that that section of the Act might become operative.

Mr. POPE suggested that the possible risk attending the change could be met in two ways—one was by means of an indicator and the other was the installation of automatic safeguards against overwinding. They contemplated that there might be some delay in complying with that provision, and they were quite prepared to postpone the coming into operation of this universal signalling code until, say, January 1 of next year, and that would give ample opportunities for all pits to be installed with this apparatus, which was made compulsory.

Sir THOMAS RATCLIFFE-ELLIS said this apparatus only registered the number; it did not register what the number meant, and that was the objection to it.

The REFEREE said he did not understand why the men required this uniform code.

Mr. SMILLIE said they had been agitating for it in the interests of safety for nearly a century. He further affirmed that the majority of the engine winders wanted it. All Mr. Charlton had really dealt with was the winding of men up and down the shaft. That was a control of six signals only, and some of those were almost universal. The "3" to indicate to the engine-winder was fairly universal. Not only did it apply to Scotland, but it applied to Derbyshire and Nottinghamshire, and all round there. The engine-winders had been as anxious to get an automatic contrivance to prevent overwinding as the miners had. He could take them to a colliery where the engine-winder would turn his engine full speed and walk away.

Mr. SHIRKIE, who represented the Scottish engine-winders, said it was not the stopping, but the lifting away, and the overwinding gear did nothing to prevent that.

Sir THOMAS RATCLIFFE-ELLIS said through overwinding accidents during the 10 years from 1898 to 1907 19 lives were lost. There were millions of journeys up and down the shaft in those 10 years.

Mr. REDMAYNE said the only thing he wished to say that would be of any use was as to the manner in which these regulations were drawn up. They took it that they had to draw up a universal code. It was the opinion of the Committee, it was the opinion of the Royal Commission, and it was the opinion of Parliament, and so they proceeded to draw up a code. The *modus operandi* was this. They took all the existing codes and tried to strike the line of least resistance, and this was the outcome. The objection was sent in at the end of March. But they received a request from the organisation represented by Mr. Harper Parker to receive a delegation and go through the code with them.

They came, and they sat for many hours—two meetings, and went through the code line by line, and letter by letter, and they made suggestions, the effect of which was to

make it still more in accordance with the practice as their body knew it. They stated that the code would practically have no adverse effect on the whole of the collieries which their organisation represented, and they supported it very strongly.

Mr. BLACKETT said he had looked through the statistics for 1911. Mr. Redmayne was dealing with 881,000 persons who had been run up and down the shafts—run up and down probably 250 times twice a day during the year. In the whole of that time, with all those millions—some 400 or 500 millions of chances of accident to happen—an inconceivable number to anyone, he could not find, nor hear anywhere in Mr. Redmayne's reports, of one single accident in that year occurring from a man being changed from one colliery to another. He also drew attention to one more difficulty that had not been referred to. There were two methods of signalling—one was electrical and the other was by hammer. These rules had been made so that they could have electrical signals as well as mechanical signals. The mechanical signals were the only ones they could really rely upon for safety. The report of the sub-committee, which had been already referred to, stated "electrical signalling arrangements are not always to be relied upon owing to their sometimes becoming defective." When a shaftman was working in a cage at a critical point on a repair in the shaft he sometimes wanted that cage to be moved a matter of inches, and it might be that it was a case of great risk to him personally if it was not moved inches. For that purpose they used their mechanical rapper, and the cage was held up on the instant; the instant the man let it go the cage was stopped. It was only with a mechanical rapper that they could get an instantaneous signal. They had cut that out of the regulations altogether, and if this code was accepted they would either be driven to the rapid method of electrical signalling which the report said was not reliable, or would have to take more time to transmit the signal.

Mr. POPE said this was already covered by Regulation 83: "The manager shall, in the case of a mine where there are entrances into the workings from the shaft at different levels, prescribe the signals to be used to indicate the level to which the cage is to be sent, and in respect of movements of the cage between one level and another level, and shall fix any other signals that may be required."

Mr. DICKINSON, on behalf of the Managers' Association, said they were unanimous in the fear of the increased danger from this universal code for signalling. It had been said that the danger anticipated would be only in the transition stage, but the transition stage might last for months. Force of habit could not be mastered in a few days or in a few weeks. It had also been pointed out that the risk of danger appeared to be mainly men riding in the cages. They considered that there was very great danger at all other times. The men riding in the cages was only for a couple of hours during the whole 24 hours, but the other operations during which grave danger would arise were continuous. He also referred to Rule 86 applicable to hauling. With regard to Regulation 89, if a tub was off the road at witness's colliery, before it could be put on the road according to the code, they would have a total of 15 signals to the man who controlled the road. According to Rule 89: "All signals must be acknowledged by the persons receiving them (other than the hauling engineman) by their returning the same signal." In witness's endless rope arrangement, with eight stations on each rope, every signal bell that was rung to the engineman rang automatically at every station, so that eight people would receive 15 signals. Therefore 120 signals would be rung every time a tub was off one road; and if two were off together, which was not infrequent, the engineman would receive 240 signals.

Mr. REDMAYNE said to signal to every point was purely voluntary and extra. All their code required was that the man at the end, when the tubs were ready, should signal to the hauling engineman 6 and 2.

Mr. DICKINSON said it would be far better if it were left to the managers. There was no necessity for a universal code in hauling. The conditions were not merely different in every pit, but they were very different in the same pit. He had roads in his own pit that had not got the same signalling method.

Mr. HALL, of the Ashington Colliery, said they invariably arranged their electric signals so that each station on the system received every signal given by any other signal, and he considered that that was by far the best way, because it notified everyone concerned exactly what was going on. Witness did not see the object of giving these intermediate signals unless they were returned, but he did not think it necessary to give intermediate signals. But they wanted these signals given in various parts of the system so that not only the haulage men but others concerned would know where the accident was.

Mr. MITTON, who was the next witness, presented a petition from the winding enginemen employed in the Butterley Colliery. He said he sent these clauses to his managers, and told them to hand them to the winders. He had received back from 53 winders this petition, together with a short note signed by them protesting against any interference with their signals, and asking, if the present signals were to be altered, that they should not be held liable for the result. He thought if the onsetters and banksmen were approached they would be found very strongly to protest against any interference.

Mr. CHARLTON said return signals could never be given with coal winding. Often before a signal was complete an enginewinder had travelled, perhaps, 2 or 3 yards in the shaft before the signalling was finished, and before the hammer rose, and before the I got down. They could not get the vast amount of coals up to the surface if they had to wait to see every signal completed. Immediately a move was made in the direction of being ready the engine was ready.

Sir THOMAS RATCLIFFE-ELLIS here suggested a course that, he said, would probably shorten the enquiry. If the Act of Parliament was not to be altered a code of some sort must be agreed, and he thought it would be better if the two gentlemen who were to meet the Home Office representatives and Mr. Smillie upon the question of the stoppages could also discuss the question of the code, and see if they could not come to an understanding as to establishing a code.

The REFEREE said he thought there must be a general code. The Act said so, and he was not going to alter the Act. If they had any objections that were of any real substance, he thought it would be an advantage that they should put them before the Home Office, who, he believed, would listen to the objections, and with their technical knowledge would devise some means, if they thought the objections were serious, of removing the objections. He thought that the mineowners got bested in the House of Commons. In a great many matters his sympathies were with the mineowners, but unfortunately there was the Act of Parliament, and he could not get over that.

The REFEREE asked Mr. Redmayne whether he had discussed with the inspectors the possibility of danger during the period of transition.

Mr. REDMAYNE said they had discussed it, and he did not know that they expressed any decided opinion one way or the other. Personally, he must acknowledge that there was an element of danger, but it was a balance of dangers, and the danger was purely a transitory one. With the knowledge one had of the winding enginemen, seeing that they were a most carefully-selected class of men, and were among the most level-headed and sober-headed men in the country, he thought it would be doing them a great injustice.

#### Rule 91.

Rule 91 reads: "Where in any mine not being a small mine the distance, as measured by the shortest route along the roadways, of any part of the workings from the nearest shaft or outlet by which persons enter or leave the mine exceeds 1,000 yards, efficient means of telephonic communication shall be provided and maintained between the point at which the tubs coming outbye from that part of the workings are finally made up into sets or trains, or are attached to the rope of an endless rope system, and the shaft or outlet, and the surface of the mine. This regulation shall not apply to mines of stratified ironstone in the Cleveland district." There was an objection in line 1 to leave out from "distance" to end of line 9, and insert "of the main haulage from the shaft exceeds 1,500 yards, efficient means of telephonic communication shall be provided and maintained between the end of the main haulage and the pit bottom."

Mr. POPE said the effect was that where there was a distance of 1,000 yards from the pit bottom to the workings there should be a telephonic installation. The owners said that there should be no telephones used at all until the main haulage from the shaft exceeded 1,500 yards. The effect of that would be to strike out the whole of the regulation in nearly all the pits of the country. Out of 436 mines in Scotland, if the owners' suggestion was accepted, 32 only would have telephone installations under the regulations such as the owners suggested.

Mr. WILLIAMS said they thought the distance to the end of the main haulage, which was the point where the telephone had to be put, should be the criterion and not the distance of the face. It was only a question whether 1,500 yards was too far away. As far as the distance was concerned, he thought they could accept 1,000 yards, provided it was made the length of the haulage.

The REFEREE thought this suggestion of the Mining Association made the rule very much simpler, and he would allow it. It was agreed that the telephone should go to the surface.

#### Rule 102

Rule 102 is: "Each hygrometer placed below ground in pursuance of the Act shall be read by the manager or under-manager once every weekday if in the main intake airway, and once every week if in the main return airway. This regulation shall apply only to mines in which coal is worked." The objection was to leave out from "read" to the end of the sentence, and insert "once every week by a responsible official."

Mr. BLACKETT said this instrument had absolutely no day-by-day or week-by-week importance at all. Its only purpose was to ascertain what amount of moisture there might be in the air. It was an absolutely purposeless thing to pile this duty upon the wretched manager or under-manager to duly observe an instrument like a hygrometer when there was no daily purpose for it.

The REFEREE said that he would leave in "every day if in the main intake airway, and once every week if in the main return airway," but put the duty upon any official of the mine.

#### Rule 103.

Rule 103 reads: "A sufficient supply of suitable sanitary conveniences shall be provided on the surface in or adjacent to the winding engine-house, and at other suitable places convenient for the persons employed where females are employed on the surface, separate conveniences shall be provided for their use."

Sir THOMAS RATCLIFFE-ELLIS said the first amendment was as to the provision "in or adjacent to the winding engine-house and at other suitable places"—they suggested it should be "at places suitable for persons employed."

The REFEREE said he did not know what "adjacent" meant, but the rule had better stand. The next amendment was in (b) ("below ground, at or near the pit bottom, and at or near junctions and inbye terminations of main haulage roads. This provision shall not apply to a shaft in the course of being sunk"). The objection was to take out from "bottom" to the end of the sentence.



Mr. DICKINSON, who was called by Sir THOMAS RATCLIFFE-ELLIS, said over 500 men were employed at his pit on one shift. If he had to comply with this, and have these conveniences at or near junctions and inbye terminations of main haulage roads, he would require 79. In answer to a question by the REFEREE, witness said he had never known the men to use one of these conveniences that he had had provided on the surface for months on end. They were used occasionally underground at meetings and haulage places where the men could not go away for a long time, and at the pit bottom, but the great bulk of workmen working at the stall faces did not require them, and did not use them. They used a shovel with some dust on it.

Mr. SMILLIE said they had had evidence before the Royal Commission on it, and especially in mines worked under the pillar-and-stall system, sometimes for a considerable distance the roads were absolutely filthy.

Mr. POPE said this was a recommendation of the Royal Commission supported by evidence.

The REFEREE said his own notion was that if they put the thing there it would never be used.

Mr. POPE said the regulation required it to be used.

Mr. DICKINSON said there was another point in regard to this, that it was introducing a very considerable danger. These appliances would have to travel out on the roads to come to the pit top to be emptied and cleansed. It would take many hours for them to travel, and they would be filling the whole atmosphere of the mine during that time.

Mr. LANDLESS said what had been referred to by Mr. Smillie was a condition of affairs with which he was unacquainted, although he had been acquainted with pillar-and-stall work all his life. He was in the same position as Mr. Dickinson—they would have no end of these junctions, and they would have about the same proportion of these conveniences to provide as Mr. Dickinson had.

Mr. POPE subsequently read passages from the Report of the Royal Commission on Mines in regard to ankylostomiasis and outbreaks of enteric as affecting this question. He added that there had not been any suggestion that these conveniences should be supplied at any subsidiary parts of the main haulage, but at the suitable places along the main haulage roads.

Mr. GRIFFITHS said the practice in South Wales in the steam coal collieries was that at the pit bottom they had a place on each side of the pit, and they covered it over with coaldust. Then after the winding of coal they cleaned the pit bottom. At the bottom of the pit the extreme number would be a dozen. If they had to have it at or near junctions and inbye terminations of main haulage roads they would have to have conveniences on every branch road. It might be six, 10 or 20, depending upon the conditions. These branches were anything from 150 to 200 yards apart.

Eventually the REFEREE made the rule read: "Below ground at or near the pit bottom, and at suitable positions along the main roads, and the inspector must see whether they are suitable distances."

#### Rule 117.

When the enquiry was resumed on the 27th ult., Rule 117 was under consideration. At the suggestion of the Home Office, it was decided that the regulation should be added to Part I. instead of Part III.

The Miners' Federation sought that it should be obligatory to post on the top of a pit a sketch plan of the main roads, the escape roads and the telephone stations.

Mr. EVAN WILLIAMS said there was a strong objection to putting a plan in the colliery, because it might disclose secrets.

The REFEREE, however, allowed the addition.

#### Rules 59 and 60.

Sir THOMAS RATCLIFFE-ELLIS read the clause that had been agreed in substitution for Rules 59 and 60 as follows: "The person in charge of any ventilating machinery driven by mechanical power should keep the machinery running at the speed ordered by the manager or under-manager, and should examine the machinery and observe the indicators at intervals which, in the case of mines in which safety lamps are required by the Act or the regulations of the mines to be used, should be of not more than half-an-hour, or such longer time as may be approved by the inspector of the division, and in the case of other mines should be of not more than two hours."

#### Rule 73

Sir THOMAS RATCLIFFE-ELLIS read the following agreed wording for Rule 73: "No mode or type of capping shall be used which fails to withstand a strain (a) in the case of a winding rope of at least seven times the weight of the maximum load carried at any time by the capel; (b) in the case of a hauling rope of at least 60 per cent. of the breaking strain of the rope." He said they had found when they came to discuss it that, in the haulage, it was difficult to fix the load on the rope.

#### Rule 75.

Sir THOMAS RATCLIFFE-ELLIS said, in regard to the beginning of that clause, they had an amendment which they withdrew. In Rule 76 the last words would go in now, "This regulation shall not apply to hauling ropes if mineral only is hauled or if the gradient is less than 45 degrees," and after the word "back" they would insert the words "or the rope lapped with soft wire."

#### Rule 77.

In Rule 77, "500 degrees" was agreed to be altered to "750 degrees."

#### Rule 80.

It was agreed to add at the end: "In the case of an inclined shaft or level entrance not driven in the coal-

seam, the distance should be the distance between the point where the shaft or entrance strikes the seam and the edge of the pillar left to support the shaft or entrance. In the case of an inclined shaft or level entrance driven in the coalseam, the distance should be 200 yards from the mouth of the shaft or entrance.

#### Rule 81.

Sir THOMAS RATCLIFFE-ELLIS said with regard to Rule 81 the parties had agreed this: "All stoppings between main intake and main return airways shall either (a) be constructed of tight stone, dirt, sand, or rubbish packing at least 5 yards thick; or (b) be constructed of tight stone, dirt, sand, or rubbish packing at least 3 yards thick, and have the end of the packing nearest to the intake airway faced with a wall of masonry, brickwork or concrete, not less than 9 in. thick, the face of which should be covered with a coating of mortar so as to prevent leakage of air. The space between the face of the stopping and the roadway should be kept clear. (c) This regulation shall apply only to mines in which coal is worked, and shall not apply to any mine in South Staffordshire which is liable to spontaneous combustion in the unworked coal."

#### Rule 139.

The Rescue and Ambulance Regulations in Part IV. were next proceeded with. In 139 (b), which provides that tracings of the workings shall be kept at every mine, there was an agreed amendment adding "telephone stations" to the particulars recorded thereon.

#### Rule 144.

This rule reads: "In every mine there should be provided and kept in good condition and ready for immediate use at a convenient spot in the district of each fireman, examiner, or deputy, and also in the office at the mine or other convenient place on the surface: (a) A suitably constructed stretcher; (b) a box containing a sufficient supply of suitable splints and bandages, adhesive plaster, caron oil, cotton wool, and carbolic acid solution (I in 40), or other suitable antiseptic solution. The foregoing requirements should not apply to any district the whole of which is naturally so wet as to make it impossible to keep the appliances aforesaid in good condition. The manager shall personally inspect the appliances so provided, at least once in every month, and satisfy himself that they are in conformity with the above requirements." There was an objection by the Mining Association and the colliery managers to take out from "use" to end of sub-paragraph (b) and insert "at convenient spots, both underground and on the surface, stretchers and boxes containing a sufficient supply of suitable first-aid material, which shall include antiseptic dressings."

Sir THOMAS RATCLIFFE-ELLIS said the owners held, first, that it was not necessary to put it in each fireman's district, and that the other amendment would bring the rule more up to date. Mr. Smillie thought that that would be better than a box containing the detailed description of materials given in the Home Office rule, but he did not agree that it should not be kept in each fireman's district.

Mr. POPE said the Home Office wanted to avoid wrangling in matters of this kind between the miners and the owners and between the owners and the inspectors, and therefore desired a rule which specifically referred to what the box ought to contain and where it should be kept. He also suggested the words "adjoining districts may, for the purposes of this regulation, be treated as one district if the total number of persons employed in that district at any one time does not exceed 50 persons." As to the contents of the box, they had had advice from the St. John Ambulance Association, and suggested that they should put boric vaseline instead of caron oil and tincture of iodine instead of carbolic acid solution.

Sir THOMAS RATCLIFFE-ELLIS said they thought the number should be 100.

The REFEREE said 50 did not appear to him to be unreasonable.

Sir THOMAS RATCLIFFE-ELLIS said as to the next paragraph they suggested: "The foregoing requirements shall not apply to any mine, seam or district, the conditions of which are so damp as to make it impossible to keep the appliances aforesaid in good condition," and the miners sought to add at the end of the rule: "In case of dispute between the manager and workmen as to the possibility of keeping ambulance appliances in good condition, the matter shall be referred to the principal inspector of the district, who shall have power to decide."

These were agreed to.

#### Rule 145.

Sir THOMAS RATCLIFFE-ELLIS next referred to Rule 145, which reads: "In every mine, not being a small mine, the manager shall arrange that there shall be at least one man trained in first aid and holding a certificate of the St. John Ambulance Association, the St. Andrew Association, or other society or body approved by the Secretary of State, in the district of each fireman, examiner, or deputy at any time when 20 persons or more are being employed in the district. If less than 20 persons are employed in each district the manager shall arrange that there shall be below ground during each shift at least one man so trained and having the certificate as aforesaid. This regulation shall not come into force until April 1, 1914." He said in some districts they could get men trained and the doctors now were raising difficulties about training them.

Mr. PHILLIPS said he had been connected with ambulance work for 30 years, and had the greatest possible difficulty in getting the men to come to the lectures. The owners paid all their expenses, and they had an institute in connection with the colliery, but they had the greatest possible difficulty in getting the men to stick to it.

Mr. SMILLIE said the Miners' Federation would undertake to advise the men to nominate the fireman as the person who should train them.

The REFEREE: If they do not, then the masters should be told that they are violating this rule.

Mr. McMURTRIE said in connection with his collieries they held classes and found that the attendance was very small and very irregular. Later two collieries combined, and again they found the same difficulty. They approached the workmen's representatives, but they could do no better. The overmen would attend, but the examiners or deputies would not attend.

Mr. LANDLESS also said they had had a lot of difficulty. They offered them some inducement, and had smoking concerts and that sort of thing and paid all expenses.

Mr. SMILLIE said he was amazed. He had never known any difficulty at all.

Mr. LANDLESS said perhaps this might apply more on the edge of fairly large towns where entertainments were alluring.

Mr. FORGIE said they started an ambulance class and at first especially had a large class; but after the first two or three lectures they gradually failed to attend, and not more than five, six or seven attended the class. At the present time there was a great difficulty with doctors. The Insurance scheme had put so much work on them that it had changed the whole position of the doctors with regard to working men, whereas before doctors used to give their services freely. The working classes got doctors under the Insurance Act and they sent for the doctor much more readily than they did before. Then, of course, they had all these forms to fill up, which occupied a great deal of time, and they really had not the same time to spare that they had before.

Mr. SMILLIE said if this clause was passed they would issue to their members a notice that in their interest the Home Office and the employers had put in a regulation providing for a man holding an ambulance certificate in each district and urging them to insist upon their attending the classes.

The REFEREE said: Supposing the masters provided the class, and nobody came, this rule was so worded that the masters would be guilty of some sort of offence. He suggested "in every mine, not being a small mine, the manager shall if possible arrange" (if it is not possible the obligation should not be put upon him, but if it is possible it ought to be put upon him) "that there should be at least one man trained." Also "if less than 20 persons are employed in each district, the manager shall, if possible, arrange that there should be below ground during each shift at least one man so trained and having the certificate as aforesaid. This regulation shall not come into force until 1st April, 1914."

#### Rule 146.

In this rule, which provides for the maintenance of a suitably-constructed ambulance carriage, the Miners' Federation objected to paragraph (a). This was an exception: "(a) To any mine the distance from which to the nearest available hospital does not exceed 1 mile."

Mr. REDMAYNE and Sir THOMAS RATCLIFFE-ELLIS agreed to the deletion.

Sir THOMAS RATCLIFFE-ELLIS said the owners had an amendment in (b) to leave out "100" and insert "200."

The REFEREE said he was not disposed to make the alteration.

#### Rule 171.

Rule 171 reads: "No engine worked by mechanical power other than a fixed engine shall be used for lowering and raising persons and material in the shaft." It was sought to add "in a shaft exceeding 25 yards in depth."

Mr. CHAMBERS said there were cases in which it would not be possible to carry out this rule until they had the shaft sunk at least 25 yards. For instance, there was one place in his district where there was some shifting sand on the top, and there was nothing into which to put any foundations for fixing an engine and properly securing it. It had nothing to do with men tumbling down the shaft.

Mr. REDMAYNE said the rule would apply to a steam crane, and in contradistinction to a locomotive.

Mr. CHAMBERS said if that was the interpretation he did not think they need bother.

Mr. REDMAYNE said the object was to prevent a movable engine being used.

#### Rule 174.

Subsection (d) reads: "The cradle or platform shall not be moved except by the express direction of the manager or master-sinker." It was sought at end to insert "or chargeman", and this was allowed.

#### Rule 180.

Rule 180 reads in this way: "When stone, coal, or debris or gear, tools or materials are being sent to the surface, the chargeman shall see (a) that the kibble is properly loaded; (b) that no stones, coal or debris are packed above the level of the top of the kibble; (c) that gear, tools or materials are put into an empty kibble, and, if they project above the level of the top, are securely fastened to the bow of the kibble before the kibble is sent away." The suggestion was to leave out the words "are put into an empty kibble." This was not allowed. There was an agreed amendment inserting "of the kibble" after "top" and "or chains" after "bow," which was adopted. A similar alteration was made in Rule 184.

#### Rule 181.

In this rule, which provides for examination of the shaft by the chargeman before the re-entry of the workmen after shotfiring, &c., there was an amendment enabling the chargeman to be accompanied by not more than "two" other persons instead of "one" as in the draft.



Rule 183.

88 now reads: "When lowering the kibble, the engineman shall stop it when it has reached a fathoms above the bottom of the shaft or above any radle or platform upon which the kibble is to alight, and shall wait the signal from the chargeman to let it down. When raising the kibble, he shall stop the engine as soon as the kibble has been raised 4 ft. from the bottom, in order that the chargeman may see that the rope is steady, and shall not again move his engine until he has received the signal from the banksman or chargeman." The words in italics are new; originally the signal to lower had to be given by the banksman, and the chargeman was called upon to "steady the rope."

Rule 82.

Sir THOMAS RATCLIFFE-ELLIS said the code that had been agreed upon was as follows:—

WINDING.

The following signals shall be used at all times in connection with winding in shafts:—

(a) For winding persons:—

(1) When a person is about to descend, the banksman shall signal to the onsetter..... 3

Before the person enters the cage the onsetter shall signal to the banksman and to the winding engineman ..... 3

When the person is in the cage and ready to descend, the banksman shall signal to the winding engineman..... 2

(2) When a person is about to ascend, the onsetter shall signal to the banksman and to the winding engineman ..... 3

Before the person enters the cage the banksman shall signal to the onsetter ..... 3

When the person is in the cage ready to ascend, the onsetter shall signal to the banksman and to the winding engineman... 1

(b) For winding otherwise than with persons:—

To raise up ..... 1

To stop when in motion ..... 1

To lower down..... 2

To raise steadily ..... 4

To lower steadily ..... 5

HAULING.

The following signals shall be used in all mines in connection with underground haulage worked by gravity or mechanical power:—

(a) Direct or main rope haulage—

To stop ..... 1

To lower ..... 2

To wind up ..... 3

(b) Haulage (other than endless rope or chain haulage) on self-acting declines—

To stop ..... 1

To lower ..... 2

When persons are about to travel up or down the incline this signal shall be acknowledged by signalling..... 4

(c) Main-and-tail rope haulage—

To stop ..... 1

To haul inbye ..... 2

To haul outbye ..... 3

To slack out tail rope ..... 4

To tighten tail rope ..... 5

To slack out main rope ..... 6

To tighten main rope..... 7

(d) Endless-rope haulage—

To commence haulage ..... 2

To stop haulage ..... 1

This regulation shall not come in operation until July 1, 1914.

It was also agreed that Rule 82 be supplemented by these words: "In connection with every winding engine there shall be provided an appliance which shall automatically indicate in a visible manner to the winding engineman, in addition to the ordinary signal, the nature of the signal until the signal is complied with."

Conclusion.

The REFEREE now brought the proceedings to a close. He said it might be necessary for him to call them together for a formal purpose later on, but he did not think it would be by reason of any dispute; it would be merely a formal meeting. He thanked them all for the very great assistance which they had given to him, and expressed the pleasure he had felt at the spirit of concession which had been displayed on all sides with the obvious desire to bring the thing to a business end.

Mr. POPE said he would like to express their thanks to his lordship in a generous way for the manner in which he had lightened the labours of the enquiry. His lordship had assisted them in a way that he probably could little understand.

Sir THOMAS RATCLIFFE-ELLIS, Mr. SMILLIE and Mr. CHARLTON desired to be associated with what Mr. Pope had said.

At the conclusion of the enquiry the members of the special committee of the Mining Association met, along with representatives of the Colliery Managers' Association.

Mr. EVAN WILLIAMS presided and referred to the very great services rendered to the association by Sir Thomas R. Ratcliffe-Ellis during the prolonged proceedings in connection with the regulations. In the negotiations with the Home Office and with the workmen's representatives, and finally in presenting the owners' case before the Referee, the untiring devotion of Sir Thomas, and the power he had displayed of appreciating and bringing out in the clearest manner the points of

which had been largely instrumental in conducting the enquiry, and the considerable measure of success which had been a result of the enquiry. He moved that the report be presented to the Mining Asso-

ciation recording the views of the committee on the value of Sir Thomas's services.

This was seconded by Mr. J. T. FORGIE (Scotland), supported by representatives of other districts, and carried with the greatest enthusiasm by all the members of the committee.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF COMMONS.—July 2.

Cadeby Main Colliery Disaster.

Mr. BRACE moved the adjournment of the House to call attention to the explosions at the Cadeby Main Colliery last year, on behalf of the Miners' Federation of Great Britain. The motion was to call attention to "the failure of the Home Secretary to take action under the Coal Mines Regulation Act so as to protect the lives of miners against the declared policy of the management of the Cadeby Main Colliery Company, which has been shown by the report of the Chief Inspector to have resulted in loss of life on July 9, 1912." He said a peculiar situation existed in the fact that Mr. W. H. Chambers, the managing director, took a very active part in the management of the colliery. If Mr. Chambers accepted the responsibility of giving orders, and the Chief Inspector reported that the instructions came from Mr. Chambers direct, he must accept the responsibility for the result. But they were faced with a situation under which a dead colliery manager had had laid on him the responsibility for the disaster. On July 9, 1912, two explosions occurred, resulting in the loss of 88 lives. Workmen, for some reason best known to themselves, kept quite silent on the condition of the mine. The Chief Inspector reported that the evidence of four men pointed to the condition of the atmosphere for a few days preceding the explosion being exceedingly bad, and that on account of the foulness of the atmosphere electric lamps were provided. The afterdamp and the conditions were so terrific that although the men worked in the heading for only from 2 to 4 minutes at a time, they became unconscious. To allow the men to go into these workings was a wilful disregard of responsibility. The complaint he made against the Home Office was that they were unable to bring home responsibility to the right quarter. At the enquiry Mr. Chambers said he gave certain orders to a man who was dead, and that if those orders had been carried out the danger would have been avoided. The time had come when other than verbal orders should be given to officials. The men made the very serious charge that they could not accept such evidence, and that due precaution was not taken to protect the men. Furthermore, no word as to the condition of the mine was sent to the mines inspector. Also, the deputies' report was not in the prescribed form. It seemed that the production of the colliery had been regarded as being more important than the lives of the men. There was a callousness about the accident which appalled him, for, while 35 bodies were lying in the mine, the day shift had been lowered down the shaft in ignorance of what had occurred. At the other pit, winding of coal was not stopped until the arrival of the inspectors. That was a disgrace to civilisation, and was the most cold-blooded callous thing he had heard of.

Mr. F. HALL, who seconded the motion, said he had known something of the management of the mine for many years. The men went about the colliery in fear, but they knew that if they complained they would be dismissed and might be unable to get work at other places. The agent of the colliery was now employed as a deputy at the same colliery, and he was informed that he received the same salary as when he was agent. He understood the under-manager's certificate had gone.

Mr. McKENNA said the speeches of his hon. friends had been directed with great force against the management of the Cadeby mines, but they had not disclosed any blameable action or neglect on the part of the Home Office. Indications of danger were discovered in the mine four days before the accident took place. It appeared from the evidence that the managing director of the mine gave orders that all the passages to the place of a fire which appeared to be indicated should be built up. There was no evidence at the enquiry to rebut the statement of Mr. Chambers, though an examination of the mine showed that one of the passages had not been built up. Breaches of the Act of 1911 had undoubtedly been committed. The Act said that notice of the facts ought to be given by the manager to the Home Office. It was in evidence that no notice was given, and the manager, who ought to have given the notice, was dead. The charge brought against the Home Office was that when the breaches of the Act came to the knowledge of the Home Office they did not prosecute Mr. Chambers. But what was the evidence upon which the Home Office could have prosecuted Mr. Chambers? The Act was specific that the notice must be given by the manager, and Mr. Chambers was not the manager. The manager was killed in the accident. There was evidence that Mr. Chambers gave the order that the passage to the gob fire should be built up. There was no evidence to rebut the evidence given by Mr. Chambers. All the persons who might conceivably have given rebutting evidence were dead, and the Home Office could not proceed upon the assumption that Mr. Chambers' evidence was

false. The accident had disclosed three serious defects in the present law. Under the Act no action could be taken except within a period of six months after the accident. In this case, with all possible expedition, the evidence was not completed until the beginning of December, and the report was not in draft until the end of January, more than six months after the accident had taken place. If there had been a *prima facie* case disclosed at any part of the evidence on which a prosecution could have succeeded against Mr. Chambers or anybody else, an interim report would have been issued in order that proceedings might have been taken within the period allowed by the Act; but there was no such evidence. The Act required amendment in that respect, and he proposed at the earliest opportunity to introduce an amendment extending the period to three months after the enquiry into the accident had been completed. The second defect exposed was in section 11, which provided for an enquiry being held with a view to the suspension of the certificate of the manager who was in default, but made no provision for the holding of an enquiry with regard to any person superior to a manager. An amendment of section 11 must be made so as to secure that a person who, though acting as superior to a manager, was in truth really the manager, although not so acting in law, was rendered liable to have his certificate suspended just as if he were the manager himself. In view of the strong statements made by his hon. friend with regard to Mr. Chambers, he would lay the evidence before the Law Officers of the Crown, and if they advised him that it bore out the contention of his hon. friend that Mr. Chambers was in fact the manager, he would order an enquiry under section 11. The third defect disclosed was in section 67, which related to the withdrawal of the men from a mine when a dangerous condition was exposed. But it left it open as a matter of opinion whether such circumstances as existed some days before an accident did in fact constitute a dangerous condition within the meaning of the section. He was advised that this ought not to be left as a matter of opinion, and he was asking the committee which was now sitting to report to him at once on this limited branch of their enquiry with a view to the immediate issue of regulations. His technical advisers at the Home Office strongly recommended such regulations, as in their opinion the men ought to be withdrawn in all circumstances similar to those existing at the Cadeby mine prior to the accident. He hoped that after this explanation his hon. friend would not think it necessary to press his motion.

Sir A. MARKHAM regretted that this matter had been raised, because it was a highly technical and complicated one. Commissions in Germany, Australia and America had failed to arrive at the cause of these fires, and the House of Commons was not a fit body to deal with it. The hon. member for South Glamorgan had used his position in the House to make statements reflecting on men who were not there to defend themselves, which he very much regretted. Mr. Chambers was the last man who would not accept full responsibility for the orders he gave. If there had been a violation of the Act, the hon. member was perfectly able through his association to institute a prosecution against Mr. Chambers. If there was a violation of the Act, it was the duty of the men who were presumed to represent the workmen to have taken action long since, but no action had been taken. He believed that they were within measureable distance of making it impossible for mining explosions to occur in the future. They were now stonedusting all their roads leading to these fires. As to the lowering of the men, he did not think that the mine managers allowed this, knowing that an explosion had occurred. There was panic, and no doubt mismanagement. As to the alleged breaches of the law, he said deliberately and with a sense of responsibility that not a single mine in Great Britain was worked in full conformity with the Coal Mines Act. At the present time there were about 1,000 regulations relating to the working of mines, and while the number was continually being added to by the Home Office it was beyond the capacity of any manager of a mine to see that they were complied with in all their details.

Mr. MEYSEY-THOMPSON remarked that in the course of the discussion some useful suggestions had been made; but the circumstances in which mining accidents arose varied so much that it was difficult, if not impossible, to foresee the conditions accurately and to legislate in such a way as to secure the prevention of explosions.

Mr. BRACE, in view of the statement of Home Secretary, asked leave to withdraw his motion, but leave was refused.

Mr. NORMAN CRAIG urged the Home Secretary to consult practical men before making further regulations, because by withdrawing men from the whole of the mine in consequence of a gob fire in a particular part, gob fires might be created all over the mine, with the result that the mine would be closed to the men as well as to the proprietor, and the price of coal would be raised to the public. Secondly, he asked the Home Secretary not to allow himself to be led in to defining the danger other than in general terms, and embodying something which should cover the whole area of danger irrespective of the facts of a particular case.

Mr. McKENNA moved, That the question be now put.

The House divided, and the numbers were:—

For the closure ..... 262

Against..... 143

Majority ..... —119

The motion for the adjournment of the House was then negatived without a division.



THE COAL AND IRON TRADES.

THURSDAY, JULY 3.

Scotland.—Western District.

COAL.

Business in coal shipments bulks very well in the current returns of the Scotch ports, but the succeeding week's clearances are not unlikely to be materially curtailed by a recurrence of labourers' strikes at the docks, both on the west and east coasts. The past week's aggregate shipments amounted to 314,017 tons, being an increase of 757 tons over those of the preceding week, and an increase of 40,402 tons compared with the quantity despatched in the corresponding week of last year. At Glasgow 38,303 tons were despatched abroad and 37,682 coastwise, the total of 75,985 tons comparing with 64,109 in the preceding week, and 81,844 in the corresponding week of 1912. At the lower Clyde ports there were despatched from Bowling 508 tons, Greenock 690, Irvine 2,925, Ardrossan 4,866, Troon 7,927, Ayr 18,201—total 35,117 tons, against 35,555 in the preceding week, and 48,229 in the corresponding week of last year. The aggregate Clyde clearances reached 111,102 tons, against 57,664 in the preceding week, and the half-year's shipments are 2,687,802 tons, compared with 2,355,587 in the first six months of last year. But there has recently ensued a period of slackness, due to the fine weather and the extra coals that have thus been thrown on the market, and prices have had an easier tendency.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	12/3 to 12/9	12/9 to 13/3
Ell .....	12/3 to 12/9	12/6 to 13/
Splint.....	13/6 to 14/	14/ to 14/6
Treble nuts .....	12/6 to 13/	12/6 to 13/
Double do. ....	12/6 to 13/	12/6 to 13/
Single do. ....	12/ to 12/3	12/ to 12/6

These rates are 3d. to 6d. per ton cheaper than those current a week or two ago. There has also been a reduction of 6d. to 1s. per ton in household coal for home use. Holidays are now taking effect in different places and reducing the consumption for manufacturing purposes, and a number of collieries are idle on account of strikes. It is reported that a contract for 200,000 tons of coal for the Russian railways has been given to Russian merchants, who have been endeavouring to purchase Durham and Yorkshire coal for delivery 21s., cost, freight and insurance at Cronstadt, and it appears to be doubtful whether any portion of the coal will be taken from Scotland. Sheriff Mackenzie, the arbiter in the Scotch miners' claim for an advance of wages, has decided that the men shall receive at once an additional 6½ per cent. on the 1888 basis, which will make their pay 7s. 6d. per day.

IRON.

The Glasgow pig iron market has continued in an unsettled condition, and a fair business has been done in Cleveland warrants since last report from 54s. 8½d. to 55s. 8d. cash, 55s. 1½d. one month, and 55s. 8½d. to 56s. 7½d. three months. Makers do not appear anxious to sell as low as warrant prices, owing to the reduction of stocks. The quantity taken by Scotland in the past week amounted to 8,038 tons, and the arrivals for the six months at Grangemouth from Middlesbrough and district amounted to 234,435 tons, which is 21,769 tons more than in the first half of last year. The furnaces in blast in Scotland have been increased from 85 to 89, which compares with 85 at this time last year, and of the total, 51 are producing hematite, 33 ordinary and special brands, and 5 basic iron. The demand for Scotch hematite is well maintained and the price is variously stated at 79s. to 81s. for west of Scotland delivery. Scotch pig iron is steady in price. Govan and Monkland f.a.s. at Glasgow are quoted Nos. 1, 70s. 6d., Nos. 3, 69s.; Carnbroe, No. 1, 75s., No. 3, 71s.; Clyde, No. 1, 76s., No. 3, 71s.; Gartsherrie, Summerlee, Shotts and Calder, Nos. 1, 76s. 6d., Nos. 3, 71s. 6d.; Langloan, No. 1, 77s. 6d., No. 3, 72s. 6d.; Coltness, No. 1, 98s., No. 3, 80s.; Eglinton, at Ardrossan or Troon, No. 1, 71s., No. 3, 70s.; Glengarnock at Ardrossan, No. 1, 76s. 6d., No. 3, 71s. 6d.; Dalmellington, at Ayr, No. 1, 72s., No. 3, 70s.; Carron, at Grangemouth, No. 1, 77s., No. 3, 72s. per ton. The shipments of Scotch pig iron are small, the quantity despatched in the past week being 1,707 abroad and 2,233 coastwise, the total of 3,940 tons comparing with 3,687 in the corresponding week. The half-year's shipments are 127,102 tons, being 11,713 tons less than in the first half of 1912.

Scotland.—Eastern District.

COAL.

There has been a falling away in the coal shipments at Firth of Forth ports, and this is not unlikely to continue, owing to additional trouble with dock labourers. Some coal pits have had to dismiss their miners in the meantime, and shipping companies, as well as canal carriers, have stopped receiving goods until the disputes are adjusted. The coal shipments in the past week have been at Granton 6,478 tons, Bo'ness 13,678, Grangemouth 35,631, and Leith 20,728—total 76,515 tons, compared with 102,842 in the preceding week, and 110,727 in the corresponding week of 1912. Prices have been again tending easier.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	12/9 to 13/	13/3 to 13/9
Secondary qualities .....	11/9 to 12/	11/9 to 12/3
Treble nuts .....	13/	12/9 to 13/
Double do. ....	12/ to 12/6	12/3 to 12/6
Single do. ....	11/3 to 11/6	11/9 to 12/3

Business is being greatly interrupted at Leith and Granton by the dockers' strikes.

The Fife ports have been well supplied with tonnage, and there has been some difficulty in getting coals forward in sufficient quantity to load the vessels promptly. At the same time the shipments have been considerably larger than the average. At Methil 70,790 tons were despatched, Burntisland 50,420, Alloa 1,682, Dysart 1,436, Tayport 721,

Wemyss 961, Charleston 360—total 126,400 tons, compared with 112,754 in the preceding week, and 113,619 in the corresponding week of 1912. It is reported that collieries have still good orders in hand, and the prices are comparatively well maintained.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	16/9 to 17/	16/9 to 17/3
Unscreened do. ....	14/9 to 15/	14/6 to 15/
First-class steam coal.....	14/3 to 15/	14/3 to 14/9
Third-class do. ....	11/6 to 12/9	11/9 to 12/9
Treble nuts .....	13/6 to 14/	13/ to 13/6
Double do. ....	12/9 to 13/3	12/6 to 13/
Single do. ....	11/9 to 12/	12/ to 12/6

The household demand has had a quieter tendency owing to fine weather.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 141,603 tons of coal and 1,673 tons of coke were despatched from Tyne Dock, an increase of 3,245 tons of coal and a decrease of 1,030 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 59,681 tons of coal and 3,655 tons of coke, a decrease of 13,436 tons of coal and an increase of 3,316 tons of coke. The Blyth shipments aggregated 93,074 tons of coal and coke, a decrease of 1,774 tons. The main business of interest to the market during the past week has been the allotment in respect of the Russian State Railways' requirements of steam coals up to the end of the Baltic season. The department appears to have allotted orders for 315,000 tons—a very much larger quantity than was originally anticipated would be contracted for—to two St. Petersburg merchant firms, which, however, will, it is believed, have to cover their commitments in this country. Best Northumbrian and best South Yorkshire coal seems to have been specified. At the time of writing, the St. Petersburg merchants are stated to have purchased from 60,000 to 70,000 tons of their requirements, taking local coal at about 20s. 9d. per ton, c.i.f. Cronstadt, Libau, Riga, Reval, &c., for best Blyths and South Yorkshire hards at about the same figures. The buyers, it is understood, pay the cost of delivery into railway trucks and any other expenses in port. The c.i.f. price is estimated to leave about current f.o.b. values. Another big business item of much interest is the enquiry, by the Altos Hornos Ironworks, Bilbao, for 250,000 tons of Durham coking coal for delivery over the next six or 12 months, at tenderer's option, at Bilbao. Offers are wanted immediately. Ordinary brands of Tyne unscreened bunkers are stated to have been sold by merchants abroad for delivery over next year at from 12s. 3d. to 12s. 9d. per ton, f.o.b. Tyne steam smalls for delivery to Norway over the same period are said to have realised from 7s. to 7s. 3d. and Blyth smalls from 8s. 3d. to 8s. 6d. The Blyth Gas Company invites tenders of from 12,000 to 13,000 tons of gas coal for delivery over 12 months. The tone of the prompt coal market is considerably improved this week, as is not unnatural after the news of so large a contract from Russia and so considerable an enquiry, likely to result in business, from Bilbao. Besides, the suspension of activities last week has resulted in a certain amount of recuperation all round, excepting only so far as shipping is concerned, which has accumulated largely, and loading turns are congested. However, owners may take heart of grace from the fact that the demand for tonnage is so good that rates are not likely to be seriously affected. F.o.b. quotations for prompt shipment have varied as follow during the week:—Best steams, Blyths, are stronger; Tynes, firmer; unscreened, 6d. dearer; smalls, Blyths, from 6d. to 1s. advanced; Tynes, weaker; gas bests, easier; seconds, inclined to fall; specials, stronger; unscreened bunkers, Durhams, a shade weaker; Northumbrians, 6d. increased; coke, foundry, 1s. reduced. Other descriptions of fuel are unaltered.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	15/	14/9 to 15/
Do. Tynes (Bowers, &c.) .....	14/9	14/6 to 14/9
Secondary, Blyths .....	13/ to 13/3	13/ to 13/3
Do. Tynes (Hastings or West Hartleys) .....	13/3 to 13/6	13/3 to 13/6
Unscreened .....	11/6 to 12/6	11/6 to 12/
Small, Blyths .....	9/ to 9/6	8/6
Do. Tynes .....	7/9 to 8/	8/
Do. specials .....	10/	10/
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	14/6 to 14/9	14/9
Secondary gas coals (Pelaw Main or similar) .....	13/ to 13/6	13/3 to 13/6
Special gas coals .....	15/	14/9 to 15/
Unscreened bunkers, Durhams	13/3 to 14/	13/4½ to 14/
Do. do. Northumbrians	12/ to 12/6	11/6 to 12/
Coking coals.....	13/6 to 14/	13/6 to 14/
Do. smalls .....	13/ to 13/6	13/ to 13/6
House coals .....	15/6 to 16/	15/6 to 16/
Coke, foundry .....	23/ to 25/	24/ to 26/
Do. blast-furnace.....	20/	20/
Do. gas .....	18/6	18/6

Sunderland.

COAL.

The exports from Sunderland last week amounted to 92,885 tons of coal, and 470 tons of coke, as compared with 98,830 tons of coal and 215 tons of coke for the corresponding period of 1912, being a decrease of 4,945 tons of coal, and an increase of 255 tons of coke. The coal market is quietly steady all round, prompt values being nominally unchanged. Gas qualities are steady, with a fair demand for this time of the year. Coking coals are in fair demand, bunkers are a good market, coke is on the easy side. Households are quiet. The Russian railways have contracted for over 200,000 tons, which is having a steadying

effect on steam coals. The Altos Hornos Works at Bilbao are asking tenders for 250,000 tons of best Durham coking coals for shipments over twelve months. Steamers are arriving with more regularity, and colliery turns are now fairly full for the first half of July. The following are about the current market quotations:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	16/	15/3
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	18/	17/6 to 18/
Ordinary do. ....	17/	16/ to 16/6
Other sorts:—		
Lamhton screened .....	14/6	15/6
South Hetton do. ....	14/6	15/3
Lamhton unscreened .....	13/6	13/9
South Hetton do. ....	13/6	13/6
Do. treble nuts	16/9	16/6
Coking coals unscreened..	13/6 to 14/	13/6
Do. smalls .....	13/6	13/3
Smithies .....	16/	13/
Peas and nuts .....	16/	16/ to 16/6
Best bunkers .....	14/ to 14/6	14/
Ordinary bunkers ..	13/6	13/6
Coke:—		
Foundry coke .....	23/6	24/6 to 25/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	19/ to 20/	21/
Gas coke .....	18/	18/

The freight market is fairly steady, particularly for the Baltic. This is no doubt owing to the Russian orders coming into the market. Fixtures reported are:—Cronstadt 5s. 9d., Stockholm 5s., Gefle 5s., Wyburg 6s. Mediterranean is only quiet, Genoa getting on at 9s. 3d., Port Said 8s. 3d., Porto Vecchio, 9s. 6d., Leghorn 9s. 6d., Naples 9s. 9d. In the Bay trade Bordeaux is reported at 6s. 3d., Bayonne 7s. 1½d., and St. Nazaire 6s. Coasting is featureless with London 3s. 1½d., Hamburg 3s. 6d., Havre 4s. 3d., Rouen 5s. 3d., Antwerp 4s. 9d.

Middlesbrough-on-Tees.

COAL.

A steady tone prevails in all sections of the fuel market. Demand is on a fairly good scale, and deliveries are on a satisfactory basis. Best Durham gas coal is in the neighbourhood of 14s. 9d.; seconds are 13s. 6d. to 14s.; and specials up to 16s. The fairly heavy demand for bunker coal is met by ample supply. Ordinary Durham bunkers are 13s. 3d. to 13s. 6d. f.o.b.; superiors, 14s. to 14s. 3d.; and specials, 15s. to 15s. 6d. Household coal is now in only very moderate demand, and prices range from 15s. 3d. to 16s. Coking coal is in very good request at 14s. to 14s. 6d. Local consumption of coke is heavy, and as supply is being curtailed by ovens being put out prices of furnace kinds are stiffer. Average qualities of blast-furnace coke now stand at 20s, delivered at Teesside works. Best foundry coke ranges from 23s. 6d. to 25s. f.o.b., and gashouse coke remains at 17s. 6d.

IRON.

Shipments from the Tees ports last month fell short of expectations. The total clearances of pig were returned at 95,403 tons as compared with 96,874 tons for the previous month, and 112,349 tons for June last year. Of last month's despatches 85,634 tons went from Middlesbrough, and 9,769 tons from Skinningrove, no less than 9,229 tons of the latter going to Scotland, the remaining 540 tons going to Holland. Of the pig loaded at Middlesbrough last month 58,089 tons went foreign, and 27,545 tons coastwise. As usual Scotland was the largest customer, receiving 16,925 tons; whilst Germany took 11,162 tons; France, 7,795 tons; Japan, 6,150 tons; Italy, 5,800 tons; Austria-Hungary, 5,398 tons; Sweden, 5,002 tons; Holland, 3,668 tons; Wales, 3,400 tons; and the United States of America, 3,120 tons. The Tees loadings of manufactured iron last month were officially returned at 21,455 tons, 15,548 tons for foreign ports, and 5,907 tons for coastwise customers; whilst shipments of steel amounted to 51,211 tons, 47,380 tons of which went abroad, and 3,831 tons coastwise. Again India was the largest receiver of both manufactured iron and steel, importing 7,572 tons of the former, and 12,341 tons of the latter. Other principal importers of steel were: Victoria, 6,767 tons; the Argentine, 4,408 tons; New Zealand, 3,506 tons; Mexico, 3,000 tons; and Natal, 2,600 tons. The pig iron market is unsteady. News from the Balkans has had a bad effect upon the market, and the suspension of payment a few weeks ago by a world wide known firm of merchants still has a disturbing influence on the staple industry of Cleveland. No. 3 g.m.b. Cleveland pig is 56s. 3d. f.o.b., No. 1 is put at 58s. 3d., No. 4 foundry 56s., No. 4 forge 55s. 6d., and mottled and white iron each 55s.—all for early delivery. Though supply is none too plentiful values of East coast hematite pig are steadily falling. Second hands are now pressing sales of Nos. 1, 2, and 3 at 74s. for both early and forward delivery. There is little or nothing passing in foreign ore, but prices are upheld on the basis of 20s. for best rubio. Orders for manufactured iron and steel are scarce, and prices tend downward, but as yet have not been quotably lowered.

South-West Lancashire.

COAL.

A quiet tone prevails in the inland household coal trade, although the deliveries are perhaps above an average mid-summer. Shipping remains much as last reported. The demand for bunkering purposes under contract is well maintained, but open sale enquiry is perhaps less active. Prices of screened Lancashire steam coal range, as before, from 13s. 6d. to 13s. 9d. f.o.b. for cheaper qualities, and up to 14s. or 14s. 3d. f.o.b. for the best grades. The great bulk of bunkering contracts for the coming year are now fixed up, but, in a few cases, shipowners have only contracted for a portion of their requirements, their intention being to come into the market for the balance a little later on, when they hope prices may be somewhat easier. Whether they will gain anything by this, of course, remains to be seen. In the coastwise and cross-Channel household coal shipments a very fair trade keeps in progress, although, no doubt,



It is not going into consumption. In slacks there is a great difference between supply and consumption, as irregularity is now creeping in in the working of the pits. There will be very little output from the collieries in the Leigh district next week, in consequence of the annual holidays there.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/3	16/3
Do. (f.o.b. Garston, net) .....	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/6 to 14/3	13/6 to 14/3
Best slack .....	10/6	10/6
Secondary slack .....	9/9	9/9
Common do. ....	9/3	9/3

### South Lancashire and Cheshire.

#### COAL.

There was a good attendance on the Manchester Coal Exchange on Tuesday. The house coal trade remains essentially at the summer level, without change in the price list. Furnace coal is if anything rather on the easier side, while shipping business is good, though perhaps with a slight tendency in the same direction. Slack is firm and good, with a tendency on the part of buyers to renew expiring contracts for six months rather than twelve. Prices generally are as at foot.

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

#### IRON.

There was a good attendance on 'Change in Manchester on Tuesday last, but business here is rather quiet. Forges are only moderately employed, and the price of crown iron bars is unchanged at £8 15s., with second quality 10s. less, and hoops £8 17s. 6d. Steelworks are fairly busy on bars at £8, hoops £8 15s., plates £8 5s. to £8 10s. Foreign material is still being offered at low rates. Wagon works are fully occupied. Heavy engineers and ironfounders fairly busy.

### Yorkshire and Derbyshire.

#### Leeds.

#### COAL.

The half-year just concluded has been an eminently satisfactory one from the colliery owners' point of view. Prices have been high, the output has been fairly heavy—although complaints have been frequent that the output has been much below the maximum—and profits have probably created a record. The outlook for the coming half year, however, causes some apprehension. Buyers generally are holding off in the expectation of lower prices. The international outlook is not at all reassuring. The financial stringency on the Continent is reacting upon the local coal trade. So much coal, however, has been sold to the end of the year that owners are to some extent independent. During the past week the pits have worked about four days on the average, and although siding stocks have been increased, these are still below the average for the time of the year. The scarcity of empty wagons is again causing serious trouble at the pits, but apart from this traffic is being worked fairly expeditiously. The market on Tuesday was well attended, but business generally was on the quiet side.

**House Coal.**—The demand from London is very quiet, although it is expected that with the turn of the half-year there will be an improvement. Reports from the London depots indicate a quiet state of affairs in the retail trade. Colliery prices, under the circumstances, are being well maintained. Deliveries under the new contracts, which have averaged 1s. a ton advance, have been begun this week. In the coastwise trade there is a fairly active demand for Silkstone house coal, and several parcels have been sold during the past few days at about 14s. 9d. per ton f.o.b. Hull. The freight market is characterised by considerable firmness. In West Yorkshire merchants are very quiet, as the public are buying next to nothing. There is no change in official pit prices, although concessions equal to wagon hire are frequently offered. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

**Gas Coal.**—There has been a little more buying in the open market during the past few days at prices which average about the new contract figures. Forward business is still being booked in fair bulk at the official advance of 1s. per ton. Tenders have recently been sent out to several Yorkshire works including Dewsbury and Doncaster, and tenders are also due to Bradford during the next few days. There is a fair amount of trade passing for export, several parcels of unscreened gas coal having been sold during the week for shipment to the nearer Continental ports.

**Manufacturing Fuel.**—The weakness in rough slacks is still evident, but other qualities are firm. Washed nuts are scarce, and command a high price. Very few contracts have been booked this week, as buyers seem to have an idea that values will be lower.

**Washed Furnace Coke.**—Prices of washed furnace coke are again lower. The fact that the South Yorkshire Associated Cokemakers have reduced their official price to 14s. 6d. per ton at the ovens has had an effect locally. We hear, however, of a sale having recently been concluded of a week of washed patent oven coke at over 15s. per ton.

**Washed Patent Oven Coke.**—A fair tonnage is being sent to the Leeds district. The demand from Midland is quieter.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Prices at pit (London):		
Haigh Moor selected .....	14/	14/
Wallsend & London best .....	13/ to 13/6	13/ to 13/6
Silkstone best .....	13/ to 13/6	13/ to 13/6
Do. house .....	11/6 to 12/	11/6 to 12/
House nuts .....	11/ to 11/6	11/ to 11/6
Prices f.o.b. Hull:		
Haigh Moor best .....	15/9 to 16/6	15/9 to 16/9
Silkstone best .....	15/6 to 16/	15/6 to 16/
Do. house .....	14/6 to 15/	14/6 to 15/
Other qualities .....	13/6 to 14/6	13/6 to 14/6
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/3 to 12/9	12/3 to 12/9
Gas nuts .....	11/6 to 12/6	11/6 to 12/6
Unscreened gas coal .....	10/9 to 11/3	10/9 to 11/3
Other sorts:—		
Prices at pit:		
Washed nuts .....	12/ to 12/6	12/ to 12/6
Large double-screened engine nuts .....	11/ to 11/6	11/ to 11/6
Small nuts .....	10/9 to 11/3	10/9 to 11/3
Rough unscreened engine coal .....	10/9 to 11/3	10/9 to 11/3
Best rough slacks .....	8/9 to 9/3	9/ to 9/6
Small do. ....	8/ to 8/6	8/ to 8/6
Coking smalls .....	8/ to 8/3	8/ to 8/6
Coke:—		
Price at ovens:		
Furnace coke .....	14/ to 15/	14/6 to 15/6

#### Barnsley.

#### COAL.

The chief feature of interest at the local market was the placing of the contracts by the Russian State Railways for a further 300,000 tons during the season. It is understood that the tonnage required includes a substantial bulk of best South Yorkshire hards. The report that about 21s. per ton is the price accepted by the merchants aroused a good deal of curiosity, and generally the opinion was held that the contract for these supplies from this district could not be located at this figure. At the present time there is a strong demand for the best class of large hards, and although the market had been fairly tested of late, owing to exporters holding off with a view to forcing down quotations, prices have not been materially shaken. The production of this class of coal is comparatively limited, and it is stated that, owing to the men not working their full available time, the output is substantially reduced. The market was influenced by the placing of the Russian contracts, and quotations over July were advanced about 6d. per ton, whilst on current account prices also showed a slight advance. The position in regard to secondary descriptions of large steams is somewhat different. The output is no doubt heavy, although the demand continues to be still above the average. Prices of this class of coal have also shown greater strength, and some collieries report having been able to obtain an advance on the week. The position seems likely to be maintained, considering the fact that during the next few months the working of collieries will be materially interfered with owing to various local holidays. With regard to small steam fuel, the demand again appears to show a little weakness, but prices are fairly well maintained—no doubt owing to the fact that the shorter working of collieries has led to keeping the output about on a level with the enquiry. There are instances where local conditions have led to slacks being offered at slightly less than quoted prices, but buyers are less pressing for deliveries, in the belief that prices are now falling. The demand for house coal continues to be affected by the hot weather, but coalowners are meeting with considerable success in keeping up their prices, either by a lessened working of the pits or resorting to stocking. Merchants report there is still a little difficulty in obtaining quick deliveries of best fuel, but with respect to other sorts no doubt the position is considerably weaker, and offers of concessions for prompt clearances are more frequently met with. The position in regard to coke continues to be unsatisfactory from a producer's point of view, and prices are again considerably lower on the week. As previously stated, owing to the high price of slack and the refusal of smelters to contract, the question of setting down some of the beehive ovens would have to be seriously considered. In several cases the producers have put out a considerable number of ovens, and intend to lay them aside until either the price of slack is materially reduced or more favourable contracts can be obtained.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone .....	14/6	14/6
Best Barnsley softs .....	14/	14/
Secondary do. ....	11/ to 13/	11/6 to 13/
Best house nuts .....	12/ to 13/6	12/6 to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/9 to 13/3	12/9 to 13/
Secondary do. ....	12/ to 12/3	12/ to 12/3
Best washed nuts .....	12/	12/
Secondary do. ....	11/	11/
Best slack .....	9/ to 9/3	9/ to 9/3
Rough do. ....	8/ to 8/6	8/6
Gas coals:—		
Screened gas coals .....	12/ to 12/3	12/ to 12/6
Gas nuts .....	11/3 to 12/	11/6 to 12/
Furnace coke .....	15/	16/

#### Hull.

#### COAL

There is very little that is new to report in the Humber coal trade, which during the week has been of normal dimensions. Best Yorkshire steam hards for prompt delivery are fairly steady at last week's quotation, the advent of the Russian buyers for State Railway requirements over the next three months having some little effect in overcoming the weakness that was fast becoming apparent. Secondary sorts and smalls are unchanged, except for rough slack, which shows some slight improvement. House coals and gas fuels are only in poor request. Best Derbyshire and Nottingham steam

hards have improved and are quoted 3d. higher. The export demand generally is fairly good, but this is mainly confined to present or near requirements, exporters being very chary of entering into negotiations for August and September delivery. Shipments at the docks continue on a large scale, and loading conditions all round are good. The figures published to-day of the six months' working of the new King's Dock at Immingham show that in that period foreign coal exports (exclusive of bunkers) amount to 650,000 tons, and coastwise shipments to 70,000 tons (approximately). The decrease in the shipments of coal from Goole is giving rise to some anxiety locally, and a small committee of the Chamber of Commerce has been appointed with a watching brief in order, if possible, to ascertain the cause. The shippers also look with anything but favour on the proposal of the coal workers to obtain a Saturday half-holiday, on the subject of which a ballot among the men is being taken. It is pointed out that the Ouse is a tidal river, and that vessels can only enter and leave the port at high water. Some of the men perceive that if they insist on the holiday the port is likely to suffer, because Goole cannot get ships when the workers like, and that shipowners are anxious to get their vessels loaded without delay upon arrival—especially if, as often happens, they have been stopped in the river by fog and other causes. The following are the approximate prices for prompt shipment f.o.b. Hull:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	16/ to 16/3	16/ to 16/3
Washed double-screened nuts .....	14/3 to 14/9	14/3 to 14/9
Unwashed double-screened nuts .....	13/9 to 14/3	13/9 to 14/3
Washed single-screened nuts .....	14/3	14/3
Unwashed single-screened nuts .....	13/	13/
Washed smalls .....	11/	11/
Unwashed smalls .....	9/9	9/9
West Yorkshire:—		
Hartleys .....	13/3	13/3
Rough slack .....	10/9 to 11/	10/9
Pea slack .....	9/9	9/6
Best Silkstone screened gas coal .....	14/3	14/3
Best Silkstone unscreened gas coal .....	13/	13/
Derbyshire and Notts:—		
Best steam hards .....	15/9 to 16/	15/6 to 15/9
Do. (Grimsby) .....	15/6	15/ to 15/3
Derbyshire nuts (doubles) .....	13/6	13/6
Derbyshire nuts (doubles) (Grimsby) .....	13/3	13/3
Derbyshire large nuts .....	14/6	14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards .....	15/9 to 16/	15/6 to 15/9
Do. do. (Grimsby) .....	15/6	15/ to 15/3

#### Chesterfield.

#### COAL.

The demand for all classes of coal is well maintained and the pits continue to work practically full time. House coal moves more freely than might have been expected, considering the warm weather. Prices are exceptionally firm for the time of year. The bulk of contracts which recently expired have now been renewed and values mark an appreciable rise upon prices that were accepted a year ago. There is no doubt that the public realise that in future they will have to pay more for their coal, and that this is due to the greatly-increasing cost of production. Manufacturing coal, notwithstanding the fears of some people, shows no signs of weakness and prices are firmly held. Large consumers are renewing their contracts for 12 months ahead, at advances averaging a shilling per ton, which is a hopeful indication. Slack for boiler firing is again coming into greater request. Prime brands still command top prices. Steam coal for locomotive use is in steady demand. There is considerable activity in the export trade and a brisk demand is experienced for steam coal. There is an improved tone about this section during the last few days, which may be the beginning of the better state of things which has been looked for with the advent of July. Prices of the best brands of Derbyshire Top Hards stand at 16s. per ton delivered free alongside steamer at Grimsby. Washed fuel is in steady demand, supplies of which are, at the moment, less difficult to secure. There is no change in the coke trade. The demand is fairly steady without any further weakening of prices. Coking fuel is in good request.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

#### IRON.

The iron trade of this district is quieter and buying for delivery during the remainder of the year has slackened somewhat. Prices, however, are firm, as makers are still fairly well placed for work.

### Nottingham.

#### COAL.

There has been no material change in the condition of the coal trade in Nottinghamshire during the past week. The continued prevalence of summer weather is causing business in household fuel to be slow, the public purchasing very sparingly from merchants and the local landsale depots. A better sale, however, has been noticeable in second-grade fuel, the rates for which have been slightly reduced. For other qualities prices remain practically unchanged. The position is regarded as moderately satisfactory. The stocks at collieries, though accumulating, are not large, most of the soft coal pits being on short time. In the steam coal branch business is on a moderate scale, with prices unaltered, except in a few cases where special lots are on offer at easier rates. One satisfactory feature is the



good demand for industrials. Gas coal is in fair request, inland works taking supplies for stocking purposes. Contracts have in many cases been renewed at an advance of from 1s. to 1s. 6d. per ton, and some firms are pressing for early delivery. Slacks are going out of hand fairly well, and late rates are being obtained for best qualities.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	12/6 to 13/	12/6 to 13/
Good house coals.....	11/ to 12/	11/ to 12/
Secondary do. ....	10/ to 11/	10/6 to 11/
Best hard coals .....	12/ to 12/6	12/ to 12/6
Secondary do. ....	10/6 to 11/6	11/ to 11/6
Slacks (best hards).....	8/6 to 9/	8/6 to 9/
Do. (seconds) .....	7/6 to 8/3	7/6 to 8/3
Do. (soft).....	7/6 to 8/6	7/6 to 8/6

Leicestershire.

COAL.

There is not any very marked alteration in the condition of business in this district. The trend of business is rather towards a summer level. The demand for household coals has slackened, though not so much as it has done at this period in past years. Still there is a further adding to stocks, which are assuming at some collieries summer proportions. The enquiry for steam coals is considerable, and this market shows very little tendency to slackness. Local merchants are now very quiet, and relying principally on the requirements for factory coal. The quotations are still very firm, and late prices are fully maintained; any decline in the lately current rates is very unlikely.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

There has been a falling off since last report in the condition of the coal trade of the Cannock Chase district. Orders are not so plentiful and stocks have increased on the colliery sidings. The collieries are running irregularly—in some cases only about three days a week being worked. House coal, owing to the continuance of warm weather, is in poor request. The labour trouble in the Black Country, which unfortunately is not yet over, is having an injurious effect on the demand for coal for manufacturing purposes. Railway and canal sales are quiet and very little business is being done at the landsale depots.

Birmingham.

COAL.

The coal trade is stagnant. Prices are not changed, but they are not of much value as a test, inasmuch as no business is being done. If owners offered reductions it is doubtful whether they would effect sales in the present unsettled state of trade in the district. Stocks are becoming heavy at some collieries. We append the figures:—

Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep .....	16/6	16/6
Do. best shallow .....	14/6	14/6
Do. seconds do. ....	13/	13/
Best hard .....	14/	14/
Forge coal.....	11/	11/
Slack .....	8/6	8/6
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked .....		
cobs .....	13/9	13/9
Best hard spires .....	14/6	14/6
Forge (steam) .....	10/	10/
D.S. nuts (steam) .....	9/6	9/6
Small (do.) .....	8/6	8/6

IRON.

The labour troubles throughout the Midlands are playing havoc with the market. Neither buyers nor sellers are finding it worth while to put in an appearance in large numbers. Business is done in truckloads instead of 50 or a 100 ton lots. Quotations are quite nominal, but week after week sees a reduction in values, making the producer's profit a diminishing quantity. Northamptonshire pig iron ranges from 53s. to about 55s. or 56s., and Derbyshire is sold in restricted quantities at about 57s. net. Neither finished iron or steel are receiving much attention at present. Merchant bars can be bought at £7 17s. 6d. to £8 delivered Birmingham. The mills are going about three days a week, low prices are being taken for common iron for nut and bolt making. The galvanised sheet trade shows no improvement, and makers find the utmost difficulty in competing at present rates with coast firms, who have not to pay the heavy freightage charges that Midland firms have to meet, and which since July 1 have been increased. It is possible to buy at £10 17s. 6d. f.o.b. Liverpool. There is no business passing in gas strip. In the steel trade concessions can be had for finished material, but the heavy bookings at the end of last year keep the works going. The raw steel market is not so fortunate, and the selling price is about £5 2s. 6d. for Welsh steel, with rather higher prices in the Midlands. Copper sheets are maintained at £80 a ton, with business quiet.

Forest of Dean.

Lydney.

COAL.

Rather more animation has characterised the house coal market of this district during the past week, and the collieries, as a whole, are more regularly employed. Having in view the excessive heat we are now enduring, the position may be described as very satisfactory. Prices of the better coals are firm, but slacks show a little weakness. All the qualities of steam coal continue in heavy request and the pits are working at full pressure. Stocks are nil.

Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	16/6	16/6
Forest .....	15/6	15/6
Rubble .....	15/9	15/9
Nuts .....	14/	14/
Rough slack .....	10/	10/
Steam coal:—		
Large .....	13/6 to 14/	13/6 to 14/
Small .....	10/6	10/ to 10/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

Devon, Cornwall, and South Coast.

Plymouth.

COAL.

Messrs. W. Wade and Son report that the wholesale and retail trade of the south coast shares the general stagnation reported from other districts. Various tempting offers are being made, but buyers generally are holding off, although a few contracts have been entered into. The general idea of importers is that they are likely to gain by waiting. Freights for steam and sailing colliers are still easier, and this fact has induced a certain amount of business in those instances where collieries have been able to meet the views of their customers.

LABOUR AND WAGES.

North of England.

The question of "non-unionism" has arisen in a somewhat sharp form during the past week at Ashington Colliery. It is stated that not less than 10 per cent. of the men employed are non-unionists, and the Federation committee of the men's unions has issued a circular stating that drastic action to put an end to this state of affairs is being seriously considered.

A mass meeting of the men on strike at Newbiggin Colliery was held on Monday morning to consider the situation in the light of the Government inspector's report in regard to blasting from the solid. At the close of the meeting it was stated that the report of the inspector was unfavourable. The men decided to appeal to the executive committee in Newcastle, and they were subsequently advised by the executive committee to have the cavils drawn in the course of the day. The meeting accepted that advice. The men claim that the prices for this seam were fixed through data obtained through the "blasting off the solid" method of work, but urge that as this is a place where higher explosives can be used, therefore blasting off the solid should not continue, and that fresh prices should be fixed. The inspector having enquired into the men's objection, states that, under the circumstances, the Mines Act gives him no power to insist on the use of higher explosives, and, therefore, there is nothing to hinder blasting off the solid.

The 22 weeks' strike of Cumberland Colliery surface-men, resulting from a disagreement between the Miners' Association and the Amalgamated Union of Labour, is at an end.

On Friday morning the perturbation in the Cumberland coal industry, caused by the divergence of views between the British Steel Smelters' Association and the Cumberland Winding Enginemen's and Boiler Firemen's Associations, resulted in an important conference at Workington, summoned by the coalowners, at which representatives of the Cumberland Miners' Association were present. The point in dispute is the claim of the Cumberland Winding Enginemen's and Boiler Firemen's Association to fill all the vacancies that may occur in the machinery departments in the coke ovens in the country which it is contended was conceded by the coalowners to the British Steel Smelters' Association. After discussion, which lasted over two hours, arbitration was offered by the Steel Smelters' Association, the Coalowners' and the Miners' Association to the Winding Enginemen's and Boiler Firemen's Association as a medium of settling the threatened dispute. The latter association refused to submit the matter to arbitration and brought the conference to a close. It is expected that the executive committees of the three associations will further consider the question and report to a future meeting.

At the quarterly meeting of the Cleveland Miners' and Quarrymen's Association at Middlesbrough, on Monday, instructions were given to the agent to write to the President of the Board of Trade for information as to the cost of powder. Further efforts are to be made to secure an alteration in the Explosives Order issued last year, and it was resolved again to approach the Home Secretary and the member for Cleveland. It was agreed to make an effort to get a minimum tonnage base rate of 1s. for winning ironstone, and it was further resolved to instruct the executive at their next meeting with the employers to ask that no class of workmen should be engaged by them on recognised holidays unless the work was of a compulsory and unavoidable character. Mention was made of a suggestion to ask the mineowners to grant a week's holiday annually to each man and lad employed in and about the mines, subject to a certain amount of time being worked, but this was not pressed, and the meeting negatived a motion asking for a ballot to decide whether the association continue its membership of the National Federation. The council adopted a resolution, giving instructions to the executive committee to formulate a sliding scale to govern wage settlements in future, this to be submitted to the members for their approval before it is presented to the mineowners.

Federated Area.

It was announced on Monday that the strike of 2,500 miners employed at the Pemberton Collieries, near Wigan, which commenced last Saturday, June 28, would probably be short-lived, the whole of the non-unionists, with the exception of about 30, having now joined the union, and it was expected that these outsiders would come into the fold during the present week. It is stated officially that strikes against non-unionists are pending at several other collieries in the Wigan and Bolton areas, between 5,000 and 6,000 men being affected.

At two or three collieries in Notts some trouble is being caused through the employment of non-unionists, and these were considered at the council meeting of the county miners' association on Saturday afternoon. The secretary reported on the recent meeting of the county Minimum Wage Board, at which it was agreed that the matters in dispute at the Newstead, Teversall and Pinxton collieries should be referred to the District Dispute Board, with the independent chairman. It was decided that the meeting should take place on July 3. It was agreed to approach the colliery owners, requesting them to grant a general holiday on August 23, the date fixed for a county demonstration.

Owing to a dispute on the question of a price-list, between 200 and 300 men are on strike at the new Brierley Colliery, near Barnsley, and the possibility of serious action being taken to bring about a settlement was discussed on Monday at a meeting at Barnsley of the executive of the Yorkshire Miners' Association.

At a meeting of the council of the Derbyshire Miners' Association at Chesterfield, on Saturday, it was reported that the representatives of the union were to meet representatives of the coalowners, with a view to settling the question of declaring August Bank Holiday a holiday for miners. Regarding the complaints of unsatisfactory lamps at the Grassmoor Colliery, it was reported that the ballot had resulted in 1,168 voting in favour of handing in notices and 161 against. Grievances regarding weighing machines on pit banks were again discussed, and it was resolved to take drastic action unless colliery proprietors, against whom there were considered to be real grievances, introduced automatic weighing machines at the earliest possible date. The council decided to take joint action with all the Midland counties in the Conciliation Board area with a view to establishing, if possible, a basis rate of wages 50 per cent. above the 1888 rate. Disputes have arisen at all the pits of the Clay Cross Company regarding bankmen's "home" coal and the question of allowing 2d. per ton for facing through fallen-in stalls. The council decided that if the grievances were not settled the men should be empowered to take a ballot on the question of handing in notices.

At a meeting of the South and West Yorkshire delegates, held in Barnsley on Saturday under the chairmanship of Mr. Herbert Smith, of the Yorkshire Miners' Association, a letter was read from Mr. Ben Day, secretary of the Coalowners' Association, intimating that the owners were prepared to meet the surfacemen's representatives.

The North Staffordshire Miners' Federation are taking definite action to force non-union miners to join the Federation. The membership of the Federation, which was only 8,000 at the time of the coal strike last year, is stated to be now over 22,000.

Scotland.

Fully 7,000 miners were idle on Monday at most of the collieries in Mid and East Lothian in consequence of the stoppage of shipping operations by the dockers' strike at Leith.

The 20th annual conference of the Scottish Miners' Federation has been fixed to commence on Tuesday, August 19, and will continue the three following days. The place of meeting is so be the Free Gardeners' Institute, Picardy-place, Edinburgh.

The Scottish miners were on Tuesday awarded an advance in wages of 6½ per cent. on the basis of the 1888 rates, equivalent to 3d. per day. This represents an increase of wages from 7s. 3d. to 7s. 6d. per day, and the award, which is made by Sheriff A. O. M. MacKenzie, K.C., as independent chairman, concerns about 100,000 miners. The original claim was for an advance of 25 per cent., or 1s. per day. The employers, on the other hand, claimed a reduction of 12½ per cent., or 6d. per day, because of the increased expense of working and the effect of recent legislation. This is the second increase the miners have received this year. In March last they were awarded an advance of 12½ per cent., or 6d. per day.

Contraventions of the Coal Mines Act.—At Ayr Sheriff Court, on Tuesday (Sheriff-substitute Shairp on the bench), David Robertson, colliery manager, Dailly, pleaded guilty to six contraventions of the Coal Mines Act, 1911, and was fined £25. It was alleged that between March 1 and May 31 the fireman in the Maxwell pit was not devoting his whole time to his statutory duties, but was acting also as under-manager; between January 6 and May 31 the respondent failed to keep separate plan showing system of ventilation; failed to see that bottom of the shaft at the mine was not kept securely fenced; there was not in constant attendance at the top of the shaft from which miners were to be raised a competent person for the purpose of receiving and transmitting signals; while persons were below ground in the mine there was not in attendance a winding engineman; no barometer and no thermometer were placed above ground in a conspicuous position, and no hygrometer was placed below ground in a conspicuous position near the main intake airway, or in the main return airway.



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The *Colliery Guardian* is published at 2.30 p.m. on Friday, and includes the latest intelligence. The Annual Subscription is 24s.; but if paid in advance, 21s. In both cases the charge includes delivery free by post in the United Kingdom. Post free and prepaid to Foreign Countries, £1 7s. 6d.

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(A Classified List appears on page 44.)

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AND A LEGAL APPENDIX BY

DOUGLAS KNOCKER, M.B., Barrister-at-Law.

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Description of the Eye—Anatomy: Physiology—(1) General  
Description of the Disease—(2) Frequency and Resulting  
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See Page 49.

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\* \* For other Miscellaneous Advertisements see Last White  
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### Forthcoming Annual Meetings.

International Geological Congress—  
August 21, 1913 (Toronto)  
North of England Institute of Mining and Mechanical  
Engineers ... August 2, 1913  
Manchester Geological and Mining Society—  
October 14, 1913  
Institution of Mining Engineers—  
Sept. 24, 25 & 26, 1913 (Manchester)  
Midland Institute of Mining, Civil and Mechanical  
Engineers ... July 20, 1913  
Midland Counties Institution of Engineers, Sept. 1913  
South Staffordshire and Warwickshire Institute of  
Mining Engineers ... October 20, 1913

### The Colliery Guardian.

LONDON, FRIDAY, JULY 4, 1913.

The House of Lords has allowed the appeal of the widow of a Scottish workman from the decision of the Second Division of the Court of Session depriving her of the sum allowed to her by a Sheriff-Substitute under the Workmen's Compensation Act, 1906, for the loss of her husband through a mining accident. The point raised was whether two children of the miner remained dependants within the meaning of the statute when their father, against whom an order for



aliment had been obtained by the mother, evaded them for a considerable time before his death. It was decided in favour of the widow on the ground that after her husband had left her she had never abandoned her claim to support.

The members of the Midland Counties Institution of Engineers will visit to -morrow (Saturday) the sinkings of the Warwickshire Coal Company Limited at Keresley, near Coventry.

The South Wales Miners' Federation council yesterday decided to tender the statutory three months' notice under the Minimum Wage Act to secure a revision of wage rates and working rules. The council also decided that the schedule of wage rates adopted by the recent miners' conference for new collieries and new seams be put into operation forthwith.

The Cleveland ironmasters are proposing to form a company to undertake the distribution of the pig iron made in their district.

The Clyde Navigation Trustees have resolved to obtain Parliamentary powers for utilising certain lands on the south side of the river for an extension of the harbour of Glasgow. The proposal is for the construction of five additional basins.

An appeal from the decision of the judge of the Chesterfield County Court raising a question under the Coal Mines (Minimum Wage) Act, 1912, was heard before Mr. Justice Ridley and Mr. Justice Coleridge this week. Their lordships came to the conclusion that the judgment of the county court judge was wrong, and held that such a court had no jurisdiction to revise a decision of the special tribunal which had been formed to administer rules made under the Act.

We regret to announce the death at an early age of Mr. Hugh Watts, one of the principals of Messrs. Watts, Watts Limited, and vice-chairman of the Monmouthshire and South Wales Coalowners' Association.

The House of Lords last week decided the appeal of the Denaby and Cadeby Main Collieries Limited in their action against Messrs. Lambert Brothers in favour of the appellants. The case referred to the repudiation of contracts.

Lord Mersey, on Friday of last week, brought his enquiry into the draft general regulations to a close. The parties announced that they had agreed to a form for Regulation 81 relating to the construction of stoppings and to a general code of signals for winding and hauling.

Sir Arthur B. Markham, M.P., has acquired from Earl Fitzwilliam the leases of the coal in the Cantley district, near Doncaster, the area affected being about 7,000 acres. Sinking operations will shortly commence at Armthorpe.

"Accidental asphyxiation" was the verdict at the inquest on Capt. Ramsay, chief of the Northumberland and Durham Colliery Fire and Rescue Brigade, who met his death while wearing rescue apparatus and exploring a drift at the Benwell Colliery, near Newcastle. The jury suggested that provision ought to be made to guard against the possibility of a valve being turned.

At the Home Office, Whitehall, S.W., this week, a meeting was held of the committee, consisting of Dr. W. N. Atkinson, Mr. D. Lewis, and Mr. Tom Richards, M.P., to consider what first-aid certificates should be recognised in connection with the qualification certificate for mines and other colliery management.

An inquest was opened on Wednesday at Rotherham on the body of Robert Rodgers, who lost his life in the flooding of the No. 1 Minimum Level in the Parkgate seam of the Car House Colliery on June 16. Fifteen men were at work, and eight lives were lost. The inquest was adjourned until Wednesday next.

Next week their Majesties the King and Queen pay a visit to the Lancashire industrial districts. Several collieries will be visited.

On Wednesday, Mr. Brace moved the adjournment of the House of Commons to call attention to the recent Cadeby Main disaster and to certain alleged breaches of the Coal Mines Act. The Home Secretary, who said three serious defects in the existing law had been disclosed, proposes to introduce amendments to extend the period during which a prosecution may be begun to three months after the enquiry into an accident has been completed, also to provide power to suspend the certificate of a person superior to the manager, but acting as manager. He likewise undertook to bring in new regulations to provide for the withdrawal of workmen under conditions similar to those existing at Cadeby prior to the explosions. Mr. Brace's motion was defeated.

Sheriff A. O. M. Mackenzie, K.C., has decided that the wages of underground workers in Scotland shall be advanced to the extent of 6½ per cent. on the 1888 basis from July 1 and 2. This increase represents 3d. a day, and now raises the wages of the Scottish miners to 7s. 6d. per shift.

At Ayr Sheriff Court, on the 1st inst., Sheriff Shairp sentenced David Robertson, colliery manager, Dailly, to pay a fine of £25 or suffer 60 days' imprisonment, for six contraventions of the Coal Mines Act.

THE DRAFT GENERAL REGULATIONS.

On Friday of last week Lord MERSEY brought his enquiry on the draft general regulations proposed by the Home Office to a rapid close. Not only were the remaining rules cleared off, but the parties were able to announce their agreement on all points outstanding—that is, within the limits already laid down by his lordship. We are thus able to complete our brief analysis of the results.

RESCUE AND AMBULANCE.

The Rescue and Ambulance rules have already undergone the ordeal of revision, and therefore it was to be expected that but little time would be lost upon them. There was some discussion, however, upon Regulation 144, which prescribes the location and nature of ambulance outfits. A change was made in the contents of the ambulance boxes to be provided, in order to bring them more nearly in keeping with the latest practice. All that may be said is that the fact that the change was generally admitted to be desirable is further evidence of the inadvisability of detailed specification. The law is always some distance behind practice, and this particularisation only accentuates, as time passes, an obvious feature of all legislation.

More real importance is to be attached to the discussion on Rule 145, which is that placing upon the manager the onus of providing trained men for service in the mine. The evidence discloses a grave condition of things, for witness after witness testified to the difficulty that is being experienced throughout the country in arousing the interest of the workmen in ambulance and rescue work. It is, perhaps, a matter for little surprise that the same recreative influences that have so seriously retarded educational advancement should operate to defeat the dictates of the Home Office, but it is at least unreasonable to make the distressful colliery manager responsible for tendencies that are clearly beyond his control. Mr. SMILLIE has undertaken to whip up the flagging interest of his constituents, and, in the meantime, the words "if possible" are to be introduced in the regulation.

OPERATIONS IN SINKING PITS.

The alterations in the sinking rules do not call for much comment, beyond mentioning that a new signalling code has been agreed upon, and the duties of the chargeman have been more clearly defined.

THE CONSTRUCTION OF STOPPINGS.

The parties agreed to a wording of Regulation 81 which leaves the manager rather more latitude than the original rule. There are now alternative modes of construction, one with a brickwork, masonry, or concrete facing to the intake as in the draft, but the required thickness of brickwork is 9 in. instead of 14 in.; a solid unfaced stopping of 5 yards thickness, however, may be substituted, and, if the former mode is employed, it is not necessary to recess the facing in solid ground where practicable. The regulation is not to apply to any mine in South Staffordshire liable to spontaneous combustion in the unworked coal.

Here, of course, the owners have failed in their main purpose, which was to secure the omission both of section 42 and the regulation founded upon it.

THE SIGNALLING CODE.

A new general code of signals for winding and haulage has also been accepted. Taking the winding code first, it will be seen that the signals for winding persons are practically unchanged, but the signals for winding otherwise than with persons and the elaborate code of general signals have been cut down from nine to five, with a great saving in phraseology. The economy in language is even more marked in the case of the haulage code, and the number of signals has also been materially curtailed. This will be seen from the following:—

	Number of signals.	
	As proposed.	As agreed.
Direct or main rope haulage	7	3
Haulage (other than endless-rope or chain haulage) on self-acting inclines.....	4	3
Main-and-tail rope haulage ...	9	7
Endless-rope haulage .....	4	2
Other signals .....	3	—
Total.....	27	15

The revision does not, of course, meet the fundamental objection to the inauguration of a new code, advanced so strongly by the owners and enginewinders—too late, unfortunately, to be of much service—to the effect that the risk of accident in the transition stage far outweighs all the advantages of uniformity; there is, however, some consolation in the fact that the regulation will not come into operation for another 12 months, which will give the winders a longer period in which to overcome the promptings of habit.

WHAT THE OWNERS HAVE GAINED.

On the whole the owners may look back upon the enquiry with some satisfaction, as they have secured some alterations of considerable utility. Amongst these in particular may be mentioned the amendments in Regulation 39 regarding the examinations before the commencement of work, and the examination of safety lamps at the underground station, in Regulation 33 regarding the conferences between the under-manager and the officials, in Regulation 35 relating to the examination of "travelable" parts of the mine, in Regulations 59 and 60 which deal with the continuous duties of the fan engineman, in Regulation 72 which fixes the strength of the capping, in Regulation 145 affecting the responsibility of the manager for the efficiency of his rescue brigade, and last, but not least, the exceptions in Regulation 79 with regard to the construction of double intakes.

For their success the owners must owe a large



attitude to Sir THOMAS RATCLIFFE-ELLIS, BLACKETT, PHILLIPS, CHAMBERS, WILLIAMS and the other gentlemen who have so ably represented them at this enquiry.

#### THE BURDEN OF LEGISLATION.

The owners have unfortunately failed to obtain sanction for the use of powerful electric lamps at busy in-by junctions and other places where good lighting is most highly desirable, and the instruments of statutory law have at the outset prevented their views on the subjects of tight stoppings and the signalling code from receiving proper consideration; nor, indeed, could they ever have expected to gain everything they asked for. Very much wider issues would have to be reopened before that could happen.

Whilst we do not go quite to the length of the learned REFEREE who presided over this admirably-conducted enquiry, and advocate a Utopia in which there should be no Act and no Regulations, it is for our legislators to consider the fact that, apart from the practicability and utility of these penal sections and regulations, their very number is a source of the gravest danger. The "burden of legislation" is not only to be translated into pounds, shillings and pence; its more serious effect is the strangulation of individual effort, the deadening of impulse, and the dulling of those acute faculties which are the mainsprings of commercial enterprise and the chief safeguards against disaster. As to who suffers most we need scarcely go the length of arguing.

If we may say so, the faults of the Home Office are twofold—some will say we are sparing. In the first place they are too prone to think that the only way to cure abuses is by way of legal enactment, that for every ill there is a statutory panacea; the second point, closely allied to the first, is that in devising means they are too fond of arguing from the "particular to the general." The Royal Commission on Mines had at least a weight of evidence, drawn from widely separated sources, upon which to base their report; but the Coal Mines Act of 1911 and the General Regulations are much less the fruit of that investigation than of the isolated facts disclosed by the Hulton and Whitehaven explosions, as interpreted by the authorities at Whitehall. More lately came the Cadeby disaster, and now the long tale of regulations is to be still further extended. We have no wish to add as a tag to this article reflections upon Wednesday's discussion in the House of Commons, but we feel that Mr. NORMAN CRAIG was speaking with great commonsense when he asked the HOME SECRETARY, before he added to the innumerable rules and regulations, to consult practical men and also "not to be led, as he threatens to be, into defining the danger other than in general terms and in embodying, either in statute or in rules or regulations, something which shall cover the whole area of danger irrespective of the facts of a particular case."

No one whose path of duty takes him into the mine but will admit that the experience of two men such as Sir THOMAS RATCLIFFE-ELLIS and Mr. W. C. BLACKETT, to take two typical instances, would greatly help our legislators, but the fact is that the predominant partner, as represented by the House of Commons, is intolerant of the expert, except for purposes of quotation. We note that on Wednesday night one member made the illuminating objection:—"Is it in order on this motion of urgent public importance to enter into a detailed discussion of technical matters dealing with gob and a permanent thing, 300 years

#### Trade Summary.

The London coal trade for the past week has been exceedingly slow. The depots report, if anything, a slightly increased tonnage, and public orders are also showing an improvement. All prices, however, are weak and unchanged. The manufacturing market continues dull and listless, and the iron trade and shipping returns are very unsatisfactory. Contract renewals are at a complete deadlock, and buying is almost exclusively restricted to spot lots at a cheap rate.

The prompt coal market at Newcastle has improved, considerable enquiries having come to hand. Loading turns are congested.

The Durham coal trade is quietly steady, with values nominally unchanged. Coke is on the easy side.

Lancashire house coal continues quiet, and deliveries are fairly well maintained. The output of slack is now smaller, and this compensates for the slackening in the demand.

In West Yorkshire there is a disposition to hang back for lower prices. House coal is quiet, but stocks do not grow appreciably. Manufacturing fuel is rather weak.

In South Yorkshire there is a strong call for best hards, and secondary sorts are fairly steady. Small coals show some weakness. House coal is remarkably steady. The coke market continues unsatisfactory.

In Derbyshire the demand for all classes of coal is well maintained.

The tone of the market at Cardiff is distinctly better, as tonnage difficulties have to a large extent been removed. Small coal is more animated. In Monmouthshire coals there is not much change. Patent fuel shipments have been on the heavy side.

In Scotland trade has been interfered with by trouble at the ports, and prices are somewhat weak.

### Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

#### THE BENWELL FATALITY.

SIR,—The reports which have appeared in the Press with regard to the cause of Mr. W. H. Ramsay's death at Benwell Colliery, on the 6th ult., are somewhat conflicting. From the evidence given at the inquest, it is perfectly obvious to anyone who has any knowledge of rescue appliances that the main valve of the oxygen cylinder in this case could not have been opened properly when the apparatus was put into use. Had the valve been turned on fully in accordance with the instructions—i.e., a complete revolution of the wheel—it would have been impossible to close it in the manner suggested.

We may add that the apparatus, which had been in use for 2½ years, was found to be in perfect order, and there was plenty of oxygen left in the cylinders.

R. W. DAVIS, Director,  
Siebe, Gorman and Co. Limited.

187, Westminster Bridge-road,  
London, S.E., July 3, 1913.

### THE WELSH COAL AND IRON TRADES.

THURSDAY, JULY 3.

#### North Wales.

##### Wrexham.

##### COAL.

The coal trade of this locality remains fairly satisfactory, at least in some departments, and pits are working fairly well. The demand for household coal is, of course, very limited indeed, excepting for special spot lots at reduced prices, and the landsale depots are very quiet. Railway companies and manufacturing firms are taking good deliveries just now, and the shipping trade at the Mersey ports is all that could be desired. There is a good call for large and small gas-making fuel, and many of the new contracts have now commenced, and the coalowners should soon feel the benefit of the advanced price. Generally speaking, prices are identical with those quoted last week.

Prices at pit f.o.r. —	Current prices.	Last week's prices.
Best house coal .....	14/ to 15/	14/ to 15/
Secondary do. ....	13/6 to 14/6	13/6 to 14/6
Steam coal .....	12/6 to 13/6	12/6 to 13/6
Gas coal .....	13/ to 14/	13/ to 14/
Bunkers .....	12/3 to 12/9	12/3 to 12/9
Nuts .....	11/3 to 12/	11/9 to 12/3
Slack .....	6/6 to 8/	6/6 to 8/
Gas coke (at works) .....	15/ to 16/8	15/ to 16/8
Prices landsale:—		
Best house coal .....	18/4 to 19/2	18/4 to 19/2
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

#### Monmouthshire, South Wales, &c.

##### Newport.

##### COAL.

During the past week the coal trade has dragged along in a sleepy way. A fair enquiry seems around, but business does not crystallise nearly so rapidly as sellers wish, a paucity of tonnage helping to prevent this in many cases. Prices now seem to have reached their nadir, as except for a side line here and there, both large and small coals remain quoted much the same as last week. Stocks on hand are considerable, and without some early accretion of tonnage will probably hamper collieries for some time, rendering outputs uncertain and fluctuating. The house coal trade remains quiet, with quotations unchanged. Patent fuel is rather weaker, but pitwood, despite the extreme difficulty of finding empty wagons, has advanced to 22s. for good wood, on a shortage of supplies. In the freight market outward chartering has been none too brisk. Plenty of heavy tonnage is available, but of more handy sized bottoms the supply is not so good. Freights, if anything, show an easier tendency.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	17/3 to 17/9	17/3 to 17/9
Western-valleys, ordinary	16/9 to 17/	16/9 to 17/
Best Eastern-valleys .....	16/ to 16/6	16/ to 16/6
Secondary do. ....	15/6 to 16/	15/6 to 16/
Best small coals .....	8/6 to 9/	8/6 to 9/
Secondary do. ....	7/6 to 8/	7/6 to 8/
Inferior do. ....	7/ to 7/6	7/ to 7/6
Screenings .....	8/9 to 9/	8/9 to 9/
Through coals .....	13/9 to 14/6	14/ to 14/6
Best washed nuts .....	14/9 to 15/3	15/ to 15/3
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	20/6 to 21/	20/6 to 21/
Furnace coke .....	23/ to 25/	27/ to 28/
Foundry coke .....	26/ to 28/	29/ to 31/

##### IRON.

There is no material alteration to report in the local conditions of the iron and steel trades, but there is perhaps a slightly weaker tone, and only a small amount of fresh business is being negotiated, mostly of a hand-to-mouth nature. With buyers covered for some considerable time ahead, they can only be tempted to offer business by further concessions, which makers are not at the moment showing any inclination to make. Work is again reported fair at the bar mills, where the output is normal and values steady. Only small business is being transacted. Imports for the week total over 8,000 tons, and there is no alteration to record in quotations from the Continent. The rail department has somewhat eased since last week. There is little fresh enquiry coming along, but values remain stationary. Blastfurnaces continue fully employed, but it is difficult in this department to secure any fresh orders. Quotations are steady and remain as named last week. Fresh business in the tinplate department is practically nil; in fact, conditions are about as bad as they can possibly be. Buyers are able to secure considerable concessions for any business they have to place, and several more mills have again shut down. Unfortunately there seems very little probability of any improvement in the early future. Following may be taken as latest approximate quotations. Steel rails: Heavy sections £6 10s. to £6 15s., light ditto £6 15s. to £7. Tinplate bars: Bessemer steel £5 2s. 6d. to £5 5s.; Siemens £5 5s. Tinplates: Bessemer primes 20 × 14, 13s. 9d. to 14s. Siemens ditto 14s. Finished blackplate £10 to £10 5s. Pig iron: Welsh hematite 82s. to 83s. delivered locally.

##### Cardiff.

##### COAL.

The shipments of coal last week to foreign countries from the port of Cardiff amounted to about 389,500 tons, an increase of over 70,000 tons as compared with the corresponding week of last year. As the pressure to provide empties for the collieries has been greatly relieved, the tone of the market is decidedly better, and there has been, comparatively speaking, but few forced sales. The result is that prices are firmer, and prospects for this month much more favourable. Sellers are very optimistic as to the effect on the market of the extra demand by the Admiralty for the forthcoming naval manœuvres. Of course, it is never known exactly how much coal will be absorbed, but it is estimated that it will amount to from 150,000 to 200,000 tons above the ordinary monthly quantity. A number of vessels are being taken up for the conveyance of the coal to the Fleet, the rate last paid being 11s. per ton per month on the gross registered tonnage. This is an advance of 1s. per ton on what was obtained last week. Although buyers seem disposed to discount the effect which the Admiralty demand will have on the market, it is almost certain to stiffen prices. The quantity of free coal obtainable direct from the best collieries is small, and the prices quoted range between 20s. 6d. to 21s. Sales have actually been made at 20s. 9d., and even a little higher than that figure. Superior second admiralities are 18s. 6d. to 19s., and ordinary kinds 17s. 6d. to 18s. per ton. The French Naval Commissioners have visited the port for the purpose of adjudicating on the tenders sent in for the 40,000 tons of steam coal required for the Fleet, and somewhat to the surprise of almost everybody, they decided not to purchase best Admiralty qualities. What they are paying for half the quantity is 34 francs 60 cents., and for the other half 34 francs 80 cents. c.i.f. Toulon. After allowing for freight tax and other incidental charges, the sum left for the coal is between 17s. 3d. and 17s. 6d. net f.o.b. The contract has been divided between Messrs. Pyman, Watson and Co., and a Paris firm, and delivery is to take place between July 15 and the October 1. Tonnage is more plentiful. The quantity chartered last week was close upon 424,000 tons, and succeeding as it does, a week of one 435,000 tons, constitutes a record for the fortnight since the commencement of the year. Freights are more in favour of charterers, and this will probably have some effect on prices. Stocks abroad are known to be low. As has been pointed out on more than one occasion, buyers have been holding off as long as



possible in the hope that values would be reduced, but they are recognising the fact that higher prices have to be paid, and are consequently placing their contracts. Taking all these things into consideration, the outlook is decidedly rosy. There is another fact also which is likely to influence prices, and that is that the men are taking it far easier in consequence of the hot weather, and already a number of them have commenced to take their summer holidays. The result is that outputs are being lessened, both of large and small coal. The small coal market is gradually emerging from the slough of despond into which it had drifted, and forced sales are now very few in number. The result is that prices have advanced. Bunkerings are 10s. 3d. to 10s. 9d., whilst cargo qualities range from 8s. 6d. to 9s. per ton. The Custom House returns show that during the five months ending May 31 there were exported from the Bristol Channel to foreign countries 12,347,727 tons as against 8,607,138 tons in the corresponding period of last year, being an increase of 3,740,589 tons. In Monmouthshire coals there is not much change, but the tendency is distinctly upwards. Black Veins are quoted at 17s. 6d. to 17s. 9d., and western valleys 16s. 9d. to 17s. 3d. f.o.b. Cardiff. It is reported that the contract for the supply of 200,000 tons of coal for the Russian State Railways over the rest of the Baltic season has been given to St. Petersburg merchants. Whether they have covered themselves is rather doubtful, but under any circumstances it is not believed that any Welsh coal will be bought, but that it will be obtained mainly from Yorkshire and Northumberland. Contrary to anticipations, the sellers of house coals have made no change in their prices, and all transactions consequently are of a hand-to-mouth character. As regards bituminous coals, prices are with difficulty maintained. No. 3 Rhondda large is nominally 17s. to 17s. 6d., while for No. 2 qualities the top price is 13s. 9d., and in some cases as low as 13s. 3d. is being accepted. Though the Chamber of Commerce have not obtained all they asked for in regard to the coal-mixing charges, satisfaction is expressed that a conditional settlement has been arrived at covering a period of five years. The charges formulated by the several dock-owners in August last have been accepted subject to the condition that there shall be a reduction of 25 per cent. in cases where there is no unsorting of empties after the coal has been mixed, and that instead of the charges coming into operation on October 1 they shall come into force on January 1, 1914. There was a heavy shipment of patent fuel last week, the total quantity exported being 43,852 tons, of which the Crown Fuel Company shipped 10,121 tons and other local makers 5,050 tons, Swansea 26,381 tons, and Newport 2,300 tons. Prices are 21s. to 23s. per ton. Coke is rather unsteady. Pitwood remains firm at 22s. 3d., with a strong upward tendency.

Prices f.o.b. Cardiff (except where otherwise stated).

Steam coals:—	Current prices.	Last week's prices.
Best Admiralty steam coals .....	20/6 to 21/	20/ to 21/
Superior seconds .....	18/6 to 19/	18/ to 19/
Ordinary do. ....	17/6 to 18/	16/9 to 17/6
Best bunker smalls.....	10/3 to 10/9	10/ to 10/6
Best ordinaries.....	9/6 to 10/	9/6 to 10/
Cargo qualities .....	8/6 to 9/	8/ to 8/6
Inferior smalls.....	7/6 to 8/	7/ to 8/
Best dry coals .....	18/6 to 19/	18/6 to 19/
Ordinary drys .....	15/ to 15/9	15/ to 16/
Best washed nuts .....	15/6 to 15/9	15/6
Seconds .....	14/6 to 14/9	14/6
Best washed peas .....	15/	13/6
Seconds .....	14/	12/6 to 13/
Dock screenings .....	10/6	9/6
Monmouthshire—		
Black Veins .....	17/3 to 17/9	17/ to 17/6
Western-valleys .....	17/ to 17/3	16/9 to 17/
Eastern-valleys .....	16/3 to 16/6	16/ to 16/6
Inferior do. ....	15/6	15/6 to 16/
Bituminous coals:—		
Best house coals (at pit)	20/	20/
Second qualities (at pit)	17/6 to 18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/ to 17/6	17/ to 17/6
Through-and-through...	14/9 to 15/3	15/ to 15/6
Small .....	12/ to 12/6	12/ to 12/6
No. 2 Rhondda—		
Large .....	13/3 to 13/9	14/
Through-and-through...	11/6 to 12/	11/6
Small .....	8/ to 8/6	7/6 to 8/
Best patent fuel .....	23/	23/
Seconds .....	21/	21/
Special foundry coke .....	30/ to 31/	30/
Ordinary do. ....	27/ to 28/	28/
Furnace coke .....	22/ to 24/	24/
Pitwood (ex-ship) .....	22/3 to 22/6	22/3

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

IRON.

Owing to the heavy drop in the price of tin, which now stands at £190, the tinplate market is a little weaker, 14 x 20 cokes selling at 13s. 6d., and oil sizes 14 x 18½ at 14s., and 10 x 20 at 20s. per box. Amidst the reports that several more mills may shortly close down, it is encouraging to note that four additional mills erected at the Duffryn works, Morriston, have just been put into operation, and that new mills have also been started at the Foxhole works. This would seem to point to the fact that in cases where works are modernised it is still possible to do business on a remunerative basis. Shipments of tin-plates last week amounted to 129,422 boxes. Receipts from works were about 10,000 boxes more, so that stocks in the dock warehouses and vans have been increased to 429,519 boxes as compared with 460,311 boxes at the corresponding date of last year. The Tinplate Conciliation Board met the other day to consider the claims put forward by the workmen for an alteration in the wages agreement. They claim 25 per cent. advance where employers reverted from eight-hour to six hour-shifts. They frankly admitted that their sole object in bringing such a proposal forward was to restrict production, but the employers pointed out that this was the surest way to make matters worse than they were at present, and after a long discussion the workmen withdrew their claim. There has been a recrudescence in the

foreign bar import trade. During the week the quantity of steel plates, bars, blooms, and billets landed in the Channel amounted to between 9,000 and 10,000 tons. This, coming on to a slack market, led to the shutting down of some of the local furnaces. In view of the fact that foreign bars of good basic steel are being offered at less than £4 15s. per ton, it is difficult to get the £5 2s. 6d. now asked for Siemens tin bars, and some business is reported to have been done for prompt delivery at £5 delivered. Competition in the galvanised sheet trade is very brisk, and good specifications of 24-gauge corrugateds are being taken at £10 15s. A very heavy shipment of rails has taken place, no less than 8,000 tons being despatched to Singapore, Port Sudan, and Port Swettenham. Prices are without change. Welsh pig iron has fallen to 79s. f.o.t. Best rubio iron ore is quoted at 19s. 6d., and Almeria at 18s. 6d. to 19s. per ton, but it is almost impossible to do business at these figures. New steel crop ends are 64s. 6d. to 65s., heavy wrought scrap 52s. 6d., and heavy steel 55s. per ton. The iron and steel workers' wages as a result of the audit for the three months ending May 31 have been advanced 2½ per cent.

Swansea.

COAL.

The returns of the trade of the port last week were exceptionally good. Great activity was displayed in the coal and patent fuel trades, the shipments reaching the high total of 128,354 tons. There was a capital attendance on 'Change this morning, and a fairly steady tone prevailed on the anthracite coal market. Sellers were asking higher prices for Swansea Valley large, but Red Vein large was still a very poor market. Machine-made nuts were without alteration, and rubbly culm continued steady. Duff was in very good demand, and values moved in an upward direction. In the steam coal market there was very little business doing, bunkers being still without any improvement.

Prices f.o.b. Swansea (cash in 30 days).

Anthracite:—	Current prices.	Last week's prices.
Best malting large (hand picked) (net) .....	21/ to 23/	22/ to 24/
Secondary do. ....	18/6 to 20/	18/6 to 20/
Big Vein large (less 2½ per cent.) .....	16/ to 17/6	16/ to 17/6
Red Vein large do. ....	12/ to 13/	12/ to 13/
Machine-made cobbles (net) .....	22/ to 23/	22/ to 23/6
Paris nuts (net) .....	23/ to 24/	23/ to 24/
French do. do. ....	23/ to 24/	23/ to 24/
German do. do. ....	23/ to 24/	23/ to 24/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	11/6 to 13/6	11/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.)	7/ to 7/6	7/6 to 8/
Duff (net) .....	5/6 to 6/	5/3 to 5/6
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 21/	19/6 to 21/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/ to 12/	11/6 to 12/6
Small do. ....	8/ to 9/6	8/ to 9/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/6	17/ to 18/6
Through-and-through (less 2½ p.c.) .....	15/ to 16/	15/ to 16/
Small (less 2½ per cent.)	13/ to 14/	13/ to 14/
Patent fuel do. ....	18/ to 20/	20/ to 21/

IRON.

The iron and steel trades were fairly busy during the past week. A good output of pig iron was noted, and the steelworks were actively engaged. The tin-plate trade continues quiet throughout the district. The Western Works, at Llanelly, is still closed, operations having now been suspended for over three months. The shipments of tin-plates last week were 129,422 boxes, receipts from works 139,889 boxes, and stocks in the dock warehouses and vans 429,519 boxes.

Llanelly.

COAL.

There is no improvement of any kind to report in the local coal market, and the position is perhaps worse than it was last week. Such a change in so short a time is extraordinary, and quite unexpected by the colliery owners. There appears to be no life whatever in the demand, and collieries for the most part are having several idle days. Stocks are heavier than they have been for a long time, and the pits are much inconvenienced by shortage of wagons. Owing to the depression in the tin-plate trade, many of the works are idle, and it is thought others will close down next week. This has come just at the contracting season, and only a few of the works are renewing. Others prefer waiting until the position improves. The anthracite market is very quiet, and there is no brisk demand for any kinds. Large of all kinds is moving slowly, especially Red Vein. The present hot weather is causing a falling-off in orders. Prices this week are:—

Prices f.o.b.

Anthracite:—	Current prices.	Last week's prices.
Best malting large .....	20/ to 22/	20/ to 22/
Secondary do. ....	18/ to 20/	18/ to 20/
Big Vein large.....	16/6 to 17/6	16/6 to 17/6
Red Vein do. ....	12/6 to 13/6	12/6 to 13/6
Machine-made cobbles ...	18/6 to 20/	18/6 to 20/
German nuts .....	21/ to 22/	19/6 to 21/6
French do. ....	22/ to 22/6	22/ to 23/
Paris do. ....	22/6 to 23/6	22/ to 23/
Machine-made beans .....	19/ to 21/	19/ to 21/
Do peas.....	12/6 to 13/6	11/6 to 13/
Rubbly culm .....	7/ to 7/6	7/ to 7/6
Duff .....	5/ to 7/	5/3 to 5/6
Other sorts:—		
Large steam coal.....	17/ to 18/	17/ to 18/
Through-and-through ...	12/ to 13/	11/ to 12/
Small .....	10/ to 11/	10/ to 11/
Bituminous small coal ...	11/6 to 12/	10/6 to 12/

OBITUARY.

The late Duke of Sutherland, who died at Llandudno Castle on the 27th ult., was a large colliery owner in North Staffordshire and Shropshire, being the principal owner of the pits owned by the Stafford Coal and Iron Company Limited and the Florence Coal and Iron Company at Fenton and Longton. These pits were sunk in the 70's by the late Duke's father, and the undertakings were some years ago converted into limited companies, the share capital being held almost entirely by members of the family. The late Duke was born in 1851, and succeeded to the dukedom in 1892. He was supposed to be the largest landowner in Great Britain, and held large properties in Canada. Up to 1886 he sat, as the Marquess of Stafford, for Sutherland in the Liberal interest, but in that year went over to the other party. Latterly he acted as president of the Tariff Reform League. The ducal residences included Trentham Hall, near Stoke (now abandoned), Tittensor Chase, and Lilleshall.

The death has taken place of Mr. William Jenkins, Walter-street, Tredegar, at the age of 76, one of the oldest officials of the Tredegar Iron and Coal Company. He had charge of the company's quarries for a number of years, and during the sinking of Oakdale Colliery he superintended the excavations and road-making. Mr. Jenkins was a native of Talybont, Breconshire, but he had resided at Tredegar over 50 years.

The death has occurred from heart failure at the age of 68 of Mr. Tom Atkinson, of Oakwood, Kirkstall, Leeds. Mr. Atkinson, who was the head of the firm of J. Atkinson and Son, coal merchants, of Aire-street, was a member of the committee of the Yorkshire Coal Exchange, of which institution he was one of the founders. He leaves a widow and four children—two sons and two daughters.

Mr. Frederick Robert Atkinson, the secretary of the North Staffordshire Institute of Mining and Mechanical Engineers, whose death took place recently at his residence at the Brampton, Newcastle, Staffs., in his 57th year, after two months' illness, was born at Bowburn, Durham, the third son of the late Mr. John J. Atkinson, H.M. inspector of mines for the county of Durham. He served his time as a mining engineer under Mr. Hall, Haswell Collieries, Durham, and then became manager of Ellenborough Colliery, Maryport, Cumberland. He came to North Stafford to take an appointment with the Shelton Iron, Steel and Coal Company. About 20 years ago he commenced in practice for himself as a mining engineer and surveyor, and afterwards added the business of an agent and merchant for mining explosives and colliery materials. He had been the secretary of the North Stafford Institute of Mining and Mechanical Engineers for about 14 years, and was widely known and highly esteemed. He was very active in promoting the success of the institute, and his death will be sincerely lamented by the local mining community. Mr. Atkinson resided for some time at Congleton, and afterwards at Shottle and Duffield, near Derby, but more recently at the Hollies, the Brampton, Newcastle. He has three brothers who are well known—viz., Mr. W. N. Atkinson, LL.D., I.S.O., formerly H.M. chief inspector of mines for North Stafford, and now divisional inspector of mines for South Wales; Mr. J. B. Atkinson, who recently resigned the chief inspectorship of mines for the Newcastle-on-Tyne district; and Mr. A. A. Atkinson, Chief Inspector of Mines at Sydney, New South Wales. The late Mr. Atkinson married Joan, daughter of the late Mr. James Buchanan, of Briar-hill, Camden, Gloucester, and is survived by Mrs. Atkinson and two sons and two young daughters. He had lately formed his practice and business into a partnership, under the title of Messrs. F. R. Atkinson and Sons. His sons, Mr. Archibald J. B. Atkinson and Mr. Gerald Fitz-Gerald Atkinson, will continue their father's practice and business.

We regret to announce the death of Mr. Hugh Watts, partner in the well-known firm of Messrs. Watts, Watts and Co., of London, Cardiff, Newcastle, &c., which occurred on Saturday afternoon at a private nursing home in London. Deceased was vice-chairman of the Monmouthshire and South Wales Coalowners' Association, and was a vice-president of the Cardiff Chamber of Commerce in 1912. Until recently deceased lived at King's Acre, Newport, and thence moved to St. Lawrence, Chepstow, which property he had purchased. Born in London in 1871, he was the youngest son of the late Mr. E. H. Watts, J.P., the founder of the firm of Messrs. Watts, Watts and Co. He was educated at Southborough Preparatory School and Malvern College. He commenced business by qualifying as a mining engineer, being articled to the late Mr. Forster Brown. He obtained a first-class mining certificate, and for some time acted as certificated manager of the National Collieries in the Rhondda Valley. In 1895 he entered the firm of Watts, Williams and Co., which afterwards became Watts, Watts and Co., succeeding as a partner his brother, Mr. E. H. Watts, jun. He was a director of the United National Collieries Limited, the National Development Company Limited, Burnyeat, Brown and Co. Limited, and the Briton Steamship Company Limited, of which Messrs. Watts, Watts, and Co. are the managers. He was also local honorary director of the Scottish Widows' Assurance Fund. Beside being vice-chairman of the Monmouthshire and South Wales Coalowners' Association, he was one of the owners' representatives on the Joint Conciliation Board. Deceased, who was a justice of the peace for Monmouth, married in 1897 the daughter of the late Col. J. Williams, J.P., of Bryn Glas, Newport. He leaves a widow and two sons, the elder of whom is a naval cadet at Osborne, and one daughter.



## THE IRISH COAL TRADE.

THURSDAY, JULY 3.

## DUBLIN.

The falling off in demand for house coal has not been so marked as is usually the case at midsummer, and in these and other classes business continues to be fairly good, both locally and with the inland districts. The month opens without change as regards prices, and it is not now expected that rates will be any lower this summer, as the high prices charged for coals at the other side will not warrant any reductions being made here. Quotations in the city stand as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 24s.; Orrell slack, 21s.—all less the usual 1s. per ton discount for cash; steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. The coaling vessels arriving during the past week amounted to 69, as compared with 65 the week previously, chiefly from Garston, Ayr, Maryport, Burryport, Preston, Newport, Whitehaven, Liverpool, Point of Aire, Workington, Irvine, Glasgow, Partington, Manchester, Ardrossan and Swansea. The total quantity of coal discharged upon the quays was 28,200 tons.

## BELFAST.

No reductions have been made in house coals, prices generally being firm, particularly for English house qualities. Business upon the whole continues to be good in spite of the falling off in the household branch, and the inland trade shows somewhat of an improvement during the week. There is a good supply in the port, although rather less coal has been coming in from some of the Scottish ports. Scotch and Welsh steam coals are a little lower in price this week. Quotations in the city are as follow:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current prices ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Cargoes arriving during the week were chiefly from Ellesmere Port, Manchester, Ayr, Newport, Neath Abbey, Garston, Maryport, Girvan, Preston, Glasgow, Swansea, Troon, Ardrossan, Cardiff, Whitehaven, and Workington. A contract is open for a 12 months' supply of English and Scotch coal to the Harbour Commissioners representing about 8,000 tons.

## THE TIN-PLATE TRADE

## LIVERPOOL.

There is no improvement to report. Some business in oil sizes has been done, but beyond this buying has been of the hand-to-mouth description. Prices are weak, and a good deal of "bearing" is going on. Quotations are about as follow:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 13s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 10½d. to 14s. per box; I C 28 × 20 (112 sh. 216 lb.), 27s. 3d. to 27s. 6d. per box; I C 14 × 18½ (124 sh. 110 lb.), 14s. per box; I C 14 × 19½ (120 sh. 110 lb.), 14s. per box; I C 20 × 10 (225 sh. 156 lb.), 20s. to 20s. 3d. per box; I C squares and odd sizes, 14s. basis for approved specifications. Charcoals tins easy at 16s. basis and upwards, according to finish, while ternes are quiet at round 23s. 6d. for I C 28 × 20. Coke wasters are in quiet demand. Quotations:—C W 14 × 20, 12s. 9d. to 12s. 10½d. per box; C W 14 × 18½, 12s. per box; C W 28 × 20, 26s. per box; C W 20 × 10, 17s. per box—all f.o.b. Wales, less 4 per cent.

## THE BY-PRODUCTS TRADE.

**Tar Products.**—The market is very quiet, and prices continue to rule easy. Benzols are about the firmest product, with pitch next. Naphthas are weak, and carbolic shows no signs of improvement. Creosote steady. Nearest values are:—

Benzols, 90's .....	1/1
Do. 50's .....	10/3
Do. 90's North .....	1/
Do. 50's North .....	10
Toluol .....	11
Carbolic acid, crude (60 per cent.) .....	1/3½ to 1/4
Do. crystals (40 per cent.) .....	4½
Solvent naphtha (as in quality and package) ..	9½
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3
Pitch (f.o.b. east coast) .....	41/6 to 42/6
Do. (f.a.s. west coast) .....	40/6 to 41/6
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—Though undoubtedly quiet, there is an atmosphere of stability about the market, which is more particularly pronounced in the forward section. In this branch some business is reported to the end of the year at a satisfactory premium on prompt quotations, but for anything beyond that makers are inexorable as to price. Closing prompt prices are:—

London (ordinary makes) .....	£12/5
Beckton (certain terms) .....	—
Liverpool .....	£12/17/6
Hull .....	£12/16/3
Middlesbrough .....	£12/15/0
Scotch ports .....	£12/18/9 to £13
Nitrate of soda (ordinary) per cwt. ...	10/7½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

**The French "Patente" Tax.**—At a meeting of the council of the Newcastle and Gateshead Chamber of Commerce, on Wednesday, the secretary reported that full details of the claims made by the French fiscal authorities upon British coal contractors for the payment of *patente* upon the French Railways have been submitted to the British Legation in Paris. The matter is now the subject of negotiations with a view to securing the option of *patente* of all contracts made up to the end of 1912.

## THE LONDON COAL TRADE

THURSDAY, JULY 3.

The London coal trade for the past week has been exceedingly slow. The wholesale market has been entirely deserted so far as colliery orders are concerned, and the buying has been almost entirely restricted to the factors and merchants dealing with one another for loaded wagons, either on route, or standing at one or other of the marshalling stations. The attendance on market has only been moderate, and business (especially for house coals), continues very small. The weather precludes any increase in the actual consumption of coal, so that the purchasing power of the ordinary merchant is limited entirely to the question of stock coal, and no one will pay full prices for this unless, of course, it is part of his contract arrangement. The renewal of contracts for the coming year has been entirely in abeyance during the past few weeks, and whilst collieries are firm in maintaining the full advance of 1s., the London merchants are equally firm in declining to enter into any further contracts unless at a lower figure, so the past few weeks negotiations have been at a complete deadlock. As, however, the time approaches when attention is specially turned to the question of stock coal for the coming winter, the chances of getting collieries to break away from the combination or the general understanding becomes less and less, and merchants, on the other hand, find public orders are gaining ground and increasing in volume. One large merchant, however, reports that he has already over 14,000 tons on the ground at his various depots. The depot trade in some districts already shows signs of increasing activity, and so far collieries have not had to work such short time as in previous years. The steam coal market is also very quiet just now, and manufacturers are not pressing, as they formerly did, for supplies of hard steam coal or for the small coal. The iron trade with its continual falling off is beginning to have a telling effect upon the trade generally, and it is very evident that unless the demand for shipment shows a marked improvement in the immediate future there will be a decidedly lower demand for all qualities of steam hards and furnace coals. Present prices are with difficulty maintained. The reports from America, however, speak of a good revival in the iron trade, and a larger volume of trade. In the seaborne market prices are nominally the same for house coals. On Monday's market the returns showed 26 cargoes having arrived in the Thames and 6 for Wednesday, all sold. The new contracts commence from July 1, and already a good number are settled, although during the past two or three weeks nothing whatever has been done in this respect. The question of increase in the railway rates is becoming a very serious matter, as although it does not affect the coal rates yet, it does hamper nearly all other kinds of merchandise, and the extra cost put upon material, together with the heavy burdens occasioned by the passing of the Workmen's Compensation Act, the Coal Mines Act, and the National Insurance Act, means a very heavy charge to all kinds of users, both collieries and manufacturers. Four per cent. in pig iron means 8 per cent. when it is handled again in the form of "billets," and 12 per cent. when moved into "rolled steel." The colliery increased expenses inevitably means that the public must make up their minds to pay more for coal in future.

## Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/6	13/6
Do. nuts .....	12/6	12/6
Birley cube Silkstone .....	12/	12/
Do. branch coal .....	15/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	12/6	12/6
West Riding Silkstone .....	12/	12/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	11/	11/
New Sharlston Wallsend .....	14/	14/
Wharfedale Silkstone coal .....	14/	14/
Do. Flockton Main .....	13/6	13/6
Do. Athersley house coal .....	11/6	11/6
Newton Chambers best Silkstone .....	15/	15/
Do. Grange best Silkstone .....	14/	14/
Do. Hesley Silkstone .....	13/	13/
Do. Rockingham selected .....	13/6	13/6
Do. Rockingham Silkstone .....	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best .....	11/	11/
Do. large nuts .....	10/9	10/9
Do. small nuts .....	10/	10/
Do. kitchen coal .....	9/6	9/6
West Hallam Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Do. London brights .....	10/	10/
Do. bright nuts .....	9/6	9/6
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Shipley do. brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Mapperley brights .....	11/	11/
Do. hard steam .....	10/9	10/9
Cossall Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Trowell Moor brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Grassmoor Main coal .....	12/6	12/6
Do. Tupton .....	11/	11/
Do. do. nuts .....	12/	12/

## Derbyshire—(cont).

Clay Cross Main coal .....	12/6	12/6
Do. do. cubes .....	12/	12/
Do. special Derbys .....	11/9	11/9
Do. house coal .....	11/	11/
Pilsley best blackshale .....	12/6	12/6
Do. deep house coal .....	10/6	10/6
Do. hard screened cobbles .....	10/	10/
Hardwick best Silkstone .....	12/6	12/6
Do. Cavendish brights .....	11/6	11/6
Do. cubes .....	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/	12/
Do. small hards .....	11/	11/
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	12/	12/
Do. cobbles .....	12/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/	14/
Bestwood hard steam coal .....	12/	12/
Do. bright cobbles .....	11/3	11/3
Hucknall Torkard main hards .....	12/3	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. ...	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/	12/
Do. hard steam .....	10/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/9	11/9

## Warwickshire.

Griff large steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	11/	11/
Do. loco Two Yard hards .....	14/	14/
Do. Ryder nuts .....	11/6	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Haunchwood steam .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Exhall Ell coal spires .....	12/6	12/6
Do. large steam coal .....	10/9	10/9

## Leicestershire.

Snibston steam .....	10/6	10/6
Do. cobbles .....	10/3	10/3
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/6	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	17/	17/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	10/	10/
Do. large nuts .....	10/	10/
Do. bakers' nuts .....	9/6	9/6
Do. Main nuts .....	10/	10/
Do. hards .....	9/6	9/6
Granville New Pit cobbles .....	11/6	11/6
Do. Old Pit cobbles .....	10/6	10/6

## North Staffordshire.

Talk-o'-th'-Hill best .....	13/6	13/6
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	15/	15/
Do. cobbles .....	14/	14/
Apedale best .....	13/6	13/6
Do. seconds .....	13/	13/
Podmore Hall best .....	13/6	13/6
Do. seconds .....	13/	13/

## South Staffordshire (Cannock District).

Walsall Wood steam coal, London .....		
Do. brights .....	13/	13/
Do. shallow one way .....	12/	12/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	11/	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/	12/
Do. one way .....	12/	12/
Do. shallow coal .....	12/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles .....	12/	12/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/	11/

## From Messrs. Dinham, Rawson and Co.'s Report.

Friday, June 27.—The seaborne house coal market was steady to-day, and a cargo of Sharlston Main and Silkstone unscreened was sold at last prices. Cargoes 15.

Monday, June 30.—The seaborne house coal market continued steady to-day, with no cargoes offering. Cargoes 26.

Wednesday, July 2.—The seaborne house coal market was very quiet to-day; no transaction in Durham or Yorkshire reported. Cargoes 6.

Messrs. Babcock and Wilcox Limited, Oriel House, Farringdon-street, E.C., inform us that owing to the rearrangement of the telephone exchange boundaries now being carried out by the postal authorities, their telephone number is City 6470 (eight lines).



THE CONCEALED COALFIELD OF YORKSHIRE AND NOTTINGHAMSHIRE.\*

By WALCOT GIBSON, D.Sc.

(Continued from page 1386, vol. CV.).

The Permian, Triassic and Superficial Rocks.

The lower coal measures pass up into the middle coal measures and these into the upper coal measures without showing clear signs of a break in the sequence or of a pause in sedimentation. The sandstones were doubtless deposited at a quicker rate than the beds of shale, and these more rapidly than the seams of coal, but proofs are wanting of a prolonged elevation and erosion of the carboniferous rocks during any part of the period.

After the deposition of the carboniferous rocks there followed a time during which they were uplifted and worn deeply down by erosion into a nearly plane surface on which the permian and triassic sediments, which form the cover of the coalfield, were afterwards overspread. The extent to which the carboniferous rocks suffered erosion is most clearly illustrated north-east of Leeds, where the whole of the coal measures, amounting to 5,000 ft. of strata, were thus removed before the maguesian limestone was deposited.

at the outcrop. In some cases the dip is the same, and a shaft near the outcrop reaches coal measures at nearly the same horizon as one situated in the direction of full dip. In this case, the horizontal shift of the outcrop of a bed by a fault of even small throw is considerable, so that another shaft placed on the line of strike may enter coal measures at a different horizon. From evidence obtained at Kelham and Thorne, it appears that the coal measures, at least locally, rise to the east on approaching the Trent, so that the base of the permian rests on lower horizons in the coal-measure sequence, and if the plane of the pre-permian denudation continues, the whole of the coal measures will ultimately be cut out by the newer formations.

Structure.—Three widely-separated periods can be recognised during which the main structural features of the coalfield were formed. Some of these were faintly outlined during the deposition of the carboniferous rocks; others were added and older ones modified in post-triassic, and possibly in tertiary, times, but the main structures originated and were stereotyped during the long interval which elapsed between the close of the carboniferous and the opening of the magnesian limestone period. The recognition of these three stages in the geological history of the coalfield, and of the

show that some of the lower seams had been consolidated and then denuded before the later sediments were deposited. Considering the friable nature of coal its presence in the form of fragments is in favour of a slight temporary elevation of the low-lying margins of the area of deposition rather than of considerable and prolonged emergence. The orderly sequence in which the groups and sub-groups of the coal measures follow each other from one end of the coalfield to the other precludes extensive contemporaneous denudation, which, indeed, has been advanced only in the case of the alleged unconformity of the Rotherham red rock.

The greater part of the folding and faulting of the coal measures is certainly later than the formation of the upper coal measures; but in one district of the Whitwood Colliery it is stated by Prof. Kendall\* that a "small fault throws a coalseam to the extent of 60 ft., and does not affect a seam above it." This is an exceptional occurrence unless the phenomenon has been undetected in other collieries.

(2) Post-Carboniferous and pre-Permian movements.—Throughout the carboniferous period depression and deposition were practically continuous. At its close a reversal of movement set in: elevation succeeded depression; denudation, on a vast scale, followed

TABLE GIVING THE THICKNESS OF THE COVERING FORMATIONS AS PROVED BY SHAFT SINKINGS (c), AND BORINGS (b). The arrangement is from north to south. Measurements are in feet and inches.

Name of formation.	Selby (b). 16, O.D.	Barlow (b). 16-1, O.D.	West Bank Carl- ton, Snaith (b). 20, O.D.	Thorne (b). 20, O.D.	Brodsforth (c). 123, O.D.	Bentley (c). 21, O.D.	Armthorpe (b). 50, O.D.	Haxey (b). 18, O.D.	Manton (c). 120, O.D.	Bevercotes (b). 95, O.D.	S. Scarle (b). 35, O.D.	Sherwood (c). 380, O.D.	Mansfield (c). 385-86, O.D.	Oxton (b). 260, O.D.	Kelham (b). 40, O.D.	Thurgarton (b). 57, O.D.	Gedling (c). 185, O.D.	Wilford (b). 80, O.D.	Edwalton (b). 95, O.D.	Ruddington (b). 100, O.D.	Clifton (b). 180.	Owthorpe (b). 200, O.D.
Superficial	70	94	60	60	—	100	20-7	32	—	9-9	21	—	0-10	—	18-6	21	7-3	21	10	7	11	—
Lias	—	—	—	—	—	—	—	—	—	—	29	—	—	—	—	—	—	—	—	—	—	—
Rhætic and keuper marl	—	—	—	—	—	—	—	105-7	—	—	—	—	—	—	397-6	92-9	—	—	389	386-0	509	661-6
Keuper waterstones	—	—	—	—	—	—	—	—	—	27-9	908-6	—	—	—	174	150	69-0	—	—	—	—	—
Bunter	590	601	466-6	856-6	—	28-6	518-5	1,042-11	213-4	681-10	541-6	14	273-10	374-6	671	493-5	385-2	192	50-8	73-9	192	121-6
Upper permian marl	109	105	102-6	131	—	56-4	68-10	58	20	3-2	118-6	absent	absent	absent	absent	absent	absent	246	254-4	220-7	258	273-6
Upper permian limestone	109	103	104	92	—	53-2	42-8	84	22-6	25-6	43-6	absent	absent	absent	absent	absent	absent	—	—	—	—	—
Middle permian marl, &c.	74	118	118	125	79	34	114-9	132-9	68-8	153-4	150	absent	absent	absent	absent	absent	absent	—	—	—	—	—
Lower permian limestone	312	284	215	261	110	224-10	194-9	273	260-6	202-3	207	132-6	68-6	44-4	82-6	68-10	46-1	absent	absent	absent	absent	absent
Marl slates	3	nil	nil	12	nil	24-6	11	9	35-10	26-6	207	88-3	98-7	85-6	21-6	24-0	0-8	absent	absent	absent	absent	absent
Breccia (b) or	—	nil	—	—	nil	nil	nil	nil	nil	6 (b)	1 (b)	8 (b)	2-11 (b)	2-6 (b)	1 (b)	0-6 (b)	—	—	—	—	—	—
Sands (s)	17 (s)	nil	25 (s)	1 (s)	nil	nil	nil	nil	nil	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	1,284	1,305	1,091	1,538-6	189	521-4	971	1,737-3	620-10	1,136-1	2,020	212-9	458-10	516	1,401	850-6	508-2	459	704-0	687-4	970	1,069

Configuration, Structure and Limits of the Basin.

Configuration.—Between Nottingham and Thorne a sufficient number of shafts and borings have reached the coal measures to enable the construction of a rough outline map, showing the contours of the surface of the concealed carboniferous plateau over the central part of the coalfield. Each of the contour lines is obtained by taking the depth to the coal measures at three points arranged triangularly. It is assumed that between two of these points the inclination of the coal measure surface remains uniform, so that if the line joining two points is subdivided into equal lengths, these will give the depth to the coal measures at intervals between the two known points. A second side of the triangle is subdivided in the like manner, and the points giving equal depths to the coal measures are then joined. The same process is repeated for the rest of the area.

The method supposes the absence of extensive post-permian faulting. Between Nottingham and the Yorkshire border the recent survey on the 6 in. scale has shown the general absence of faulting in the newer formations. South of Nottingham there are several large faults affecting the trias, and it has not been thought advisable to continue the contour lines south of the Trent. Near Doncaster, the swerving of the contour lines may be caused by the presence of faults which are known to displace the permian rocks to the west at Conisborough. The contours are not extended north of the Thorne, since the triassic rocks are here concealed under the superficial deposits, and there are only a few borings which reach coal measures.

While the parallelism of the contour lines is probably not so exact as represented, it shows a striking uniformity in the slope of the coal-measure surface underneath the permian and trias. The map, it is hoped, will afford, therefore, a ready means to obtain the approximate depth to the coal measures in future explorations.

The slope of the buried surface is directed a few points north of east, and is, therefore, oblique to the north-west strike of the coal measures. Its amount varies between 90 and 100 feet per mile, or about 1 deg., which is less than the general dip of the coal measures towards their outcrop. Higher coal measures, therefore, occur more frequently beneath the permian than

relative extent of the deformation of the carboniferous strata attributable to each, constitute an important branch of investigation applicable not only to the present area, but to all the coalfields of carboniferous age in western Europe.

The disturbances may be considered in the consecutive order of their occurrence as (1) those of carboniferous age; (2) those of post-carboniferous but of pre-permian age; and (3) those of post-permian age.

(1) Carboniferous Movements.—The marked paleontological break between the upper and lower carboniferous rocks does not appear to have been accompanied by a stratigraphical discordance in the present area; at any rate, there are no evidences of an unconformity between the millstone grits and the limestone shales.

Among the upper carboniferous rocks, the frequent alternation of marine, estuarine, and, in the case of the seams of coal, possibly terrestrial conditions, indicates repeated changes in level. Though oscillatory movements are thus clearly demonstrable, there are no proofs that they were accompanied by contemporaneous folding and extensive fracturing or of much erosion of the rocks. But while the structural changes were of small account, the effect of the oscillatory movements on the sedimentation of the coal measures was considerable. The coal measures, it is agreed, consist of shallow water deposits. It is therefore impossible to account for the much greater accumulation of sediments over the central part of the coalfield other than by differential movements acting during their deposition.

In an area undergoing differential movement it may be expected that the sediments would be raised locally above sea-level and subjected to erosion. The well-known "washouts" met with in the Top Hard (Barnsley) seam, in the Deep Hard (Parkgate) seam, and in other coals, furnish examples of contemporaneous erosion on a small scale. The removal of the coal is usually attributed to the action of streams flowing across the areas of coal measures. A tidal scour, however, would produce the same result. A more convincing example of inter-carboniferous denudation accompanied by elevation is the occurrence of angular and rounded fragments of coal at several horizons in the middle coal measures.\* These pieces of hard coal

deposition. When, at the commencement of the magnesian limestone epoch, depression and sedimentation again took place, the complicated structure of the coalfield and its outline had been almost completed while thousands of feet of carboniferous rocks had been swept away.

The disturbing force in the form of a lateral thrust which buckled up the originally horizontal or gently dipping coal measures appears to have come from two directions. By far the most powerful thrust came from the east. It was accompanied, or, according to some authorities, it was preceded by a secondary impulse from the south and south-east. Whether the compressing forces are regarded as acting together or separately, they bent the horizontal or gently inclined sheet of carboniferous rocks into a series of ridges (anticlines) and basins (synclines). One of these main ridges is occupied by the limestone country of Derbyshire; the chief basin is filled with the coal measures. While the relative age of the movements is disputed, it is quite certain that the two sets operated and were completed before the magnesian limestone period, for the permian rocks, gently inclined, pass over the edges of the anticlines and synclines without themselves being folded; also, as happens north of Leeds, they are sometimes inclined at a right angle to the underlying carboniferous rocks. It is important to bear in mind that the impulse from the east was the most intense, and that to it is due the elongated north and south direction of the coalfield. At the southern end of the coalfield, east of the Erewash Valley, it mastered the movement from the south, so that the east-and-west trend of the coal measures between Dale and Sandiacre is twisted round to the south-east, in which direction it is known that it extends past Ruddington and for many miles to the south-east. If the thrust from the south had dominated the one from the east, then, as was once thought, the coalfield would have terminated a few miles south of Nottingham City. According to Clifton Ward, the east-and-west fold at the northern end of the coalfield is similarly turned to the north-east; but Prof. Kendall considers that it continues, without deflection, under the permian and trias eastwards to the chalk escarpment.

\* From a Memoir of the Geological Survey, England and Wales.

\* The Haigh Moor coal in many pits within 10 or 15 miles of Normanton affords a good example of a wash-out with the formation of a conglomerate, containing pebbles of coal, which fills up the hollows in the denuded parts of the

seam (P. F. Kendall), "The Geology of the Districts around Settle and Harrogate." Proc. Geol. Assoc., pt. 1, vol. xxii, 1911, p. 44.

\* Ibid., p. 44.



is represent only one way in which rocks subjected to pressure accommodate themselves so as to occupy a confined space. The same result is obtained by the displacement of the strata by faults, of which the visible coalfield affords numerous examples. The faults belong to two systems. One trends north-west or north-and-south, being roughly in the direction of the major folding. The other, represented by several faults, crosses the coalfield in a north-easterly direction. A few faults have the direction of the east-and-west folds, of which one, the Clifton Fault, at the southern end of the coalfield, is entirely of post-triassic age. Several of the faults belonging to the north-west and north-east systems can be traced up to the escarpment of the magnesian limestone which either extends in unbroken continuity across the faulted coal measures, or the displacement of the limestone is very much less than that of the coal measures. In the first case the faulting was certainly older than the magnesian limestone; and in the second, the maximum displacement evidently took place previously to the deposition of the limestone.

Many of these faults have been proved in the underground workings beneath the magnesian limestone, and others are met with which do not extend into the visible coalfield, or affect overlying permian and trias. In the south, at Bulwell, a fault trending a little south of east, has been proved to have a throw of 261 ft. in the workings of the Cinderhill Colliery. In the quarried permian limestone and triassic sandstones at the surface it has only a few feet throw. On the same line a belt of faulting extends across Nottingham city, and may indicate the surface position of faults having a much greater displacement in the coal measures. Their existence is at least sufficient to invalidate the calculation of the dip of the Top Hard coal as deduced from its depth in the shafts of the Clifton and Gedling collieries.

Further north the magnesian limestone is not affected by a belt of faults, having an aggregate downthrow south, which crosses the Derbyshire coalfield from north-west to south-east between Chesterfield and the limestone escarpment west of Skegby. As the faulted belt keeps roughly parallel with the pronounced anticline (Brimington anticline) which extends from near Holmesfield to Teversall, it may continue further to the south-east, in which case it would pass between the borings at Oxtan and Thurgarton and that of Kelham, and so bring the middle coal measures nearer to the surface on the upthrow side of the fault. The faulted Dronfield syncline which succeeds the Brimington anticline on the north is also in alignment with disturbances found in working the Top Hard coal beneath the unfaulted magnesian limestone between Langwith and Whitwell.

Travelling north, the next conspicuous belt of fracture belongs to the north-east system of faulting. This consists of the remarkable disturbances which range along the Don Valley between Sheffield and the magnesian limestone outcrop near Conisborough. Green states that "between these faults the beds are twisted round so as to range in a north-easterly and south-westerly direction with a dip to the south-east, whereas the average strike of the adjoining country on either side of the faults is north-west and south-east, and the dip to the north-east."\*

If the line of this faulting is continued to the north-east of Conisborough it passes between Bentley Colliery, where the Barnsley coal lies 1,847 ft. below sea-level, and the boring at Armthorpe in which, though it is nearly on a level course with Bentley Colliery, the Barnsley coal is certainly at a much greater depth. Proofs of the extension of the Don faults beneath the superficial deposits to the north-east of Armthorpe are entirely wanting. The possible presence of this pronounced disturbance in the deeper parts of the syncline should, however, be kept in mind. It is certainly not safe to assume that the depth to the Barnsley coal at Hatfield is intermediate between the depth (3,115 ft.) of this seam at Haxey and that of the Thorne boring (2,736 ft.).

North of the Don Valley several faults with a north-easterly direction, and having considerable throws, extend up to the magnesian limestone; but there are no proofs of their prolongation into the concealed coalfield, though the boring at Barlow passed through highly-inclined and faulted middle coal measures. The boring is on a line with the faults seen at Pontefract, 12 miles to the south-west of Barlow, but a slight change in their direction would carry them either to the north or to the south of the boring.

The close association of faulting and folding exemplified by the faults accompanying the Brimington anticline is repeated in several other cases, notably by the faults

of the Yorkshire Coalfield," *Mem. Geol. Surv.*, 1907, p. 33.

bounding the anticline along the Erewash Valley between Trowell and Langley Mills, and by those limiting the Shipley syncline. The change in the strike of the coal measures between the Don faults also suggests the partial formation of a pre-permian anticlinal fold, in which the strata became dislocated before the completion of the fold.

The disturbances found in the exposed coalfield, although numerous, are not so abundant or so intense as those in the coalfields on the west side of the Pennines. The folds are less acute: the faults of inferior magnitude. It is perhaps too generally assumed that the concealed coalfield was even less influenced by the pre-permian movements than the visible coalfield, a conclusion in many cases deduced from the comparative absence of faults in the permian and trias. The examples previously given of the magnesian limestone resting undisturbed on faulted and folded coal measures clearly show that the structure of the coalfield underneath the undisturbed permian and triassic rocks may be often of a complex character. A case is on record where the depth to the Barnsley coal was 300 yards shallower than the depth estimated from the dip to the nearest workings.

*Post-triassic Movements.*—The post-triassic disturbances, as shown by faulting, are of much less magnitude than those of pre-permian date; and so far as is known the chief post-triassic faults are confined to the southern part of the basin. The small faults affecting the trias between Nottingham and Retford may, as in the case of the Cinderhill faults, indicate the surface position of much larger dislocations in the coal measures. Gentle undulations of the strata occur among the triassic rocks; and between Bulwell and Linby a narrow monoclinical fold in the magnesian limestone coincides with several faults of small throw, and of considerable linear extension in the coal measures. With this exception, sharp folds, extending in belts for considerable distances, are not met with in the permian or triassic formations.

*Igneous Rocks in the Coal Measures.*—Possibly one of the latest signs of movement is afforded by the igneous rock of the Owthorpe and Kelham borings. There can be little doubt that this rock is intrusive into the coal measures, and though it has not been found to pierce the triassic rocks, yet in its petrological character it bears some resemblance to those igneous intrusions which traverse the later triassic sediments in Staffordshire. At Whitwick, in Leicestershire, however, it is thought that the whinstone is of late carboniferous age, and was injected in the upper part of the coal measures, being overlain by the highest of these measures, which were denuded prior to the deposition of the trias.\*

\* Fox-Strangways "Leicestershire and South Derbyshire Coalfield," *Mem. Geol. Surv.*, 1907, p. 33.

(To be continued.)

## LAW INTELLIGENCE.

### HOUSE OF LORDS.—June 25.

Before Lord LOREBURN, Lord DUNEDIN, Lord SHAW, and Lord MOULTON.

#### A Coal Contract: Question of Warranty.

**Denaby and Cadeby Main Collieries Limited v. Lambert Brothers Limited et al.**—This was an appeal and cross-appeal against an order of the Court of Appeal reported in *The Times* of October 31, 1912. The plaintiffs (the Denaby and Cadeby Main Collieries Limited) claimed in the action to recover £2,295 18s. 9d. for the price of Denaby coal, washed doubles, washed singles, and washed small, sold and delivered to the defendants. The defendants pleaded that the coal, which was intended for shipment to the Rhine district, was not up to sample and was unmerchantable. They said that the coal was defective as regarded the size of the pieces, its calorific efficiency and quality of ash, and the amount of moisture it contained. The defendants counterclaimed for damages for breach of warranty, and also for damages for the wrongful repudiation by the plaintiffs of a contract to deliver certain coals known as Denaby "washed singles" to the defendants. The action was tried in the Commercial Court, and Mr. Justice Scrutton gave judgment for the plaintiffs on the claim for £2,295 18s. 9d., and also gave judgment for them on the first part of the counterclaim—namely, the defendants' claim in respect of bad qualities of previous deliveries. On the second part of the counterclaim he gave judgment for the defendants for £1,700, being of opinion that there was nothing in the conduct of the defendants which justified the plaintiffs in refusing to make such deliveries. Both parties appealed from that judgment. The Court of Appeal (Lords Justices Vaughan Williams, Buckley, and Kennedy) dismissed the appeal of the appellants and the cross-appeal of the respondents, and ordered the trial of certain issues which were not relevant to the present appeal and cross-appeal.

Lord Loreburn, in giving judgment, said that the decision of the House in this case must depend upon the

application of a principle of well-ascertained law. It was clear that in order to operate as a repudiation of a contract the declaration not to carry out by buyers of the coal must distinctly convey to those whom they were dealing with that the contract would not be performed. He thought that upon the whole of the correspondence the Denaby Company were entitled to come to the conclusion that their buyers did not intend to carry out the contract except on obtaining instructions or authority from their German correspondents. That being the case, it seemed to him that they were entitled thereupon to cancel the contract as being one which had been repudiated by the other party. The other point was whether the repudiation applied to "washed singles" or only to the other qualities of coal. He thought that the intimation of the future course of conduct on the part of the buyers was sufficiently general to apply to all three contracts, and therefore the appeal must be allowed and the cross appeal dismissed, and he moved their lordships accordingly. The other noble and learned lords gave judgment to the same effect.

Order accordingly.

### SUPREME COURT OF JUDICATURE.

#### COURT OF APPEAL—May 28.

Before Lords Justices VAUGHAN WILLIAMS and HAMILTON, and Mr. Justice BRAY.

#### Charges for Water.

**Nuneaton Corporation v. Stanley Bros. Limited.**—This was an appeal by the Nuneaton Corporation (the defendants in the action) from a judgment of Mr. Justice Bailhache in favour of the plaintiff, Messrs. Stanley Bros. Limited.

Lord Justice Vaughan Williams, in giving judgment, said that the arbitrator found that the claimants were, during the period between June 24, 1900, the date of the agreement, and December 30, 1909, when they discovered their rights under the agreement, *bona fide* ignorant of the existence of legal rights of any nature or extent whatsoever, whereby they could require the respondents to supply them with water under the agreement; that they were ignorant of the covenants in the conveyance which related to such rights, and that the sums paid in respect of the water consumed were paid by them by inadvertence and in ignorance of any legal rights entitling them to supply at the lower rate. The arbitrator left four questions to the Court—(1) Upon the construction of the agreement were the Corporation liable, in the event of the company being unable to obtain from all their available sources sufficient water for the purposes of their said works to supply the company with water at cost price, not exceeding 2d. per 1,000 gallons, to the extent that the company might be unable to obtain sufficient water from their own sources, such supply being given through and taken from the water mains of the Corporation vested in and used by them as the water undertakers for the borough of Nuneaton? (2) Was the Corporation bound to supply the company to the extent that they were unable to obtain sufficient water for some or any of the purposes of their works by reason of any defect in the quality thereof? (3) Whether what the company had paid in excess was paid under a mistake of law or a mistake of fact? (4) Whether the Statute of Limitations applied? In his lordship's opinion, the water to be supplied by the Corporation was to be "commercial water," and therefore their duty to supply was not limited to pumping water into the company's reservoirs. But he thought Mr. Justice Bailhache had wrongly decided Question 2, and that the liability to supply only arose by failure of quantity and not of quality from their own sources. He also was of opinion that the money paid was paid under a mistake of law. He was content, however, to hold that the appeal must be allowed, because, in his opinion, no liability to supply at the lower rate arose unless and until the company gave notice to the Corporation that their own supply was exhausted, and they required water for their brick and glazing work and colliery. No such notice had been given, and therefore the company were not in a position to require repayment, but must pay for the supply they had had just as any other ratepayer who took water from the Corporation. In that view of the case it became immaterial to consider whether the Statute of Limitations prevent the company getting back payments for more than six years, because, in his opinion, they could get back none of the money which they had paid for water.

The other members of the Court agreed.

The appeal was accordingly allowed with costs, no costs to either side of the trial, and the costs of the arbitration to be decided by the arbitrator.

### HIGH COURT OF JUSTICE.

#### KING'S BENCH DIVISION.—May 22.

Before Mr. Justice CHANNELL and Mr. Justice COLERIDGE.

#### Payment of Wages.

**Pilling and the South Kirby (Featherstone) Collieries Limited.**—This was an appeal by Herbert Pilling, a collier, who was the plaintiff in an action against the South Kirby (Featherstone) Collieries Limited from the judgment of his Honour Judge Benson at the Pontefract County Court. The amount claimed was a small one, only 7s. 6d., and was for work done. The plaintiff worked under a contract of



service with the defendants dated April 19, 1912. He had formerly worked for the company in a "place of his own." Then there came the national strike, and he went back to work for the defendants. His "place" was some time afterwards finished, and following the procedure in the colliery he went and stood in the "market" at the bottom of the colliery. Then the deputy-manager came round, and ascertaining what places were vacant sent the plaintiff to work in a particular "set" where the men were regularly employed. The plaintiff being a "market" man could not collect the money earned, and it was the practice for one of the regular "set" to collect and distribute it among the men. On this particular day Pilling earned 7s. 6d. At the end of the week one of the regular men named Jones went and got the lot. Instead of paying Pilling his 7s. 6d. he absconded, and the plaintiff never obtained the money. The onus, as the judge had found, was upon the company to show that they had paid the money. Several reasons were set up by the defendants to persuade him they had paid the 7s. 6d., but on two points he found for the plaintiff. On the third point, however, he gave a decision for the defendants and entered judgment for them, saying that the plaintiff had acquiesced in being paid in that way and therefore he must put up with the loss. There was no evidence, it was contended, upon which the judge could find such authorisation. Counsel thought that the judge had confused acquiescence in the mode of payment with an agreement with the person who collected the sum to be his agent to collect.

For the defendants, it was argued that the decision was correct. This method of payment was an implied term of the contract of service with the defendant company and would constitute Jones the agent to collect the money.

Mr. Justice Channell, in giving judgment; said that the only fact found by the county court judge appeared to be the plaintiff's knowledge of the mode of payment. He did not think that the judge had found sufficient facts to justify him in deciding that the burden of proof of payment had been discharged by the defendant company. The appeal must therefore be allowed and judgment entered for the plaintiff for 7s. 6d.

Mr. Justice Coleridge concurred. Leave to appeal was given.

June 10.

Before Mr. Justice PICKFORD.

#### The Strike Clause.

**Cunard Steamship Company v. the Denaby and Cadeby Main Collieries Limited.**—In this action the Cunard Steamship Company sued the Denaby and Cadeby Main Collieries Limited in respect of 25,000 tons of coal which they said should have been supplied for their liners. The case turned upon the interpretation of what was called in the Cunard's invitation to tender "the usual strike clause." A year's contract to supply coal was to have ended in October, but the great coal strike of the spring of last year interfered with deliveries and the Cunard asked for damages, first, for refusal to deliver after October the quantity of coal the plaintiffs said had been suspended or carried forward by the strike clause, and, secondly, for refusal to deliver during the strike from coal which the plaintiffs had in stock. The quantity in question, according to the defendants, was less than 10,000 tons. They contended that not only were they not bound to deliver under their contract, according to the strike clause, but they were under no necessity to deliver out of their stock unless they wished.

His lordship, in delivering judgment, said that he found there was little controversy as to what the usual strike clause was. It was practically agreed that it meant where there was a total or partial stoppage deliveries were to be suspended or cancelled. One said "suspended," another "cancelled." The right to suspension entitled the defendants to say if they had stocks in hand, "As there is a strike we shall not deliver, but shall sell to you at an enhanced price." He should have thought that that was a consequence not originally contemplated when the strike clause was first introduced. Since, however, this seemed to be the meaning of "the usual strike clause," it appeared to him that the defendants did simply what they were justified in doing. Judgment would be for the defendants, with costs.

July 1.

Before Justices RIDLEY and COLERIDGE.

#### The Minimum Wage Act and County Court Claims.

#### The Clay Cross Colliery Company Limited v. Randle.

This case raised a point of considerable importance under the Coal Mines (Minimum Wage) Act, 1912. From April 11 to 17 there was a local strike at the Clay Cross Colliery, and upon April 23 it became necessary to ascertain whether the workmen had earned a minimum wage. The workman Randle contended that under the Minimum Wage Act he ought to have £1 11s. 8d., whereas, in fact, he only earned 19s. 4d., and he claimed the balance of 12s. 4d. At the particular moment when Randle was working the Derbyshire district rules had not been made. This dispute had gone through all the various tribunals under the Act, and in due course of time it came before an independent chairman, Mr. W. M. Wilson. On November 12 the independent chairman decided against the workman, and said he was not entitled to a minimum wage under the Act. He gave

a certificate on November 14, 1912. It said that James Randle was a workman employed at No. 6 pit, and was a person excluded under the District Rules from the operation of section 1 of the Act; and was not a workman to whom the minimum rate of wages was applicable for the week in question in April 1912. Upon that, Randle went to the County Court, and there sued for 12s. 4d. Counsel submitted that there was no jurisdiction for the man to go to the County Court at all, because he had invoked all the special tribunals under the Act, and they had given judgment against him. For the respondent, it was contended that the certificate of the chairman was void, and was equivalent to no certificate at all. The Minimum Wage Act simply modified the contract of employment by inserting a statutory term in the contract of employment which entitled the man to a minimum wage in any event, and, apart from certain certificates, entitled him to recover that minimum wage in a way that every member of the community was entitled to recover—by suing for it in the county court. This man earned his money before the rules came into operation, and he was entitled to recover it in the county court. The county court judge held that the workman might recover the minimum wage as a simple contract debt, unless certified to be a person excluded from such rights and held to forfeit them. He came to the conclusion that the certificate given Randle was not within the Act, and therefore the objection to the jurisdiction to the county court failed. Counsel finally contended that the rule under which the certificate was given was *ultra vires*.

Mr. Justice Ridley, giving judgment, said they had come to the conclusion that the decision of the county court judge was wrong, and could not be supported. A certificate was given that the plaintiff was not a person to whom the Act was applicable, and the certificate he held was a good and valid certificate. The decision of the county court judge was wrong, and therefore the proper decision would be judgment for the defendants.

Mr. Justice Coleridge said what the Court had to decide was the legal correctness or otherwise of a certificate signed by the independent chairman of a board appointed under the Act excluding the plaintiff as a workman to whom the minimum rate of wages was not applicable. He did not consider District Rule 4 *ultra vires*. Therefore the matter could only be referred to the chairman, and could only be decided by him. The certificate given was very clear. If the workman got a certificate he could sue upon that certificate, and if the employer got the certificate he could meet the workman's claim with it. In substance the certificate given by the chairman was correct. There was no ground, therefore, for saying that the chairman exceeded his jurisdiction, or that the case was open to the jurisdiction of the county court judge. The appeal would be allowed, and judgment entered for the defendants, here and in the Court below, with costs.

Leave to appeal was granted.

#### SCOTTISH JUSTICIARY APPEAL COURT.—June 10.

Before the LORD JUSTICE-GENERAL and Lords KINNEAR, JOHNSTON and MACKENZIE.

#### Question of Mechanical Haulage.

**J. S. Soutar v. C. C. Reid.**—This was an appeal presented for John Shaw Soutar, Procurator Fiscal, who, in the Sheriff Court at Dunfermline, brought a complaint against Charles Carlow Reid, certified colliery manager, Cowdenbeath, charging him with having, in the sense of section 122 of the Coal Mines Act, 1912, as agent of the Fife Coal Company Limited, contravened section 46 (4) (b) of the Act in respect that, on November 30, 1912, in No. 1 Dalbeath Pit, he failed to provide to ascending tubs on a haulage road on which mechanical haulage was used, backstays or other suitable contrivances for preventing the tubs running back. The haulage road in question was a self-acting incline about 30 yards long. There were two lines of rails, each line being alternately used for the passage of an empty tub and a loaded tub. As the loaded tub descended under gravity it pulled up the empty tub, the two tubs being joined by a chain which passed round a pulley fixed at the top of the incline. Backstays were not provided, but had they been provided, there was nothing to prevent the full hutch from running away. In November last the chain broke, and both tubs ran away, James Meldrum, a worker, being killed. Sheriff-Substitute Umpherston found the respondent not guilty, holding that no mechanical power, as he interpreted that phrase when used in the Act, was in use to actuate the haulage, and that the backstays were not required by the Act.

The Court dismissed the appeal, and found the respondent entitled to expenses in both Courts. Their lordships were of opinion that this was not a road worked by mechanical haulage within the meaning of the Statute.

In consequence of the great development of the district of Adwick-le-Street, midway between the Bentley and the Brodsworth collieries, the parish council have applied to West Riding County Council to grant them urban powers. A communication has been received from the county council to the effect that the applicants have made out a *prima facie* case for enquiry, and that a sub-committee has been appointed to initiate such enquiry.

#### CONTINENTAL MINING NOTES

##### Austria

**Official Wholesale Coal Prices, Vienna Exchange.**—Pilsen large coal, 32.20 kronen per ton, in 10-ton lots, ex Franz-Josef Bahnhof. Ostrau-Dombrau-Karwin coals: Large 28.10-29.10 kronen, cubes 27.60-28.60 kr., nuts 26.60-27.60 kr., small 23-23.20 kr., washed smithy coals 29-29.20 kr., coke 38-40 kr. per ton net cash, ex shutes Nordbahnhof. Rossitz-Zbeschau-Oslawan coals: Washed smithy coals 30.50-31.50 kr., coke 30-30.20 kr. per ton ex shutes Nordbahnhof or Staatsbahnhof. Upper Silesian coals: Best large or cubes 32.30-33.10 kr., medium large or cubes 31.50-32.30 kr., seconds large or cubes 26.70-27.80 kr., best nuts I. 32.70-33.50 kr., II. 29.60-30.10 kr., best small 23.50-24 kr., seconds small 22.50-23 kr. per ton net cash ex shutes Nordbahnhof. In 10-ton loads: Best large or cubes 30.70-31.50 kr., nuts 31.10-31.70 kr. per ton ex Nordbahnhof. Gas coke from the Vienna Gasworks, 32.40-34 kr. per ton ex works. Lignite: Dux large 21.70-23.20 kr., Brux or Dux cubes 21.70-23.20 kr., nuts 21.20-22.70 kr., Mariaschein cubes 23.70-25.20 kr., nuts 23.20-24.70 kr. per ton ex shutes Franz-Josefs or Nordwestbahnhof.

##### Germany.

**Ruhr Coal Market.**—There is no change in the situation, business being in general satisfactory, though not so exceedingly active as it was a short time back, the demand for fuel being less urgent, and consequently stocks, which were getting very low, are beginning to pick up again. This is due, on the one hand, to the lessened consumption of house coal, and on the other to the less favourable condition of the iron industry. It is true that the demands of that industry are still considerable, but users are no longer in dread of running short of coal and coke and do not care to lay in heavy stocks. Gas coal is in smaller request owing to the time of year, and the lessened consumption of coke accounts for the falling off in enquiries for coking coals. Nevertheless business is far from being considered bad. Large shipments have been going forward to South Germany, where, however, a portion has had to be stocked—especially in the case of house coals—though industrial coals and coke are slacker than heretofore. In northern Germany the volume of business is good, and is not affected by English competition. Among foreign customers, Belgium is not taking nearly as many coals as before the strike there, the local industry being in a very unsatisfactory condition. There is, however, no decline in the demand from Holland and northern France.

**Coal Market in South Germany.**—The market remains about the same, sales being naturally small since consumers and middlemen are, almost without exception, under contract, and it is only here and there that dealers are purchasing extra supplies of house coal in order to meet an anticipated increased demand in the winter. Industrial consumers are taking delivery to a satisfactory extent, and the same applies to dealers in house coal, considering the time of year. Dealers in lignite briquettes are taking in and stocking their quota in order to secure the rebate on the summer deliveries. The trade in gas coke is quiet, and the works are not offering much for shipment, preferring to lay up stocks for sale in the home market later on, when a good demand is anticipated. The Rhine keeps in good condition for traffic, craft being able to proceed above Rheinau without lightening cargo; but consignments of house nuts and broken coke are not coming forward in sufficient quantity.

**Coal Market in Upper Silesia.**—The state of business is satisfactory, the demands of consumers being all the greater on account of their stocks having been exhausted during the strike. The iron industry in particular has very heavy requirements, and though one hears that its situation is less favourable, this does not seem to have affected the consumption of fuel, most of the works being clamorous for delivery all the time. In these circumstances the deliveries are maintaining a high level, even in the case of house coal and gas coal, notwithstanding the season. The demand is naturally greatest for industrial coals; and coking coals cannot be raised fast enough to satisfy consumers. The export consignments are extensive, Austria-Hungary being willing to take even more than can be sent off. The requirements of the home market, which are considered first, also prevent full deliveries being made to Russian-Poland. In coke, the whole output of blastfurnace and foundry coke finds a ready sale, though other kinds are less sought after.

**Fuel Traffic in the Ruhr Harbours, May.**—The total railway consignments of coal, coke and briquettes to the Ruhr harbours during May amounted to:—Ruhrort, 1,115,948 tons; Duisburg, 432,173 tons; Hochfeld, 44,154 tons—aggregate, 1,592,275 tons. Shipments outward:—To Coblenz and places higher up river, 775,902 tons; to places below Coblenz, 19,429 tons; to Holland, 612,998 tons; to Belgium, 348,256 tons; to France, 45,936 tons; to other destinations, 32,853 tons. Total shipments from:—Ruhrort, 1,111,882 tons; Duisburg, 417,199 tons; Hochfeld, 45,300 tons; Rheinpreussen, 94,129 tons; Schwelgern, 85,818 tons; Walsum, 81,049 tons—aggregate, 1,835,377 tons.



## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**During the Federation—Swansea Agreement on Coal-trimming Tariff—How Latter-day Legislation has Burdened Coalmining—Housing Extensions for Thousands More Colliers—Protest against General Holidays Suddenly Called—Miners' Executive and the Joint Committee—Coalowners' Mining School and the Federation—Cardiff Docks and Increased Coal Rates—The Controversy as to Mixing Charges Ended—Death of Mr. Hugh Watts—Increase in Wage-rate of Iron and Steel Workers.**

During the early days of July "show cards" prevail throughout South Wales, and some trouble is anticipated on account of a number of men being members of the Gasworkers' Union instead of the Miners' Federation. In their circular of instructions the miners' executive state that they "have endeavoured to show the imperative necessity of all men being in one organisation, and the utter impossibility of colliery workmen securing any protection or benefit from membership" of the other union. But as negotiations have failed, the members of the other organisation are to be regarded as non-unionists. Against this declaration the Gasworkers' executive, at a meeting in Pontypridd on Monday, made energetic protest.

The coal-trimming tariff for Swansea has been agreed upon, a joint committee, which was invested with plenary powers, having made an arrangement which covers the next 12 months, subject to formal ratification by the Chamber of Commerce.

As evidencing the burden imposed upon industry by late legislation, it may be noted that the chairman of the Newport-Abercarn Company (Mr. T. E. Watson), at the shareholders' meeting, stated that during the year they had paid under the Minimum Wage Act £1,729, the new Mines Act £1,080, Health Insurance £772; these payments being in addition to £3,844 Workmen's Compensation. For three years the shareholders have been without a dividend, and the present distribution is 4 per cent. In his opinion, the coal market showed signs of reaction from the high prices recently paid, but he thought they might anticipate that the average price of large coal over the current year would show little if any diminution of the average of the past year.

Addressing the shareholders in the Tredegar Company, on Friday, Lord Aberconway incidentally made a reference which is further indicative of a pressing need in South Wales—namely, that for new houses. He said that, at Oakdale, 130 more houses were in course of construction, and that a company had been formed under the auspices of their own to erect 300 additional houses, and also a licensed hotel to be carried on under the same principle as that at Abertyswg, and they hoped by that means to keep the ordinary public-house out of the district.

At Pengam, where the Powell Duffryn Company are sinking, Mr. E. M. Hann, general manager of the company, laid the memorial stone of a garden village of 500 houses, and, in addition, the Beddwellty Council are putting up 60 houses. Together, these enterprises will give accommodation for over 3,000 persons.

Swansea Chamber of Commerce has made formal protest upon a matter which affects other places equally, for the growing tendency to take sudden holidays, deranging business seriously, is not confined to South Wales. At the meeting on Friday afternoon the president (Mr. W. T. Farr) drew attention to the stoppage of the docks on regatta day, and said that serious losses had been occasioned. He therefore proposed that the Chamber express disapproval of the action then taken, and suggested that in future before a general holiday be called there shall be a conference of the Chamber, the Harbour Trust, the Corporation, and the workmen's organisations. His own firm, he added, had their collieries stopped for a day owing to the stoppage at the docks. The resolution was unanimously carried.

The miners' executive, which met at Cardiff on Saturday, passed a resolution of protest against alleged dilatoriness on the part of the owners' representatives on the sub-committee in reference to the colliery banksmen dispute, and it was decided to press for a further meeting at an early date.

With regard to customary holidays—such as for an annual excursion, Sunday school demonstrations, &c., the executive discussed attempts by several colliery companies to prevent workmen taking a day off; and it was resolved that the council should support the men who take holiday in accordance with well-established custom.

Concerning the dispute at the Cynon Colliery, the Mayor of Aberavon wrote asking if the men were prepared to submit the questions to an independent person for settlement. The general secretary was instructed to reply that hitherto the owners had invariably refused to allow the interposition of a third person in disputes of this kind, and suggesting that the mayor should approach the owners in order to ascertain their opinion on the matter.

The secretary to the governors of the South Wales Mining School of Mines (Mr. Hugh Watts) wrote asking the council to receive a deputation in view to having placed before them the question of the institution; and it was decided that a

deputation should be invited to a future meeting of the council.

The proceedings before the House of Commons concerning the Cardiff Railway Bill have been of exceptional importance these last few days because of the keen cross examination that the witnesses have had to undergo.

The Cardiff company seek to double their rates for coal shipment at the Bute Docks, and also to add 50 per cent. to the wharfage dues, as well as ensure other changes. But the trade are opposing on the ground (among other things) that the statement as to the income of the docks does not entirely represent what Lord Bute—as owner of all the ordinary shares, and (with the Bute Trustees the greater part of the other capital—is really receiving. It has been pointed out that the rental from works, &c., situated on the dock side has not been brought into the account, and that there are other reasons for challenging the dock balance-sheet—such as the fact that three-quarters of a million was spent upon a railway some years ago intended to compete with the Taff Vale undertaking, but never yet brought into use. If Parliament does give power to charge the maximum rates asked for in the Bill, this would add £180,000 per annum to the income, yielding a return of 7 per cent. on the ordinary stock, notwithstanding the unused railway and other considerations.

Another part of the argument of the traders is that Lord Bute's revenue is obtained from the whole of the property in Cardiff and of the mineral territory behind, and that it is not fair to isolate the docks from the rest of his interests. It has been stated in evidence that Lord Bute's income from the dock estate alone is over £100,000 per annum. The present application does not specifically provide for any additional facilities to the trade, although a better return on the investment would naturally enable further provision to be made.

On the other hand, evidence for the promoters goes to show that increase in the size of vessels has necessitated heavy increase in equipment charges as to tips, &c.; and part of their case is that whilst coalowners, shipowners and wage-earners have all had a largely-increased income, the receipts of the dock property (as such) have actually gone down.

The importance of the contest lies in the belief that behind the Cardiff Railway Company stand the other dock owners; and that if power to increase charges be granted to Cardiff it will not be long before the other companies seek similar powers to increase.

It has been stated during the examination that if the company failed to get powers to increase the dues, the development of the docks will come to an end.

Cardiff Chamber of Commerce dealt on Saturday with the question of increase in coal-mixing charges, and decided to accept the arrangement made by the committee which had the matter in hand—viz., that a deduction of 25 per cent. should be made on the new charges in all cases where there was no sorting of empties, these new charges to come into force as from January 1 last, instead of three months earlier. The committee had endeavoured to secure postponement of the charges for another three months, but were unsuccessful, although they had a strong case for deduction. The dockowners were apparently agreed, so Mr. North Lewis explained to the Chamber, and the only alternative to acceptance of the new rates was costly litigation. Mr. Lewis pointed out that as the agreement was to remain in force for five years (except in the case of Cardiff) there could be no further advance in that period in the other docks. As to Cardiff, he did not think that company was likely to adopt independent action.

Concurrence by the Freighters' Association is announced, and the Swansea Chamber has agreed to fall in with the Cardiff arrangement, recognising that the best terms procurable had been secured by the committee during the negotiations.

The death of Mr. Hugh Watts, ten days after an operation for appendicitis, took place on Saturday afternoon at a private nursing home in London. He was partner in Watts, Watts and Co., and was well known in South Wales mining and commercial circles, being also greatly respected both for geniality of disposition and for exceptional business qualities. He was vice-chairman of the Coalowners' Association, and resided until recently at Newport, his later residence being Chepstow. He qualified as a mining engineer under the late Mr. Forster Brown, and for some time acted as certificated manager of the National Collieries at Wattstown, in the Rhondda. He was a director of the United National Collieries, and of Burnyeat, Brown and Co., large interests in the Sirhowy Valley. His death at the early age of 42 is generally regretted.

The Iron and Steel Workers' Joint Committee met at Abergavenny on Saturday. As a result of the report of the auditors, it was resolved that the wages should be advanced 2½ per cent. from July 1.

Before the Tin-platers' Conciliation Board, the workmen's representatives put in a claim for 25 per cent. advance where employers changed from eight-hour to six-hour shifts, it being admitted that this demand was put forward solely in order to restrict production. The employers' representatives, however, contended that this was the surest way to make matters really worse; and evidently the fact was recognised by the men, for after discussion the claim was withdrawn.

## MINING AND OTHER NOTES.

Mr. Maurice Deacon, presiding at the annual meeting of the Dinnington Main Coal Company, said local rates had risen enormously, and were now costing the company £7,000 a year. This inevitably meant that the public must make up their minds to pay more for their coal in the future.

The Newport coroner (Mr. Lyndon Moore) held an inquest last week on the death of Joseph Nicholls (23), Hewerton-street, Newport, who was killed at Cwmbran coke ovens by being smothered in small coal. The coal was being loaded into trucks, which were run under the bunker, and the view was expressed that deceased fell into the funnel. Mr. John B. Deakin, manager of the coke ovens, said for future precaution he intended to fix several ropes, with clips, to a beam over the bunker, so that they could be attached to belts which the men would wear.

Much is being done to perfect colliery rescue appliances in Northumberland and Durham. Three other stations are now being erected, namely, at Ashington, Houghton-le-Spring, and Crook. In Durham and Northumberland there are 350 collieries affiliated with the coalowners' associations, and with a single exception in Northumberland, the whole of the 350 collieries can be covered by the four stations, when completed, each of the pits being within a 10 miles radius of one or other of the stations. The present scheme is being carried out by a committee, of which Mr. W. C. Blackett, agent to the Charlaw and Sacriston Coal Company, is chairman, and it will cost over £40,000. Distinct from the fire engines, the rescue tenders are powerful motor cars fitted with special accommodation for rescue dresses, portable telephones, canaries for detecting the presence of gas, pumps and other sundries of an essential character. In Durham and Northumberland about 60 per cent. of the miners' houses belong to the coalowners, and as very few villages have adequate fire extinguishing appliances, the coalowners have offered the services of the brigade to the local authorities on the following terms:—£5 5s. for the first hour, £3 8s. for the second hour and each subsequent hour, and £1 10s. per mile travelled. Already a number of local authorities have made arrangements with the brigade at the figures mentioned. The engines are driven by 55-horse power motors, and can pump 400 gallons per minute. Seven trained men will be attached to each station in charge of a superintendent, and day and night there will be someone on duty. The fire engines have cost £1,500 each, and the rescue tenders and equipment about the same, and each station has involved an outlay of £8,000.

Mr. J. G. James, until recently a mining pupil and chief clerk in the Esh Colliery Offices of Messrs. Pease and Partners Limited, is leaving for America, and has been presented with a dressing case by the office staff.

Mr. H. Vassall, solicitor, of Bristol, son of the late chairman of the Taff Vale Railway Company, has been appointed a director of the company in the place of his father.

Mr. Henry Chester Vivian, of Roslear, Park-road, Penarth, coal exporter, who died on June 2, aged 43 years, left estate of the gross value of £13,285, of which the net personalty has been sworn at £11,230.

Mr. James Elce, who for the past seven years has been manager of the Silverwood Colliery, near Rotherham, and is now relinquishing that position in order to take up an important appointment as consulting mining engineer in South Russia, was on Saturday presented with an illuminated address by the Yorkshire branch of the National Association of Colliery Managers. Mr. Elce only recently completed a two years' term of presidency of the branch.

A fire broke out just before midnight on Saturday at Skinningrove Iron Works, Cleveland, and completely destroyed a portion of the joiners' shops.

Following upon the results disclosed by boring operations in West Fife, it is contemplated that new communities will arise in the not distant future. Recently the Oakley Collieries bored the Blair field, and there, within a short distance from the surface, some excellent seams were proved. It is understood that the company intend to sink two large new pits to work the minerals, which, as they lie at a depth of from 30 to 40 fathoms, will be comparatively inexpensive to raise. At the present time the Coltness Iron and Coal Company, who have secured a lease of the minerals on Inzievar, which lies contiguous to their Blairhall field, are proving the strata there in order to find its commercial possibilities. The Fife Coal Company are also proving a field to the west of Thornton, where they have struck the Five-foot seam at a depth of fully 200 fathoms. Operations at Thornton, where it is believed the company will sink pits at no very distant date, will be continued until the Dunfermline splint coal is reached. That seam is also expected to prove a valuable asset.

Mr. R. T. Moore, D.Sc., M.E. (chairman), presiding at the general meeting of the Niddrie and Benhar Coal Company Limited, stated that the sum paid in taxes was equal to a dividend of 4 per cent. on the share capital. The income tax, he said, was a specially unfair tax on mining properties. No deduction was allowed to be made for the large sums which had yearly to be set aside from the profits in order to repay the capital expended in sinking pits, which were of no value when the fields were exhausted. In the case of the Niddrie Company, during the past five years £2,476 had



been paid as income-tax on profits, while £16,000 had been divided among the shareholders in the form of dividends. The income-tax paid was thus 3s. 1½d. in the pound. Lest outsiders should talk of the large profits of coal companies, he pointed out that in this year of exceptionally good trade, the dividend they were paying amounted to less than 7d. per ton of coal produced.

In his report for 1912 the Chief Inspector of Factories and Workshops, referring to industrial developments, says wonderful tales of trade activity come from all parts among the works in Leeds for making detonators and in Newcastle for making ferro-silicon alloys and malleable cast steel, both of these processes being carried on through the aid of electric furnaces. The advance in the use of electrical power for driving is again most marked. Another trade development to which attention is specially drawn is an influx of colliers into the Doncaster district, which has led to the starting of industries, such as worsted spinning and blouse making, to provide for the employment of women.

At a meeting of Cleveland ironmasters, held at Middlesbrough on Tuesday, a suggestion was considered to form a company for the distribution of the pig iron made in the district. It is understood that the suggestion is made by Messrs. Bolckow, Vaughan and Co., and arises out of the situation created by the recent suspension of payment by the firm of Messrs. James Watson and Co. The formation of such a company as suggested would render the continuance of the public warrant stores superfluous. The meeting adjourned with the understanding that another meeting to further discuss the matter would be called at an early date.

The Standing Orders Committee of the House of Commons met on Monday for the purpose of considering whether the Standing Orders ought to be dispensed with in the case of the North British Railway Bill. The Select Committee of the House of Lords, who recently passed the Bill, did so on condition that the Lothian colliery owners should be allowed to place as many coal wagons as they liked on the railways between the coalmines and Leith Docks. The Caledonian and the Glasgow and South Western railway companies strongly objected to this clause, which runs counter to the general policy of the railway companies to reduce the number of privately-owned wagons. The Standing Orders Committee, after deliberating in private, decided that the Standing Orders should be dispensed with, and the Bill be allowed to proceed in the Lower House.

The session at the University of Manchester of the department of mining and geology will commence on October 2. In addition to the usual courses in mining, special provision is now made for the training of students who wish to qualify for prospecting appointments under mining companies, or who may become candidates for appointments on the Colonial and Indian Geological Surveys. Such students may take a three years' course leading to the degree of honours B.Sc. in mining geology. This course will include a special course of mineral economics for prospectors, conducted by Prof. Sir Thomas H. Holland. Prospectuses may be obtained on application to the registrar.

The British Association meets at Birmingham on September 10, and a provisional programme has now been drawn up. In the Chemistry section (B) an important discussion is promised on the future of British fuel under the following heads:—The use of poor fuel, coke oven recovery plant, gas and oil fuel, the Bonecourt system, and alcohol as fuel. In the Geology section (C) the presidential address will be delivered by Prof. E. J. Garwood, and amongst the other papers are those by Prof. C. Lapworth on "The Geology of the Country Round Birmingham"; by Mr. G. Barrow, on "The Spirorbis Limestone in North Warwickshire" and "On Systems of Folding"; by Mr. T. C. Cantrill, on "Estheria in the Bunter of South Staffordshire"; by Mr. F. G. Meachem, on "The Probable Development of the South Staffs Coalfields to the West of the Western Boundary Fault and to the Shropshire Fault and the Severn Valley Fault, with some notes on the Probable Conditions of Mining in the New Area"; and by Mr. V. C. Illing, on "The Stockingford Shales." In Section F there will be discussions on the cost of living, and canals and inland waterways. Prof. Kirkaldy will read a paper on "The Economic Effects of the Opening of the Panama Canal"; Prof. Chapman, one on "Progressive Taxation"; Prof. Oldham, one on "The Study of Business Organisation"; whilst Mr. B. C. Kershaw and Dr. C. Carpenter will deal with "Trades Unions and Co-partnership." The interim report of the committee on town planning will be presented. In the Engineering section (G) Dr. Gisbert Kapp will act as president. Prof. Burstall will read a paper on "Solid, Liquid, and Gaseous Fuel," and the report of the committee on gaseous explosions will be under discussion.

Mr. William Jones, who for many years past has been engaged as under-manager at Hafod Colliery, owned by the Ruabon Coal and Coke Company Limited, is leaving that colliery in order to take up the post of manager at the Bettisfield Colliery, Bagillt. Mr. Jones is one of a family of colliery managers; his late father, Mr. Enoch Jones, was manager of Hafod Colliery No. 1 pit for many years, and another son, Mr. John Jones, succeeded the father and holds the position at the present time.

A correspondent says the Wirrall Colliery Company (which embraces a number of gentlemen interested in coalmining in the Wigan district) which has taken over the Wirrall Collieries at Neston, some 9 or 10 miles from

From	Total cargo.		Total bunker.	
	1912.	1913.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.
Bristol Channel ports .....	549,041	298,818	21,644	21,880
North-western ports .....	295,361	290,394	65,198	68,529
North-eastern ports .....	741,362	693,824	30,862	29,467
Humber ports.....	212,745	248,376	10,532	13,140
Other ports on east coast.....	11,990	10,967	7,119	6,753
Other English ports .....	2,444	1,842	3,397	3,574
Total from England and Wales .....	1,812,943	1,544,221	138,752	143,343
Ports on east coast of Scotland.....	152,818	114,901	17,810	18,094
Ports on west coast of Scotland.....	197,860	133,618	37,586	47,657
Total from Scotland .....	350,678	248,519	55,396	65,751
Irish ports .....	—	—	3,487	2,596
Total from United Kingdom .....	2,163,621	1,792,740	197,635	211,690

Birkenhead, is now developing the same by opening new mines and carrying out various improvements both below and above ground, with a view to increasing output. A few additional workers are being engaged, thus brightening the industrial outlook of Neston. Mr. Arthur Rushton, manager of the Abram Colliery Company, near Wigan, is the managing director.

Mr. G. Mure Ritchie, one of the directors of Palmers Shipbuilding and Iron Company Limited, Jarrow and Hebburn, has been elected chairman of that company in succession to the late Lord Furness. Mr. Ritchie is also chairman of the Millom and Askam Hæmatite Iron Company Limited. Mr. Claude Glennon Bryan has been elected a director of the company to fill the vacancy caused by the death of Admiral Sir Archibald Douglas.

A letter has been addressed to the President of the Board of Trade on behalf of the executive committee of the Employers' Parliamentary Association in regard to the rise in railway rates. The letter states that the proposed general advance places traders in a very difficult position. Even if it were possible to challenge every revised rate, the cost to the traders of proceedings of such vast complexity would be prohibitive. It is contended that it is neither just nor expedient that the adjustment of difficulties arising as a direct consequence of an Act of Parliament passed in the interests of the railway companies, should be fought out before the Railway and Canal Commissioners between the railway companies, a homogeneous organised body with peculiar knowledge and unlimited resources on the one hand, and the traders, each affected in different ways, with divergent interests and lacking accurate information essential to a fair presentment of their case, on the other. It is submitted that such a method of settling such an issue would be one-sided in the extreme, and the committee confidently appeal to the Board of Trade to suggest some method by which this grave difficulty can be adjusted.

The Ebbw Vale Steel, Iron and Coal Company Limited have placed an order with the Koppers Coke Oven and Bye-product Company, of Sheffield, for the erection of 100 of their latest patent by-product coke ovens, together with all the necessary plant for recovering the tar and ammonia from the gas evolved during the time the coal is being converted into coke. At present the Ebbw Vale Company are making their coke in the old-fashioned type of ovens in which no by-products are recovered. The new installation will replace these ovens, and it is to be capable of converting into coke 5,500 tons of coal per week. At Ebbw Vale it is intended in the first instance to consume the gas under steam boilers, and subsequently to utilise it for generating power in gas engines. The work of erection at Ebbw Vale is proceeding rapidly, and the plant is expected to be at work early next year.

A banquet was held at the Green Man Hotel, Kirkby-in-Ashfield, Notts, on Saturday evening, June 28, to do honour to Mr. Joseph Hall, who until recently was a deputy at the Bentinck Colliery, and has been appointed H.M. inspector of mines.

The council of the University of Sheffield, at its last meeting appointed Mr. W. G. Fearnside, M.A. (Cantab) to the Sorby Chair of Geology. Mr. Fearnside is at present fellow and lecturer in natural sciences at Sidney Sussex College, and demonstrator in petrology in the University of Cambridge.

Mr. Henry M. Hudspeth, one of H.M. inspectors of mines, Doncaster, has just had conferred upon him by the Durham University the degree of M.Sc. as a result of examination. Mr. Hudspeth was a student at the Armstrong College, Newcastle-upon-Tyne, and graduated as a bachelor of science in 1908.

Large ventilating plant has been erected at the Mary Pit Lochore, belonging to the Fife Coal Company. The huge fan is driven by 10 ropes, each 1½ in. in diameter. The fan is capable of giving 300,000 cubic feet of air per minute. A pit to hold the fan has been sunk to a depth of 84 ft., 16 ft. in diameter, and bricked throughout. It will run at a very high speed.

**COASTWISE SHIPMENTS DURING MAY.**  
According to the monthly coal tables, the following were the quantities of coal shipped coastwise during the month of May:—

To ports in	May 1912.		May 1913.	
	Tons.	...	Tons.	...
England and Wales .....	1,490,452	...	1,228,828	...
Scotland .....	183,458	...	144,696	...
Ireland .....	489,711	...	419,216	...

The destination of cargo shipments was as follows:—  
The shipments to London during May totalled 760,009 tons.

**COLLIERY ACCIDENTS.**  
**Benwell.**

The adjourned inquest into the circumstances attending the death, in an old drift at Benwell Colliery, Newcastle-upon-Tyne on June 6, of Capt. William Henry Ramsay, chief of the Durham and Northumberland Collieries' Fire and Rescue Brigade, was concluded at Newcastle Infirmary on Saturday afternoon last, before Mr. Coroner Alfred Appleby and a jury.

Henry James Storey, superintendent of the brigade, who was with Capt. Ramsay at the time of the fatality, was the first witness called on Saturday. He stated that the brigade had, at headquarters, four "Proto" (Fleuss-Davis) breathing dresses. Each dress was fitted with cylinders containing 9 cubic feet of pure oxygen and carried on the back. The cylinders were connected by valves with a canvas bag carried in front. There were three valves—one self-controlled, one to be used in case of emergency only, and one which was turned on as soon as the apparatus was fixed, and supplied oxygen at the rate of two litres per minute.

Mr. Blackett asked whether, if the tap were not open to the extent of allowing two litres a minute through, the reduced pressure would be shown on the gauge.

Prof. Hill remarked that he did not think the full amount would be shown, but a pressure would be recorded.

Supt. Storey contended that, no matter what pressure was shown, the same quantity (two litres) would be delivered. Continuing, he said the apparatus weighed 37 lb. and allowed for breathing for two hours. He had had experience of various types of dresses for three years, and of that type for two and a-half years, and had never known it to fail. Capt. Ramsay had been in charge of the brigade for 18 months, and had a fortnight's training at headquarters prior to joining the brigade. The dresses were frequently used, the last time, prior to the accident, being on June 4. On June 6, witness and Fireman Francis went with deceased to South Benwell Colliery to explore an old drift which had been discovered. Deceased chose his own headdress—a mouthpiece and nose-clip—but witness and Francis each used a half-mask. Mr. Young, the mine manager, and two other men went with them into the drift as far as the fresh air lasted. They carried a canary, oil and electric lamps, and candles. Proceeding to where the naked lights went out, they went back and fixed their breathing dresses. Witness dressed Captain Ramsay's and saw that the straps were adjusted properly, and that the oxygen was turned on. The gauges showed the same pressure of from 110 to 115 atmospheres in all three dresses. After entering the drift, they passed a fall, and, some distance on, deceased sent the canary back, as it was showing signs of distress. Witness took it back.

When he returned, Capt. Ramsay was taking a sample of air. Shortly afterwards they reached a second fall of roof which almost blocked the way. Capt. Ramsay explored it by himself, getting over it and going about 20 or 30 yards beyond. When he returned, he was sweating profusely and was distressed. He motioned to witness to examine his dress. Witness did so and saw that the gauge indicated 10 to 15 atmospheres. That was a big loss of oxygen. Witness thought that was due to deceased, in working over the fall on the left side, having caught his valve block on some heavy obstruction and loosened the union, so losing oxygen, or else that, working extra hard, he had used his by-pass valve and so depleted his supply of oxygen. If the first surmise were correct, and the damage were sufficiently great, the cylinders might be emptied in a couple of minutes.



carried as an extra precaution so as to fasten the first contingency occurred, and the gauge and by-pass wheel were differentiated, so as to avoid being mistaken for another. There was no escape of oxygen when witness examined the apparatus. It did not occur to him to use the spanner to tighten up the dress. He thought deceased had put it right before reaching him. He heard the hissing sound of the oxygen passing through the reducing valve, and held up his fingers to deceased to show him that he had 10 minutes, which witness considered was quite sufficient time in which to get out. Capt. Ramsay then started to run, but dropped prone after 3 or 4 yards. He fell on his hands, and witness did not think that his face touched the ground. It did not occur to witness to try the valve again then. Deceased raised himself on one hand but dropped again, and witness and Francis tried to get him out. Witness could not say how far they went; they went as far as they were able, and only stopped when they were exhausted. Deceased weighed about 12 stones. When they stopped witness looked at the gauges of Francis's apparatus and his own, and found that there was plenty of oxygen left. They had a supply sufficient to last 75 minutes. He had never known deceased try experiments with his apparatus in bad air. They did not know what the air was like when witness went forward alone, but it subsequently appeared that it was breathable, and they might have taken off their apparatus.

He told Francis to sit down and recover his breath, and went on at once to give warning. Mr. Young had been left at the fresh air point, and, after asking where the canary was, went in himself. Witness, after recovering, followed in and found Mr. Young and Francis bringing deceased out. Artificial respiration was tried, and the Pulmotor oxygen apparatus used, but without avail. When, later, the body was taken to the colliery office, it was found that life was extinct. Deceased's face, when they brought him to the fresh air point, was very red and hot. When he first fell down, he was not breathing naturally, but was gasping.

The coroner, asking a further question, said he was trying to get at the fact of how the valve became closed, a condition in which it was found next day.

Witness said Francis and he were stooping all the time they were bringing deceased out, and had to rest twice or thrice. He did not think they put the deceased down on his side so as to injure the valve. It had never been his practice or his instruction to interfere with the valve once it was turned on. He could not understand how the valve had become shut. If the valve had been open two complete turns, as deceased was taught to open it, it could not have been accidentally closed. He had known instances of the union being loosened, but it was in a different position to the main valve.

Prof. Hill remarked that, while the gauge showed no oxygen the following day, actual measurements showed 45 atmospheres. He suggested that, if there were 75 atmospheres when deceased collapsed, and the valve was partly closed, the gauge might only show 10 or 15 atmospheres and, if it went on leaking all night, that would result in the reduction to 45 atmospheres by the next day, and to the gauge showing nothing.

Witness, in reply to Prof. Hill, said that if the reducing valve were in order, the user of the apparatus would be getting two litres of oxygen per minute if 15 atmospheres were shown on the gauge, whatever the quantity of oxygen in the cylinders.

Prof. Hill said he had not experimented, but would accept that. He suggested that a man would not feel the deficiency of oxygen as quickly as would a canary.

Mr. Blackett said it was known that a canary would die quicker than a man in carbon monoxide, but he would like Prof. Hill to say whether that was also true with regard to blackdamp.

Prof. Hill said it was so.

Witness further stated, in reply to Prof. Hill, that he always gave two turns to the main valve. He knew that the instructions said one turn was sufficient, and he did not see how the valve after one turn could be interfered with. When deceased fell, witness did not remove deceased's mouthpiece.

Witness then added to his previous evidence by stating that, when Capt. Ramsay came over the fall, he started to run and dropped. He was in a bad state, and witness suggested that the mouthpiece should be loosened. They had had previous talks about that, owing to an affair which occurred at Felling. Witness suggested that deceased should loosen his mouthpiece, and that the quantity of oxygen would nearly last him to get out. Deceased's answer to that was a back-handed blow which nearly knocked witness over. It was a question of temperament whether men in danger of their lives could do the same things as men in practice.

Mr. George Ellis Young, manager of the colliery, stated that the old drift which was being explored was near to the river. At about 160 yards in, lamps and candles would not burn, and as deceased had asked witness to let him know of any such place where he might experiment, witness tele-

phoned at 10.50 a.m. on June 6 and Capt. Ramsay arrived at 11. With the exception of the mouthpieces, the apparatus was fixed at the colliery office, and witness took the canary to watch the experiments.

When the accident was reported to him he took the canary, and at the first fall came across Ramsay and Francis. The canary was all right and witness felt all right, so he took deceased's mouthpiece off. He saw that Ramsay was not dying from the atmosphere in which he was, and thought it was best to take the mouthpiece off to give him a chance. Witness saw that Ramsay's condition was very serious. Ramsay did not appear to be breathing, and his face was whitey-blue. He got Francis to take his half-mask off and to assist him in bringing deceased out. Next day, when he examined deceased's dress, he found the main valve closed and still 45 minutes' supply of oxygen left. Next day, with the inspector (Mr. Wilson), he entered the old drift again. They found that it was about 160 yards to where the lights went out. It was 37 yards to the first fall and about 70 yards to the second fall. At the latter point the canary became distressed. It was there that Capt. Ramsay climbed the fall and went for some distance beyond before he returned to Storey and Francis.

Prof. McDonald, who made a post-mortem examination of deceased, attributed death to asphyxia, which might have been caused by an insufficient supply of oxygen. The complete stoppage of oxygen would cause unconsciousness in less than a minute, and death in two or three minutes. There might have been lack of oxygen from the first, culminating as stated. There were no traces of carbon monoxide present. Lack of oxygen had an effect on the brain, one of the symptoms being mental aberration, and might have caused deceased himself to turn off the valve. He had heard recently that doctors were beginning to doubt if 2 litres of oxygen were sufficient under circumstances such as those described. Dr. Haldane had shown recently that, following a gradual deprivation of oxygen, collapse was sudden. Witness was prepared to agree that different people's need of oxygen varied. If 2 litres of oxygen were insufficient when a man was working hard, they became sufficient on normal conditions being resumed.

The jury found that death was due to asphyxia, caused by the supply of oxygen being cut off through a partial and, later, a complete closing of the valve. They considered that the partial closing was probably due to the wheel of the valve catching some obstruction whilst Capt. Ramsay was working on the fall, and that the complete closing occurred owing to his being dragged on his left side when being taken out of the drift. They considered the valve defective in that respect, and expressed the view that the dress ought to be so protected as to prevent the recurrence of such an accident.

## COAL, IRON AND ENGINEERING COMPANIES.

**Adisham Colliery Company Limited.**—This private company has been registered, with a capital of £120,000 in £5 shares, to take over the benefit and obligations of certain agreements for leases or sub-leases of coal and other minerals at or near Adisham, Kent, and to adopt an agreement with Jules Bernard and Arthur Capel. First directors: Jules Bernard, Arthur Capel, François de Beauchamp and Sir Fredk. Harrison. Secretary, B. T. Winterbottom. Registered office, 4, Irongate, Chesterfield, Derby.

**Anglo-French (Transvaal) Navigation Coal Estates Company Limited.**—An interim dividend of 7½ per cent. (1s. 6d. per share) has been declared on account of 7 per cent. cumulative preference shares.

**Barton and Co. (Coal) Limited.**—This private company has been registered, with a capital of £7,000 in £1 shares (3,000 7 per cent. preference), to take over the business of coal factor and colliery agent carried on by T. B. Butterworth at Wrexham and elsewhere as Barton and Co. First directors: T. B. Butterworth and C. G. Haswell (founders, both permanent, subject to holding £400 shares).

**Bristol Wagon and Carriage Works Limited.**—The directors' report for the year ended March 31, 1913, states that the accounts show a balance, including the amount brought forward from last account, of £12,253, from which must be deducted the interim dividend of 2 per cent., amounting to £2,200, paid in December last, leaving a balance of £10,053. The directors recommend that a dividend (free of income-tax) of 3 per cent. (making, with the interim dividend, 5 per cent. for the year) be declared on the called-up preference and ordinary share capital for the half-year ended March 31 last, which amounts to £3,300, and that the balance of £6,753 be carried forward.

**British and Foreign Engineering, Mining and Industrial Syndicate Limited.**—This company has been registered, with a capital of £10,000 in £1 shares, to carry on the business indicated by the title. Minimum cash subscription, two shares. First directors, I. H. Hirschler, 9, Pembroke-villas, W.; Sir N. R. Pringle, Bart., Newhall, Galashiels; and T. Pringle. Qualification, 100 shares. Registered office, 1, Victoria-street, S.W.

**Broken River (New Zealand) Coalmining Company Limited.**—This private company has been registered, with a capital of £6,000 in £1 shares, to carry on the business of coalminers, &c., in New Zealand, Australia or elsewhere. First directors, C. Merrick and F. H. Farley.

**Broomhill Colliery Company Limited.**—Broomhill Colliery Company Limited have posted warrants for the six months' dividend on the preference share capital and warrants for six months' interest on the debenture stock.

**Cascade Coal Syndicate Limited.**—This private company has been registered, with a capital of £12,500 in £1 shares, to carry on the business of coalmasters, engineers, patent fuel manufacturers, &c., in Canada. First directors: J. Humble, J. H. M. Laverick, J. H. Ashton, E. B. Whalley and P. J. Mitchell.

**Cefnybedd Colliery Company Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of colliery proprietors, coalmerchants, ironmasters, &c., and to adopt two agree-

ments with C. W. M. Massey and R. Kendall (a) for the acquisition of certain leasehold hereditaments, mining rights and other property, and (b) relating to management. Provisional managers, Dutton, Massey and Co., 22, Water-street, Liverpool.

**Clydesdale (Transvaal) Collieries Company Limited.**—The directors have declared a dividend of 5 per cent. (1s. per share).

**Crompton and Co. Limited.**—This company has been registered, with a capital of £221,007 in £1 shares (136,000 7 per cent. non-cumulative preference), to carry on the business of electrical engineers, workers in metals, contractors for the supply of electrical plant, producers and distributors of electrical energy, &c., to acquire the assets and liabilities of Crompton and Co. Limited (incorporated 1888).

**Crossley (John) and Sons Limited.**—Interim dividend for the half-year ended June 14 of 1s. per share, less tax, payable on August 1.

**East Indian Coal Company Limited.**—The directors report for the half-year ended April 30, 1913, that the half-year has resulted in a profit of £12,703. The sum of £1,614 brought forward is to be added to the above profit, and there is therefore an amount of £14,317 for disposal. The directors recommend that this sum be dealt with as follows:—In payment of a dividend of 8½ per cent. (free of income-tax) for the half-year (making 11 per cent. for the year) £10,200, add to general reserve account £2,000, to carry forward to next half-year £2,117. The output was 273,069 tons during the half-year, as compared with an output of 197,568 tons for the half-year ended April 30, 1912. The loss of coal during half-year to April 30, 1913, by fire and exhaustion of workings was 26,972 tons, and the additional coal won during same period 102,473 tons, making a net gain of output of 75,501 tons. The two inclines, Nos. 2 and 4, at Bararee, are still burning. The three pits at Kendwadiah are still closed. A second attempt to reopen them has failed; another will be made as soon as it can safely be done. By reason of the subsidence of the ground over large areas, owing to coal having been taken out, the amount of surface water finding its way underground is steadily increasing, and the cost of pumping must necessarily rise. The second turbine of 950-horse power has been ordered six months earlier than was anticipated. The electrical installation of the Kendwadiah district, when at work, will be of about 2,600-horse power. About 600-horse power of this amount is completed. The three new pits at Bulliari are down to the solid and the surface works well advanced. The sinking of the No. 4 pit at Bulliari, which was begun in 1905, and stopped from 1909 till 1913 owing to water, has been resumed. The shaft is now down about 500 ft. Permanent pumps of over 500-horse power will be put into this shaft alone. The output of coal during the last 12 months, in spite of large losses by fire and exhaustion, is the largest in the history of the company.

**Glencoe (Natal) Collieries Limited.**—The directors have declared an interim dividend of 2½ per cent. (6d. per share) for the half-year ending 30th ult.

**Green and Carter Limited.**—This private company has been registered, with a capital of £2,500 in £1 shares, to take over the business of ironfounders and engineers carried on by H. V. Vacher at Vulcan Ironworks, Kingsworthy, Hants. First directors, R. C. Green and G. B. Carter (secretary). Registered office, Vulcan Ironworks, Kingsworthy, near Winchester.

**Grigg (Wm.) and Sons, Hauliers, Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to take over the business of hauliers and coal merchants carried on by W. Grigg, C. Grigg, W. T. Grigg, and W. Grigg at 27, Neal-street, West Bromwich; 34, George-street, West Smethwick; and Flash-road, Oldbury; as Wm. Grigg and Sons. First directors: W. Grigg (chairman), C. Grigg (secretary), W. T. Grigg (vice-chairman), and W. Grigg.

**Lewis (Edward) and Co. Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of manufacturers of iron washers and axle plates, &c. First directors, A. Pullin and B. J. Twiss. Registered office, Albert-street, Works, Princes End, Tipton.

**Lochgelly Iron and Coal Company Limited.**—The directors have declared a final dividend of 50s. per share, making 60s. per share, or 30 per cent., for the past year.

**New Sharlston Collieries Company Limited.**—The directors have declared an interim dividend of 5s. per share, free of income tax, payable on July 22.

**Stone (J.) and Co. Limited.**—The company has declared a dividend of 10 per cent. on the ordinary shares, together with bonus of 2s. 6d. per share for the 12 months ended December 1912. This represents 22½ per cent. per annum.

**Transvaal Coal Trust Company Limited.**—The directors announce an interim dividend of 10 per cent., 2s. per share.

**United National Collieries Limited.**—Interim dividend of 5s. per share, free of income-tax.

**West Denton Colliery Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares (4,750 preferred and 5,250 deferred), to carry on the business of colliery owners and workers, ironmasters, &c. First directors: A. L. Bird, G. F. Mounsey and J. Heslop. Registered office, 18, Grainger-street West, Newcastle-on-Tyne.

**The Shortage of Houses in North Wales.**—The housing question has been and is a great problem in North Wales, especially in the vicinity of the collieries, owing to the great lack of suitable cottages for the working classes. In one village, Gresford, where a large new colliery is just being opened out, there are practically no cottages, and the men have to live in Wrexham, three miles away. It is, however, proposed to construct a garden city there, and a company has been formed at the head of which is Mr. David Davies, M.P., and the work is likely to be carried out without delay. Things are worse still in the case of Chirk, where there are two collieries, Brynkinallt and Blackpark. Here there is also a great dearth of cottages, and many of those which are there are scarcely habitable, and this week plans have been passed for the erection of a block of 38—and not before they were wanted. Lord Howard de Walden, who has bought the major part of the village, and has taken Chirk Castle for his residence, is greatly interested in the housing question, and it is understood that he will make efforts to improve matters in this respect.



## THE FREIGHT MARKET.

The outward freight market on the north-east coast has developed so much activity during the past few days that, despite the great accumulation of tonnage consequent on the Race holidays last week, rates are substantially steady. It is estimated that about 100,000 tons of shipping was taken up during the first two days of the present week. Coasting business is based on about 3s. 1½d., Tyne to London, and from 3s. 4½d. to 3s. 6d. to Hamburg. The Baltic is being done at from 5s. 6d. to 5s. 9d. to Cronstadt. The Bay is steady, at 6s. 3d. to Bordeaux. The Mediterranean is based on about 9s. 3d. to Genoa. At South Wales, chartering is rather slow. Mediterranean rates are unaltered. South America is dull. The Bay and coasting ports are steady. The Humber market is active at well-maintained quotations. There is only a small amount of business being done at the Clyde, and rates are unchanged. Homeward markets are rather quiet. New York advices report that rates for full-cargo tonnage show a substantial reduction, tonnage being offered much in excess of requirements. Time-charter vessels are in fair demand at recent rates. The River Plate is unchanged. The demand at the Black Sea, Azof and Danube is small, and the tone is easy. The Mediterranean and ore trades are active and firm, as is also the Baltic. Eastern markets are quiet.

Tyne to Antwerp, 1,900, 4s. 9d.; 2,200, 4s.; Archangel, 1,350, 5s. 6d.; Bayonne, 1,800, 7s. 1½d.; Barcelona, 3,000, 11s. 3d.; Brindisi, 2,600, 11s. 6d.; 500, Bordeaux, 3,000, 6s. 3d.; 4,000, 6s. 3d.; Cronstadt, 1,600, 5s. 6d.; 5,600, 5s. 6d.; 2,700, 5s. 7½d., second half July; 2,600, 5s. 6d.; 2,200, 5s. 9d.; 4,700, 5s. 6d.; 1,200, coke, 8s. 6d.; Copenhagen, 2,000, 4s. 9d., from Dunston, Christianholm terms; Elsinore, 650, 5s. 9d.; Genoa, 3,500, 9s. 3d.; 5,000, 9s. 3d.; Havre, 1,500, 4s. 3d.; 1,500, 4s. 6d.; Hamburg, 2,500, 3s. 6d.; 2,200, 3s. 4½d.; Königsberg, 2,100, 5s. 3d.; 2,000, 5s. 6d.; London, 2,200, 3s. 1½d.; Leghorn, 4,000, 9s. 3d.; Norrköping, 1,800, 5s. 3d.; Naples, 2,500, 9s. 9d.; 700, Port Said, 5,500, 10s.; 10s. 6d., mid July; 4,200, 9s. 3d.; Porto Vecchio, 7,000, 9s. 6d., Genoa terms; Palermo, 2,200, 10s. 9d.; Rouen, 2,000, 4s. 10½d.; 1,600, 5s. 3d.; 2,000, 5s.; Stockholm, 3,400, 5s.; 3,800, 5s.; Spezzia, 3,500, 9s. 3d.; St. Nazaire, 4,000, 6s.; Trieste, 7,000, 9s. 6d.; Wiborg, 1,200, 6s.; Zeebrugge, 2,100, 3s. 3d.

Cardiff to Alexandria, 5,600, 9s. 7½d., July 7; 6,700, 9s. 1½d., July 16; Ancona, 6,600, 10s.; July 9; Aden, 4,000, 11s. 10½d., July 10; Bahia, 17s. 3d.; Bilbao, 2,000, 7s.; Brest, 1,200, 4s. 9d.; Brindisi, 6,000, 9s.; 500, next week; Bourgas, 5,500, 12s. 3d., July 12; Bizerta, 3,200, 11½ fr.; Constantinople, 3,500, 12s.; 400, July 14; Catania, 5,500, 9s. 6d.; Copenhagen, 2,000, 5s. 6d.; Cherbourg, 750, 5s. 9d.; Chantenay, 2,300, 7½ fr.; Calais, 1,500, 4s. 10½d.; Chatham, 2,200, 3s., Admiralty; Cadiz, 2,100, 9s. 6d.; Cronstadt, 4,000, 6s. 6d.; 3,200, 6s. 6d., July 7; 2,300, 6s. 6d., July 11; 1,400, 6s. 6d.; Devonport, 3,700, 2s. 6d., Admiralty; Dieppe, 2,100, 4s. 10½d.; Danube, 3,600, 12s. coal, 14s. 6d. coke, July; Genoa, 6,300, 8s. 9d.; 9s. 4½d., July; 4,000, 9s., July 10; 3,300, 9s. 3d.; 5,000, 9s.; 3,300, 9s. 3d., July 10; 6,400, 8s. 9d., July 7; 4,100, 9s. 3d.; 4,600, 8s. 9d.; 3,400, 9s. 3d., July 8; Gandia, 1,300, 12s. 6d.; 300, Granville, 680, 5s. 6d.; Haulbowline, 1,900, 3s. 3d., Admiralty; 2,900, 3s. 3d.; 2,200, 3s. 4½d.; Havre, 1,000, 4s. 6d.; 1,700, 4s. 6d.; 2,700, 5s. 3d., July 7; Kiel, 900, 6s.; Leghorn, 4,600, 9s. 3d.; 500, 8s. 9d., 800, July 5; 3,500, 9s. 3d.; 4,000, 9s.; 3,300, 9s. 3d., July 10; Las Palmas, 5,500, 9s., July 5; 6,600, 9s.; 3,100, 9s., mid-July; Lisbon, 3,200, 7s. 7½d., 400; 2,500, 7s. 6d., 500; La Goulette, 3,200, 14½ fr.; La Pallice, 3,200, 6½ fr., July 7; Malta, 3,500, 7s. 6d., Admiralty; 3,500, 7s. 6d., 8s. 3d., mid-July; 4,500, 8s., July 10; 5,000, 8s., July 7; Marseilles, 5,000, 11 fr.; 5,000, 11 fr., July 5; 4,100, 11 fr., July 6; Messina, 5,500, 9s. 6d.; Mollendo, 22s., fuel, 250, August; Morlaix, 5,200, 6s. 3d.; Monte Video, sail, 16s. 9d.; 16s. 6d.; Naples, 4,600, 9s. 3d.; 500, 8s. 9d., 800, July 5; 5,500, 8s. 9d.; 800; 5,200, 8s. 9d., 800, 10d.; 5,600, 8s. 6d.; Nantes, 3,000, 7½ fr.; Oporto, 1,000, 8s. 3d.; 900, 8s. 6d.; Port Said, 7,600, 9s., July 9; 4,400, 9s. 6d., July 9; 5,500, 9s., July 17; 5,700, 9s.; Port Sudan, 5,500, 12s. or 12s. 6d., mid-July; Pernambuco, 17s. 3d.; 4,500, 16s. 9d.; Piræus, 5,500, 9s. 6d., July 9; Palma, 2,300, 12s. 3d.; Queensferry, 850, 5s.; Queenstown, 2,250, 3s. 4½d.; River Plate, 5,000, 20s.; 6,000, 19s. 9d., early July; 5,600, 19s. 9d., July 5; 4,500, 20s.; 5,000, 19s. 9d.; 4,500, 19s. 7½d., early July; 20s., early August; 20s., July-August; Reval, 3,300, 6s. 9d., July 7; Rosario, 3,800, 21s. 6d.; 21s. 3d., mid-July; Rio de Janeiro, 16s. 6d.; 7,100, 16s. 9d.; 6,300, 16s. 9d., July 8; 4,500, 16s. 9d., July 10; 6,600, 16s. 9d., July 25; Rouen, 1,000, 5s. 6d.; 800, 5s. 3d.; St. Nazaire, 1,500, 7½ fr.; 2,900, 6½ fr.; Sfax, 3,600, 14½ fr.; Suez, 5,500, 12s. 6d., early July; Sheerness, 2,200, 3s., Admiralty; Savona, 3,300, 9s. 3d.; 5,000, 9s.; 3,300, 9s. 3d., July 10; 6,700, 8s. 9d.; 4,600, 8s. 9d.; Spezzia, 3,300, 9s. 3d.; 6,700, 8s. 9d.; St. Servan, 1,100, 4s. 10½d.; 1,800, 4s. 10½d.; Syra, 5,500, 9s. 6d., July 9; Teneriffe, 6,600, 9s.; Taranto, 5,000, 9s. 9d.; Venice, 6,600, 10s., July 9; Varna, 5,500, 12s. 3d., July 12; Zea, 5,500, 9s. 6d., July 9.

Newport to Genoa, 5,400, 9s.; Savona, 5,400, 9s.; Spezzia, 5,400, 9s.; Marseilles, 5,000, 11 fr.; 4,100, 11 fr.; Alexandria, 4,200, 9s., July 15; 5,400, 9s.; Catania, 2,800, 11s.; 2,800, 10s. 9d.; Algiers, 2,700, 10 fr.; Cadiz, 2,100, 9s. 6d.; Venice, 6,800, 9s. 7½d.; Ancona, 6,800, 9s. 7½d.; Gibraltar, 1,800, 9s.; Brindisi, 6,000, 9s., 500, July 10.

Swansea to Catania, 2,500, 11s.; Barcelona, 3,300, 10s. 6d.; Genoa, 5,000, 9s. 3d. coal, 10s. fuel; 9s. 6d. coal, 10s. 3d. fuel; Marseilles, 2,600, 11½ fr.; Tunis, 2,400, 15 fr. coal, 16 fr. fuel; Rochefort, 1,400, 8 fr.; Rouen, 900, 5s. 7½d.; Tarragona, 1,200, 13s., July 9; St. Brieux, 700, 6s. 3d.; Oxelosund, 1,400, 6s.; Monte Video, 4,000-4,500, 22s., fuel; Gandia, 1,250, 12s. 9d.; Rouen, 1,700, 5s. 6d.; 1,200, 5s. 9d.; 720, 6s.; Calais, 1,200, 5s. 3d.; Rotterdam, 8,500, 5s.; Stettin, 3,000, 5s.

Hull to Cronstadt, 6,000, 5s. 3d.; 2,800, 5s. 7½d.; 5,000, 5s. 6d.; 2,050, 5s. 7½d.; 2,000, 5s. 6d.; Røkkala, 1,100, 6s. 6d.; Bilbao, 1,500, 7s. 6d.; Genoa, 3,500, 10s.; Perna, 1,300, 5s. 6d.; Alexandria, 10s. 3d., 500, July; Rio de Janeiro, 6,000, 17s.; Santos, 20s., July; Buenos Ayres, 7,000, 19s. 6d., July; Riga, 1,600, 5s.; 2,000, 5s. 1½d.; Reval, 2,500, 5s. 6d.; St. Petersburg, 1,700, 5s. 9d.; 5,000, 5s. 6d.

Goole to Boulogne, 950, 5s., early July; Bruges, 800, 4s. 3d.; Stettin, 700, 5s. 10½d.

Boston to Rouen, 1,400, 5s. 3d.

Glasgow to Genoa, 9s. 6d.; Savona, 9s. 6d.; Leghorn, 9s. 6d.; Monte Video, 5,500, 20s. 6d.; Rosario, about 22s., July.

Wales to Mexillones, sail, 17s. 6d., fuel.

Wear to Gefle, 1,800, 5s., 350.

Rotterdam to Valparaiso, sail, 22s. 6d., coke; St. Nazaire,

3,500, 6s. 4½d., Trignac terms, July 6; 4,000, 6s. 4½d., Trignac terms; Leghorn, 600 tons fuel 10s., 950 tons coke 11s. 9d., July 9; Alexandria, 5,400, 11s., fuel, July 10; La Rochelle, 2,000, 6s., July 12-14; Bagnoli-Porto Ferrajo, 4,100, 9s. 3d., July 15-31; Porto Vecchio di Piombino, 4,100, 9s. 3d., July 15-31.

Burysport to Rouen, 680, 6s.

Burntisland to Faaborg, 1,600, 5s. 3d.; Hudikswall, 1,500, 5s. 7½d.

Hartlepool to Hamburg, 1,300, 4s.; Trelleborg, 1,400, 5s. 6d.

Grimsby to Gefle, 2,250, 4s. 9d.

Immingham to Perna, 1,600, 5s. 3d.; 2,100, 5s. 3d.

Hamburg to Pensacola and Tampa, 6,500, 10s. 10½d., kainit.

Fife port to Cronstadt, 2,700, 5s. 9d.

Antwerp to Buenos Ayres, sail, 19s. 6d.; 19s.

Newport River to Puerto Militar, 5,200, 20s. 3d., fuel,

300, 1s., July.

Port Talbot to St. Nazaire, 1,450, 6½ fr.; Nantes, 3,000,

7½ fr.; 1,130, 8 fr.

Blyth to Aalborg, 1,500, 5s.; Stockholm, 3,800, 5s., 500;

Palermo, 2,200, 10s. 9d., 300.

Llanely to Calais, 850, 5s. 6d.; Dunkirk, 850, 5s. 6d.

Britonferry to Lisbon, 1,200, 8s. 9d.

Homeward charters:—Azof, 7,000, Rotterdam 9s. 6d.,

Emden or Weser 9s. 9d., Hamburg 10s., with 3d. less barley,

ppt.; 6,000, Rotterdam, Emden or Weser 9s., Hamburg

9s. 6d., with 3d. less barley, ppt.; 9,600, basis Rotterdam

8s. 10½d., with 3d. less barley, completing outside 1s. 6d.

less, ppt.; Novorossisk 7,900, Rotterdam, 7s. 6d., ppt.;

Suina, 3,850 max., 9s. 3d. n.c. or any, 9s. 9d. Hamburg, ppt.;

3,400, Denmark, 12s. one port, 12s. 3d. two ports, 12s. 6d.

three ports, ppt.; Saigon-Haiphong, 2,660 net, Marseilles,

Dunkirk, Havre or Liverpool, basis 26s. 6d., August-

September; Calcutta, 2,276 net, Madras, Rs. 4.12, July;

Gulf, 1,935 net, 160 ft., Bremen, 55s., cotton and 1,000 tons

meal, September-October; 2,213 net, United Kingdom-

Continent, about 16s., net form, August-September; San

Lorenzo, not above, 5,500, 10 per cent., Genoa, 18s.,

no reduction direct, July-August; 4,500, Liverpool and Birken-

head, 16s.; 4,400, 16s. 6d., o.c.; Santa Fe, 5,800, 10 per cent.,

United Kingdom-Continent, 16s. p.p., no reduction direct,

July; 17s. p.p., no reduction direct port; Gulf timber port,

2,543 net, Antwerp and Tyne, 100s., July-August; 2,053 net,

Rotterdam, 97s. 6d., August; Talanta Channel, 3,200,

Newport, 6s., ppt.; Bona, 4,200, Rotterdam, 6s., phosphate,

ppt.; Huelva, 4,000, Northern States 10s. 3d., Boston

10s. 6d., f.d., ppt.; 4,000, Rotterdam, 7s. 9d., f.d., ppt.;

5,300, 5s. 6d., with 10d. and 50c., Tinto charter, mid July;

7,200, 5s. 6d., with 10d. and 50c., Tinto charter, July 10;

Lisbon, 3,500, Cardiff, 6s., early July; New York, Phila-

delphia, Norfolk, 20s., La Plata, late July; Rangoon and

Bassein, 28s., Braila, July; Kohsichang, 25s., Continent,

ppt.; Bilbao, 5s. 3d., Glasgow, ore; 3,000, West Hartlepool,

5s. 6d., ppt.; time charter, Baltic trade, 1,000 stds., £1,025,

one round trip, delivery East Coast, redelivery United

Kingdom-Continent; Azof, 18,000 qrs., 10 per cent., 400, 10s.

n.c. or any, 10s. 6d. Hamburg, barley, cancelling July 15;

6,300, Rotterdam, 11s., with options, August; 5,000-6,000,

12s., with options, September; 4,700, Denmark, basis 12s.

one port, ppt.; Kurrachee, 5,800, United Kingdom-Continent;

17s. 3d. p.p., with 3d. less if 2,500 guaranteed; 4,800, 17s. 3d.,

ppt.; 6,000, 17s. 3d. one p.p.; 17s. 9d. two p.p.; 6d. extra

Hamburg, ppt.; 2,708 net, Hull, 18s., July; Pensacola,

107s. 6d., St. Nazaire and Honfleur, August; Galveston,

2,163 net, Bremen, 55s., cotton and 500 tons

meal, October; 15s. 6d. London, Liverpool, Rotterdam,

Antwerp, or Bremen, 16s. Hamburg, net form, August-

September; Castro-Urdiales, 3,200, Middlesbrough, 5s. 9d.,

ppt., time charter, Brazil and River Plate trade, 4s. 6d., one

trip, delivery Glasgow, re-delivery United Kingdom-Conti-

nent; Nicolaieff, 4,600, Rotterdam, 7s. 3d., ore, ppt.;

5,000, Middlesbrough, 7s. 6d., ore, ppt.; Nicolaieff, Odessa,

or Novorossisk, 7,000, London or Rotterdam, 7s. 4½d., with

3d. less barley, option Kherson and Nicolaieff or Odessa 3d.

more, July 10-25; Burmah, 23s., p.p., Continent, July-

August; Saigon, 6,000, Hamburg and/or Bremen, 28s. one

port, 29s. 6d. both ports, rice, meal, July-August; 26s.

Marseilles or Liverpool, 27s. Havre, for parcels, July,

August and September loading; New York, 2,436 net,

Brazil, basis 28 c. one port, September-October; Barreiro,

2,000, Rotterdam, 6s. 9d., ppt.; Algiers, 3,800, Cardiff, 4s. 9d.,

600-600, ppt.; Soroko, 500 stds., Waterford and Cork,

62s. 6d., d.b.h., early August; Columbia River, sail, 65s.,

Tasmania; West Australia, two places, 4,000 loads, London,

50s. 9d.; Delagoa Bay, 2,979 net, Bombay or Kurrachee,

6s. 6d., July; Christmas Island, 1,794 net, Kobe, 10s. 6d.,

July; Carthage, 4,200, Middlesbrough, 6s. 3d., ppt.;

Alicante, 3,600, Rotterdam, 6s. 9d., ppt.; Bordeaux, 3,500,

Barry or Newport, 5s. 6d., ppt.; St. Petersburg, 5,000,

London, 1s. 9d., wheat basis, eight days loading, July 28-

August 15; Riga, 500 stds., Garston, 38s., d.b., five days

loading, ppt.; time charter, Transatlantic trade, £1,300, two

round trips, delivery and re-delivery Mediterranean, via

States; 6,000, Rotterdam, 1s. 6d., wheat basis, 10 days

loading, July 28-August 15.

Association of Private Owners of Railway Rolling Stock.—The twenty-second annual general meeting of this association was held in London on the 26th ult. In the unavoidable absence of Mr. F. Parker Rhodes, the chairman, the chair was occupied by Mr. G. C. Locket, deputy-chairman, who moved the adoption of the balance-sheet and report. In doing so, Mr. Locket called attention to the satisfactory financial position of the association, as shown by the balance-sheet, and especially to its possession of a substantial reserve fund. He pointed out that beyond the matters considered of sufficient general importance to be referred to in the report, a very large number of matters equally important to individual members came before the solicitor of the association (who advised all members gratuitously), and, where necessary, were considered and dealt with by the committee. Subjects of special interest referred to in the report were commented on by Mr. Locket and discussed by the meeting, and the balance-sheet and report were then approved and adopted. The retiring members were unanimously re-elected, and a cordial vote of thanks to the deputy-chairman for presiding, brought the proceedings to a close.

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

NEATH, JULY 16.—Tenders are invited for the large screened gas coal required during the year commencing July 30 next. Estimated quantity, 12,000 tons. The coal to be delivered into gasworks in such weekly or monthly quantities as may be appointed by the manager. Payments monthly, subject to 2½ per cent discount. Fuller particulars on application direct to the gas manager (R. A. Browning, Esq.), Gasworks, Neath. Sealed tenders, specifying the description of coal offered and the pits and veins from which raised, to be in my hands not later than 10 o'clock on Wednesday morning, July 16. No tender necessarily accepted. The tenders received in response to previous advertisement have not yet been opened. The company whose tender is accepted must enter unto the compact usually required by the Corporation in such cases. Edwin C. Curtis, town clerk.

SOUTHAMPTON, JULY 10.—The Corporation invite alternative tenders for the supply and delivery at Otterbourne siding, near Eastleigh, of cobbles and gas coke for six or 12 months. Form of tender and all particulars may be obtained at the Waterworks Engineer's Office, French-street, Southampton. Sealed tenders upon the printed form and endorsed "Tender for coal, Waterworks," must be delivered at the Town Clerk's office on or before the 10th inst. No pledge is given to accept the lowest or any tender. R. R. Linthorne, town clerk, Municipal Offices, Southampton.

SOUTHAMPTON, JULY 14.—The Corporation invite alternative tenders for the supply of coal to the Electricity Works, Western Shore, during a period of six or 12 months. Form of tender and conditions may be obtained upon application to the borough electrical engineer. Sealed tenders, endorsed "Tender for Coal, Electricity Works," must be delivered at the town clerk's office by 12 o'clock at noon on the 14th inst. No pledge is given to accept the lowest or any tender. R. R. Linthorne, town clerk, Municipal Offices, Southampton.

## Abstracts of Contracts Open.

ANTWERP, JULY 9.—About 350 tons of coke to the Hôpital Sainte-Marie, Berchem-lez-Anvers. Information to be obtained from the Administration des Hospices Civils, Berchem-lez-Anvers, Belgium.

BELFAST, JULY 8.—Coal, for the Belfast Harbour Commissioners. Tenders to Mr. W. Currie, secretary, Harbour Office, Belfast.

BELFAST, JULY 9.—For 1,500 tons (more or less) of best Welsh steam coal, from a South Wales colliery, and 120 tons (more or less) best English house coal, for the Hospital Committee. Further particulars obtainable from the superintendent, at the Hospital, Grosvenor-road.

BIRMINGHAM, JULY 7.—Best house coal and rough engine slack, for the Markets and Fairs Committee. Specification from Mr. H. C. Wilkins, superintendent of markets, Moat-lane.

BLANDFORD, JULY 7.—Supply of 1,400 to 1,500 tons of unscreened gas coal, for the Blandford Gas Company Limited. Tenders to Mr. R. H. Groves, Gas Offices, Blandford, Dorset.

BRADFORD, JULY 17.—Best gas coal, cobbles, nuts and cannel, all to be well screened, dressed and free from shale and pyrites, for the Gas Committee. Forms from Mr. C. Wood, gas engineer, Town Hall.

CHATHAM, JULY 7.—Supply of 100 tons of good household coal, for the Guardians of Medway Union. Forms from Mr. A. Reynolds Norman, clerk, Chatham.

CHELMSFORD, JULY 7.—For the Guardians: Portland hand-picked steam coal, 300 tons; Portland screened cobbles, 150 tons; Rockingham best selected, from Newton, Chambers and Co.'s Colliery, 30 tons. Forms from Mr. Arthur S. Duffield, clerk, 96, High-street, Chelmsford.

DARTFORD, JULY 26.—For the Urban District Council, 3,600 tons of coal. Tenders to Mr. W. Kay,



BY 15.—Warwickshire nuts, coke breeze and the Hammersmith Guardians. Forms from Clerk to the Guardians, 206, Goldhawk-road, Bush, W.

LONDON, JULY 24.—Coal, for the Guardians of Stepney Union. Forms from Mr. T. G. Stacey, clerk, Guardians' Offices, Barnes-street, Commercial-road-East, E.

MANCHESTER, JULY 12.—About 80 tons of house coal and 210 tons of gas coke, for the Corporation. Tenders to Mr. John Crofton, clerk, 36, Brazennose-street, Manchester.

MARCH, JULY 14.—Coal and coke, for the Isle of Ely Education Committee. Particulars from Mr. J. H. Haigh, education secretary, Education Offices, County Hall, March.

MEXBOROUGH, JULY 16.—Gas coal, 4,000 to 6,000 tons, for the Swinton and Mexborough Gas Board. Particulars from the engineer, Mr. J. H. Brearley, Gasworks, Longwood.

MILBORNE ST. ANDREWS (DORSET), JULY 10.—Coal, to the Dorset County Boys' Home. Forms from the Education Secretary, County Offices, Dorchester.

NORWICH, JULY 8.—House coal, hard steam coal, and coke, for the Corporation. Forms at the office of Mr. A. E. Collins, M.I.C.E., city engineer, Guildhall, Norwich.

NOTTINGHAM, JULY 11.—Good hard house coal and good screened cobbles, for the Corporation. Forms from Mr. W. J. Board, town clerk, Town Clerk's Office, Guildhall, Nottingham.

OAKHAM, JULY 21.—Coal and coke, to the public elementary schools maintained by the Rutland Education Committee. Particulars on application at the Education Office, Oakham.

PAISLEY, JULY 7.—Coal, for the Paisley Corporation (Electricity Department). Schedules from Mr. C. F. Parkinson, engineer and manager.

PORTSMOUTH, JULY 16.—Coal (other than Welsh coal), for the Corporation electricity supply. Forms from the engineer and manager, Electric Lighting Works, Gunwharf-road, Portsmouth.

SAFFRON WALDEN, JULY 7.—About 200 tons of best hand-picked hard steam coal and 100 tons of coke, for the Guardians. Tenders to Mr. J. Arthur S. Baily, clerk, Union Offices, Saffron Walden.

SLEAFORD, JULY 14.—From 100 to 200 tons of Portland hard best steam coal (pit weight), for the Trustees of the Billingham South District Drainage. Tenders to Mr. H. A. Peake, clerk to the trustees, Sleaford.

WALLASEY (CHES.), JULY 8.—Best steam coal, double-screened North Wales, Lancashire, or other steam coal, for a period of one, two, or three years from August 1, 1913, for the Corporation (Ferries Department). Forms from the General Office, Seacombe Ferry, Wallasey.

WALSALL, JULY 19.—About 300 tons of good deep house coal, about 150 tons of deep kibbles, and about 450 tons of slack, for the Corporation. Forms from Mr. H. Lee, town clerk, Council House, Walsall.

WARE (HERTS.), JULY 7.—Old Roundwood best Silkstone house coal, Annesley best hard steam coal and coke, for the Hertford and Ware Joint Hospital Board. Tenders, Mr. G. H. Gisby, clerk to the Joint Board, Ware, Herts.

WARRINGTON, JULY 8.—Supply of 10,000 tons of slack, for the Electricity and Tramways Committee. Specification from Mr. F. V. L. Mathias, borough electrical and tramways engineer, Howley, Warrington.

YORK, JULY 7.—Gas coal, for the directors of the York Gas Company. Tenders to Mr. Harold E. Bloor, secretary, Gas Offices, Davygate, York.

The date given is the latest upon which tenders can be received

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ABERDEEN, JULY 14.—Boilers, &c.—For the Corporation: Supplying and erecting at Cairnry Colliery, Aberdeen, one Lancashire steam boiler, 26 ft. long by 8 ft. diameter; also supplying and erecting about 800 lineal yards of corrugated iron and wire mesh fencing and gates at Cairnry Quarries, Aberdeen. Specifications, Mr. A. Findlay, superintendent of cleansing, Poyernook-road, Aberdeen.

CUDWORTH, JULY 7.—Gas Engine, &c.—For the delivery and erection of a gas engine and exhaustor of a capacity of 7,500 cubic feet per hour, for the Urban District Council. Specification from the engineers, Messrs. Thomas Newbigging and Son, 5, Norfolk-street, Manchester.

ECCLES, JULY 12.—Engine Room, &c.—For (1) erection of engine-room; (2) supply of machinery parts and cast iron pipes; (3) supply of gas engine and suction producer gas plant, for the Corporation. Drawings can be seen, and specification and bills of quantities of the several contracts, with official forms of tender, obtained from Mr. G. W. Willis, sewage works engineer and manager, Sewage Works, Peel Green-road, Patricroft, on payment of a deposit of two guineas (returnable).

ECCLES, JULY 21.—Stokers.—For the supply and fixing of mechanical stokers for four Lancashire boilers at the electricity works, Cawdor-street, Patricroft, for the Electricity Supply Committee. Specification from the borough electrical engineer, Electricity Works, Patricroft.

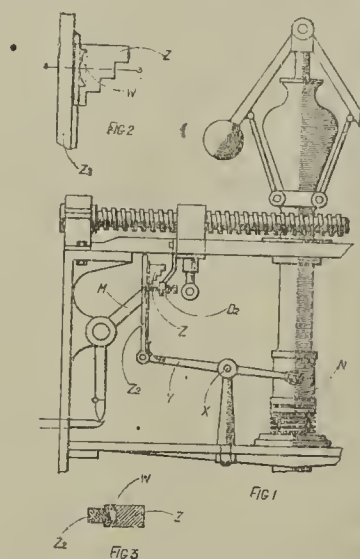
HINDLEY, JULY 15.—Gas Engines, &c.—Tenders are invited for the manufacture, delivery, and erection of two gas engines and two pumps, and other works in connection therewith, for the Urban District Council. Specifications and drawings can be obtained from the surveyor, Mr. Oswald P. Abbott, Council Offices, Hindley, on payment of a deposit of £1 ls. (returnable).

OUNDLIE, JULY 12.—Water Mains.—For providing and laying 4 in. and 3 in. cast iron water mains, with valves and hydrants, for the supply of King's Cliffe, Northants, for the Rural District Council. Drawings and specification can be seen at the office of the engineers, Messrs. G. and F. W. Hodson, M.Inst.C.E., at Bank-chambers, Loughborough.

WALSALL, JULY 14.—Gas Engine, &c.—For the supply, erection and maintenance for twelve months of gas engine, suction gas plant, and three-throw pump, capable of lifting 22,500 gal. per hour (manufactures only), for the Brownhills Urban District Council (Sheffield Sewerage). Copies of the specification and form of tender can be obtained at the Council's consulting engineer (Mr. Robert W. Ford, M.Inst.C.E., 17, Waterloo-street, Birmingham), upon payment of a deposit of two guineas (returnable).

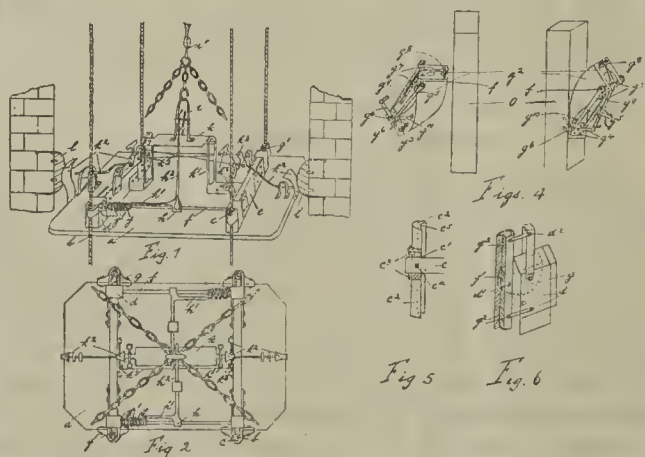
## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

2547 (1913). *Improvements in Overwind Prevention Mechanism and similar Safety Devices for use in Coal Mines and the like.* C. F. Jackson, of The Gables, Bedworth, Warwickshire, and J. F. Staley, of The Laurels, Exhall, near Coventry, Warwickshire.—Relates to overwind prevention mechanisms and similar safety devices of the type described in prior Patent Specification No. 15443 (1912), and has for its object to afford an addition to the safety mechanism therein provided, which will come into operation during the end of the wind so as to prevent excessive speeds at such times, the device being adjustable to be inoperative when required. A governor-actuated distance piece is employed, which is interposed between the travelling stops and the stop valve or similar actuating arm. The distance piece may be arranged adjustably on a link which is pivoted to a lever moved by a governor. Fig. 1 is an elevation showing part of the mechanism which forms the subject of the prior patent referred to, and also the additional mechanism which constitutes the present invention. Fig. 2 is a side elevation of a detail, and fig. 3 a transverse section on the line 3—3 of fig. 2. As the collar moves upwards, the link Z<sup>2</sup> is drawn down, bringing the distance piece Z into such a position that the stop D<sup>2</sup> engages the arm M through the distance



piece. The distance piece is stepped on the side next to the stop, or it may be inclined on this face so as to form a wedge, and it is adjustably arranged on the link Z<sup>2</sup>, which latter may be graduated so that the position of the distance piece may be quickly set to enable different results to be obtained. A simple method of making the distance piece adjustable is illustrated in figs. 2 and 3. The link Z<sup>2</sup> is provided with a dovetailed face with which the rear edge of the stop engages, and pressure is exerted by a bow spring W to cause slight binding between the dovetailed face so that accidental movement is prevented. To move the distance piece, it is pushed slightly towards the link and then raised or lowered thereon. For winding men, the safety distance piece is brought into operation by being moved downwards on the link Z<sup>2</sup>, and unless the engineman slows down sufficiently during the last revolution or so, the safety device operates. When the safety device is out of operation, the speed during the terminal winding is under the control of the curved levers F. (Three claims.)

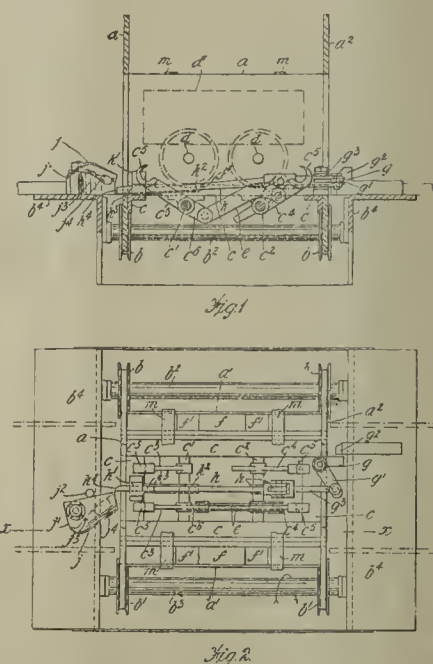
4710 (1912). *New or Improved Automatic Safety Apparatus for Pit Cages, Lifts, and the like.* F. E. Adams, of 7, Park-street, Briton Ferry, Glamorgan, and E. M. Bythway, of 20, Mirador-crescent, Swansea.—One of the chief objects is that of providing V-type gripping surfaces to the parts coming into contact with the guide ropes, such parts, as required, being renewable and giving extended areas to such contact surfaces, together with improved methods of



applying same, thereby making a reliable mechanism capable of satisfactorily meeting all the requirements consequent to the extremely varied conditions found in pits, in particular. Fig. 1 is a perspective view of the top part of a single deck cage, showing the main parts of the invention attached thereto; fig. 2 is a plan of fig. 1; fig. 4 shows application of a combined braking shoe with pawls in regard to wood guides; figs. 5 and 6 show various details. (Six claims.)

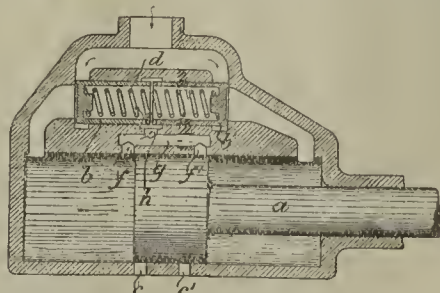
5219 (1913). *Improvements in and relating to Rotary Tipplers.* W. Ford, of 6, New-cottages, Dinas, Rhondda,

Glamorganshire.—Relates to rotary tipplers of the type in which, when the tram or the like is run on to tracks in said tippler, it is centralised therein, and on the commencement of the rotation of said tippler is automatically locked thereto by two pairs of jawed levers oppositely disposed to one another and on transversely arranged shafts, the jaws of said levers engaging the axles of the tram or the like, holding the same during rotation; but on the tippler resuming its normal position, said jaws are automatically released from the axles of the tram or the like, allowing said tram or the like to be run off the tippler. The present invention obviates the use of the weighted oscillating lever. Fig. 1 is a longitudinal vertical section taken on line x—x of fig. 2, the tram or the like being shown diagrammatically in its unlocked position; fig. 2 is a plan view of fig. 1, but with certain parts broken away and tram or the like removed. On the tram being run on to the tracks of the tippler it is brought in a central position by the flanges of the wheel engaging in recesses f<sup>1</sup> on said tracks. The tippler is now rotated anti-clockwise, and in so doing a projection g on a lever g<sup>1</sup> pivoted to the frame of the tippler engages with a stop g<sup>2</sup> on the frame b<sup>4</sup> forcing said lever g<sup>1</sup> inwards, and with it the connecting rod g<sup>3</sup> which



is pivoted to said lever g<sup>1</sup>. To the inner end of the rod g<sup>3</sup> is pivotally connected the arm h carried by shaft c<sup>2</sup>, and the inner end of the releasing bar k, which bar k at its forward end works in a slotted projection k<sup>1</sup> fixed to the other end of the tippler frame and is kept up to its work by a spring k<sup>2</sup>. This inward movement of the rod g<sup>3</sup> through the arm h and link e rocks the shafts c<sup>2</sup>, c<sup>1</sup> bringing the hooked ends c<sup>5</sup> of the levers c<sup>3</sup>, c<sup>4</sup> into engagement with the axles d of the tram d<sup>1</sup> and at the same time forces the end k<sup>3</sup> of releasing bar k through projection k<sup>1</sup>, said end k<sup>3</sup>, which is notched, springing into engagement with the outer face of the projection k<sup>1</sup> under action of the spring k<sup>2</sup>. By this time the projection g has slipped the stop g<sup>2</sup> and the tram is locked to the tippler which now carries with it the tram through the tipping positions. The continued rotation of the tippler now brings the nose k<sup>4</sup> of the end k<sup>3</sup> of bar k under the guide place j of the pivotally mounted releasing stop j<sup>1</sup>, movement of which is prevented in a backward direction by a stop j<sup>2</sup>, the nose being forced inwards and downwards by the curved face j<sup>3</sup> and cam surface j<sup>4</sup>, releasing against the action of the spring k<sup>2</sup> the notched end k<sup>3</sup> of bar k from engagement with projection k<sup>1</sup>, allowing said bar to travel inwards and through arm h and link e to rock the shafts c<sup>1</sup>, c<sup>2</sup> in reverse direction, bringing the jawed ends c<sup>5</sup> of the levers c<sup>3</sup>, c<sup>4</sup> out of engagement with the axles d of the tram d<sup>1</sup>, leaving the same free to be run out of the tippler as shown in figs. 1 and 2. (Four claims.)

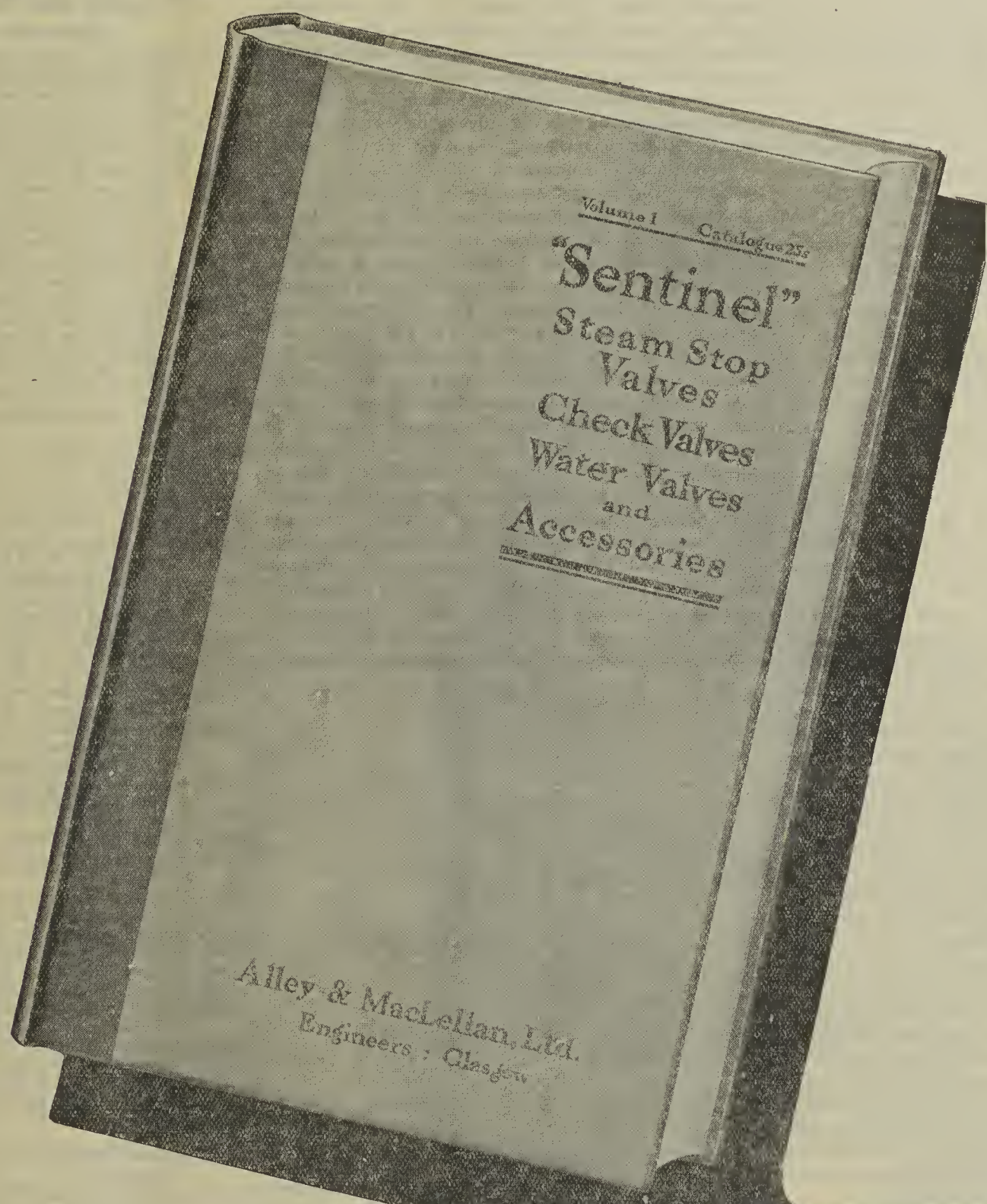
5222 (1913). *Valve Gear for Machines and Tools Operated by Compressed Air and the like.* W. E. Evans, 27, Chancery-lane, London, W.C. (Communication from abroad by Deutsche Maschinenfabrik A.G., of Duisburg, Germany.)—In the known machines and tools operated by compressed air and the like, in which two valves, which each control one side of a cylinder, are mounted in a common chamber



connecting the supply channels for the pressure medium the operation of the valve body is effected by the pressure medium itself, and in such a manner that the valves are opened by the compression pressure existing in front of the working piston and closed by a fresh pressure medium, which is conducted between the two valve bodies. According to this invention it is possible in compressed air or the like machines and tools of the hereinbefore described



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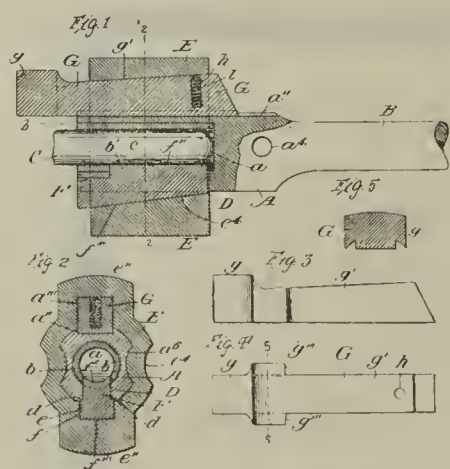
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 (5 Lines)



to employ cylindrical valve bodies of the same diameter throughout, whereby the production of valve bodies in comparison with those known is considerably cheapened and simplified. Between the two valve bodies there is provided a spring which is tensioned correspondingly to the pressure to be employed, which spring forms the necessary source of power for closing the valves. In this case the arrangement can be such that either only springs or springs and pressure medium are employed for closing the valves. In the latter case the spring tension must only correspond to the necessary surplus pressure which is produced in the constructions hitherto known by the enlargement of the rear surfaces of the valves. The accompanying drawing shows a constructional form in which the closing is effected by a spring and compressed air. (Three claims.)

6343 (1913). *Improvements in or connected with the Treatment of Dust in Mines, Tunnels and other Places.* H. Belger, of 2, West Houses, Cullercoats, Northumberland.—It has been suggested to prepare a mucilage of some body which, when mixed with dust and dried, forms a tough cakey mass, and so prevent the dust again rising in a cloud. In such a dust-holding means a rich tenacious mucilage is made by boiling seaweed in water, to which is added some hygroscopic salt such as calcium chloride to assist in retaining the moisture, so that the caked mass of dust and mucilage may not become too brittle when dried. The object is not to cake dust already deposited, but to cause such dust to adhere in position and also collect and hold the dust which becomes subsequently deposited on the long-before-treated dust. An example of a suitable solution is composed of the following ingredients:—30 per cent. calcium chloride, 10 per cent. glue, 60 per cent. water; or 30 per cent. magnesium chloride, 10 per cent. glue, 60 per cent. water. The term "glue" comprises preparations obtained by the action of water upon certain portions of animals and fishes which have the property of gelatinising in aqueous solutions and drying up to a strong, hard adhesive layer. The calcium and magnesium chlorides may be mixed together and they are interchangeable, the advantage of the calcium chloride over the magnesium chloride, however, being that it does not decompose before, say, red heat, whereas magnesium chloride decomposes near the boiling heat of water; it is therefore advisable to adopt the calcium chloride solution wherever explosions are likely to occur. In making up the solution, the ingredients are placed in a vat in which, without the application of heat or other mixing inducement, the solution naturally takes place in about two or three days. Salt may be added—say, 5 per cent.—for the purpose of increasing its viscosity. The proportion of calcium chloride or magnesium chloride may be varied, the less glue employed the less viscous does the solution become. Excess of glue—say, an amount equal to the amount of calcium chloride employed—prevents the dust sinking in the solution, and thus would make the solution ineffective after a short time, whilst excess of calcium chloride—say, 10 times that of the glue employed—prevents the dust from becoming securely anchored. It is preferable to use a solution composed of from 15 to 35 per cent. of calcium chloride or magnesium chloride, and from 5 to 10 per cent. of glue. (Three claims.)

24120 (1912). *Improvements in Chucks for Rock Drills.* J. C. H. Vaught, Tonapah, Nyo County, Nevada, U.S.A.—Relates particularly to a gib and self-tightening sleeve connection and yielding retaining and releasing devices for the sleeve. Fig. 1 represents a longitudinal section showing an automatic self-tightening chuck for rock drills. Fig. 2 represents a transverse section on line 2—2, fig. 1. Figs. 3 and 4 represent respectively a side elevation and a top plan view of a releasing key. Fig. 5 represents a cross section thereof on line 5—5, fig. 4. By the operation of the drill

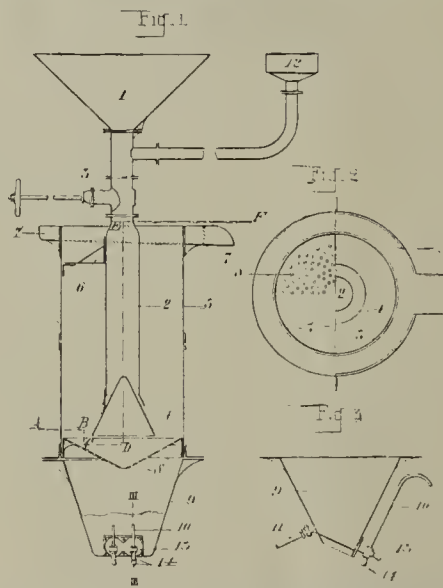


and impact of same on the rock, the sleeve E is automatically driven on to the inclined face of the gib, thereby forcing it against the drill-shank and holding the same in its socket; and the retaining and releasing key is also driven forward, while subjected to pressure of the spring, and exerts a yielding or spring pressure on the sleeve, keeping it in engagement with the gib, thereby preventing rattling of the parts. When a drill is to be removed and replaced by another the operation will be quickly performed by a blow on the outer end g of the retaining and releasing key, which drives it back against the sleeve, and driving the

sleeve backward to the back stop device. The gib will thereby be released, so that the shank may be taken out and another one inserted in the socket. A spring bar with a projection prevents the sleeve from backing off from the body, but will permit it to be slid back far enough to let the gib fall away from engagement with the shank, so that the latter may be withdrawn from its socket and replaced by a new one. A spring clip stop will also serve the same purpose. (Eight claims.)

23582 (1912). *Improved Process for Treating Carbonaceous Material.* O. J. Parker, of 91 and 98, Bishopsgate, London.—Relates to that class of process for treating carbonaceous material in vacuum between certain limits of temperature and degrees of vacuum. In treating the material in accordance with this invention the substance is placed in a metal or other suitable retort having airtight doors and in which a temperature of from 460 degs. to 700 degs. Cent. is maintained, in combination with which a simultaneous pressure of from 20 in. of mercury below atmospheric pressure to a practically perfect vacuum is maintained within the retort. The vacuum is also maintained throughout a condensing apparatus during the whole of the time occupied in distillation, and such volatile matter as is capable of being condensed *in vacuo* is recovered. The gas is then passed through ordinary scrubbers after passing through the vacuum pump in order to recover the highly volatile oils which were not recovered in the before-mentioned condensing apparatus. (Two claims.)

29617 (1912). *Improved Apparatus for Washing, Grading, and Concentrating Ores, Minerals and the like.* G. Michel, 23, rue Truffant, Paris, France.—Fig. 1 represents a view, in vertical section, partly broken away, of a complete apparatus. Fig. 2 represents a section of the same apparatus on the line A B C D E F of fig. 1. Fig. 3 shows a sectional elevation of the discharge mechanism on the line III—III of fig. 1. Tube 2 which serves to conduct the mixture of water and of mineral or pulp to the interior of the apparatus has in its upper part, in the case where the apparatus is a single one, a feed hopper 1 which is replaced by a spout in the case in which the apparatus is coupled to others of the same kind. Beneath the hopper or the spout is placed a controlling valve 3 which permits of regulating the supply and consequently the speed of flow of the pulp. The lower part of the feed tube 2 possesses a distributing cone 4 which permits of the material being distributed uniformly throughout the entire apparatus. The cylinder 5 is provided at its upper part with an annular basin 7 which serves to contain the discharge of the exhausted material or its residues from washing or cleansing. It possesses internally



at its lower part a conical perforated and sloping grill 8, the slope as well as the size of the holes of which are determined according to the nature of the minerals or rocks to be washed or sorted. This grill has for its purpose to admit of the passage into the collecting receptacle 9, fixed below the cylinder 5, of the cleansed, washed or concentrated particles. These particles accumulate there in the case of an apparatus giving a small supply, or, in the case of a larger yield, they may be removed automatically without occasioning any trouble or disturbance in the speed of the motion of the pulp through the apparatus, by means of a special device consisting of one or two outlets 10 of diameter and height adapted to the yield of the apparatus. These outlets are hinged, as is shown in fig. 3, so as to cause the yield to vary to a certain extent without changing the section of the tubes placed at the end. These apparatus possess a cruciform device 13 provided with inspection plugs 14 which enable the operator to relieve, if it is necessary, any choking of the apparatus. In order to prevent the trouble occasioned in the motion of the pulp by the passing of the particles into these orifices, the quantity of material discharged is compensated by the addition of clear water made through the part 11 supplied by a cistern with constant level so as to render its supply uniform, the rate of which should be in constant relation to the flow through the outlet or outlets. In order to permit of ensuring the absolute uniformity of action of the apparatus a cistern 12, provided with a float, is connected with a central tube 2. This cistern communicating with the hopper is intended to supply, by an automatic addition of

clear water, any temporary insufficiency in the feeding of the hopper so as to maintain constant the water level in the said hopper and consequently the speed of passage through the apparatus. The principle of the apparatus consists in making use of the free fall of the material in a stream of water ascending at a predetermined constant speed and of a suitable height. In the apparatus the direction of motion of the liquid in which the grading takes place is always the same as is also that of the material under treatment. No vibrations or impulses have to be applied to the liquid, as have been proposed in cylindrical devices for grading minerals in a stream of liquid, either by the action of compressed air, or by mechanical movement or by the action of a piston, but in the apparatus the material is graded in a steady stream of liquid and the feed to the apparatus and the discharge of the finished products are automatically kept constant. (Two claims.)

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

- 14439. Mechanism of steam-boiler furnaces to be employed for facilitating combustion and the prevention of smoke. E. Ramshotom.
- 14450. Reversing gear for fluid-pressure engines. J. W. S. Martin, and Douglas and Grant Limited.
- 14469. Automatic weighing apparatus. H. Kellersohn.
- 14478. Metal such as basic or acid steel and other metal employed for manufacturing purposes; a process for improving such metal and for converting it into a solid, hollow or other formation, or into rings, hoops, tires and other bodies; and apparatus for carrying out such process. H. Reinhard.
- 14488. Miners' and like drills. J. Young.
- 14498. Method of and means for detecting dangerous atmospheres in mines and the like, and for operating an alarm therein. G. Schauli.
- 14500. Apparatus employed in the removal of dust and the like. W. G. Hay.
- 14518. Method for the electrical welding of metals by means of increased resistance. Allgemeine Elektrizitäts Ges.
- 14526. Water-tube boilers. J. P. Davies.
- 14538. Self-acting lockers for colliery corves. G. W. Hawkins.
- 14541. Reversible regenerative gas furnaces of the Siemens type. A. Reynolds.
- 14543. Miners' safety lamps and apparatus in connection therewith. E. A. Hailwood.
- 14554. Automatic controlling appliances for air-compressors. F. W. Wilson and Tilghman's Patent Sand Blast Company Limited.
- 14571. Manufacture of artificial fuel in the form of balls, briquettes, or the like. Ovex Fuel Company Limited and A. C. Evans.
- 14581. Oil furnaces for heating and melting metals and other purposes. P. W. Allday.
- 14589. Rolling apparatus of armoured turrets, turntables, swing-bridges, and similar structures. Soc. Anon. John Cockerill and E. Ternström.
- 14612. Means for supplying the actuating fluid to oscillating cylinders of haulage machines and the like. H. Wood.
- 14637. Rock drills. G. Meyer.
- 14641. Wire ropes. J. and E. Wright Limited and T. A. Taylor.
- 14663. Fuel economisers, steam boilers, and tubular, flat, or other shaped surfaces. W. J. Ogden.
- 14665. Coating iron and steel plates. M. L. Jones.
- 14667. Automatic railway coupling. S. Masters.
- 14668. Railway couplings. S. Masters.
- 14669. Pin-and-link type railway couplings. S. Masters.
- 14723. Ball bearings especially suitable for conveyor rolls. Spencer and Co. Limited and T. R. Murray.
- 14726. Crucible furnaces. V. Coppée.
- 14728. Rotary pumps or engines. W. H. Utley.
- 14737. Driving-belts for use in connection with conical drum-driving mechanism. J. Hardman.
- 14745. Explosives. E. C. R. Marks. (Giovanni, Spica, Italy.)
- 14753. Refuse destructors. A. B. Scorer and Meldrums Limited.
- 14755. Automatic control for cylinder by-pass valve on steam-engines. J. Mann. (Heinrich Berghoefer, Germany.)
- 14773. Purification of coal gas. G. Wilton.
- 14793. Process and apparatus for the distillation of gas, tar, petroleum, and allied materials. C. H. Beadle and A. W. Pearce.
- 14814. Gas furnace. G. Hughes.
- 14821. Sewage destructors. L. W. Williams.
- 14826. Apparatus for the transference of heat between any gases (including air) at different temperatures. E. L. Pease.
- 14848. Junction boxes for electric circuits. H. E. Walker.
- 14862. Furnaces. T. W. Atterbury and P. W. Matthews.
- 14863. Ventilating fan. J. S. G. Telfer and J. H. C. Boyd.
- 14886. Means for protecting the nuts or heads of stay bolts or like fittings exposed to heat or flame in boiler or other furnaces. H. A. Thompson.
- 14889. Water-tube boilers. Vulcan-Werke Hamburg und Stettin Akt.-Ges.
- 14928. Process and apparatus for separating the products of combustion, especially those derived from furnaces. A. F. Müller.
- 14933. Safety device for high-tension cables. W. Voigt.
- 14934. Apparatus for indicating and/or recording weights and measures. W. A. Brame and G. P. M. Lee.
- 14941. Apparatus for cooling electrical machines. Akt.-Ges. Brown, Boveri, et Cie.
- 14954. Conveyors for minerals and other materials. A. Klein.
- 14979. Steam turbine with non-expanding and expanding nozzles in the stages following the high-pressure part. W. Evans. (Vereinigte Dampfturbinen G.m.b.H., Germany.)

Continued on page 42.



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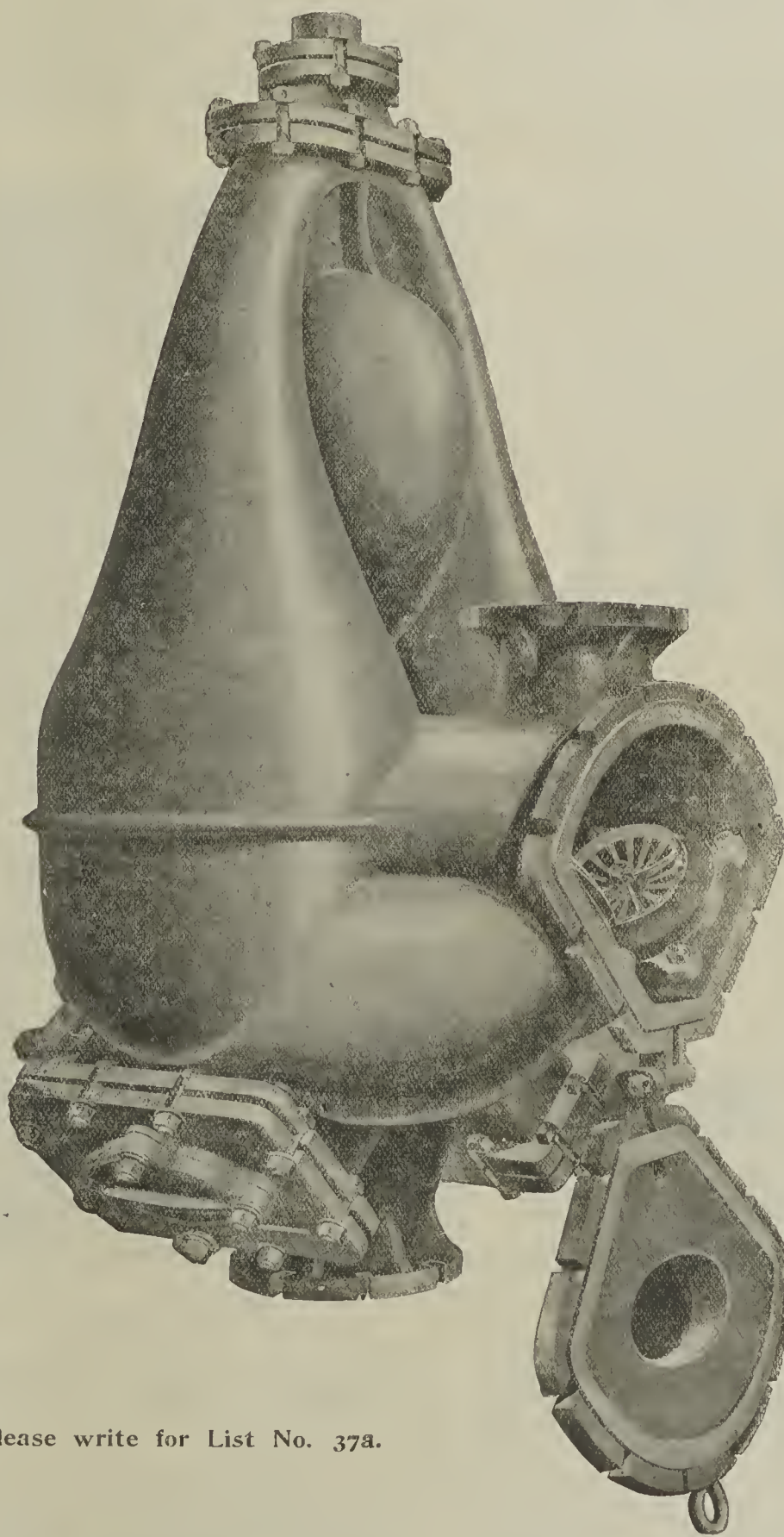
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Apparatus for regulating the supply of steam to gas producers. Alston and Houston.

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189. Couplings where the part coupled is required to be cast adrift quickly and with ease. Forsythe.

14510. Refractory open work structures for consuming smoke or heating air in boiler and other furnaces, or for use in reversible regenerators. Blizzard, Todd, and Cotton.

14652. Absorber or separator for gases or vapours. Smith, Mitchell, Askham, and Hey.

14710. Production of a mixture of steam and combustion products. Kraus.

14714. Water-tube boilers. Suzuki.

15095. Machine for manufacturing rail spikes. McGregor.

15542. Firebars of furnaces. Bythway.

15920. Electric aerial rail or rope ways. Elektro Motoren Werke Herrmann-Gradenwitz.

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18700. Automatic weighing apparatus. Gibbs and Johnson.

19424. Valve apparatus for percussive rock drills and like tools. Rayner.

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20755. Decking plant for collieries and the like. Leech and Rother Vale Collieries Limited.

23307. Coupling for colliery trams and like vehicles. Cryer and Jones.

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24422. Couplings for railway vehicles. Tietjen.

24448. Tube mills. Fennell.

26341. Apparatus for operating the brake mechanism of colliery winding engines. Shrigley.

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56. Weight-indicating devices for automatic weighing apparatus. Reiser.

184. Weighing machines. Clifford and Murray.

2704. Controlling apparatus for moving devices for trucks. Cippitelli.

5416. Treatment of coal or carbonaceous waste materials for the manufacture of briquettes or fuel blocks. Wetter (Naamloze Vennootschap Briquet Company—Briquet Maatschappij).

12696. Combustion of combustible mixtures. McCourt and Bonecourt Surface Combustion Limited.

## Complete Specifications open to Public Inspection before Acceptance.

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13889. Boring tools. Nevin.

14107. Levelling apparatus for surveying purposes. Zwicky and another.

## GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named **post free**.

Education: Report of Practical Work in Elementary Schools, 2s. 1d.

Factory Inspectors' Report for 1912, 2s. 10d.

Merchant Shipping Certificates Bill, 2d.

Caledonian Railway Order, 4½d.

Crown Lands Bill, 1d.

Royal Commissions: Return, 1904 to 1911, 4d.

Consular and Trade Reports for 1912: U.S.A., Chicago, 6½d.; Netherlands, 2½d.; Mexico, Vera Cruz, 2d.; Corea, 3d.; Swedish Budget, 1914, 1d.; Italy, Genoa, 6d.; Italy, Sicily, 6d.; Roumania, 1911-12, 6d.; Portugal, Azores, 2½d.; Egypt, Alexandria, 6½d.; St. Helena Report for 1911-12, 4d.; Austria-Hungary, Bosnia, Herzegovina, 4½d.; France, Corsica, 2½d.; Turkey, Jerusalem, 3d.; Spain, Corunna, 5d.; France, Lyons, 8d.; U.S.A., Baltimore, 7d.; Bolivia, 4½d.; Chile, Antofagasta, 1d.; China, Wuchow and Nanning, 3½d.; Trade of Canada for 1912, 4d.

Board of Education Minute, June 26, 1913, Modifying the Regulations for Public Elementary Schools, 1d.

Boiler Explosions: No. 2228, at Blaydon Burn Colliery, 5½d.; No. 2225, at the Halls-street Works, 7½d.

Companies Consolidation Amendment Bill, 1d.

Trade Boards: Memoranda in Reference to the Working of the Act, 4d.

Grimsby Coal Exports.—The following is the official return of the quantity of coal exported from Grimsby during the week ended Friday, June 27:—Foreign: To Antwerp, 708 tons; Bandholm, 1,237; Cronstadt, 2,294; Dieppe, 1,274; Drammen, 2,179; Esbjerg, 305; Fredrikshald, 648; Gefle, 1,837; Gothenburg, 1,379; Hamburg, 1,058; Landserona, 1,517; Malmo, 1,394; Narvik, 2,058; Riga, 1,673; and Rotterdam, 259; total, 19,820 tons.

Coastwise: To Lerwick, 930; London, 193; total, 1,123 tons, compared with 26,222 tons foreign and 2,280 tons coastwise during the same week last year.

## PUBLICATIONS RECEIVED.

"Journal of the Franklin Institute" (Vol. 175, No. 6), June, price 50c.; "Transactions of the Mining Institute of Scotland" (Vol. 35, Part 4); "Bulletin et Comptes Rendus Mensuels de la Société de l'Industrie Minérale" (Tome 3 No. 6), June; "Transactions of the Concrete Institute" Vol. 4, Part 4; "Peru To-day" (Vol. 4, No. 12), price 5d.; "The Engineering Magazine" (Vol. 45, No. 3), June, 25c.; "Bulletin Mensuel de la Société Industrielle du Nord de la France" (No. 192), May; "Publications de l'Association des Ingénieurs de l'Ecole de Mons" (Tome 6); "The Mining Magazine" (Vol. 8, No. 6), June, price 1s.; "Le Mois Scientifique et Industriel" (No. 166), June, price 2 fr.; "Excerpt from the Trans. of the Institution of Mining Engineers: 'Colliery Cables,'" by W. T. Anderson; "Trade of the Union of South Africa, Southern and Northern Rhodesia and British South for the month of April," price 3s. 6d.; "Canada Department of Mines, Mines Branch, 'The Magnetic Iron Sands of Natashkwan, county of Saguenay, Province of Quebec,'" by G. C. Mackenzie; "Royal Society of Arts Cantor Lectures on Liquid Fuel," by Prof. Vivian B. Lewes; "Properties of Saturated and Superheated Ammonia Vapour," by G. A. Goodenough and Wm. Earl Mosher (University of Illinois Bulletin 66); "The Secretaries Association Limited" (Verbatim Reports of Lectures, 1912-13), 1s. net.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, June 24, 1913, is as follows:—Amsterdam, 745 tons; Alexandria, 5,280; Antwerp, 405; Buenos Ayres, 8,625; Brunsbittel, 1,196; Bremen, 3,564; Copenhagen, 440; Cronstadt, 16,631; Christiania, 189; Drontheim, 393; Danzig, 206; Fiume, 44; Gefle, 1,311; Genoa, 3,868; Gothenburg, 1,091; Ghent, 557; Hamburg, 6,215; Harlingen, 1,407; Kallundborg, 2,108; Kiel, 1,354; Leghorn, 4,282; Malmo, 953; Marseilles, 2,541; Newfairwater, 380; Pernau, 1,760; Philippeville, 2,022; Rotterdam, 848; Riga, 950; Rio de Janeiro, 894; Rouen, 5,945; St. Malo, 239; St. Petersburg, 18,337; Stockholm, 932; Stege, 835; Tuborg, 1,150; Wyborg, 1,417; Waa, 203; total, 99,317 tons. Corresponding period last year, 71,000 tons.

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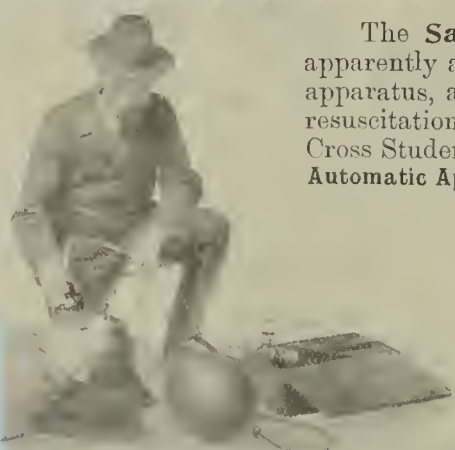
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THE SOUTH WALES COALFIELD. PART II.

By HENRY K. JORDAN, F.G.S. (Past President and first Gold Medalist of the South Wales Institute of Engineers).

This Paper, which deals with the western part of the Coalfield, has just been published by the South Wales Institute of Engineers. It consists of 31 pages of printed matter with Sections and Diagrams. The large drawings are issued separately and comprise:—

1. A HORIZONTAL SECTION across the authracite region of Llandybïe and Pant-y-ffynnon, and via the Dulais Valley to the sea at Swansea. It is drawn to a scale of six inches to one mile, is 8 ft. in length, mounted on linen, and geologically coloured.

2. COMPARATIVE SECTIONS of the LOWER MEASURES in the following areas —  
(A) NEATH VALLEY. (E) AMMANFORD.  
(B) SWANSEA VALLEY. (F) LOUGHOR VALLEY.  
(C) BRYNANMAN DISTRICT. (G) GWENDRAETH DISTRICT.  
(D) AMMAN VALLEY. (H) GWENDRAETH DISTRICT.

These are drawn on one sheet, about 35 by 30 in., mounted on linen, to a scale of 200 ft. to 1 in.

3. A MAP OF SWANSEA DISTRICT, on a scale of 6 in. to one mile, showing the outcrops of the coal seams.  
A limited number of the above are for sale, and may be obtained from The Secretary, The South Wales Institute of Engineers, CARDIFF.

PRICE £1 1s., POSTAGE EXTRA.  
"THE SOUTH WALES COALFIELD," PART I., by Mr. H. K. Jordan, published in 1908, price 22s., dealt with the eastern half of the Coalfield, and may be obtained from the Secretary.



# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY, JULY 11, 1913.

No. 2741.

## IGNITION OF MINE GASES BY THE FILAMENTS OF INCANDESCENT LAMPS.\*

By H. H. CLARK and L. C. ILSLEY.

As part of its investigations of the causes of mine accidents, and of the safest and most efficient methods of handling electricity underground, the Bureau of Mines undertook a study of the ignition of mine gases by the filaments of electric incandescent lamps. This bulletin describes the investigation in detail, and gives a complete record of the results obtained.

Previous investigators† have, to a greater or a less extent, been concerned with certain theoretical features of the problem, such as the effect of the temperature and the dimensions of the lamp filaments and the question whether a lamp may ignite gas by the heat of its glowing filament or by the spark that is drawn when the filament is broken. Although these features were considered in the present investigation and are briefly discussed in this bulletin, the principal object of the tests was to determine what sizes of incandescent lamps suitable for mine use would ignite explosive mixtures of mine gas and air, and what were the circumstances most effective in causing such ignition.

### General Statement of Results.

The results of the investigation may be generally summarised as follows:

The naked carbon filaments of standard lamps, burning at rated voltage, will invariably ignite explosive gaseous mixtures.

If gas can reach the filaments of standard lamps without breaking the filaments or producing partial combustion within the bulbs, the explosive gaseous mixture is sure to be ignited.

Several sizes of both standard and miniature lamps, when smashed while burning at rated voltage, will ignite gas.

Standard lamps that do not usually ignite explosive gaseous mixtures may do so if the broken pieces of the filament cause a short circuit when the lamps are smashed.

One thousand one hundred and eighty-eight carbon-filament and 31 tungsten-filament standard lamps, also 42 carbon-filament and 192 tungsten-filament miniature lamps, were used in this investigation, including 125 kinds of lamps differing in candle-power, voltage, or brand.

Natural gas from the Pittsburg city mains was used in all tests. The composition of this gas is approximately 82 per cent. methane, 16.4 per cent. ethane, 1.5 per cent. nitrogen, and a trace of carbon dioxide. The lamps under test were surrounded by gas that was at rest. No tests were made in a current of gas, because gas in motion is not so easily ignited as gas at rest, and it was the intention to make the test conditions as severe as possible. The lamps were tested in a gastight receptacle filled with a mixture of gas and air. The usual proportion was 8.6 per cent. gas to 91.4 per cent. air. The percentage of gas, however, was increased or decreased for some of the tests.

\* From Bulletin 52 of the United States Bureau of Mines.

† H. Couriot, professor of mining methods, and J. Meunier, professor of chemistry, Central School of Arts and Manufactures, Paris, France; F. Heise, bergassessor, Gelsenkirchen, Westphalia, Germany; Dr. Theim, engineer, Siemens-Halske Company, Berlin, Germany; Emanuel Lemaire, professor, University of Louvain, and engineer, Frameries Experiment Station, Frameries, Belgium; M. Hauser, professor, Madrid School of Mines, Madrid, Spain; A. Stassart, professor, Hainault Mining and Polytechnic School, Hainault, France.

### Standard Lamp Tests.

The results of the tests of the standard lamps were satisfactory, in that positive results were obtained in almost every case. The purpose of the tests was to determine whether certain specific sizes of incandescent lamps would when broken ignite explosive mixtures of gas and air. The results obtained showed that gaseous mixtures could be ignited by all the classes of standard lamps tested and also by all the classes of miniature lamps that gave sufficient light to be of commercial value. Although some classes of lamps gave comparatively few ignitions, the unsafe character of such lamps was indicated by even a single ignition under conditions that might exist in actual practice.

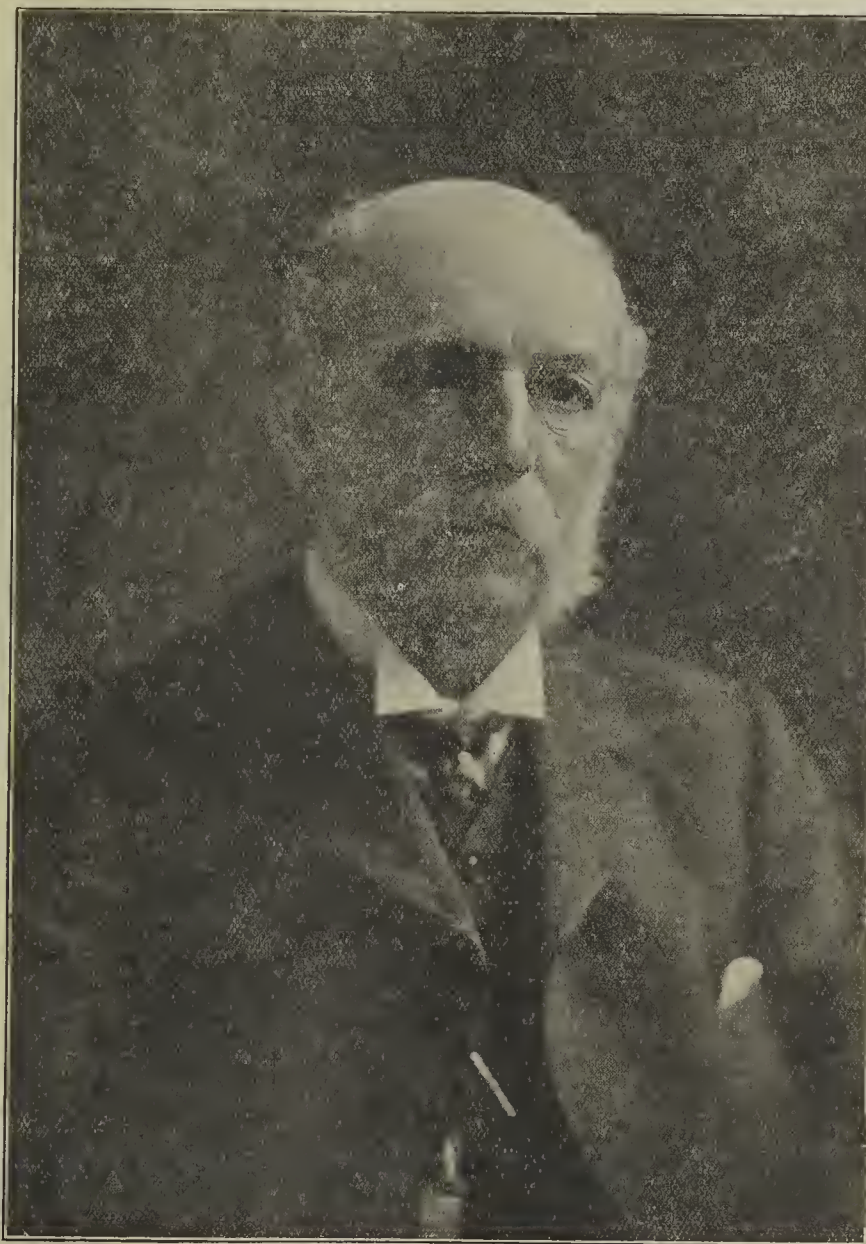


Photo by]

SIR W. SCOTT BARRETT, D.L.,

Honorary Treasurer of the Mining Association of Great Britain,  
Knighted by his Majesty during the Royal visit to South Lancashire.

[Lafayette.

**Smash Tests.**—Series 1 tests included tests of both standard and miniature lamps. In the tests with alternating current, 25 ignitions were obtained from 80 trials, as compared to 26 ignitions from 80 trials in the tests made with direct current. In the tests made with series-connected lamps, 11 ignitions were obtained from 50 trials, as compared to 14 ignitions from 50 trials made with similar lamps connected in multiple.

The results demonstrate that the standard lamps that ignite gas least readily are those of low candle power and high voltage. The only lamps that, in some brand, did not ignite gas were those of the 8-candle power 220 volt class. Lamps of the 16-candle power 220 volt, and 32-candle power 220 volt classes failed to ignite gas in some brands, but gave ignition in others.

Standard incandescent lamps for underground use are usually 16-candle power 110 to 250 volt lamps. Sixty-two carbon lamps and seven tungsten lamps of the

16-candle power 110 volt class were tested by direct smashing while burning at rated voltage. Five of the carbon and six of the tungsten lamps ignited the gas. Twenty-seven carbon lamps and 14 tungsten lamps of the 16-candle power 220 volt class were tested by direct smashing while burning at rated voltage. One of the carbon lamps and four of the tungsten lamps ignited the gas. The carbon lamp produced ignition by the short-circuiting of its filament.

The 55 volt and 110 volt lamps of all candle-powers ignited gas under the conditions of the series 1 tests, 32 and 50 candle-power 55 volt lamps invariably ignited the gas, the 8-candle power 220 volt lamps gave no ignitions, and in general the percentage of ignitions obtained from lamps of a given candle-power decreased as the voltage increased.

The tests of series 1—C were made with both standard and miniature lamps with variations in the gas percentages. The results showed that any standard or miniature lamp that would cause ignition of gas in the most explosive mixture would, under similar conditions, ignite mixtures containing from 5 to 11.5 per cent. of gas. None of the lamps ignited mixtures containing more than 12 or less than 5 per cent. of gas.

Series 1—D tests were made with both standard and miniature lamps, with a voltage in excess of that rated. The tests of standard lamps were made for two purposes—first, to confirm by positive results the negative results of the series 1 tests, and, second, to obtain a means of comparing the relative safety of such lamps as did not cause ignition in the series 1 tests.

The tests achieved the purpose for which they were undertaken. Lamps that gave negative results in the tests of series 1 gave no ignitions in the series 1—D tests until their energy consumption had been increased by at least 26 per cent.

The table below gives, for each class of standard lamps tested, the number of ignitions and the percentage of normal wattage at which ignition took place. The figures given in the fifth column provide a means of comparing the relative abilities of the lamps to ignite the gas when the lamps are broken by a direct blow while under rated-voltage conditions. A lamp that causes ignition only when its filament is radiating 3.5 times its normal energy is obviously less likely to ignite gas under normal conditions than a lamp that invariably causes ignition when radiating only 30 per cent. more than its normal energy.

**Tip-breaking Tests.**—The tests of series 2 were made with standard lamps only.

The results of the tests showed that practically every class of standard lamps will ignite gas if the tips are

SUMMARY OF RESULTS OF TESTS IN SERIES 1—D.												
Approximate rating of lamps.						Percentage of normal wattage causing ignitions.						
Candle-power.	Watts.		Volts.	No. of ignitions.	Mini-mum.*			Average mini-mum.†		Average.‡		
8	...	30	...	55	...	27	...	128	...	135	...	142
8	...	25-30	...	110	...	24	...	214	...	232	...	239
16	...	50-60	...	110	...	27	...	106§	...	119	...	126
8	...	35	...	220	...	11	...	349	...	364	...	365
16	...	60	...	220	...	27	...	182	...	199	...	205
32	...	120	...	220	...	30	...	117	...	126	...	132

\* Minimum percentage of normal wattage at which an ignition was obtained from any brand of lamp. † Average minimum percentage of normal wattage for all brands. ‡ Average percentage of normal wattage for all tests giving an ignition. § This brand of lamp gave ignitions at normal wattage in 8.3 per cent. of the series 1 tests.



oved in a certain way. The size of the hole left by removal of the tip has an important bearing upon whether or not ignition will occur. Small filaments are most likely to ignite when the hole is small; the reverse is true with large filaments. There are three conditions that may exist after the tip has been removed. The filament may be distorted and broken by the entering gas; the filament may remain intact but be cooled by the entering gas below the ignition point of the gas, recovering its temperature later and burning off after igniting the gas; the filament may ignite the gas as it enters, thus producing a partial explosion that temporarily checks the entrance of gas and fills the bulb with the products of combustion.

These conditions are stated in the order of the violence of the gas entrance. The first and last are at either extreme and produce no ignition. The second condition, which depends upon the proper relation of filament diameter to gas-entrance velocity, is the only one that causes ignitions, but does so invariably.

The percentage of ignitions increased as the candle-power rating increased, and decreased as the voltage rating increased, and although no class of lamps gave 100 per cent. of ignitions, all classes produced some ignitions. Although the average percentage of ignitions in the tests of series 2 is less than that in the tests of series 1, the former tests proved to be the more severe, because they showed that every class of lamp could cause ignition. The tip-breaking and the smash tests are both practical. In the majority of underground lighting systems, the tip of the bulb is the most exposed part of the lamp, and lamps are often destroyed by having their tips broken off.

*Puncture Tests.*—The tests of series 3, made with standard lamps only, were similar in character to those of series 2, the principal differences being that the gas entered through larger holes and did not impinge directly upon the filaments. Under these conditions the filaments were greatly cooled, but were not broken. As compared to the tests of series 2, the percentage of unbroken filaments was 1·45 times as great. The cooling of the filaments is evidenced by the high percentage of ignitions from unbroken filaments, which was 2·5 times as great as in the tests of series 2. The severity of the conditions is shown by the fact that the percentage of ignitions was 3·6 times as great as in the series 2 tests.

*Naked-filament Tests.*—The tests of series 4 were made with both standard and miniature lamps. They showed conclusively that any of the standard lamp filaments burning in an explosive mixture of gas will eventually ignite it. This fact is confirmed by some of the series 3 results, the conditions in the latter series being similar in some tests to the conditions in the series 4 tests.

Miniature Lamp Tests.

Miniature lamps cannot be divided into as distinct classes as are standard lamps, because the demands of the service to which miniature lamps are put are quite different. On account of the desirability of using as light a battery as possible, miniature lamps are often operated at higher temperatures than standard lamps, with a proportionately increased efficiency and decreased length of life. A single lamp may be variously rated according to the needs of the purchaser as to the candle-power, voltage, current consumption, or life.

Another variable that affects the performance of miniature lamps is the voltage of the battery with which the lamps are used. There are no standard voltages for this class of service. For portable lights there is available almost any voltage from 1·3 to 7. These voltages are not constant during the length of life of the battery or charge, and at the beginning lamps must be used at over-voltage in order to give a satisfactory average performance.

The results show that none of the carbon-filament lamps ignited gas under the conditions of the series 1 (smash) tests. In fact, no ignitions from carbon-filament lamps burning at rated voltages were obtained in the tests of any of the series. An ignition with a potential 4 per cent. above rated voltage was obtained from a carbon lamp of the 5·5 volt class under the conditions of the series 1—D tests. Carbon lamps of all the other classes gave little light and would be of little practical use in mines.

Fifteen classes of tungsten lamps were tested under series 1 conditions. All ignited gas except the lamps of the 2 volt, 0·23 ampère class, and the lamps of the 1·5 volt, 0·4 ampère class. The former gave an ignition in a later test with a 20 per cent. over-voltage, and the latter with a 33 per cent. over-voltage. Both of these lamps gave about 0·5-candle power.

The tests showed that it is quite probable that any lamp that gives enough light to be of practical use in a mine will ignite explosive mixtures of gas

PROBABILITY OF GAS IGNITION AT RATED VOLTAGE BY EACH CLASS OF LAMPS TESTED \*

Classification of lamp.				Condition of lamp.	Ignition of gas.
Size.	Character of filament.	Approximate candle-power.	Approximate voltage.		
Standard .....	Carbon .....	50	55	Bulb completely smashed.....	Certain.
Ditto .....	Ditto .....	32	55	Ditto .....	Ditto.
Ditto .....	Ditto .....	50	110	Ditto .....	Almost certain.
Ditto .....	Ditto .....	50	220	Ditto .....	Ditto.
Ditto .....	Ditto .....	16	55	Ditto .....	Ditto.
Ditto .....	Ditto .....	32	110	Ditto .....	Frequent.
Ditto .....	Ditto .....	8	55	Ditto .....	Occasional.
Ditto .....	Ditto .....	16	110	Ditto .....	Ditto.
Ditto .....	Ditto .....	32	220	Ditto .....	Rare.
Ditto .....	Ditto .....	16	220	Ditto .....	Ditto.
Ditto .....	Ditto .....	8	110	Ditto .....	Ditto.
Ditto .....	Ditto .....	8	220	Ditto .....	Unlikely.†
Ditto .....	Ditto .....	50	55	Tip of bulb broken off .....	Almost certain.
Ditto .....	Ditto .....	32	55	Ditto .....	Ditto.
Ditto .....	Ditto .....	50	110	Ditto .....	Frequent.
Ditto .....	Ditto .....	50	220	Ditto .....	Ditto.
Ditto .....	Ditto .....	16	55	Ditto .....	Ditto.
Ditto .....	Ditto .....	32	110	Ditto .....	Ditto.
Ditto .....	Ditto .....	8	55	Ditto .....	Ditto.
Ditto .....	Ditto .....	32	220	Ditto .....	Occasional.
Ditto .....	Ditto .....	16	110	Ditto .....	Ditto.
Ditto .....	Ditto .....	8	110	Ditto .....	Ditto.
Ditto .....	Ditto .....	16	220	Ditto .....	Ditto.
Ditto .....	Ditto .....	8	220	Ditto .....	Ditto.
Ditto .....	Tungsten .....	20	110	Bulb completely smashed.....	Almost certain.
Ditto .....	Ditto .....	20	220	Ditto .....	Frequent.
Ditto .....	Ditto .....	20	110	Tip of bulb broken off .....	Almost certain.
Ditto .....	Ditto .....	20	220	Ditto .....	Unlikely.†
Miniature .....	Ditto .....	2	4-6	Bulb completely smashed.....	Certain.
Ditto .....	Ditto .....	1·5	2-3·5	Ditto .....	Almost certain.
Ditto .....	Ditto .....	1	2-2·5	Ditto .....	Frequent.
Ditto .....	Ditto .....	0·5	1·5-2	Ditto .....	Unlikely.

\* The results of tests of the miniature carbon-filament lamps are not included in this table because those lamps were rated in voltage only, and hence their behaviour could not be used as a standard of comparison.  
† No ignitions were obtained in any of the tests of this lamp made under the condition stated.

and air if the bulb is so broken that the filament is not injured.

Results were obtained from the smash tests, under series 1—D conditions, of nine classes of miniature lamps. These lamps are often purposely used at greater than rated voltage, and may be used, through accident or ignorance, at voltages much higher than those at which the lamps are rated. The relative danger under such conditions was better shown by the increase in voltage than by the increase in wattage. The maximum over-voltage required to give ignition in these tests was approximately 37 per cent. for carbon lamps and 33 per cent. for tungsten lamps.

Only a few miniature lamps were tested under series 4 (naked filament) conditions. The lamps tested were of a class that had not caused ignition when smashed at rated voltage. Only one of these lamps gave an ignition at rated voltage under the series 4 conditions. The tests showed that the naked filaments of miniature lamps will not invariably cause ignition, as naked standard filaments do, when burned to extinction in explosive mixtures.

Immediate Cause of Ignition.

It was not regarded as absolutely essential to the value of the investigation that the specific cause of ignition of the gas be determined. Other investigators, however, have been much interested in this phase; consequently, certain observations are reported that bear upon the question of whether the ignition is caused by the glowing filament alone or by the spark that occurs when the filament is ruptured.

That glowing filaments may ignite gas seems to be proved by the fact that in 58 tests in which the gas was ignited the filaments continued to glow 2 to 59 seconds after ignition had taken place.

The tests did not prove so conclusively that the spark that occurs when the filaments are broken is not the cause of gas ignition, although the following evidence seems to show that the unassisted spark cannot ignite gas: 50 tests made upon 50, 60, and 120 watt lamps, each of 110 volts, showed a greater percentage of ignitions when the lamps were connected in multiple than when they were connected in series, although the breaking spark was drawn at 110 volts with the lamps in multiple as against 550 volts with the lamps in series.

By breaking a non-inductive 550 volt circuit between a steel contact and a carbon contact, it was found that when the current exceeded 0·15 ampère an ignition was always obtained when the circuit was opened. Yet 10 tests made with five 110 volt lamps connected in series across 550 volts produced no ignition, although the filament of the tested lamp carried ½ ampère, and the spark must have been drawn at 550 volts. Neither were ignitions obtained from 11 similar tests made with lamps carrying approximately 1 ampère.

The authors believe that the spark that is drawn

when the lamp filament is broken is to a great extent "blown out" by the entering current of gas. To prove this assumption, a 50 watt 55 volt naked filament was connected in series with non-inductive resistance and 0·5 ampère (one-half normal current) at 110 volts was passed through the circuit. The filament was then broken by gradual pressure, which distorted it until it snapped off. Five ignitions were obtained from six tests made in this way. Similar lamps were then connected in series with non-inductive resistance across 550 volts, and the filaments were disrupted by smashing the lamp bulbs. Five tests were made, three with a current of 0·6 ampère, and two with a current of 0·7 ampère. No ignition was obtained in any of the five trials, although the current was 20 to 40 per cent. greater and the voltage 400 per cent. greater than in the five tests that gave ignitions with the naked filaments. It is therefore manifest that the intruding gas has a quenching effect upon the spark.

Five tests were then made by connecting a 175 watt 55 volt lamp (normal current 3·5 amperes) in series with a non-inductive resistance of such value that 2·25 amperes flowed through the filament when 550 volts was impressed across the lamp and resistance. The lamp was surrounded with gas and smashed while carrying this current. No ignition resulted from five trials, although the current broken was greater, and the voltage 10 times as great as in the case of lamps that invariably produced ignitions when broken while burning under normal conditions.

It is manifest that the spark alone did not cause these ignitions, if ignition could not be caused by a similar spark with ten times the voltage behind it.

The authors are inclined to believe that the likelihood of gas ignition by standard carbon-filament lamps is a function of the cross section of the filaments. The filaments of 24 different types of standard lamps were measured, and the cross sections of the filaments were compared to their tendency to ignite gas, as expressed in percentage of ignitions obtained in a given number of trials. All filaments having a cross section of 0·000177 square centimetre or less failed to ignite gas in the series 1 tests. All filaments having a cross section of 0·000234 square centimetre or more invariably ignited gas under the conditions of the series 1 tests; filaments having a cross section of 0·000194 square centimetre ignited gas in 50 per cent. of the trials; and filaments having a cross section of 0·000215 square centimetre ignited gas in 83 per cent. of the trials. It is true that a similar relation existed between the current flowing in the filaments and the percentage of ignitions that they gave, but the authors do not regard this relation as significant, because they believe that the spark that is drawn when a filament is broken is not responsible for the ignition of gas.

If the bulb of a glowing incandescent lamp is smashed while surrounded by an explosive mixture, and if the filament is not broken by the jar of the blow, the



filament is first cooled by the intruding mixture and then broken by it. Of course, the cooling and the breaking are almost simultaneous, but the authors believe that ignition, if it occurs, takes place during the period of cooling and before the filament is broken.

If this hypothesis is correct, there are two reasons why large filaments ignite gas more readily than smaller ones: First, the temperature of the larger filaments will not be so greatly reduced before they are broken; and, second, the larger filaments will not so quickly succumb to the breaking action of the intruding gas.

The authors are not yet certain whether the ignition of gas by standard tungsten lamps is caused by the normal heat of the filaments or by abnormal temperatures resulting from a short circuit of the filament.

It is probable that miniature lamps ignite gas by virtue of their glowing filaments, as the sparks produced when the filaments are broken are small, and in many tests the filaments were observed to glow after ignition had taken place.

Based upon the results of the investigation, the table on opposite page gives deductions as to the probability of igniting gas by each class of lamp examined.

### IMPROVED LIFTING AND HOISTING MACHINERY.

In that branch of engineering which deals with the design and construction of machinery for lifting and hoisting purposes, Messrs. Youngs, of Ryland-street Works, Birmingham, England, have always held a prominent place.

At their well-appointed works can be seen many tools of interest to engineers, colliery proprietors, contractors, &c. In the hoisting crab department crab winches are

of lifting 16 cwt. direct from the barrel, designed for use where the space for working is limited. It is fitted with cast iron single-purchase gearing, wrought iron rectangular sides with angle iron riveted along the base, wrought iron shafts throughout, two winch handles, and lever strap brake. The sides of this crab measure 3 ft. long by 2 ft. high, and the width of the crab over the angle iron at base is 26 in. only. It is shown in the accompanying illustration.

Hand cranes for every requirement are also manufactured, and mention may be made of a worm-gear overhead travelling crab fitted with Youngs' patent self-sustaining and lowering brake, which automatically sustains the load at any position directly the hand chain is let go, and also allows the load to be lowered rapidly, the speed of lowering being regulated by means of the brake cord.

The hydraulic department at Messrs. Youngs is especially interesting on account of the many improvements which they have made to existing types of hydraulic tools. Here are made lifting jacks for all purposes, for ships, locos., &c., for forcing up collapsed boiler crowns. Many of these jacks are supplied with the rams screwed and fitted with a nut, by means of which a load can be left suspended on the jacks for any period without any danger of the load coming down owing to leakage, if there should be any. Other tools made are:—Screw-jacks, bolt-forcers, stretching screws, punching bears, rail-benders, rail-lifters, ash levers, spanners for track work, cramps, rail gauges, carrying tongs, rail presses.

In the pulley block department, there are a great variety of blocks made, notably Weston's, Thomson's worm-screw block, worm-screw runner and block, epicycloidal, "quick action," and the Ryland patent worm-screw pulley block fitted with patent self-lowering and control brake. The popularity of the ordinary

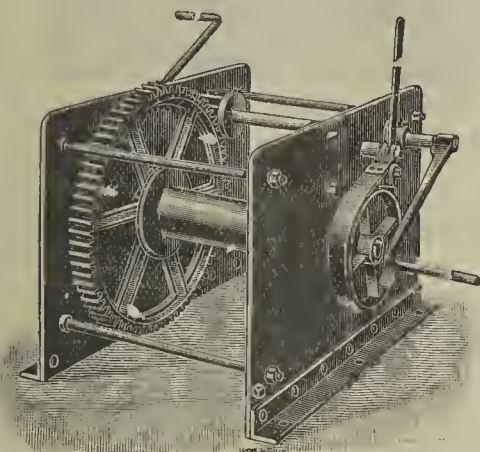


FIG. 1.—COLLIERY CRAB.

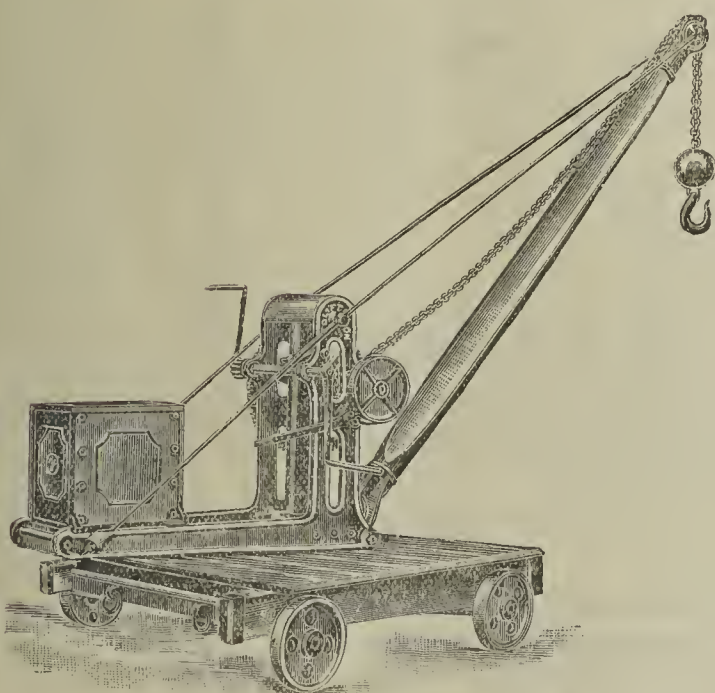


FIG. 2.—PORTABLE CRANE FOR ROAD OR RAIL.

made in a large variety of sizes and powers. Besides the ordinary crabs with cast and wrought iron sides, to lift weights up to 80 cwt., direct from the barrel, special crabs for lifting loads up to 20 tons are made for use with wire rope, furnished with suitable barrel to coil the wire rope to be used in one lap, wall crabs, crabs with twin barrels which can be used for hoisting two loads at a time, powerful crabs with double or treble purchase gearing, for colliery use, ships' winches with warping ends, friction hoists, lift gearing, runners for travelling on the flange of girders, platelayers' trolleys, hand pile drivers, sheer legs and other tools.

Amongst these may be mentioned a power friction crab, for lifting small loads at a quick speed, if a small amount of power is available. There is also a specially-designed colliery crab—a small, compact crab, capable

of lifting 16 cwt. direct from the barrel, designed for use where the space for working is limited. It is fitted with cast iron single-purchase gearing, wrought iron rectangular sides with angle iron riveted along the base, wrought iron shafts throughout, two winch handles, and lever strap brake. The sides of this crab measure 3 ft. long by 2 ft. high, and the width of the crab over the angle iron at base is 26 in. only. It is shown in the accompanying illustration.

Additional places have been opened out in the new Worsley Four-feet mine at the Clifton and Kersley Coal Company's Wet Earth Colliery, Clifton, near Manchester, which pit, it is said, has now been working for about a century.

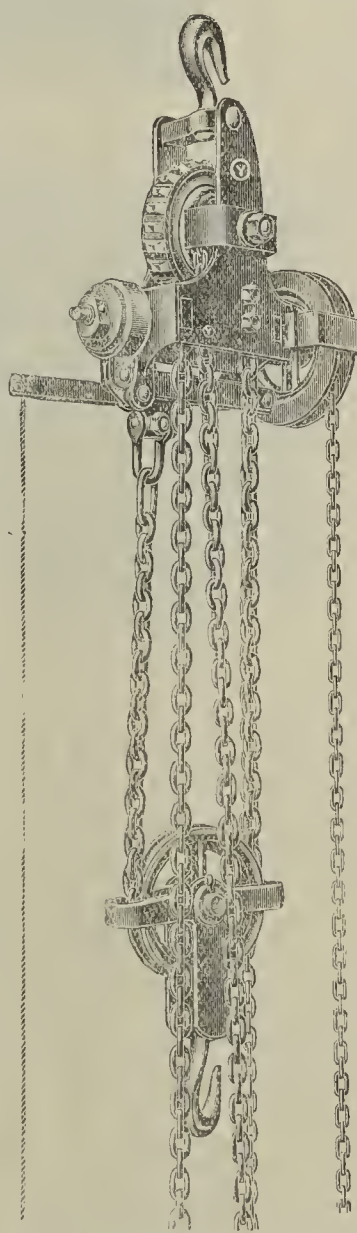


FIG. 3.—THE "RYLAND" PULLEY BLOCK.

### THE COVENTRY COLLIERY.

Visit by the Midland Counties Institution of Engineers.

On Saturday last the members of the Midland Counties Institution of Engineers paid a visit to the Warwickshire Coal Company Limited's Coventry Colliery, now in process of sinking at Keresley, about 3 miles from Coventry.

The area of the coalfield acquired comprises about 5,000 acres, partly leased and partly freehold, and the coal has been proved by two boreholes at a depth of 708 yards and 814 yards respectively. The Warwickshire coals come together here in one seam 20 ft. thick, dipping westward about 1 in 16.

The colliery is being equipped to deal with an output of 4,000 tons per day, and is connected to the London and North-Western Railway Company's Nuneaton line by a private branch about 2 miles in length, the engineers for which are Messrs. Formans and McCall, of Glasgow. There are two shafts of 21 ft. 6 in. diameter, distant 180 ft. apart, the depth being about 730 yards. Water is expected to be tapped at various depths, and is tubbed back by means of cast iron tubbing.

The steam generating plant consists at present of six Lancashire boilers, 30 ft. by 9 ft., working at 160 lb. pressure, made by Messrs. Wm. Arnott and Co., of Coatbridge. The plant is equipped with three Ferguson and three MacPhail and Simpson superheaters, giving 150 degs. Fahr. superheat, two Vicars' mechanical stokers, Green's economisers, and two Weir feed pumps. The chimney is constructed of brick, and attains a height of 180 ft., the internal diameter at bottom being 10 ft. 7 in., and at top 10 ft. The steam and exhaust pipes have been supplied by Messrs. Stewarts and Lloyds and are of steel, the flanges being solid welded. The internal diameter of main steam piping is 22 in. The supports and anchors are of steel. Special pipes are inserted for expansion purposes, and the exhaust pipes are steel riveted.

It is proposed to instal two Sirocco fans, each with a capacity of 350,000 cubic feet per minute, at 3½ in. water-gauge. One fan will be driven by a Belliss and Morcom enclosed compound self-lubricating engine, and the other by an electric motor of 375-horse power, both by ropes.

The winding engine and power houses are entirely fireproof, the walls being of brick and cement. All the roofs, which are practically flat, are of concrete made by Wm. Little and Sons Limited, of Edinburgh, and are rendered waterproof by a covering of Limmer asphalt. The inside dimensions are as follow:—Robey engine-house, 53 ft. 9 in. by 54 ft.; Markham engine-house, 56 ft. 3 in. by 48 ft. 9 in.; power-house, 128 ft. 9 in. by 50 ft. Each house is equipped with overhead cranes made by Messrs. Herbert Morris Limited, and with the following lifting capacity:—In winding engine-houses, 15 tons; in power-house, 10 tons.

The winding engine at the downcast shaft is made by Messrs. Markham and Co., of Chesterfield, and that at the upcast shaft by Messrs. Robey and Co., of Lincoln. They have the following dimensions:—Diameter of steam cylinders, 38 in.; length of stroke, 72 in. The drums are of the semi-conical type, the diameter on smallest part being 14 ft., and diameter on largest part 24 ft. The total weight of engines and drum is 280 tons. The Markham engines are fitted with Whitmore steam brakes and overwinding gear, and the Robey engines are fitted with Robey steam brakes and overwinding gear.

The electrical generating plant consists at present of two mixed-pressure turbo-generators, the makers of the turbines being Messrs. Willans and Robinson, of Rugby; the makers of the generators are the General Electric Company of Birmingham. The turbines give high-pressure steam at stop valve at 140 lb. per square inch, and low-pressure steam at 16 lb., with 27½ in. vacuum. The kilowatt capacity of each turbine is 750, and the power factor 0.85. The generators run at 2,750 volts, and 50 cycles. The plant is equipped with low-level jet condensers, driven by Belliss and Morcom enclosed compound self-lubricating engines. The arrangement of condensing plant enables it to be started up before the turbine, and the speed adjusted to suit varying conditions of load.

The main switchboard is made by Messrs. Brash and Russell, of Glasgow, and is of cellular construction, the switchboard panels being made of enamelled slate, and the framing of angle steel. The instruments and cells containing the switchgear are placed behind the panels with interlocked doors, so that it is impossible to open any of the chambers when alive. The switchboard is provided with two generator panels, with provision for a third; two exciter panels, with provision for a third; four high-tension panels; six low-tension panels; two transformer panels, and one lighting panel.

The makers of the transformers are the British



Warehouse Company Limited. They are four in (three working and one spare), and have a capacity of 350 kw., and a power factor of 0.8. By means of them the current is stepped down from 2,750 to 550 volts.

The electric lighting plant consists of a Belliss and Morcom engine driving a dynamo made by the General Electric Company. The engine gives 80 effective horse-power, running at 140 lb. steam pressure, and 500 revolutions per minute. The generator is 55 kw. capacity, running at 250 volts.

A motor generator is to be installed later, and will be supplied by the General Electric Company. It will be of 55 kw. capacity, and 500 revolutions per minute, and will give 550 volts at motor terminals, and 250 volts at generator terminals. The object of installing a motor generator and an independent lighting plant is to keep the lighting and power circuits separate, and to enable lighting to be done from the motor generator when exhaust steam is available.

It is estimated that the exhaust steam from the winding engines and fan engine that passes through the mixed-pressure turbo-generators will give 1,500 kw. constant load. There is a Rateau-Morison exhaust steam accumulator to bridge over a stoppage of half-a-minute.

The cooling pond is constructed of Portland cement-concreted throughout. The length is 152 ft., the width 113 ft., and the depth 4 ft. It is equipped with 224 Giers-Harrison spray nozzles, designed for a working head of 15 ft. The cooling capacity is 315,000 gallons per hour, and the reduction of temperature from 95 to 80 degs. Fahr. The pond is made 4 ft. deep to act as a storage for water, and is connected by a concrete flume to the suction sump at the back of the power house, from which the condensers draw their water.

The lattice steel pithead frames have been made by Messrs. A. Findlay and Co., of Motherwell. The height from the ground level to the pulley shaft is 90 ft., the approximate weight of each frame 110 tons, and the diameter of pulleys 19 ft. Each is fitted with improved King's detaching hooks.

There are two double-drum sinking capstans, made by Messrs. Markham and Co., having a lifting capacity of 40 tons, the diameter of drums being 5 ft., and the length 5 ft. They are driven by 11 in. by 16 in. double-cylinder horizontal engines. The two sinking drum pump capstans are made by the same firm. They have a lifting capacity of 40 tons, the drums being 5 ft. by 5 ft., driven by 11 in. by 16 in. engines. Lock-coil scaffold ropes are employed of 1.5 in. diameter, and lock-coil winding sinking ropes of 1.2 in. diameter. Flexible-strand pump ropes are used of 2 in. diameter. The sinking pithead frame is independent of the main frame, and arranged to carry the sinking pumps and pulleys, and constructed of pitch-pine baulks, and steel girders, securely braced to the main frame. The pulleys on the pithead gear are arranged so that the pumps in either Nos. 1 or 2 shafts can be operated from the two capstans, but these are placed so that additional capstans can be provided if required. The cable drums, which are 4 ft. by 7 ft., have been supplied by Messrs. Callender's Cable and Construction Company, of London. The cable drum will coil 600 yards, the method of operation being by hand through worm gear. The sinking pump cables are made by the Callender's Cable Company, and are of the three-core type, the sectional area of each conductor being 0.075 square inches, with oxone-proof vulcanised indiarubber insulation, and double galvanised iron wire armouring. They carry current at 3,000 volts.

Auxiliary winches for raising and lowering pipes have been supplied by Messrs. Clarke, Chapman and Co., of Gateshead-on-Tyne, with cylinders 6 in. by 10 in., and drums 2 ft. by 2 ft. 6 in. The rising water mains have been supplied by the British Mannesmann Company, and have an internal diameter of 9 in., with  $\frac{1}{4}$  in. thickness. The flanges are of cast steel with two bolts in each, the jointing being effected by guttapercha rings.

Two Sulzer-Brown-Boveri sinking pumps are at work, giving 1,000 gallons per minute each, to a vertical head of 1,000 ft. They are driven by squirrel-cage motors of 485 effective horse-power each. The pump castings are water-cooled. The pumps are of the multi-stage Sulzer type, with gunmetal impellers and diffusers designed to avoid all endthrust. A framing is provided with the necessary suspension pulley, 4 ft. diameter, for carrying the pump, and motors, with platform for attendant. An emergency switch is provided on each pump platform. The total weight of each pump with its rising main, water, and suspension ropes is approximately 55 tons.

The workshops, which are of brick, with iron roofs, of fireproof construction, have the following dimensions: 30 ft. by 30 ft., sawmill 20 ft. by 30 ft., 30 ft. by 30 ft., engineers' shop 60 ft. by 30 ft., 60 ft. by 30 ft., rack for iron 14 ft.

by 30 ft., electricians' shop 25 ft. by 30 ft., ambulance room 20 ft. by 16 ft., ambulance van shed 11 ft. by 10 ft. 7 in., officials' room 14 ft. 10 in. by 13 ft. 6 in., stables 18 ft. by 18 ft., harness room 11 ft. by 7 ft. Building operations were commenced in March 1912, the contractors being Messrs. Kelley and Son, of Coventry.

The sinking of the shafts is being carried out by Messrs. Charles Walker and Sons, of Coventry. Mr. William C. Mountain, of Newcastle-on-Tyne, is consulting electrical and mechanical engineer to the company, and the whole work is under the direct supervision of Mr. Robert Russell, the managing director of the company, assisted by Mr. Archd. M. Russell and Mr. J. W. Liddell, agent and certificated colliery manager.

#### THE ARCHBUTT DEELEY WATER SOFTENER.

The filtration and purification of water for public or industrial purposes is a subject to which the firm of Messrs. Mather and Platt Limited, of Manchester, have devoted considerable attention, and some of the most noteworthy installations in various parts of the country

attention to the design of chemical apparatus, and they have placed on the market several types, suitable for different working conditions, which render certain the addition to the water of a regular supply of chemical solution of a known strength. By this means a uniformly satisfactory result is assured. The special feature of the filters is the washing device, which consists of a central vertical tube fixed in the centre of the filtering bed of quartz crystals, extending upwards to within a few inches of the top level of the filtering material. Messrs. Mather and Platt Limited recently completed a large contract for the Sheffield Corporation comprising 32 pressure filters, each 8 ft. in diameter, for dealing with the Loxley Valley water supply. The results were so satisfactory that a repeat order has been placed for a further 24 filters to deal with the Derwent supply.

Messrs. Mather and Platt Limited have also carried out some very important contracts for water softening. They were, indeed, the pioneers of water softening on a mechanical scale, as they were the sole licencees for the Archbutt Deeley type of plant. By the Archbutt system, the impurities are quickly precipitated and settled, thus reducing the actual first cost, and ensuring a saving of chemicals as well as more satisfactory purifi-



FIG. 1.—WATER SOFTENING PLANT

At the Willesden Works of the Metropolitan Electric Supply Company Limited.

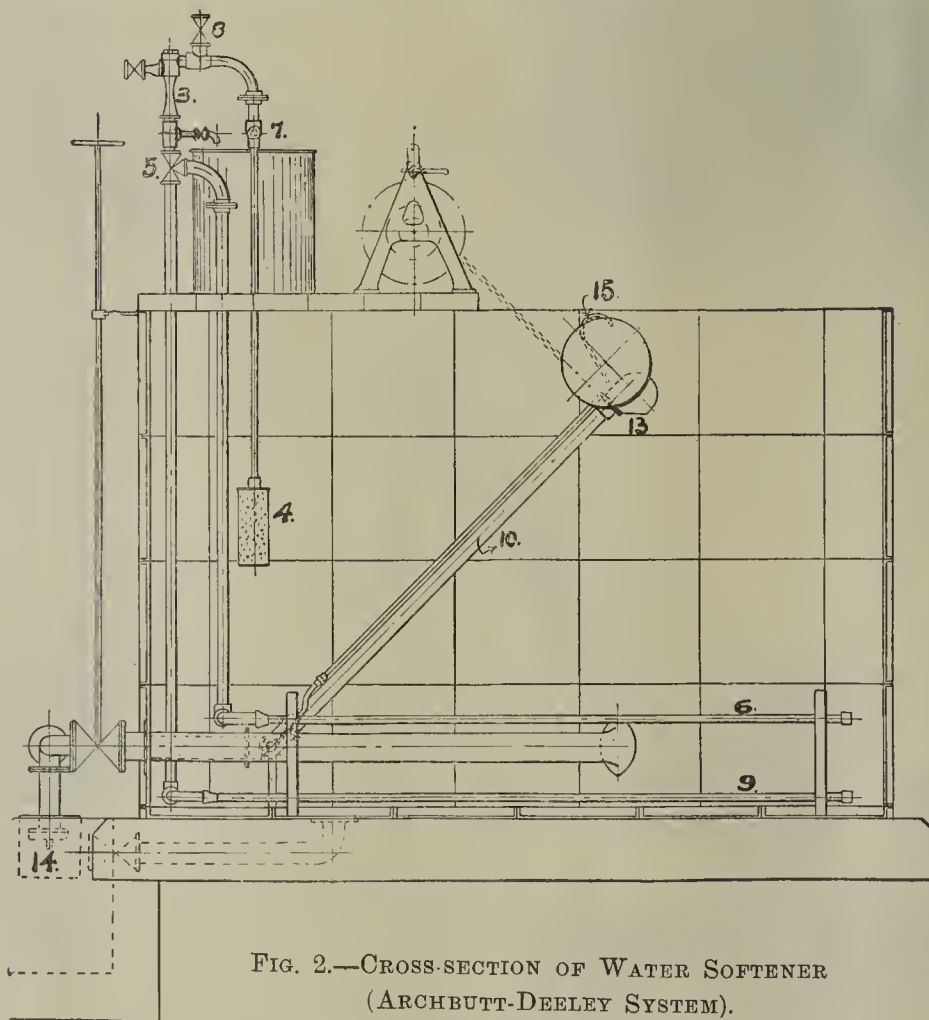


FIG. 2.—CROSS-SECTION OF WATER SOFTENER (ARCHBUTT-DEELEY SYSTEM).

#### LIST OF REFERENCES.

- |   |                                     |
|---|-------------------------------------|
| 1. Hard water supply.                   | 9. Lower perforated pipes.          |
| 2. Chemical tank.                       | 10. Floating discharge pipe.        |
| 3. Blower for air and mixing chemicals. | 11. Coke stove.                     |
| 4. Perforated rose.                     | 12. Blower for fuel gas.            |
| 5. Three-way tap to treating tanks.     | 13. Discharge mouth.                |
| 6. Upper perforated pipes.              | 14. Ball tap for regulating outlet. |
| 7. Three-way tap to chemical tank.      | 15. Vent pipe.                      |
| 8. Air tap on blower.                   |                                     |

have been carried out by them. Messrs. Mather and Platt Limited are in a position of some advantage for the carrying out of such work, inasmuch as, although there are many firms who manufacture filters, water softeners and sewage plant singly, they are the only firm who manufacture appliances for the whole three sections.

The firm have been engaged for many years in the construction of mechanical filters and have installed numerous plants at home and abroad. In the very early stages of the development of mechanical filters Messrs. Mather and Platt Limited devoted special

cation. The plant consists of two cast iron tanks capable of treating 600 to 10,000 gallons per hour, according to size. For more than 10,000 gallons per hour, three or more tanks are used. The main feature of the apparatus is that the whole water supply is held under complete control. Each tankful is treated separately, so that any imperfections in the treatment can be rectified before the water is turned on to the mains. This is impossible with the continuous type of water softener, as in that case imperfections in treatment cannot be ascertained until the water has passed through the softener.



## THE ORIFICE OF PASSAGE OF THE FAN.

By M. E.

When a dynamical ventilator is made to rotate, the air between the blades moves outwards and is thrown off from the tips of the blades, and if the fan is connected to a passage or drift, however short, a continuous current of air is made to flow through it, due to the difference of pressure induced between the exterior and interior of the fan. Under such conditions, two distinct resistances are offered to the passage of the air-current—(a) that due to the passage, and (b) that due to the fan itself.

If we represent the resistances by the pressures necessary to overcome them, we may readily determine whether the fan is manometrically efficient or otherwise—in fact, it is most desirable that the resistance offered by the fan to the passage of an air-current should be known. This resistance may conveniently be represented by the orifice of passage which is to the fan what the equivalent orifice is to the mine.

The orifice of passage may be defined as the opening in an infinitesimally thin plate, which offers the same resistance as the fan itself to the passage of the same volume of air.

If we substitute the word "mine" for "fan" in the foregoing definition, it will have assumed the specification of the equivalent orifice. We observe, then, that

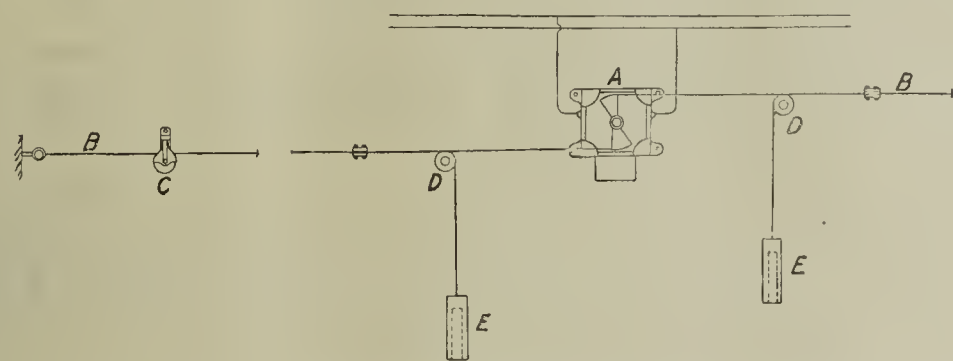


FIG. 1.—ARRANGEMENT OF THE DAVIS-FRYAR MECHANO-ELECTRIC SIGNALS FOR HAULAGE ROADS IN GASEOUS MINES.

the air passes through two resistances in series, and if we let  $h$  represent the depression necessary to overcome the resistance of the air passage, and  $h_1$  that necessary to overcome the resistance set up by the fan itself,

$$H = h + h_1,$$

i.e., the total depression, which is frequently called the initial depression. Since we are concerned with the orifice of passage, we must note that

$$h_1 = H - h.$$

It is to be observed that only the depression  $h$  is recorded on the gauge on the drift or passage while the fan is circulating air through the drift; the depression  $h_1$  is said to be invisible, but is never zero.

To obtain the value of  $h_1$  at any speed of the fan, we may first of all, by completely closing the drift and running the fan at that speed, get the value of  $H$ , and by removing the stopping and running the fan at the same speed, obtain the value of  $h$  direct by observation of the gauge on the drift—

$$\therefore h_1 = H - h.$$

The volume of air passing through the fan during the latter stage of the experiment must, for the purpose of calculating the orifice of passage, be observed, whence

$$V = \sqrt{2gh_1} \times \phi \times 60 \times 0.65,$$

where  $V$  = volume of air circulating in cubic feet per minute,

$$g = 32,$$

$$h_1 = H - h = \text{invisible depression in feet of air column} = \frac{800}{12} \times \text{W.G.},$$

$$\text{W.G.} = \text{invisible water-gauge.}$$

$$\therefore V = \sqrt{2 \times 32 \times 66.6 \text{ W.G.}} \times \phi \times 60 \times 0.65.$$

$$\phi = \frac{0.0003927 V}{\sqrt{\text{W.G.}}}; \text{ the orifice of passage in square feet.}$$

It used to be held that the most economical ratio of orifice of passage to equivalent orifice was 3:1, but recent experiments have shown that that is a characteristic of a particular fan, and does not apply to all fans.

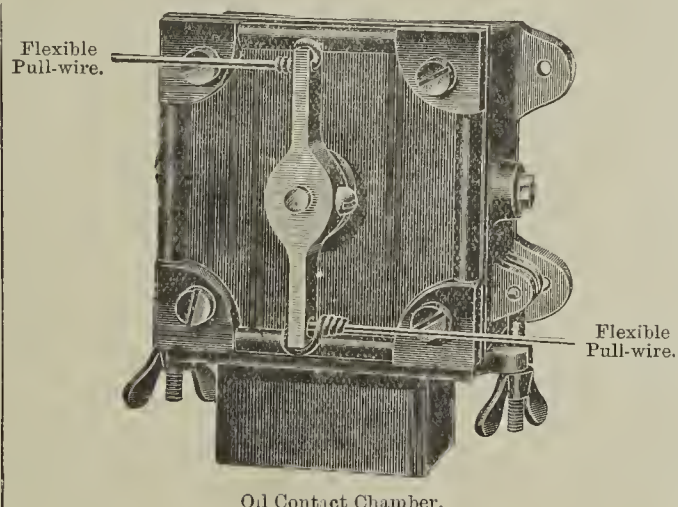
The new mining district of Maltby is very rapidly developing. The Rural Council of Rotherham have just passed plans for 112 houses on Tickhill-road, for the Maltby Main Colliery Company, and for three new streets off Tickhill-road, and a new street for the Maltby Brocklands Estate Company Limited. It is hoped the Maltby Sewage Works will be completed in two months, and the model village has already been connected with the sewer. Last week Mr. Edgar Dudley, Local Government Board inspector, held an enquiry regarding the application of Rotterdam Rural Council to borrow £9,421 for street improvements in the district comprising Maltby. It was explained the improvements were necessitated by the colliery developments in the district and in South Yorkshire generally, where new pits were sinking, whilst the Maltby Colliery was now rapidly opening out.

## DAVIS-FRYAR MECHANO-ELECTRIC SIGNALS.

The Special Rules governing the installation and use of electricity in mines require that the signalling apparatus installed on haulage roads in gaseous mines shall be so constructed and worked that there shall be no open sparking, thus abolishing the system of carrying two bare wires side by side along the road, whereby the signal is transmitted by connecting the wire by hand.

To comply with the regulation by fixing a series of gas-proof press buttons at intervals would prove both costly and unsatisfactory, but our attention has been called to a system invented by Mr. Mark Fryar, the manager of the Denby Colliery, which supplies a practical solution of the difficulty.

In this device a contact maker A of special construction is placed in a position where required and actuated by flexible wires B, which run along one side of the haulage road. These wires, which are carried by small supporting pulleys C, are anchored at the end remote from the contact maker, pass over pulleys D adjacent to it, and are kept taut by means of weights E. Near to one of the last-mentioned pulleys one end of the flexible wire is secured, and the other end is attached to the contact maker. The electric contact is contained in a strong iron case which is gas proof, the actual contact being immersed in oil, and a removable cover



Oil Contact Chamber.

FIG. 2.

enables it to be readily examined. The contact maker is double-acting, so that the flexible wire may be run right and left, double the length of road being thus served. To transmit a signal the taut flexible wire is pulled at any point, one box being capable of operating over 200 yards of roadway.

The sole makers are Messrs. John Davis and Son (Derby) Limited, of the All Saints Works, Derby.

## PARLIAMENTARY INTELLIGENCE.

## HOUSE OF COMMONS.—July 1.

## Rescue and Ambulance.

Mr. DUNCAN MILLAR asked the Home Secretary if he could state what steps had been taken to enforce in the Lanarkshire coalfield the regulations made under section 85 of the Coal Mines Act, 1911, for the provision of rescue and ambulance appliances and the formation and training of rescue brigades.

The HOME SECRETARY replied: A circular was sent out earlier in the year to the owners who had not complied with the Rescue Order. A reply was received by the Lanarkshire owners to the effect that immediate steps would be taken to comply with the provisions generally of the Order, but contending that the provision of smoke helmets fed with fresh air by a tube and bellows was a sufficient compliance with the requirements as to portable breathing apparatus. The Home Office cannot accept this view, and the steps to be taken for enforcing the Home Office opinion are now under consideration. The matter has been unavoidably delayed by the work in connection with the settlement of the general regulations, but will now be pressed on as rapidly as possible.

July 2.

## The Weighing of Minerals.

Mr. STEPHEN WALSH asked the Home Secretary whether a local enquiry had been held into the circumstances under which the employers at the Maypole Colliery, near Wigan, had deprived the workmen, paid according to the weight of the mineral gotten by them, of one of the places hitherto appointed for the weighing of the mineral; whether, if such local enquiry had not been held, he would see that both the workmen and the employers had a full opportunity of stating their case at any enquiry that might take place; whether, in default of such enquiry, he could state under what section of the Coal Mines Regulation Acts the employers had power to abandon a place hitherto appointed for the weighing of the mineral so long as all the other conditions of the workmen remained unchanged; and, in view of the local feeling that the checkweighers appointed were being unfairly treated, would he cause a test case to be entered to decide the issues involved?

Mr. McKENNA said he had received a report from the inspector as to the arrangements at this mine, but he was quite willing before coming to any decision in the matter to give both parties a full opportunity of stating their views, and he was sending instructions to the inspector to visit the mine for this purpose at the earliest possible date.

## Deputies and Timbering.

Mr. BOWERMAN asked the Secretary of State for the Home Department if he had received Mr. Redmayne's report regarding the conditions under which colliery deputies are employed in Northumberland and Durham; whether the communication addressed to the Home Office upon this subject on June 2 last had yet been considered; and whether he could see his way to receive a deputation of representatives of the men in order that they might be given an opportunity to state their case?

Mr. McKENNA replied as follows: "Yes, sir, I received from the Chief Inspector a report of his enquiry into the complaint made by the Northumberland and Durham deputies. The complaint had reference to a change introduced by the owners of some mines by which the work of timbering, that has hitherto in these two counties fallen on the deputies, is entrusted to another class of workmen. The old practice, under which the deputies did the timbering, differed from the practice generally adopted in the other coalfields; and the new Act, though it contains a saving clause which would have permitted the continuance of the old practice in these two counties only, clearly recognises the opposite practice, by which the firemen or deputies give their whole time to inspection and safety duties as the best. I understand that the representatives of the Northumberland and Durham deputies put their case fully before Lord Mersey, who held the recent enquiry, but he declined to alter the Regulations so as to reimpose the old practice. In the circumstances, and as I am advised by the Chief Inspector that the new practice does not impair the safe working of the mines, but tends rather to increased safety by leaving deputies more time for their inspection and safety duties, I do not think it would be advisable for me to take any action in the matter. Several deputations have already been received by me and by the Chief Inspector, and the Department is thoroughly acquainted with the views of the deputies, and I am afraid a further deputation would not serve any useful purpose."

July 9.

## Nationalisation of Coalmines.

Mr. WALSH asked leave to introduce a Bill to nationalise the coalmines and minerals of the United Kingdom and to provide for the distribution and sale of coal. First of all it was proposed that on an appointed day the State should take over all the coalmines of the country. That day could not yet be stated, but in order that that condition might be brought about, it was proposed that a Minister of Mines should be appointed under whom Commissioners should be appointed. The Minister of Mines was to be empowered to purchase mines on the appointed day, and value was to be given to those who were actually working the mines, and who had invested their capital in them. It was not suggested that any compensation should be given to the royalty owners, nor was it intended to recognise any rights on their part. The Mine Commission was to be composed of 10 persons, the chairman, appointed by the Government, and three representatives from the Mining Association of Great Britain, the Miners' Federation and Trades Union Congress respectively. The valuation suggested in the Bill was to be based on the output of the previous five years, dating from the appointed day, mines with an output of 100,000 tons a year being paid for on a maximum of 12s. a ton, and mines with an output exceeding that amount being paid for on a maximum of 10s. a ton. To raise the necessary revenue it was proposed that there should be a Coal Mines Three per Cent. issue, and that the owners of mines who could prove their title should receive dividends from the fund thus created. He submitted that the national coal supply, being a fundamental necessity of the continued existence of the nation, and being the result of no man's energy, should become the property of the whole nation.

The SPEAKER said the Bill would seem to involve some slight charge upon the taxpayers, and he was not at all sure that the hon. member ought not to bring it in in Committee. However, he would allow him to bring it in, subject to the caution that he might subsequently rule it out of order.

A division was challenged upon the motion that leave be given to bring in the Bill, but the challenge was not persisted in, and the Bill was brought in and read a first time.



## THE COAL AND IRON TRADES.

THURSDAY, JULY 10.

## Scotland.—Western District.

## COAL.

The coal shipments at the Scotch ports have been larger than was anticipated, taking into account the interruptions to loading, due to strikes of dock labourers. The clearances amounted in the aggregate to 325,595 tons, being 11,578 more than in the preceding week and 35,665 tons larger than in the corresponding week of 1912. At Glasgow, 49,127 tons were despatched abroad and 38,467 coastwise, the total of 87,584 tons comparing with 75,985 in the preceding week, and 88,059 in the corresponding week of last year. From the lower Clyde ports the clearances were at Bowling 354 tons, Greenock 2,500, Irvine 2,153, Ardrossan 8,268, Troon 9,032, and Ayr 16,456—total 38,778 tons, compared with 35,117 in the preceding week and 36,169 in the corresponding week of 1912. There has been a somewhat steadier feeling in the coal market generally as regards the Western district, due to various causes. Coalmasters are firmer in their terms since the wages were advanced and the numerous holidays now taking place have rendered coal less plentiful. Consumers have been evidently anxious to increase their supplies and shippers to implement their engagements to the fullest possible extent. There has been a somewhat better demand for the finer qualities of house coal, and steam coals have also met with a brisk sale. There has, however, been less enquiry for nuts. Splint coal has been selling fairly well for the season.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	12/6 to 14/6	12/3 to 12/9
Ell .....	12/ to 12/9	12/3 to 12/9
Splint.....	13/ to 15/	13/6 to 14/
Treble nuts .....	12/ to 12/6	12/6 to 13/
Double do. ....	11/9 to 12/	12/6 to 13/
Single do. ....	11/3 to 11/6	12/ to 12/3

It is much in favour of the trade at this particular moment that most of the labour disputes are either settled or apparently on the point of being so, and the conviction seems to be gaining ground that a fair summer business may be anticipated, with probably a firmer tendency in the early autumn.

## IRON.

There is much talk on 'Change in Glasgow regarding the proposal of the Cleveland ironmasters to cease delivering iron into the warrant stores, but to commit its custody to stores of their own. It is not easy to see what advantage such a system would have over the present one. Some authorities, while admitting that such a plan might give the makers greater control of the market, are of opinion that it might be hurtful to the trade in other respects. What the outcome of the agitation may be it is impossible to foresee, but it may be confidently predicted that it will not turn out quite as the leaders in the new movement seem to desire. Business has in the meantime been somewhat restricted in amount. Prices have, on the whole, been steadier. The recent marked reduction of stocks has had the effect of strengthening the hands of makers, who have not been prepared to sell freely at recent warrant rates. Since last report Cleveland warrants have sold at 55s. 10d. to 56s. cash. The arrivals at Grangemouth of pig iron from Middlesbrough and district were smaller than usual, amounting to 5,300 tons, being 3,837 tons less than in the corresponding week of last year. The demand for Scotch pig iron has been quiet, but prices are steady. Govan and Monkland are quoted at Glasgow f.a.s. Nos. 1, 70s. 6d., Nos. 3, 69s.; Carnbroe, No. 1, 75s., No. 3, 71s.; Clyde, No. 1, 76s., No. 3, 71s.; Gartsherrie, Calder, Summerlee, and Shotts, Nos. 1, 76s. 6d., Nos. 3, 71s. 6d.; Langloan, No. 1, 77s. 6d., No. 3, 72s. 6d.; Coltness, No. 1, 98s., No. 3, 80s.; Eglinton, at Ardrossan or Troon, No. 1, 71s., No. 3, 70s.; Glegarnock, at Ardrossan, No. 1, 76s. 6d., No. 3, 71s. 6d.; Dalmellington, at Ayr, No. 1, 72s., No. 3, 70s.; Carron, at Grangemouth, No. 1, 77s., No. 3, 72s. per ton. There are 89 furnaces in blast in Scotland compared with 85 at this time last year, and of the total, 51 are producing hæmatite, 33 ordinary and special brands, and 5 basic iron. A large amount of Scotch hæmatite is going into consumption, and merchants quote 79s. for delivery at west of Scotland steelworks. The finished iron and steel works, if anything, are a little busier this week; they have been pushing forward work that required to be finished before the annual trade holidays, which begin towards the end of next week. There is, however, no real improvement in the demand for malleable iron goods.

## Scotland.—Eastern District.

## COAL.

The volume of business at Firth of Forth ports has again been restricted by the disputes among the dock labourers, by which many vessels have been held up, and many thousands of coalminers have been idle. Shipments have been at Granton 2,914 tons, Leith 2,602, Bo'ness 19,521, and Grangemouth 45,113—total 70,050 tons, compared with 76,515 in the preceding week, and 131,151 in the corresponding week of last year. The state of matters at Leith and Granton has been deplorable this week, and the colliery districts have been doing no business, but awaiting a settlement of the dispute. In these circumstances quotations are nominal.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	12/9 to 13/	12/9 to 13/
Secondary qualities .....	11/9 to 12/	11/9 to 12/
Treble nuts .....	12/9 to 13/	13/
Double do. ....	12/ to 12/6	12/ to 12/6
Single do. ....	11/3 to 11/6	11/3 to 11/6

Dysart 1,945, Wemyss 1,269, Tayport 619, Charleston 570, and Alloa 286—total 129,183 tons, compared with 126,400 in the preceding week, and 105,879 in the corresponding week of 1912.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	16/9 to 17/	16/9 to 17/
Unscreened do. ....	14/9 to 15/	14/9 to 15/
First-class steam coal.....	14/3 to 15/	14/3 to 15/
Third-class do. ....	11/9 to 12/9	11/6 to 12/9
Treble nuts .....	13/3 to 13/9	13/6 to 14/
Double do. ....	12/6 to 13/	12/9 to 13/3
Single do. ....	11/9 to 12/	11/9 to 12/

There is a fair inland business doing generally at steady prices.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 132,855 tons of coal and 742 tons of coke were despatched from Tyne Dock, a decrease of 21,134 tons of coal and an increase of 484 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 61,677 tons of coal and 1,220 tons of coke, an increase of 3,826 tons of coal and a decrease of 3,572 tons of coke. The Blyth shipments aggregated 84,650 tons of coal and coke, a decrease of 8,007 tons. During the week further allotments of the Russian State Railways' requirements of best steam coal for shipment to the end of the season were made. In all, about 360,000 tons are to be taken from Northumberland, Durham and Yorkshire. The order is in the hands of merchants at St. Petersburg, Riga and Libau, and negotiations are being conducted by these firms with local and Yorkshire producers, in order that the commitments may be covered. It would appear that, thus far, some 120,000 tons of Northumberland and Durham steams have been arranged for at from 20s. to 20s. 3d. per ton, c.i.f. Cronstadt. From 80,000 to 100,000 tons of Yorkshire coals also appear to have been arranged for. The rest of the requirements is still in negotiation and is likely to continue so if the Russian firms do not raise their offer of 19s. 9d. per ton c.i.f., which is all that is being tendered by them for local steam bests. Tenders of 22,000 tons of Durham gas coal for supply to the Aarhus Gasworks over this and next year were despatched on Monday. Tenders of the Altos-Hornos Ironworks' requirements of Durham coking coal have been sent in and are stated to be based on from 13s. 6d. to 13s. 9d. per ton f.o.b. for bests, delivery over 12 months. It is stated, however, that the ironworks have postponed making any allotments, their ideas of price being about 1s. 6d. below the tendered figures. Six thousand tons of best unscreened Durham bunkers have been sold for July-December shipment at 13s. 3d. per ton f.o.b. The Moscow-Windau Railways are enquiring for immediate tenders of 20,000 tons of prime steams for September shipment. Reports that best steams have been sold for delivery at Norway over next year at 12s. 6d. per ton f.o.b. are discredited. A quantity of good Durham gas seconds has been sold for shipment over next year at 11s. 9d. per ton f.o.b. The various coking coal collieries in Durham have been circularised by the Teams By-product and Coal Company Limited, near Gateshead, with the intimation that the company is prepared at any time to enter into negotiations for supplies of suitable coking fuel. It is understood that the new works, which will commence operations about May next, will consume from 200,000 to 300,000 tons of coking coal per annum. It will have one of the most complete by-product coke-making plants in the country and will, it is said, have the distinction of having the first independent plant of its kind in the kingdom—i.e., a plant not attached to steelworks or collieries. The coal market has lacked incident during the week. There has been a fairly good demand for prompt shipment and prices have generally fully held their ground. F.o.b. quotations for prompt shipment have varied as follows:—Best steams, Blyths, are 3d. dearer on the week; Tynes, similarly increased; seconds, Blyths, 3d. cheaper; Tynes, easier; unscreened, stronger; gas bests, 3d. increased; seconds, 6d. higher; specials, 6d. more; unscreened bunkers, 3d. advanced; foundry coke, 1s. reduced; blastfurnace, weaker; and gas coke, 6d. lower. Other descriptions of fuel are unaltered. It will be noted that coke is much weaker.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	15/ to 15/3	15/
Do. Tynes (Bowers, &c.) ..	14/9 to 15/	14/9
Secondary, Blyths .....	13/	13/ to 13/3
Do. Tynes (Hastings or West Hartleys) .....	13/ to 13/6	13/3 to 13/6
Unscreened .....	11/9 to 12/6	11/6 to 12/6
Small, Blyths .....	9/6 to 9/9	9/ to 9/6
Do. Tynes .....	7/9 to 8/	7/9 to 8/
Do. specials .....	10/	10/
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	14/9 to 15/	14/6 to 14/9
Secondary gas coals (Pelaw Main or similar)	13/6 to 14/	13/ to 13/6
Special gas coals .....	15/ to 15/6	15/
Unscreened bunkers, Durhams	13/3 to 14/3	13/3 to 14/
Do. do. Northumbrians	12/ to 12/6	12/ to 12/6
Coking coals.....	13/6 to 14/	13/6 to 14/
Do. smalls .....	13/ to 13/6	13/ to 13/6
House coals .....	15/6 to 16/	15/6 to 16/
Coke, foundry .....	23/ to 24/	23/ to 25/
Do. blast-furnace.....	19/ to 20/	20/
Do. gas .....	18/	18/6

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 100,940 tons of coal, and 240 tons of coke, as compared with 106,500 tons of coal and no coke for the corresponding period of 1912, being a decrease of 5,560 tons of coal and an

increase of 240 tons of coke. The coal market is without any important alteration. There is a firmer undertone with a good enquiry circulating for coals for delivery July-August; this especially applies to best steams and best gas qualities. There is also a better feeling in smalls, with better prices. There is no special movement in coking fuel and bunkers. Loading turns are full and with still restricted outputs. Second-hand sellers are not materially discounting colliery quotations. There is not much forward business doing either for gas or bunker purposes. Contracts aggregating about 150,000 tons of Northumberland/Durham steams have been placed for account of the Russian Railways on the basis of 20s. to 20s. 3d. c.i.f. Cronstadt, and the Aarhus Gasworks are inviting offers of 22,000 tons of special Durham gas coals. The Moscow-Windau Railways are also asking for immediate offers of 20,000 tons of steams September shipment. Quotations are about as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	16/	16/
Secondary do. ....	13/6 to 14/	14/
House coals:—		
Best house coals .....	16/6	18/
Ordinary do. ....	15/6	17/
Other sorts:—		
Lambton screened .....	15/9	14/6
South Hetton do. ....	15/6	14/6
Lambton unscreened .....	14/	13/6
South Hetton do. ....	13/9	13/6
Do. treble nuts	16/6	16/9
Coking coals unscreened ..	14/ to 14/6	13/6 to 14/
Do. smalls .....	14/	13/6
Smithies .....	14/6	16/
Peas and nuts .....	16/3	16/
Best bunkers .....	14/3	14/ to 14/6
Ordinary bunkers ..	13/9	13/6
Coke:—		
Foundry coke .....	23/6 to 24/6	23/6
Blast-furnace coke (dlvrd. Teesside furnaces) .....	19/6 to 20/	19/ to 20/
Gas coke .....	17/9 to 18/	18/

Outward chartering has been fairly heavy, but rates are easier all round. Recent fixtures include:—Coasting: London 3s. 1½d., Rotterdam 3s. 4½d., Antwerp 4s. 3d., Havre 4s. 6d., Hamburg 3s. 6d. Bay: Bordeaux 6s. 3d., St. Nazaire 6s. 3d. Baltic: Cronstadt 5s. 3d., Riga 5s., Malmö 5s. 3d., Kiel 5s. 9d., Gêfle 5s. 3d., Kotka 5s. 7½d. Mediterranean: Genoa 9s., Piræus 9s., Venice 10s. 6d., Port Said 9s., and Las Palmas 10s.

## Middlesbrough-on-Tees.

## COAL.

On the whole, the fuel market is steady and firm, and some descriptions of coal promise to advance. An increasing demand is now reported for gas coal, and especially is this the case for best qualities, deliveries of which are on a rather heavy scale. Best gas coal is quoted 15s., and seconds 13s. 6d. to 14s., whilst for special kinds up to 16s. is named. Demand for bunker coal is met by ample supply. Ordinary Durhams range from 13s. 3d. to 13s. 6d. f.o.b., superiors 14s. to 14s. 3d., and specials 15s. to 16s. Household coal is quiet, and is quoted 15s. 3d. to 16s. Coking coal is in good request at 14s. to 14s. 6d. Coke shows little change. Local needs absorb large quantities and average blastfurnace qualities are in the neighbourhood of 19s. 6d. delivered at Teesside works. Best foundry coke runs from 23s. 6d. to 25s., f.o.b. Gashouse coke is put at 17s. 6d.

## IRON.

The all-absorbing topic in iron trade circles is the suggestion of Messrs. Bolckow, Vaughan and Co., that the ironmasters create a limited company for the distribution of their make. The proposal has not met with the unanimous approval of the ironmasters, and merchants have protested against the suggested scheme, which would render the pig iron warrant store superfluous. A further meeting of Cleveland ironmasters to discuss the proposal was held this week, and the matter was referred to a committee to fully consider and report upon the scheme. The market is quiet, with business on only a very limited scale. Shipments of pig iron from the Tees are hardly up to expectations. To date this month they total 25,838 tons, as compared with 25,999 tons to the same date last month, and 36,445 tons for the corresponding part of July last year. No. 3 g.m.b. Cleveland pig is 56s. 9d. f.o.b., No. 1 is put at 59s., No. 4 foundry 56s. 6d., No. 4 forge 56s. 3d., and mottled and white iron each 55s. 9d.—all for early delivery. The foregoing are merchants' prices, makers asking rather higher rates. East coast hæmatite pig is lifeless, and merchants' efforts to sell mixed numbers at 74s. for either early or forward delivery meet with little success, buyers considering that too high a figure. Foreign ore is lifeless, but merchants show no inclination to lower quotations, and market rates remain on the basis of 20s. ex-ship Tees for rubio of 50 per cent. quality. There are no new features in the finished iron and steel industries. New orders are very scarce, and prices tend downward, but as yet they have not been notably reduced.

## South-West Lancashire.

## COAL.

Many of the pits in the Wigan district are playing to-day in consequence of the King's visit. The inland household coal trade if anything is rather better than a usual July. In screened coal for forge and manufacturing purposes there is nothing new to report, a fair quantity going into consumption. With regard to shipping, the steam coal market is still in the somewhat quieter condition last reported. There is no doubt that open sale enquiries have fallen off for the time being, though contract requirements are fully normal, and the excursion steamers are now beginning to approach their maximum quantities. Quotations for screened Lancashire steam coals, however, are still about 13s. 6d. to 13s. 9d. f.o.b. for cheaper grades, and 14s. to 14s. 3d. f.o.b. for the best descriptions. Household coal for the coastwise and cross channel trade keeps in a very brisk condition for the time of the year. Slacks and small fuel hang a little at the moment, but there is no great surplus about, and probably the broken time that will be worked this week will have the effect of balancing

An active business has been done in the Fife coal trade. The coal has been good, and shipments have been a fair business in nuts. The total for the week was 68,454 tons, Burntisland 56,040,



supply and demand. The stoppage of a block of collieries in the Wigan district on the non-union question has been settled, the men resuming work last Monday.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	16/3	16/3
Do. (f.o.b. Garston, net)	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net)	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal.....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/6 to 14/3	13/6 to 14/3
Best slack .....	10/6	10/6
Secondary slack .....	9/9	9/9
Common do. ....	9/3	9/3

South Lancashire and Cheshire.  
COAL.

There is very little to report about the coal trade in this district. There was a good attendance on the Manchester Coal Exchange on Tuesday, but the demand for house coal continues poor, with list prices unchanged. Furnace coal is brisk, and there is a good demand for shipping coal. Slack is in fair call, with firm prices.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington)	14/	14/
Best slack.....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

IRON.

There was a very flat market in Manchester on Tuesday. Buyers have no confidence, and there is very little new business in consequence. There is a fair amount of old work going through, and everybody seems to be busy on old work. Good foundry iron can be bought at 63s. to 64s. delivered Manchester. Forges are most of them on short time, but the Association prices are kept up—viz., £8 15s. for Crown bars, £8 5s. second quality, £8 17s. 6d. hoops. Steelworks, too, are busy, but any new work that is coming forward has to be taken at low prices in consequence of foreign competition; this applies more especially to billets. Orders for bars are now being taken at £8, less 2½ per cent., with billets at £5 7s. 6d. net. Engineers are busy, and report a fair amount of enquiry coming forward. Textile engineers and wagon works are very busy. Foundries are fairly well off for orders.

Yorkshire and Derbyshire.

Leeds.

COAL.

There was about the usual muster of traders at the market on Tuesday, but business was on the quiet side, very few orders apart from steam coal being given out. It was reported that a considerable tonnage of gas coal had been sold within the past few days for stacking at one of the big Yorkshire works, at prices fully equal to the new contract figures. Wagons are scarce, and the pits are having to resort to ground stocking. Siding stocks are now considerable, but still below the average for the time of the year. An average of four days has been worked at the pits.

House Coal.—There has been a considerable improvement in the demand for best coal from London and the eastern and southern counties. Fairly heavy contract deliveries have been specified, and in addition there has been some open market buying. No further contracts for house coal are reported, but this causes no anxiety locally, as owners generally prefer to take the open market prices. Further stocking orders have been placed, one of which is said to concern 5,000 tons of Silkstone best coal, which has been sold at 12s. 9d. at the pit. The coastwise trade is a shade quieter this week, although an extra number of boats have been loaded at Goole for the river and the south coast. Freights are a shade easier, Goole to London for small steamers having been done this week at 4s. In the West Riding there is very little alteration since our last report.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	14/	14/
Wallsend & London best	13/ to 13/6	13/ to 13/6
Silkstone best .....	13/ to 13/6	13/ to 13/6
Do. house .....	11/6 to 12/	11/6 to 12/
House nuts .....	11/ to 11/6	11/ to 11/6
Prices f.o.b. Hull:		
Haigh Moor best.....	15/9 to 16/6	15/9 to 16/6
Silkstone best .....	15/6 to 16/	15/6 to 16/
Do. house .....	14/6 to 15/	14/6 to 15/
Other qualities.....	13/6 to 14/6	13/6 to 14/6
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/3 to 12/9	12/3 to 12/9
Gas nuts .....	11/6 to 12/6	11/6 to 12/6
Unscreened gas coal ...	10/9 to 11/3	10/9 to 11/3
Other sorts:—		
Prices at pit:		
Washed nuts .....	12/ to 12/6	12/ to 12/6
Large double-screened engine nuts .....	11/ to 11/6	11/ to 11/6
Small nuts .....	10/6 to 11/	10/9 to 11/3
Rough unscreened engine coal .....	10/6 to 11/3	10/9 to 11/3
Best rough slacks .....	8/9 to 9/3	8/9 to 9/3
Small do. ....	8/ to 8/6	8/ to 8/6
Coking smalls .....	8/ to 8/6	8/ to 8/3
Coke:—		
Price at ovens:		
Furnace coke .....	14/6 to 15/	14/ to 15/

The public generally are holding off, but pit prices show no reduction. Representative pits quote as under:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

Gas Coal.—Although there is little new to report in this branch of the trade, the market generally is firm. The pits are working full time, and there is almost an entire absence of stocks of gas coal in colliery sidings. Reserves at the works are now ample, although there is yet some little buying of spot lots. Forward business is easing off a little, as the great majority of the works have already made their contracts. Any tenders that are sent out, however, are based on an advance of at least 1s. per ton.

Manufacturing Fuel.—The short-time working of the house coal pits has the effect of limiting the supply of nuts and slacks. Prices generally are well maintained, but there is still some weakness in the rougher qualities of slack. Coking smalls are in considerable demand, and prices a shade firmer.

Washed Furnace Coke.—Average samples of washed furnace coke realise 14s. 6d. for prompt delivery, and from this figure to 15s. for short time contracts. The demand is pretty full, and there are no stocks either on the benches or in trucks. The Frodingham district is absorbing a huge tonnage of locally-produced coke, but the demand from the Midlands, probably owing to strike troubles there, is very much quieter. The iron and steel works in the Leeds district are taking about average supplies.

Barnsley.

COAL.

Generally speaking, there has been little change in the position of affairs on the week. Business is steady, and buyers are operating in the belief that the receding of prices is inevitable. In some respects lower values are operating, but generally the position from a sellers' point of view is strong, and is expected to remain so. In regard to the export demand for large steam fuel, buyers find it difficult to place orders at lessened prices or to induce sellers to make material concessions on forward account. The placing of the requirements of the Russian State Railways in the district has given the market a strong test. It is understood only the best hards were acceptable, and it is stated that the merchants have only been able to place about 80,000 tons of the 300,000 tons required in this district, and no doubt the firm state of the market restricted the placings in local collieries. This has given the market a more settled position, and again the best hards are quoted at from 12s. 9d. to 13s. 3d. per ton. The somewhat limited output enables producers to pass by offers at less than current rates in the belief that the surplus can be readily dealt with in the open market. Though secondary descriptions of large steams are rather firmer, prices are hardly so stable, and about 12s. to 12s. 3d. per ton represents the present run of business. The latest returns regarding the traffic at Hull clearly indicates the great hold which the newer district collieries are getting on the foreign trade. Last month seven firms sent about a quarter of a million tons, equal to one third of the total landed at the port. There is again rather a weakening in regard to all kinds of unscreened coal, but the reductions are not of a very material character. The best steam nuts continue to be in good demand, but rougher sorts are about 3d. per ton weaker, whilst the enquiry for slacks has lost a considerable amount of vitality. Although the output, owing to the restricted working of house coal pits, is not so large, there is more of this class of fuel on offer. The holidays in the textile districts are having a not inconsiderable influence in that direction, whilst the most extensive activity in damping down coke ovens is again having its effect. Prices of rough slacks, particularly, have fallen about 6d. per ton, and best sorts are easier in about the same degree. Generally all the gas coal collieries are engaged in supplying on new contract account, and there is little buying for current use when contract rates are being obtained. The house coal trade continues to be in a quiet state, but merchants report there is still no evidence of a more free supply of the best grade of fuel, and prices are still being maintained. However, in regard to secondary descriptions the position is not so good and efforts are made by concessions to avoid stocks of this grade of fuel. There is no improvement in regard to coke so far as prices are concerned. Smelters are still averse to entering into contracts at anything like the present prices, and business continues to be sluggish.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	14/6	14/6
Best Barnsley softs.....	14/	14/
Secondary do. ....	11/ to 13/	11/ to 13/
Best house nuts .....	12/ to 13/6	12/ to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/9 to 13/3	12/9 to 13/3
Secondary do. ....	12/ to 12/3	12/ to 12/3
Best washed nuts .....	12/	12/
Secondary do. ....	11/	11/
Best slack.....	9/	9/ to 9/3
Rough do.....	8/ to 8/3	8/ to 8/6
Gas coals:—		
Screened gas coals .....	12/ to 12/6	12/ to 12/3
Gas nuts .....	11/ to 12/	11/3 to 12/
Furnace coke .....	14/ to 14/6	15/

Hull.

COAL

There was a fair attendance at the weekly market, but business only on quiet lines. Though best Yorkshire steam hards steadily maintain late quotations, owing to a fair demand for prompt shipment abroad, secondary sorts are very much lower on the week, while smalls and slack are plentiful and cheap. Derbyshire and Nottingham steam hards have suffered a relapse, and are now worth no more than 15s. for shipment at Grimsby or Immingham. The forward market has continued in a listless state, exporters holding out for lower prices than the collieries have been asking. Most of the foreign buying is of the hand-to-mouth description. House coals are quiet, and gas fuels a poor market. Shipments from the docks maintain the recent high level. With a plentiful supply of tonnage coming on the home market freights have eased off

considerably, and several large steamers have been chartered at from 5s. to 5s. 3d. for Cronstadt, handy sizes being worth up to 5s. 6d. Mediterranean freights are also lower since the beginning of the week, when 10s. was paid Hull to Alexandria. The following are the approximate prices for prompt shipment f.o.b. Hull, &c.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards.....	16/ to 16/3	16/ to 16/3
Washed double-screened nuts .....	13/9 to 14/	14/3 to 14/9
Unwashed double-screened nuts .....	13/6	13/9 to 14/3
Washed single-screened nuts .....	13/9	14/3
Unwashed single-screened nuts .....	13/	13/
Washed smalls.....	11/	11/
Unwashed smalls.....	9/9	9/9
West Yorkshire:—		
Hartleys .....	13/3	13/3
Rough slack .....	10/9 to 11/	10/9 to 11/
Pea slack .....	9/9	9/9
Best Silkstone screened gas coal .....	14/3	14/3
Best Silkstone unscreened gas coal .....	13/	13/
Derbyshire and Notts:—		
Best steam hards .....	15/6	15 9 to 16/
Do. (Grimsby) .....	15/	15/6
Derbyshire nuts (doubles) .....	13/6	13/6
Derbyshire nuts (doubles) (Grimsby).....	13/3	13/3
Derbyshire large nuts ...	14/6	14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	15/6	15/9 to 16/
Do. do. (Grimsby) .....	15/	15/6

Chesterfield.

COAL.

For house coal the demand is quiet but prices are well maintained and the pits continue to work full time. Fuel for industrial purposes is in good request and no falling-off in any of the kinds required for the large steel-works of Sheffield and district is experienced. Prices remain firm. The demand for slack for boiler firing is not quite so strong as it has been, but a little weakness is usually felt at this time of the year—especially from Lancashire—where the “wakes” cause a serious suspension of operations in connection with the cotton mills. Otherwise, this branch of the coal trade is in a satisfactory state. It is becoming apparent that the supply of slack for sale is likely to decrease with the growth of the by-product industry, which is now such an important department of the coal trade. In some cases, collieries that are now erecting such plants, are notifying their customers that they will be unable to offer any slack for delivery over next year. It is obvious that consumers need not look for any depreciation in the value of this class of fuel for some time to come. A satisfactory quantity of steam coal is going forward to the various railway companies for locomotive use against existing contracts. There is an active demand for steam coal for export and prices are firm at 16s. per ton for best Derbyshire Top Hards, delivered alongside steamer at Grimsby. The Russian orders for steam coal, which have recently been placed on this side, have given the market a stronger tone, and the remainder of the season promises to be a busy period. There is less pressure for the smaller classes of fuel, supplies of which are more plentiful, owing to the reduced requirements caused by the serious stoppage of work in the Midlands, as a result of strikes. Washed fuel finds a ready sale at current prices. Coke is easier, and unless there is an early improvement, it is feared that the number of ovens now at work will have to be reduced. Coking fuel continues in good demand.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

IRON.

The iron trade is quiet and there is very little new business offering. With a resumption of operations after the recent big strike in the Black Country, it is hoped and believed that orders will become more plentiful.

Nottingham.  
COAL.

Though the cooler weather has been a little more favourable to the coal trade during the past week, the tone in Nottinghamshire is moderately quiet. A feature in the branch for household fuel is the desire on the part of owners to maintain prices notwithstanding the slackness in the demand, there being a prospect of an improvement in a few weeks, when merchants will begin to order for the autumn. It cannot be said that business in the steam coal branch is altogether satisfactory. The decline in shipments, combined with a falling off in the home demand, is making this section less active, and for the time of the year the consignments from local collieries are not up to expectation. As a result the stocks at some of the pits are increasing, and while prices for best qualities are generally firm, a weakening tendency is noticeable

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	12/ to 13/	12/6 to 13/
Good house coals.....	11/ to 12/	11/ to 12/
Secondary do. ....	10/ to 11/	10/ to 11/
Best hard coals .....	12/ to 12/3	12/ to 12/6
Secondary do. ....	10/6 to 11/6	10/6 to 11/6
Slacks (best hards).....	8/6 to 9/	8/6 to 9/
Do. (seconds) .....	7/6 to 8/	7/6 to 8/3
Do. (soft).....	7/6 to 8/6	7/6 to 8/6



to second rate fuel. The position of slacks is less favourable, this branch receding to a normal condition after the boom, and quotations are on the down grade. Coal is just now manifesting a declining demand.

### Leicestershire.

#### COAL.

Since last week there has not been any marked variation in the course of business. There is yet an aggregate amount of business being done which for mid July is good. There is no pressure, but on the whole a steady run of business. Some collieries are much less furnished with business than others, and hold rather large stocks, but generally the amount of coal on hand is not above the usual. The household coal demand is about normal as a rule, the commoner qualities being most in request. But there is a good enquiry for steam coals of all descriptions, and this branch of the trade seems likely to continue active for some time yet. Local merchants are not busy, and as yet consumers are holding off taking in supplies. But it is likely that there may be some movement shortly in this direction. The current quotations are generally unchanged, and coalowners are disposed, despite the lessened demand, to hold firmly to late rates for new business. Contracts for the ensuing year have been concluded at an advance on last year's prices.

### South Staffordshire, North Worcestershire and Warwickshire.

#### Hednesford.

#### COAL.

There is no very marked change to report this week in the condition of the coal trade of the Cannock Chase district, but as there is now a probability of the labour troubles in the Black Country soon being at an end, it is hoped there will be an early improvement in business. The collieries are working short time, and a large number of loaded trucks are standing in stock. The house coal trade continues quiet, and there is little alteration in the demand for fuel for manufacturing purposes.

#### Birmingham.

#### COAL.

The coal market was of a distinctly more encouraging nature than has been the case for several weeks. The new contracts came into operation on the first of the month at the increased rates already announced, and there is no giving way in any other branch of the trade. The output is curtailed in order to avoid stocks accumulating. Quotations:—

#### Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep.....	16/6	16/6
Do. best shallow.....	14/6	14/6
Do. seconds do.....	13/	13/
Best hard.....	14/	14/
Forge coal.....	11/	11/
Slack.....	8/6	8/6
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked cobs.....	13/9	13/9
Best hard spires.....	14/6	14/6
Forge (steam).....	10/	10/
D.S. nuts (steam).....	9/6	9/6
Small (do.).....	8/6	8/6

#### IRON.

The quarterly meeting of the South Staffordshire iron trade was dull and featureless. The settlement of the labour troubles, which have upset the trade of the district for over a couple of months, has revived hopes of an early improvement, but so far it has only reached the visionary stage. Buying is of hand-to-mouth character, foreign competition is keen, and the labour upheaval gave the foreigner an opportunity of which he has taken every advantage. The number of outside visitors on 'Change was very small. The South Wales party was reduced by about half, and they reported a quiet trade in iron and steel, and the tinplate trade still passing through a period of depression. Surprise was expressed at the attitude of marked bar makers, while all other classes of finished iron have tumbled down they have been able to uphold the £10 basis. Until recently the active condition of the engineering trades has absorbed the output of this class of iron, but the demand from this source is now of less dimension, and it was thought producers would have dropped their quotations by 10s.; in justification of not doing it they state that the price of the raw material they use has not declined, like the other grades, and that the cost of production in other respects is maintained. Merchant iron was on offer at £7 15s. to £8 a ton delivered, and common iron for nut and bolt purposes at £7 10s. The mills in Darlaston and Wednesbury are operating about three days a week, and have to compete against low priced Belgian iron. Small rounds, squares, and flats 3/4th basis, are sold at £8 per ton delivered Birmingham. The demand is limited, and, so far as rounds are concerned, is affected by the falling off in the common chain trade at Cradley. Pig iron is still bought in small parcels, and in Northamptonshire particularly stocks are accumulating, Birmingham being the principal market for this iron. Derbyshire makers are better placed, having an outlet in their own district. The following are the quotations:—Northamptonshire forge, 55s. to 56s.; Derbyshire, 56s. to 57s.; South Staffordshire, 55s.; and part-mine, 2s. to 3s. more. The Gas Strip Association met, and on the resumption of work, which it is hoped will be general on Monday, decided to maintain the £8 basis. Steel strip is £8 to £8 5s. Galvanised sheets are a shade firmer at £10 15s. up to £11 10s. for the home trade. Spelter is cheaper, and is available to buy their sheet bars at £5 to £5 10s. which is about 5s. above Continental rates. Sheet iron is reduced £1 a ton, making coke 27s. per ton, and best charcoal 34s.

#### Lydney.

#### Forest of Dean.

#### COAL.

The house coal pits in this district are running short of orders, and most of the collieries are on short time. The majority, however, are managing four days in the week, which is considered satisfactory for the summer months. There are fair stocks to be noticed, but this is usual at this time of the year. The steam coal collieries are still receiving large orders, and the pits are easily kept going full time. Smalls and through coals especially are in great demand.

#### Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block.....	16/6	16/6
Forest.....	15/6	15/6
Rubble.....	15/9	15/9
Nuts.....	14/	14/
Rough slack.....	10/	10/
Steam coal:—		
Large.....	13/6 to 14/	13/6 to 14/
Small.....	10/ to 10/6	10/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

### THE WELSH COAL AND IRON TRADES.

THURSDAY, JULY 10.

#### North Wales.

#### Wrexham.

#### COAL.

During the week which has gone the amount of business done in this locality has been up to the average, considering the time of the year, which, of course, is against the house coal trade. Most of the collieries have been working well, but they could do with more orders in most grades of fuel. The house coal trade is particularly weak, except in special cases of spot lots, and the landsale depots are very quiet indeed. Prices, however, have not been altered, as it is felt that if a reduction was made there would be no increased business done in this class of trade just now. The gas coal business is brisk, and during the past week a number of new contracts have been settled, including Chester, Conway and Carnarvon. In the case of the last-named works the contracts have been settled at 9d. per ton advance for large coal, and 1s. per ton advance for the nuts. The prices are 17s. 11d. for large coal and 17s. 2d. for nuts. With regard to steam coal, the railway companies are taking large quantities on account of contracts, and, as several railways have large contracts with the North Wales collieries, this trade is very acceptable just now. Coal for manufacturing purposes is also in good demand, and there are no stocks in this class of fuel to be seen standing in the colliery sidings. The brickworks of the district are very busy. The shipping trade at Garston, Birkenhead, and Ellesmere Port is fairly well maintained, and the prices are about the same as last week. With reference to nuts, most of these go to the gas-works under contract, but in regard to slack the demand is a little easier, though numerous forward contracts have been arranged at the general advance of 1s. to 1s. 6d. per ton on last contract prices. The demand for gas coke is unchanged, and so are the prices. Current prices are as follow:—

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal.....	14/ to 15/	14/ to 15/
Secondary do.....	13/ to 14/	13/6 to 14/6
Steam coal.....	12/6 to 13/	12/6 to 13/6
Gas coal.....	13/ to 14/	13/ to 14/
Bunkers.....	12/3 to 12/9	12/3 to 12/9
Nuts.....	11/6 to 12/	11/3 to 12/
Slack.....	6/ to 8/	6/6 to 8/
Gas coke (at works).....	15/ to 16/8	15/ to 16/8
Prices landsale:—		
Best house coal.....	18/4 to 19/2	18/4 to 19/2
Seconds.....	16/8 to 17/6	16/8 to 17/6
Slack.....	10/ to 12/6	10/ to 12/6

### Monmouthshire, South Wales, &c.

#### Newport.

#### COAL.

The influx of a fair amount of tonnage has done something to steady the tone of the steam coal trade and ease the heavy depression of the past month. There is rather more enquiry apparent now, although forward business continues slow. Sellers maintain steadily their recent quotations and express confidence in the early improvement of present conditions. On the other hand, buyers seem little disposed to do business at to-day's prices and very few actual orders are being placed beyond small parcels of a hand-to-mouth description. The extremely quiet state of the freight market for the past few days does not encourage the hope of a quick improvement, rather indicating a continuance of those quiet conditions which have been recent experience. Indeed the only factor which seems to

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	17/6 to 17/9	17/3 to 17/9
Western-valleys, ordinary ..	16/9 to 17/	16/9 to 17/
Best Eastern-valleys.....	16/3 to 16/6	16/ to 16/6
Secondary do.....	15/6 to 16/	15/6 to 16/
Best small coals.....	8/9 to 9/	8/6 to 9/
Secondary do.....	7/9 to 8/	7/6 to 8/
Inferior do.....	7/ to 7/6	7/ to 7/6
Screenings.....	9/	8/9 to 9/
Through coals.....	13/9 to 14/6	13/9 to 14/6
Best washed nuts.....	14/6 to 15/	14/9 to 15/3
Other sorts:—		
Best house coal.....	18/ to 19/	18/ to 19/
Secondary do.....	17/ to 18/	17/ to 18/
Patent fuel.....	20/ to 20/6	20/6 to 21/
Furnace coke.....	22/ to 24/	23/ to 25/
Foundry coke.....	26/ to 28/	26/ to 28/

encourage the attitude of colliery agents is the effect of the approaching holiday stoppage which they know will restrict the output. Values of smalls rule a shade easier, house coals remain unchanged, while pitwood shows much firmness, 22s. 9d. to 23s. being asked for good wood.

#### IRON.

With the approach of the quarterly meeting at Birmingham, there has been very little fresh business moving locally in the iron and steel trades. During the past week only small transactions have taken place, conditions remaining much as last reported. At bar mills work continues good, with makers holding out for their values. Considerable enquiries are expected on the market shortly, and it is not anticipated they will be dealt with at anything less than to-day's figures. Continental imports have hardly been so heavy, quotations from this quarter remaining steady. Rail mills continue actively engaged, exports at the docks just now being the heaviest for years past. Output here is well booked for some time ahead and quotations, rather than easing, show a tendency in the other direction. Work is again reported satisfactory at blastfurnaces, where the outlook is considered not unsatisfactory, although prices are a little down on the week. In the tinplate trade there is a very welcome improvement, more business passing and a better enquiry coming along. Values of plates are being well maintained and there is talk of several mills that have been idle restarting shortly.

#### Cardiff.

#### COAL.

The chief feature of the market this week has been the heavy chartering by the Admiralty of vessels to follow the Fleet during the forthcoming naval manoeuvres. Altogether over 20 steamers ranging between 3,000 and 6,000 tons have been taken up at 11s., 12s. and 12s. 6d. per ton on the gross register. With the increased demands that have come forward from other directions, especially in second-class coals, the market has maintained a very steady tone, but there has been no decided advance in values. For best steams anything between 20s. 6d. to 21s. is obtainable, but second Admiralties are about 6d. better than last week. It is reported that the Greek Government are enquiring for about 30,000 tons of best steams, and though at the time of writing no confirmation of this was obtainable, it is very generally thought that they will ask prices for a considerable quantity in the near future. The Portuguese Navy are also in the market for 6,000 tons of Admiralty coals for delivery this month. These are strong bull points with sellers, and as, owing to the very fine weather which has been experienced, a large number of miners are away hay-making, outputs are decreasing. There is every indication that for the remainder of this month there will be a shortage of best coals. Shipments last week, though not as heavy as in the previous six days, amounted to over 375,000 tons, and it is stated that many of the best collieries have very little free coal for prompt sale. It is quite expected that the increased Admiralty demand will result in the clearance of all standing stocks, and the coalowners are confident that prices will continue firm until at least the autumn. The large quantity of coal already contracted for in the north on Russian account—namely 220,000 tons out of the 360,000 tons required—is sure to have a good effect on the markets, and probably will be the means of inducing many merchants to come forward to arrange for their supplies both for this month and next. There is a good deal of speculation on 'Change as to the outcome of Mr. D. A. Thomas's visit to the British Columbian and West Virginian coalfields. Up to the present the Cambrian Combine, of which Mr. Thomas is the head, have been large exporters to the west coast of America, and naturally they do not relish the probability of this business being diverted from them through the opening of the Panama Canal. Immediately on his return, Mr. Thomas was buttonholed by a number of his friends as to what he had accomplished during his visits, but he was too wily to be drawn. All that he would admit was that there are immense possibilities financially in both British Columbia and West Virginia. From the coalfields of the latter region very fine coal, he said, was being put into cars at less than 3s. 6d. per ton, but unfortunately there was a great scarcity of labour and capital both in the United States and in Canada. There is very little change in Welsh small coal. Stocks in Belgium are still large, and therefore business with that country is as yet comparatively small, but with the extra tonnage lately taken up bunkering qualities have hardened up to 11s. per ton. Best cargo sorts, however, are still procurable at about 8s. 6d., whilst lower grades have been sold at as low as 7s. to 7s. 6d. per ton. Monmouthshire coals are steady to firmer, Black Veins commanding from 17s. 9d. to 18s. and Western Valleys from 17s. to 17s. 3d. f.o.b. Cardiff. It will be noticed from the appended table that in only nine cases was there a decrease in the exports. It is noteworthy, too, that whilst Italian East Africa last year took 22,628 tons, this year the exports to that country were nil. Bulgaria last year took 16,251 tons, this year nothing.

	Total Jan.-May Tons.	Increase. Tons.	Decrease. Tons.
Russia.....	123,966	43,151	—
Sweden.....	109,917	52,242	—
Norway.....	42,206	5,421	—
Denmark.....	12,291	799	—
Germany.....	122,700	35,817	—
Netherlands.....	51,674	5,709	—
Java.....	12,573	—	6,122
Dutch possessions in Indian Seas.....	12,448	2,538	—
Belgium.....	233,424	140,485	—
France.....	2,957,605	1,077,510	—
Algeria.....	341,110	158,310	—
French Somaliland.....	28,068	15,235	—
Portugal.....	336,621	100,417	—
Azores.....	12,134	—	231
Madeira.....	61,242	31,713	—
Spain.....	543,453	179,519	—
Canary Islands.....	334,269	53,183	—
Italy.....	2,191,311	506,397	—
Austria-Hungary.....	178,201	155,070	—
Greece.....	125,182	24,196	—
Roumania.....	41,477	7,717	—
Turkey (European).....	26,118	—	14,419
" (Asiatic).....	22,189	—	14,587
Egypt.....	807,006	242,485	—
Tunis.....	72,681	38,281	—



	Total Jan.-May Tons.	Increase. Tons.	Decrease. Tons.
Japan .....	5,765	—	4,918
Mexico .....	14,598	7,534	—
Chile .....	246,121	23,238	—
Brazil .....	746,241	258,269	—
Uruguay .....	248,043	—	10,744
Argentine Republic	1,302,480	387,639	—
Channel Islands.....	22,063	—	4,906
Gibraltar .....	106,438	—	7,461
Malta .....	289,719	186,200	—
Cape of Good Hope	12,752	1,678	—
Mauritius .....	12,621	5,923	—
Aden .....	60,196	—	20,033
British India .....	54,839	22,886	—
Ceylon .....	92,182	4,850	—
Hong Kong.....	27,910	7,202	—
West Africa: French	71,045	36,813	—
„ Portuguese	121,415	6,864	—
„ British	47,106	13,574	—

The Cardiff Journal of Commerce gives the following as the declared price per ton of coal exported from the Welsh ports during the month of May:—

	Cardiff.	Newport.	Port Talbot.	Swansea.
	s. d.	s. d.	s. d.	s. d.
Large steam .....	17 9	16 5	17 3	16 5
Through-and-through	14 8	15 0	11 5	10 10
Small .....	11 7	13 0	11 3	10 1
Large anthracite .....	—	29 2	15 3	17 9
Household .....	16 4	—	15 0	17 6

In May of last year the prices were:—

	Cardiff.	Newport.	Port Talbot.	Swansea.
	s. d.	s. d.	s. d.	s. d.
Large steam .....	17 2	15 8	17 5	16 2
Through-and-through	14 3	11 9	10 2	10 5
Small .....	9 5	10 7	8 7	8 4
Large anthracite .....	20 6	—	18 9	17 3
Household .....	—	—	14 10	15 0

Fancy house coals are still ruling from 18s. to 20s. net at pit's mouth, but there is very little buying going on. No. 3 Rhondda bituminous coals are quoted at 17s. to 17s. 6d., but No. 2 ditto realised from 13s. 9d. to 14s. or 9d. more than last week. There was a great falling off in coastwise shipments in the month of May as compared with the corresponding month of last year. Last May they amounted to only 298,818 tons, whilst in the same month last year they totalled 549,041 tons, being a decrease of 250,223 tons. From Cardiff there were shipped 143,817 tons, of which Southampton took 39,700 tons, London 33,000 tons, Liverpool 27,960 tons, and Bristol 15,217 tons. From Newport the shipments were 63,986 tons, of which Dublin alone took 13,690 tons. From Port Talbot and Briton Ferry the shipments were 18,266 tons, and from Swansea 35,085 tons, of which 15,945 tons were for London. Shipments of patent fuel during the week exceeded 81,000 tons, of which the Crown company despatched 18,151 tons, and other local makers 6,000 tons, and Swansea 17,015 tons. Best brands are obtainable at 22s. In coke there is no material change. Pitwood continues firm at 22s. 6d.

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam	20/6 to 21/	20/6 to 21/
coals .....	19/ to 19/6	18/6 to 19/
Superior seconds .....	18/ to 18/6	17/6 to 18/
Ordinary do. ....	10/6 to 11/	10/3 to 10/9
Best bunker smalls.....	9/9 to 10/3	9/6 to 10/
Cargo qualities .....	8/6	8/6 to 9/
Inferior smalls.....	7/ to 7/6	7/6 to 8/
Best dry coals .....	18/ to 19/	18/6 to 19/
Ordinary dries .....	15/ to 15/9	15/ to 15/9
Best washed nuts .....	16/6	15/6 to 15/9
Seconds .....	15/6	14/6 to 14/9
Best washed peas .....	14/6	15/
Seconds .....	13/6	14/
Dock screenings .....	10/	10/6
Monmouthshire—		
Black Veins .....	17/9 to 18/	17/6 to 17/9
Western-valleys .....	17/ to 17/3	17/ to 17/3
Eastern-valleys .....	16/6 to 16/9	16/3 to 16/6
Inferior do. ....	15/9 to 16/	15/6
Bituminous coals:—		
Best house coals (at pit)	20/	20/
Second qualities (at pit)	18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/ to 17/6	17/ to 17/6
Through-and-through....	14/9 to 15/3	14/9 to 15/3
Small .....	12/ to 12/6	12/ to 12/6
No. 2 Rhondda—		
Large .....	13/3 to 13/9	13/3 to 13/9
Through-and-through....	11/6 to 12/	11/6 to 12/
Small .....	8/ to 8/6	8/ to 8/6
Best patent fuel .....	22/ to 22/6	23/
Seconds .....	20/ to 21/	21/
Special foundry coke .....	30/ to 31/	30/ to 31/
Ordinary do. ....	26/ to 28/	27/ to 28/
Furnace coke .....	22/ to 24/	22/ to 24/
Pitwood (ex-ship) .....	22/6	22/3 to 22/6

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

IRON.

There is considerable discrepancy in the returns of the tin-plate mills operating. One report is that less than 95 are idle; another, that 110 mills have not restarted, and that unless better conditions prevail other works will also be compelled to close down. Shipments for the week were over 155,000 boxes, or 20,000 boxes in excess of receipts from works. Stocks, however, are still over 400,000 boxes. There has been a fall of £10 in block tin, and also a drop in steel bars, but prices of plates have undergone very little change. The lower prices have, however, stimulated buying, and some good orders are reported to have been received from South America. 14 x 20 cokes are still quoted at 13s. 6d., and oil sizes at 13s. 10½d. to 14s. for 14 x 18½, and 19s. 10½d. to 20s. for 10 x 20 sizes. The Board of Trade

returns show that for the six months ended June 30 the exports of tin-plates amounted to 255,109 tons. For the same period last year the quantity was 216,089 tons. To the United States last month no less than 4,373 tons were exported, as against 52 tons in the corresponding month of last year. Exports of blackplates for the past six months were 34,251 tons; for the same period last year, 26,794 tons. In galvanised sheets there has been a very large increase, the exports for the past six months showing a total of 378,628 tons; for the same period last year, 289,574 tons. Notwithstanding that foreign steel bars are offering at 90s. c.i.f., the imports for the week have been very light, being less than 4,000 tons. Welsh bars are obtainable at from £4 17s. 6d. to £5, or fully 2s. 6d. under last week. Prices of galvanised sheets continue very weak, leading makers offering 24-gauge corrugateds freely at £10 12s. 6d. There have been heavy exports from the Channel of rails and railway plant, 1,860 tons of rails having been despatched to Bombay, and over 6,000 tons of rails and accessories to South African and other ports. Fresh business, however, except for colliery rails, is coming along but slowly. Welsh pig iron has fallen to 77s. 6d. f.o.t. Best rubio ore is offering at 18s. 6d., but buyers refuse to give more than 18s. Second qualities are 17s. 6d., or 6d. above buyers' ideas. New steel crop ends are down to 63s. 6d.

Swansea.

COAL

The returns of the trade of the port were again very satisfactory during the past week. The coal and patent fuel trades were both active, the shipments together amounting to 110,331 tons. There was a capital attendance on 'Change this morning and the condition of the anthracite coal market was without any material alteration. Swansea Valley large was a little steadier, but Red Vein large was without any improvement. Machine-made nuts (both French and German varieties) were steady. Cobbles were rather slow in moving off, while both rubby culm and duff were freely offered for immediate delivery at slightly-reduced figures. In the steam coal department there was rather a dull tone in evidence, and all qualities were more easily obtainable.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/ to 23/	21/ to 23/
Secondary do. ....	18/6 to 20/	18/6 to 20/
Big Vein large (less 2½ per cent.) .....	16/ to 17/6	16/ to 17/6
Red Vein large do. ....	12/ to 13/	12/ to 13/
Machine-made cobbles (net) .....	21/ to 22/	22/ to 23/
Paris nuts (net) .....	23/ to 24/	23/ to 24/
French do. do. ....	23/ to 24/	23/ to 24/
German do. do. ....	23/ to 24/	23/ to 24/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	11/6 to 13/6	11/6 to 13/6
Do. fine peas (net) .....	—	—
Rubby culm (less 2½ p.c.)	6/9 to 7/	7/ to 7/6
Duff (net) .....	5/8 to 6/	5/8 to 6/
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 21/	19/ to 21/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/ to 12/	11/ to 12/
Small do. ....	8/ to 9/6	8/ to 9/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/6	17/ to 18/6
Through-and-through (less 2½ p.c.) .....	15/ to 16/	15/ to 16/
Small (less 2½ per cent.)	11/6 to 12/6	13/ to 14/
Patent fuel do. ....	18/ to 19/	18/ to 20/

IRON.

Last week the iron and steel trades in this district were active. In the pig iron trade heavy production was registered at the blastfurnaces and there was more regular employment in the steel trade. The tinplate trade was very slow, owing to lack of orders. The engineering shops were kept steadily going, but the foundries were not so busy as usual. The shipments of tinplates during last week were 155,182 boxes, and receipts from works 135,627 boxes, whilst stocks in the dock warehouses and vans were 409,964 boxes.

Llanelli.

COAL.

The coal trade of this district can only be described as bad for all kinds, and it looks as though the colliery people will have to experience a slump for some time to come. Many of them did not get much benefit out of the boom of the past six months, as their outputs were mostly sold at the lower prices received before the rush began. Naturally they are anything but pleased that the market has collapsed just when their old contracts had expired. Stocks of most kinds are very heavy, more especially anthracite, and prices in consequence are down. Anthracite kinds do not show the least improvement, nor is it probable that any great change will take place until the colder weather arrives. The suction

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	21/ to 23/	20/ to 22/
Secondary do. ....	19/ to 21/	18/ to 20/
Big Vein large .....	17/ to 18/	16/6 to 17/6
Red Vein do. ....	12/6 to 13/6	12/6 to 13/6
Machine-made cobbles ...	18/ to 20/	18/6 to 20/
German nuts .....	20/ to 21/	21/ to 22/
French do. ....	22/ to 23/	22/ to 22/6
Paris do. ....	22/ to 23/	22/6 to 23/6
Machine-made beans .....	19/ to 21/	19/ to 21/
Do peas .....	11/6 to 13/6	12/6 to 13/6
Rubby culm .....	7/ to 7/6	7/ to 7/6
Duff .....	5/ to 5/6	5/ to 7/
Other sorts:—		
Large steam coal.....	17/ to 18/	17/ to 18/
Through-and-through ...	11/6 to 12/6	12/ to 13/
Small .....	10/ to 11/	10/ to 11/
Bituminous small coal ...	11/ to 12/	11/6 to 12/

gas qualities are moving very slowly, and sellers do not quite know what to make of this market. The gas engines are now more used than ever, yet the enquiry is less than it has been for years. It is evident that some other fuel is taking the place of anthracite for this purpose. Steams show no improvement, and prices are very easy.

THE IRISH COAL TRADE.

THURSDAY, JULY 10.

Dublin.

Business generally continues to be evenly maintained locally, and the country trade is fairly good, as orders are now coming in which had been held back in anticipation of lower prices, which, it appears, are now likely to remain stationary for the rest of the summer. Quotations for all qualities are unchanged as follows:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 24s.; Orrell slack, 21s.—all less the usual 1s. per ton discount for cash; steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. There has been a falling off in the import trade during the past week, the coaling vessels arriving amounting to 42, as compared with 69 the week previously, chiefly from Workington, Garston, Newport, Liverpool, Preston, Girvan, Point of Aire, Glasgow, Saundersfoot, Whitehaven, Cardiff, Llanelli, Irvine, and West Bank. The total quantity of coal discharged upon the quays was 19,000 tons.

Belfast.

The tendency is still towards improvement in point of demand, more particularly as regards the inland trade, and as the contracts placed with the collieries by the local merchants for the next 12 months are all at higher prices than for some years past, it is improbable that any reductions will be made this summer in house coals. Quotations in the city are:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current prices ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Labour troubles at some of the Scottish ports have curtailed shipments for this port to some extent. Cargoes arriving during the week were chiefly from Garston, Ardrossan, Cardiff, Ayr, Girvan, Partington, Preston, Swansea, Newport, Point of Aire, Glasgow, Maryport, Troon, Lydney, West Bank, and Clydebank. The total number of coaling vessels entering the harbour between June 15 and 28 was 127. Some contracts are open in connection with the city and county asylums for the usual supplies. It is stated that the total quantity of coal exported from Ireland to British and Irish stations last year 477 tons as compared with 136 tons in 1911, these figures being independent of the coal shipped for use on steamers on their voyages.

THE TIN-PLATE TRADE

Liverpool.

There has been a little more doing the last few days, the low prices ruling tempting buyers to cover their requirements to some extent. The general position, however, is unsatisfactory, and unless an improvement in demand comes along soon, a reduction in output is bound to take place. There certainly are not sufficient orders to go round just now. Makers' quotations may be called:—Coke tins: I C 14 x 20 (112 sh. 108 lb.), 13s. 6d. per box; I C 28 x 20 (112 sh. 216 lb.), 27s. to 27s. 3d. per box; I C 14 x 20 (56 sh. 108 lb.), 13s. 10½d. to 14s. per box; I C 14 x 18½ (124 sh. 110 lb.), 14s. per box; I C 14 x 19½ (120 sh. 110 lb.), 14s. per box; I C 20 x 10 (225 sh. 156 lb.), 20s. per box; I C squares and odd sizes, 13s. 9d. to 14s. basis for approved specifications. Charcoals tins are easy at 16s. basis and upwards, according to tinning. Coke wasters are in moderate demand. The following figures are being quoted:—C W 14 x 20, 12s. 9d. per box; C W 14 x 18½, 12s. per box; C W 20 x 10, 17s. per box; C W 28 x 20, 26s. per box—all f.o.b. Wales, less 4 per cent.

THE BY-PRODUCTS TRADE.

Tar Products.—Things generally are quiet. There is virtually no change in pitch or naphthas. Benzols keep firm, and are about the strongest feature of the market. Carbolic rule weak. Other products are unchanged. Nearest values are:—

Benzols, 90's .....	1/1
Do. 50's .....	10½
Do. 90's North .....	1/ to 1/0½
Do. 50's North .....	10
Toluol .....	11
Carbolic acid, crude (60 per cent.) .....	1/3 to 1/3½
Do. crystals (40 per cent.) .....	4½
Solvent naphtha (as in quality and package) ...	9½
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3
Pitch (f.o.b. east coast) .....	41/6 to 42/
Do. (f.a.s. west coast) .....	40/6 to 41/6
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

Sulphate of Ammonia.—Quiet but steady is as near as can be the state of the market. The tone is decidedly steadier in the north, though the actual business passing is almost microscopic. American advices are satisfactory, 3 04 dols. per 100 lb. now being quoted. Closing prompt prices are:—London (ordinary makes)..... £12/5  
Beckton (certain terms) .....

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]



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The *Colliery Guardian* is published at 2.30 p.m. on Friday, and includes the latest intelligence. The Annual Subscription is 24s.; but if paid in advance, 21s. In both cases the charge includes delivery free by post in the United Kingdom. Post free and prepaid to Foreign Countries, £1 7s. 6d.

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AND A LEGAL APPENDIX BY

**DOUGLAS KNOCKER, M.B., Barrister-at-Law.**

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\*\* For other Miscellaneous Advertisements see Last White Page.

## Forthcoming Annual Meetings.

International Geological Congress—

August 21, 1913 (Toronto)

North of England Institute of Mining and Mechanical

Engineers ... .. August 2, 1913

Manchester Geological and Mining Society—

October 14, 1913

Institution of Mining Engineers—

Sept. 24, 25 & 26, 1913 (Manchester)

Midland Institute of Mining, Civil and Mechanical

Engineers ... .. July 20, 1913

Midland Counties Institution of Engineers, Sept. 1913

South Staffordshire and Warwickshire Institute of

Mining Engineers ... .. October 20, 1913

## The Colliery Guardian.

LONDON, FRIDAY, JULY 11, 1913.

Last month the quantity of coal, coke and manufactured fuel exported from the United Kingdom was 6,266,908 tons, valued at £4,466,488, as compared with 5,916,432 tons, valued at £3,602,414, in June 1912, and 5,442,775 tons, valued at £3,045,853, in June 1911.

During the first half of the present year ending June 30 the aggregate quantity of exports reached 37,048,137 tons, valued at £25,839,252, as compared with 27,196,714 tons, valued at £17,126,514, and 32,808,385 tons, valued at £18,724,682, in the corresponding periods respectively of 1912 and 1911.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during June was 14s. 3'05d. per ton, as compared with 12s. 2'1d. in June 1912 and 11s. 2'3d. in June 1911.

The value during the first six completed months of the present year is 13s. 11'3d. per ton, as compared with 12s. 7'1d. and 11s. 4'3d.



respectively in the corresponding periods of 1912 and 1911.

The Court of Appeal, on Monday, concluded the hearing of an important case under the Workmen's Compensation Act. The question raised was whether, on an application to redeem an award, the employers could have it drawn up in such a form that they could take it up or not as they liked. The Master of the Rolls said that, if the arbitrator found that the incapacity was permanent, it was his duty to award such a lump sum as he thought was sufficient.

A subject that has excited much interest was broached last week in a question put by Mr. Duncan Millar to the Home Secretary. Mr. McKenna stated that the Lanarkshire owners had contended that the provision of smoke helmets fed with fresh air by a tube and bellows was a sufficient compliance with the requirements as to portable breathing apparatus. The Home Secretary said he was unable to accept this view, and the steps to be taken for enforcing the Home Office opinion are now under consideration.

The directors of the Lochgelly Iron and Coal Company Limited announce that a provisional agreement has been entered into with Robert Forrester and Co. Limited, for a community of interests.

The quarterly meeting of the Coal Conciliation Board for the Federated districts of England and Wales was held in London on the 4th inst. Amongst the questions discussed were the rearrangement of the list of collieries which are taken as the bases of rises and falls in prices, and the question of adjusting of the last increase in the Leicester district.

An adjourned meeting of Cleveland ironmasters was held this week at the offices of the Cleveland Ironmasters' Association, Middlesbrough, to consider the proposals laid before them at the instance of Messrs. Bolckow, Vaughan and Co. for forming a limited liability company for the sale and distribution of Cleveland pig iron. A committee was appointed to consider the matter further. A letter from some of the iron merchants particularly identified with the Cleveland iron trade was read, in which they said they viewed with much disfavour the rumours of the proposed alteration by the makers in their methods of distributing their iron.

In every case the regulations framed by the district chairmen under the Coal Mines (Minimum Wage) Act have now been in operation for 12 months. The South Wales miners have discussed the question of revisions with the owners, and the Northumberland Miners' Association has instructed its representatives to arrange a meeting with the owners at an early date. In Northumberland, the chief point at issue is the regulation requiring the men to attend six days in each week in order to qualify for the minimum.

On Wednesday, Mr. Stephen Walsh asked leave to bring in the Miners' Federation's Nationalisation Bill. The Speaker raised the preliminary point that the Bill inflicted charges upon the ratepayer, and therefore could not be introduced by a private member. The Bill, however, was read a first time.

Their Majesties the King and Queen have this week paid a visit to the industrial districts of South Lancashire. Yesterday they passed through Wigan and Bolton, and to-day (Friday) the new Gladstone Dock at Liverpool will be opened by the King. A knighthood was conferred upon Mr. William Scott Barrett, chairman of the Lancashire County Council and honorary treasurer of the Mining Association of Great Britain.

On Saturday last the members of the Midland Counties Institution of Engineers visited the new Coventry Colliery of the Warwickshire Coal Company.

A meeting of the South Wales Institute will be held on Thursday next at Cardiff.

At several of the Lancashire collieries agreements have been signed in regard to the wages of banksmen. A conference last week with reference to the wages of surface workers in West Yorkshire came to an abrupt termination, and trouble is threatened, as a ballot already taken has resulted in a large majority in favour of a strike.

The Royal Commission on Metalliferous Mines and Quarries have issued their report. It contains no recommendations, and merely covers the publication of evidence taken during the latter part of 1910.

The returns of the national ballot on the question of an eight-hours day for all industries are now in possession of the Parliamentary Committee of the Trade Union Congress. It has proved a total failure, very few of the members of the respective unions having recorded their votes.

Troubles that have arisen regarding the conditions under which colliery deputies are employed in Northumberland and Durham were referred to Mr. McKenna in an answer to Mr. Bowerman last week. The complaint had reference to a change introduced by the owners of some mines by which the work of timbering has been entrusted to another class of workmen. The Home Secretary said he was advised by the Chief Inspector that the new practice does not injure the safe working of the mines, but tends rather to increase safety by leaving deputies more time for their inspection and safety duties, and he refused to take any action in the matter.

On Thursday, the Court of Appeal dismissed the appeal of a workman employed by Messrs. Andrew Knowles and Sons Limited from the decision of a county court judge sitting as arbitrator under the Workmen's Compensation Act. The workman, who had contracted out of the provisions of the Act of 1897 under a scheme for five years, contended that after the expiration of that period, when there was no subsisting scheme, his rights against his employers under the Act of 1897 were revived. The Court held that when once the fund under the scheme was accepted in substitution for the employers' liability under the Act, the fund must remain liable. The workman had therefore no right whatever against the employers in respect of an accident which happened during the continuance of the scheme.

**The Royal Tour of Lancashire.**

ALTHOUGH the collieries of Lancashire are not directly associated with the programme of the visit with which the KING and QUEEN are now honoring the Royal Duchy of Lancaster, yet the important part which they play in the prosperity of the district must ever be present to their Majesties' minds.

In Lancashire practically every industry in the kingdom is notably represented: textile, iron and steel, chemical, and glass manufacture; railway, canal, dock, mechanical and electrical engineering. But, in our present state of knowledge, all these industries, without cheap coal, would be at a standstill, and, in fact, could never have developed. The great Lancashire coalfield has made all these developments possible, and its resources—if economically used—bid fair to provide the sinews of enterprise for many generations to come.

Much has been said and written regarding

the advance which has already been made in the employment of oil fuel as a substitute for coal, and also as to the possibilities of radium and other radio-active substances, in the future; but for all practical intents and purposes coal still holds the field in this country as the main source of energy for industry and commerce.

According to the Report of the Royal Commission on Coal Supplies, 4,238 million tons of available coal remained unworked in the Lancashire coalfield in the year 1904. The output of coal in this coalfield averages about 24 million tons per annum, so there is enough to last, at this rate of production, for some 182 years to come. The coal production of Lancashire before the construction of the Bridgewater Canal, which opened up communication with the Duke's pits at Worsley, was inconsiderable, and in 1854 only amounted to about 9 million tons. In 1864 the production was 11½ million tons; in 1874, 15½ million tons; in 1884, 20½ million tons; in 1894, 23 million tons; and in 1904 it was 24 million tons. Since 1904, up to and including 1911, the production has remained practically stationary, averaging 24 million tons per annum. This cessation of increase in production is to be accounted for, probably, by the greater economy exercised in the use of fuel rather than by any reduction in the amount of energy consumed in the various industries. In addition to the above quantity, the Royal Commission estimated that there existed in this area about 158 million tons of coal lying at depths exceeding 4,000 ft. below the surface, and further that there were, in all probability, vast quantities of unproved coal lying beneath the triassic and permian rocks which form the southern boundary of the exposed coalfield. Whether the depth at which these supplies may be found will be within the limits rendered available by the engineering skill of the future is a matter for conjecture.

A great downthrow fault, with about 1,000 yards displacement, forms the western boundary of the main Lancashire coalfield, and makes the search for accessible coal in this direction unpromising. The field of extension lies to the south of the main Lancashire coalfield under the newer formations which bound the visible coalfield, and part of this concealed area has already been proved by shafts and boreholes.

This strip of Lancashire lying east and west between Manchester and Liverpool forms the northern portion of what is known as the Cheshire basin. This region comprises the triassic area which lies between the North Staffordshire and Denbighshire coalfields, and is bounded on the north and north-east by the Lancashire and East Cheshire coalfields.\*

At Marston, near Northwich, about the centre of the Cheshire basin, a boring has shown that the red sandstone (Bunter) lies at a greater depth than 2,610 ft., so, even assuming that the coal measures underlie continuously throughout the basin, they would appear to be inaccessible in the central and southern regions.

Mr. STRAHAN divided the margins of the basin into three sections, and, basing his estimate upon the productive coal measures lying within 4,000 ft. of the surface, arrived at the following quantities, which are in addition to those given above:—

1. Unproved extension of the Lancashire and Denbighshire margins 34,000,000 tons.

2. Unproved extension on the west side of a fault which forms the western boundary of the Cheshire coalfield, after deducting 40 per cent., 72,500,000 tons.

\* Final Report of the Royal Commission on Coal Supplies, Part 9, Appendix 2 (Sub-report by A. Strahan).



Improved area lying between the Flintshire and the Lancashire coalfields, bounded on one side by a line drawn from Chester through Weston, and terminating in the other direction 2 miles short of Ormskirk, 2,880,000,000 tons.

These quantities together make a total of 2,986,500,000 tons, the greater part of which, when brought to the surface, would be within easy reach of the Lancashire industries.

Just as the collieries of Lancashire are indirectly associated with the programme of the royal tour, so the honour of knighthood conferred by the KING upon Mr. WILLIAM SCOTT BARRETT is a graceful though indirect recognition of the coal industry. The coalowners of Lancashire and of the country have for many years been represented by the Mining Association of Great Britain, of which body Sir WILLIAM has almost immemorially held the office of honorary treasurer, exercising considerable influence in his quiet unobtrusive way. We are sure that we are voicing the general feeling of the coal industry in offering the new knight our hearty congratulations and in wishing him a long enjoyment of the well-deserved honour. It is not so long ago that the well-known secretary of the association, Sir THOMAS R. RATCLIFFE-ELLIS, received a similar honour at the hand of the KING, and within the last few weeks it has been repeated in the case of one of its vice-presidents, Sir FRANK BRAIN.

#### Trade Summary.

The London coal market continues exceptionally quiet, especially for household qualities. The steam coal market is fairly firm, and prices are well maintained. The seaborne market is slow, and principally confined to contract coals. A few consignments of best Wallsend realised 21s. 6d. on the market, and seconds 20s. 6d. No Yorkshire on offer. Contract renewals are still at a deadlock, but collieries mostly prefer selling in the open market to breaking away from the recognised 1s. advance. Smalls have been selling freely, but the demand is not so strong. Public orders are increasing, and the depot trade is reported fairly satisfactory. Country orders are very slow.

The market at Newcastle has been without movement, there being a fairly steady demand for prompt shipment.

The Durham coal trade is unchanged, but the feeling in regard to the future is more cheerful.

The Royal visit has interfered with production in Lancashire. House coals are fairly steady. Shipping trade is weak, and slacks hang a little.

The West Yorkshire house coal trade is dull, but there is a fair enquiry for steam-raising and gas-making descriptions.

The South Yorkshire steam coal trade is steady, prices being fairly well maintained. House coals are quiet. Small coals are weaker, the coke market being dull.

There is not much call for Derbyshire house coal, but prices are firm, and fuel for manufacturing purposes continues in excellent request.

There have been increased enquiries at Cardiff, notably for secondary steam coals, but values are unaltered. Small coals are rather better. Monmouthshire coals are also firmer. House coals are easy.

Notwithstanding the strikes at the docks, the Scottish shipping trade has been active, and the general tone of the market is firmer.

**Grimsby Coal Exports.**—The official return of the quantity of coal exported from Grimsby during the week ended Friday, July 4, was as follows:—Foreign: To Aarhus, 3,178 tons; Ahus, 199; Antwerp, 535; Christiansund, 637; Dieppe, 1,280; Esbjerg, 500; Gefle, 2,340; Gothenburg, 3,999; Hamburg, 1,188; Malmo, 3,796; Otterlacken, 278; Pernau, 1,428; Riga, 1,120; Rotterdam, 455; Cimbrihamn, 745; Skien, 623; Stavanger, 753; and Ystad, 4,431; total, 27,485 tons, compared with 34,968 during the corresponding week last year. Coastal shipments of the week were nil.

**Commercial Motor Show at Olympia**—Much interest is being shown in the Commercial Vehicle Exhibition which opens at Olympia on Friday, July 18. The show, which has been organised by the Society of Motor Manufacturers and Traders, is under the patronage of H.M. the King, and will be opened by H.R.H. Prince Arthur of Connaught. The heavy motor vehicle is now competing for all classes of traffic, and the recent increases in railway rates have turned the eyes of many traders to this alternative mode of long-distance transport. Seventy-four firms will be exhibiting complete vehicles and coach work, while 63 will display various component parts and accessories now in such request. Tire and wheel manufacturers exhibiting are also numerous, and they and other incidental stallholders bring the number of exhibitors up to approximately 200.

The show remains open from 10 a.m. till 10 p.m. for the first five days, namely, from July 18 to July 26, the price of admission being 1s. The Imperial Motor Conference will be held concurrently.

#### LABOUR AND WAGES.

##### North of England.

The miners' representatives on the District Board for Northumberland under the Minimum Wage Act will meet the coalowners at the Coal Trade Offices, Neville-street, on Friday, 18th inst., for the consideration of amendments to the district rates. Notice of revision has been duly given by both employers and men. The men are dissatisfied with the rules which compel them to work full time before they are entitled to the minimum wage. It is stated that half the hewers in the county are unable to claim the minimum in consequence of the rule. The amendments to rules recommended by the owners and the men will be laid before Lord Mersey, the umpire for Northumberland under the Act, at a meeting to be held in Newcastle, on Monday, 21st inst.

The voting of Northumberland miners' lodges on matters discussed at the half-yearly council meeting has been made public. By a practically unanimous vote it was agreed to ask the employers to supply a better class of house coal; to add the county percentage to all minimum wages; to supply tools, explosives, &c., free to all workmen; to pay chargemen at the same rate as deputies; and to give an immediate answer to the men's proposals for remedying the grievances of night workers. It was also unanimously agreed that the present time is opportune for a vigorous attempt to reduce the hours and increase the wages of surface workers.

The voting of Northumberland Miners' Association on the proposal to pay strike pay to the men at Ferney Beds and Walbottle has been completed, the decision of the recent special council meeting in favour of doing so being endorsed in each case. The executive, however, has decided to take legal advice before making any payments, as they are doubtful as to whether the payments will come within the rules.

##### Federated Area.

At a meeting of the Lancashire and Cheshire Miners' Federation, held in Manchester on Saturday, it was reported that the strike at Pemberton Collieries, Wigan, had been settled. In this case, 33 non-unionists, the whole of the men outside the Federation, had joined the union, and the colliery restarted on Monday. After certain information had been given, it was decided that 14 days' notice should be given, also on the non-union question, at the whole of the Haydock Collieries, where 6,000 men are employed. The notices will date as from Monday last. On the question of bringing about a stoppage at the Maypole Colliery, near Wigan, where 2,000 men are employed, a ballot is to be taken forthwith, and a similar course will be taken in regard to the Hindley pits belonging to Messrs. Crompton and Shawcross. In the latter case about 5,000 men and boys will be affected. At a meeting at Pemberton last week, Mr. H. Twist said that, comparing the six months preceding with the six months following the national strike, the Lancashire and Cheshire Federation had saved £20,000.

The Goole coal-tippers and trimmers on Saturday voted on whether coal shipping should cease on Saturdays at 1 p.m. until 6 a.m. on Mondays, and the ballot resulted in 37 in favour of the proposed change and 78 against it. Both shipowners and men regarded the proposed change as likely to prejudice the interests of the port.

A meeting of the Notts District Mining Disputes Board, of which Mr. C. H. Williams is the independent chairman, was held at the Victoria Station Hotel, Nottingham, on Thursday, July 3, to consider matters in dispute at the Newstead, Teversall and Pinxton collieries, which had been referred to them by the Notts District Minimum Wage Board. The question considered was whether timberers, stone rippers and stablemen at the collieries concerned should be treated under section 8 or section 11 of the Act.

The fireclay workers in the South Staffordshire and North Worcestershire districts, who had been out on strike for five weeks, have resumed work.

The Coal Conciliation Board for the Federated mining districts in England and North Wales met at the Westminster Palace Hotel, London, last week, to consider the wage position in the Leicestershire coalfield under the Minimum Wage Act. Mr. F. J. Jones (Yorkshire), chairman, presided, with Mr. W. E. Harvey, M.P., in the vice-chair. The joint secretaries (Sir Thos. Ratcliffe-Ellis and Mr. Thos. Ashton) reported as to the difficulty which has arisen at the Leicestershire collieries with respect to the amount of the minimum wage to be paid to miners working on contract who fail to earn the wage. The independent chairman of the County Wage Board has fixed the minimum wage for coal-getters working on contract at 6s. 2d. per day. As this minimum was fixed when the wage was 50 per cent. on the standard, the coalowners of the county have taken it as representing a basis wage of 1888, and have reckoned the three advances of 5 per cent. which have since been made as equal to 2d. each, making the present minimum 6s. 8d. per day. The miners contend that the basis wage of 1888 in the county was 4s. 9d. per day, and that signed agreements exist to this effect. The resolutions of the English Coal Board granting the three advances of 5 per cent. state that the advance to men working on contract rates shall be on the basis wage of 1888, and on these figures the men contend that each advance amounts to 3d., and the present minimum wage should be 6s. 11d. The point in dispute is, therefore, the difference of 3d. between 6s. 8d. and 6s. 11d. as the minimum wage for those men who fail to earn their wage on the contract. The coalowners remain firm in standing by the decision of the independent chairman in fixing the minimum wage at 6s. 2d. plus the percentages on that basis. The men stand out for the basis wage of 4s. 9d. as the basis from which future advances shall be paid. The failure to effect an agree-

ment was reported, and the Board were not in a position to take any action. It is unlikely that any further action will be taken, as it only affects those workmen who have failed to earn the minimum wage, though it is one of the legacies of the Minimum Wage Act of last year. A resolution of sympathy was passed with Mr. Jas. Haslam, M.P., who is lying seriously ill at Chesterfield.

At the adjourned conference, held at Leeds on the 3rd inst., between the Yorkshire Miners' Association and the West Yorkshire coalowners for consideration of the West Yorkshire surfacemen's demand that they should be given the same conditions as have already been given to the surface workers in South Yorkshire. The coalowners declined to discuss the claims of the enginemen and firemen, on the ground that these had already been arranged with the West Yorkshire Enginemen's and Firemen's Association. They also declined to discuss the general demands in the presence of representatives of the National Engineers' and Firemen's Union. The miners' representatives insisted that the whole of the claims should be dealt with together, and, as neither side would give way, the meeting broke up without any discussion of the terms at all. Afterwards, the men had a meeting and decided that they had no alternative but to recommend the men to hand in their notices at the earliest possible moment.

A private consultation of Yorkshire Miners' Association officials was held at the Miners' Offices, Barnsley, on Wednesday. It may be added the council of the association will meet early next week.

A strike of 800 colliers at Lord Dudley's Baggeridge Colliery, Dudley, was on Saturday settled, all the men resuming work and accepting the firm's tonnage proposals.

The Lancashire coalowners and miners are leading the way for a pacific settlement of the question of surface workers' wages. In the Lancashire and Cheshire coalfield the wages of about 40 per cent. of the colliery surfacemen employed have been settled by mutual agreement between the coalowners and the workmen's representatives. The following is a signed price list which has been agreed to, and may be taken as typical of the county agreements which have been signed:—

Rates of wages agreed to be paid to boys, youths and men working on the pit banks, screens, &c., at the Bedford, West Leigh and Bickershaw Collieries:—

Age.		Rate per day.	
		s.	d.
13	to 14	.....	1 6
14	„ 14½	.....	1 7
14½	„ 15	.....	1 8
15	„ 15½	.....	1 10
15½	„ 16	.....	2 0
16	„ 16½	.....	2 2
16½	„ 17	.....	2 4
17	„ 17½	.....	2 6
17½	„ 18	.....	2 8
18	„ 18½	.....	2 10
18½	„ 19	.....	3 0
19	„ 19½	.....	3 2
19½	„ 20	.....	3 5
20	„ 20½	.....	3 8
20½	„ 21	.....	3 11
21	and over	.....	4 3

The above rates to be paid when wages are at 50 per cent. above the 1888 standard. Each advance or reduction of 5 per cent. in the rate of wages to mean an advance or reduction of 1d. per day for those of the age of 16½ years and under, and 2d. per day for those over 16½ years.

At any ordinary winding pit overtime is to be paid for after a nine hours shift.

Exemption from the above clause in respect of hours to be made in the case of sinking pits also when any tunnelling is immediately required for opening-out purposes to reach the seams of coal intended to be worked.

Cases of aged and infirm workmen and of workmen partially disabled by illness or accident, to be considered by the pit set committee in the same manner as similar cases coming under the Minimum Wage Act, 1912.

With wages at the present rate of 65 per cent. on the standard an addition of 3d. per day must be made to the wage of boys between the ages of 14½ and 16½, and of 6d. per day on the wages of all of 17 years and upwards in the agreement set out above. There is a reasonable prospect of nearly all the Lancashire coalowners falling into line.

##### Scotland.

On Monday the grain elevator and two coal hoists, which have been idle for some time in consequence of the strike of dockers at Leith Docks, were restarted. On the other hand, a number of railway checkers, who have continued working till now, stopped, and accordingly all railway traffic at the docks was brought to a standstill, and 2,000 workmen were thrown idle in Newtongrange district, as the Lothian Coal Company Limited, Newbattle, closed down their pits, and work will not be resumed till next Monday at the earliest. The Dalkeith pits of Messrs. Moore and Co. Limited, Glasgow, were closed, and at a number of the smaller mines work was also stopped. Ten thousand workmen were idle on Monday at 13 pits altogether. Some work was done at the Edinburgh Collieries Company at Carberry, and there, as at some other mines where a good land sale of coal is obtained, work will proceed intermittently.

Under the auspices of the Scottish Colliery Engine and Boilermen's Association a demonstration was held on Saturday at Hamilton in celebration of the inauguration of the statutory eight hours day for winding enginemen. Mr. Robert Shirkie, the association agent, moved the following resolution: "That this meeting resolves to press for an eight hours shift for all colliery enginemen and boiler firemen and a minimum wage of 6s. 6d. for winding enginemen and other classes



in proportion." The resolution was carried with acclamation.

#### Iron, Steel, and Engineering Trades.

A branch of the British Steel Smelters, Mill and Tinplate Workers' Association has been formed at Brymbo. There is an agitation for increased rates.

The sliding scale ascertainment governing blast-furnacemen's wages in Cumberland showing the cash price of pig iron to have averaged 77s. 3d. for the past quarter, wages are advanced 4½ per cent. on last quarter, and 9 per cent. on the corresponding quarter of last year, and now stand at 46½ per cent. above the standard.

On Monday a settlement was come to in the strike of metalworkers in the Midlands, at a conference between the Midland Employers' Federation and the Engineers' and Allied Trades Societies' Federation, under the presidency of Sir George Askwith, as a result of which an agreement was reached granting men in Birmingham, Smethwick, and Oldbury, the 23s. minimum asked for, and 22s. in the Black Country, the latter to be increased to 23s. six months after work is resumed. Other concessions also are made. Two long conferences, on Thursday and Friday of last week, both attended by Sir George Askwith, showed that an amicable arrangement was not impossible, and over the week-end a hopeful spirit prevailed. Both sides have had to make concessions, but the men have gained their minimum and many other important considerations.

The agreement has, however, been accepted with much hostility by the pieceworkers in the tube trade, whilst at Cradley Heath and Dudley the boilermakers have refused to return to work.

After being idle a little over a week, the Darlaston nut and bolt workers, numbering about 4,000, including men and women, on Monday resumed work on the terms offered them by the employers—namely, a minimum wage of 23s. weekly for unskilled workers, with a promise that the application for an advance of 10 per cent. to pieceworkers shall be considered after work has been resumed, on the understanding that any revision of prices shall not take effect for six months.

The average net selling price of No. 3 g.m.b. Cleveland pig iron for the three months ending June 30 last has been certified at 63s. 7½d. per ton, as compared with 63s. 5½d. for the previous quarter. There was thus an advance of 1½d. in the second quarter of the year. This means an advance in blastfurnacemen's wages of 0.25 per cent., raising wages from 39.25 per cent. above the standard to 39.50 per cent. above the standard.

#### The General Eight-Hours Day.

The full returns of the national ballot on the question of an eight-hour day for all industries are now in possession of the Parliamentary Committee of the Trade Union Congress. Circulars were issued to unions with an aggregate membership of over two millions, but the replies received have been of a disappointing character. The gross membership of the unions taking the trouble to vote falls far short of half-a-million, and in each case the actual number of men taking part in the ballot represents a very small proportion of the total membership of the society concerned. In the Boilermakers' Society, for instance, not more than one-twelfth of the members voted, and this is typical of the other unions, with the exception of one or two of the textile unions.

#### South Yorks Coalfield: Colliery to be Sunk at Cantley

The brief announcement made recently foreshadowing another new pit for the Doncaster district, as the result of the acquiring of the lease of the coal at Cantley by a well-known colliery proprietor, has proved to be substantially correct. It has now transpired that Sir A. B. Markham, Bart., M.P., has taken over from Earl Fitzwilliam the lease of the coal under his lordship's estates in Cantley and Armthorpe, and also the lease which the Corporation of Doncaster granted his lordship of the coal under Sandall Beat and the Doncaster Race Common, which lands adjoin his own estate. As far back as April 1908 the Doncaster Corporation leased to Earl Fitzwilliam all the coal underlying their Sandall Beat and Townmoor estates. Boring operations took place, it is true, but the result of these remained a profound secret until the publication of Dr. Gibson's memoir. Sir Arthur is well known as being keenly interested in the Brodsworth and Bullcroft collieries, as well as other local pits. The area to be dealt with comprises, we understand, between 7,000 and 10,000 acres, of which about 1,500 acres are under land the property of the Doncaster Corporation. The fact that the coal under the historic race common of Doncaster will be worked by this colliery is a most interesting circumstance. It is stated that the coal underlying the race common and the adjoining lands belonging to the Corporation represents a total value in royalties to the ratepayers of the borough of some £450,000. When the coal was leased to Earl Fitzwilliam by the Corporation the agreement formed the subject of a Local Government Board enquiry, and was subsequently approved by the Board of Trade. As to sinking, it is understood preliminary arrangements are to be put in hand at an early date; as to the exact site, definite information is, at the moment, not forthcoming. In this connection, however, it may be recalled that at the Local Government Board enquiry the town clerk told the inspector that the borehole had been put down within a distance of 1,200 yards from the South Yorkshire Joint Railway, and that a clause in the agreement stipulated that the shaft should be sunk within that limit. The object of this was that the lessees should not put down a shaft a couple of miles away and so delay the working of the Corporation's coal. The Doncaster racecourse, being such a valuable and productive municipal asset, the Corporation had not been slow to safeguard the town's interests. While the lease comprises the coal under the race common, it does not apply to any land within 300 yards of the race stands. There is also a proviso that the coal under any portion of the common is to be worked according to the method which the Corporation's mining engineer may deem best. The lease is for 60 years. It is believed the shafts will be sunk near the village of Armthorpe; in any case it is said they are not likely to be far removed from Sandall Beat Woods.

#### LAW INTELLIGENCE.

##### SCOTTISH COURT OF SESSION.

##### OUTER HOUSE.—May 9.

Before Lord DEWAR.

#### Cannel from a "Bing": Another Strike Contract.

**Edinburgh Collieries Company Limited v. J. and W. Wood Limited.**—This was an action in which the Edinburgh Collieries Company Limited, 29, St. Andrew-square, Edinburgh, sued Messrs. James and William Wood Limited, 28, Royal Exchange-square, for £1,289 6s. 11d., being the contract price of 1,010 tons of cannel coal delivered to the defenders' order in March 1912. The defence was that a material proportion of the coal delivered was disconform to contract, and the defenders maintained, founding upon the Sale of Goods Act, that they were entitled to set off against the pursuers' claim the sum of £392 12s. 3d., being the amount of loss sustained by them in respect of the defective material supplied.

The Lord Ordinary granted decree for the sum sued for, less certain sums paid to account and less £300. The defenders were found entitled to expenses. His lordship said that on March 19, 1912, the defenders purchased 500 tons of cannel coal at 20s. per ton, to be delivered from a bing standing at the pursuers' Carberry Colliery, and on March 20 they purchased the balance of the bing, which amounted to 510 tons, at 23s. 6d. The bing had been standing at the colliery for 10 or 15 years. The pursuers had been unable to sell it because cannel coal had now largely ceased to be used for producing gas, and it was not ordinarily used for heating and household purposes. But during the coal strike in the spring of 1912 the pursuers found a ready sale for this bing, in which there were originally about 40,000 tons. It was a condition of the contract that the pursuers should deliver the coal free on rail from the colliery to the defenders' customers as it could be lifted from the bing. When the coal reached the defenders' customers they all, without exception, complained of the quality delivered. On the top there was cannel coal of good quality, but underneath, in every case, there was a large deposit of gum or very small dross. The pursuers maintained that as the defenders had purchased the coal ex bing they were bound to accept the material as it came from the bing whatever the quality might be. The proportion of gum to cannel coal was ascertained to be nearly 25 per cent. The pursuers, his lordship thought, took a wrong view of their rights and obligations under their contracts, but they acted throughout in a perfectly honest and straightforward manner. The defenders argued that, according to the custom of the coal trade, dross and gum was invariably screened or separated from the large coal in fulfilling an order for "coal"; that having failed to screen the coal and having tendered a material in large quantities which was not in point of fact cannel coal, the pursuers were in breach of their contract. The pursuers replied that the wagons did not in fact contain gum from soft coal, as was alleged; even if they did that, this gum came from the bing; that there was no obligation on them to screen or separate, particularly during a coal strike, and that it was not, in any event, customary to screen cannel coal. His lordship was of opinion, on the evidence, that the defenders' contention was well founded and that they had succeeded in establishing their defence to the action. It was, of course, impossible to estimate accurately what price might have been realised if the defenders had kept the whole consignments in their hands—he thought if they had done so they might have sold it to better advantage than their customers did—but, taking everything into consideration, he had reached the conclusion that the total loss sustained by the defenders through the pursuers' breach of contract might, in the circumstances, be fairly estimated at £300.

#### LANCASHIRE CHANCERY COURT.—July 1.

Before Vice-Chancellor STEWART-SMITH, K.C.

#### Pollution by Pit Water.

**Laburnum Spinning Company and Others v. Hulton Colliery Company.**—This was an action for an injunction against the Hulton Colliery Company Limited, brought by six large spinning and manufacturing concerns, to restrain the defendants from causing pollution to a stream and so damaging their business. The stream in question, it was stated, was one of the tributaries of the Mersey, and the action was concerned with it for a space of about six miles from its source, in the region of Leigh and Atherton. All the plaintiffs were riparian owners. The defendants were the proprietors of a considerable number of collieries in the neighbourhood of the source of the stream, and for many years had pumped water from the pits into the stream in which the plaintiffs had rights. No complaint was made of that. What was complained of was that they had also put into the stream—particularly since July 1911—noxious and objectionable matter, which had caused the plaintiffs considerable damage. In sinking the Pretoria Pits, the defendants came across water which was admittedly of a noxious character, and which was pumped into the stream. An action was begun by the Atherton Spinning Company to restrain the defendants from polluting the water. It was said, however, to be a temporary difficulty caused by the

sinking operations, and the action was compromised. Matters so remained till just before July 1911, when the water again became of a noxious character. It was charged with an ochreous deposit which made the stream red, and other deposits. The polluted water turned into the stream had a ruinous effect upon the boilers in the plaintiffs' works, shortening their lives by considerably more than 50 per cent.

The defendants admitted pollution and claimed no prescriptive right in that matter, but said they were doing their level best to put matters straight. The defendants were laying down a plant (all of which had been delivered), at a cost of £2,000, known as Mather and Platt's softening plant, which—they were assured by people who had had experience—would absolutely take out the iron from the water and soften it, and reduce it to a condition no worse than it had been from these collieries for 150 years. Further than that, the water complained of might be stored in a reservoir week by week, treated and sent down the stream on Saturday and Sunday, when the plaintiffs were not using water.

Eventually a settlement was arrived at. The order declared that the defendants had wrongfully polluted the stream, and that the plaintiffs were each entitled to an injunction. The defendants undertook to give the plaintiffs access to the pipes and conduits which conveyed the water from different parts of their premises into the stream, with liberty to any of them at the expiration of three calendar months to apply for an injunction if so advised. Enquiries to be taken as to the amount of damages suffered by the plaintiffs, the defendants to pay the costs.

#### CONTINENTAL MINING NOTES.

##### Belgium.

The following table shows the exports and imports of fuel during May and the five months ended therewith:—

	May.	January-May	
	1913.	1912.	1913.
	Tons.	Tons.	Tons.
Exports—			
Coal .....	418,661 ...	2,051,833 ...	1,952,476
Coke .....	90,441 ...	385,716 ...	423,092
Briquettes .....	54,349 ...	287,675 ...	216,618
Imports—			
Coal .....	677,339 ...	3,232,351 ...	3,821,198
Coke .....	92,927 ...	370,540 ...	535,789
Briquettes .....	54,972 ...	166,215 ...	201,107

##### France.

The Rhenish-Westphalian Coal Syndicate propose to establish in France a branch similar to that in existence at Antwerp.

The Budget Commission of the Chamber of Deputies propose that M. Thomas's proposition to levy a tax on colliery profits shall be adhered to, but that the amount be reduced from 50 to 25 centimes.

At Oignies, in the Pas-de-Calais, on June 22, a monument to Madame De Clercq was unveiled to commemorate the discovery of coal in the region. This occurred in 1846. Up to the present 450,000,000 tons of coal have been extracted from the basin, the annual output now being about 22,000,000 tons. The companies have created 765 kiloms. of railway, utilising 250,000-horse power, and have built 33,000 workmen's dwellings and furnish employment to nearly 100,000 workers, to whom 150 million francs are paid in wages, whilst 10 million francs are paid direct to the State in taxation.

During the five months ended with May there were imported into France 7,543,700 tons of coal (as against 5,708,100 tons in the corresponding period of 1912); 1,389,800 tons of coke (1,086,500 tons), and 439,900 tons of briquettes (447,900 tons). Exports in the same period included 583,299 tons of coal (929,194 tons), 97,021 tons of coke (67,618 tons), and 74,091 tons of briquettes (87,662 tons). The imports included 4,744,100 tons of British coal (as against 3,011,300 tons last year), 1,899,700 tons of Belgian coal (1,397,600 tons), and 1,272,300 tons of German coal (1,298,800 tons).

##### Germany.

**Coal Syndicate Report for May.**—The total coal raised amounted to 3,256,608 tons (7,990,369 tons in May 1912), being 340,479 tons (319,615 tons) per working day. Calculated distribution 6,754,536 tons (6,478,817 tons), being 278,538 tons (259,153 tons) per working day, or 105.73 per cent. (98.66 per cent.) of the participation. Total coal distribution of the syndicated pits 8,315,657 tons (7,973,910 tons), or 342,914 tons (318,956 tons) per working day. Deliveries, including local sales, miners' house coal and supplies to pits' own ironworks:—Coal 5,260,897 tons (5,274,614 tons), or 216,944 tons (210,985 tons) per working day; coke 1,755,286 tons (1,561,774 tons), or 57,590 tons (50,380 tons) per working day; briquettes 375,850 tons (346,289 tons), or 15,499 tons (13,852 tons) per working day.

**Official Coal Prices, Essen Exchange.**—Gas and open-burning coals: Gas coal, through-and-through, 12.50-14.50 marks per ton ex pit; gas-flaming coal, through-and-through, 12.25-13.25 marks; open-burning coal through-and-through, 11.50-12 marks; large coal 14-15.50 marks; semi-screened, 13.50-14.50 marks; washed nuts, I./II./III., 14.25-15 marks, IV. 13.75-14.50 marks; nuts slack, 0-20/30 mm., 9-10 marks, 0-50/60 mm.,



12-25 marks; slack, 8-10-75 marks. Bituminous coals: Through-and-through, 12-12-75 marks; best mixed, 13-50 marks; large, 14-14-50 marks; washed nuts, I./II./III., 14-25-15 marks; IV., 13-75-14-50 marks; coking coal, 13-25-14 marks. Lean coals: Through-and-through, 11-25-12-75 marks; mixed, 11-25-13-25; improved, 13-25-14-75 marks (according to proportion of large); large, 13-75-16-25 marks; washed nuts I./II., 15-75-19 marks; III., 16-50-20 marks; IV., 12-25-14-75 marks; anthracite nuts I., 20-50-22 marks; II., 22-26 marks; through-and-through slack, 10-25-11-25 marks; slack below 10 mm., 7-25-10 marks. Coke: Blastfurnace coke, 16-50-18-50 marks; foundry coke, 19-21 marks; broken coke I. and II., 21-24 marks. Briquettes, 18-50-15 marks.

**Syndicate and Export Bounty.**—A circular has been addressed to customers of the Coal Syndicate notifying them that from October 1 next a bonus of 1-50 marks per ton will be paid in respect of all coal (obtained from the Syndicate) which can be proved to have been consumed in the preparation of iron material intended for export.

**Coal Market in Upper Silesia.**—The great activity of this market shows no diminution, and delivery specifications demonstrate the extensive character and probable continuance of the demand. Considerable delay is experienced in getting water-borne coals away, owing to the difficulties resulting from the low state of the river. The consumption of large, cube, small, slack and dust in all industrial branches remains unabated; and small consumers of house coal have been clamouring for supplies. Large consignments of gas coal have been sent out both by rail and water. The demand for coking coal is very active, and, although there are no arrears, there is little surplus. In the export markets, Russia's requirements are large, and Austria-Hungary would take far more than it is possible to supply.

**Miners' Wages.**—The wages per shift of miners of all grades in the various Prussian coalfields during the first quarter of 1913 were as follows:—Upper Silesia, 3-59 marks; Ruhr (North), 5-33 marks; Ruhr (South), 5-12 marks; Saar, 4-46 marks. For the entire year 1912 the average wages per shift were 3-64 marks, 5-08 marks, 4-86 marks and 4-22 marks, the average annual wages in Upper Silesia amounting to 1,053 marks, in the Ruhr coalfield to 1,586 marks, and in the Saar coalfield to 1,251 marks. These figures are exclusive of the cost of tools, oil and explosives and the insurance charges.

**Exports and Imports of Fuel.**—The following table shows the exports and imports of fuel in May and the five months ended therewith:—

	May.		Jan.-May, 1913.	Increase or decrease.
	1912.	1913.		
Exports—	Tons.	Tons.	Tons.	Tons.
Coal .....	2,480,522	2,288,587	13,687,651	+ 149,809
Lignite .....	4,172	3,093	26,073	+ 2,949
Coke .....	512,026	596,424	2,863,838	+ 600,036
Coal briquettes .....	193,907	202,171	1,023,580	+ 154,513
Lignite ditto .....	37,084	61,034	374,660	+ 146,947
Imports—				
Coal .....	882,846	952,624	4,071,183	+ 1,073,426
Lignite .....	503,825	528,573	2,911,166	+ 23,146
Coke .....	48,767	53,036	235,150	+ 14,448
Coal briquettes .....	3,372	1,713	9,033	+ 13,114
Lignite ditto .....	7,399	7,620	51,869	+ 1,365

In May, 832,496 tons of coal were imported from the United Kingdom, as compared with 794,773 tons, and in the five months 3,527,124 tons, an increase of 1,078,176 tons. In May, the exports of German coal to Belgium declined by 65,000 tons, and those to Austria-Hungary by 317,000 tons. Amongst the increases were France (20,000 tons), Italy (45,000 tons), Netherlands (77,000 tons), Sweden (10,000 tons), Spain (12,000 tons) and Egypt (12,000 tons).

**Output of Fuel.**—The following shows the output of various descriptions of fuel in May and the five months ended therewith:—

	May.		May-June.	
	1912.	1913.	1912.	1913.
Coal .....	14,734,098	14,268,674	66,938,122	73,414,129
Lignite .....	6,742,672	6,865,488	27,137,136	28,309,207
Coke .....	2,378,226	2,673,104	11,376,863	13,266,336
Coal briquettes .....	438,477	451,087	2,044,311	2,365,154
Lignite do. ....	1,389,169	1,710,005	6,407,057	7,146,051

Taking all classes of fuel, the consumption in May comprised 12,051,638 tons of coal (including coke and briquettes) and 7,269,216 tons of lignite fuel; the consumption in the five months amounting to 63,721,755 tons and 37,187,883 tons (increases of 6,257,324 tons and 1,477,183 tons respectively).

**Hamburg Coal Trade.**—Mr. H. W. Heidmann, of Hamburg, writes: The imports of coal into Hamburg have been in June:—

From	1913.	1912.
	Tons.	Tons.
Northumberland and Durham...	230,762	354,668
Yorkshire, Derbyshire, &c. ....	65,499	60,037
Scotland .....	114,244	133,228
Wales .....	9,499	6,297
Coke .....	—	697
Total .....	420,004	554,927

The plans for the new colliery village at Comrie Castle, Fife, the property of the Coltness Coal and Iron Company, show 300 houses. The space set apart is 34 acres, giving 12 acres to the acre. Four of the houses are of the type with scullery, and 386 are one room, colliery houses. Gardens will be provided, also wharf and curling pond. It is probable that a school will be erected for young unmarried miners.

## THE LONDON COAL TRADE.

THURSDAY, JULY 10.

The London coal trade for the past week has shown very little movement as regards prices or tonnage. The high prices asked by the various collieries prevent any considerable amount of speculative buying, and, on the other hand, colliery representatives report that they are pledged by the district decisions not to take less than the minimum summer contract prices, so that for the time being the market transactions are very feeble. The new contract arrangements commence from July 1, and whilst the actual consumption is so small, the whole of the consignments are going into stock, and many of the large buyers are waiting for favourable opportunities to buy "spot lots" for putting into stock, and are refraining from closing with the usual contract quantities in the hope that some of the districts will take less, and so break through the recognised understanding of 1s. advance on last year's prices. As, however, so many contracts have already been settled at the 1s. advance, and one by one others are falling into line, there is very little prospect of the collieries giving way, especially as it would mean that in common fairness to those who have already settled, the collieries would have to yield the reduction in case of giving way to the few remaining unsettled. The growing feeling on the market now is that the bulk of the collieries will be content to work with only the relatively few contracts made, and so have more coal for open sale in the winter. Some of the Warwickshire and Leicestershire collieries, who have been hampered by very heavy stocks, have unloaded a good many trucks recently at very low prices, and this has been considered by many as a sign of a weaker state of the market, but even these special sales have been restricted to immediate clearance, and in no case has it affected forward quotations. Taken as a whole, the general public have bought more freely this year than in former years, and merchants who have entered into obligations to deliver the summer stocks to householders during the holiday months of August and September may find themselves in a very difficult position as the autumn approaches, especially as it is generally understood that prices will advance earlier than usual on account of the improvement in the trade returns throughout the country. Shipping trade has not been so good of late, and prices have fallen, but the demand is still fairly strong, and very few of the Yorkshire collieries are able to quote at competitive prices for the London market. Manufacturing coals are still maintaining their price, and the volume of trade is increasing. The large customers, principally railway companies, are showing a stronger disposition to buy more freely. The attendance on the market during the week has not been very large, only on Monday can the exchange be said to have been fairly full. The seaborne market continues very quiet, but very little is available for the open market. Twenty-four cargoes were reported as arriving in the Thames for Monday's market, and nine for Wednesday (mostly under contract), the bulk of the vessels being loaded with gas coals or smalls. A few parcels of Durham coal were on offer and fetched 21s. 6d. for best Wallsend and 20s. 6d. for seconds. No Yorkshire qualities were on offer. The inland market is suffering most, on account of the stern refusal of so many of the merchants to buy at present prices. Steam coal is in fair demand and prices are well maintained, but the conditions are not quite so favourable as a month or two ago. The holiday season, as a rule, tends to diminish the work at the various factories, and stocktaking at the end of the half-year often interrupts deliveries at many of the works, but there is still a good deal of activity and forward buying is steadily progressing.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/6	13/6
Do. nuts .....	12/6	12/6
Birley cube Silkstone .....	12/	12/
Do. branch coal .....	15/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	12/6	12/6
West Riding Silkstone .....	12/	12/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	11/	11/
New Sharlston Wallsend .....	14/	14/
Wharfedale Silkstone coal .....	14/	14/
Do. Flockton Main .....	13/6	13/6
Do. Athersley house coal .....	11/6	11/6
Newton Chambers best Silkstone .....	15/	15/
Do. Grange best Silkstone .....	14/	14/
Do. Hesley Silkstone .....	13/	13/
Do. Rockingham selected .....	13/6	13/6
Do. Rockingham Silkstone .....	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best .....	11/	11/
Do. large nuts .....	10/9	10/9
Do. small nuts .....	10/	10/
Do. kitchen coal .....	9/6	9/6
West Hallam Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Do. London brights .....	10/	10/
Do. bright nuts .....	9/6	9/6
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Shipley do. brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Mapperley brights .....	11/	11/
Do. hard steam .....	10/9	10/9
Cossall Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Trowell Moor brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Grassmoor Main coal .....	12/6	12/6
Do. Tupton .....	11/	11/
Do. do. nuts .....	12/	12/

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal .....	12/6	12/6
Do. do. cubes .....	12/	12/
Do. special Derbys .....	11/9	11/9
Do. house coal .....	11/	11/
Pilsley best blackshale .....	12/6	12/6
Do. deep house coal .....	10/6	10/6
Do. hard screened cobbles .....	10/	10/
Hardwick best Silkstone .....	12/6	12/6
Do. Cavendish brights .....	11/6	11/6
Do. cubes .....	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/	12/
Do. small hards .....	11/	11/
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	12/	12/
Do. cobbles .....	12/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/	14/
Bestwood hard steam coal .....	12/	12/
Do. bright cobbles .....	11/3	11/3
Hucknall Torkard main hards .....	12/3	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. ....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/	12/
Do. hard steam .....	10/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/9	11/9
<b>Warwickshire.</b>		
Griff large steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	11/	11/
Do. loco Two Yard hards .....	14/	14/
Do. Ryder nuts .....	11/6	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Haunchwood steam .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Exhall Ell coal spires .....	12/6	12/6
Do. large steam coal .....	10/9	10/9
<b>Leicestershire.</b>		
Snibston steam .....	10/6	10/6
Do. cobbles .....	10/3	10/3
Do. nuts .....	10/6	10/6
South Leicesters steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/6	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	17/	17/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	10/	10/
Do. large nuts .....	10/	10/
Do. bakers' nuts .....	9/6	9/6
Do. Main nuts .....	10/	10/
Do. hards .....	9/6	9/6
Granville New Pit cobbles .....	11/6	11/6
Do. Old Pit cobbles .....	10/6	10/6
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/6	13/6
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	15/	15/
Do. cobbles .....	14/	14/
Apedale best .....	13/6	13/6
Do. seconds .....	13/	13/
Podmore Hall best .....	13/6	13/6
Do. seconds .....	13/	13/
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London		
Do. brights .....	13/	13/
Do. shallow one way .....	12/	12/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	11/	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/	12/
Do. one way .....	12/	12/
Do. shallow coal .....	12/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles .....	12/	12/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/	11/

### From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, July 4.—The seaborne house coal market continued quiet to-day, no cargoes on offer. Cargoes 19.

Monday, July 7.—The seaborne house coal market was quiet to-day. A sale of Durham house was reported at 21s. 6d. and 20s. 6d., but no Yorkshire was on offer. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 24.

Wednesday, July 9.—The seaborne house coal market was very quiet to-day, with no cargoes on offer. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 9.

**South Wales Institute of Engineers.**—A meeting will be held on Thursday next, when the following papers will be discussed:—"Underground Conveying," by Mr. Sam Mavor; "Recording Instruments for the Scientific Control of Iron, Steel and Tin-plate Works," by Mr. Sidney B. Haslam.



A NEW PROTECTOR FOR PIT PONIES.

Messrs. the Pongard Pit Pony Cap Company, Back Queen-street, Barnsley, have just placed on the market a head protector for pit ponies, a photograph of which we give herewith.

This hood, known as the "Pongard" eye and head shield, for which Messrs. Legard and Son, Barnsley, are the sole agents, is made out of one solid piece of the best harness leather, and when completed with the bridle weighs only 2½ lb., it is strong, and is designed to fit the natural shape of the head.

The advantage of its being made out of one piece of leather, as will be seen from the illustration, is that it cannot wear out or become useless so soon as caps which have eye-shields attached, by the breaking of stitches, through the continual rubbing against the roof of the pit. Whilst the eye is completely protected, it has perfect freedom of sight, there being no object to cross the line of vision; it also has perfect ventilation, ¾ in.



parating the eye from the shield, thus allowing the r to pass freely up and around the ears.

Another advantage of this hood is that it can be tached without much trouble to the bridle at present use. It can also be made of various shapes and signs to suit different workings and temperatures of e pit.

H.M. INSPECTORS OF MINES.

As several important alterations have recently been de in the Home Office staff of inspectors and, in the angement of the divisions, we print below, through e courtesy of the Home Office, a list, corrected to ne 1913, showing the present constitution of the ff. It may be observed that the Northumberland d Durham districts have now, on the retirement of . J. B. Atkinson, been amalgamated, this having, of rse, been contemplated from the first. The names l addresses of the sub-inspectors of quarries and the pectors of horses also are now available.

ef Inspector of Mines: R. A. S. RED-  
AYNE, Esq., C.B.  
ctrical Inspector of Mines: ROBERT  
ELSON, Esq.  
vate Secretary to Chief Inspector:  
RANVILLE POOLE, Esq.  
retary to the Board for Mining  
aminations: W. W. WARE, Esq.

Home Office,  
Whitehall,  
London.

[1] Inspector; [2] Senior Inspector; [3] Junior Inspector;  
[4] Sub-Inspector of Mines; [5] Sub-Inspector of Quarries;  
[6] Inspector of Horses.

Scotland Division, comprising the whole of Scotland.

W. WALKER, Esq., Tyne Lodge, Grange Loan, Edinburgh.  
R. McLAREN, Esq., Drumclair House, Airdrie, near Glasgow; K. G. M. PRICHARD, Esq., Braemont, Liberton, Edinburgh.  
J. MASTERTON, Esq., 72, St. Leonards Road, Ayr; A. H. STAELE, Esq., 5, Talbot Terrace, Scotstounhill, Glasgow; W. E. T. HARTLEY, Esq., 5, Pitt Terrace, Stirling; J. A. S. RITSON, Esq., 5, Marchmont Road, Edinburgh; H. J. HUMPHREYS, Esq., Canmore Street, Dunfermline.  
P. McILHENNY, Esq., 130, Almada Street, Hamilton; W. LOUDON, Esq., Aerial Bank, Hunter Street, Dunfermline; T. MEEK, Esq., Kilmarnock; G. RANKIN, Esq., Edinburgh.  
L. R. SOWERBY, Glasgow.  
A. McARTHUR, 17, Hillside Street, Edinburgh.

northern Division, comprising Northumberland, Dur- am, Cumberland, Westmoreland, the North Riding of orkshire, the detached part of North Lancashire, and e Isle of Man.

J. R. R. WILSON, Esq., Westfield Drive, Gosforth, Newcastle-on-Tyne.  
F. H. WYNNE, Esq.  
W. LECK, Esq., Cleator Moor, Cumberland; W. J. CHARLTON, Esq., 32, Western Hill, Durham; L. CLIVE, Esq., 2, Pimlico, Durham; T. ASHLEY, Esq., 4, Sanderson Road, Jesmond, Newcastle-on-Tyne; DOUGLAS HAY, Esq., Abbey View, South Street, Durham; H. T. FOSTER, Esq., 25, Queen's Terrace, Newcastle-on-Tyne; G. COOK, Esq., Oakbank, Whitehaven.

(4) W. WAINWRIGHT, Esq., 6, Fieldhouse Terrace, Western Hill, Durham; W. BROWN, Esq., 45, Stanton Street, Westgate Road, Newcastle-on-Tyne; W. GOODIN, Esq., 11, Emerald Street, Saltburn-by-the-Sea; T. BROWN, Newcastle-on-Tyne.  
(5) R. W. BALL, Esq., Newcastle-on-Tyne.  
(6) R. L. LAYFIELD, Esq., 7, Flass Street, Durham.

3. York and North Midland Division, comprising East and West Ridings of Yorkshire, and the counties of Lincoln, Nottingham, and Derby (north of the River Trent).

(1) T. H. MOTTRAM, Esq., Doncaster.  
(2) C. L. ROBINSON, Esq., The Knolls, Wedgewood Grove, Roundhay, Leeds; H. A. ABBOTT, Esq., 18, Priory Road, Sharrow, Sheffield.  
(3) J. MELLORS, Esq., 14, St. John's North, Wakefield; H. M. HUDSPETH, Esq., 3, Imperial Crescent, Doncaster; E. H. FRAZER, Esq., 24, Caledon Road, Sherwood, Nottingham; C. D. MOTTRAM, Esq., 81, Rustlings Road, Sheffield; A. L. FLINT, Esq., 25, Hilton Road, Harehills, Leeds; HERBERT DANBY, Esq., 13, Victoria Crescent, Doncaster.  
(4) H. J. BURDEN, Esq., 72, Dodworth Road, Barnsley; J. HOBSON, Esq., 25, Inglewood Terrace, Leeds; J. GAWTHROPE, Esq., 45, Junction Road, Sheffield; J. HALL, Esq.  
(5) S. H. LOMAS, Esq., 80, Sharrow Lane, Sheffield.  
(6) R. BAXTER, Esq., 6, Guest Road, Sheffield.

4. Lancashire, North Wales and Ireland Division.

(a)\* Manchester and Ireland District, comprising part of Lancashire (namely, so much of the county as is not included in No. 2 Division and the Liverpool and North Wales District), and Ireland.  
(1) JOHN GERRARD, Esq., Worsley, Manchester.  
(3) G. B. HARRISON, Esq., Shamrock, Worsley Road, Swinton, Manchester; F. N. SIDDALL, Esq., 18, Albert Road, Bolton.  
(4) J. DUNCAN, Esq., 123, Willows Lane, Accrington.  
(5) O. JONES, Esq.  
(6) D. MORRIS, Esq., 232, Wigan Road, Bryn, Wigan.  
(b)\* Liverpool and North Wales District, comprising South-West Lancashire, part of Chester (namely, so much of the county as is not included in No. 6 Division), Anglesey, Carnarvon, Denbigh, Flint, Merioneth, and Montgomery.  
(1) A. D. NICHOLSON, Esq., Elmsley Road, Mossley Hill, Liverpool.  
(2) D. H. P. MATHEWS, Esq., Hoole, Chester; G. J. WILLIAMS, Esq., Coed Menai, Bangor.  
(3) O. R. JONES, Esq., Glan Seiont, Carnarvon; W. H. MURRAY, Esq., Cairndhu, Queen's Drive, Mossley Hill, Liverpool.  
(4) R. W. CORLESS, Esq., 191A, Downall Green Road, Brynn, near Wigan; W. ROBERTS, Esq., Newton-le-Willows; RHYS WILLIAMS, Esq., 2, Garfield Terrace, Garth Road, Bangor.  
(5)  
(6) D. MORRIS, Esq., 232, Wigan Road, Bryn, Wigan.

5. South Wales Division, comprising Brecon, Cardigan, Carmarthen, Glamorgan, Pembroke, Radnor, and Monmouth.

(1) W. N. ATKINSON, Esq., I.S.O., LL.D., 123, Cathedral Road, Cardiff.  
(2) J. DYER LEWIS, Esq., 2, St. Helen's Crescent, Swansea; F. N. WHITE, Esq., 30, Stow Park Avenue, Newport, Monmouth; A. PEARSON, Esq., Llandaff.  
(3) J. M. CAREY, Esq., Caerlon, Newport, Monmouth; T. GREENLAND DAVIES, Esq., 128, Westbourne Road, Penarth, Cardiff; J. S. FOOT, Esq., Bridgend, Glamorgan; E. S. REES, Esq., 23, Marlborough Road, Cardiff; P. T. JENKINS, Esq., Newport, Monmouth.  
(4) W. J. OWEN, Esq., 66, College Hill, Llanelly; P. D. DAVIES, Esq., 37, Station Road, Llandaff, North, Cardiff; R. MORGANS, Esq., 20, Windsor Road, Newport, Mon.; T. WALDIN, Esq., Hill Side, Mount Pleasant, Neath.  
(5) W. J. STEPHENS, Esq., 80, Brunswick Street, Canton, Cardiff.  
(6) T. L. EVANS, Esq., Westgate, Quarella Road, Bridgend, Glam.

6. Midland and Southern Division, comprising Bedford, Berks, Buckingham, Cambridge, part of Chester, Cornwall, Derby (south of the River Trent), Devon, Dorset, Essex, Gloucester, Hants, Hereford, Hertford, Huntingdon, Kent, Leicester, Middlesex, Norfolk, Northampton, Oxford, Rutland, Salop, Somerset, Stafford, Suffolk, Surrey, Sussex, Warwick, Wilts, and Worcester.

(1) HUGH JOHNSTONE, Esq., 3, Priory Road, Edgbaston, Birmingham.  
(2) W. SAINT, Esq., Glentworth, Stafford; H. WALKER, Esq., Walden, Widcombe Hill, Bath.  
(3) W. H. HEPPLEWHITE, Esq., Chestnut House, Kettlebrook Road, Tamworth; J. R. FELTON, Esq., 298, Pershore Road, Birmingham; T. BOYDELL, Esq., 7, Treyew Road, Truro; P. S. LEA, Esq., 296, Pershore Road, Edgbaston, Birmingham; (one vacancy).  
(4) T. H. BULL, Esq., 172, Lower Chaplin Road, Longton, Stoke-on-Trent; H. MORGAN, Esq., 14, Castle Street, Dudley; E. ROWLEY, Esq., Bristol.  
(5) RICHARD KING, Esq., Ranelagh Road, St. Austell; T. R. REES, Esq., Birmingham.  
(6) J. EVANS, Esq., 56, Hugh Road, Smallheath, Birmingham.

\* The amalgamation of the Manchester and Ireland and Liverpool and North Wales Districts to form the Lancashire, North Wales and Ireland Division is postponed for the present.

† Including the parishes of Hesketh-with-Becconsall, Tarleton, Croston, Eccleston, Standish, Wigan, Winwick and Warrington, and all parishes to the west thereof.

‡ Including the parishes of Church Lawton, Odd Rode, and Wildboarclough, and the portion of Cheshire situated on the east side of North Staffordshire Railway, from Mow Cop Station to North Rode Station, and south of the North Staffordshire Railway from North Rode Station to Rushton Station.

Rainfall Statistics.—Messrs. John Davis and Son (Derby) Limited, All Saints Works, Derby, send us the following statistics of rainfall:—

	Derby.		Duffield.		Average for Derby 1884-1904 inclusive.
	In.	No. of rainy days.	In.	No. of rainy days.	
January .....	4.16	20	3.65	22	2.13
February .....	0.97	11	1.10	14	1.57
March .....	4.01	23	4.17	27	1.67
April .....	3.38	18	3.05	20	1.78
May .....	1.84	14	2.10	16	2.02
June .....	1.45	11	1.24	10	2.10
Total .....	15.81	97	15.31	109	11.27

THE CONCEALED COALFIELD OF YORKSHIRE AND NOTTINGHAMSHIRE.\*

By WALCOT GIBSON, D.Sc.

(Concluded from page 32).

Limits of the Basin.

As previously mentioned, the original sheet of horizontal or gently-inclined coal measures was compressed by the pre-permian movements into an elongated basin, of which one edge forms the boundary of the visible coalfield on the west; but the rest of the basin, except small parts of the northern and southern margins, is concealed under the permian and triassic formations. The probable form and extent of the concealed part of the basin-fold was fully and critically discussed in a stimulating report by Prof. P. F. Kendall.† Since 1905 much additional information has been obtained from the borings described in this memoir, and it is now intended to state how far the boundaries of the concealed areas suggested by Prof. Kendall are confirmed or modified by these later explorations.

Southern Boundary.—On the map accompanying the report of 1905, the southern limit of the coalfield, as considered by Prof. Kendall, is indicated by a line extending from the outcrop of the millstone grits west of the Erewash Valley to within 5 miles south of the boring at Ruddington, and is thence continued to the south-east for many miles to the borders of the Fen Country. This extension was regarded by the Commissioners (op. cit., p. 3) as "too hypothetical," and the limit was fixed at an east and west line, drawn about 2 miles south of the Owthorpe boring.

At this date the boring at Clipston had not been commenced; and of the section of coal measures proved at Owthorpe only the first 244 ft. had been made public. It has been previously stated that the increased thickness of the millstone grits in the Ruddington boring as compared with their development in the Derwent Valley supports the view of their further extension to the south-east, and that the carboniferous formation is not dying away south as it is at the northern end of the Leicestershire coalfield.

The thickness of coal measures proved at Owthorpe amounted to 963 ft. Several coals exceeding 2 ft. in thickness were passed through, and one near the bottom is recorded as being 4 ft. 8 in. thick. An examination of the cores showed that the rocks belong to the middle coal measures and that, if not horizontal, the inclination was very slight. Unless the measures turned up sharply to the south, the southern limit will therefore extend some distance beyond the limit assigned in the report.

In the boring at Clipston, the inclination of the coal measures was also very slight, and since 1,135 ft. of coal measures were proved in the boring, the southern limit of the coalfield would approximate, if it does not actually coincide, with that adopted by Prof. Kendall for this part of the area.

The coalfield, therefore, extends for some distance south of Owthorpe, but without further data it is not possible to fix its southern boundary except on the general lines suggested by Prof. Kendall.

Northern Boundary.—On the northern margin of the visible coalfield, the coal measures, as previously stated, rise against an anticline which brings the millstone grits to the surface. This anticline, of which the axis is directed nearly due east, can be traced along the valley of the Wharfe up to the outcrop of the discordant magnesian limestone. Inliers of millstone grits occur east of Thorne, and, on the evidence obtained in a boring, they are considered to extend immediately beneath the magnesian limestone to near Tadcaster; but to the east of Tadcaster all traces of the solid formations are lost sight of beneath the drift and alluvium of the Vale of York, and though a few borings have reached triassic rocks they have not penetrated the bunter division.

The Wharfe anticline, if it extends across the Vale of York, would form the northern boundary of the concealed coalfield. According to Clifton Ward (Report of the Commissioners relating to Coal, 1871, pp. 505-7) it does not; while Prof. Kendall considers that it does form a boundary.

Clifton Ward based his contention on the structure of the exposed carboniferous rocks between the Wharfe and Harrogate. In his evidence he stated that "the general dip of the millstone grit beds is not south but east or north, or something between them. Nor is there, as far as I have seen at present, anything like a great axis of the older limestone rocks coming across the millstone grit series and abutting against the magnesian limestone." After noting that the principal direction

\* From a Memoir of the Geological Survey, England and Wales.  
† "Final Report of the Royal Commission on Coal Supplies," pt. ix., 1905, pp. 18-35, with plates.



The main faults was along the northern margin of the coalfield, he continued by pointing out that "in the neighbourhood of Leeds there is a band of large faults running north-east and south-west, almost precisely in the direction of the Harrogate anticlinal." From this he inferred that the continuation of the Yorkshire coalfield will also be in a north-easterly direction. The alteration in the strike of the carboniferous rocks is, he suggested, comparable with that accompanying the Don faults. It may here be added that at the southern end of the Derbyshire coalfield a parallel instance of the deflection of an east-and-west fold has been previously cited.

The dissentient opinion of Prof. Kendall depends upon the significance to be attached to the structures observable in the Jurassic rocks around Market Weighton on the east side of the Vale of York. With regard to the Wharfe anticline, he remarks that "if the assumed axis of the fold and the actual boundary of the coal measures be projected forward, they strike the Chalk Wolds on the crown of one of the most remarkable anticlines in the whole country . . . the first fact which will arrest attention when the strata at the fold of the Wolds escarpment are examined is the enormous hiatus in the Secondary Series, the chalk resting directly on the lower lias, so that the whole of the Neocomian Series, the oolites, and the upper, middle and a portion of the lower lias are missing." After a critical discussion of the evidence, Prof. Kendall concludes: "The facts and arguments which I have stated seem to me to point conclusively to the occurrence of an anticline of pre-permian date extending across the Vale of York and forming the northern boundary of the coalfield." He therefore considers that the northern limit of the coalfield lies about 4 miles north of the recent boring at Selby. At the site of this boring 3,000 ft. of coal measures are estimated to exist between the magnesian limestone and the millstone grits. Therefore, to allow the millstone grits to abut against the magnesian limestone 4 miles north of Selby they must rise at the rate of the 1 in 7 (8 degs.). But at Selby the coal measures are nearly if not quite horizontal. Thus, unless they turn up rapidly they will stretch beyond the projected line of the Wharfe axis.

At Selby the evidence for or against an easterly extension of the Wharfe anticline is not conclusive; but whatever significance is to be attached to the hiatus in the later mesozoic rocks near Market Weighton, the increase in the thickness of the permian rocks in the boring compared with that at Carlton and Thorne, their gentle inclination both in the boring and along the outcrop where it crosses the Wharfe anticline, show that they, at any rate, were not influenced by the later elevatory movements. The main structures of the coalfield, as before insisted on, originated and were stereotyped before the commencement of the magnesian limestone period, and if sometimes modified, they were never much affected by the post-permian disturbances.

Since the slightly older or simultaneously-formed east-and-west fold has in many cases been deflected by the north-and-south (Pennine) disturbance, it is possible, as suggested by Clifton Ward, that the coal measures extend across the Vale of York in a north-easterly direction. The evidence of the Selby boring certainly favours this suggestion; but it is not directly opposed to the extension of the Wharfe anticline eastward beneath the concealed outcrops of the permian and triassic rocks. It is, however, evident that the revival of the elevatory movement did not take place until comparatively late mesozoic times since the permian and triassic rocks were not affected by it; nor was the uplift accompanied by the powerful folding and faulting of the strata which gave the coalfield its main structural outline. The alignment of the Market Weighton disturbance with the Wharfe anticline is certainly remarkable, and indicates a much later renewal of a movement having the same direction as that of pre-permian date. But there is this difference: the Market Weighton anticline did not come under the influence of a powerful impulse from the east, which was the stronger and determining factor in post-carboniferous but pre-permian times. The northern boundary of the coalfield therefore depends on whether the Wharfe anticline is or is not deflected to the north-east by the Pennine movement.

*The Eastern Boundary.*—The Report for 1871 places the boundary of the concealed coalfield at 2 or 3 miles east of the Trent. This boundary line runs parallel to the river between Nottingham and Amcott and roughly coincides with the outcrop of the lower lias. In the later Report (1905) it is suggested that the margin lies near the outcrop of the lower cretaceous rocks, 20 to 30 miles east of the Trent.

Both opinions were based on broad generalisations: the smaller extension was suggested by Green on the "assumption" that the concealed area approached in size

that of the visible coalfield; the liberal increase allotted by Prof. Kendall and accepted by the Commissioners in 1905 was granted partly on the interpretation of the evidence afforded by the coal measure sequence in the borings at Thurgarton, South Scarle, and Haxey, but particularly on the supposition that folds in the newer formations indicate the position of folds in the carboniferous rocks. Since 1905 the evidence obtained in a boring near Kelham,  $1\frac{1}{2}$  miles west of Newark, shows that the limit assigned in 1871 is nearer the truth in the south; while the depth to the Barnsley coal in the boring at Thorne, 11 miles north-east of Doncaster, does not favour an extension of the coalfield for more than a few miles east of the Trent in the north. In Nottinghamshire, at any rate, and probably in South Yorkshire, a great reduction must be made in the estimates of 1905. A possibility of a reduction in the estimates was indeed implied in the following qualifying statement by the Geological Committee:—"With regard to the eastern extension of the coalfield advocated by Prof. Kendall, though we feel some reluctance to admit so large an increase in our estimates for ground of which so little is known, we admit that the eastern limit as drawn by him is the only line for which evidence exists, and we therefore accept it."

The eastern boundary suggested by Prof. Kendall is drawn at a line about 6 miles from the axis of an anticline which, extending in a north-easterly direction, affects the chalk and lower cretaceous rocks from the Wash through Willoughby and Alford to Louth. On cumulative rather than any positive evidence, this anticline is regarded as a posthumous fold repeated upon a crest in the deep-seated carboniferous rocks. On this interpretation it is considered that the lower coal measures rise to the east and abut against the newer formation near Tealby, about 20 miles east of the Trent. An alternative view is expressed that the fold in the carboniferous rocks is not a posthumous one and the coal measures may extend to and beyond the coast of Lincolnshire.

The axis of the supposed fold in the carboniferous rocks is considered by Prof. Kendall to lie between Haxey and Arksey (Bentley) and a "good deal to the east of South Scarle." The Thorne boring is therefore situated near to or on the assumed axis: Kelham lies 12 miles south-west of Scarle.

Since in the Thurgarton boring  $5\frac{1}{2}$  miles south-west of Kelham, the magnesian limestone rests on a considerable thickness (524 ft.) of Upper coal measures, at Kelham a greater, and at Scarle a still greater amount should occur, unless the measures flatten very rapidly on approaching the supposed axis. However, at Kelham the magnesian limestone rests on middle coal measures. It appears, therefore that the axis of the syncline instead of lying to the east of South Scarle is situated to the west of Kelham and possibly a little west of Thurgarton.

To bring the lower coal measures into their position at Kelham the measures must rise to the north-east of Thurgarton at the rate of 1 in 15 (4 degs.). The same rate and direction brings the lower coal measures against the magnesian limestone at South Scarle.

As the carboniferous floor of the permian rocks slopes east at the rate of 1 in 57 between Kelham and South Scarle, it follows that the margin of the basin is reached within a mile or two east of Kelham; and that if upper coal measures are present at South Scarle they are introduced by another fold between which and the extension of the Nottinghamshire coalfield there intervenes a tract of millstone grits or of lower carboniferous rocks. It is possible that Kelham lies on the upthrow of a large fault and that a large downthrow fault may exist between it and South Scarle. This does not affect the general conclusion that to the north-east of Thurgarton the coal measures do not extend uninterruptedly with a gentle fall to and beyond South Scarle in the direction of the Willoughby-Louth anticline; but they were affected by one, and possibly more than one, powerful disturbance of which the newer formations do not show any indication either in the form of folding or faulting.

In the Thorne boring the Barnsley coal was penetrated at a depth of 2,736 ft. below Ordnance Datum, or 885 ft. lower than in the shafts of Bentley Colliery, 10 miles to the south-west. This is considerably less than the depth would be if calculated from the dip of 2 degs. observable in the workings of Bentley Colliery. The dip either decreases rapidly north-east of Bentley until the beds are horizontal, or the dip gradually diminishes and the strata rise in the direction of Thorne.

After a correction was made for a deviation of the hole from verticality, a dip of 2 or 3 degrees was observed in the cores at Thorne. Its direction was not ascertained, but the fact of the measures being inclined at all suggests that the axis of the basin lies between

Bentley and Thorne and the measures are rising to east. If the rise amounts to only 2 degs., and on the assumption that the permian rocks descend at the same rate east of Thorne as they do to the west, a boring situated near the Trent at Amcott, 10 miles east of Thorne, would reach the coal measures at about 1,700 ft. below the Barnsley coal, and the millstone grits would rise against the magnesian limestone within 1 and 2 miles east of the Trent. A boring near Crosby, 1 mile south-east of Amcott, and in which it has been stated\* coal measures were reached, should go far to prove the position of the eastern margin of the coalfield as suggested by the evidence of the Thorne boring.

#### Shaft Sections and Borings.

The sites of the shafts and borings have been chosen generally with a view of exporting the coal. South of Nottingham several attempts have been made to find workable seams on the route nearest to London; in a central region, between Nottingham and Gainsborough, a large area has been proved by shafts along the western margin of the concealed coalfield, and by borings near the navigable Trent; but the most active development is found in the north, around Doncaster, where transit by rail and water especially favours an export trade.

A record of the various sinkings and borings follows.

\* Rep. Brit. Assoc. for 1910 (1911), Sheffield Meeting, p. 609.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

#### MINERS' NYSTAGMUS.

SIR,—Your correspondent, Mr. Theodore Schontheil, in his letter in your esteemed journal of last week, states that, whilst he does not doubt my authority as regards the construction of oil lamps, I show a deplorable ignorance of facts respecting electric lamps. He apparently bases this statement upon his knowledge of the working for only *twelve* months of 2,000 of what he terms, "most up-to-date electric lamps." All I can say is that he has got a "bad time in store" when, after more experience, he finds that the figures upon which he has based his statement as regards the low cost of electric lamps are "all at sea."

Another point which should not be overlooked is that the 2,000-lamp installation is not a proper criterion upon which to base figures of cost applicable to the average installations in use in this country, which usually only run up to a few hundred lamps. With these small average installations the skilled labour, &c., necessary for electric lamp installations runs out particularly heavy. We were told by the manager of a large Lancashire colliery, who have been running 100 electric lamps for the last twelve months, that their costs were amounting to 7d. per lamp per week. A firm may not guarantee their cells for longer than nine months and quote prices varying from 7s. to 8s. 6d. each for these new cells; taking it at its best and assuming that the accumulator will last twelve months, this entails an expenditure of  $1\frac{1}{2}$ d. to 2d. per lamp per week. For the bulbs, they may charge in the neighbourhood of 12s. 6d. per dozen, which is practically a shilling each; many bulbs, by well-known makers, tested at our works whilst the lamp has been quite *stationary*, have not had a life of more than 200 hours; even doubling this and taking 500 hours as the number of hours burning, it would make the cost run out at about 1d. per lamp per week for bulbs. The capital outlay on an electric lamp installation will run out at from 17s. to 20s. per lamp, and judging by the condition of lamps we have seen in use and to meet possible changes in the development of electric lamps, I should think three years would be ample in which to "depreciate" this out, equalling again  $1\frac{1}{2}$ d. per lamp per week, so that so far, without including labour, the figures above mentioned amount to 4d. to  $4\frac{1}{2}$ d. per lamp per week; other things in connection with the lamp, such as protecting glasses and general repairs, will also add a goodly sum to these figures; and as regards cleaning labour, this will certainly cost more for the general manipulation of the lamps, as an electric lamp takes at least double the handling in regard to cleaning than an oil lamp does. This system also requires double storage space as compared with oil lamps—in fact the cleaning of oil lamps is a mere "bagatelle" compared with all the above-mentioned operations. So that it is pretty obvious that the general cost of cleaning and handling of electric



lamps must be considerably more than oil lamps, and seeing that every penny per lamp per week added to the cost means 4s. 4d. per lamp per year, which on a thousand lamps means £216 13s. 4d. per annum, so that the increased cost of electric lamps at a big colliery may easily mean £1,000 or more added to their (the colliery) expenses, and even at a small colliery may mean an increase equal to, say, the manager's salary or the salary of several other officials, and may easily equal, say, the whole insurance of the Workmen's Compensation benefit. Judging by the difficulty that oil lamp makers have in getting a fractional increase per lamp per week from colliery firms over and above the low rate which is now charged for the maintenance of oil lamp installations, I think that the electric lamp makers will have, if they are going to hold their trade after they have gone through the list of what are in many cases evidently "interested" patrons, to show more benefits from the electric lamp than they do at present if they are to get orders from the general mining men.

Perhaps Mr. Theodore Schontheil has overlooked the fact that the electric lamp makers brought enormous pressure to bear on the Home Office to reduce the standard candle-power under the new regulations to 0.6 of a candle; evidently they (the lamp makers) realised the impossibility of constantly maintaining a high candle-power in a "practicable" portable electric miner's lamp.

As to Mr. Schontheil's statement about oil lamps flickering, while there is, he states, no diminution of candle-power in the electric lamp, this to me seems a very strange statement, as it is common knowledge that the bulb of a portable electric lamp must be made to suit the highest initial voltage at the commencement of the shift, the voltage called for by the bulb (excepting for an ordinary diminution of candle-power brought about by wear and tear), remains the same at the end of the shift as it did at the commencement, but at the end of the shift the voltage of accumulators (as at present on the market), has dropped considerably, and therefore the candle power from, say, a 2.5-candle power bulb, running on a battery which has dropped to, say, 2 volts or less, is part way through the shift very much reduced and, unlike the oil lamp, the point quickly arrives in an electric lamp where the light goes down with a *big drop*, whereas, as proved by independent parties, the drop in candle-power of oil lamps up to after 10 hours is exceedingly small, and if the lamp be fitted with a snuffer so as to trim the wick the fall in the lighting power of a well-designed oil lamp is practically imperceptible; in some tests we have carried out, using a new electric bulb and a new battery, we find that at the end of one hour the candle-power had dropped 13½ per cent, at the end of six and a-half hours the candle-power had dropped 26½ per cent., and at the end of 10 hours the candle-power had dropped 34 per cent. The battery in this instance was not impeded in its work by any absorbent, the acid being quite free to circulate amongst the plates; it is well known that a battery having glass-wool or other absorbent has a greater drop still. No doubt when an accumulator has had some months of wear in which the paste has become soft, the drop in candle-power will be much greater than in the tests we carried out.

As regards the bearing "nystagmus" may have on miners' lamps, Dr. Llewellyn refers in his book to the report from Mr. Wood, of Murton Colliery, to the effect that he had seen no signs of nystagmus in his pit; evidently this was not to the credit of the electric lamps, lamps identical with those in use in his pit only give an average of 0.44-candle power.

I am of opinion that one very prominent factor in connection with the "nystagmus" has been overlooked by the various writers, and that is, the effect on the eyes of miners by attending the cinematograph entertainments, many of which in mining towns are not given by the best of machines; and in fact, in reply to enquiries I have made, it seems to be a very common thing for men who are receiving compensation to spend a lot of their time at cinematograph shows.

Professors of mining, who have been for the last year or two devoting special attention to instructing miners in the reading of gas caps, realise that their work would be thrown to the winds; the supplying of a miner with an electric lamp would destroy the intelligent application of the knowledge they have sought to bestow upon the miner. For my part, I have looked forward to the tension of this knowledge as being one of the greatest factors in the reduction of pit disasters in the future, and I contend that it is a retrograde step to take from the miners such a valuable detector as the miner's oil lamp. In some cases the stallman has been told off to look in his oil lamp at intervals of, say, an hour to test

for gas. One of the first objects in life of a stallman is to get out as much coal as possible; is it therefore likely that he will satisfactorily carry out such a task? Furthermore, the light from an electric lamp is, irrespective of its candle-power, of a harder nature than that of the oil lamp, and I submit that it is unlikely that he would allow sufficient time to elapse after taking up the oil lamp to get his eyes accustomed to the condition of affairs to see properly—particularly the lower gas caps—and he might quite innocently and ignorantly report "no gas" when, if using ordinary lamps under ordinary conditions, it (the "cap") would be easily visible to him.

I also contend that sufficient stress is not laid upon the possibility of igniting gas from an electric lamp. Several authorities have demonstrated beyond dispute that the breaking of the electric bulb of a lamp may cause an explosion. Some of the devices which have been put on the market by electric lamp makers to overcome this are quite amusing in their innocence, especially the one in which the breaking of the entire glass is supposed to switch off the current. If the designer had had much experience in the fractures of miners' lamp glasses, he would have seen that it is the odd chance in a thousand that the entire glass is broken, and therefore it is an equally odd chance for his switch-gear to operate in such manner. In some tests which the writer carried out he was able to keep the filament of the bulb *incandescent* after the bulb glass had been shattered; this was apparently because the gas was somewhat rich, but in passing through the layer from the full rich to the lesser rich the explosive point was passed and the gas ignited. E. A. HAILWOOD.

Morley, July 1, 1913.

[This letter has been considerably condensed.—Ed. C.G.]

#### SIR WILLIAM SCOTT BARRETT.

The honour of knighthood which his Majesty the King this week conferred upon Mr. William Scott Barrett, the chairman of the Lancashire County Council, in the course of his itinerary in Lancashire, is one that will evoke genuine pleasure in the coal trade. The new knight, who is intimately connected with coalmining in South Lancashire, has for many years—as honorary treasurer of the Mining Association of Great Britain—taken a prominent part in what may be termed the administrative side of the industry. At the same time, his capacity has been freely recognised in other channels of public life, and, without doubt, this new honour is mainly due to his services in the chair of the important body that controls the affairs of the great duchy.

A Yorkshireman by birth, Sir William Scott Barrett has spent the greater part of his life in the County Palatine, and for nearly forty years he has been a resident of Blundellsands. He was born at Leeds on November 28, 1843, the son of the late Mr. John Chalk Barrett, a well-known flax spinner and colliery owner, of Harewood, Leeds, and was educated at Leeds Grammar School and Liverpool College.

Several years ago Sir William was appointed a Deputy Lieutenant for Lancashire, and he is also a county magistrate, a position he has held for a lengthy period. He is the chairman of the Lancashire County Council, the Standing Joint Committee, the West Derby County Quarter Sessions, the David Lewis Northern Hospital, and of the governors of the Merchant Taylors' Schools.

Sir William Scott Barrett gave evidence before the Royal Commission on Coal Supplies in regard to the export trade of Lancashire, and his services have frequently been enlisted on all questions affecting the commercial side of the coal trade.

It may be of interest to state that Sir William's father, the late Mr. John Chalk Barrett, was one of the original proprietors of the *Colliery Guardian*, the first meeting of which was held at the offices of the secretary, the late Mr. Maskell Peace, at Wigan, on November 23, 1860. That association is one that has been maintained without interruption by his son.

**The Trade Boards Act.**—Memoranda in reference to the working of the Trade Boards Act have been issued in the form of a White Paper. It is believed that there are about 200,000 persons engaged in the trades at present within the scope of the Act, of whom about 70 per cent. are women and girls. Officers have been appointed by the Board of Trade for the purpose of investigating complaints and otherwise securing the proper observance of the Act. Proceedings have been taken against employers in four cases in which breaches of the Act have been brought to the notice of the Board of Trade, and in each case a conviction was obtained.

#### BOOK NOTICES.

**A Dictionary of Applied Chemistry.** By Sir EDWARD THORPE, C.B., LL.D., F.R.S. Vol. 4. (Oilstone to Soda Nitrate.) London: Longmans, Green and Co. £2 5s.

Perhaps a satisfactory method of reviewing, for a mining journal, a book such as this dictionary, that makes an appeal to so many and such varied industries, is to quote from its pages such paragraphs as may appear to have some direct bearing upon mining.

In the present instance there is no fear of such a "review" becoming of inordinate length, for a careful study of the volume has failed to discover more than two paragraphs that can be regarded as possessing more than general interest to mining engineers.

Both these paragraphs appear in an article on "oxygen." On page 42, in dealing with the question of spontaneous combustion, it is stated that: "The allegation that the ignition of coal is due to the oxidation of pyrites has been disproved by the work of Richters and Lewes, who have shown that the heat is generated by the absorption of oxygen and its action on the bituminous constituents of coal."

This statement is incorrect. Richter's work shows that atmospheric oxidation of the coal substance itself generates heat, which, if loss be prevented, may be sufficient to raise the coal to its ignition temperature; but it does not prove that the oxidation of pyrites may not be a contributory cause of the spontaneous ignition of coal. We are not aware of any work done by Lewes on this branch of the subject, but neither he nor Richters have shown that it is the bituminous constituents of coal *par excellence* that are acted upon by atmospheric oxygen—the exact nature of the reaction that takes place between the oxygen and the coal is at present unknown.

The second paragraph that we would quote deals with the physiological action of oxygen (p. 43). We are told that: "In the pure state it may be inhaled for a time with impunity, and acts as a mild tonic or exhilarant. But its long-continued respiration is harmful, feverishness and weakness being produced; and it becomes poisonous if breathed under pressure."

There are useful articles of general interest on paraffin, petroleum, pyrometry, &c.; but text-books dealing with each such subject in detail—written in many cases by the author of the corresponding article in the dictionary—can be obtained at low cost.

There is no reference to photometry—a subject of growing importance in many industries.

**The War against Bribery.** By R. M. LEONARD. 44 pp. 5½ in. by 8½ in. London: The Secret Commissions and Bribery Prevention League. Price 6d.

This pamphlet gives a short history of the subject from a legislative and judicial standpoint, and outlines the aims and achievements of the League, under the Prevention of Corruption Act, which came into force in 1907. This body came into being in 1908, and has done much useful work, not so much by instituting proceedings, but in the more excellent direction of stirring up sleeping consciences to a higher standard of business morality. The League now agitate that the Act should be amended so as to remove the necessity for obtaining the *fiat* of the Attorney-General before a prosecution can be begun.

**Smoke Abatement and City Smoke Ordinances.** (Bull. 49, U. S. Bureau of Mines.) By SAMUEL B. FLAGG. 57 pp., 6 in. by 9 in. Washington: Government Printing Office.

It is a well-known fact that municipal authorities in the United States are apparently more exacting on the subject of smoke abatement than British corporations; not only are regulations in force and penalties inflicted to discourage the emission of black smoke from chimneys, &c., but in several instances the consumption of soft coal is prohibited. The results of a study of these ordinances are contained in this *Bulletin*, and the most important conclusion is that "smoke abatement by ordinance cannot hope to succeed unless supported by public sentiment, and that a smoke ordinance should look to future prevention rather than to immediate prohibition." In other words, strict control of furnace construction offers much greater hope for smoke abatement than the desultory imposition of severe penalties on the escape of "dense" or "black" smoke. It is interesting to know that the fuel tests carried out by the Bureau are already having practical effect in this direction.

Of the 28 cities having over 200,000 population, it was found that five were making practically no effort toward smoke abatement, but in three of these fuel oil is being used extensively. The Chicago Ordinance provides for the approval of all power plants, and it is said that the campaign has been more successful here than in any



American city, because the problem has been solved from the engineering standpoint. In many cases the ordinances seem to have proved defective in securing the object for which they were introduced, whilst many of them are, in Mr. Flagg's opinion, incapable of being upheld in the law courts.

**Stock Exchanges Ten-Year Record of Prices and Dividends.** Compiled by FREDC. C. MATHIESON AND SONS 1903-1912. 472 pp., 7 in. by 10½ in. London: Fredc. C. Mathieson and Sons and Effingham Wilson.

The scope of this useful annual is sufficiently described in the title. The tables give in each case the highest and lowest quotations and dividends paid in each year and the present capitalisations. A vast number of companies is dealt with in about 50 separate sections, whilst the alphabetical index gives further assistance.

**Richesses Minérales de Madagascar.** By D. LEVAT. Paris: H. Dunod and E. Pinat. xvi. + 360 pp.; 155 figs. and one coloured map, 6½ in. by 10 in. Price 15 fr.

In 1910-11 M. Levat was instructed by the French Minister of the Colonies to conduct the investigation the results of which are contained in this memoir. It deals mainly with the gold deposits in the central plateau of the island and the petroliferous areas on the west coast, and some interesting geological questions are discussed. The other mineral products of Madagascar include precious stones, graphite, radium ores and copper. In his concluding chapter, the author discusses the labour problem and the legislation necessary in order to establish a mining industry on a proper basis; without descending to great enthusiasm, M. Levat considers that the colony has a future as a mineral producer.

Coal, it may be mentioned, was discovered by Capt. Colcanap in 1906 in the Mahafaly neighbourhood. M. Levat has discovered fossil remains which lead him to associate these deposits with the Karoo and Gondwana formations, and it has been concluded that they extend the whole length of the island under the great band of triassic sandstone. In 1911, State reserves were created at Janapera and Ambohibatn, and small seams have been located in both. M. Levat now advocates deep borings of from 500 to 600 metres at Ankaramy and other places.

**Kelly's Customs Tariffs of the World.** xiii. + 1,099 pp. 9 in. by 10½ in. London: Kelly's Directories Limited.

This book at one time formed part of the Merchants' Directory. Its arrangement is so simple, that with the help of the general index and of those given at the commencement of the different countries, the duty on a particular article levied by any particular country can be ascertained in a moment. In the present volume, new tariffs, among others, have been added for Costa Rica, Salvador, Panama, Libya (Tripoli and Cyrenaica).

**The Law Relating to National Insurance.** By J. H. WATTS. vii. + 664 pp. 6 in. by 10 in. Price 2s. 6d. London: Stevens and Sons.

The National Insurance Act has produced a deluge of explanatory literature, and we shall not say that it has not its justification. Mr. Watts' work, however, is the most comprehensive treatise on the subject that has come to our notice. In his introduction he gives a general idea of the scope of the Act, and incorporates extracts from many of the pamphlets and "official explanatory leaflets" issued by the Insurance Commissioners. This is followed by the annotated text of the Act, whilst the remainder—a good half—of the book is taken up with appendices containing regulations, rules, orders, &c., issued by the Insurance Commissioners and the Board of Trade, as well as the actuarial memoranda upon which the Bill was based. The whole is supplemented by an excellent index.

**The Oil Shales of the Lothians.** By R. G. CARRUTHERS, W. CALDWELL and R. D. STEUART. Second edition. 199 pp.; 83 figs. and a geological map. 6 in. by 9½ in. Edinburgh: Geological Survey of Scotland. Price 2s. 6d.

The first edition of this memoir was exhausted in 1911, and a reproduction is justified by the extended interest now being taken in oil fuel supplies. The present issue contains three parts—the first, on "The Geology of the Oil Shale Fields," by R. G. Carruthers, is based upon the work of H. M. Cadell and J. S. Grant Wilson; whilst, in the second, W. Caldwell deals with "Methods of Working the Oil Shales"; and, in the third, R. D. Steuart with "The Chemistry of the Oil Shales." So much new information has been collected since the appearance of the first edition, in 1906, that the geological section has practically been re-written. Among the new points of interest dealt with are (1) the areas now being worked at Livingston and

Newfarm, and developments at Cobbinshaw, Ingliston, Philpstoun and Duddingston; (2) the recognition of the Pumpherston shales on the northern coast and the revision of the Queensferry shore section; (3) the separation of the Barracks and Burdiehouse limestones; (4) the recognition of the zonal values of certain horizons, especially two bands of marine fossils, which have been proved to extend over the whole field (the Mungle and Pumpherston shale beds), and also the Barracks volcanic ash; (5) the discussion as to the position of the Dalmahoy shale; (6) new outcrops of the Burdiehouse limestone near Binny, Humbie and Kirkliston; (7) the demonstration that the teschenite sills are generally restricted to particular horizons, while the quartz-dolerite sheets are more irregular in their occurrence.

Mr. Carruthers incidentally gives an account of a remarkable case of "burning" in the Pumpherston shales. These occurrences, it is pointed out, are occasionally found without the presence of any igneous rock, and their cause is not yet definitely known. Mr. Carruthers hazards the suggestion that the burning may have been caused at the time the shale-beds were deposited by the action of water upon pyrites producing heat sufficient to cause a discharge of oil from overlying oil shales.

At the conclusion of his memoir Mr. Carruthers refers to possibility of further discoveries in the field. He urges the use of the diamond or chilled shot drill, in order that the cores may be preserved for examination, and emphasises the value of palæontological evidence, a matter which is now receiving so much attention in coal-measure geology. It may be added that the coloured small-scale map accompanying the memoir contains several corrections which do not appear in Sheet 32 of the 1 in. map issued in 1910. New and corrected editions of the 6 in. maps of Linlithgow are in preparation.

The contributions of Messrs. Caldwell and Steuart have been brought thoroughly up to date, and the latter of these especially forms a most interesting account of the manner in which the Scottish shale companies, in the face of fierce competition, have managed to hold their own. Thus, whereas formerly not more than 16 lb. of sulphate per ton was obtained as a maximum, yields are now got ranging from 35 to 70 pounds per ton. The industry employs about 10,000 workmen, and produced in 1910 the following products, viz.:—600,000 gallons of motor spirit, 4,400,000 gallons of naphtha, 20,000,000 gallons of burning oil, 12,000,000 gallons of gas or fuel oils, 10,000,000 gallons of lubricating oils, 25,000 tons of paraffin wax, and 54,000 tons of sulphate of ammonia (total value £2,000,000). At the present time the industry is highly organised with a view to efficiency and economy.

#### GLAMORGAN SUMMER MINING SCHOOL.

The Education Committee of the Glamorgan County Council has issued a nicely-illustrated syllabus of the Summer Mining School and the tours for the present year. The ninth session of the school will be opened on August 4 at the lecture hall of the South Wales Institute, Park-place, Cardiff, when the Chief Inspector of Mines is to deliver an inaugural lecture. Prior to that date, however, several tours will have been concluded, including tours in Somerset and Cornwall, the Midland coalfield, Newcastle-on-Tyne district (mechanical engineering students), South Wales coalfield (east and west); at the end of last month the students in electrical engineering started a tour in Scotland, and on August 9 the tour to the Saxony coalfield will start. The school, which has its habitat at Penarth, closes on August 23. The school work is directly supervised by Principal Griffiths and the county director of mining instruction (Mr. Henry Davies), and the syllabus comprises lectures in practical mathematics, applied mechanics, electrical engineering, surveying, &c., with a special course in engineering for mining students, and a teachers' course, covering the subjects of geology, chemistry, physics, coalmining, and the electrification of collieries. Whilst on tour the students are expected to record their impressions in note books, a special prize being given for the best report on each tour. Special reports are also required on such subjects as timbering, methods of working, shaft sinking, recovery of by-products, haulage, rescue stations, application of electricity, the treatment of coaldust, and miners' baths. There is besides a sound recreative side to the scheme.

At a meeting of the council of the Sheffield Chamber of Commerce on Tuesday, it was decided that a resolution should be sent to the autumnal meeting of the Associated Chambers of Commerce urging the Government to hold an enquiry into the subject of railway rates and charges, as promised by the Chancellor of the Exchequer last year.

#### MINING AND OTHER NOTES.

The workmen and officials of the New Gored Merthyr Collieries Limited recently met at Melyncourt and presented Mr. F. J. Leslie Ditmas, F.G.S., M.E., with a magnificent illuminated address and a framed photograph of horses and hauliers.

Messrs. John Davis and Son (Derby) Limited, All Saints Works, Derby, inform us that they have received notification from the Home Office testing station that their miners' safety lamps have passed the official tests.

We understand that Mr. Francis L. Lane, for several years past the general manager of the Leeds Forge Company Limited, has recently been appointed managing director of the company.

The Lochgelly Coal and Iron Company have acquired a controlling interest in the business of Messrs. Robert Forrester and Co. Limited, coalmasters, who own collieries in the Slamannan and Bathgate districts of Scotland. It is intended to develop a large area of coal near Bathgate. A deep pit has been sunk and the seams are satisfactory, both in thickness and quality. The capital of Messrs. Forrester is being increased to £140,000. Mr. Robert Forrester will, it is understood, be elected to a seat on the board of the Lochgelly Company, which, in future, will practically control the affairs of Messrs. Forrester. No increase in the capital of the Lochgelly Company will be required for the purpose of taking up these shares.

The question of the sanitation of the new colliery districts of South Yorkshire is dealt with in the minutes of the Public Health and Housing Committee of the West Riding County Council. It is stated, in regard to Tickhill, the District Council are not exhibiting that activity in sanitary matters which is necessary to cope with the needs of the growing population. With regard to Doncaster Rural District, the overflow of cesspools at Adwick-le-Street must be a menace to health. A model village was about to be erected at Rossington, and plans had to be passed for nearly 1,000 dwellings. The sanction was being awaited of the Local Government Board to a loan of £3,900 for a sewerage and sewage disposal scheme.

"Some Experiences of Gob Fires in Fife Coalfields" and "Some Notes on Dealing with Gob Fires in Highly Inclined Workings" were the titles of two papers which were discussed at great length at a meeting of the Scottish branch of the National Association of Colliery Managers held in Edinburgh on Saturday last. Mr. G. L. Kerr made an interesting remark that he did not think the system of using water to extinguish underground fires was to be advocated. He had the feeling that water merely added to the flame. It might be successful in the initial stages of the fire, but not in the later stages.

At a general meeting of the Scottish branch of the National Association of Colliery Managers, a paper previously read by Mr. David Beveridge (Kelty) on "Supporting Underground Roadways, with Special Reference to Steel Arches" was discussed. Those taking part in the discussion included Messrs. G. L. Kerr (Glasgow), R. Wilson (Alloa), Archibald (Lassodie), Provan (Niddrie), McPhee (Bothwell Collieries), Kirkpatrick (Bothwell), and the branch president. All generally congratulated the author on the successful way in which he had negotiated the difficult problem of arranging for the support of the underground roadways in the Mary Pit, Fife.

A meeting of the Scottish branch of the National Association of Colliery Managers was held in the Heriot-Watt College, Edinburgh, on Saturday evening, Mr. Charles C. Reid (Cowdenbeath), the president, in the chair. It was announced at the outset that Mr. George L. Kerr, mining engineer (Glasgow), who had been secretary and treasurer of the Scottish branch since its inception—nearly three and a-half years ago—had resigned those appointments in view of his having been elected to similar posts with the Mining Institute of Scotland. In the circumstances that Mr. Kerr's new appointment was a most desirable one, the council accepted and nominated Mr. James Kirkpatrick, colliery manager (Bothwell), for the vacancy.

The ninth annual report of the Education Committee of the West Riding County Council, just issued, mentions that both universities of Leeds and Sheffield have been engaged in the organisation and supervision of classes in coalmining—the Leeds University in the area of the West Yorkshire coalfield, and the Sheffield University in the South Yorkshire area. Each has made provision for the training in mine gas testing of persons selected by the committee as prospective teachers of this subject. In addition, the Sheffield University has undertaken the setting and marking of the technical school examination papers for the coalmining classes. Such classes were held at 10 technical schools and 35 centres, 18 in the West Yorkshire coalfield and 27 in that of the South Yorkshire, the whole of the classes having been inspected by the two universities. The figures show a decrease of two centres in West Yorkshire and an increase of eight centres in South Yorkshire.

Mr. Robson and another North-country gentleman have leased the royalty of the old Mother Pit drift, at Dearham, near Maryport, and already active preparations are in progress for opening it out. The colliery, which has not been worked for over twelve years, contains several fairly good seams of coal of first-class quality. It is situated near Dearham Bridge Station, on the main railway line,



practically in the heart of the Cumberland coalfield, and in close proximity to the two large collieries—Dearham and Garleygill—which were worked altogether a quarter of a century ago. Within the next few weeks the promoters of this scheme intend commencing boring operations near the Mother Pit drift, with the object of trying to find some of the larger seams which are to be found at Siddick and St. Helens. If they prove successful they intend to erect a new shaft, put an up-to-date plant down and work the colliery. Between 20 and 30 years ago Dearham Collieries were the most successful in the county, employing between 800 and 1,000 men, and it is stated that many of the valuable seams were not worked to a very great extent.

The Earl of Ellesmere is having extensive alterations and improvements effected at his Crook-street sidings, Bolton, and is preparing to establish new wharves and depots at Clifton which will be connected with his lordship's Linnshaw Collieries, Walkden, by means of a new railway now being constructed.

At Doncaster Town Council meeting last week tenders for the supply of coal for the year ending June 30, 1914, were opened, and the following were accepted:—Hoyland Silkstone Coal and Coke Company Limited, 10,000 tons (nuts) at 14s. 6d. per ton; J. Brown and Co., 5,000 tons (nuts), at 14s. 6d. per ton, and, if satisfactory, 4,000 tons small nuts at 14s. per ton, and 1,000 tons (peas) at 13s. 9d. per ton; Mitchell Main Colliery Company Limited, 4,000 tons (nuts) at 13s. 3d. per ton; and J. Longbotham and Sons Limited, 4,000 tons (nuts) at 12s. 9d. per ton.

Judgment was given by Sheriff-Substitute Umpherston at Dunfermline in a case in which the North British Railway Company sought to recover 7s. 6d., in respect of demurrage on a wagon, from William Brown, contractor, Lochgelly. A truck containing sand was consigned by the defender from Crossgates, addressed to Lumphinnans No. 7 siding, which belongs to the Fife Coal Company. The truck arrived at the siding on July 25, 1910, and was not unloaded until August 4. Allowing four days for discharge, the pursuers claimed demurrage at the rate of 1s. 6d. per day. The defender did not know of the arrival of the truck until one of his employees saw it in the siding. The Sheriff-Substitute says he cannot hold that delivery of the wagon on a siding which did not belong to the defender can be regarded as intimation to him of its arrival. On the facts there was no evidence that the defender delayed unduly to take delivery after he had knowledge of the arrival of the wagon. The defender was absolved, with expenses.

"I picture sometimes an ideal pit village, with its church and schools, its good houses and gardens, its cricket ground and bowling green, its large winter garden, where refreshment can be bought, where good music can be heard. Would that another Carnegie would subscribe not organs but bands? Why cannot we brighten life and drive out drunkenness and gambling?" This is the picture drawn by the Bishop of Southwell in a pastoral letter.

Mr. E. H. Lamb, M.Sc. (Vict.) A.M. Institution of Civil Engineers, has been appointed to the University chair of civil and mechanical engineering tenable at the East London College, which is affiliated to the London University. Since 1903 Mr. Lamb has been technical and scientific adviser to Messrs. W. H. Allen, Son and Co., of Bedford, and demonstrator to the pupils and apprentices of the firm. The trustees of the Albert Kahn Travelling Fellowships have elected Mr. Douglas Knoop, M.A. (Victoria University of Manchester), lecturer in economics in the University of Sheffield, to a fellowship.

Sir Arthur Markham has offered to place a pit at the disposal of a Royal Commission in order to see whether it is possible to blow up a mine in which the roads have been efficiently stonedusted.

Arrangements are being made for the erection of a number of aged miners' homes in East Hetton, or Kelloe district, the workmen at that colliery, where about 1,200 men and boys are employed, having agreed to pay a levy of 2d. per man and 1d. per lad each fortnight towards the cost. The levy is expected to reach about £8 per fortnight. The officials of the local miners' lodge are about to negotiate with Mr. T. Lamb, Hetton, who is the owner of some land at Davy Lamp, for the purchase of a portion on which to build homes. It is also contemplated opening homes at Quarrington Hill.

The Staveley Coal and Iron Company Limited celebrates its jubilee this year. In commemoration of the event, the company have decided to entertain the children of the workmen in their employ, treats and a pleasure fair being the chief attractions. It is some 200 years ago since the iron foundries were opened out. In the late Mr. Barrow's days, the principal pits in the district were the Speedwell, Farewell, Old Hollingwood, and Seymour. In the old days the output varied from 150 to 250 tons of pig iron weekly, whereas now the output is anything up to 5,000 tons in the same time. And the extraordinary progress made in the manufacture of pig iron has been equally remarkable. From a yearly output of about 300,000 tons of coal, the output of the collieries, together with the subsidiary companies, approaches nearly 5,000,000 tons a year. In all, including pits, ironfoundries, and ironstone mines, nearly 23,000 workmen are mainly dependent on the company for their livelihood.

Messrs. J. and C. Holcroft Limited, of the Portfield Iron Works, Tipton, have recently made important changes to their plant which will greatly increase their capacity.

It is stated that household property and public offices at New Basford have suffered considerably through subsidence due to colliery workings.

Messrs. Price and Pryse, inventors of the new P.P. safety shot-firing appliances, gave an exhibition of their invention at the Cambrian Mining School, Porth, last week. Mr. Wm. Emerson, manager of the No. 6 Ferndale Pit, presided.

Mr. A. S. E. Ackermann, B.Sc. (Engineering), A.M.I.C.E., left England on the 1st inst. for Egypt for the purpose of testing and reporting upon the Shuman-Boys Sun Power plant which has been erected near Cairo.

The first meeting of the creditors of Richard Fosdick (trading under the style or firm of "Richard Fosdick and Co.") residing at Pentrich, Vernon-road, Bridlington, and carrying on business at Castle-buildings, Castle-street, Hull, and also at Mariner's-street, Goole, coal exporter, was held at the offices of the Hull official receiver last week. The official receiver stated that on account of the ill health of the debtor he had been unable to obtain the whole of the information required. A statement of affairs had been prepared, but it was incomplete. It would appear, however, that the debtor's unsecured liabilities amounted to about £12,000. There was also due to three creditors, who were treated as fully secured, the sum of £8,796. Mr. Alfred John Downs, chartered accountant, Hull, was appointed trustee with a committee of inspection. The creditors include: the Lancashire and Yorkshire Railway Company; the Lincoln Wagon and Engine Company Limited, Lincoln; Messrs. Locke and Co. Limited, Normanton; the South Kirby Colliery Company, Pontefract; the British Wagon Company Limited; and the Lofthouse Colliery Limited.

Capt. Maurice Pope has been appointed to the chairmanship of the Denaby and Cadeby Collieries Limited, in succession to his uncle, the late Mr. J. Buckingham Pope. Capt. Pope is also appointed chairman of the South Yorkshire Junction Railway Company, in which enterprise the Denaby and Cadeby Company has a large interest.

Mr. W. H. Carter has left Bolsover to manage the Bolsover Colliery Company's pit at Forest Town. He is succeeded by the underground manager, Mr. W. R. Colliss, while Mr. L. Henton, a deputy, has been promoted to the post of under-manager. Mr. J. Bingley, who was at one time manager of the Bolsover Colliery, has returned to his old sphere of work as the company's general manager.

At a recent meeting of Dunfermline District Committee, the Public Health Committee reported having given consideration to various cases of overcrowding in miners' houses.

Between 40 and 50 members of Parliament, representing all parties, have attended a meeting with the object of forming a committee to consider commercial subjects from a non-party point of view. Sir John Randles was appointed chairman and Sir Norval Helme vice-chairman. The joint secretaries will be Col. Pryce-Jones, M.P., and Mr. Louis Sinclair. The committee discussed the question of amending the Patent Laws, and it was decided to support a recommendation of the Manchester Chamber of Commerce in favour of placing the onus of proof of manufacture on the owner of the patent and not on the plaintiff. The question of railway rates was also discussed, and was referred to a special committee.

Mr. J. Strachan (president) was in the chair at a meeting of the Midland branch of the National Association of Colliery Managers, held at the University College, Nottingham, on July 2, when a resolution was passed heartily congratulating Sir Frank Brain on receiving the honour of knighthood. A desire was expressed to establish a reference library for members of the branch, and the president and secretary were deputed to interview the librarian of the Nottingham Free Library with a view to having a reference library on the premises. As the attendance at the meetings had not improved since they had been held on Wednesday evenings, it was decided to ballot the members by postcard to get their decision as to whether the meetings should be held on Saturdays, as formerly.

A correspondent learnt on Tuesday that the Wirral Colliery Company propose carrying out still further developments at their Neston Colliery, Cheshire, in the shape of tapping new seams and improving screening and other surface appliances. A few more men have lately been engaged, and it is expected that the number will be steadily augmented. The output of coal, which is of good quality, is on the upward grade, and will be substantially increased at no distant date.

There came before the Wigton Rural District Council last week, as special business in committee, the question of Fletchertown sewerage scheme, which is estimated to altogether cost about £1,575, and for which tenders were received a fortnight ago. Consideration was given to a letter from the Local Government Board to the purport that representation had been made to them that it was within the range of probability that Allhallows Colliery might cease operations, and requesting that no further action be taken until a Local Government Board inspector paid a visit. The Council accordingly decided to hold all matters concerning the scheme in abeyance, as requested by the Board.

## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Great Increase in Coal Shipments—Labour Questions, New Rates and Conditions—Notice given for Revision of Rates and Rules under the Minimum Wage Act—Proposal to Raise Miners' Contributions to Federation—Colliers and Political Action—Heavier Rates on Mine Properties Foreshadowed—Coal Trimmers to seek Saturday Half-Holiday—The Pithead Baths Deputation to the Continent—Claim that Miners be Empowered to Enforce Provisions of Mines Acts—The Great Struggle to Raise Dock Charges—Enormous Profits by Ship-owners.**

The coal trade returns for the past six months have furnished subject for gratified comment, because of the great increase of totals that is shown; but, inasmuch as these are set against the strike period of last year, their comparison is to some extent misleading. Taking, however, the 12 months from midsummer to midsummer and comparing that with any preceding year—eliminating the strike time altogether—it is seen that a marked advance has taken place, probably as much as 17 per cent. The total of shipments (not the whole output) reckoning foreign, coastwise and bunkers, is estimated at not much short of 40 millions of tons, being an increase of close upon 6 millions. A more noteworthy fact is that the output in sight is already very much greater, for large new undertakings are rapidly approaching full production.

With these conditions of trade in full view the labour question is seen in its real importance; especially the determination of the miners to apply their schedule of rates to all new work, and their expressed intention of shortly raising the question of the surfacemen. The miners' executive have decided (the decision having been left in their hands by the recent delegates' conference) that the schedule of rates applicable to new collieries and new seams shall come into operation at once.

Under the provisions of the Minimum Wage Act, the rates and rules were operative for 12 months, subject to notice; and at their meeting last week the executive of the South Wales Miners' Federation decided to give three months' notice in order to secure a revision, which would be operative for the succeeding 12 months. During the currency of this notice, the District Board is asked to complete the present schedule by fixing the rates of certain classes of workmen who were not in the original award.

The miners' lodges have now before them the question of increasing their contributions, and it is a remarkable fact that whereas in Scotland 2s. per month is being paid, and the men there are considering an increase upon that amount, only 1s. is paid in South Wales, and the conference a few days ago declined to sanction any increase upon half what the Scotchmen contribute. The matter has been referred back to the lodges, and the men are being urged to consider the great services that the Federation has rendered them in respect of increased wage-rate, legal protection, &c. The two recent cases are cited in proof of the value of litigation; and the need is urged for securing greater power through representation upon local councils. The question forms the subject of general discussion, and very much more will be heard of it as time goes on. The fact is being continually emphasised that South Wales—whilst ever insistent upon an active policy—raises only half as much in subscriptions as England and Scotland.

The forthcoming ballot of colliery workmen upon the subject of political action will be of exceptional interest, because of the revival of the scheme to contest close upon a dozen Parliamentary seats in this district. This is upon the line of an original scheme which was cast into abeyance by the Osborne judgment, but under the new law (assuming that the men as a body vote in favour of their trade union taking political action) it may prove to be practicable for them partly to revive the scheme in effective form. Five out of the 12 seats originally marked are already held by Labour members, and although, perhaps, the workmen may not be able to bring forward seven additional candidates, there will be, it is probable, at least three or four others.

Registration agents of the Federation have been active, and a great number of lodger votes have been secured. Some divisions have chosen the new candidates, and when opportunity serves the Federation will be ready. All depends, of course, upon the voting shortly to be taken. Not alone in regard to Parliament, but also in regard to local councils will the ballot have application, for there is a determination to get more and more direct Labour representatives on the administrative authorities, in order that the existing laws—particularly in regard to housing and the like—shall be worked to the advantage of the wage-earners. All this, of course, entails heavy increase of rates, which in the main fall upon the collieries.

The Insurance Committee of Glamorganshire have had before them a curious complaint. One of the county councillors stated that many colliers found it difficult to get their cards from the colliery offices after the lapse of several weeks; and another member of the committee from another district confirmed this statement. On the other hand, it was asserted that the men would not fetch their cards, one speaker stating that at a colliery of 2,000 men, 600 of them did not claim their cards at the end of six weeks.

Consequent upon a dispute as to the kind of work the hauliers were required to do in the Naval Collieries



...ing, 1,500 men stopped, and ultimately as many men were idle. The difficulty arose in consequence of two night hauliers refusing to haul coal as it was rubbish, their claim being that in regard to coal they should either be paid a higher rate or on a tonnage basis. The point at issue was largely one of custom, and finally the men, after a three days' stoppage, decided to restart, a later day to be set aside for the consideration of grievances. Work was resumed under the same conditions as existed before the stoppage. This is one other instance of sudden action stopping hundreds of men, instead of the dispute being dealt with by conciliation, in accordance with the general understanding.

The coaltrimmers of Cardiff made a presentation to their secretary on Saturday night, in celebration of the twenty-fifth anniversary of forming their union, and his elevation to the commission of the peace. In accepting the illuminated address which was given him, Mr. S. Fisher, general secretary, said that during those 25 years the appliances at the docks had been revolutionised. Some speakers dwelt upon the necessity for provision of staging for bunkering and cargoing purposes; and argued that shipowners should provide the necessary staging, and that coalowners should do the same for cargo purposes. The question of stopping at one o'clock on Saturdays was introduced; and it was decided to summon a mass meeting of the members on the 20th, in order to deal with that question.

The New Baglan Colliery Company, Trimsaran, has won the Waenffynonau seam, and it turns out to be of excellent quality, with good roof and floor. The company has decided to open out another slant.

The company of Welsh miners who have been touring France, Belgium, and Germany at the expense of Mr. David Davies, M.P. (Ocean), have now returned home. They travelled under the conductorship of Mr. J. Samuel, mining lecturer, and have seen the methods of pithead baths as adopted in the three countries mentioned. As to some systems, the men did not think they could be acceptable in the Welsh coalfield; and they did not at all like the open baths which are in vogue at certain German collieries. Some of the members of the deputation have been induced to express themselves as strong advocates of the system of pithead baths, considering that it is more satisfactory than the practice of washing at home, which prevails in Wales. In France and Belgium (where washing is optional) it is said about 80 per cent. of the workmen use the baths. In Germany, bathing is compulsory.

Criticising the Parliamentary debate upon the Cadeby Mine disaster, Mr. Hartshorn states that one aspect of the matter was not fully dealt with in the debate—viz., the method by which the Mines Act ought to be administered. He asserts that the whole question of administration demands drastic treatment. It is, says Mr. Hartshorn, utterly impossible for the limited staff of inspectors to see to the proper administration of the Acts. Every manager is given the power to prosecute workmen for breaches of the Acts, but "no workman has the right to institute proceedings against the management, although his very life depends upon the observance by the manager of the provisions. The power of enforcing those provisions of safety of miners must be extended to the workmen. There will never be efficient administration without that. In matters of wages and compensation the men have the right to take proceedings themselves; how much more necessary is it that they should be able to safeguard their own lives?"

The importance of this statement of opinion is that it probably indicates the line of future action by the Miners' Federation.

The proceedings before the House of Commons Committee, in relation to the Cardiff Railway Company's Bill, fully maintain their interest for all connected with the coal trade, even for those whose operations lie outside the Bristol Channel. In their Bill, the company seek powers to double the charge for tipping coal, and to add 50 per cent. to their wharfage charges. One point brought out in evidence is that, in all probability, should Cardiff Company obtain powers to increase, other dockowners would seek similar powers; and it is notorious that, the Cardiff case being the strongest (by reason of the present charges having been fixed over 40 years ago), this has been first taken before Parliament; the other undertakings to base their claims largely upon Cardiff's success, should that be realised.

Mr. Holtham, accountant to the company, stated in evidence that the wages charged against revenue account had increased from 24.6 per cent. to 30 per cent. between 1865 and 1912, and that considerable sums had had to be spent on hydraulic engines because of the larger size of wagons and the bigger type of ships; whilst the coal needed for those engines amounted to between 20,000 and 30,000 tons per annum, and the price of coal was 18s. per ton last year, compared with 8s. 9d. in 1865, when their existing dock rates were fixed.

Counsel ascertained from this witness that the company did not use 18s. coal, but used "small," and then questioned him upon his allegation that the cost of coal-shipping had increased, pointing out that the Taff Vale Company (Penarth Dock) had published a balance-sheet which showed decrease in that cost. But he did not make any difference; he asserted, however, that the cost of coal-shipping was 1.08d. per ton more than the rate which the traders now paid.

With regard to the increase in the charges for coal-mixing, counsel asked one witness whether the increase would not bring an additional revenue of £8,000 per annum. The answer was that under the new arrangement (just agreed upon) the increase would not be more than £5,000 a year; "and," added the witness, "that will not cover the cost to us. We should prefer to be without the mixing and the charges."

Among the contentions urged during the evidence was one that the Queen's Dock—this is the new dock of the Cardiff Company—is not working at more than a third of its capacity; the inference of the suggestion being that the return of earnings did not give a correct idea of what the property would yield.

One of the points made during the investigation of the Bill has been that shipowners and coalowners are making large profits, whilst the dockowners sustain loss on their trade; and it is noteworthy that the Tatem Shipping Company, of Cardiff, which has a capital of only £350,000, has issued a balance-sheet showing a profit for the year ended June 30 of no less than £363,139. With a profit of £1,000 a day for each day in the year the contention as to shipowners' prosperity is well sustained. The balance-sheet of this company also sets out that the cost of 19 steamers (originally £555,950) had had a sum of £205,950 written off, leaving the cost in the books at £350,000—probably not more than half of what the steamers would realise in the market, seeing that there has been an increase in steamship values during the past two years. A preceding statement of earnings was for 15 months ended June 1912, and this showed a profit of no less than £264,655. Although this company's experience is exceptional in regard to the very large amount of profit, it has been strikingly manifest that shipowners generally have been wonderfully prosperous.

A meeting of the Western District, delegates representing 8,000 men being present, took place at Swansea on Saturday, and dealt with a report of a committee concerning lodges which desire to secede and form separate districts. As to part of these, whose geographical position made co-operation difficult, it was resolved not to oppose the application, but as to certain others the members of the Western District of Miners make strong objection.

One of the subjects dealt with at the meeting was the delay experienced by Minimum Wage Committees in obtaining the services of panel chairmen, so that cases should be dealt with as they arise. Panel chairmen, as a body, being gentlemen in business with little time to spare, were not in a position to render prompt service, and the meeting decided to collect evidence and forward it to Mr. T. Richards, M.P., the Federation secretary, in order that a protest should be lodged.

The condition of affairs in regard to the Welsh tin-plate trade continues to claim a great deal of attention, there being at least 100 mills in idleness, with hundreds of men out of employment. A large number of mills still at work are on only six-hour shifts instead of eight-hour. A curious feature is that comparison of exports (which has to be made with 1911, because the first half of 1912 included the coal strike, with its stoppage of tin-plate work) shows that the total of exports is about equal; and that probably it is a certain slackness in demand for home consumption which produces the unsatisfactory conditions. There is, of course, also a greater output per mill, and many new mills in existence. The loss of the Canadian trade still affects matters very greatly; but it is hoped that the Americans will be kept out of the markets, and that Wales will regain the trade that was lost because of high prices in 1912, combined with the scarcity of supply during the stoppage occasioned by the coal strike last year.

**London Coal Contracts.**—The following tenders have been received by the Asylums Committee of the London County Council for annual supplies of coal to the under-mentioned asylums:—House coal: Jas. Butler Wilks and Co., West Hallam large bright nuts, Banstead Asylum, 20s. 1d. per ton, Griff cobbles, Long Grove 20s. 4d. per ton, ditto Epileptic Colony 20s. 6d. per ton; R. C. A. Palmer Morewood (Swanwick Colliery), Swanwick main brights, Bexley, 20s. 6d. per ton; Bestwood Coal and Iron Company Limited, Bestwood cobbles, Cane Hill, 20s. 7d. per ton, ditto Horton 20s. 10d., ditto The Manor 20s. 10d.; Annesley Colliery Company Limited, Annesley bright cobbles, Claybury 19s. 5d. per ton, ditto Hanwell 19s. 2d.; Linby Colliery Company Limited, Linby bright cobbles, Colney Hatch 19s. 4d. per ton. Steam coal: Tredegar Iron and Coal Company Limited, Tredegar washed nuts (railborne), Banstead 24s. 2d. per ton, ditto Cane Hill 24s. 2d., ditto Claybury 23s. 6d., ditto Colney Hatch 22s. 11d., ditto Hanwell 21s. 8d.; Wm. Cory and Son Limited, Nixon's Navigation large washed nuts (seaborne), Bexley 24s. 3d. per ton, ditto Claybury 24s. 8d.; Powell Duffryn New Tredegar and/or Bargoed washed nuts (railborne), Colney Hatch 24s. 5d. per ton, ditto Hanwell 23s. 2d.; Nixon's Navigation large washed nuts (seaborne), Horton 24s. 11d. per ton, ditto Long Grove 24s. 10d., ditto The Manor 24s. 11d., ditto Epileptic Colony 24s. 11d.; Nixon's Navigation small washed nuts (seaborne), Central Station 23s. 4d. per ton. Gas coal: Wm. Cory and Son Limited, Holmside, Banstead Asylum 21s. 3d. per ton, ditto Colney Hatch 20s. 3d., ditto (by barge and unloaded into stores), Hanwell 21s. 9d.

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

**BLACKBURN, JULY 19.**—The Electricity Committee is prepared to receive tenders for the supply and delivery of steam coal for the 12 months ending August 31, 1914. Specifications and forms of tender may be obtained on application at the Electricity Works, Jubilee-street, on and after Saturday, July 19, 1913. Sealed tenders, endorsed "Steam Coal," and addressed to the chairman of the Electricity Committee, will be received at the Town Hall up to mid-day Saturday, August 2, 1913. The lowest or any tender will not necessarily be accepted. P. P. Wheelwright, M.I.E.E., engineer and manager, Corporation Electricity Works, Jubilee-street.

**EXMOUTH, JULY 29.**—The directors of the Exmouth Gas Company invite tenders for the supply of 7,000 tons of best gas coal (screened or unscreened), to be delivered in such quantities and at such times as may be required from August 1, 1913, to August 31, 1914, and to weigh 20 cwt. to the ton over the gas company's or dock company's weighbridge, the coal to be fresh wrought, dry and free from hards, smudge, shale and pyrites. Tenders to be accompanied by practical works analysis. Prices may be quoted c.i.f. or f.o.b. by sailing vessels or steamers, or f.o.r. Exmouth Railway Station (London and South-Western Railway). Sealed tenders, endorsed "Tender for coal," to be sent to the undersigned not later than Tuesday, July 29, 1913. The directors do not bind themselves to accept the lowest or any tender. Special tender forms are not provided or required. James T. Foster, secretary and manager, Gasworks, Exmouth.

### Abstracts of Contracts Open.

**ARLON (LUXEMBURG), JULY 18.**—About 100 tons of anthracite cobbles. Particulars from Monsieur le Gouverneur, Arlon, Luxembourg, Belgium.

**BATLEY, JULY 15.**—Coal for the Corporation, 4,000 tons of pea nuts or beans. Forms from Mr. S. Derwen Jones, engineer.

**BELFAST, JULY 14.**—Best colliery-screened English house coal and best South Welsh steam coal, for the Committee of Management. Forms on application to the Clerk, at the office of the Institution, Grosvenor-road, Belfast.

**BRADFORD, JULY 17.**—Best gas coal, cobbles, nuts and cannel, all to be well screened, dressed and free from shale and pyrites, for the Gas Committee. Forms from Mr. C. Wood, gas engineer, Town Hall.

**BRIGHTON, JULY 21.**—For the supply of not exceeding 4,500 tons and not less than 3,500 tons of coal of any one of the following descriptions, for the Corporation, viz.:—Best Durham unscreened (from Hollingside or Tanfield Moor Collieries), Harton rough small, Wearmouth rough small, Monk Bretton hard steam nuts, Featherstone washed pea small, old Roundwood Silkstone slack, Rhodes (Pontefract) Silkstone small, Shipley (Derbyshire) bright slack. Forms at the office of Mr. Hugo Talbot, town clerk, Town Hall, Brighton.

**BRISTOL, JULY 18.**—Coal, for the Bristol Board of Guardians. Forms, Mr. J. J. Simpson, clerk to the Guardians, St. Peter's Hospital.

**BROMLEY (KENT), JULY 21.**—Coal and coke, for the Corporation, in accordance with the particulars and conditions, which may be obtained from the borough engineer, Bromley.

**CARDIFF, JULY 15.**—Fuel and oil, for the Glamorgan Education Committee. Forms from the clerks of the respective groups.

**CLACTON-ON-SEA, JULY 21.**—House and steam coal and coke to the Middlesex Hospital Convalescent Home, Clacton-on-Sea. Forms from the Matron at the Home.

**CLEATOR MOOR, JULY 18.**—For 2,000 tons of round gas coal or nuts, for the Urban District Council. Tenders to Mr. Henry Rothery, clerk to the Council, Public Offices, Cleator Moor.

**DARLINGTON, JULY 26.**—Household coal for the use of the various departments of the Corporation. Tenders from Mr. Hy. G. Steavenson, Town Clerk's Office, Houndgate, Darlington.

**DARTFORD, JULY 26.**—For the Urban District Council, 3,600 tons of coal. Tenders to Mr. W. Kay, clerk to the Council, Council Offices, Dartford.

**DORCHESTER, JULY 14.**—Coal and coke to the public elementary schools maintained by the Dorset County Council. Forms from the Secretary, Education Department, County Offices, Dorchester.

**DOWNPATRICK, JULY 15-18.**—Household, steam and gas coal to the Down District Lunatic Asylum, Downpatrick, for the Committee of Management. Forms of Mr. S. Rea, clerk.

**DUNDEE, JULY 15.**—Coal for the Dundee Harbour Trustees. Specifications, &c., at the office of Mr. J. Hannay Thompson, general manager and engineer, Dundee Harbour Trust.

**DUNMANWAY (IRELAND), JULY 15.**—About 60 tons of best Newport red ash or screened Whitehaven coal for the Guardians. Tender lodged with Miss Florence J. Crowley, clerk to the union, and accompanied by sum of £5.

**EASTBOURNE, JULY 21.**—Coal and coke, for the Guardians. Forms from Mr. A. Hurst, town clerk, Guardians' Office, Avenue House, Eastbourne.

**EPSOM, JULY 19.**—Coal and coke to the Epsom Church of England and Epsom Council schools, for the Managers. Forms at the office of Mr. Theodore Bell, clerk.

**EXETER, JULY 14.**—Steam coal and house coal and coke, for the Corporation. Forms at the office of Mr. H. Lloyd Parry, town clerk.

**EXETER, JULY 19.**—Coal and coke to the Royal West of England Institution for the Deaf and Dumb, Exeter. Forms supplied at the institution.

**HASTINGS, JULY 14.**—About 150 tons of house coal, for the Corporation. Forms from Mr. P. H. Palmer, Town Hall, Hastings.

**HAVERHILL, JULY 15.**—For the Urban District Council: 600, 1,200 or 1,800 tons of best gas coal (screened or unscreened). Tenders, endorsed "Gas," to Mr. T. Bates, clerk, Haverhill.



HEREFORD, JULY 19.—Coal, to the public elementary schools of the county, for the Herefordshire County Council. Forms from Mr. John Wiltshire, county education secretary, Education Office, Shirehall, Hereford.

HOLYWELL (ANTRIM), JULY 14.—For the Visiting Committee of the Antrim District Lunatic Asylum: Best screened house and steam coal. Forms from the Clerk of the Asylum, Holywell, Antrim.

IPSWICH, JULY 16.—Coal, for the board of management of the East Suffolk and Ipswich Hospital. Forms, Mr. A. Griffiths, secretary, hospital.

KANTURK (IRELAND), JULY 16.—About 300 tons coal, for the Guardians. Forms from Mr. William Murphy, assistant clerk of union.

KILLOUGH, JULY 14.—About 120 tons best Whitehaven coal to Charles Sheil's Institution, Killough, for the local Board of Governors. Tenders to the Presiding Chairman may be lodged with Mr. G. M. Swail, superintendent, Board Room.

LANCASTER, JULY 14.—Coal and slack, for the Electricity Committee. Forms from Mr. Geo. C. Milnes, Electricity Works, Marton-street, Lancaster.

LIEGE, JULY 17.—Fuel as under to the Hospices Civils:—(1) 400 tons of semi-bituminous cobbles; (2) 250 tons of anthracite cobbles; (3) 2,000 tons of washed semi-bituminous slack; (4) 500 tons of broken gas coke; and (5) 250 tons of cokedust. Particulars from Economat Général, 17, Rue des Prébendiers.

LIMERICK, JULY 16.—Coal to the different departments of the Corporation for 12 months. Tenders to Mr. Wm. N. Nolan, town clerk.

LONDON, JULY 15.—Warwickshire nuts, coke breeze and steam coal, for the Hammersmith Guardians. Forms from Mr. J. Lamb, clerk to the Guardians, 206, Goldhawk-road, Shepherd's Bush, W.

LONDON, JULY 21.—House and steam coal to the Middlesex Hospital, W., and its steam laundry at Hendon. Forms from Mr. F. Clare Melhado, secretary-superintendent.

LONDON, JULY 24.—Coal, for the Guardians of Stepney Union. Forms from Mr. T. G. Stacey, clerk, Guardians' Offices, Barnes-street, Commercial-road-East, E.

MARCH, JULY 14.—Coal and coke, for the Isle of Ely Education Committee. Particulars from Mr. J. H. Haigh, education secretary, Education Offices, County Hall, March.

MEXBOROUGH, JULY 16.—Gas coal, 4,000 to 6,000 tons, for the Swinton and Mexborough Gas Board. Particulars from the engineer, Mr. J. H. Brearley, Gasworks, Longwood.

NEATH, JULY 16.—Large screened gas coal. Estimated quantity, 12,000 tons. Tenders to Mr. Edwin C. Curtis, town clerk.

NEWPORT, JULY 17.—Best house coal and best gas coke, for the Newport Education Committee. Tenders, endorsed "Tender for Coal," to Mr. T. A. Eaves, secretary and executive officer, Education Offices, Charles-street, Newport.

NORWICH, JULY 21.—Coal and coke, for the Norwich Education Committee. Forms of Mr. A. H. Miller, town clerk, Guildhall, Norwich.

NOTTINGHAM, JULY 18.—Coal, for the Health Committee. Forms of Mr. W. J. Board, town clerk, Guildhall, Nottingham.

OAKHAM, JULY 21.—Coal and coke, to the public elementary schools maintained by the Rutland Education Committee. Particulars on application at the Education Office, Oakham.

OXFORD, JULY 21.—Warwickshire or Leicestershire hand-picked cobbles, for the Education Committee. Tenders, marked "Tenders for coal," to Mr. Richard Bacon, town clerk, Education Office, Town Hall, Oxford.

PORTSMOUTH, JULY 16.—Coal (other than Welsh coal), for the Corporation electricity supply. Forms from the engineer and manager, Electric Lighting Works, Gunwharf-road, Portsmouth.

SAWBRIDGEWORTH, JULY 26.—Coal (Bestwood hard cobbles), for the Sawbridgeworth Local Education Sub-Committee (Hertfordshire County Council). Tenders, marked "Tender for coal," to Mr. W. Morris, clerk to the sub-committee, 15, Bell-street, Sawbridgeworth.

SLEAFORD, JULY 14.—From 100 to 200 tons of Portland hard best steam coal (pit weight), for the Trustees of the Billingham South District Drainage. Tenders to Mr. H. A. Peake, clerk to the trustees, Sleaford.

SLIGO, JULY 17.—About 3,000 to 4,000 tons of best screened gas coal, for the Gaslight Company of Sligo. Tenders to Mr. R. Brown, secretary.

SOUTHAMPTON, JULY 14.—Coal to the Electricity Works, Western Shore. Tenders to Mr. R. R. Linthorne, town clerk, Municipal Offices, Southampton.

SOUTHBOROUGH, JULY 17.—About 200 tons of steam coal, for the Urban District Council. Mr. P. Hammer, clerk to the Council, Council Offices, Southborough.

STROOD, JULY 23.—About 100 tons of the best Welsh anthracite beans. Forms of Mr. W. Banks, city surveyor, Rochester.

TEWKESBURY, JULY 16.—About 120 tons of coal (kitchen nuts), for the Guardians. Tenders to Mr. H. A. Badham, clerk, Tewkesbury.

TORQUAY, JULY 21.—3,000 tons of gas coal or slack, for the Corporation. Forms from the town clerk, Fredk. S. Hex, Town Hall, Torquay.

TRURO, JULY 15.—Coal and coke, for the Cornwall Education Committee. Tenders to Mr. A. A. Clinknick, district clerk, Truro.

VALLETTA, JULY 24.—About 4,500 tons of coal to the Government of Malta. Forms on application to the Crown Agents for the Colonies, Whitehall-gardens, London.

WALSALL, JULY 19.—About 300 tons of good deep house coal, about 150 tons of deep kibbles, and about 450 tons of slack, for the Corporation. Forms from Mr. H. Lee, town clerk, Council House, Walsall.

WARWICK, JULY 18.—Coal, for the Education Committee. Forms from Director of Education, County Education Office, Warwick.

WEST HAM, JULY 14.—Coal and coke, for the Corporation. Forms from Borough Engineer's Office, Town Hall, West Ham, E.

*The date given is the latest upon which tenders can be received*

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ABERDEEN, JULY 14.—Boilers, &c.—For the Corporation: Supplying and erecting at Cairnry Colliery, Aberdeen, one Lancashire steam boiler, 26 ft. long by 8 ft. diameter; also supplying and erecting about 800 lineal yards of corrugated iron and wire mesh fencing and gates at Cairnry Quarries, Aberdeen. Specifications, Mr. A. Findlay, superintendent of cleansing, Poynerbrook-road, Aberdeen.

BANGOR (IRELAND), JULY 18.—Exhausters.—For supply and fixing complete, at their gasworks, of two sets of exhausters and engines, combined, for the Urban District Council. Specification on application to the engineer and manager, Mr. B. Mitchell, at the gasworks.

ECCLES, JULY 21.—Stokers.—For the supply and fixing of mechanical stokers for four Lancashire boilers at the electricity works, Cawdor-street, Patricroft, for the Electricity Supply Committee. Specification from the borough electrical engineer, Electricity Works, Patricroft.

HINDLEY, JULY 15.—Gas Engines, &c.—Tenders are invited for the manufacture, delivery, and erection of two gas engines and two pumps, and other works in connection therewith, for the Urban District Council. Specifications and drawings can be obtained from the surveyor, Mr. Oswald P. Abbott, Council Offices, Hindley, on payment of a deposit of £1 ls. (returnable).

MITENHAGE (SOUTH AFRICA), JULY 29.—Power House.—Tenders are invited by the South African Railways Administration for the supply and erection of a steel-framed building to form a new power-house at Mitenhage, Cape Province. Tenders, on the proper forms, will be received by the Secretary to the Tender Board, South African Railway Headquarters Offices, Johannesburg. Copies of the specification and form of tender may be obtained at the office of the High Commissioner for the Union of South Africa, 32, Victoria-street, S.W.

SHEERNESS, JULY 29.—Borehole.—Tenders invited for the sinking of a borehole, from 16 in. to 12 in. diameter, about 750 ft. deep; also for the sinking of a trial boring from the bottom thereof to a further depth of about 700 ft., for the Urban District Council. Specification, schedules, and form obtainable at the office of the engineer, Mr. F. W. S. Stanton, A.M.Inst.C.E., 3, Victoria-street, Westminster, on deposit of £2 3s. (returnable).

WALSALL, JULY 14.—Gas Engine, &c.—For the supply, erection and maintenance for twelve months of gas engine, suction gas plant, and three-throw pump, capable of lifting 22,500 gallons per hour (manufactures only), for the Brownhills Urban District Council (Sheffield Sewerage). Copies of the specifications and form of tender can be obtained at the office of the Council's consulting engineer (Mr. Robert Green, M.Inst.C.E., 37, Waterloo-street, Birmingham), upon the deposit of £5 (returnable).

## THE FREIGHT MARKET.

Outward freights on the north-east coast have shown some decline in figures this week, and some falling-off in activity. Coasting business is based on about 3s. 1½d. Tyne to London, and 3s. 6d. to Hamburg, with Havre at from 4s. 3d. to 4s. 6d. The Bay is unaltered, at 6s. 3d. to Bordeaux. The Baltic is weaker, at from 5s. 3d. to 5s. 6d. to Cronstadt. The Mediterranean is easier, at from 8s. 9d. to 9s. to Genoa. At South Wales, chartering is rather slow, and Mediterranean rates are lower. There is some weakness evident in most directions. South America is quiet, but steady. At the Clyde, comparatively little business is being done at unaltered figures. The Humber is situated pretty much the same, so far as freights are concerned, as the north-east coast ports. Homewards, chartering has been rather quiet. There is a moderate demand from the Eastern ports at steady figures. The Black Sea and district show a more active enquiry, but, owing to the fresh outbreak of hostilities, owners are somewhat chary of sending tonnage in that direction. The Mediterranean and ore trades are unchanged. There is a good enquiry and a firm tone at the Baltic. America is quiet and unaltered. The River Plate is firm for prompt, handy-sized vessels.

Tyne to Antwerp, 700, 4s. 6d., from Dunston; 1,200, 4s. 3d., from Elswick; 1,750, 4s. 3d., from Derwenthaugh; Archangel, 1,800, 5s. 6d.; 1,450, 5s. 9d.; Aalborg, 1,700, 4s. 10½d.; Ancona, 4,000, 10s. 6d.; Bordeaux, 2,700, 6s. 3d.; Bas Indre, 2,200, 6s. 3d.; Buenos Ayres, part cargo, 19s., July, from Dunston; Bas Indre, 2,100, 6s.; Cronstadt, 1,700, 5s. 9d.; 3,500, 5s. 6d.; 1,200, 8s. 6d., coke; 5,600, 5s. 6d.; 4,800, 5s. 3d.; Carthagena, 2,100, 11s. 6d.; Genoa, 6,600, 9s.; 3,500, 9s. 3d., river loading; 6,800, 8s. 9d., from Dunston; 5,500, 8s. 9d.; 4,200, 9s.; G-f-l-a, 2,000, 5s. 3d.; Hamburg, 3,100, 3s. 7½d., from Dunston; Havre, 1,800, 4s. 6d., from Dunston; Kiel, 1,900, 5s. 9d.; Korsøer, 1,400, 5s. 3d.; Las Palmas, 3,200, 10s.; London, 1,500, 3s. 1½d.; Malmo, 2,400, 5s.; Oporto, 1,500, 10s. 3d.; 1,500, 10s.; Port Said, 4,500, 9s.; 4,600, 9s., from Dunston; Porto Ferrajo, 4,700, 9s.; Riga, 2,700, 5s.; Rotterdam, 1,700, 3s. 4½d.; St. Nazaire, 3,100, 6s., from Dunston; 2,200, 6s. 3d.; Trelleborg, 950, 5s. 6d.; 950, 5s. 9d.; Venice, 4,000, 11s.; 4,200, 10s. 6d., coal, 600, 13s. coke, from Dunston; 5,300, 10s. 7½d. from Tyne Dock; 10s. 9d. from Dunston; Wasa, 1,450, 5s. 7½d.

Cardiff to Algiers, 3,400, 10 fr.; 4,700, 9½ fr.; Aden, 6,500, 11s. 6d., July 20; Bordeaux, 1,000, 8 fr.; 2,300, 7½ fr.; Brindisi, 6,000, 9s.; Bilbao, 1,900, 7s.; Buenos Ayres, 6,000, 19s. 6d., mid-July; 19s., reported; Barcelona, 3,200, 10s.; Colombo, 7,500, 12s. 9d., end July; 7,200, 12s. 9d., July-August, P. and O. terms; Civita Vecchia, 4,500, 9s. 3d.; 4,000, 9s.; 500, 10d.; Chantenay, 2,200, 7½ fr.; Calais, 1,100, 5s. 3d.; Cromarty, 2,200, 5s.; Admiralty; Caen, 1,900, 5s. 6d.; 780, 5s. 3d.; Cronstadt, 5,000, 6s. 1½d., July 15; Danube, 5,700, 12s., July 15; 4,500, 12s. coal, 14s. 6d. coke, July 12; Dieppe, 2,200, 5s.; 1,600, 5s.; Dakar, 4,800, 12s.; 5,000, 12s.; 250; Dublin, 200, 4s. 9d.; Galatz, 5,700, 12s.; 4,500, 12s.; Genoa, 4,500, 8s. 3d.; 3,300, 8s. 6d.; 3,800, 8s. 6d., July 20; Grimsby, 1,600, 4s.; Admiralty; Gibraltar, 2,100, 9s., 700; Havre, 2,100, 4s. 9d.; 1,400, 5s.; 1,100, 5s. 3d.; 750, 5s. 6d.; Havre Canal, 1,550, 5s. 6d.; Las Palmas, 5,500, 9s.; Leghorn, 4,500, 8s. 6d.; 4,500, 8s. 3d.; Lisbon, 2,200, 8s.,

350; Marseilles, 4,800, 10 fr., July 18; 4,500, 10½ fr., July 19; 6,000, 10½ fr., July 17; 3,000, 10½ fr.; 5,800, 10½ fr.; 3,500, 10½ fr.; Messina, 4,500, 7s. 3d., clean terms; Monte Video, 18s. 6d., August; Naval manœuvres, several vessels, all 12s. 6d. on gross register per month, 15 days guaranteed; 2,398 gross register, at 12s.; Nantes, 2,100, 7½ fr.; Naples, 5,600, 8s. 6d., 800; 2,700, 9s. 3d.; 4,500, 8s. 6d., 800, July 14; Oporto, 950, 8s. 6d.; Oran, part cargo, 800-1,000, 10½ fr.; 980, 8s. 6d.; Portland, 2,800, 3s. 1½d.; Port Said, 5,600, 8s. 9d., July 22; Piræus, 4,000, 9s. 6d.; Passages, 1,400, 8s.; 1,000, 9s.; River Plate, 5,700, 19s. 6d.; 3,400, 19s. 6d.; 5,500, 19s. 9d.; 19s. 6d., July 20; Rouen, 1,700, 5s. 6d.; 1,200, 5s. 9d.; 750, 6s.; Rio de Janeiro, 6,400, 16s. 9d.; Sfax, 3,300, 14½ fr.; Sables, 1,350, 7½ fr.; St. Servan, 1,800, 5s. 3d.; Seville, 900, 9s. 6d.; Savona, 4,500, 8s. 3d.; 3,800, 8s. 6d., July 20; St. Nazaire, 3,000, 7½ fr.; Sulina, 5,700, 12s.; Sheerness, 680, 5s.; Sulina and Galatz and/or Braila, 12s., July; Teneriffe, 4,000, 9s.; 5,500, 9s.; Toulon, 6,000, 10 fr., July 14; Torre Annunziata, 4,500, 9s. 3d.; time charter, Mediterranean trip, 2,600, 11s. 6d.; Venice, 4,600, 9s.; 4,000, 9s., July 15-20.

Newport to Naples, 5,500, 8s. 6d., 800; Torre Annunziata, 4,500, 9s. 3d.; Civita Vecchia, 4,500, 9s. 3d.; River Plate, part cargo, 1,000, 19s.; Seville, 1,600, 9s. 350; Nantes, 1,600, 7½ fr.; Genoa, 4,800, 7s. 9d.; Savona, 4,800, 7s. 9d.

Swansea to Civita Vecchia, 3,800, 9s. 9d.; 9s. 9d. coal, 10s. 6d. fuel; Cagliari, 3,100, 10s. 3d.; Trapani, 3,300, 11s.; Rouen, 1,600, 5s. 6d.; 900, 5s. 9d.; 1,200, 5s. 9d.; 1,700, 5s. 9d.; Genoa, 2,500, 9s.; 3,000, 9s. 6d.; Dieppe, 1,000, 5s. 3d.; Bari, 2,000, 11s. 6d. coal, 12s. 3d. fuel; Calais, 1,800, 5s. 3d.; Cherbourg, 1,100, 6s.; St. Nazaire, 1,320, 7½ fr.; Chantenay, 1,320, 7½ fr.; Rotterdam, 1,100, 5s. 1½d.; Valencia, 950, 12s. 9d.; Algiers, 3,800, 10½ fr.; London, 900, 4s.; Helsingfors, 900, 6s. 6d., July; Savona, 2,500, 9s.; St. Malo, 650, 5s. 6d.; Stettin, 2,300, 5s. 9d.

Blyth to Varna, 7,000, 11s. 6d., 400; Bandholm, 1,600, 5s. 3d.; Helsingfors, 2,000, 5s. 4½d.; Cronstadt, 5,400, 5s. 6d.; 2,400, 5s. 6d.; 5,300, 5s. 3d.; Varna and/or Bourgas, 10s. 9d. one port, 11s. both ports, 400; Memel, 1,700, 4s. 9d.; Aalborg, 1,750, 4s. 10½d.; St. Petersburg, 2,700, 5s. 6d.; Malmo, 2,400, 5s.

Wear to Bordeaux, 2,700, 6s. 3d.; Hamburg, 2,000, 3s. 6d.; Kotka, 900, 5s. 7½d.

Norway to Melbourne, sail, 57s. 6d.

Wales to Para, 5,300, 15s., two milreis, July; West Coast South America and home to United Kingdom-Continent, sail, 42s. 9d.; 43s.; Antofagasta, sail, 18s., fuel; Mexillones, sail, 18s., fuel; Bahia, sail, about 18s.; 18s. 6d.; Monte Video, sail, 16s. 6d.

Hull to Buenos Ayres, 5,000, 19s. 3d., July; Cronstadt and St. Petersburg, 5,000, 5s. 6d.; Genoa, 3,500, 10s.; 5,600, 9s., July; Cronstadt, 2,400, 5s. 7½d.; 5,400, 5s. 6d.; 2,000, 5s. 9d., July 21; 5,700, 5s. 3d.; Alexandria, 4,200, 10s.; St. Petersburg, 1,800, 6s., 500; 1,700, 5s. 9d.; 2,800, 5s. 9d., discharge into lighters; Bandholm, 1,250, 5s. 9d.; Hudiksvall district, 1,600, 5s. 6d.

Fife port to Cronstadt, 2,300, 5s. 9d.; Malmo, 1,500, 5s. 3d.; Kotka, 2,000, 5s. 6d.

Glasgow to Rio de Janeiro, 17s. 3d.; Venice, 4,000, 11s. 3d.; Cronstadt, 1,800, 5s. 7½d.; Civita Vecchia, 10s. 6d.

Seaham Harbour to Malmo, 1,600, 5s. 3d.

Grangemouth to Horsens, 850, 5s. 9d.; Wyborg, 1,200, 6s. 11s. 6d. to Calais, 1,000, 5s. 3d.; Boulogne, 1,000, 5s. 3d.

Rotterdam to Bordeaux, 3,600, 5s. 4½d. steam coals, 7s. 1½d. net; Algiers, 2,000, 10 fr.; 1,000, 10½ fr., fuel; St. Nazaire, 2,300, 6s. 3d., Trignac terms, July 16; 3,200, 6s. 1½d., Trignac terms, July 25; Genoa, 4,400, 8s. 9d., July 18-25; Valparaiso, 22s. 6d., coke.

Port Talbot to Rouen, 1,600, 5s. 6d.; Alexandria, 4,600, 9s. 1½d., 700, July 14.

Goole to Sonderborg, 1,050, 5s. 9d.; Bruges, 750, 4s. 1½d.

Hartlepool to Hamburg, 1,800, 3s. 6d.; Fredrikshaven, 1,200, 5s. 6d.

Partington to Riga, 2,800, 4s. 4½d.

Forth to Cronstadt, 1,500, 5s. 9d.

Antwerp to Rio de Janeiro, sail, 20s.; Boca, sail, 20s.; Buenos Ayres, sail, 20s., cement.

Homeward charters:—Marmagoa, 2,796 net, Hull, Burnt-island or Leith and Antwerp, two ports, 22s. on d.w., August; Kurrachee, 2,834 net, Antwerp or Liverpool, 16s. 3d., August; 5,500, 10 per cent., United Kingdom-Continent, p.p., 17s. 4½d., July; Saigon-Haiphong, 7,000, Bordeaux, Havre, Dunkirk, basis, 27s., two ports to one port, 1s. extra maize, July-August; Villa Constitución, 4,100, 10 per cent., United Kingdom-Continent, 10s. o.c., July; Bahia Blanca, 7,500, 10 per cent., United Kingdom-Continent, p.p.; 13s. 6d. wheat, 15s. oats, ppt.; Dico, 3,700, Rotterdam, 5s. 4½d., end July; Bilbao, 3,000, Middlesbrough, 5s. 4½d., mid-July; 1,800, St. Nazaire, 6½ fr., July; 3,200, Rotterdam, 5s. 3d., ppt.; Port Said, 2,870, Calcutta, about 10s., salt, July; Lisbon, 1,800, Bristol Channel, 6s., July; Bombay, 16s. 6d. one p.p., 17s. two p.p. United Kingdom-Continent or Mediterranean, 6d. extra Dieppe, 2,500 tons seeds guaranteed, net terms, August; Gulf, 19s., Denmark, October; 4,500, United Kingdom-Continent, 17s. p.p., September-October; 2,845 net, United Kingdom-Continent, 14s. 6d., net form, July-August; 3,720 net, 14s. 6d., net form, August; 16s. 6d. United Kingdom-Continent, 17s. 6d. Denmark, 18s. Mediterranean, net form; Virginia, 11s., West Italy; Japan, 3,180 net, United Kingdom-Continent; lump sum equal to 23s. 6d. timbor, July; Saleef, 5,500, Calcutta, Rs. 6, July-August; Bombay, 3,525 net, reported 20s. 6d. on d.w. to two ports United Kingdom, August; River Plate, 1,810 net, Denmark-Sweden, basis 18s., July; Gulf timber port, 2,335 net, River Plate, 150s., September; Ergasteria, 4,800, Rotterdam, 5s. 6d., ppt.; Carthagena, 3,300, Glasgow, 6s. 6d., Ayrshire, 6s. 3d., July; Huelva, 3,400, Charleston or Savannah, 9s. 4½d., Tinto charter, July; Newcastle, N.S.W., 3,721 net, Java, two ports, 15s. 6d., July-August; Sydney, N.S.W., 3,715 net, United Kingdom-Continent; 31s., less 6d., with Mediterranean options, July; Barreiro, 1,800, Rotterdam, 7s. 6d., ppt.; time charter, Baltic trades, 670 stds., £615, nine months; time charter, River Plate and Brazil trade, 4s. 9d., one round trip, delivery France, re-delivery United Kingdom-Continent; Azof, 4,700, Denmark, basis 13s. one port, oilcake, ppt.; 3,600, West Italy, basis 12 fr., ppt.; 6,400, Weser, 10s. 6d., with 3d. less barley, ppt.; 4,000; Rotterdam, 9s. 6d., no reduction, ppt.; 7,600, 10s. 1½d. on d.w., grain, ppt.; 5,000, 10s., no reduction, ppt.; 5,800, basis Rotterdam 10s. 6d., July 20; 5,300, 10s. 6d., August 1; 4,000 max, 11s. n.c. or any, 11s. 6d. Hamburg, barley, ppt.; 4,300, 10 per cent.,



## EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During June and the first six months of 1911, 1912 and 1913

	June, 1913.						June.					
	Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
	Tons.	£	Tons.	£	Tons.	£	1911.	1912.	1913	1911.	1912	1913
Russia .....	111,897	71,689	35,378	23,378	553,989	411,020	437,467	533,154	701,761	238,588	338,132	506,087
Sweden .....	61,235	37,429	31,244	19,809	258,620	177,257	353,895	350,168	351,144	174,281	197,215	231,495
Norway .....	52,603	28,318	6,237	3,894	98,779	70,207	124,473	155,150	157,619	57,172	83,839	102,419
Denmark .....	42,623	23,999	50,900	33,171	105,963	74,792	202,324	244,718	199,486	101,109	144,061	131,962
Germany .....	299,030	169,436	289,380	169,477	183,643	121,310	764,896	967,330	772,053	333,200	490,244	460,223
Netherlands .....	75,467	44,927	33,987	21,660	38,283	26,207	169,969	195,330	147,737	85,195	103,100	92,794
Belgium .....	69,331	35,525	30,386	19,631	35,750	24,332	128,103	130,154	135,447	54,279	62,411	79,538
France .....	460,007	247,392	277,660	170,256	324,728	256,490	809,163	944,872	1,062,395	429,927	517,869	674,158
Portugal, Azores, and Madeira .....	23,073	14,289	17,903	11,742	85,676	75,003	79,252	101,317	126,652	50,273	66,153	101,034
Spain and Canaries .....	34,993	24,299	83,571	52,297	171,431	143,044	210,254	271,942	290,000	131,344	180,547	219,640
Italy .....	96,553	48,822	207,517	131,248	473,388	389,886	824,006	716,113	777,463	473,086	465,948	569,956
Austria-Hungary .....	2,100	1,222	13,030	8,390	18,552	15,302	82,050	68,816	33,732	40,085	38,381	24,914
Greece .....	6,167	4,355	23,440	14,824	23,142	21,861	55,738	23,190	54,749	31,748	13,788	41,040
Turkey .....	—	—	4,340	3,063	9,778	7,315	32,009	29,575	14,118	20,084	19,444	10,378
Egypt .....	11,169	6,959	17,978	11,458	181,848	147,115	224,477	180,704	209,995	143,114	118,119	165,532
Algeria .....	21,905	11,669	34,413	20,979	31,234	29,171	93,021	80,156	92,552	53,209	45,277	61,819
United States of America .....	—	—	—	—	—	—	126	100	—	154	118	—
Chile .....	930	1,063	—	—	70,024	59,137	71,986	89,344	70,954	53,476	73,407	60,200
Brazil .....	1,261	1,232	5,130	3,057	164,173	149,032	106,339	147,070	170,564	79,356	119,819	153,321
Uruguay .....	—	—	—	—	60,911	54,929	51,319	63,882	60,911	38,709	51,997	54,929
Argentine Republic .....	8,416	7,967	—	—	289,299	244,021	203,630	247,909	297,715	143,039	190,972	251,988
Gibraltar .....	4,571	2,853	4,671	2,742	10,164	8,151	37,477	13,366	19,406	25,591	8,588	13,746
Malta .....	8,089	4,619	10,346	7,654	16,865	13,319	18,934	12,970	35,300	12,360	7,126	25,592
British South Africa .....	219	211	2,317	1,738	1,843	1,585	2,346	5,823	4,379	1,369	3,994	3,534
India .....	189	161	—	—	14,393	11,717	14,839	9,323	14,582	8,774	5,298	11,878
Straits Settlements .....	824	1,221	—	—	—	—	249	972	824	442	1,478	1,221
Ceylon .....	707	870	—	—	28,446	26,111	16,994	20,406	29,153	13,278	16,044	26,931
Other countries .....	30,810	21,749	8,172	5,705	133,709	117,407	123,512	147,790	172,691	83,689	107,425	144,861
Total { Anthracite .....	109,407	76,390	339	339	109,068	96,410	183,150	189,973	218,814	134,285	153,089	173,139
Steam .....	1,077,724	589,980	253,509	157,467	3,066,558	2,429,729	3,846,978	3,928,199	4,397,791	2,178,627	2,457,885	3,177,176
Gas .....	79,951	44,699	793,139	490,864	113,420	80,144	858,468	1,161,590	936,510	412,390	604,233	615,707
Household .....	45,789	29,206	202	138	98,801	67,551	100,387	154,856	144,792	52,021	88,655	96,895
Other sorts .....	114,358	72,001	141,361	87,365	2,784	1,937	249,910	322,026	258,503	119,678	167,943	161,303
Total .....	1,427,229	812,276	1,188,550	736,173	3,390,631	2,675,771	5,238,893	5,756,644	6,006,410	2,897,001	3,471,795	4,224,220
Total (June 1912) .....	1,379,520	667,774	1,339,536	689,627	3,037,588	2,114,394	—	—	—	—	—	—
Total (June 1911) .....	1,201,962	532,447	1,123,472	536,566	2,913,459	1,827,958	—	—	—	—	—	—
Coke .....	—	—	—	—	—	—	69,670	51,139	75,336	54,277	43,516	77,339
Manufactured fuel .....	—	—	—	—	—	—	134,212	108,649	183,162	94,575	87,103	164,929
Total of coal, coke & manufactured fuel .....	—	—	—	—	—	—	5,442,775	5,916,432	6,266,908	3,045,853	3,602,414	4,466,488

First six months of 1913.

First six months.

Total { Anthracite .....	649,472	447,387	339	339	757,286	671,250	1,169,675	974,193	1,407,097	870,344	774,467	1,118,976
Steam .....	6,245,060	3,468,616	1,840,162	1,147,458	17,949,023	13,809,200	22,985,294	18,720,167	26,034,245	13,324,161	12,104,361	18,425,274
Gas .....	469,038	257,495	4,446,584	2,646,134	594,786	417,548	5,074,073	4,437,837	5,510,408	2,472,143	2,353,550	3,321,177
Household .....	251,785	152,025	1,339	946	602,251	401,321	713,568	640,455	855,375	375,543	379,601	554,292
Other sorts .....	758,511	472,808	901,339	551,308	59,260	41,575	1,551,349	1,350,671	1,719,110	741,790	723,723	1,065,691
Total .....	8,373,866	4,798,331	7,189,763	4,346,185	19,962,606	15,340,894	31,493,959	26,173,323	35,526,235	17,783,986	16,335,702	24,485,410
Total for six months of 1912 .....	5,899,291	2,861,182	5,636,455	2,965,542	14,637,577	10,508,978	—	—	—	—	—	—
Total for six months of 1911 .....	7,062,917	3,111,340	6,397,378	3,075,452	18,033,664	11,597,194	—	—	—	—	—	—
Coke .....	—	—	—	—	—	—	462,559	388,108	499,670	351,547	301,701	436,527
Manufactured fuel .....	—	—	—	—	—	—	851,867	635,283	1,022,232	589,149	489,111	867,315
Total of coal, coke & manufactured fuel .....	—	—	—	—	—	—	32,808,385	27,196,714	37,048,137	18,724,682	17,126,514	25,839,252

Rotterdam 10s. 6d., Antwerp, Emden, or Weser 10s. 9d., Hamburg 11s., with 3d. less barley, ppt.; 7,500, Rotterdam 10s., Weser 10s. 3d., Hamburg 10s. 6d., with 3d. less barley, ppt.; Kherson, Nicolaieff, Odessa, Novorossisk, or Theodosia, 4,000, Rotterdam 8s. 9d., no reduction, ppt.; San Lorenzo, 4,500, 10 per cent., United Kingdom-Continent, 16s. 6d. o.c., less 6d., August-September; 4,300, 10 per cent., 17s. o.c., less 6d., ppt.; 5,000, 10 per cent., 16s. 3d. o.c., less 6d., August-September; 16s. 6d. o.c., no reduction, 3d. less if Bristol; 5,200, 10 per cent., 16s. 6d. o.c., less 6d., August; 5,200, 10 per cent., Marseilles or Genoa, 18s., July; 4,500, 10 per cent., United Kingdom-Continent, 18s. 6d. o.c., less 6d., ppt.; 5,400, 10 per cent., 17s. 6d. o.c., less 6d., less 3d. more if Liverpool or Birkenhead, July-August; 4,500, 10 per cent., 17s. o.c., less 6d., August; 4,000, 10 per cent., 18s. o.c., less 6d., July 31; 2,376 net, 17s. o.c., less 6d., July; time charter, States and West Indies, about 3s. 6d., one round trip, delivery and re-delivery north of Hatteras; £675, two years; time charter, Australian and Eastern trade, 6s. one trip, delivery Newcastle, N.S.W., re-delivery Java or Manila.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, July 1, 1913, is as follows:—Amsterdam, 1,184 tons; Antwerp, 487; Abn, 1,244; Alexandria, 9,506; Allinge, 189; Bremen, 1,668; Barcelona, 3,674; Charente, 1,006; Cronstadt, 15,289; Copenhagen, 142; Drontheim, 254; Drammen, 405; Delfzyl, 1,134; Danzig, 294; Elfrida, 2,460; Flekkfjord, 169; Gefle, 2,255; Ghent, 549; Harlingen, 1,334; Harburg, 488; Hornum, 153; Hamburg, 11,268; Konigsberg, 3,568; Libau, 920; Malmo, 478; Marseilles, 1,301; Newfairwater, 223; Oxelosund, 7,327; Oporto, 1,194; Pernau, 1,500; Rotterdam, 4,493; Riga, 5,275; Rouen, 3,779; St. Petersburg, 14,458; St. Malo, 302; Santos, 5,560; Stockholm, 543; Wyk, 108; Ystad, 1,287; total, corresponding period last year, total, 93,936

## COAL, IRON AND ENGINEERING COMPANIES.

**Argentine Iron and Steel Company Limited.**—The report for the ten and a-half months ended February 28 shows a net profit of £75,360, and, after placing £8,000 to general reserve, the directors recommend final dividends, making 9 per cent. for the period on both the preferred and ordinary shares, carrying forward £2,282 to credit of the former and £1,771 to credit of the latter. It is proposed to increase the capital by the creation of 200,000 new shares of £1 each, one half of which will be issued privately at par and the balance held in reserve.

**Avery (W. and T.) Limited.**—The directors report for the year to March 31 last that, after allowing £8,296 for depreciation and including amount brought forward from last year, the balance of revenue account is £39,041. From this amount has to be deducted for interest on debentures £4,000; for interim dividend for half-year to September 30, 1912 (paid October 1, 1912), on the 5 per cent. preference shares, less income-tax, £2,939; for interim dividend for half-year to September 30, 1912 (paid January 1, 1913), at the rate of 5 per cent. per annum on the ordinary shares, free of income-tax, £2,665, leaving a disposable surplus of £29,437. The directors recommend that this sum should be applied as follows: To dividend on the 5 per cent. preference shares for the half-year ended March 31, 1913, already paid, £2,939; to pay on the ordinary shares a dividend for the half-year ended March 31, 1913, at the rate of 15 per cent. per annum (free of income-tax), making, with the interim dividend, 10 per cent. for the year, £7,997; to place to reserve (which will then stand at £58,500) £10,000, and to carry forward to the next account £8,501. The business of Parnall and Sons Limited, in which all the shares were held by this company, has now been absorbed, and its assets and liabilities are incorporated in the balance-sheet.

**Bessemer (Henry) and Co. Limited.**—The directors have decided to pay an interim dividend of 5s. per share (less tax) on the preference shares, and 6d. per share (free of tax) on the ordinary shares to shareholders on the company's books on the 14th inst.

**Consolidated Cambrian Limited.**—The report states that the total number of shares allotted is 1,007 ordinary shares of £1 each, upon all of which the full amount has been paid

in cash, and 593,352 ordinary shares of £1 each, and 694,430 preference shares of £1 each, the whole of which have been issued as fully paid in accordance with and for the consideration mentioned in the deposit agreement dated March 19 last. The total amount of cash received by the company in respect of the shares issued wholly for cash is £1,007. The receipts and payments of the company on capital account to June 30 last are as follow:—Received on account of shares allotted, £1,007; paid for preliminary expenses, £25,361 12s. 4d. The preliminary expenses of the company are estimated at £45,000.

**Davy Brothers Limited.**—Including £1,811 brought forward, the gross profit made during the year ended April 30, after deducting interest on mortgage and other loans (£2,728) and depreciation (£1,938) was £8,669. The directors recommend a dividend at the rate of 4 per cent. per annum on the ordinary share capital, free of tax, £2,000 is put to reserve, and the balance carried forward is £1,414.

**East Kent Light Railways Company Limited.**—A general meeting was held at Dover on the 4th inst., Mr. Arthur Burr presiding. He stated that the railway was now open for traffic from Shepherdswell to Wingham, serving Tilmanstone, Wingham, Guilford and Woodnesborough Collieries. The branch connecting Wingham with Stodmarsh was well forward, and the permanent line from Eastry to Sandwich was making great progress. He referred to the new Adisham Colliery, and said this was one of the areas sold to the French Syndicate, the Concessions Company taking the royalties and half the profits. A special meeting was afterwards held to consider a draft order before the Light Railway Commissioners authorising the construction of light railways from Hammill to Snowdown Colliery from Little Mongeham to Deal, from Wickhambreux to Canterbury, and from Coldred to Alkham, with a branch to Lydden Colliery, and branch railways at Little Mongeham, Wingham and Stonar.

**Electric Construction Company Limited.**—The report for the year ended May 31 last states that the net profit for the year (after payment of £6,903 for debenture interest and crediting £5,000 as formerly to depreciation account) is £27,500. The sum brought forward from previous year was £5,693, and the amount available for distribution is,



COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of June 1913, compared with the corresponding month of 1912.\*

Port.	June 1913.		June 1912.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle .....	787,775	18,792	910,088	13,920	—	122,313	4,872	—
North Shields .....	80,445	2,121	123,384	1,846	—	42,939	275	—
South Shields .....	153,234	1,999	152,462	1,049	772	—	950	—
Sunderland .....	272,322	2,430	296,084	2,109	—	23,762	221	—
West Hartlepool .....	83,763	1,414	155,490	1,417	—	71,727	—	3
Goole .....	118,599	2,144	92,349	2,234	26,240	—	—	90
Blyth .....	398,196	1,464	347,161	233	51,035	—	1,231	—
Newport .....	387,404	1,665	378,453	1,953	8,951	—	—	288
Liverpool .....	37,731	329	27,458	1,127	10,273	—	—	798
Methil .....	218,726	—	209,369	—	9,357	—	—	—
Glasgow .....	165,893	4,026	182,477	844	—	16,584	3,182	—
Kirkcaldy .....	8,979	—	8,134	—	845	—	—	—
Burntisland .....	131,794	—	123,795	286	7,999	—	—	286
Cardiff .....	1,582,522	7,710	1,345,574	3,219	236,948	—	4,491	—
Borrowstoness .....	39,662	157	60,492	1,238	—	20,830	—	1,081
Llanelli .....	20,085	2	11,986	—	8,099	—	2	—
Middlesbrough .....	169	1,669	2,222	659	—	2,053	1,010	—
Seaham .....	98,737	—	95,695	—	3,042	—	—	—
Swansea .....	264,358	62	220,568	174	43,790	—	—	112
Granton .....	7,133	1,067	10,004	1,115	—	2,871	—	48
Port Talbot .....	190,151	16	152,337	255	37,814	—	—	239
Alloa .....	7,704	—	15,818	—	—	8,114	—	—
Grangemouth .....	126,039	6,101	165,460	9,744	—	39,421	—	3,643
Neath .....	18,035	—	11,244	—	6,791	—	—	—
Hull .....	501,778	3,035	372,575	753	129,203	—	2,282	—
Amble .....	43,433	—	50,435	—	—	7,002	—	—
Troon .....	13,558	—	4,966	—	8,592	—	—	—
Grimsby .....	102,258	502	106,106	—	—	3,848	502	—
Ayr .....	11,226	—	4,021	—	7,205	—	—	—
Greenock .....	—	—	1,933	—	—	1,933	—	—
Leith .....	144,371	—	159,782	—	—	15,411	—	—
Ardrossan .....	2,263	—	—	—	2,263	—	—	—
Stockton .....	—	—	—	—	—	—	—	—

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.\*

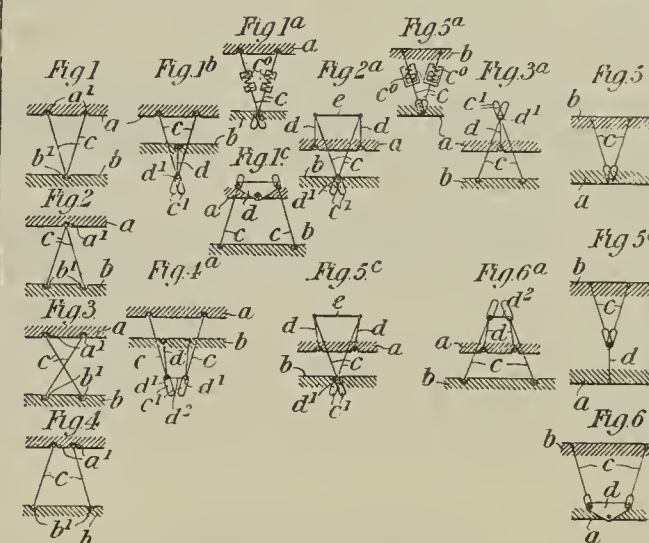
Port.	June 1912.		June 1913.		Port.	June 1912.		June 1913.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle .....	279,253	67	317,131	28	Ayr .....	85,452	—	62,211	—
North Shields .....	1,300	—	—	—	Irvine .....	9,798	—	10,924	—
South Shields .....	7,670	—	225	—	Alloa .....	3,296	—	2,551	—
Blyth .....	15,600	—	11,821	30	Whitehaven .....	24,572	—	18,061	—
Amble .....	2,317	—	5,045	—	Liverpool .....	155,482	—	174,397	90 c. 67 p.f.
Sunderland .....	105,279	—	112,826	—	Grimsby .....	12,749	—	5,329	—
Seaham .....	65,632	—	86,085	—	Granton .....	13,083	—	15,358	—
Hartlepool .....	39,490	—	75,318	—	Borrowstoness ..	10,203	—	22,770	—
Stockton .....	—	—	—	—	Burntisland .....	25,616	—	21,745	—
Middlesbro' .....	330	—	2	40	Kirkcaldy .....	2,719	—	6,365	—
Hull .....	69,331	—	88,909	—	Methil .....	24,302	—	40,870	—
Goole .....	90,546	—	106,280	—	Port Talbot .....	11,046	400 p.f.	14,789	523 p.f.
Swansea .....	13,300	10	33,341	—	Glasgow .....	48,251	437	37,406	570
Cardiff .....	215,400	236	264,645	120	Grangemouth .....	17,159	50	8,133	15
Llanelli .....	6,773	—	5,950	—	Greenock .....	1,371	—	708	—
Newport .....	56,368	9 c. 2 p.f.	69,411	22	Neath .....	13,774	—	8,430	—
Troon .....	21,679	—	16,978	—	Leith .....	9,138	6	15,443	—
Ardrossan .....	12,337	—	5,346	—					

\* From Browne's Export List.

ABSTRACTS OF PATENT SPECIFICATIONS  
RECENTLY ACCEPTED.

11680 (1912). *Improvements in the Manufacture of Fuel.* J. W. Butler, 29, Glenshiel-road, Eltham, Kent.—Peat, in a damp condition, is thoroughly disintegrated, or reduced to the condition of pulp, in a suitable machine, and is then introduced into a steam jacketed mixing pan and heated so as to drive off the moisture. Whilst this drying is proceeding, to the mass a proportion (say from 5 to 7½ per cent.) of the hard tar is added, such hard tar being preferably in a heated or melted condition. During the drying process and the mixing of the hard tar the mass is stirred or agitated until a thorough commingling of the different materials has been effected. The mass can then be filled into moulds and compressed to form briquettes. A drying and mixing machine suitable for the purposes is described. (Two claims.)

12329 (1912). *Improvements in Axle Trucks for Railway, Tramway and Mining Vehicles and Locomotives.* Warner International and Overseas Engineering Company Limited, 5, Carteret-street, London, S.W., and R. C. Hour, 89, rue de St. Cloud, Billancourt, Seine, Paris, France.—Relates to axle-trucks, in which struts or links are employed as a connecting medium between the axles and axle frames, or between the latter and the body or chassis or sub-frames. Pairs of struts or links are employed either alone or combined with other links or struts for connecting the body and axles or frames or the like, and directly or indirectly bearing on one of the said parts at two points, such that a tendency to the resumption of the normal position is set up during the whole or a part of the movement on the relative displacement of the parts. Or single struts or struts are employed as normally bearing at one end at two points on one frame or part, in combination with a single link. In a suitable arrangement for carrying out the invention the



members of each pair of struts or links are so inclined to one another that disturbances in the positions of the axle frame or frames or parts connected thereto displace such struts or links so as to vary their inclination, whereby there is a tendency during a whole or a part of the movement on the part of such struts or links to return the parts into alignment under the action of gravity assisted, if required, by an elastic action. In some cases one link or more than one link may be used in series with two inclined links. In practice it is preferable to connect the axle frame or frames to a king pin or king pins, about which the axle frame or frames can rotate in a horizontal plane. Any number of king pins and major and minor frames may be used and controlled by any number of struts or crutches or links, which may be variously disposed either for effecting direct connection, or in series with one another in various orders or arrangements. Figs. 1 to 6 are diagrammatic views illustrating various forms of connecting mechanism embodying the principle of the invention. (Eight claims.)

12364 (1912). *Improvements in and relating to Mining Machines.* F. E. Van Slyke, 4, Eslington-road, Newcastle-on-Tyne, Northumberland.—Comprises improvements more particularly in that type of mining machine known as the chain longwall or side-cutting machine. The improvements provide in combination a cutter-arm which may be arranged in the advanced position at, for example, an angle of from 70 degs. to 80 degs. to the main frame and a special haulage gear arrangement for moving the machine along the face with a tendency to keep the machine up to the face, which haulage arrangements provide for the rope to exert its pull at one side of the front end of the machine. Haulage-gear arrangements of this kind are described in the prior British Patent Specification No. 6285 of 1912. In carrying out the present improvements the forward inclination of the cutter-arm and the point and direction of haulage must be so co-ordinated as to secure the most efficient traction, taking into consideration the result to be obtained. Preferably provision is made for locking the cutter-arm in any one of several forward inclined positions, this making possible the adjustment of the machine in accordance with varying conditions of use. Fig. 1 is a plan view of the machine as a whole, this view showing the machine in operative position in a mine. Fig. 2 is a side elevation of the machine shown in fig. 1. Fig. 3 is a rear-end view. Fig. 4 is a front-end view. Fig. 5 is a cross-

therefore, £33,194. The directors recommend a dividend of 5 per cent. per annum on the ordinary shares, transfer to general reserve fund (which will then amount to £46,000), £10,690, leaving to be carried forward £6,899. Mr. Philip Edward Beachcroft has been appointed chairman, and Mr. William Bulloch, who has been manager of the works for 11 years, has been elected to fill the vacancy on the Board.

**Harrison, Ainslie and Co. Limited.**—The accounts for last year show that £150,000 has been written off capital in conformity with the order of the Court, this amount representing 15s. per share; £7,800 has been written off pits, and amounts aggregating £25,800 have been waived by creditors in terms of the settlement, the debit balance at profit and loss adjustment account being now £2,516.

**Kent Coal Concessions Limited.**—Speaking last Friday at a meeting of the East Kent Light Railways Company, Mr. Arthur Burr, the chairman, said that the meetings in connection with the projected amalgamation of the parent companies would, he hoped, take place about the last week of the current month. All their balance-sheets were now audited, and the Concessions board had settled that company's accounts. After their adjourned meeting on Monday instructions would be given for convening the ordinary general meeting, and also that of the South-Eastern Coal-field Extension. Notices had already gone out for the Guildford Syndicate's meeting, and notices with regard to the East Kent contract and Financial Company's meeting would be issued early in the following week. Within a week of the general meeting of the Concessions Company he hoped to hold the first amalgamation meeting. The intention was to hold it in London, and he had in preparation a statement of the position which would give shareholders a clear view of the great value of their possessions, which was in no way indicated by the Stock Exchange price of the shares. The amalgamation scheme would, he was confident, command the approval of all shareholders; the future held for them things far greater than anything he had even dreamed of. The directors announce that dividend warrants at the rate of 10 per cent. per annum on the preference shares for the half-year ended June 30 last have been posted.

**Kyshtim Corporation Limited.**—The directors, in their report covering the period from January 1, 1912, to January 13, 1913, state that during the period the remaining £250,000 debentures were issued, bringing the total debenture issue up to £650,000. The interim dividend of 1s. per share, free of income-tax, paid on December 2, 1912, absorbed £50,396, and there remains a balance on appropriation account of £227,634. The directors recommend the payment on July 13, 1913, as a final dividend in respect of the period ended January 13, 1913, of 3s. 6d. per share, free of income-tax. This dividend will absorb £215,068, and

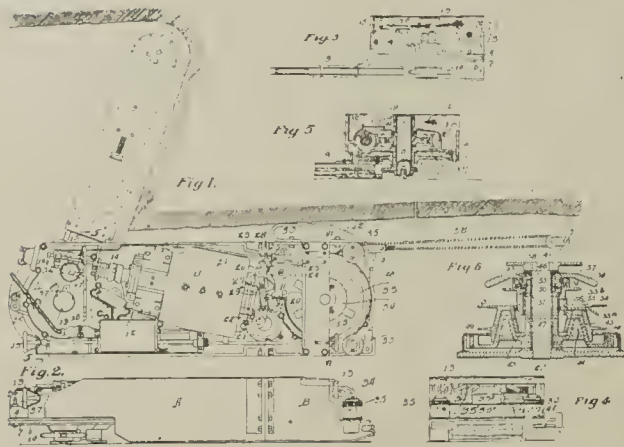
leave a balance to be carried forward of £12,566, of which it is estimated that £8,500 will be required for payment of income-tax.

**Lochgelly Iron and Coal Company Limited.**—The report for the year ended May 31 last states that the profit on the year's trading, after deducting all ordinary expenses and depreciation on works and plant, amounts to £99,080. The amount brought forward from previous year was £9,966, making £109,046, less interest on loans, £1,239, and interim dividends paid December 1912, £13,183—in all, £14,423, leaving £94,623. The directors recommend that this sum should be disposed of as follows:—In payment on July 17 of the following dividends for the half-year to May 31 last: To the preference shareholders at the rate of 5 per cent. per annum, less income tax, £3,295; to the ordinary shareholders, £2 10s. per share, less income tax, £49,437; to be carried to reserve, £25,000; to be carried to next year, £16,890. Early this year the board was approached with a view to acquiring for the company a controlling interest in the business of Robert Forrester and Co. Limited, coal-masters. That company, which owns collieries in the Slamannan and Bathgate districts, is an old-established and successful one, but additional capital is required to develop fully a large area of coal held under lease near Bathgate. A deep pit has been sunk in this field to the dip of the existing workings, and the coals being developed are satisfactory both in thickness and quality, while in the older fields there is still a large quantity of coal which can be worked at moderate cost. An interest in the business has been offered on what the board considers reasonable terms. A provisional agreement has been entered into, in terms of which Robert Forrester and Co. Limited are to increase their capital to £140,000, consisting of 7,000 6 per cent. cumulative preference shares and 7,000 ordinary shares of £10 each, and the Lochgelly Company is to take up at par 3,500 of the preference shares and 3,600 of the ordinary shares. The preference shares are to be paid up in full on allotment, and the ordinary shares are to be paid up as the money is required, probably in the course of a year. As the two companies will be so closely connected, and the Lochgelly directors will practically control the affairs of Robert Forrester and Co. Limited, it is proposed that Mr. Robert Forrester should, on acquiring his qualification, be elected to a seat on the board of the Lochgelly Company. No increase in the capital of the Lochgelly Company will be required for the purpose of taking up these shares.

**Metropolitan Coal Company of Sydney Limited.**—The directors announce a dividend of 5 per cent., less income-tax, on the 10 per cent. preference shares on account of arrears, setting aside £3,000 for depreciation of buildings and plant, and carrying forward £18,280.

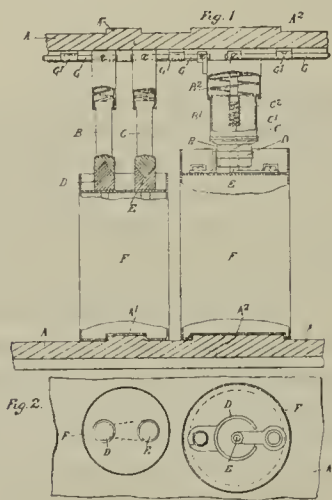


transverse section on the line 5—5 of fig. 1, and fig. 6 is a transverse section on the line 6—6 of fig. 1. The means for locking the turntable and cutter-arm comprise the apertured bracket 36 and the pin 37. Suitable apertures are provided in the turntable, and by inserting the pin



into one or another of these apertures the cutter-arm can be locked in the desired position. In addition to the adjustment made possible by the apertures in the turntable, further adjustment can be obtained by means of the two apertures in the bracket 36. (Five claims.)

12505 (1912). *Improvements relating to the Storing and Charging of Electric Hand Lamp and like Secondary Batteries and in Apparatus therefor.* W. Maurice, of "The Elms," Hucknall Torkard, Nottinghamshire.—Refers to storage accommodation of the kind which is adapted to serve as a multi-charging device, so that the batteries of the lamps when they are returned to the store can, with the minimum of handling and manipulation, be recharged before they are issued to the workmen again. Fig. 1 is a front elevation partly in section, and fig. 2 a plan of storage shelves fitted with charging contacts. The storage shelves are provided with electrical charging contacts connected to, say, a charging dynamo or source of supply, and these contacts are disposed so that they will make contact with the terminals of the respective batteries, when the latter are placed on the said shelves. Provision is also provided for positioning the batteries on the shelves where necessary, so as to ensure the proper connections being set up without risk of error. For batteries F of the usual type with terminals at the top, as shown on the left of figs. 1 and 2 (which shows two forms of contacts, although it is intended to employ one form of contact throughout each shelf), the charging contacts B and C consist of spring plungers, which are carried by rods G secured to brackets G<sup>1</sup> fixed to



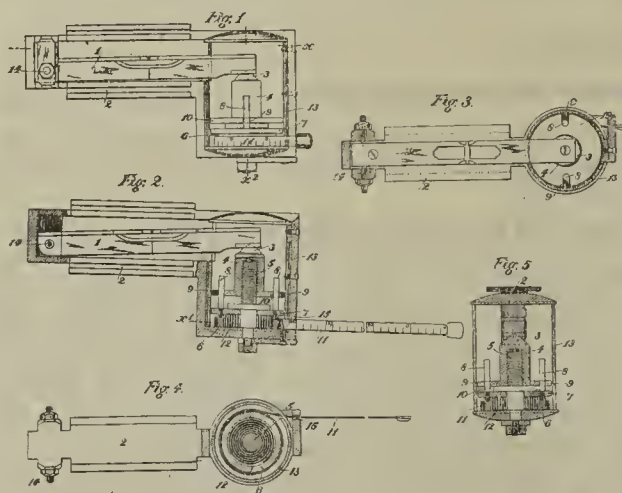
the underside of the shelves A. The charging contacts B and C may be adjustable horizontally on the rods G, so as to provide an adjustment for batteries with different spaces between their terminals D and E. The rods G serve as conductors and connect the positive charging contact of one pair to the negative contact of the other pair, and thus connect the whole of the batteries F up in series. To connect the batteries up in parallel the contacts B and C are connected to independent continuous rods or conductors. Special provision is made to ensure that the respective terminals D and E on the batteries are placed in connection with the charging contacts B and C of the same polarity. One battery terminal D is made pointed, and the corresponding charging contact B is made hollow, whilst the other terminal E is made hollow and the charging contact C is pointed. Reversal of the battery will render proper contact difficult, and prevent wrong connections being set up. The same result may be attained by employing shelves A, which have raised parts or recesses of suitable shape, and making the bases of the batteries F, so that they will only fit on or in the same when the terminals are in the right position. This arrangement may be made to serve the double purpose of determining the exact position of each battery on the shelf, and the relation of its terminals, to the charging contacts. The shelf A may be provided with raised parts A<sup>1</sup> of irregular shape, placed at intervals along the same, and the bases of the batteries F are made with corresponding shaped recesses to fit on said raised parts. If preferred circular raised parts with a break or notch may be employed, the recess in the base of the

battery in this case being provided with a part to fit in said notch. If preferred concentric plug contacts may be employed as shown on the right of fig. 1, and this obviates the necessity for providing additional means for positioning the batteries. In this construction the battery terminal D is made in the form of a ring, and the terminal E is a socket arranged concentrically within the former. The charging contact B is a sleeve adapted to fit in the ring terminals D, whilst the charging contact C consists of a concentric pin which fits into the socket terminal E. Current for charging the batteries may be obtained from any convenient source of supply. For example, a motor generator may be used, the motor being driven from a high voltage power circuit. The shaft or spindle of this motor generator may be extended and be adapted to carry buffing discs, brushes, or other lamp-cleaning devices, or tools for locking or unlocking, or for putting together or separating the several parts of the lamps. (Seven claims.)

12770 (1912). *Improvements in the Manufacture of Explosives from Glycols or their Oxides.* F. E. Matthews, Ph.D., F.I.C., and E. H. Strange, M.Sc., both of 7, Staple Inn, in the county of London, and H. J. W. Bliss, M.A., of Ingram House, Stockwell, London.—Consists in the manufacture of explosives from glycols having their OH groups on neighbouring carbon atoms, or from oxides of such glycols. Nitrated compounds may be produced from certain glycols which can be prepared from paraffins, or olefine hydrocarbons, or higher alcohols, the paraffins in particular being obtainable cheaply and in large quantities. (Two claims.)

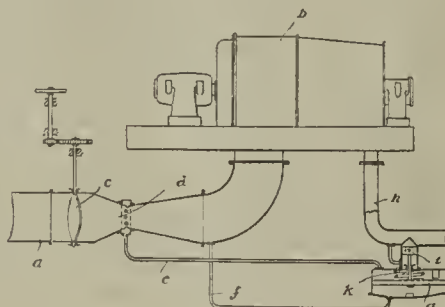
16111 (1912). *Composition for Coating Pellets of Black Powder or Other Blasting Charges.* Curtis's and Harvey Limited, of Cannon-street House, London and C. L. W. Smith, of Faversham, Kent.—Relates to a means for covering pellets of black powder and other blasting charges used in coalmines with a distinctive coating so that they may be easily distinguished from coal if left therein. The covering composition that has been found to be satisfactory for this purpose is made from substantially 13 parts by weight of paraffin wax and one part by weight of metallic aluminium. This composition is applied to the pellet in any convenient manner, and when so applied to a pellet gives a colour and lustre to the same, which renders its detection in coal quite easy. (Two claims.)

18856 (1912). *Improvements in Clinometers.* H. Ely, High-street, West Bromwich, near Birmingham.—Relates to clinometers for measuring angles of elevation and depression, and consists essentially in arranging the spirit level of the clinometer to be adjusted to a horizontal position, after the instrument has been sighted or set at the angle to be measured, by means of a rotatable drum around which is wound a tape measure or graduated scale, which is coiled up or paid out according to the angle through which the



level is moved, the said measure or scale being so graduated that the extent to which it is wound or unwound represents the angle to be determined. Fig. 1 represents a side elevation of a clinometer constructed in accordance with this invention, showing same in a horizontal position. Fig. 2 shows a sectional elevation of the instrument when tilted for the purpose of ascertaining the angle of elevation or depression of an object. Fig. 3 is a horizontal section through x<sub>1</sub>, fig. 1. Fig. 4 represents a section through x<sub>2</sub>, fig. 2. Fig. 5 shows a vertical section through x<sub>2</sub>, fig. 1. (Three claims.)

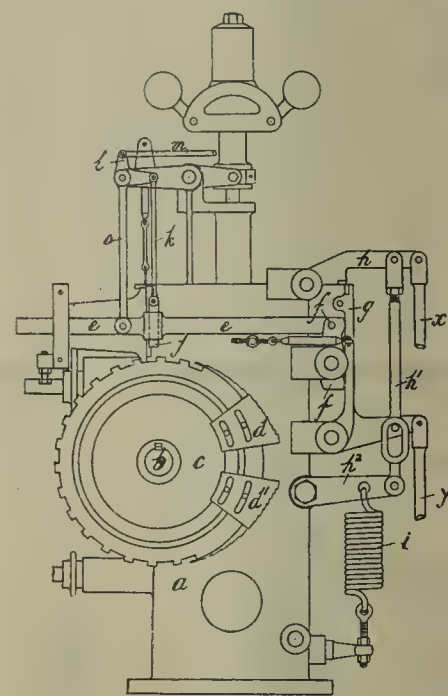
21955 (1912). *Improvements in and relating to Centrifugal Compressors.* The British Thomson-Houston Company Limited, of 83, Cannon-street, London, E.C. (A communica-



tion from the Allgemeine Elektricitäts-Gesellschaft, of Friedrich Karl-Ufer 2-4, Berlin, Germany.—Relates to rotary compressors, and consists in taking the pressure difference acting upon the blow-off valve from a part of the

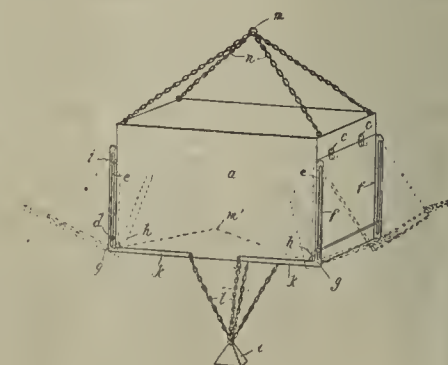
suction pipe of the compressor which follows a throttling member, so that the pressure difference which is critical for the opening of the blow-off valve depends upon the suction pressure, which is regulated by a throttling device. (Two claims.)

23511 (1912). *Improvements in Controlling Gear for Winding, Hauling and similar Engines.* J. W. Melling, of 82, Swinley-road, Wigan.—Relates particularly to controlling gear in which auxiliary or supplementary means are provided for accelerating the action of such gear (whether emergency gear or otherwise) to prevent overwinding or the like by shutting off motive power and applying the brakes in the event of the attendant suddenly applying full power or power in excess of requirements when very near the end of the wind or run in either direction. The invention consists in the provision of a sliding bolt or equivalent adjustable stop on the governor-controlled bar which is suspended over the stepped side plates of the emergency gear on the notched disc or circular rack, the said bolt or stop being coupled to the steam lever by which it is operated in conjunction with the stepped side plates of the circular rack. The speed-controlled emergency gear



illustrated is of the type described in the specification of former application No. 17888 of 1912. The bolt *j* is so held by its connections, that if the engineman's steam valve or other source of power is full open or "on" when near the end of the wind or the like operation in either direction, it (the bolt *j*) would come into contact with one of the teeth or projections on the plates *d d'* before the wind or the like operation could be completed, and so ensure the immediate shutting off of the motive power and application of the brakes. When, however, the motive power is shut off, the bolt *j* is partially withdrawn, and will only come into contact with a tooth or projection late enough to allow the completion of the wind without bringing the emergency gear into action unless the speed was such as to cause the governor to lower the bar *e* through the rod *o* in the ordinary way, thereby also lowering the bolt *j* and tripping the levers *g* and *h*, and so shutting off motive power through the rod *x* and applying the brakes through the rod *y*. (Two claims.)

24844 (1912). *An Improved Anti-breakage Box for Large Coal or any other Material.* B. W. Coopey, 148, Western-street, Swansea.—Relates to anti-breakage boxes for shipping coal or other material, provided with hinged doors at the ends, which are automatically released on the box contacting with the bottom of the coal bunker of the ship or other surface for the self-discharge of the contents down an inclined bottom formed in the box. An arrangement of



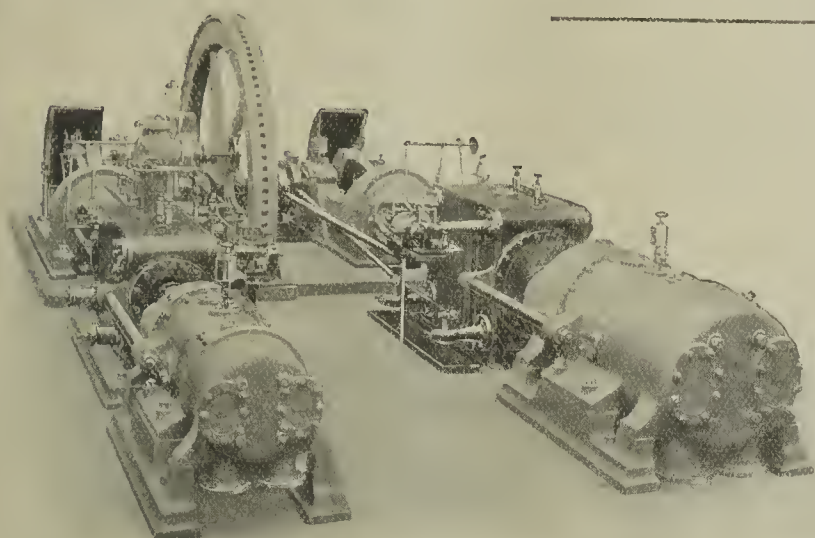
bell-crank levers is employed pivotally fitted to the sides and having slotted limbs which normally occupy a position vertically alongside the side edge of the box or other suitable angle and with which engage cross-bars fixed to the doors, the horizontal limbs of the bell-crank levers being inwardly disposed along the bottom edge of the box and having a weight or the like suspended from their respective horizontal extremities which normally retains the slotted limbs in the vertical position. The box is hauled into position by means of chains connected to eye-bolts fixed to the mouth of the box and suspended from a crane or other



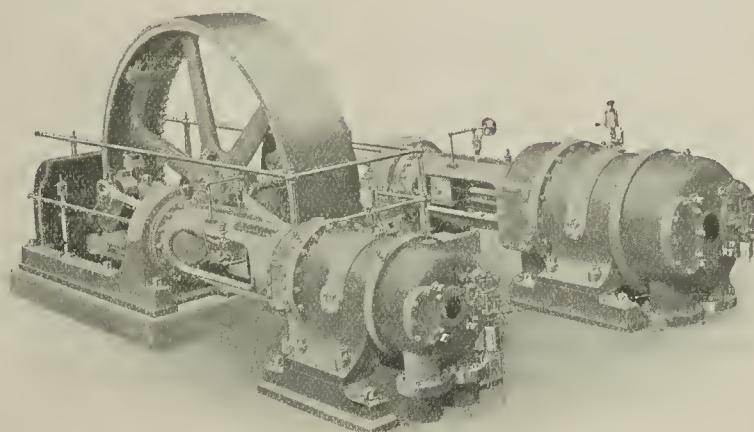
# WALKER BROS. (WIGAN) LTD

Pagefield Ironworks, WIGAN.

New Broad Street House, LONDON.



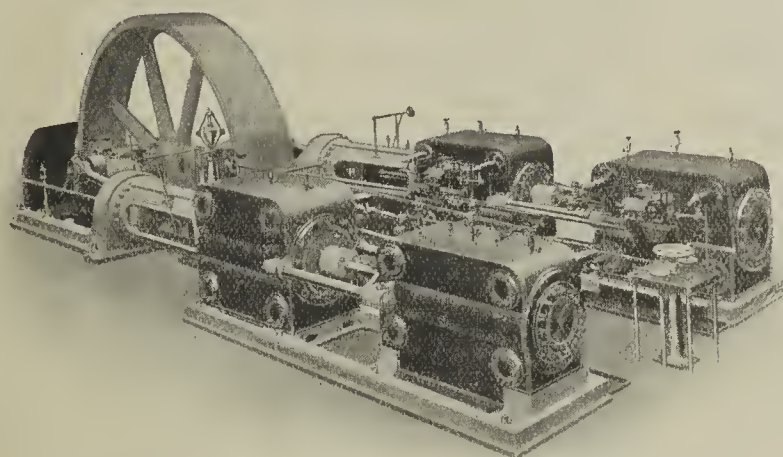
Pair Compound Corliss Steam Two Stage Air Compressing Engines.



Pair Two Stage Air Compressing Engines for Belt Drive.

## NEW PATENT DISC VALVES FOR AIR COMPRESSING & BLOWING ENGINES. HIGH EFFICIENCY AND LARGE OUTPUT.

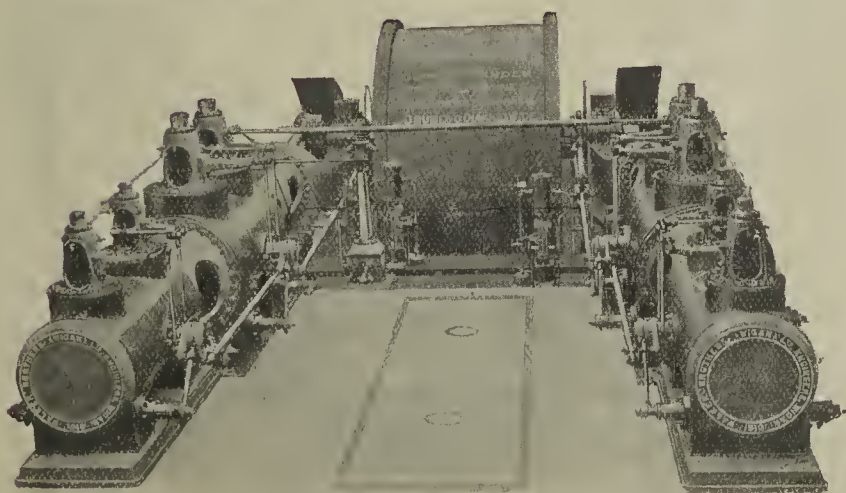
Applicable to existing Installations.



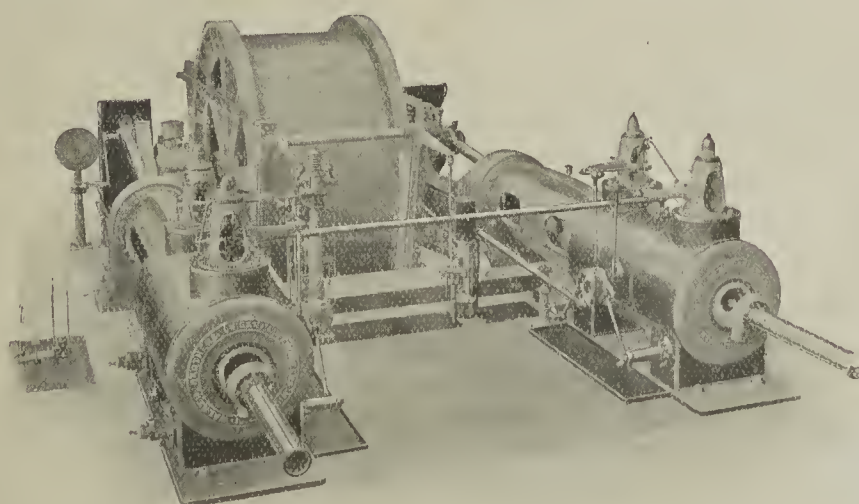
Triple Expansion Driving Engine with Corliss Valve Gear.

## "INDESTRUCTIBLE" TYPE VENTILATING FANS FOR STEAM OR MOTOR DRIVING.

EASY MEANS FOR REVERSING AIR CURRENT.



Twin Tandem Compound Winding Engines.



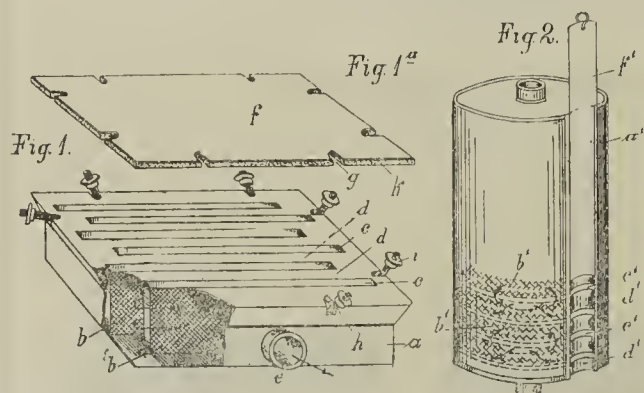
Horizontal Winding Engines with Two Non-Compound Cylinders.

WINDING, HAULING, AND GENERAL MINING MACHINERY.



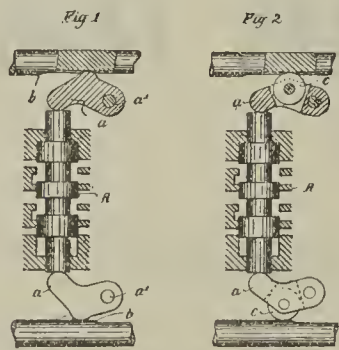
pliance on the wharf. When the weight suspended from the horizontal limbs of the levers comes in contact with the coal in the hold or with the bottom of the hold of the ship, or other surface, the ends of the levers are relieved from the weight and the contents of the box force the doors open, and are discharged bodily into the ship's hold or as the case may be. One practical form of the invention is illustrated in the accompanying drawing, which shows a side elevation of a box for automatically discharging the contents thereof, constructed in accordance with the invention. (Three claims.)

27965 (1912). *Improvements in and relating to Air Regenerators for Respiration Apparatus.* W. E. Lake, 7 and 8, Southampton-buildings, London. (Communication from the firm of Drägerwerk, Heinh. and Bernh. Dräger, of 53, Moislinger Allee, Lubeck.)—Relates to air cleaning or regenerating devices for use in connection with breathing or respirating apparatus. The invention combines the advantages of the refillable regenerators with the known usually preferred cartridges or batteries. In the known batteries or cartridges there are flat shelves or carriers made of sheet iron and wire net or mainly of wire net adapted to carry layers of chemicals. In order to render the cartridge refillable, according to the invention apertures such as slits or the like are provided in the wall of the cartridge, care being taken that the air passages that lead through the regenerator are closed towards outside. By way of the apertures in the wall of the cartridge the



carriers can be easily filled with granular chemicals without allowing the grains to fall into the air passages. By the aid of a funnel, which may be constructed so as to allow of filling several or all carriers at the same time, the refilling can also be facilitated. When the filling has been accomplished, all openings or apertures can be closed by a common cover or slide in such manner, that there is no communication between one opening and the following one. With this object it is advisable to insert an elastic layer, such as a soft rubber plate or the like under the rigid cover. If the filling openings are arranged in a row they can be closed by means of a common slide. Fig. 1 is a perspective view of a rectangular refillable cartridge with its cover removed, the cover being shown in fig. 1<sup>a</sup>, and fig. 2 is a modification showing a cylindrical cartridge. (Five claims.)

28839 (1912). *Improvements relating to the Valve Operating Gear for the Motors of Shaking or Jigging Conveyors.* Maschinenfabrik "Westfalia" Aktien-Gesellschaft, of Gelsenkirchen, Westphalia, Germany.—Relates to valve operating gear for the motors of shaking or jigging conveyors, of the kind in which a piston valve is controlled or actuated by a cam lever. According to the invention, at each end of the piston valve of the motor a cam lever is employed, operated by a reciprocating rod and



acting on the respective end of the piston valve, these cam levers being pivoted at points situated to one side of the valve. By this means an increased length of reciprocation can be obtained for the piston valve. As the shoulder or portion of the cam lever which acts against the tappet or shoulder of the valve-operating rod is liable to much wear owing to the considerable resistance or inertia which the piston valve opposes to starting, the cam levers are preferably provided with a roller at this point, fig. 1 being a diagrammatic section of the one form of valve gear, and fig. 2 a similar view of the other form. (Two claims.)

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnership:—G. Wood and J. A. Wood, carrying on business as metal workers, at Perseverance Works, Gower-street, Bradford, under the style of Geo. Wood and Son; H. F. Broadhurst and G. A. M. Broadhurst, carrying on business as well boters and manufacturers and suppliers of well boring and pumping machinery, at Pentonville-road, under the style of the Artesian Well Boring Company.

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

15012. Apparatus for automatically conveying tin-plates and the like from a tinning machine to a cleaning machine. A. A. Jones.
15019. Pyrometers, gas analysis apparatus, and the like. M. Arndt.
15021. Truck frames. F. W. Golby. (Brown Hoisting machinery Company, United States.)
15036. Chain or chain coupling. D. H. Irons and F. Bowden.
15039. Apparatus for galvanising sheet-metal wires and the like. O. V. Cardell.
15042. Mechanical stokers. G. de Grahl.
15050. Chains. J. M. Dodge.
15064. Device for detecting combustible or explosive gases, especially firedamp. Accumulatoren-Fabrik Akt.-Ges. and Fritz Rüsse.
15094. Method of and apparatus for measuring gas. J. Pintsch Akt.-Ges.
15099. Ingot moulds. H. Jouanneau.
15101. Foundry moulding boxes. H. Rudman, H. T. Lancey and J. E. H. Craven.
15102. Hand-operated moulding machines. H. Rudman, H. T. Lancey and J. E. H. Craven.
15105. Method of lining artesian wells or other borings so that the hole would remain permanent when the steel or iron tubing had perished owing to chemical action or the progress of time. A. F. Williams.
15115. Pawl and ratchet wheel mechanism. T. Vicars, J. Vicars, E. L. Vicars and F. C. Hounsfield.
15130. Devices for use in connection with overspeed, overwind and underwind prevention gear for colliery winding and like engines. R. Yates, J. D. Miller and D. Murdoch.
15134. Recovery of nickel from its ores. H. L. Sulman, H. F. K. Picard and A. E. Roberts.
15136. Winches, hoists and like lifting or hauling apparatus. F. Masters, C. E. Masters and Tittley, Son and Brickley Limited.
15143. Steam turbines. A. M. H. V. de la Saurais.
15155. Recovery of nickel from its ores. H. L. Sulman, H. F. K. Picard, and A. E. Roberts.
15157. Driving chains of the silent type. C. G. Eden, H. W. Allingham, and Hans Renold Limited.
15186. Fuel economisers for heating feed-water for steam boilers. E. A. L. Green and H. Slade.
15218. Electrically-operated drill of the percussion type. T. F. Wall.
15235. Union joints and couplings for electrical and other accessories. J. N. Mollett.
15246. Manufacture of welded tubes. E. A. Edwards and Credenda Conduits Company Limited.
15272. Device for ascertaining the weight of cargo on barges and other vessels. P. H. Suisted and P. R. Davison.
15273. Process and apparatus for intermittently producing oxygen for inhaling purposes. G. Matschinski.
15282. Treatment of iron or steel for prevention of rust. T. W. Coslett.
15286. Joining or bonding the junctions of metallic sheathing or armouring of electric conductors. L. Sunderland.
15300. Process of and apparatus for distilling mineral oils and the like. K. Kubierschky.
15304. Dressing ores. C. Vautin.
15323. Metal furnaces. I. Hall.
15344. Conveyors, more particularly intended for conveying coils of wire. Fried. Krupp Akt.-Ges.
15366. Poking holes for suction gas-producers and like apparatus. P. T. Houston.
15367. Suction gas-producer apparatus. P. T. Houston.
15368. Heating-furnaces. Galloways Limited and J. P. Shepherd.
15376. Process for manufacturing steel plates, armour-plates, hollow bodies and the like. H. Braun.
15379. Furnaces for gaseous reactions at high temperatures. R. P. Pictet.
15396. Means for transporting loads. Sir W. G. Armstrong, Whitworth and Co. Limited, and D. B. Farquharson.
15399. Hinges and means for securing the doors or hinged sides or ends of railway wagons and other vehicles. N. H. Morris. (William Greaves Mackern, Argentine.)
15413. Apparatus for heating boiler-feed water. D. B. Morison.
15439. Process for briquetting fuel. F. Reinold.
15456. Synthetic petrol and solidified fuel. W. Higgins.
15459. Process for the manufacture of motor spirit similar to petrol. T. Franke.
15470. Combustion of combustible mixtures. Bonecourt Surface Combustion Limited and N. B. Richards.
15472. Apparatus for the compression of air or gas. W. M. Melmore.
15517. Gas-driven pumps. H. Tooley.
15531. Surface feed-water heaters. D. B. Morison.
15536. Steam-turbine-driven rotary feed pumps. G. and J. Weir Limited and J. Petermoller.
15554. Coating sheet steel or iron by dipping. P. B. Taylor.
15555. Railway and like vehicles. F. L. Davis.

### Complete Specifications Accepted.

To be published on July 24.

1912.

3903. Miners' safety or like lamps. Hailwood.
14896. Process for briquetting fine ores and more particularly iron ore. Marks (Maschinenbau-Anstalt Humboldt).
15209. Apparatus for the purification of gases. Bouhon.
15252. Liquid-fuel furnaces for melting metals and their alloys and for other metallurgical operations. Etienne, Caet, Mercier, and Mercier.
15283. Furnaces for heating copper ingots and for other like uses. Gibbons and Masters.
15384. Means for compensating for changes in barometric pressure in pyrometers, gas-analysing apparatus, and the like gases. Arndt.
15546. Apparatus for ore concentration. Minerals Separation Limited (Hebbard).
15601. Measuring rules for use by coalminers, timbermen, and the like. James.

15706. Electrical distribution junction boxes or apparatus. British Insulated and Helsby Cables Limited and Allwood.
15775. Percussive tools. Guenee.
16218. Removal of zinc from the ore, particularly zinc lead ore. Woltreck and Moeller.
17885. Steelyard weighing apparatus or the like. Gibbs and Brown.
18924. Means for promoting combustion in steam boiler furnaces. Fullarton.
19043. Apparatus for shearing, polishing, trimming, corrugating, beading, flanging and bending or otherwise treating sheet metal and the like. Hickman.
19222. Clutches for conveying rotary motion. Green.
19528. Hooks for load-lifting chains or ropes. Mathwin and Mathwin.
19635. Gas producers. Farnham.
20164. Casting or moulding boxes. Korting.
21656. Centrifugal pumps. George Fletcher and Co. and Rudder.
22163. Driving chains. Renold and Hans Renold Limited.
22602. Workmen's checkboard. Giddins.
22712. Machines for sharpening the teeth of saws for cutting steel or other metals. Humpage.
23103. Appliances for elevating and conveying stone, ores, coal and other minerals or materials. Pochin and Pochin.
24643. Electro-magnetic separators. Maschinenbau-Anstalt Humboldt.
25698. Method of and apparatus for making or treating fuel. Smith.
26628. Steam generators. Babcock and Wilcox Limited and Branczik.
27702. Fluid-pressure turbines. Hodgkinson.
27843. Blasting powder. Ponnay.
29694. Moulding boxes for foundry use. Karcher.

1913.

218. Aluminothermic and similar methods of uniting railway and tramway rails and the like. Th. Goldschmidt Akt.-Ges.
1384. Purification of coal and other gas. Manchester Paint and Varnish Company and Jordan.
5317. Governing turbines operated by high and low-pressure elastic fluid. Bergmann Elektrizitäts Werke Akt.-Ges.
5552. Marine boiler and other furnaces. Carew.
6847. Crucible and similar furnaces. Brayshaw and Brayshaw.
8053. Stretcher-carriers for automobile vehicles. Lemaistre.
11094. Forging, hardening, tempering, annealing, and similar furnaces. Fletcher, Russell and Co., and Fletcher.

### Complete Specifications open to Public Inspection before Acceptance.

1913.

8560. Rock drill chuck. Taylor and another.
12349. Elastic-fluid turbines. Bentley.
12668. Refuse destructors. Compagnie d'Incineration Industrielle.
13313. Water-tube marine steam boilers. Soc. Anon. Italiana Gio. Ansaldo and Co.
13314. Water-tube marine steam boilers. Soc. Anon. Italiana Gio. Ansaldo and Co.
14726. Crucible furnaces. Coppée.
15019. Pyrometers, gas analysis apparatus, and the like. Arndt.

### GOVERNMENT PUBLICATIONS.

\*\*\* Any of the following publications may be obtained on application to this office at the price named post free.

- Workmen's Compensation Consolidated Rules, July 1913 (661), 10½d.
- Workmen's Compensation Memorandum, 1½d.
- Trade and Consular Reports, 1912: Russia, Trade of Odessa, 8½d.; U.S.A., Trade of Boston, 5d.; Japan, Dairen, 6d.; China, Hankow, 2d.; Changsha, 4d.; Harbin, 5d.; Foochow, 4d.; Nanking, 5d.; Chungking, 3½d.; Wieu, 4½d.; U.S.A., Trade of Portland, Oregon, 7d.; Brazil, Trade of Rio Grande, 1d.; Spain, Trade of Malaga, 4d.; China, Chinkiang, 4½d.
- Bills, 1913: Companies' Consolidation, 1½d.; Factories, Hours of Labour, 1½d.
- Statutory Rules and Orders, 1913: Doncaster Corporation Light Railways (Nos. 662 and 663), 1½d. each.
- Finance Accounts of the United Kingdom, 7½d.
- Trade and Navigation Returns for June, 1s. 9d.

### PUBLICATIONS RECEIVED.

- CANADA, DEPARTMENT OF MINES ANNUAL REPORT ON THE MINERAL PRODUCTION OF CANADA, 1911. By John McLeish. Ottawa: Government Printing Bureau.
- ANNUAL REPORT OF THE DEPARTMENT OF MINES, NEW SOUTH WALES, 1912. Sydney: W. A. Gullick.
- "Printers' Ink" (Vol. 5, No. 125), July, price 6d.; "Special Number of the Gas Engineer's Magazine and Gas Industries, containing Report of the Conference of the Jubilee Year of the Institution of Gas Engineers, 1913," price 6d.; "Journal of the Western Society of Engineers" (Vol. 18, No. 5), May, price 50 cents; "The I.C.S. Student" (Vol. 5, No. 7), July, price 2d.; "Annales des Mines" (Tome 3, No. 6).

The Partington Steel and Iron Company are having an extensive battery of coke ovens installed at their new works on the banks of the Ship Canal at Irlam, some nine miles from Manchester. The installation is by Simon-Carves Limited. The new works are rapidly approaching completion, and it is expected that production will be in full swing a month or two hence.



# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

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## THE FRENCH COALDUST EXPERIMENTS.

At the recent annual meeting of the Comité Central des Houillères de France, a report was presented on the Liévin Testing Station, together with a more detailed record of the experiments by M. Taffanel, the engineer. During 1912 the extension of the gallery to 400 m. in length and the provision of a lateral branch were completed. Experiments have also been conducted in the abandoned gallery placed at the disposal of the committee by the Commentry Company. In the large gallery, during last year, progress was made with the methodical study of the conditions of inflammability in coals containing from 14 to 16 per cent. of volatile matter, with variations of the quantity, the fineness and purity of the deposits. Experiments have also been made, with a given fineness of coaldust, to determine the proportions of incombustible material that must be added to coals containing 14, 20, 24, 30 and 40 per cent. of volatile matter, to obtain a medium unsuitable for the transmission of explosions. Other tests have been made by varying the degree of fineness in a given coal, and to ascertain the influence of small additions of firedamp, as well as the comparative influence of watering and stonedusting. Certain of these tests have been repeated in the Commentry mine.

At the beginning of 1912 the establishment of a pyrotechnical laboratory was accomplished, and since then numerous experiments with explosives have been carried out. These tests have thrown much light upon the influence of modifications in the *charges limites*. The investigations have been seriously interrupted, however, by the action of the Minister of War in recalling M. Dutriche to active service. M. Taffanel's time has also been occupied in various other directions.

The expense of the station has been less than was estimated by 17,404 fr., the total being 155,595 fr.; of this sum, 38,319 fr. is attributed to establishment charges, which were estimated at 60,000 fr.

During 1913 the tests will be continued. It is stated that the natural firedamp taken from the Liévin No. 3 pit has given results so uncertain and so variable, that M. Taffanel has endeavoured to find a method of producing firedamp artificially; various devices have been examined, but none have proved satisfactory. In 1913 it is proposed to expend 20,000 fr. on the cost of establishment and 145,000 fr. besides.

In his more detailed report M. Taffanel states that several new appliances have been added to the equipment of the station. The Carpentier pressure-recorders have been furnished with an arrangement enabling a photographic record to be made of the air velocity at any point in the gallery during the development of an explosion. The work at Commentry has also necessitated the provision of new appliances, including an apparatus to communicate chronological indications of pressure to the surface by means of electricity. At the explosives testing station a "densimeter" has been constructed to determine the density of explosives, as well as an apparatus to measure the volume of the gases generated by the ignition of an explosive in the Sarrau and Vieille canon. A cinematograph is also being employed for purposes of record.

In the large gallery during the year 321 experiments were carried out, the tests in regard to the minimum quantities of incombustible material required necessitating 114 experiments. In the watering tests already referred to, two systems of watering were employed; in the first the water was intimately mixed with the dust by hand, and in the other the dust was watered *in situ* by means of a garden hose.

It may be mentioned that the Commentry drift is about 1,100 m. in length, and has many angles and ramifications, thus presenting conditions in which it has been suggested, as a result of the fourth series of experiments, that the theoretical considerations might be susceptible of modification. The last experiment carried out in the series completed during November and December 1912 consisted in limiting the effects of an explosion, on one side by an *arrêt barrage*, and on

the other by a slightly moist stonedust zone of 200 m. in length in a tortuous roadway; with this exception the deposit of coaldust was such as to favour propagation. In the result the explosion was stopped on both sides.

Dealing with the explosives tests, M. Taffanel states that among the new causes of variation in the *charges limites*, which render the existing method uncertain, are the length of the canon, the penetration of the firedamp mixture into the bore of the canon, and the oxidation of the internal walls of the canon. These variations are seriously augmented by the irregularities in the chemical constitution of the explosives. It is stated that two foreign explosives tested—Yonckite 10 and Sabulite A—have shown a greater degree of safety than the explosives at present used in France.

Analogous with the tests in regard to the ignition of firedamp by suspended cartridges, efforts have been made to discover if the permitted explosives (*explosifs de sûreté*) when detonated outside the shothole can fire coaldust, and the distances from the floor and walls offering the most favourable conditions have been determined.

Bearing in mind the uncertainty of the experimental method by means of *charges limites*, and with a view to the preparation of new methods, the elaborate study of the properties of explosives has been continued, and a considerable mass of data has been collected in regard to the comparative power and speed of detonation, the potential and the aptitude of transmission. At the same time, the theoretical study of the detonation of explosives has been actively pursued; work has been carried out with explosives, analogous to that of MM. Jouguet and Crussard on the propagation of explosive waves in a firedamp atmosphere; equations have been obtained and new relations have been found enabling the explosive pressure to be determined as a function of the speed of detonation. This M. Taffanel regards as important, for up to the present there have been no means of measuring this explosive pressure, which plays so great a part in the ignition of firedamp and coaldust. On the other hand, the study of intermittent compressions has shown how the considerable heating produced by percussion waves may facilitate the ignition. Photographs of the flame of explosives, with the measurement of the speed of waves in the neighbourhood of the cartridge by a new method, have supported these theoretical considerations.

Investigations have also been made at the laboratory of the course of deflagration in a steel cannon. Tests have shown that lime stemming does not possess the advantageous properties attributed to it by some.

A thorough investigation has been made of firing by electricity; the resistance of fuses at different temperatures has been measured, and a study has been made of the variation in speed of rupture as a function of the intensity of current. The causes of misfires in series firing have been considered, as well as the influence of the intensity of current and of the form of current, *i.e.*, continuous or alternating; the causes of divergence due to the constitution of the fuses have served to confirm the inadequacy of the existing methods of classification according to resistance, and a new mode of classification has been examined. It may be added that the practice of testing samples of explosives from the stores at the collieries instead of those sent by the makers has disclosed some irregularities in composition that are of high importance from the point of view of safety. M. Taffanel, as a result, considers it to be desirable to organise a more effective control over the supply of explosives.

The foregoing does not by any means exhaust the work of the laboratory, at which numerous questions relating to coaldust and inflammable gases have been essayed. With regard to the oxidation of coaldust, 35 experiments have been carried out, in the course of which the dust was suspended for a lengthy period in the air to determine if it undergoes more rapid oxidation under such conditions; it has been found that the rapidity of oxidation is slightly increased, but not to

any marked extent. Trials have been made to discover if coal, after crushing, shows a difference in composition in the small and large particles respectively, but here again the differences were found to be very slight and variable.

The study of the relative inflammability of coaldusts has been continued in various ways. No less than 500 experiments have been made with regard to the speed of combustion by means of an injector, and knowledge has been obtained by this method of the influence of the content of volatile matter and ash, and of fineness and humidity; 100 tests have been executed besides, which serve to show the influence of small quantities of firedamp, these having confirmed the results obtained in the large gallery.

Two apparatus have been devised in the laboratory; one is a hot-tube igniter, and the other an igniter by means of oxygen and flame. They have been used to establish the value of various factors in over 200 samples of coaldust taken from the mine, which were at the same time examined with regard to the size of the particles and their composition. It has been found that the percentage of ash is approximately the same in the large and small particles comprised in the same sample. Arising from these tests an oxygen-flame igniter, suitable for use in colliery laboratories, has been placed on sale, in addition to a dilatometer to determine roughly and rapidly the ash content, the accuracy of which has been confirmed by systematic analysis.

M. Taffanel states that the general result of this work has been to show that coaldusts may be classified, from the point of view of inflammability, according to their degree of fineness, and their volatile and ash content. Important exceptions to the general law have only been ascertained in the case of coaldust altered by oxidation. He here refers to the fact that the English investigators have pointed out that the law relative to volatile matter has been but imperfectly verified, but have neglected to indicate whether the samples investigated had undergone oxidation or not; as to the proposal to classify only the proportion extracted by pyridine, M. Taffanel states that tests of this nature have been carried out, but that up to the present they do not appear to confirm for French coals the results obtained by the English investigators.

A study has been made of the mechanism of combustion, 35 tests having been made to determine the loss in volatile matter arising from exposure for a short period to the radiation of a surface heated to a fixed temperature.

In a further series of tests an examination has been made of the composition of gases distilled by coaldust that has been passed in the form of a cloud very rapidly before a surface heated to a high temperature, the influence of temperature and the nature of the coal having been studied. Amongst other facts ascertained is the presence of a high percentage of ethane.

An important study has been carried out in regard to the measurement of the temperatures of ignition and the retarded ignition of gas, vapour, and coaldust. It has been found that the latter is not peculiar to firedamp, that the temperature of ignition varies with the composition, and the retarded ignition with the composition, the pressure and the temperature. The laws relating to coaldust present certain analogies to those of gas. M. Taffanel considers that these experimental researches, which open the way to numerous theoretical studies, promise to be rich in consequences, notably in regard to the theory of explosives.

In conclusion M. Taffanel, referring to his visit in the autumn of last year to the United States, observes that an agreement has been come to with the various testing stations, according to which each will carry out tests for which it is most favourably organised. Following out this ideal, the Liévin staff has placed the American and Austrian stations in a position to procure the various apparatus employed at Liévin, and is supplying to the German station at Neunkirchen plans of the French lamp-testing equipment.



## ZEISS LEVELS AND THEODOLITES.

For all classes of optical instruments the firm of Carl Zeiss, of Jena, hold a deservedly high reputation, and we recently had an opportunity of inspecting a fine assortment of levels and theodolites made by them.

Fig. 1 shows Zeiss level No. 1, which consists of two readily adjustable parts. The motion head comprises the stockhead with its fittings for mounting the instrument on the stand, the preliminary levelling device with circular bubble, slow horizontal motion, and fine elevation screw motion. The level is mounted upon the stand by means of a cylindrical socket T, the clamping screw V serving to fix it upon the stockhead pin. The instrument is levelled preliminarily by bringing the bubble of the circular level N to the centre of its run by means of the screws C C C. The vertical stem is made of steel and ground truly cylindrical, and hence does not at any time require readjustment. The vertical spindle may be fixed in position by the clamp M, whilst its slow motion is effected by means of the micrometer screw B with the buffer spring. The slow-motion mechanism of the telescope about its horizontal axis consists of a forked lever S having attached to it a very accurately cut elevation and depression screw A, by means of which, in conjunction with a buffer spring, the bubble can be rapidly brought to the centre of its run. A key is provided by means of which the working of the screws A, B and C C may be adjusted to a nicety. After the removal of the set screw O the entire revolving portion of the motion head may be lifted off for the purpose of cleaning and oiling the vertical spindle.

The telescope is mounted upon a dovetailed horizontal bar K and rotates on its axis within the limits fixed by two stops. A reversible bubble tube is attached to the

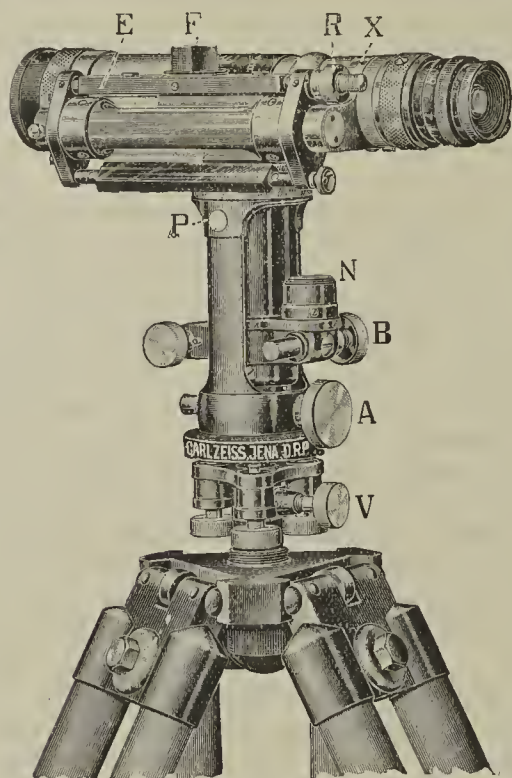


FIG. 1.—ZEISS LEVEL WITH STAND.

telescope by means of adjustable screws. Both the objective and the cross webs are permanently fixed. This ensures an invariable tube length, and affords the means of completely excluding the access of dust and water. The telescope is focussed for different distances by means of a sliding lens situated within the tube and actuated externally by means of the milled head W. This mode of focussing furnishes, under mechanically similar conditions, a degree of accuracy which is about six times greater than that realisable with the sliding diaphragm tube. The final focussing of the eyepiece with respect to the cross webs is effected with the aid of a screw collar graduated at its periphery in terms of diopters.

The reversible bubble is mounted in a manner which obviates straining, and is encased in a glass cylinder so as to protect it from the influence of changes of temperature. The bubble tube is in no way divided. The movements of the bubble are viewed through a novel combination of prisms which is contained within the casing E. This compound prism forms two tangent images of the two ends of the bubble, which may be viewed from the eyepiece end or from the objective end of the telescope. The bubble is brightly illuminated from below by light reflected at the mirror J. To bring the bubble to the centre of its run, it is only necessary to turn the elevation screw A until the two images of the bubble ends become coincident. This arrangement for viewing the bubble eliminates every trace of parallax and renders it an easy and pleasant task to bring the bubble accurately to the centre of its run. In the second position of the telescope (bubble tube on the right) the bubble is likewise viewed in the prism F from below and

through the bubble glass. The prism casing E may be displaced along the bubble tube, which furnishes the means of adjusting the instrument.

To obtain a means of ascertaining with ease and precision the small errors of the reversible bubble tube, so as to render it possible to completely adjust the instrument at any given station, the telescope is so mounted that it may be used with its ends reversed. For this purpose the eyepiece should be withdrawn and slid into the sleeve H in the objective cap, together with which it should be transferred to the objective end of the telescope. The prism F should be turned round and the staff read in the same manner as in the first two positions of the telescope. The mean of the four resulting readings is entirely free from instrumental errors. The telescope should then be set to this mean reading in position 1, and the prism casing E displaced so as to cause the ends of the bubbles to coincide. When this is the case, the instrument is in perfect adjustment. The actual levelling operations are performed in position 1 only. The complete adjustment of the instrument occupies about five minutes. The telescope is provided with a telemeter 1:100.

The weight of this instrument is  $4\frac{1}{2}$  lb. in case. The lens has a magnification of  $\times 20$ . Other levels of similar design are made with magnifications of  $\times 26$  and  $\times 30$ , whilst a simplified model is also supplied for rough usage.

Messrs. Zeiss are also makers of transit theodolites,

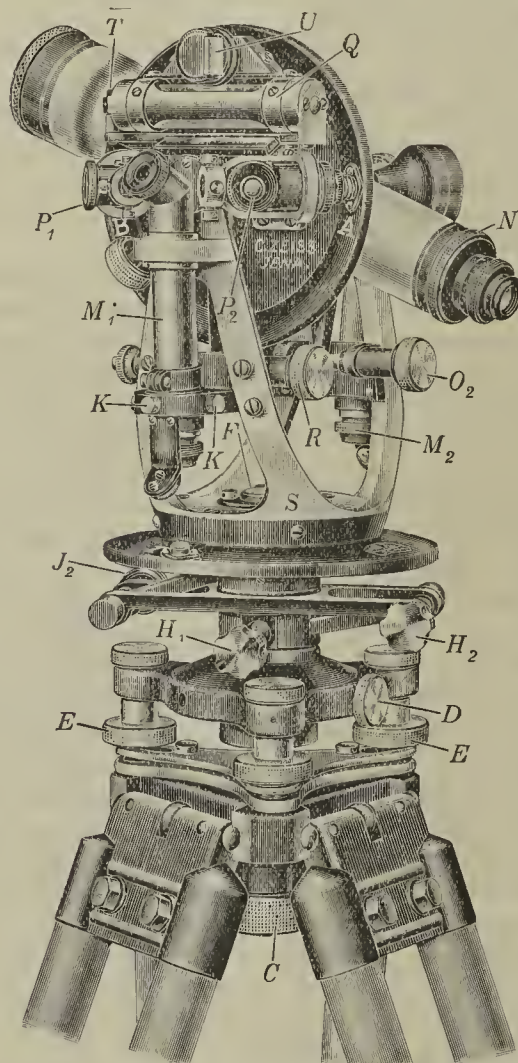


FIG. 2.—ZEISS TRANSIT THEODOLITE.

equipped with either horizontal or vertical circles, or with both, one of these being shown in fig. 2. The circles are divided into 360 degs. or 400 g, and are absolutely dust and rain proof, readings being taken by means of special micrometer microscopes with focussing eyepieces. The theodolites have a magnification of 30 diameters, and are fitted with an inner lens for focussing purposes, thus enabling the telescopes also to be rendered impervious to dust or rain. The theodolites may be used as repetition instruments.

Messrs. Zeiss have works in this country at Mill Hill, and the London office is at 13-14, Great Castle-street, W.

**University of Birmingham: School of Mining.**—The session commences on October 7, 1913. In connection with the mining classes there will be frequent visits of inspection to mines in the neighbourhood of Birmingham, and a summer mining school will also be held in the long vacation in some mining districts either at home or abroad. The mining courses are so arranged as to provide for—degree course, three years; diploma in coal or metal mining, three years; occasional mining students, a complete course in one year. A complete course of petroleum mining engineering is given in the new buildings of the university. The course of study extends over three years, and leads to the degree of B.Sc. Full particulars may be obtained from the secretary of the university. The staff includes Dr. John Cadman, and Messrs. Alexander Chubb, J. L. Jeffery and Percy Ormand.

## COALMINING IN NEW SOUTH WALES.

The report of the Under-Secretary of Mines for New South Wales, for the year 1912, states that the value of the mineral production was a record for the State. The output in 1912 was worth £11,641,435, which is an increase of no less than £1,883,428 over that of 1911. The output of coal was also a record, amounting to 9,885,815 tons, valued at £3,660,015, which exceeds the production of the previous best year (1908) by 738,790 tons and £306,922 in value.

During the year the export trade showed a satisfactory improvement, amounting to 6,053,118 tons, valued at £3,232,729, as against 5,024,080 tons, valued at £2,664,191, in 1911. The coal shipped to overseas ports was 2,956,939 tons, valued at £1,611,534, being an increase of 458,635 tons and £256,033 in value; the exports to Australasian ports were 3,096,179 tons, valued at £1,621,195, an increase of 570,403 tons and £312,505 in value.

The following table shows the output and average value per ton in each of the producing districts:—

District.	Output.		Average value per ton.	
	1911. Tons.	1912. Tons.	1911. s. d.	1912. s. d.
Northern .....	5,793,646	6,913,810	0.13	0.15
Western .....	2,066,621	2,172,800	0.72	1.19
Southern .....	831,337	799,205	1.88	1.06
Total and average	8,691,604	9,885,815	3.45	4.85

The quantity of coke made in 1912 amounted to 241,159 tons, valued at £162,454, which shows a decrease of 23,528 tons and £21,883 in value. The coke trade was in a very depressed condition until the closing month of the year, when all the ovens were fully employed. Early in the year the old coke plant at Unanderra, belonging to the Australian Coke Company, was closed down and replaced by a new one situated near to Corrimall Station.

According to the report of Mr. A. A. Atkinson, Chief Inspector of Coal and Oil-shale Mines, there were 123 mines at work in 1912, a decrease of 12 as compared with 1911; of the total, 78 are in the Northern, 27 in the Western and 18 in the South and South-Western districts. There were employed in these mines a total of 18,051 persons—13,278 below and 4,773 above ground—as compared with 17,657 in 1911. In 1912, 37.20 per cent. of the output in the Northern district was obtained from the Borehole seam in the upper coal measures and 48.21 per cent. from the Greta seams in the lower coal measures. The output from the latter seams again shows a relative decline.

The quantity of coal and shale raised per person employed was 552 tons, or, taking only those employed below ground, 751 tons. The corresponding figures for 1911 were 496 and 681 tons respectively.

The amount of coal cut by machinery again shows an increase, of 258,940 tons as compared with 1911. The total—viz., 2,896,612 tons, represents 29.3 per cent. of the total output. In 1912, 213 machines were at work, as against 202 in 1911; of these, 79 were of the percussive type, 8 of the revolving bar type, and 127 of the chain-breast type; 134 were driven by electricity, and 79 by compressed air.

During the year, 29 fatal and 140 non-fatal accidents were reported. One of the fatal accidents resulted in two deaths, the others in one each. As compared with 1911, there is an increase of 15 deaths, the number being in excess of those occurring in any year since 1902, when 95 lives were lost in the Mount Kembla explosion. Of the deaths, 16 were due to falls, one to explosives, four to haulage, and one to "sundries" below ground, whilst eight occurred on the surface. The death-rate works out at 1.662 per 1,000 employed, or 332,394 tons of mineral raised per life lost.

In connection with the accidents from falls, Mr. Atkinson states that the advancing method of working top coal is being carried on at one of the collieries, and is giving general satisfaction. This method was advocated by the Royal Commission on Thick Coal Seams which sat recently. Following upon litigation in regard to the supply of "suitable timber," it is pointed out that the magistrate suggested that timber should be supplied in 3 in. variations, and that the department cannot assent to the present practice of supplying timber in 6 in. variations.

Apart from those caused by spontaneous heating, fires were reported during the year at East Greta, Wallsend, and Pelaw Main collieries. One of these was caused by a shot of "Arkite" igniting gas, liberated by the shot. Two cases of spontaneous heating also occurred—at Aberdare and Broxburn-Maitland collieries. At the latter colliery dirt stoppings were put in on each side of the heated area and plastered in front. The department continues to insist upon the necessity of laying off bord-and-pillar work in panels, so as to confine the results of heating.



At the Hetton Colliery preparation is being made to bore one of the 60 ft. holes agreed upon between the Department of Mines and the company, and alternate 100 ft. and 60 ft. holes will be bored in the roof as the face of the narrow bords advances seawards.

Brief reference is made to the report on the Killingworth explosion. It may be recalled that the Commissioner concluded that the ignition of gas originated in a goaf area, which for two and a-half years previously had been sealed off with brick stoppings, but, as such a conclusion pointed to the existence of danger in other collieries, a further examination was made, and it was ascertained that the Commissioner's conclusion was erroneous, no signs of fire near the goaf edge being discovered, and the stopping, instead of having been blown out by the pent-up gases as supposed, was found to have been blown into the goaf.

During the year substantial progress has been made in the direction of establishing a rescue station for the South Maitland coalfield.

Mr. L. F. Harper contributes a progress report on the geological survey of the eastern portion of County St. Vincent, with special reference to its prospects as a coalfield. This area embraces the southerly and south-westerly boundaries of the permo-carboniferous rocks of New South Wales. Mr. Harper says the possibilities of the area as a source of coal are very discouraging. Apart from the quality, the mode of occurrence is unfavourable to the existence of beds of coal over large continuous areas, the lower coal measures, south of the Shoalhaven River, occupying a series of comparatively small and isolated saucer-like depressions.

A KNIGHTHOOD FOR MR. J. S. HARMOOD-BANNER, M.P.

Sir John Sutherland Harwood-Banner, M.P., the Lord Mayor of Liverpool, who was knighted by his Majesty the King on Friday last, is intimately connected with the coalmining industry, although equally well known as head of the important firm of chartered accountants of Harwood-Banner and Son, his partnership dating from 1870. He is chairman of the allied companies the Pearson and Knowles Coal and Iron Company Limited, the Moss Hall Coal Company Limited and the Partington Iron and Steel Company Limited, and a director of the British Insulated and Helsby Cable Company Limited. Sir John Harwood-Banner was born in Liverpool in 1847, was educated at Radley College, and entered his father's office in 1865. He was elected to the Liverpool Council in 1895, and for some years prior to his election as Lord Mayor had served as chairman of the Finance Committee. His Parliamentary life begun in 1905, when he was elected M.P. in the Conservative interest for the Everton division of Liverpool. He has filled the office of High Sheriff for Cheshire, in which county he resides, at Ashfield Hall, Neston. The new knight has been twice married, his first wife being the daughter of the late Mr. Thomas Knowles, M.P. In Parliament he has rendered signal service to the colliery owners' interests, having taken a prominent part in the debates on the Coal Mines and other Bills. It is indeed safe to say that, within recent years, the coalowners have had no more active or valuable representative in the House of Commons.

Shipment of Bunker Coal.—During June 1,721,016 tons of coal, &c., were shipped for the use of steamers engaged in the foreign trade as compared with 1,561,215 tons in June 1912, and 1,674,456 tons in June 1911. The aggregate so shipped during the first half of the present year was 10,087,037 tons, as compared with 8,125,897 tons and 9,558,647 tons in the corresponding periods of 1912 and 1911 respectively.

The Kent Coalfield.—At a meeting of the Guilford Syndicate Limited at Dover last week, Mr. Arthur Burr referred to the fact that the underground survey of the coal measures of Kent was now practically complete. According to Dr. Arber, the seam found at Fredville boring and now being worked at Snowdown, and the seam found at Barfreton and being worked at Tilmanstone are identical—namely, the Beresford seam. It varies in quality to some extent. There is thus 29 or 30 per cent. of volatile matter in the Snowdown coal and only 25 per cent. in the Tilmanstone coal. That seam was struck at 1,558 ft. at Tilmanstone, and Dr. Arber states that it is identical with the Rockefeller seam at Waldershare, which was found at 2,200 ft., exactly agreeing with the dip, which is 1 in 17 or 18. At Tilmanstone two upper seams of 3 ft. 4 in. and 1 ft. 6 in. were missed, which, according to Dr. Arber, ran out within 300 yards of the Tilmanstone Colliery, and he advised that roads be driven to pick up those seams, which are house coal. At Guilford there are some 400 ft. or 500 ft. of additional coal measures which do not exist at Waldershare, or at Tilmanstone, and in those 400 ft. or 500 ft. of coal measures it is expected to find some three good seams of later date.

RECTANGULAR CO-ORDINATES.

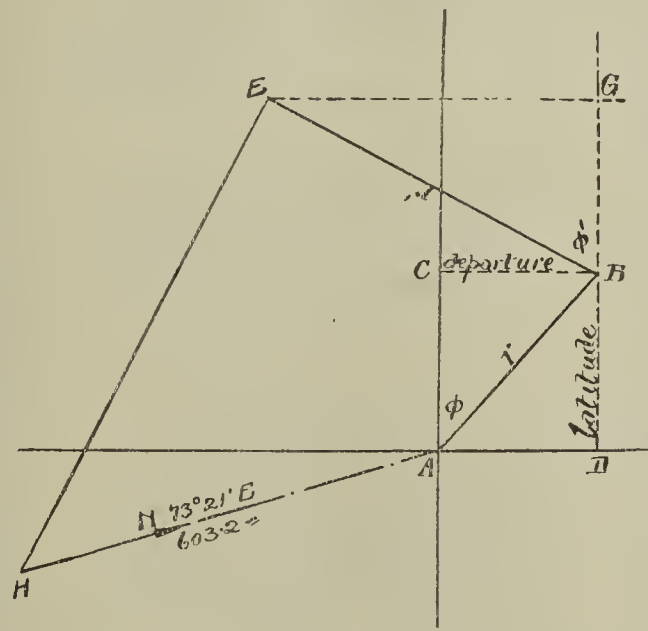
By M. E.

The method of plotting surveys by rectangular co-ordinates is at once the most useful and accurate of the various methods practised. The method, however, is not largely adopted in this country, except for special work requiring great accuracy. It is true that the calculations involved are laborious, though not at all difficult, and provided the calculations are accurately performed the weakness characteristic of the other systems—the propagation and multiplication of an error in plotting a point in the survey—is entirely eliminated, because in plotting the survey the position of a point in it is not made to depend on the position of a previously plotted point, but is referred to a point to which all other points in the survey are referred, *i.e.*, the zero

No.	Bearing.	Distance (links).	Latitude.		Departure.		Total.	Total.
			N. +	S. —	E. +	W. —	Latitude.	Departure.
1	N. 41° 35' E.	330	246·8	—	219·1	—	246·8	219·1
2	N. 63° 14' W.	515	231·9	—	—	459·8	478·7	—240·7
3	S. 27° 33' W.	729	—	646·3	—	337·1	—167·6	—577·8
4	?	?						

point or the point of intersection of the axes of reference called—for the moment for the sake of familiarity—the axes of *x* and *y*.

For the purpose of defining the position of a point, A say, fig. 1, with reference to another point B in the same plane, we may consider two axes at right-angles to each other and intersecting in one of the points, say in A. Let A B be a line of length *r*, making an angle  $\phi$  with the axis of *y* which we may call, in conformity



with an accepted convention, the meridian. Let B C be a perpendicular from B on the meridian and B D a perpendicular on the *x* axis, or E and W line.

Since A C is parallel to D B and A D is parallel to C B. A C = D B and A D = C B.

The perpendicular distance of any point such as B from the meridian is termed the “departure” of B, and is conventionally considered positive if an “easting” and negative if a “westing.”

The perpendicular distance of B from the E and W line or axis of *x* is called the latitude, and is positive if a “northing,” and negative if a “southing.”

With reference to the figure

$$\frac{CB}{AB} = \sin \phi = \frac{\text{departure}}{r}.$$
$$\therefore \text{departure} = r \sin \phi.$$
$$\frac{AC}{AB} = \frac{DB}{AB} = \cos \phi = \frac{\text{latitude}}{r}.$$
$$\therefore \text{latitude} = r \cos \phi.$$

Given, therefore, the bearing and length of a line such as A B, the co-ordinates of B with reference to A may be easily calculated by the aid of logarithmic tables, or by the use of traverse tables, such as Gurdens's.

C B is an easting and is therefore positive. D B is a northing and is also positive.

But consider now the line B E of length *r'* making an angle  $\phi'$  with the meridian.

G E (the departure) = *r'* sin  $\phi'$  and is negative. B G (the latitude) = *r'* cos  $\phi'$  and is positive.

The algebraic sum of D B and B G gives the “total” latitude of E with respect to A, and it is positive, and

the algebraic sum of C B and G E gives the total departure of E with respect to A. Since, as illustrated by the figure, G E is supposed numerically greater than C B, the total departure is obviously negative.

An extension of this consideration would, of course, show that the total latitude of any point in a survey is got by taking the algebraic sum of all the latitudes up to and including the latitude of the point considered. The total departure of a point is obtained by summing, algebraically, the departures from zero up to and including that of the point under consideration.

The following table shows how the results ought to be tabulated, and is intended also to illustrate an important application of the method to the determination of the bearing and length of a road which is required to be driven between two distant points underground:—

No.	Bearing.	Distance (links).	Latitude.		Departure.		Total.	Total.
			N. +	S. —	E. +	W. —	Latitude.	Departure.
1	N. 41° 35' E.	330	246·8	—	219·1	—	246·8	219·1
2	N. 63° 14' W.	515	231·9	—	—	459·8	478·7	—240·7
3	S. 27° 33' W.	729	—	646·3	—	337·1	—167·6	—577·8
4	?	?						

To calculate the bearing,

$$\frac{\text{departure}}{\text{latitude}} = \tan \phi = \frac{-577·8}{-167·6} = 3·447.$$

$\therefore$  The angle  $\phi = 73^{\circ} 21'$ , and since the departure and latitude are both negative, the direction of the line to join H to A is N E.

Therefore the bearing is N.  $73^{\circ} 21'$  E.

The departure = *r* sin  $\phi$ .

$$\therefore r = \frac{\text{departure}}{\sin \phi} = \frac{577·8}{0·9580} = 603·2 \text{ links.}$$

Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, July 8, 1913, is as follows:—Antwerp, 520 tons; Amsterdam, 1,392; Bremen, 1,166; Buenos Ayres, 4,957; Copenhagen, 645; Christiania, 2,150; Cronstadt, 18,790; Constantinople, 410; Degerhamn, 844; Drammen, 176; Drontheim, 291; Gefle, 1,083; Guernsey, 279; Ghent, 537; Hamburg, 8,759; Harlingen, 1,217; Harburg, 2,610; Haugesund, 4,525; Helsingborg, 447; Libau, 404; Lisbon, 2,562; Malmo, 1,799; Naples, 956; Oporto, 26; Riga, 491; Rouen, 7,416; Reval, 2,206; Røkkala, 1,133; Rotterdam, 6,322; Stettin, 1,053; Stockholm, 1,656; St. Petersburg, 5,936; Trelleborg, 909; Trieste, 308; Venice, 5,983; Ystad, 943; total, 90,901 tons. Corresponding period last year, 98,026 tons.

International Engineering Congress, 1915.—In connection with the Panama-Pacific International Exposition, which will be held in San Francisco in 1915, there will be an International Engineering Congress, in which engineers throughout the world will be invited to participate. The congress is to be conducted under the auspices of the following five national engineering societies.—American Society of Civil Engineers, American Institute of Mining Engineers, the American Society of Mechanical Engineers, American Institute of Electrical Engineers, and the Society of Naval Architects and Marine Engineers. These societies, acting in co-operation, have appointed a permanent committee of management, consisting of the presidents and secretaries of each of these societies, and 18 members resident in San Francisco. The committee has effected a permanent organisation, with Prof. Wm. F. Durand as chairman and W. A. Cattell as secretary-treasurer, and has established executive offices in the Foxcroft Building, 63, Post-street, San Francisco. The papers presented at the congress will naturally be divided into groups or sections. During the congress each section will hold independent sessions, which will be presided over by a chairman eminent in the branches of engineering covered by his section. The scope of the congress has not as yet been definitely determined, but it is hoped to make it widely representative of the best engineering practice throughout the world, and it is intended that the papers, discussions and proceedings shall constitute an adequate review of the progress made during the past decade and an authoritative presentation of the latest developments and most approved practices in the various branches of engineering work. The papers, which will be collected and published by the congress, should form an invaluable engineering library, and it is intended that this publication shall be in such form and at such cost as to become available to the greatest possible number. The various committees are now actively at work, and it is hoped that further and more definite announcements as to the membership fees, schedules of papers, &c., can be made in the very near future.



## ELECTRICITY AND DUST.

In the course of his address to the section of Industrial Hygiene at the Paris Congress, Prof. Sir Thomas Oliver dealt with various features of the dust question. He said one effect of the replacement of water-power by steam was dislocation of industries. Factories were no longer built upon the banks of rural streams, but in towns where labour was abundant, or in close proximity to coalfields, where fuel was cheap. One of the drawbacks to the use of coal is the smoke which is created. This shuts out sunlight, and so contaminates the atmosphere as to render it less fit for breathing purposes, while it increases the susceptibility of the respiratory organs to disease. Some of the large iron manufacturing districts in England have always a high death-rate from pneumonia and acute bronchial affections. It is known that since Germany has become more industrial her mortality rate from pulmonary diseases, other than tuberculosis, has markedly risen, and this, too, during a period when the number of deaths from pulmonary tuberculosis has been falling. For this rise in the mortality rate the increasingly large volumes of smoke thrown into the atmosphere are said to be answerable. By substituting electricity for steam one danger is thus got rid of; but electricity has dangers of its own—dangers of an acute and serious nature, and so subtle in their incidence as frequently and unexpectedly to entrap the unwary. We can never tell exactly what number of deaths from acute pulmonary diseases are due to the effects of smoke and fog alone, but in countries where deaths from electricity are notified, the number of persons killed, also the number of persons seriously injured, can be estimated. Apart from its use as an illuminating agent and for motive purposes, it is impossible as yet to estimate the dangers likely to arise in industrial enterprises, where electricity is becoming increasingly employed. Old methods of production in chemical works are disappearing, new methods into which electricity enters are taking their place, and these are not free from danger. When death has been caused by electricity, the question is generally asked, what was the voltage of the live metal at the time of the accident? The influence of the ampérage ought, however, to be considered as well as voltage. Voltages above 100 are dangerous; but Jellinek reports a fatality where the individual had been brought into contact with only 65 volts. It is the mode of contact which is the important circumstance, also the unexpectedness of the contact, for electricians can and do frequently touch with their hands wires carrying currents of 5,000 volts and more without experiencing any serious inconvenience. Much depends upon whether at the time of contact the skin is dry or moist, whether the workman's clothes are dry or not, also whether he is standing on damp earth. A few years ago, Sir Thomas Oliver said, his colleague R. A. Bolam and he by a series of experiments upon animals satisfied themselves that death in electrical shock from continuous currents is due to the arrest of the action of the heart, and that by means of artificial respiration carried on for a considerable time, dogs apparently killed could be resuscitated. In a few of the experiments, just as in those of MM. Prévost and Batelli, death came through stoppage of the breathing as well as by arrest of the heart's action. No matter how workmen have been struck by the electrical discharge and with an apparently fatal result, artificial breathing is the only reliable method to adopt to restore life.

He drew attention to an opinion which has been advanced by MM. Prévost and J. Reverdin, of Geneva. The burning and destruction of the skin in electrical injuries have a significance which ought not to be overlooked. Burning means bad rather than good conduct. Once charring and destruction of the superficial skin have taken place, resistance to further penetration of the current is increased, and death is thereby possibly averted. The opinion advanced by MM. Prévost and Reverdin based upon experimental enquiry is that where burns do not occur the current enters more readily and the victim is more likely to die, while, if burns have been inflicted, the individual is more likely to survive the shock.

## The Electrification of Coaldust.

There is for the student who will enquire into the subject a wide field for investigation in the electrification of dust, and how far it explains explosions occurring in factories of which no adequate cause can be found, also those occurring in coalmines when the mines are empty. Although dust is generally spoken of as matter in a state of fine division, it is something more than this. As a prelude to colliery explosions it is not alone that coal is present in the atmosphere in the form of fine minute particles, but that each particle is surrounded by a layer of gas which imparts buoyancy

to it and enables it to remain suspended in the air, even although it is heavier than the atmosphere. The minute particles of dust in factories and workshops are frequently similarly enveloped, but in these places, owing to the circumstances under which dust is generated, should moisture be present, instead of there being gas, the particles are surrounded by a layer of moisture, which renders the dust more likely to be absorbed by the respiratory mucous membranes, should it perchance be inhaled. It may be, perhaps, on account of electrical conditions, the finely divided state of its particles, or, what is more likely, as the result of the operations of circumstances of which at present we know little, that coal in the form of dust and in the presence of atmospheric air or gas behaves somewhat differently to coal in bulk. Placed under the same conditions as regards temperature, the gaseous interchange does not always run concurrently in the two forms. To show the difference between coal in the lump and coal in the form of dust, Hermann Belger, of Armstrong College, and Sir Thomas Oliver carried out a series of experiments in the Durham University College of Medicine, Newcastle-on-Tyne. They exposed to atmospheric air (1) coal in the lump, and (2) coal in the form

Weekly alterations in weight of coal in lumps and in form of dust. (Bituminous.)

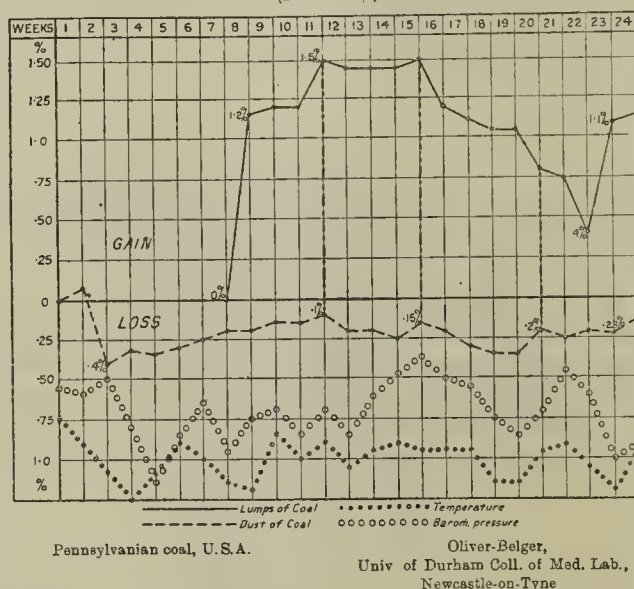


FIG. 1.

Weekly alterations in weight of coal in lumps and in form of dust. (Sub-bituminous.)

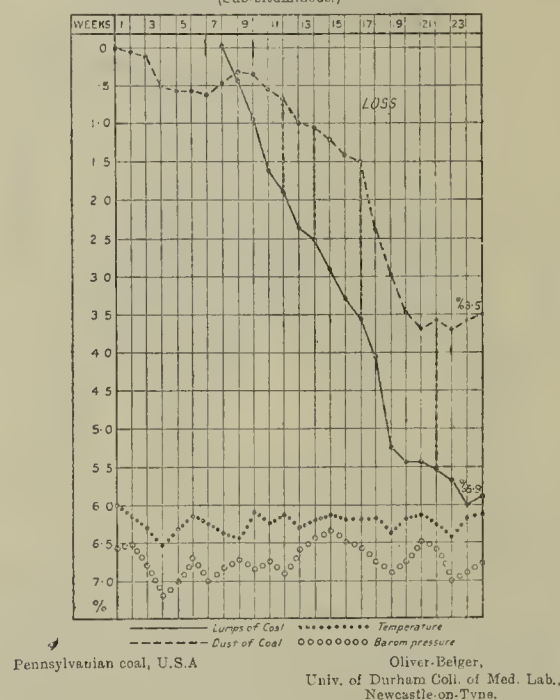


FIG. 2.

of dust. Coal when removed fresh from the mine gives off gas freely, the greater part of which is methane; so that, if dust is examined which is lying in the crevices of the rock in the mainways of a mine, it contains probably not one-tenth of the amount of methane which is present in lump coal. This difference is what might be expected from the elimination of gas which is going on, and yet in coaldust there is almost constantly taking place an exchange of gas, and not a discharge only. It is in this respect that the behaviour of coal in the lump and in the form of dust is not identical. Coaldust is not quite the inactive substance it at first sight appears to be, and yet it possesses nothing like the activity of lump coal, as the diagrams show. In the laboratory, the same coal of Pennsylvania origin in lump and also in powdered form was exposed to atmospheric air. In No. 1 experiment the coaldust loses from the first, but it exhibits during the 24 weeks gains and losses which it is difficult to explain, unless it be by absorption, loss and re-absorption of gas rather than of moisture. At the end of 24 weeks the coaldust had lost 0.25 per cent. of its weight. On the other hand, lump coal under similar

conditions, except that it was exposed to daylight, immediately gained weight to the extent of 1.5 per cent., remained fairly stationary for a period of four weeks, then lost weight to 0.4 per cent., but subsequently recovered some of its weight, so that at the end of sixteen weeks it stood with a gain of 1.1 per cent. It cannot be said that the temperature or barometric pressure played a noticeable or special part in the process.

Experiment No. 2 brings out even more forcibly the greater activity of coal in the lump compared with coaldust. It requires 24 weeks for coal in the form of dust to lose 3.5 per cent. of its weight, but in 15 weeks coal in lump form lost 5.9 per cent. of its weight.

In coalmines there is, therefore, constantly going on an interchange of gases, the replacement of lighter gases by heavier, and *vice versa*, a form of respiration, in a word, which must have some influence not only upon the air of the mine from the respiratory point of view of the coalminer, but it must also play not an unimportant part in the initiation and spread of colliery explosions. It is interesting to observe the almost rhythmic manner in which waves of absorption of gas by coal are followed by a series of exhalations, and the resemblance to respiration thereby heightened.

## Pitch Cancer.

Sir Thomas Oliver next turned to influence of occupation upon the prevalence of cancer. He said a few years ago he drew attention to the occurrence of warts on the arms of men who were engaged in boiling and mixing oils obtained from shale, and pointed out that the warts break down and become converted into epitheliomatous ulcers. The relationship of the products of the incomplete combustion of coal and of cancer has long been known. There is a difference between raw coal and the products obtained from it during combustion. Manipulation of coal is not attended by any risk of cancer, but the handling of soot, for example, predisposes to it.

It has long been known that persons engaged in the distillation of tar and the manufacture of grease and of briquettes which contain coal tar oils exhibit a peculiar swarthy skin and are liable to warts and epithelioma, but it is only recently that any serious attempts based upon clinical experience, chemical enquiry and pathological investigation have been made to explain the reason why, in the manufacture of patent fuel, cancer is found in men who work with gasworks pitch and not with that obtained from blastfurnaces. Allusion must therefore be made to the excellent work which has been done in this direction by Drs. H. C. Ross and J. W. Cropper,\* of the Lister Institute, London, also by Mr. H. Bayon, of Cape Colony. Ross and Cropper took watery extracts of the tar from which briquettes are made and tested their effects upon individual cells *in vitro*. In gasworks tar they found certain chemical products which were not present in blastfurnace pitch. There were found in gasworks tar *auxetics*, that is to say chemical bodies liberated from cells at their death, and which when absorbed by the living cells of the tissue of an injured part stimulate these cells to unwonted activity, thereby favouring the healing of wounds; also *kinetics*, bodies which as augmenters excite amoeboid movement in leucocytes and epithelial cells. Acting in co-operation, these two bodies stimulate cell-growth, auxetics causing benign cell proliferation and kinetics cell proliferation which tends to malignancy. Watery extracts of gasworks tar and of blastfurnace tar were taken and injected separately into the subcutaneous tissues of animals with the result that cell proliferation and swellings were always produced at the site of the inoculation with gasworks tar, while no such swellings akin to those caused by the gasworks product followed the injection of blastfurnace tar. The harmful bodies present in the gasworks tar must therefore be the auxetics and kinetics. It can hardly be, at any rate, pitchdust, since no dust was present when Ross and Cropper carried on their experiments. When men are making briquettes in an atmosphere laden with pitchdust, and are perspiring, the falling dust adheres to the moist skin and, becoming impacted in the follicles, it sets up irritation. The auxetics and kinetics become dissolved in the acid sweat and cell proliferation is the consequence. The skin becomes dark and swarthy, then come warts, followed by ulceration which assumes a malignant character. Of 245 fuel workers examined by Dr. T. A. Legge, 51 were found to be affected by warts. These warts at first are non-malignant. They only become epitheliomatous afterwards. There is a belief among the workmen that dermatitis, warts, ulceration of skin and epithelioma have become more prevalent during recent years, a

\* "The Problem of the Gasworks Pitch Industries and Cancer." The Wm. Howard McFadden Researches, London. John Murray, publisher.



circumstance attributed to the retention of the pitch or anthracene and anthracene oil. But anthracene was found by Ross and Cropper to be inactive so far as cell proliferation was concerned. All we can say at present is that pitch is more dangerous than tar, and tar than coal, that the harmful elements are contained in the heavy oils of the coal tar, and these cannot be distilled out completely without ruining the pitch commercially. The remedy is to wash the tar, but to this there are trade objections.

The frequency with which malignant growths of the bladder are found in aniline workers is a subject of not less importance than the occurrence of epithelioma in chimney sweeps and in the men who make briquettes. It is an illustration of occupation being a cause of malignant disease, and of the necessity for bringing to bear upon trades the resources of industrial hygiene, and the influence of beneficent legislation.

AN INGENIOUS COAL-HANDLING PLANT.  
Waterflush Delivery.

The Hammersmith Borough Council have had under consideration a novel scheme for the delivery to and storage at their electricity works, of coal required for the undertaking. It was submitted by the electrical engineer, Mr. Gilbert Bell, who stated that he had come to the conclusion that the most satisfactory method of storing coal was to keep it in large tanks constructed on the site. He explained that the cost for the delivery of coal by the present method of handling coal at the wharf worked out at 5 85d. per ton. But as a considerable amount had to be supplied from another wharf at extra cost, the actual average cost for delivery at the works was 7 02d. per ton.

His scheme was an arrangement of a pipe between the electricity works and the Borough's wharf, through which coal and water intermixed would be conveyed from a hopper at the wharf, and discharged at the works end into a tank. The mixture would be forced through the pipe at a velocity of about 7 ft. per second, which would suffice to prevent the coal from settling down in the pipe. The mixture having arrived at the tank and the coal having settled down, the surplus water could be drawn off and returned to the river by the existing return sewer of the condenser water system.

To prevent any trouble with the Thames Conservancy through the return to the river of any coaldust in the surplus water, he suggested the laying down of a return pipe line, the additional cost of which would be £1,000. If both schemes were carried out the method of dealing with the coal would be as follows:—It would first be lifted out of the barge by the Priestman grab, and dropped into an automatic weighing machine. From the machine the coal would pass into a hopper, and from this be automatically fed into the suction tank by a centrifugal suction dredger pump. This pump would also be fed with water either from the main water circulating delivery pipe to the station or from the return pipe from the coaling tanks. The dredger pump would deliver a mixture of coal and water to the pipe line (15 per cent. of the total volume being coal), maintained at a velocity of 7 ft. per second in the pipe.

The Electricity Committee provisionally approved of the plans. The estimated cost of the scheme, including storage tanks and the necessary pipes and appliances for conveying the coal to the tanks from the river by hydraulic power, was approximately £10,000. They recommended approval of the scheme in principle, and the invitation of tenders.

The committee's recommendations were adopted.

University of Sheffield: Mining Department.—The matriculation examination for the degree in mining will be held on September 9, 1913, and information should be obtained from the registrar before August 23. The mining diploma (day) course commences on October 1, 1913, the certificate (Saturday afternoon) course on September 20, the Derby mining course on September 20, and the mining teachers' course on September 27. The courses in electricity applied to mining commence on September 27.

The Distribution of Cleveland Pig Iron.—The suggestion, originally made by Messrs. Bolckow, Vaughan and Co. Limited, of Middlesbrough, that certain Cleveland ironmasters should create amongst themselves a limited liability company for the purpose of selling and distributing the output of pig iron, has been carefully considered by the committee appointed for that purpose by the ironmasters. The committee, after having sat practically continuously since their formation, have adjourned for a fortnight. There seems little reason to doubt that the company will be formed, and that its functions will be, in addition to selling and distributing the iron, fixing prices and controlling production, and, as a consequence, abolishing the warrant stores. Such proposals have met with expressions of strong disapproval by Middlesbrough merchants and merchants in Scotland, and following on this the Scotch ironfounders, in entering a protest against the suggestions, have intimated to the Middlesbrough ironmasters that, if they carry out the proposals, there is likely to be a large importation of foreign pig iron into the Clyde.

**COKE-OVEN PLANT AT GASWORKS.**  
An interesting paper, describing the installation of Koppers coke ovens at the Birmingham Gasworks, was read by Mr. W. CHANEY at the recent annual meeting of the Institution of Gas Engineers. A battery of

per ton, 20 2d.; labour, 2 7d.; repairs, &c., 1 0d. The value of the nitrogen content in the coke being approximately 1 per cent., and in the coal slack 1 4 per cent., an adjustment for the sulphate recovered on this basis has been made:—

COST OF HEATING COKE-OVENS, OUTSIDE PRODUCERS, WITH AMMONIA RECOVERY.

	Uncompressed coal.		Compressed coal.	
	All coal slack.	50 per cent. coal slack. 50 per cent. cokedust.	All coal slack.	50 per cent. coal slack. 50 per cent. cokedust.
	12 per cent. of fuel on coal carbonised.	12 per cent. of fuel on coal carbonised.	15 per cent. of fuel per ton of coal carbonised.	15 per cent. of fuel per ton of coal carbonised.
	Per ton of coal carbonised.	Per ton of coal carbonised.	Per ton of coal carbonised.	Per ton of coal carbonised.
Small coal, at 10s. per ton.....	d. 14 40	d. 7 20	d. 18 00	d. 9 00
Cokedust, at 1s. 6d. per ton .....	—	1 08	—	1 35
Boiler fuel { 50 per cent. dust, at 1s. 6d. ....	0 33	0 33	0 36	0 36
{ 50 per cent. breeze, at 7s. 6d. ...	1 64	1 64	1 79	1 79
Labour .....	3 28	3 28	3 84	3 84
Repairs .....				
Maintenance } 20 per cent. ....	7 29	7 29	8 53	8 53
Depreciation }				
Interest }				
Oil and waste .....	0 29	0 29	0 34	0 34
Acid, at 30s. per ton .....	1 56	1 04	1 95	1 30
Bags and packing .....	0 36	0 24	0 46	0 30
	29 15	22 39	35 27	28 81
Sulphate recovered, at £13 per ton.....	15 05	10 02	18 81	12 52
Total cost of heating per ton of coal carbonised	14 10	12 37	16 46	14 29

12 ovens, together with the necessary stamping equipment, was put to work at Saltley last October, and this is being augmented by a further 54 ovens. The ovens are heated by outside producers of the Mond gas type. The ovens are heated by Koppers' regenerative principle of pre-heating both the producer gas and the secondary air. The coke is discharged by means of an electrically-driven ram into a Goodall coke-quencher. At Saltley the heating of the trial installation is effected by a single producer, working under non-recovery conditions, and this, together with the want of a small relief holder to store the gas while the change-over gear in connection with the ovens was being operated, militated against satisfactory results being obtained so far as fuel expenditure was concerned.

Small coal containing 10 per cent. of water and 5 4 per cent. of ash was used in the producer, the fuel

As regards the selection of coal for the ovens, an expanding coal is not desirable, owing to the difficulty of discharge; the sulphur and ash content, as well as the amount of alkali, are also important factors.

The accompanying figure (fig. 1) shows the cycle of power required for the various operations, fig. 2 being a section through the ovens. The arrangements of the stamping machine and discharging ram at Saltley are somewhat different from the usual method employed. It is the common practice to charge and discharge the oven from one side only, both operations being performed by one combined machine. The ovens at Saltley taper from 18 in. to 19½ in. at the opposite end, the coal being introduced at the widest end, necessitating the employment of an extra machine—the pushing ram on one side (the narrower end) and the charging machine on the opposite side. Although slightly increasing the

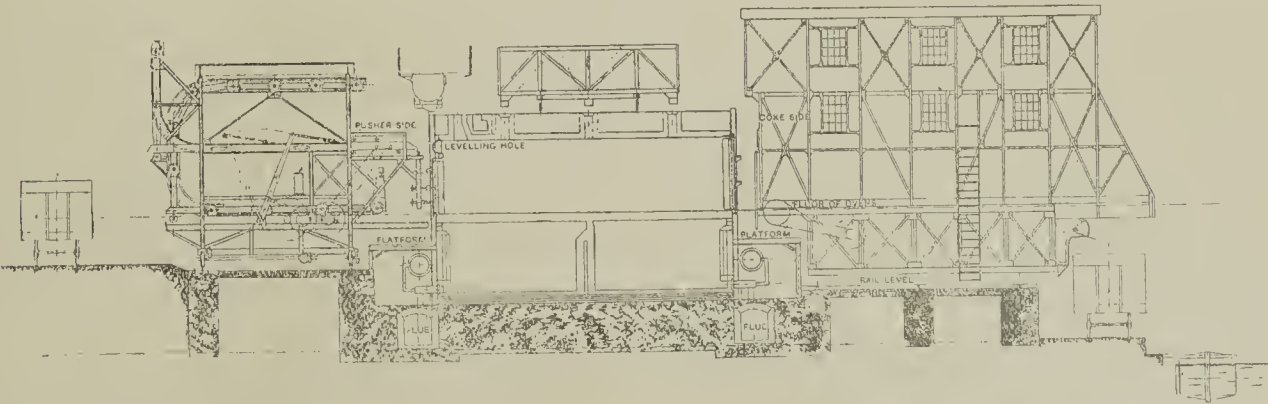


FIG. 1.—SECTION THROUGH OVEN, SHOWING DISCHARGING RAM, STAMPING MACHINE, AND HAND-CHARGING LORRY.

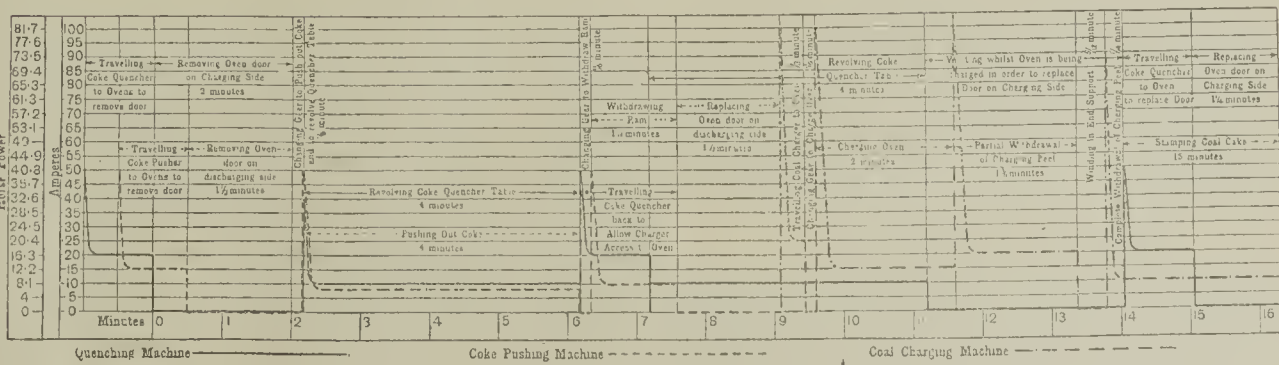


FIG. 2.—INSTALLATION OF 12 KOPPERS' CHAMBER OVENS. CYCLE OF TIME AND POWER REQUIRED TO DISCHARGE AND CHARGE ONE OVEN; ALTERNATING CURRENT, 440 VOLTS; PHASE, 25 CYCLES.

Time occupied from removing oven door on charging side to replacing same, after oven has been discharged and charged (without time allowance for travelling machine) = 14½ minutes. Time occupied in stamping coal-coke = 15 minutes. One oven, say, every half-hour.

consumption being 15 73 per cent. of combustibles on the raw coal carbonised. Figures recently published at Vienna give the fuel consumption as 10 per cent., the producers being in that case charged with cokedust and small breeze, and worked under non-recovery conditions. The author gives the following as the cost per ton of coal carbonised of heating retorts by regenerative furnaces based upon 12 per cent. consumption:—Coke at 14s.

labour costs, the charging and discharging are facilitated, and the charge of coal into the oven increased.

The coke quenching, screening and loading costs are considerably reduced; the Goodall machine being designed to meet all these conditions in one operation.

The self-sealing doors of the ovens, although somewhat heavy in initial capital outlay, dispense with the labour of the door "setters" and "dawbers" usually



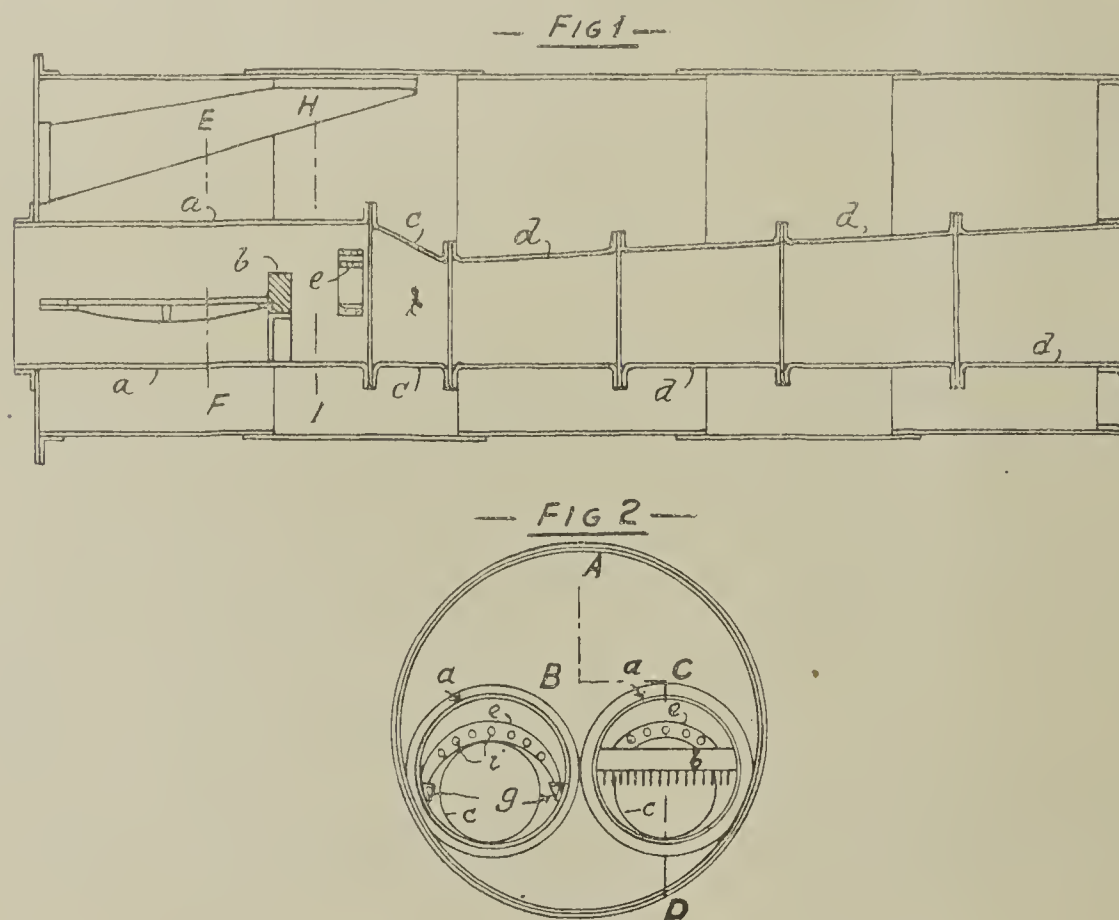
ved in securing the doors from leakage by means of the tendency of leakage through the joints of brickwork forming the oven walls is not more than with the ordinary retort; and the large doors of the self-sealing description closing the ends of the oven are quite as efficient as the ordinary retort lid. Speaking generally, by maintaining a slight plus pressure upon the ovens, the carbonic acid and nitrogen content in the gas may be kept well under control.

The coal usually employed in the by-product oven is washed slack, the original material containing varying quantities of foreign matter. The quantity of ash contained in the resulting coke, within certain limits, does not appear to materially affect its market value. A recent analysis of one of the best Durham cokes, selling in Birmingham at many shillings per ton in advance of gas coke, yielded on analysis 8.4 per cent. of ash, while one of the cheapest Derbyshire cokes, much less in price, gave, on analysis, slightly less ash, the total sulphur in both cases being almost identical. The actual value of a furnace coke seems to be more or less governed by the working experience of the ironmaster,

#### AN IMPROVED LANCASHIRE BOILER.

We illustrate herewith an adaptation of the Lancashire boiler, which has been patented by Mr. H. R. Webster, of Hosforth, near Leeds, and embodies some points of novelty. The invention, briefly, depends upon the principle of radiant heat, a subject which has lately received considerable attention in the researches of Nicolson, Dalby and others.

In the Webster boiler, a large grate area is provided, at the rear of which a combustion chamber is formed. The flues then contract, the effect being to set up eddies in the gases, thus securing a thorough mixing of the CO with the oxygen and a high gas temperature indicated by the maximum CO<sub>2</sub> reading. The junction piece also destroys the core of the heated gases so common in the Lancashire boiler. The gases now at their highest temperature must pass through the contracted part of the flue, the general design being that of the *vena contracta*, the value of which is so ably demonstrated by the Hopkinson-Ferranti valve. Beyond the contraction in the flues, a gradual expansion takes place, the maximum (as in the case of the Yorkshire boiler)



and there appears to be no standard method of comparing the density of the coke, in order to fix its market price. With the coke oven, as with the gas retort, high temperatures are essential both for the production of hard furnace coke combined with a high yield of gas per ton of coal carbonised, and, providing the oven is uniformly heated, it does not appear that the illuminating gases are broken up to any serious extent.

The question of temperature of carbonisation does not materially influence the coke oven manager. For the production of dense coke it is, however, necessary that the whole of the volatile matter from the coke be driven off. The temperatures usually employed by the coke oven manager are, as a rule, much lower than those adopted for a high yield, as with gas retorts, and the period of carbonisation is consequently prolonged. It is during the end portion of this period that air is drawn into the by-product oven and the composition of the gas thereby affected. The coke oven unit is of necessity large, the charge per oven being from 8 to 10 tons, so that their applicability is limited at present to towns where the fluctuation of the consumption of gas comes within this range.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—A. Fildes, S. C. Fildes and A. C. Fildes, carrying on business as engineers' small tool manufacturers at Greenodd, near Ulverston, under the style of Sansom and Co., so far as regards A. Fildes; G. S. Waterfall, E. Pearce and J. E. Brown, carrying on business as merchants and manufacturers of steel, files, tools and cutlery, under the style of Matthias Spencer and Sons, at Arley-street, Sheffield, as regards E. Pearce; The firm of John Gibbons and Co., of Beckwith-street, Liverpool, iron and steel merchants and nail manufacturers, ceased to exist by the withdrawal of J. M. Gibbons, the sole partner therein; H. S. Sutton and C. E. Sutton, carrying on business as metallurgists, at Neath, under the style of Thos. S. Sutton and Sons; W. P. Dobson, D. Dobson and N. Dobson, carrying on business as small merchants, at Dingwall-road, Croydon, as regards W. P. Dobson and Co., as regards W. P.

being found at the extreme rear end of the boiler; such gradual expansion enables the gases constantly to scour the gas side of the flues, and prevents any air locks or gas films forming.

This improved Lancashire, in addition, provides a larger grate, a larger heating surface (fully one-third more for the radiant heat), and, at the same time, has the advantage of the Lancashire boiler in the form of a large steam reserve, which makes it specially applicable to collieries, or any class of work, where large draws of steam are made intermittently.

The boiler should be constructed proportionately as 9 ft. diameter is to 30 ft. in length.

**Miners' Consumption.**—An investigation, conducted by the medical officer of health for Derbyshire in connection with the provision of sanatorium benefit under the Insurance Act, has revealed some interesting facts in regard to the incidence of phthisis. Briefly stated, the results go to prove on the one hand the immunity of coalminers from the disease and its prevalence among quarry workers. On the coal measures of the county, with a total population of 328,954, the death-rate from consumption for the ten years 1901-1910 was 0.7 per 1,000, as against 0.81 for the whole county, and 1.18 for England and Wales. In the area the geological feature of which is millstone grit, however, the rate was 1.2. A close examination of the statistics collected leads to the conclusion that among gritstone workers 45 per cent. of all the deaths of those above 15 years of age are from phthisis, while 12 per cent. of the limestone workers and 7.4 per cent. of coalminers die from this cause. Searching for the reason for the high rate in the first case the medical officer points out that gritstone contains 96.4 per cent. of pure silica, which is insoluble in acids and when inhaled remains in the lungs. What happens is that the workman inhales the angular particles of silica, which produce irritation in the bronchial tubes. Gradually a little chronic bronchitis develops and all the conditions are present for invasion by tubercle bacillus if the man comes in contact with a patient exhaling it. The organism spreads rapidly in the injured lung.

#### PARLIAMENTARY INTELLIGENCE.

##### HOUSE OF COMMONS.—July 15.

##### Railway Rates.

Mr. BARNSTON asked the President of the Board of Trade whether he was aware that the increased rates on goods traffic which the railway companies put into operation on the 1st of the present month are not shown in the rate books kept by those companies for public inspection; and, if so, whether, in view of the fact that the increased rates are a matter of public interest, the Board of Trade would call upon the railway companies to comply at once with their obligation to show in such books the rates for the time being charged on goods traffic.

Mr. BUXTON said he understood that in some, if not all, cases the alteration of the actual figures in the rate books was being done gradually, and that meanwhile reference had to be made to a printed scale inserted in front of the rate book, showing what the increases were on rates of various amounts. To alter all the figures immediately would probably be difficult, as the books had to be kept available for public inspection, but he would call the attention of the railway companies to the desirability of completing the alteration as soon as possible.

Mr. BARNSTON also asked whether the Board of Trade would exercise the power conferred upon them by section 6 of the Regulation of Railways Act, 1873, and appoint some person to apply to the court of the Railway and Canal Commission to determine whether the notices given by the railway companies of their intention to increase their rates on goods traffic on the 1st inst. were or were not valid.

Mr. BUXTON said if any trader or responsible association of traders or local authority was of opinion that there was a doubt of the validity of the notices, it was open to such person or body to take proceedings to obtain a legal decision in the matter.

##### Hydraulic Stowing.

Mr. DUNCAN MILLAR asked the Home Secretary if he had taken any further steps to gather information as to the system of working minerals on the Continent by hydraulic stowage or by other methods calculated to prevent the subsidence of the surface of the ground; if he would publish any reports received by him on this subject; and if he would consider as to whether such methods of working minerals might be adopted with advantage in this country.

Mr. McKENNA said his honourable friend would find references to this subject in the last two annual reports of the Chief Inspector of Mines. The method of hydraulic stowage of wastes and its applicability to English mines were now being investigated by the Departmental Committee on Spontaneous Combustion in Coalmines from the point of view of safety of working where the coal was liable to heat, but the subject of surface subsidence and the adoption of this or other methods of working as a means of preventing it were not matters in regard to which he had any power to take action.

##### Bathing and Washing Accommodation.

Mr. DUNCAN MILLAR asked the Home Secretary whether he proposed to take any steps to carry out the recommendations contained in the report of the committee on bathing and washing accommodation for miners; and whether such accommodation had yet been provided in any part of the United Kingdom under the provisions of the Coal Mines Act of 1911.

Mr. McKENNA said a draft of regulations to carry out the recommendations of the committee was issued, in pursuance of the procedure prescribed by the Second Schedule to the Act, on May 9 last. Some proposals for amendment of the regulations had been lodged by the Mining Association; but he hoped these would be disposed of and the regulations finally made at an early date. Until the regulations had been made the requirement in the Act did not take effect.

##### Coal in Ireland.

Mr. HACKETT asked the vice-president of the Department of Agriculture for Ireland whether the department had received a resolution from the Slievardagh Rural District Council asking the department to send an expert to examine and report on the possibilities of the Slievardagh coalmines, and whether he could state what action the department proposed to take in reference to the resolution.

Mr. BIRRELL said the department had received the resolution referred to. It was expected that the department's mineral expert would be able to visit the locality at an early date.

The Comptroller-General of Patents has revoked letters patent which had been granted to an American manufacturer for certain improvements. In doing so he defined what was meant by a "patented article" under the Act where one specific improvement of mechanism was claimed in combination with other matters. The patentee contended that the article could not be manufactured in this country because it could only be made commercially if American castings were used. The Comptroller held, however, that that contention could only be considered if the manufacture of the article became practically a commercial impossibility, and he pointed out that the object of the Act was to foster British industry and give employment to British labour. He gave the patentee leave to amend his specification.



## LAW INTELLIGENCE.

## SUPREME COURT OF JUDICATURE.

## COURT OF APPEAL—July 7.

Before the MASTER OF THE ROLLS, Lord Justice KENNEDY, and Lord Justice SWINFEN EADY.

## Workmen's Compensation—Redemption of Weekly Payments.

**Calico Printers' Association Limited v. Booth.**—This was an appeal from an award of the judge of the county court of Lancashire sitting at Stalybridge as an arbitrator under the Workmen's Compensation Act, 1906. The original application was made by the Calico Printers' Association Limited under Clause 17 of Schedule I. of the Workmen's Compensation Act, 1906, for the redemption of a weekly sum of 15s. 4d., which had been paid to the workman as compensation under the Act. The county court judge made an award, which was put in an optional form, that the weekly sum of 15s. 4d. might be redeemed at the sum of £613, the latter sum being the amount to which the workman would be entitled if the redemption was made on the basis that the incapacity would be permanent. The workman appealed against the optional form of this judgment. The employers also appealed on the ground that the incapacity was not permanent.

The Court allowed the workman's appeal, but dismissed the employers' appeal.

The Master of the Rolls, in the course of his judgment, said in making his award the arbitrator must find two things—(1) whether the incapacity was permanent; (2) the amount of the lump sum payable, according to the tables, for the purchase of an annuity through the Post Office Savings Bank. The arbitrator in his award had to insert the amount found and the method employed to find it. The principle of the present case had already been decided in *Castle Spinning Company Limited v. Atkinson*, where the employer applied for redemption, and named a particular sum in his application as a maximum limit. It was held that the employer must be prepared to pay whatever the arbitrator awarded. The word "may" therefore was clearly negatived by that case. The word "may" was simply inserted so as to justify the Court in entertaining an application by the employer to redeem. But when the application had been made and the jurisdiction invoked, clearly the arbitrator must award a lump sum.

The lords justices delivered judgments to the same effect.

July 10.

## Workmen's Compensation—Contracting Out.

**Howarth v. A. Knowles and Sons Limited.**—This was an appeal from an award of the judge of the county court of Lancashire sitting at Salford as an arbitrator under the Workmen's Compensation Acts, 1897 and 1906. The workman, who was the original applicant before the county court judge, was in the employment of Messrs. A. Knowles and Sons. In 1901 he met with an accident in the course of his employment which entitled him to compensation. On June 27, 1901, the applicant had contracted out of the provisions of the Act of 1897 on the basis of a scheme duly certified on December 30, 1898, by the Registrar of Friendly Societies under section 3 of the Act of 1897 in the name of the Andrew Knowles and Sons Limited Accident Society. This scheme was certified for a period of five years only, and it expired by effluxion of time on December 31, 1903. On December 30, 1903, a new scheme, substantially the same as the first, was certified for a further period of five years, but the funds under the two schemes were not in any way distinguished. This second or renewal scheme came to an end by virtue of section 15 of the Workmen's Compensation Act, 1906, not having been re-certified under the Act of 1906. The applicant did not sign on under the new scheme. Benefits continued to be paid to those who were, at the time of the termination of the second scheme, in receipt of allowances in common with all (including the applicant) who came under either scheme. The total funds under the one scheme or the other were exhausted by these payments at the end of November 1912. The applicant contended that as there was no subsisting scheme his rights under the Act of 1897 had revived, and the county court judge had jurisdiction to entertain the application, though the accident happened during the currency of a scheme which was valid under section 3 and the applicant had duly contracted to take the benefits of the scheme in substitution for those of the Act, and had actually enjoyed them from 1901 to the end of 1912. The county court judge held that, the contract having been duly made and the benefits actually enjoyed, the employers had ceased to be liable under the Act, and that there was no jurisdiction to entertain the application.

The applicant appealed.

The court dismissed the appeal.

The Master of the Rolls in the course of his judgment said the general object of the scheme was to provide a fund to be used to compensate any member for any personal injury by accident arising out of or in the course of his employment. Under Rule 4 a member was to relinquish all legal claims in respect of any accident which might occur in the course of his employment. By Rule 29 on the termination of the existence of the fund any balance remaining

after providing for all liabilities was to be distributed as might be arranged between the company and the members. The term "liabilities" plainly included liabilities which were future and uncertain and had to be provided for. It would be altogether wrong to hold that at the expiration of the five years the fund could be divided without regard for liabilities which might be incurred in the future. When once the fund was accepted in substitution for the employers' liability the fund must remain liable. In the present case the workman had, unfortunately for himself, abandoned his rights against the employers and accepted in substitution a fund which could not be divided among the members without making provision for all liabilities which had arisen during the continuance of the scheme. It was clear that in respect of an accident which happened during the continuance of the scheme he had no rights whatever against the employers, and the appeal must be dismissed.

The lords justices delivered judgments to the same effect.

## Workmen's Compensation—Riding in Colliery Tubs.

**Richardson v. the Denton Colliery Company Limited.**—This was the appeal by the widow of a workman from the award of the county court judge at Hyde in favour of the employers. On January 18 last, when Richardson had finished his work, he rode along part of the colliery in one of the tubs, and met with a fatal accident. The county court judge held that the accident did not arise out of or in the course of the man's employment. The night fireman, who was called in the arbitration proceedings, said he had repeatedly at night seen the men riding in the tubs, and it was a universal practice. For the employers it was stated that Rule 59 of the colliery company prescribed that no person should ride in any tub or wagon without the permission of the manager, the undermanager or underlooker. Each of those persons denied that he had ever given such permission.

The Master of the Rolls, in giving judgment, said there was no evidence that this man had ever been furnished with a copy of these special rules, and there was no proof that his attention had ever been called to them by anybody in authority. There was no evidence to suggest that he knew that he was doing wrong in travelling as he did in the tub. The evidence of good faith, to his (the Master of the Rolls') mind, was overwhelming. It was clear that it had been the practice of men leaving the night shift to ride in these tubs in the particular part of the mine in question, with the knowledge and with the acquiescence and tacit permission of the fireman, who was the only official in charge then. The county court judge seemed to have thought that there were only three men who did this, but that was entirely contrary to the evidence, which was that men had always used the tubs at night. The fireman, who had been there since last October, thought it was a settled practice, and that permission had been given by his predecessor. His lordship thought the fireman's acquiescence was sufficient in this case, and that the mineowners must be taken by their officials in charge to have winked at the non-observance of the rule. In the circumstances it was not such an unauthorised act by the miner as to disentitle his widow to compensation. The case must be remitted to the county court judge to make such award as he thought fit in favour of the applicant.

The lords justices also delivered judgments allowing the appeal.

July 11.

## Workmen's Compensation: Certificates.

**Birks v. Stafford Coal and Iron Company Limited.**—This was an appeal by the company from an award of the county court judge at Stoke-on-Trent in favour of Wm. Birks, of Nicholls-street, Stoke, made under the Workmen's Compensation Act. The case raised an important point with regard to the right of appeal from the certificate of a certifying surgeon in cases of industrial disease. Birks had been employed as a loader in his client's pits for 19 years. In June 1911 he suffered from an accident, and was off work for five weeks, during which time he was paid compensation. He went back to work on July 24, and worked until September 1, when the colliery was temporarily closed down. Some time in October he went into hospital for colitis. Towards the end of his term as out-patient he found that he had some eye trouble. His doctor told him he was suffering from nystagmus, and on December 10 the certifying surgeon certified that Birks was incapable of earning full wages owing to this cause. On December 20 that was communicated to the employers, but as no date was mentioned in the certificate he went back to the certifying surgeon, who granted a second certificate, fixing disablement at November 27, which was the date at which he first saw the man. Still this did not bring the disablement within a period of 12 months from the last day of employment, and was useless to the man in this sense that it left the onus on him of proving that his eye trouble was due to the nature of his employment. One of the points raised was that the certifying surgeon had no jurisdiction to hear the case again; further, that the certifying surgeon having given the certificate certifying disablement on November 27, the workman had no right of appeal to the

medical referee, who granted a certificate on which compensation was awarded.

The Master of the Rolls, in giving judgment, said he had come to the conclusion that the county court judge's award was right. The workman, in this case, was aggrieved by the certificate given by the certifying surgeon, or by the refusal to give a certificate within the meaning of the Act. There was therefore a right of appeal to the medical referee.

The other noble lords concurred and the appeal was dismissed.

July 15.

## Workmen's Compensation—Termination of an Award.

**New Monckton Collieries Limited v. Toone.**—This was the appeal of the New Monckton Collieries Limited, of Barnsley, from a decision of the Barnsley county court judge in an application by them to terminate the payments to a miner named Thomas Toone, of Royston, who sprained his back while working in the colliery in August 1910. The county court judge had reduced the compensation payable to Toone from 18s. 3d. a week to 14s., but refused to terminate the payments, on the ground that he was not satisfied that Toone had quite recovered from the effects of the accident in 1910.

The Master of the Rolls, in giving judgment, said it appeared that in May 1912 Toone said he was prepared to go back to his old work, but there was no suitable work at the time. In September he went down to the colliery, and his behaviour in the cage was such that the employers did not think it desirable he should go down again. Nobody blamed them, and the arbitrator was satisfied that the man's then state was not attributable to the accident, and dismissed the appeal. But it would be wrong for them to say it was not competent for the arbitrator to say that the employers had not discharged the onus of proving that the man had recovered from the accident.

The lords justices concurred, and the appeal was dismissed.

## SCOTTISH COURT OF SESSION.

## FIRST DIVISION.—July 4.

Before Lords KINNEAR, JOHNSTON and MACKENZIE.

## Workmen's Compensation—Average Wages.

**Mary Dalgleish v. Edinburgh Roperie and Sailcloth Company Limited.**—This was a stated case under the Workmen's Compensation Act between Mary Dalgleish, 43, Bridge-street, Leith, and the Edinburgh Roperie and Sailcloth Company Limited, Bath-street, Leith. The claimant was a mill girl in the employment of the respondents.

The Division remitted the case back to the Sheriff on the footing that in terms of section 1 (b) as interpreted by section 2 (a) and (c) of the First Schedule of the Act, he had done wrong in averaging the appellant's wages during the 12 months, and ought to have awarded compensation on the basis of her employment in one grade for five weeks at the rate of 8s. per week.

## Workmen's Compensation—Increase in Wages.

**Stated Case—A. Malcolm, jun., and T. Spowart and Co. Limited.**—This was a stated case between Andrew Malcolm, jun., Quarry-row, Kingseat, near Dunfermline, and Thomas Spowart and Co. Limited, Lassodie Colliery, near Dunfermline. Malcolm, who is 20 years of age, was injured by accident when in the employment of the respondents on September 2, 1907. It was maintained in argument to the Sheriff-Substitute that he was bound to increase the claimant's compensation because there had been a general increase in miners' wages in the district of 9d. per shift between the date of the agreement and the date of the arbitration. The Sheriff-Substitute held the increase in miners' wages to be proved as a fact in the case, but refused to give effect to the argument, because he held it could not be considered as a change of circumstances which entitled either party to have the compensation reviewed, and because, apart from the agreement of January 19, 1912, it was not proved that the claimant's earning capacity would probably, but for the accident, have exceeded 25s. at the date of the arbitration.

The Division held that the Sheriff-Substitute was right.

Judgment has been given at the High Courts by Mr Edward Pollock, official referee in the action brought against Messrs. Henry Bessemer and Co., of Sheffield and Bolton, by the British Griffin Chilled Steel and Iron Company Limited, of Barrow-in-Furness, for the recovery of damages for alleged delay in the delivery of 2,468 axles. The forgings were required for the Cordoba Central and Rosario railway companies, and the plaintiffs' claim was for £909, penalties they alleged they had had to pay to those railway companies in respect of the delay of the defendants' deliveries. The defendants denied liability on the ground that the contract had been altered. The official referee came to the conclusion that the delays were caused entirely by the default of the defendants. On the question of damages, the official referee was quite clear that the penalties paid by the plaintiffs to the railway companies were the measure to which the defendants were liable. He therefore found that the plaintiffs were entitled to a sum of £700.



## THE COAL AND IRON TRADES.

THURSDAY, JULY 17.

## Scotland.—Western District.

## COAL.

There has been a considerable reduction in the coal shipments at Scotch ports, especially on the Firth of Forth, where serious stoppages of labour still exist at the docks, and a number of collieries remain idle in consequence. The aggregate clearances at the Scotch ports in the past week amounted to 293,892 tons, a decrease of 31,703 tons compared with the preceding week, and no less than 79,849 tons less than the quantity despatched in the corresponding week of last year. At Glasgow, the shipments were 66,891 tons, compared with 87,594 in the preceding week, and 86,584 in the corresponding week of 1912. Clearances at the lower Clyde ports were at Bowling 192 tons, Greenock 3,207, Ardrossan 2,596, Troon 8,656, Irvine 2,511, Ayr 22,130—total 39,292 tons against 38,778 in the preceding week, and 37,245 in the corresponding week of last year. There has been considerable activity in the last few days in the Clyde district, where the annual holidays begin at the end of the present week. Business is now likely to be very quiet during the next two or three weeks. Some charters are fixed up to the Mediterranean to be carried into effect early in August. The local shipments in coals have been on a fairly extensive scale, and there has been a fair trade with Irish ports. There has been a good steady demand for the better qualities of navigation coal and ordinary steams have been selling fairly well. House coal for home use is slow to move. There is a fair business in splint coal, the supplies of which have been somewhat heavy. Nuts have been rather a slow market.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	11/9 to 14/	12/6 to 14/6
Ell .....	12/ to 12/6	12/ to 12/9
Splint.....	12/9 to 14/6	13/ to 15/
Treble nuts .....	12/ to 12/6	12/ to 12/6
Double do. ....	11/9 to 12/	11/9 to 12/
Single do. ....	11/3 to 11/6	11/3 to 11/6

## IRON.

The Glasgow pig iron market has been exceptionally quiet and is likely to continue so for the next few weeks at the least. The attacks which are being made on the market at the instigation of interested parties in the south, although they will probably fail in doing so much damage ultimately as has evidently been intended, have in the meantime had an unsettling effect, and have tended greatly to curtail the business. Dealers are not inclined to commit themselves until they see how far the proposed Middlesbrough ironmasters' monopoly is likely to be carried. The strikes of dock labourers on the Forth have had the effect of reducing the imports of Cleveland iron very materially in the meantime. There has not been much alteration in prices. The arrivals in the past week amounted to 6,068 tons, which is 2,454 tons less English iron than in the corresponding week of 1912. Any restriction in the free supply of Middlesbrough iron is not unlikely to result in an extension of imports into the Clyde from the Continent. There has been a quieter feeling in the Scotch pig iron section due to reduced holiday requirements, and prices are easier. Govan and Monkland are quoted f.a.s. at Glasgow Nos. 1, 70s., Nos. 3, 68s. 6d.; Carnbroe, No. 1, 74s., No. 3, 70s.; Clyde, No. 1, 75s. 6d., No. 3, 70s. 6d.; Gartsherrie, Summerlee, Calder, and Shotts, Nos. 1, 76s., Nos. 3, 71s.; Langloan, No. 1, 77s., No. 3, 72s.; Coltness, No. 1, 98s., No. 3, 80s.; Eglinton, at Ardrossan or Troon, No. 1, 70s. 6d., No. 3, 69s. 6d.; Glengarnock, at Ardrossan, No. 1, 76s., No. 3, 71s.; Dalmellington, at Ayr, No. 1, 71s. 6d., No. 3, 69s. 6d.; Carron, at Grangemouth, No. 1, 76s., No. 3, 71s. per ton. One furnace has gone out of blast since last report, and there are now 88 furnaces in operation in Scotland, compared with 85 at this time last year. The shipments of Scotch pig iron have been 1,100 tons foreign and 3,370 tons coastwise, the total of 4,470 tons being 643 tons less than in the corresponding week of 1912. There is no improvement in the finished iron trade of the west of Scotland, but the malleable iron and steel works are now closing down for the holidays.

## Scotland.—Eastern District.

## COAL.

Coal shipment business at Firth of Forth ports is still much curtailed by the stoppage of labour there. At Leith only 1,954 tons of coal were shipped in the past week, at Granton 2,865 tons, Bo'ness 17,508, and Grangemouth 43,330—total 65,657 tons, compared with 70,050 in the preceding week, and 116,567 in the corresponding week of 1912. At the collieries in Midlothian, a large amount of coal is being stored, as it is impossible to get it shipped at present. A great many of the pits, however, are altogether idle, and thousand of colliers are without employment. In these circumstances shipping prices may be regarded as largely nominal.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	12/9 to 13/	12/9 to 13/
Secondary qualities .....	11/9 to 12/	11/9 to 12/
Treble nuts .....	12/6 to 13/	12/9 to 13/
Double do. ....	12/ to 12/6	12/ to 12/6
Single do. ....	11/3 to 11/6	11/3 to 11/6

Business has been fairly active in the Fife coalfields, and good shipments have taken place. The clearances have been at 15,311 68,277 tons, Burntisland 48,660, Alloa 1,655, Methil 1,143, Tayport 754 and Charleston 2 tons, compared with 129,183 in the preceding week, and 133,345 in the corresponding week of 1912. There has been a good supply of vessels. Whole sale business is briskly for shipment, and nuts have

likewise met with a fairly active demand for the season of the year. The inland business is quiet.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	16/9 to 17/	16/9 to 17/
Unscreened do. ....	14/6 to 15/	14/9 to 15/
First-class steam coal.....	14/3 to 15/	14/3 to 15/
Third-class do. ....	11/6 to 12/9	11/9 to 12/9
Treble nuts .....	13/9 to 14/	13/3 to 13/9
Double do. ....	12/9 to 13/3	12/6 to 13/
Single do. ....	11/6 to 11/9	11/9 to 12/

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 130,596 tons of coal and 1,002 tons of coke were despatched from Tyne Dock, a decrease of 19,751 tons of coal and 1,356 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 64,282 tons of coal and 1,227 tons of coke, a decrease of 3,260 tons of coal and 1,289 tons of coke. The Blyth shipments aggregated 96,598 tons of coal and coke, a decrease of 1,110 tons. The Altos-Hornos Ironworks, Bilbao, are now stated to have contracted for from 80,000 to 90,000 tons of best Durham coking coal for shipment over the ensuing 12 months at about 13s. per ton f.o.b. The contract to supply the Aarhus Gasworks with 22,000 tons of gas coals for delivery over 12 months is stated to have been allotted for prime Wears (Easingtons) at 18s. 5d. per ton c.i.f. These are the only contracts of note this week. The prompt coal market is very well maintained, prices showing in very few instances any diminution. With coal tonnage offering freely at lower rates of freight, merchants are more inclined to operate in coals, and contractors are taking out their full quantities. The principal steam coal collieries report full stems for the next 10 to 14 days. Gas coal contractors, also, are taking out their maximum quantities, with the result that such gas coals as are still on offer are held for very firm figures. The only weak fuels on the market are Blyth steams, household and coking coals. The former are always erratic in price, whilst the outlook for coking coals is distinctly improving. F.o.b. quotations for prompt shipment have varied as follow on the week:—Best steams, Blyths, are 3d. reduced; Blyth smalls, from 3d. to 4½d. cheaper; gas bests, stronger; unscreened bunkers, Durhams, a shade easier; coking coal, 3d. reduced; and households, 6d. fallen. All other descriptions of fuel are steady.

Later.—Some 60,000 tons of Durham gas seconds have been sold for shipment to Genoa over next year at 19s. 3d. per ton c.i.f.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	15/	15/ to 15/3
Do. Tynes (Bowers, &c.) .....	14/9 to 15/	14/9 to 15/
Secondary, Blyths .....	13/	13/
Do. Tynes (Hastings or West Hartleys) .....	13/ to 13/6	13/ to 13/6
Unscreened .....	11/9 to 12/6	11/9 to 12/6
Small, Blyths ..	9/3 to 9/4½	9/6 to 9/9
Do. Tynes .....	7/9 to 8/	7/9 to 8/
Do. specials .....	10/	10/
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) .....	14/10½ to 15/	14/9 to 15/
Secondary gas coals (Pelaw Main or similar) .....	13/6 to 14/	13/6 to 14/
Special gas coals .....	15/ to 15/6	15/ to 15/6
Unscreened bunkers, Durhams .....	13/ to 14/3	13/3 to 14/3
Do. do. Northumbrians .....	12/ to 12/6	12/ to 12/6
Coking coals.....	13/6 to 13/9	13/6 to 14/
Do. smalls .....	13/ to 13/6	13/ to 13/6
House coals .....	15/6	15/6 to 16/
Coke, foundry .....	23/ to 24/	23/ to 24/
Do. blast-furnace.....	19/ to 20/	19/ to 20/
Do. gas .....	18/	18/

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 103,835 tons of coal, and 100 tons of coke as compared with 112,170 tons of coal, and 85 tons of coke for the corresponding period of 1912, being a decrease of 8,335 tons of coal, and an increase of 15 tons of coke. A little better tone prevails on the coal market; there is more enquiry, and

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/3	16/
Secondary do. ....	14/	13/6 to 14/
House coals:—		
Best house coals .....	16/6	16/6
Ordinary do. ....	15/6	15/6
Other sorts:—		
Lambton screened .....	15/6	15/9
South Hetton do. ....	15/3	15/6
Lambton unscreened .....	13/6	14/
South Hetton do. ....	13/3	13/9
Do. treble nuts .....	16/6	16/6
Coking coals unscreened... ..	13/6	14/ to 14/6
Do. smalls .....	13/3	14/
Smithies .....	13/	14/6
Peas and nuts .....	14/	16/3
Best bunkers .....	14/	14/3
Ordinary bunkers ..	13/3	13/9
Coke:—		
Foundry coke .....	23/6	23/6 to 24/6
Blast-furnace coke (divrd. Toesside furnaces) .....	20/	19/6 to 20/
Gas coke .....	18/	17/9 to 18/

more business passing, but prices are easier. Best steams have improved, and there is a better enquiry for best gas coals. The fuller supply of tonnage, together with reduced freights, is having the effect of more enquiries from abroad. There is a better demand for coking coals, but household and coke are on the easy side. There is a fuller enquiry for bunker sorts. It is reported that the Aarhus gas works have contracted for about 22,000 tons of special Wear gas at 18s. 5d. per ton c.i.f. delivery over 12 months, and it is also reported that 50,000 tons of secondary gas coals have been sold for delivery at an Italian port over next year at about 11s. 6d. f.o.b. The freight market is inclined to stiffen, except for the Baltic, which is weak. Recent fixtures include:—Coasting: London 3s., Hamburg 3s. 6d., Rotterdam 3s. 7½d., Havre 4s. 6d. Bay: Bordeaux 6s. 3d., Seville 10s., Lisbon 8s., Oporto 9s. 9d. Baltic: Cronstadt 4s. 6d., Gefle 5s. 3d., Memel 4s. 6d. Mediterranean: Algiers 8s. 9d., Oran 9s., Genoa 8s. 9d., Leghorn 9s. 6d., Ancona 10s. 6d., Las Palmas 9s.; and Buenos Ayres 19s. 6d.—A contract has been placed for 6,000 best Durham bunkers shipment July-December at 13s. 3d. f.o.b.

## Middlesbrough-on-Tees.

## COAL.

The fuel market shows little change. There is rather more doing in all kinds of Durham coal and deliveries of gas qualities are showing some slight improvement. Best gas coal has been sold at 14s. 10½d., but most sellers quote 15s., whilst second kinds are 13s. 6d. to 14s. and specials are quoted up to 16s. The rather heavy demand for bunker coal is met by an ample supply. Ordinary Durham bunkers are 13s. to 13s. 3d., superiors 14s. to 14s. 3d. and specials 15s. to 16s. As is usual at this season of the year, household coal is quiet, and the price ranges from 15s. 3d. to 16s. Coking coal is steady at 14s. Local consumption of coke is heavy, but values of blastfurnace kinds tend downward. This is due to the rather large supply of Durham sorts and the fact that Yorkshire coke is being pressed on this market to an extent that may almost be described as dumping. Average qualities of Durham furnace coke are in the neighbourhood of 19s. delivered at Teesside works. Foundry coke is quoted 23s. 6d. f.o.b., and gashouse coke about 17s.

## IRON.

There is little business passing in pig iron just now. Valuess have been reduced, but they are still above what buyers consider they should be. Second hands are now quite prepared to sell No. 3 g.m.b. Cleveland pig iron at 56s. 3d. f.o.b., and they have disposed of several parcels at that figure, which is regarded as the general market quotation, whilst No. 1 has become 58s. 6d., No. 4 foundry 56s., No. 4 forge 55s. 9d., and mottled and white iron each 55s. 3d., all for early delivery. East coast hematite pig shows a marked downward movement. Efforts of merchants to sell Nos. 1, 2 and 3 at the reduced prices of 72s. 6d. for either early or forward delivery, meet with little success. There has been a rumour current that a contract had been made at 18s. for best rubio ore delivered over five years, but the report is denied and discredited. Business in foreign ore is very limited, but sellers take a firm stand, and market quotations remain on the basis of 20s. ex-ship Tees for rubio of 50 per cent. quality. Freight Bilbao-Middlesbrough stand at 5s. 4½d. There are no new features in the manufactured iron and steel industries. Producers are kept busy on contracts, but orders are very scarce. Reductions in quotations for several descriptions may be announced at any time, but up to the present they have not been actually lowered, and principal market rates stand nominally at: common iron bars, £8 15s.; packing iron, £6 15s.; iron ship plates, £7 15s.; iron ship angles, £8 15s.; iron ship rivets, £9 10s.; iron boiler plates, £8 7s. 6d.; steel bars (basic), £8; steel bars (Siemens), £8 to £8 2s. 6d.; steel ship plates, £8 5s.; steel ship angles, £7 17s. 6d.; steel boiler plates, £9 5s.; steel joists, £7 7s. 6d.; cast iron railway chairs, £4 15s.; light iron rails, £7 to £7 5s.; heavy steel rails, £6 12s. 6d. to £6 15s.; and steel railway sleepers, £7 10s.—railway material net, and all other descriptions less 2½ per cent.

## South-West Lancashire.

## COAL.

The inland household coal trade is quiet, although rather better than the average at this time of the year. Business was a good deal interrupted last week owing to the Royal visit to various Lancashire towns, but matters are now beginning to take a normal course again. Bunkering requirements are well maintained as far as contract business is concerned, but open sale enquiry remains quiet. Prices, if anything, are slightly easier, and cheaper qualities of Lancashire steam coals rule about 13s. 3d. to 13s. 6d. f.o.b., with the best grades up to about 14s. f.o.b. The coastwise and cross-Channel trade in household coal is quite satisfactory for a summer business, being distinctly above the average. Slacks for odd lots have rather a weaker tone; otherwise quotations are quite firm for forward delivery.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/3	16/3
Do. (f.o.b. Garston, net) .....	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal.....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/3 to 14/	13/6 to 14/3
Best slack .....	10/6	10/6
Secondary slack .....	9/9	9/9
Common do. ....	9/3	9/3

## South Lancashire and Cheshire.

## COAL.

The attendance on the Coal Exchange on Tuesday last was only moderate, holidays and summer weather accounting for this. Generally the demand for house coal is quiet. There is rather a falling away in the demand for furnace coal and coke, but with prices unchanged. The prices for



shipping coal are not quite so steady as in recent weeks. Slack is easier than it was a few weeks ago; this for present sale.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

IRON.

There is no change to report in the condition of the market in this district. The prices of pig iron remain as last quoted. Forges are mostly working on short time, but the Association rates are maintained, viz., £8 15s. for Crown bars, £8 5s. second quality, £8 17s. 6d. hoops. Sheets £9, less 2½ per cent. Steelworks are fully employed on bars at £8 less 2½ per cent., and billets £5 7s. 6d. net. Engineers, textile machinists, wagonworks and foundries report plenty of work.

Yorkshire and Derbyshire.

Leeds.

COAL.

The attendance at the market on Tuesday was fairly representative, but few local merchants were present. A larger number than usual of exporters from Hull and Goole were in attendance. The West Yorkshire pits have averaged fully four days this week, and stocks on the whole are about the same. Empty wagons are still scarce, and there are again numerous complaints of delays in transit on the railways.

House Coal.—The improvement noted last week in the demand for house coal from London and the distant markets has been maintained, as in addition to full contract tonnage there has been a fair number of open market transactions. The extra demand has been chiefly for the best Haigh Moor and Silkstone coals, secondary sorts being neglected. A number of additional stacking orders are reported at prices about equal to current quotations. Coastwise sales have not been very numerous, but the collieries generally are firm, and although concessions may be obtained for prompt parcels, forward business is not booked except at higher rates. Freight show little variation on the week; small steamers, Goole to London, run about 4s. In Leeds, Bradford, Halifax, Huddersfield and the West Riding generally, merchants are indifferently employed, the public demand keeping on the quiet side. A feature of the local market at the present time is the large quantity of South Yorkshire house coals which are coming into the market at special rates. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

Gas Coal.—The forward market is still characterised by great firmness, and although new business is not too plentiful, the official advance of 1s. per ton is being insisted upon. There have been one or two meetings this week of owners interested in the gas coal trade, and it is understood that the question of the tenders of the Bradford Corporation Gas Committee has been under serious consideration. It is expected that the tenders which have been sent in this week will average the full 1s. advance, and that special qualities of gas nuts will realise from 1s. 3d. to 1s. 6d. per ton more than last year.

Manufacturing Fuel.—Although the output is limited by the short-time working of the pits, there is considerable weakness in the price of slacks. This is accounted for partly by the dulness of the coke trade, quite a number of ovens having been damped down recently. Washed nuts and other qualities are fairly firm.

Washed Furnace Coke.—Spot lots of patent oven coke have been sold this week at 14s. per ton at the ovens. Stocks have begun to accumulate in several districts, and buyers generally are holding off the market in the expectation of further reductions. Full tonnage is being taken by the local iron and steel works in the Leeds district, and the Frodingham district is also absorbing a fair quantity. The demand from the Midlands, however, is quiet.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	14/	14/
Wallsend & London best	13/ to 13/6	13/ to 13/6
Silkstone best .....	13/ to 13/6	13/ to 13/6
Do. house .....	11/9 to 12/3	11/6 to 12/
House nuts .....	11/ to 11/6	11/ to 11/6
Prices f.o.b. Hull:		
Haigh Moor best .....	16/ to 16/9	15/9 to 16/6
Silkstone best .....	15/6 to 16/	15/6 to 16/
Do. house .....	14/6 to 15/	14/6 to 15/
Other qualities .....	13/9 to 14/9	13/6 to 14/6
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/3 to 12/9	12/3 to 12/9
Gas nuts .....	11/6 to 12/6	11/6 to 12/6
Unscreened gas coal ...	10/6 to 11/	10/9 to 11/3
Other sorts:—		
Prices at pit:		
Washed nuts .....	12/ to 12/6	12/ to 12/6
Large double-screened engine nuts .....	11/ to 11/6	11/ to 11/6
Small nuts .....	10/ to 10/9	10/6 to 11/
Rough unscreened engine coal .....	10/6 to 11/	10/6 to 11/3
Best rough slacks .....	8/6 to 9/3	8/9 to 9/3
Small do. ....	8/ to 8/6	8/ to 8/6
Coking smalls .....	7/9 to 8/3	8/ to 8/6
Coke:—		
Price at ovens:		
Furnace coke .....	14/ to 14/6	14/6 to 15/

Barnsley.

COAL.

The market continues to be of a steady rather than of an active character, and business appears to be so fixed that buyers are able to show some restraint in the placing of orders. The export demand for large steam coal is about

the same, but there is less indication of rush even in respect to this class of coal. So far as the best hards are concerned the production is fully taken, and coalowners, with the surplus they have to offer, are able to maintain prices at the steady level of a week ago. Secondary sorts of Barnsley hards continue to be of a fluctuating description. The home demand has slackened considerably, and although prices, as reported a week ago, are weaker, exporters are anticipating a further reduction, and are conducting operations to that end. With regard to small manufacturing coal, collieries are again finding a considerable reduction in the demand, and although the output is somewhat restricted owing to the shorter working of the purely house coal, pit prices are hardly maintained. The stronger feature in this section is probably the best washed nuts, but otherwise buyers are meeting with considerable concessions to induce business. There appears to be little change in regard to the house coal trade. Merchants continue to take perhaps more than an average bulk of the better class of coal, and stacking operations at the pits prevents prices being affected. Secondary qualities of this class of coal continue to show weakness, although the official quotations are retained on the winter basis. The experience is, however, rather variable, and there appears to be a desire to obtain large stocks in the southern and eastern counties, owing, perhaps, to the disturbed outlook in the West Yorkshire part of the coalfield. The position in regard to coke continues to be weakening. Buyers are still averse to making contracts, and despite the fact that the make is being considerably reduced, the production is so extensive that a large tonnage is on offer on the market, and prices are about 6d. per ton increase on the week.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	14/6	14/6
Best Barnsley sorts .....	14/	14/
Secondary do. ....	11/ to 13/	11/ to 13/
Best house nuts .....	12/ to 13/6	12/ to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/9 to 13/3	12/9 to 13/3
Secondary do. ....	12/ to 12/3	12/ to 12/3
Best washed nuts .....	12/	12/
Secondary do. ....	11/	11/
Best slack .....	9/	9/
Rough do. ....	8/ to 8/3	8/ to 8/3
Gas coals:—		
Screened gas coals .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 12/	11/ to 12/
Furnace coke .....	13/6	14/ to 14/6

Hull.

COAL

There is but little improvement to report in the Humber coal trade. Except for steam hards, which have stiffened somewhat on the week, there is a continued downward tendency. Secondary sorts and smalls are in plentiful supply, while the demand is not by any means so good as it was. Prices for these sorts are again marked down. House coals are a little firmer in view of some buying for the winter supplies, and gas fuels, though in poor request, are firmly held at low rates. The business done in steam hards for export is still confined to prompt or nearly prompt shipment, and to buying forced by the necessity of meeting one's contract engagements. Thus it is that best South Yorkshires have been dealt in at as high as 16s. 6d. f.o.b. at Hull, though 16s. 3d. is about the more general figure. Derbyshires and Nottinghamshires have recovered somewhat, and are being sold freely at 15s. to 15s. 3d. at Grimsby or Immingham. Forward business, as may be gathered, does not develop, and instead of a period of briskness in what should be the height of the season, we are faced with dulness. No one seems quite to know which way things will turn. Exporters have, however, again been favoured by a further fall in freight rates, Cronstadt having been done at as low as 4s. 6d. to 4s. 9d., while other Baltic ports are lower in sympathy. There is plenty of shipping tonnage in sight, and an immediate recovery of rates is not anticipated. A note of anxiety has been sounded to-day by the sudden strike of the dock labourers employed in the timber import trade, who, after marching round the docks and "bringing out" other sections, have practically brought the port to a standstill. The men engaged in the shipment of coal have not been drawn in, but it is said that if there is not a settlement by Saturday

Approximate prices for prompt shipment f.o.b. Hull, &c.

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	16/3 to 16/6	16/ to 16/3
Washed double-screened nuts .....	13/3 to 13/9	13/9 to 14/
Unwashed double-screened nuts .....	13/	13/6
Washed single-screened nuts .....	13/9 to 14/	13/9
Unwashed single-screened nuts .....	13/	13/
Washed smalls .....	11/	11/
Unwashed smalls .....	10/	9/9
West Yorkshire:—		
Hartleys .....	13/3 to 13/6	13/3
Rough slack .....	10/9 to 11/	10/9 to 11/
Pea slack .....	9/9	9/9
Best Silkstone screened gas coal .....	14/3	14/3
Best Silkstone unscreened gas coal .....	13/ to 13/3	13/
Derbyshire and Notts:—		
Best steam hards .....	15/6	15/6
Do. (Grimsby) .....	15/ to 15/3	15/
Derbyshire nuts (doubles) .....	13/6	13/6
Derbyshire nuts (doubles) (Grimsby) .....	13/3	13/3
Derbyshire large nuts ...	14/6	14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	15/6	15/6
Do. do. (Grimsby) .....	15/ to 15/3	15/

they will throw in their lot with the rest. Nevertheless several vessels are delayed loading general goods. Shipments of coal at the docks have not been so heavy of late, and except that there are unusually large consignments to Russian ports, the exports are considerably below the normal.

Chesterfield.

COAL.

The condition of the coal trade of North Derbyshire shows little or no change on the week. For house coal there is a quietly steady demand at the same prices that have ruled for some time. Colliery agents give a hopeful report of the outlook for the autumn and winter trade. The majority of the contracts for the ensuing twelve months have now been renewed at a minimum advance of 1s. per ton. Stocks are exceptionally low for the time of the year, and the pits of the district are able to work practically full time. The demand for fuel for industrial purposes continues to be of a very satisfactory character, and, seeing that the holiday season has now begun, the quantity of fuel going into consumption is unusually great. The steel trades of Sheffield and district are requiring as large deliveries of cobbles and nuts as ever they did, and heavy deliveries are going forward daily. There is a better tone in the market for slack for steam-raising purposes. This is, no doubt, attributable to the fact that the great strike of workmen in the Black Country is ended, and that operations are again almost normal. It is expected that this class of fuel will again shortly come into active demand. Prices are firmly held, as the position of colliery owners is a strong one, due to the fact that they are already heavily sold in this quality. Stocks of slack are very low. Steam coal for locomotive use is in steady demand, and railway companies are taking full contract deliveries. Good business is passing in coal for shipment, and steam coal is in active demand. Prices of best brands are fully 3d. per ton higher than they were a week ago. Supplies outside contracts are difficult to obtain. Cobbles and nuts for near Continental ports are in slightly better request, without, however, any change in prices. Washed nuts and washed slack find a ready sale at late rates. There is no change in the coke trade. The demand shows no signs of improvement, and prices remain weak. Coking fuel is in active request at firm prices.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

IRON.

Business in pig iron is at present on a small scale, but since the resumption of work in the Staffordshire district there are indications of an early recovery. Matters are very quiet in the finished iron branch of the trade, and very little buying has been going on for some time. Buyers are expected to come forward now that labour troubles are gradually disappearing, and that peace in the Balkans is within sight.

Nottingham.

COAL.

A slightly quieter tone has characterised the coal trade in Nottinghamshire during the past week, and business may be described as being at midsummer point. In regard to household fuel, the general public are purchasing on a small scale, but there is an indication of an early improvement, inasmuch as some householders are beginning to order for the autumn and winter months, ere prices assume an upward tendency. Most of the soft coal pits are working short time, and the stocks at the same time are accumulating. For best class households, values are practically unchanged, but second grade fuel is showing a weakening tendency. The steam coal branch has not manifested any material improvement. The amount of fuel sent away on export account is not keeping up to the point expected at this time of the year, but there is a little better feeling in respect to industrials in the home market. Small steams are in fairly satisfactory demand. Gas coal is in normal request with prices unaltered. Slacks for the time being are in steady request, with prices on the down grade, except for best qualities.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	12/ to 13/	12/ to 13/
Good house coals .....	11/ to 12/	11/ to 12/
Secondary do. ....	10/ to 11/	10/ to 11/
Best hard coals .....	11/6 to 12/6	12/ to 12/3
Secondary do. ....	10/6 to 11/6	10/6 to 11/6
Slacks (best hards) .....	8/6 to 9/	8/6 to 9/
Do. (seconds) .....	7/6 to 8/	7/6 to 8/
Do. (soft) .....	7/6 to 8/3	7/6 to 8/6

Leicestershire.

COAL.

Since last writing business has become, on the whole, quieter. There is now no pressure in the demand for coal, but there is a steady business being done. Business is not equally distributed; whilst some are fairly busy, others are quiet, and are putting a considerable portion of their output to stock. A quiet time may be anticipated till mid-August, but though there is a marked decline in the demand for household coals (except the lower qualities), there is a very fair business being done in steam coals. The activity of industries generally causes a fairly steady enquiry for these coals. The stocks generally are heavier all round; some collieries are holding a very considerable amount, but, on the other hand, some have comparatively light stocks. It may be said that the position here is a summer one and, on the whole, not so quiet as is frequently the case. Local merchants are not at all busy. There is not much alteration



quotations, as a rule. But some collieries with rather low stocks are offering a concession to clear, although the attitude is not very general. The miners are moving in the matter of the 5 per cent. The basis on which the coalowners are paying, in addition to the minimum wage, is said by the miners to be an inaccurate one, they claiming that the basis of 1888 is the wage on which the percentage should be paid. A ballot will be taken on the question if a satisfactory solution is not reached.

### South Staffordshire, North Worcestershire and Warwickshire.

#### Hednesford.

##### COAL.

The condition of the coal trade throughout the Cannock Chase district continues quiet, but is well up to the average for the time of the year, and now there is a settlement of the labour troubles in the Black Country an early improvement is probable. Most of the collieries are on short time, but some are working a little better than they were a week or two ago. Any material improvement in the house coal trade can scarcely be expected before August. There is not much change in the demand for fuel for manufacturing purposes, but the outlook is more promising. Business continues quiet at the landsale depots.

#### Birmingham.

##### COAL.

Work has been resumed so recently that the effect has not been felt at the collieries, which are making about three days a week. A few spot lots of household coal are obtainable, but generally prices are unaltered, as follow:—

##### Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep.....	16/6	16/6
Do. best shallow.....	14/6	14/6
Do. seconds do.....	13/	13/
Best hard.....	14/	14/
Forge coal.....	11/	11/
Slack.....	8/6	8/6
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked cobs.....	13/9	13/9
Best hard spires.....	14/6	14/6
Forge (steam).....	10/	10/
D.S. nuts (steam).....	9/6	9/6
Small (do.).....	8/6	8/6

##### IRON.

The general resumption of labour at the railway carriage and wagon tube and other works affected by the recent strike, had a salutary effect on the market, the tone being decidedly more hopeful. Returning confidence is further shown in the fact that several purchases of some magnitude have been made both of raw and finished material by the more optimistic of the manufacturers and merchants, but in the main the attitude of buyers was one of caution. It takes time to recover from the effects of such an upheaval in labour as the district has passed through. Although there is a slightly better enquiry for pig iron, buyers are still able to force down prices. Northamptonshire has this week reached 53s. 6d., and ranges up to 55s., which is little more than cost; Derbyshire may be obtained at 55s. net, and Staffordshire common at 53s. 6d. to 56s., with 3s. to 3s. 6d. per ton extra for best quality. In the finished branches a more hopeful feeling prevails, and the resumption of the demand for merchant bars by the wagon and other works prevents any further drop in prices below £7 15s. to £8 a ton delivered Birmingham. The demand is not brisk, but it is less languid. The common branches continue to be adversely affected by sales of Continental bars at £5 17s. 6d. to £6 a ton, delivered in the district, which compares with £7 7s. 6d. to £7 10s. for local nut and bolt iron. Galvanised sheets range from £10 12s. 6d. to £11 f.o.b. Liverpool, and makers of black sheets for galvanising are making a restricted output at £8 2s. 6d. to £8 7s. 6d. a ton. The strip works have resumed and sales are effected on the association basis, and hoop iron and steel ranges from £7 12s. 6d. to £8. On the whole, the steelworks are well engaged. Targets and billets of local make cannot be had under £5 and £5 2s. 6d. per ton for Bessemer, and 2s. 6d. to 5s. more for Siemens qualities. Continental makes are 5s. to 10s. a ton below these figures, and a fair quantity is coming into the district.

### Forest of Dean.

#### Lydney.

##### COAL.

The position of the house coal trade of this neighbourhood so far as the demand is concerned is practically unchanged. With a couple of months of the summer season still to go, merchants generally show little disposition to increase their stocks to any material extent, though prices, it is understood, will not be reduced this summer. The pits are averaging about four days in the week. The steam coal pits are all on full time, and the output in all cases is readily absorbed. There are no stocks, and good prices are still obtained.

##### Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block.....	16/6	16/6
Forest.....	15/6	15/6
Rubble.....	15/9	15/9
Nuts.....	14/	14/
Rough slack.....	10/	10/
Patent fuel.....	13/6 to 14/	13/6 to 14/
Slack.....	10/6	10/6

Prices 9d. extra f.o.b. Lydney or Sharpness.

### Devon, Cornwall, and South Coast.

#### Plymouth.

##### COAL.

Messrs. W. Wade and Son report that the south coast coal trade still exhibits considerable flatness in demand for current shipments, in spite of the low prices and freights that are being placed before importers. There is also a general hesitation about contracting at the rates at present quoted, as the ideas of buyers and sellers differ widely on the question of the amount of the advance on last year's quotations. Several steamers are being chartered or offered from the east coast on the old form of charter—one of 700 tons being now here at 5s. from Goole. From the Mersey and west coast the old form of charter continues in general use. Coal prices and coasting freights seem to have reached their lowest point for the summer, and merchants will probably now take full advantage of this for stocking purposes.

### THE WELSH COAL AND IRON TRADES.

THURSDAY, JULY 17.

#### North Wales.

#### Wrexham.

##### COAL.

The reports of the past few weeks apply equally to the present condition of the coal trade of this locality, and there is a falling off in demand for most grades of fuel, though some departments are worse than others, and stocks may be seen in the sidings. With reference to the house coal trade, this is very dull just now, and landsale depots are doing very little business indeed. Prices remain fairly firm for forward contracts, and a number have been fixed up recently. Gas coal business is fairly good, and a fair tonnage is being taken on account of contracts. Many of the new contracts have now come into full operation, though there are a few old contracts which were in arrear, which are enabling these gas companies to hold out a little longer before settling their new contracts in the hopes of being able to fix a price at less than the general advance of 1s. Steam coal is not in quite such good demand as it has been latterly, but it is the general opinion that the slump is only temporary, and that the markets will improve in the near future. It is to be hoped that this will be so, as owing to having stocks on hand, and being short of wagons, some of the collieries have had to work short time of late. Generally speaking, prices for the open market are on a par with the contract figures, though in a few instances reductions have been made for quick sale in order to get the wagons returned quickly. The railway companies are taking a large tonnage on account of contracts, and the several companies are now fixing up for forward supplies at a considerable advance on the last contract prices. With regard to coal for shipment, a fairly good tonnage has been disposed of in this market during the past week, though I inclined to think that the demand is not greater than the supplies available just now. Smaller grades of fuel, also, are inclined to weaken, with the exception of nuts, which continue in good demand owing to the limited supply. Gas coals remains unaltered in demand or price. The current prices are as below:—

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal.....	14/ to 14/6	14/ to 15/
Secondary do.....	13/ to 13/9	13/ to 14/
Steam coal.....	12/6 to 13/	12/6 to 13/
Gas coal.....	13/ to 14/	13/ to 14/
Bunkers.....	12/ to 12/9	12/3 to 12/9
Nuts.....	11/3 to 11/9	11/6 to 12/
Slack.....	6/ to 7/6	6/ to 8/
Gas coke (at works).....	15/ to 16/8	15/ to 16/8
Prices landsale:—		
Best house coal.....	18/4 to 19/2	18/4 to 19/2
Seconds.....	16/8 to 17/6	16/8 to 17/6
Slack.....	10/ to 12/6	10/ to 12/6

### Monmouthshire, South Wales, &c.

#### Newport.

##### COAL.

The temporary revival of trade experienced last week has not been maintained, and at the present time matters run all in buyers' favour. For the best qualities of large there is rather more firmness displayed than for other grades, but even here it is found difficult to maintain last week's prices. Smalls are very plentiful, and sellers are offering freely the very best qualities at 8s. 6d., being fully 6d. less than last week. House coals, although nominally quoted unchanged, seem weaker on a lessened demand, while throughs and nuts are fully 6d. down. Patent fuel also rules easier on the week, but pitwood is rather scarce, although sellers are hampered by the great difficulty of obtaining empties to clear cargoes. Neither present business nor forward booking is at all satisfactory just now, nor does the present quiet state of the freight market promise that rapid expansion of business to which everyone is looking to improve the condition of trade. There is not a satisfactory enquiry for outward bound tonnage, despite the fact that freight rates are more favourable than for some time past.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	17/6 to 17/9	17/6 to 17/9
Western-valleys, ordinary	16/9 to 17/	16/9 to 17/
Best Eastern-valleys.....	16/3 to 16/6	16/3 to 16/6
Secondary do.....	15/6 to 16/	15/6 to 16/
Best small coals.....	8/3 to 8/6	8/9 to 9/
Secondary do.....	7/6 to 7/9	7/9 to 8/
Inferior do.....	7/ to 7/3	7/ to 7/6
Screenings.....	8/6	9/
Through coals.....	13/ to 13/9	13/9 to 14/6
Best washed nuts.....	14/ to 14/6	14/6 to 15/
Other sorts:—		
Best house coal.....	18/ to 19/	18/ to 19/
Secondary do.....	17/ to 18/	17/ to 18/
Patent fuel.....	20/ to 20/6	20/ to 20/6
Furnace coke.....	22/ to 24/	22/ to 24/
Foundry coke.....	26/ to 28/	26/ to 28/

##### IRON.

Local conditions of the iron and steel trades again show little or no alteration since last reported. The fresh business passing is only of a hand-to-mouth nature, while prices generally are approximately as a week ago. Tinplates continue the most unsatisfactory feature and only little hope is expressed of early improvement in this direction. Bar mills are still well engaged on current orders, but only small forward bookings are taking place. Quotations for Welsh bars are nominally unaltered, but as the opinion is expressed in some quarters that the bottom limit has been reached, a slightly stronger feeling is apparent. Foreign quotations remain unchanged. Continued activity is the rule at rail mills, where a better enquiry is coming along and keeps values steady. Work continues fair at blast-furnaces, but not a great deal of fresh business is being put through, while values remain as last reported. In the tinplate department the outlook is very gloomy. Practically no fresh enquiry is coming along and merchants and makers are keenly cutting prices for chance orders. Unfortunately there is no prospect of any early improvement, and many mills will doubtless have again to cease operations at an early date. Quotations are down fully 3d. per box on the week, Bessemer primes 20 × 14 being obtainable below 13s. 6d. per box.

#### Cardiff.

##### COAL.

The market so far as best steam coals are concerned is in a very healthy condition. Heavy shipments are being made by the Admiralty on account of the naval manœuvres, and the quantity of coal which left the port last week amounted to no less than 437,000 tons. There is very little free coal available, and for the small quantities obtainable direct from the collieries high prices have to be paid. As much as 21s. 6d. has been realised by one or two collieries, but for the bulk of best steams perhaps 20s. 6d. to 21s. would be the general average. As numbers of the miners are holiday-making, the outputs are naturally decreasing, and this state of affairs is likely to continue for at least a couple of months. Then, again, August at the best, is usually a short month, and in consequence of the high wages which are being earned by the workmen, which in numbers of instances amount to £6 a week, there is every reason to expect a prolongation of the holidays. In these circumstances sellers are more disposed to advance than reduce their quotations, and it is reported that some of the leading collieries who have full order books for some weeks to come have already secured figures in advance of current market values. These remarks apply with equal force to second-class Admiralties also. As much as 19s. 6d. to 20s. is being paid for superior seconds, and 18s. 6d. to 18s. 9d. for ordinary qualities. Nothing is yet known as to the result of the enquiry by the Greek Government for 40,000 tons of double screened steam coals, but the decision is expected at the end of the present week, though possibly it may run into the week following, but under any circumstances there is every reason to believe that the order will be placed on this market. As to future business generally, buyers are still holding back. Particularly is this the case as regards the Mediterranean. Orders from these ports are very scarce notwithstanding the free offer of tonnage and the reduction in freights which have fallen to a level not touched for months past. As low as 7s. 9d. has been accepted for Genoa, a figure which has had no parallel for a period of 15 months. The reluctance of buyers just now to enter into contracts is no doubt due to a great extent to the poor chartering which has taken place the last few days. For the week ending Saturday last, the registered tonnage taken up was less than 222,000 tons, and, unless these figures are materially improved upon, buyers anticipate there will be considerable pressure to sell, with considerable weakness in prices. These views, however, are not held by colliery salesmen, who say that they have not the slightest reason to expect that prices will be diminished to any appreciable extent for some time. It is commonly thought that freights are now at their bottom

##### Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals.....	20/6 to 21/6	20/6 to 21/
Superior seconds.....	19/6 to 20/	19/ to 19/6
Ordinary do.....	18/ to 18/9	18/ to 18/6
Best bunker smalls.....	9/9 to 10/	10/6 to 11/
Best ordinaries.....	9/ to 9/3	9/9 to 10/3
Cargo qualities.....	7/9 to 8/3	8/6
Inferior smalls.....	7/	7/ to 7/6
Best dry coals.....	18/ to 19/	18/ to 19/
Ordinary drys.....	15/6 to 16/	15/ to 15/9
Best washed nuts.....	16/6	16/6
Seconds.....	15/3 to 15/6	15/6
Best washed peas.....	15/	14/6
Seconds.....	14/ to 14/3	13/6
Dock screenings.....	10/	10/
Monmouthshire:—		
Black Veins.....	17/6 to 17/9	17/9 to 18/
Western-valleys.....	17/ to 17/3	17/ to 17/3
Eastern-valleys.....	16/3 to 16/6	16/6 to 16/9
Inferior do.....	15/3 to 15/6	15/9 to 16/
Bituminous coals:—		
Best house coals (at pit)	20/	20/
Second qualities (at pit)	18/	18/
No. 3 Rhondda:—		
Bituminous large.....	17/ to 17/6	17/ to 17/6
Through-and-through... Small.....	15/	14/9 to 15/3
No. 2 Rhondda:—		
Large.....	13/6 to 14/	13/3 to 13/9
Through-and-through... Small.....	11/6 to 12/	11/6 to 12/
Best patent fuel.....	22/	22/ to 22/6
Seconds.....	20/	20/ to 21/
Special foundry coke.....	30/	30/ to 31/
Ordinary do.....	26/	26/ to 28/
Furnace coke.....	21/ to 22/	22/ to 24/
Pitwood (ex-ship).....	22/6	22/6

Coal and patent fuel quotations are for net cash in 20 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.



and that any substantial increase in charterings will cause a rise. The small coal market continues in a depressed condition, but it is thought there will be an improvement in the near future. There is no doubt that the huge stocks which were laid in some time ago by the Belgian and French consumers are still unabsorbed, with the result that the enquiry for small is poor and the prices have crumbled away. The contractors for the French railways are being asked not to press deliveries for the next month or two, so greatly are the railways overstocked. The Midi, the Nord, the Paris-Orleans, and the State railways (which take altogether about half-a-million tons in the course of three months, it is said), have already had delivered to them the bulk of their quantities up to the end of August. At present not more than 10s. is obtainable, for best bunkerings. For ordinary qualities 9s. to 9s. 3d. is accepted, whilst for cargo sorts the price is 7s. 9d. to 8s. 3d. With respect to Monmouthshire coals the market is fairly steady, especially for forward shipment. Black Veins are 17s. 6d. to 17s. 9d., western-valleys 16s. 9d. to 17s. 3d., and best eastern-valleys 16s. to 16s. 3d.—in each case f.o.b. Cardiff. There is no alteration in house coals; neither do the figures for bituminous qualities show much change. No. 3 Rhondda large is still quoted at 17s. to 17s. 6d., through-and-through 15s. and small 12s. to 12s. 6d. No. 2 large is rather unsteady, the prices ranging from 13s. 6d. to 14s., through-and-through 11s. 6d. to 12s., and small 8s. 6d. to 9s. Shipments of patent fuel for the week were close upon 39,000 tons, of which the Crown Company shipped 14,100 tons, and Swansea 24,595 tons. Buyers are still paying 22s. for best brands. Coke manufacturers, notwithstanding the diminished demand from consumers, are very reluctant to make any change in their quotations, but special foundry does not command more than 30s., nor ordinary foundry more than 26s. per ton. Furnace coke is 21s. to 22s. Pitwood is 22s. 6d., the same as last week. The Custom House returns for the month of June show that the quantity of coal exported to foreign countries from the Welsh ports amounted to 2,475,292 tons, as against 2,047,130 tons in the corresponding month of last year, being an increase of 428,162 tons. From Cardiff alone the shipments were 1,565,627 tons, an increase of 225,616 tons. From Newport there was an increase of 98,932 tons, from Port Talbot an increase of 62,117 tons, and from Swansea an increase of 23,617 tons.

IRON.

Although so many tin-plate mills are idle, it is satisfactory to learn, on the authority of the Swansea Harbour Trust Board, that there was a gain of 10,314 tons in the exports of tin-plates last month as compared with the corresponding month of last year. China took 2,059 tons as against *nil* last year, whilst to Germany's credit there is an increase of 1,050 tons. Exports to Russia have gone up by nearly 1,200 tons, and to Japan about 800 tons. There was also a very large shipment to the United States, but that was abnormal, as it formed part of an extensive transaction entered into some time ago. A Liverpool liner is at present loading 90,000 boxes of tin-plates at Swansea for New York, to the order of the Standard Oil Company. Six mills have restarted operations at the Old Castle Tin-plate Works, Llanelly, which have been idle for nearly a month. There still continues to be some talk about the desirability of curtailing production, the last suggestion being that in addition to the ten days' holiday in August there should be a stoppage of all work the first week in September, but it is doubtful whether this will really come to anything. In some quarters, indeed, the question is seriously debated whether increased output would not safeguard the trade, but that does not find favour with acknowledged experts. If tin-plates cannot be manufactured at present except at a loss of 3d. to 6d. per box, an increase of 10,000 to 15,000 boxes per shift will, they declare, not save the manufacturer. Prices at present are very low, 14 x 20 cokes offering at 13s. 4½d., and oil sizes at 13s. 9d. and 19s. 9d. per box. Finished black-plate is £10 per ton. There is no improvement in the steel trade. Imports of plates and bars during the week do not amount to more than 5,000 tons, though it is no secret that offers are being freely made to Welsh consumers at £4 10s. to £4 12s. c.i.f. At what price business is being done by the Welsh tin-bar makers it is difficult to ascertain, but it is not believed that they are getting more than £4 17s. 6d. per ton. There is rather a better demand for galvanised sheets, but 24-gauge corrugateds still remain at £10 10s. to £10 12s. 6d. It is believed, however, that prices have touched bottom, and that stocks in consumers' hands are so low that buyers will soon be compelled to come into the market. Welsh pig iron is now offering at 75s. 6d. to 76s. 6d. f.o.t., and even at these figures it is somewhat difficult to do business, with the result that stocks are increasing. New steel crop ends are 61s. 6d. f.o.t. Very little business is doing in iron ore, best rubio being offered at 19s., second quality at 17s. 6d. to 18s. and Almeria ore at 19s. per ton.

Swansea.

COAL.

The returns of the trade of the port during the past week were not up to the average of the last few weeks. The export of patent fuel was good, but coal was rather quiet. The shipments together amounted to 91,001 tons. There was a good attendance on 'Change this morning, but the anthracite coal market was very quiet; there was very little new business doing. Sellers of Swansea Valley and Red Vein large were prepared to accept lower prices for immediate delivery, in order to obtain empties to keep their pits working. Machine-made nuts and cobbles were barely holding their position, whilst rubbly culm was being more freely offered at reduced figures. Duff, on the other hand, was very difficult to obtain, and values were harder. There was an easier tone in evidence in the steam coal market, and prices were slightly reduced.

(Table of prices will be found at top of next column.)

IRON.

There was very little change in the condition of the iron and steel trades last week. The blastfurnaces were well employed, and a good yield of pig iron was registered. The steel trade was in a fairly satisfactory condition. There was a decline in the tin-plate trade, the outputs at the various works being greater than the demand. The shipments were 125,767 boxes, receipts from works 120,805 boxes, and stocks in the dock warehouses and vans 405,002 boxes.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/ to 23/	21/ to 23/
Secondary do. ....	18/6 to 20/	18/6 to 20/
Big Vein large (less 2½ per cent.) .....	16/ to 17/6	16/ to 17/6
Red Vein large do. ....	12/ to 13/	12/ to 13/
Machine-made cobbles (net) .....	21/ to 22/	21/ to 22/
Paris nuts (net) .....	23/ to 24/	23/ to 24/
French do. do. ....	23/ to 24/	23/ to 24/
German do. do. ....	23/ to 24/	23/ to 24/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	11/6 to 13/6	11/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	6/6 to 7/	6/9 to 7/
Duff (net) .....	5/9 to 6/3	5/6 to 6/
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 21/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/ to 12/	11/ to 12/
Small do. ....	8/ to 9/6	8/ to 9/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/6	17/ to 18/6
Through-and-through (less 2½ p.c.) .....	14/6 to 15/6	15/ to 16/
Small (less 2½ per cent.) .....	11/ to 12/	11/6 to 12/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

Llanelly.

COAL.

The coal market in this district is still in a very unsatisfactory condition, and all classes are difficult to place. Prices are being much cut, but even this does not increase the number of orders to any extent. The present state of the market is quite a contrast to that of a few months ago, and no one expected that such a change would take place. Many of the works were anxious to book up over a long period, fearing that the boom would continue, but had they waited until now they would be able to contract at quite two to three shillings per ton less. The steam and bituminous coals are likely to be weak for three months to come, and collieries are bound to have many idle days. It is hoped that the slump in the anthracite trade will soon be over, and there are signs that an improvement will take place soon. Collieries are not so keen on booking forward at low prices as they were. The horticultural kinds are still in poor demand, and these can be bought at low figures to have wagons released. The other classes are going as last week. Prices this week are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	20/ to 23/	21/ to 23/
Secondary do. ....	18/ to 19/	19/ to 21/
Big Vein large .....	17/ to 18/	17/ to 18/
Red Vein do. ....	12/ to 13/	12/6 to 13/6
Machine-made cobbles ...	18/ to 20/	18/ to 20/
German nuts .....	20/ to 21/	20/ to 21/
French do. ....	22/ to 23/6	22/ to 23/
Paris do. ....	22/ to 23/6	22/ to 23/
Machine-made beans .....	19/ to 21/	19/ to 21/
Do peas .....	12/ to 13/	11/6 to 13/6
Rubbly culm .....	7/ to 7/6	7/ to 7/6
Duff .....	5/ to 5/6	5/ to 5/6
Other sorts:—		
Large steam coal .....	17/ to 18/	17/ to 18/
Through-and-through ...	11/6 to 12/6	11/6 to 12/6
Small .....	10/ to 11/	10/ to 11/
Bituminous small coal ...	11/ to 12/	11/ to 12/

THE IRISH COAL TRADE.

THURSDAY, JULY 17.

Dublin.

There is not much change in the position this week, a fair amount of business being done both locally and with the inland districts, and prices of all qualities remaining unaltered. Stocks are moderate at present and very little Scotch coal is being bought, as it is stated that the prices at the other side are too high. Railway contracts are issuing and tenders are also being invited for the usual 12 months' supply for the Board of Public Works. City prices are as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best Wigan, 25s.; best kitchen, 24s.; Orrell slack, 21s.—all less the usual 1s. per ton discount for cash; steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. Quotations for Irish coals at Wolfhill (Queen's County) are:—Best large coal, 20s. per ton; best household coal, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth. Contracts have been made in some of the western districts for the Arigna coal at 21s. 8d. per ton, this being 6s. 1d. per ton less than the prices of Whitehaven. The coaling vessels arriving during the past week amounted to 58 as compared with 42 the week previously, chiefly from Girvan, Partington, Garston, Ayr, Troon, Liverpool, Whitehaven, Glasgow, Preston, Workington, West Bank, Newport, Swansea and Manchester. The total quantity of coal discharged upon the quays was 24,500 tons.

Belfast.

The local trade, upon the whole, is fairly active and inland business has improved, although the shortage of railway wagons has considerably delayed deliveries for those districts. Prices are mostly firm and unchanged, with the exception of Scotch steam coals, which are somewhat lower. Quotations in the city are:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current prices ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Cargoes arriving during the week were chiefly from Ayr, Preston, West Bank, Ardrossan, Garston, Maryport, Glasgow, Troon, Lydney, Saundersfoot, Girvan, Workington and Partington.

THE KOPPERS COKE OVEN IN AMERICA.

In his recent paper before the American Iron and Steel Institute, Mr. C. A. Meissener, the chairman of the Coke Committee of the United States Steel Corporation, gave much interesting information concerning the by-product coking industry in America. Mr. Meissener expressed a distinct preference for the vertical flued ovens whose flues open to the top of the oven. The Koppers oven is of this type, and it is interesting to note that it is this oven which is now almost universally adopted in America. The following table given in Mr. Meissener's paper shows clearly the preference which is being shown in America for ovens of the Koppers type. It will be noted that only ovens of this type are now being erected. Mr. Meissener stated emphatically that the coke obtained from by-product ovens *if made right* is equal in every way to beehive coke, and stated that in the Koppers ovens at Gary the coke produced is used with very successful results in the blast-furnaces. In addition to the ovens specified in the table, the Koppers Company are also erecting a battery of 120 ovens for the Maryland Steel Company:—

Semet Solvay.		Koppers.		Otto-Hoffmann.	
Location.	No. of ovens.	Location.	No. of ovens.	Location.	No. of ovens.
Syracuse, N.Y. ....	40	Joliet, Ill. ....	280	Johnstown, Pa. ....	372
Dunbar, Pa. ....	110	Gary, Ind. ....	560	Glassport, Pa. ....	120
Ensley, Ala. ....	240	Corey, Ala. ....	280	Everett, Mass. ....	400
Benwood, W. Va. ....	120	Woodward, Ala. ....	60	Sydney, C.B. ....	520
Detroit, Mich. ....	175	Joliet, Ill. ....	35	Hamilton, Ohio ....	100
Chester, Pa. ....	40	Sault Ste. Marie, Ont. ....	110	Lebanon, Pa. ....	232
Tuscaloosa, Ala. ....	60			Buffalo, N.Y. ....	188
Milwaukee, Wis. ....	160	Total in operation .....	1,325	Camden, N.J. ....	150
Lebanon, Pa. ....	90	In construction.		Sparrows Point, Md. ....	200
Geneva, N.Y. ....	46	Duluth, Minn. ....	92	Wyandote, Mich. ....	30
Cleveland, Ohio ....	100	Woodward, Ala. ....	80	Farrell, Pa. ....	212
South Chicago, Ill. ....	280	Sparrows Point, Md. ....	6	Indianapolis, Ind. ....	100
Steeltown, Pa. ....	120	Indiana Harbour, Ind. ....	66		
Waukegan, Ill. ....	13	Youngstown, Ohio. ....	68		
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Indianapolis, Ind. ....	41	Total in construction. ....	368		
Grand total .....	1,689	Grand total .....	1,693	Grand total .....	2,624

THE TIN-PLATE TRADE

Liverpool.

Only a hand-to-mouth business is reported on the week, buyers holding off all they can in anticipation of lower prices. The trade is in a very unsatisfactory state just now. The reduction which has taken place in block tin and steel bars will assist makers to some extent, but, even at present costs, the figures obtainable for the finished article show an actual loss, they say. A good many mills are now closed down, but the output will need to be curtailed very much more before an improvement in price is effected. Quotations range about as follow:—Coke tin-plates:

I C 14 x 20 (112 sh. 108 lb.), 13s. 6d. per box; I C 28 x 20 (56 sh. 108 lb.), 13s. 10½d. to 14s. per box; I C 28 x 20 (112 sh. 216 lb.), 27s. 3d. to 27s. 6d. per box; I C 14 x 18½ (124 sh. 110 lb.), 13s. 10½d. per box; I C 14 x 19½ (120 sh. 110 lb.), 13s. 10½d. per box; I C 20 x 10 (225 sh. 156 lb.), 20s. per box; I C squares and odd sizes, 13s. 9d. to 14s. basis for approved specifications. Charcoals are offering at 15s. 6d. and upwards, but buyers are proceeding very cautiously. Coke wasters are in but moderate demand. Quotations:—C W 14 x 20, 12s. 9d. per box; C W 28 x 20, 26s. per box; C W 14 x 18½, 11s. 9d. per box; C W 20 x 10, 16s. 9d. per box—all f.o.b. Wales, less 4 per cent.



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## ADVERTISEMENTS.

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(A Classified List appears on page 148.)

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For the United Kingdom ... £1 1 0  
For Foreign Countries and Colonies £1 7 6

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Besides numerous other important contracts, completed (in 1897)  
the Deepest Boring in the United Kingdom to 3,500 ft.  
Great Experience in Boring for WATER.

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## AN UNIVERSITY TRAINING AT YOUR OWN HOME.

Lessons and Instruction by Post for candidates for FIRST and SECOND Class Mine Managers' and Mine Surveyors' Home Office Examinations; Surveying and Electrical Engineering for London City Guild's Examinations; also A.M.E.E. Examinations and Government Inspectors' Exams. Candidates for the above write without delay for free Syllabus, and book of Previous Examination Questions.

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See Illustrated Page Advertisement in July 11 issue.

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men qualified to prepare you for the highest mining positions. The U.M.S. is the sure road to promotion. Employers know that OUR PRACTICAL TRAINING FITS MEN FOR POSITION. That is why U.M.S. men obtain and hold nearly all the best positions. 42 of H.M. Inspectors are U.M.S. men. LESSONS BY POST only. Syllabus free. Dept. A3, The U.M.S., CARDIFF.

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Machinery for Briquetting Peat, Lignite, Coke, Coal, Iron, Copper, Nickel, Cement; Also Sawdust, Waste Cereals, Offals, Sewage.

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Demy Octavo, 176 pages, Cloth.

Price 6s. 3d.

45 Original Photographs and Diagrams.

(post free).

## Miners' Nystagmus:

Its Causes and Prevention,

By T. LISTER LLEWELLYN, M.D., B.S. (Lond.), &c.

WITH A PREFACE BY

Professor J. S. HALDANE, F.R.S., M.D.,

AND A LEGAL APPENDIX BY

DOUGLAS KNOCKER, M.B., Barrister-at-Law.

## CONTENTS.

Description of the Eye—Anatomy: Physiology—(1) General Description of the Disease—(2) Frequency and Resulting Incapacity—(3) Historical Account of the Disease and Theories of its Causation—(4), (5) and (6) Conditions Determining the Occurrence of Nystagmus—(7) Diagnosis and Prognosis—(8) The Etiology of Nystagmus—(9) Preventive Measures and Treatment—(10) Summary and Conclusions—With Appendices: Legal Information—Glossary—References and Bibliography—The Effects of Deficiency of Oxygen on the Light of a Safety Lamp—Test of Coag Lamp.

THE COLLIERY GUARDIAN COMPANY LTD.,  
30 & 31, FURNIVAL STREET, HOLBORN, LONDON, E.C.



Lattice Girder Bridge as per illustration, 96 ft. long, 7 ft. by 7 ft. inside, in three lengths, has been across L. & N.W. Railway, FOR SALE.—Apply, LEAMORE BRICK CO., Walsall.

**Wanted, position as Assistant Manager**  
by experienced undermanager of large modern colliery; first-class certificate; expert in coal cutting, &c.; excellent testimonials.—Apply, Box 5311, *Colliery Guardian* Office, 30 & 31, FURNIVAL ST., HOLBORN, LONDON, E.C.

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SCHOOL OF MINING.

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Lecturer in Surveying .....  
Demonstrator in Metal Mining and .....  
Lecturer in Economic Mineralogy ..... J. L. JEFFERY, A.R.S.M.  
Lecturer in Mine Rescue Work ..... PERRY ORMAND, M.I.M.E.

THE SESSION COMMENCES ON OCTOBER 7th, 1913.

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ments of those who intend to become Practising and Consultative Mining Engineers, Colliery Managers, Managers of Metal Mines, Teachers of Mining, Mine Surveyors, Land and Estate Agents, Land Owners, Owners of Collieries, and those generally interested in Mines and Quarries. The Degree Course includes instruction in Mathematics, Physics, Chemistry, Geology and Mineralogy, Mechanical Engineering, Electrical Engineering, Civil Engineering, Mining (Coal, Metal, Surveying), and Metallurgy and Assaying. In connection with the Mining Classes there will be frequent visits of inspection to mines in the neighbourhood of Birmingham, and a Summer Mining School will also be held in the long vacation in some mining district either at home or abroad.

The Mining Courses are so arranged as to provide for  
Degree Course—3 years.  
Diploma in Coal or Metal Mining—3 years.  
Occasional Mining Students—a complete course in 1 year.  
A complete Course of Petroleum Mining Engineering is given in the new buildings of the University. The course of study extends over three years, and leads to the Degree of B.Sc.  
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MINING DEPARTMENT.

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Degree in Mining will be held on September 9th, 1913. For information apply to the Registrar before August 23rd. The Mining Diploma (Day) Course commences on October 1st, 1913. The Certificate (Saturday afternoon) Course commences on September 20th, the Derby Mining Course on September 20th, and the Mining Teachers' Course on September 27th. The Courses in Electricity applied to Mining commence on September 27th. For particulars, apply to  
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Tubes for Gas, Water, Steam, and Compressed Air. Electric Tramway Poles, Pit Props, High Pressure Steam Mains, &c.  
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SUPPLY ALL KINDS OF COLLIERY TIMBER.

TELEGRAMS—"OSBECKS, NEWCASTLE-ON-TYNE."

\* \* For other Miscellaneous Advertisements see Last White Page.

## Forthcoming Annual Meetings.

International Geological Congress—  
August 21, 1913 (Toronto)  
North of England Institute of Mining and Mechanical Engineers ... August 2, 1913  
Manchester Geological and Mining Society—  
October 14, 1913  
Institution of Mining Engineers—  
Sept. 24, 25 & 26, 1913 (Manchester)  
Midland Institute of Mining, Civil and Mechanical Engineers ... July 20, 1913  
Midland Counties Institution of Engineers, Sept. 1913  
South Staffordshire and Warwickshire Institute of Mining Engineers ... October 20, 1913

## The Colliery Guardian.

LONDON, FRIDAY, JULY 18, 1913.

Of the total exports of coal during June, the mean value of the large coal exported was 15s. 9.3d.; through-and-through (unscreened) coal, 12s. 4.6d.; and small coal, 11s. 4.5d. The average value of all kinds of coal exported was 14s. 0.7d., an increase of 0.8d. as compared with the preceding month. Otherwise divided, it fetched the following values:—Steam coal, 14s. 5.3d.; gas coal, 12s. 5.7d.; anthracite, 15s. 9.9d.; household coal, 13s. 4.5d.; and



other sorts of coal, 12s. 5·7d. The value of the coke exported was 20s. 6·3d. per ton, and of the manufactured fuel 17s. 9·7d. per ton.

In the House of Commons, on Thursday, Mr. Churchill made an important statement in regard to the use of oil in the Navy. After detailing the advantages of oil for naval purposes, he said for the new fast battleships and light armoured cruisers it was a necessity, and the Admiralty had been compelled to use oil fuel over almost the whole field of the new construction programme of 1912-13; this policy had, with one exception, been repeated in the present year. The five battleships of this year, however, are to burn coal, using oil as an auxiliary, and for ordinary speeds coal would continue to be the main basis of sea power. The First Lord saw no difficulties in the question of supply, and he especially referred to the potentialities of the home supply, stating that the Scottish shales, if developed to their full capacity, would yield 400,000 to 500,000 tons for 150 years. He also alluded to the deposits of Kimmeridge clay stretching from Dorsetshire to Lincolnshire. The problem, he said, was one of price. The ultimate policy of the Admiralty was to become the independent owner and producer of its own supplies of liquid fuel, by building up an oil reserve in this country, by acquiring the power to deal in crude oils and refine them, and, finally, by being able to control the supply at its source. In the meantime, important contracts were being fixed up, amongst others, with the Mexican Eagle Company, Lord Cowdray's company, and a fleet of 13 oil transport steamers had been built or were under construction.

The *London Gazette* of the 15th inst. contains the following:—"The Secretary of State for the Home Department gives notice that on July 10, 1913, he made General Regulations, under section 86 of the Coal Mines Act, 1911, to apply to all mines to which that Act applies, and to come into force on the expiration of two months after the date of this notice."

**The Half-year's Coal Trade.** THE coal trade during the past six months has been riding on the crest of a wave, and has taken a generous share in the prosperity that has visited commercial undertakings. The handsome dividends paid to shareholders and the substantial increases in miners' wages, no less than the general steadiness of the prices prevailing in the open market, are eloquent witnesses of this fact. In a word, the past 12 months have proved a period in which consistency has been the ruling feature, the half-year now specially under notice having been the direct antithesis, in many respects, of the first half of 1912, when the high cost of fuel was due to artificial and nerve-distracting causes, that have been notably absent in 1913.

It is a truism but imperfectly appreciated that the high prices that spontaneously result from a wholesome and widespread demand are immensely more profitable and sustaining than the effervescent accretions of value that are derived from strikes or lock-outs, wars and other international dislocations. Commerce cannot benefit from causes that palpably impede and destroy it. When all the natural opportunities for good trade have been exhausted, however, it yet remains to be said that the producers of coal have shown a greater ability to carry their way through the calm patches; and there have been fewer of those lapses in price which, in past years, have frequently followed upon periodic abatements of the demand. To what extent

PRICES.			
Description of fuel.	Per ton. July 1, 1912.	Per ton. January 1, 1913.	Per ton. July 1, 1913.
Best Northumbrian steam coals f.o.b. Tyne...	12s. 3d.	15s. 6d.	14s. 9d.
" " steam smalls " ...	7s. 6d.	11s. to 11s. 6d.	10s.
Best Durham gas coals " ...	13s.	16s.	14s. 6d. to 14s. 9d.
Durham coking coals " ...	10s. 3d. to 10s. 9d.	16s.	13s. 6d. to 14s.
Best Durham blast-furnace coke del. Tees-side	18s. 6d.	30s.	20s.
Durham bunkers f.o.b. Tyne .....	10s. 6d. to 11s.	15s. to 16s.	13s. 3d. to 14s.
Foundry coke f.o.b. Tyne .....	21s. 6d.	30s. to 32s.	23s. 6d.
Best Lancashire house coals at pit .....	16s. to 16s. 6d.	16s. 6d. to 17s.	16s. 6d. to 17s.
" " slacks " .....	9s. to 9s. 9d.	9s. 6d. to 10s.	10s. 6d.
Best Yorkshire Silkstone " .....	13s. 6d.	14s. 6d. to 15s.	14s. 6d.
Barnsley thick-seam house " .....	12s. 6d.	14s. to 14s. 6d.	14s.
Best Haigh Moor " .....	14s.	14s. to 14s. 6d.	14s.
Yorkshire steam coals " .....	10s. to 10s. 3d.	12s. 6d.	12s. 9d. to 13s. 3d.
Best Derbyshire house coals " .....	13s. 6d.	14s.	14s. 6d.
Large " nuts " .....	10s.	11s.	11s.
Best Staffordshire house coals .....	16s. 6d.	18s.	18s.
" Welsh steam coals f.o.b. Cardiff...	17s. 6d.	18s. 6d. to 18s. 9d.	20s. 6d. to 21s.
" Welsh small steam coals " " ...	11s.	14s. 6d. to 15s.	10s. 3d. to 10s. 9d.
" Semi-bituminous " " " ...	15s. 6d.	17s. 9d.	17s. 6d. to 17s. 9d.
No. 3 Rhondda, large " " " ...	17s. 6d.	17s. 6d.	17s. to 17s. 6d.
No. 2 " " " " " ...	12s.	16s.	13s. 3d. to 13s. 9d.
Patent fuel " " " " " ...	19s.	23s.	23s.
Best Welsh malting anthracite f.o.b. Swansea	23s. to 25s.	23s. 6d. to 25s. 6d.	21s. to 23s.
Special foundry coke, Cardiff .....	27s.	32s. to 33s.	30s. to 31s.
Scotch ell coals f.o.b. Glasgow .....	11s. 3d. to 11s. 6d.	13s. 6d. to 13s. 9d.	12s. 3d. to 12s. 9d.
" steam " " " " " ...	11s. to 11s. 6d.	13s. 6d. to 14s.	12s. 3d. to 12s. 9d.
" splint " " " " " ...	11s. 3d. to 11s. 9d.	14s. to 14s. 6d.	13s. 6d. to 14s.
Fife steam coals, f.o.b. Methil .....	10s. 6d. to 12s. 6d.	13s. 9d. to 14s.	14s. 3d. to 15s.
Fife treble nuts " " " " " ...	12s. to 12s. 6d.	13s. 6d. to 14s.	13s. 6d. to 14s.
Hetton Wallsend, London .....	20s.	21s. 6d.	21s. 6d.

FREIGHTS.			
	July 1, 1912.	January 1, 1913.	July 1, 1913.
Tyne to—			
Hamburg .....	4s. to 4s. 3d.	4s.	3s. 6d.
Genoa .....	10s. 6d.	10s.	9s. 3d.
Barcelona .....	11s. 3d.	10s. 3d.	11s. 3d.
Alexandria .....	11s. 6d.	11s.	10s.
Cronstadt .....	6s.	—	5s. 6d.
London .....	3s. 9d.	4s.	3s. 1½d.
Cardiff to—			
Genoa .....	11s. 6d.	10s. 6d.	9s. 3d.
Bordeaux .....	7s.	6s. 6d.	6s. 3d.
Marseilles .....	10s. 9d.	10s.	9s.
Havre .....	6s.	6s.	4s. 6d.
Barcelona .....	11s.	10s.	10s.
Las Palmas .....	11s.	9s. 6d.	9s.
Alexandria .....	12s.	11s. 3d.	9s. 3d.
River Plate .....	20s.	18s.	20s.

this somewhat uncharacteristic firmness has been due to the impetus of high wages and the high cost of production generally, or to a closer spirit of co-operation amongst the producers themselves, is not an easy matter to decide; it is incontrovertible, however, that the steady congregation of common interests is a tendency of the times, although it may not be easy to discover internal evidence of it; it is the inevitable outcome of trade union agitation and increased legislative control on the one hand, and a similar collaboration of purchasing agencies on the other.

The remarkable steadiness of house coal during the late spring and early summer has undoubtedly been due to the tendency mentioned rather than to any active demand for domestic fuel, which now has a host of formidable rivals to contend with. On the other hand, the demand for the small fuel used so largely in the manufacturing and power-producing industries has never been larger, and the chief cause of apprehension at the moment is that there are signs of a slackening in the call for this description of fuel, which, combined with a lessened activity in the shipping trade, a more subdued tone in the iron trade, and a general retrenchment abroad, may justly give rise to the belief that the summit has been reached, and less prosperous times are ahead. It must be some time, however, before the coal trade feels the pinch, for the weight of forward contracts is heavy, and realised prices cannot very well fail to maintain a high general level throughout the remainder of the year.

On the present occasion, the export returns, except as a basis of prices, provide a less reliable index of trade than usual, owing to the

WAGES.			
District.	Percentage of wages above standards.		
	July 1, 1912.	Jan. 1, 1913.	July 1, 1913.
Northumberland .....	32½ ...	38½ ...	48½
Durham .....	42½ ...	46¼ ...	56¼
Federated area .....	50 ...	55 ...	65
South Wales and Mon. ....	51¼ ...	57½ ...	60
Scotland .....	62½ ...	68¾ ...	87½

abnormal conditions ruling during the corresponding period of last year. Naturally the figures show considerable increases in the case of every important market, some of them being as follows:—France (2,050,000 tons), Russia (950,000 tons), Sweden (700,000 tons), Denmark (350,000 tons), Norway (250,000 tons), Germany (940,000 tons), Belgium (450,000 tons), Spain (380,000 tons), Netherlands (550,000 tons), Austria-Hungary (250,000 tons), Italy (830,000 tons), Egypt (350,000 tons), Algeria (250,000 tons), Brazil (300,000 tons), Argentine Republic (470,000 tons), and Malta (120,000 tons). When a comparison is made with the first half of 1911, it will be found that in many markets quite the normal degree of progress has been maintained, this being especially marked in the case of Russia and France; in others, however, it is less apparent, and the volume of our trade with Germany during the first half of 1913 only exceeds that in the first half of 1911 by 31,000 tons, that with Italy by 130,000 tons, and we have actually sent less coal to the Netherlands, Greece, Turkey, Chile, Uruguay, British South Africa, British India and Ceylon—the comparison being, it is remembered, between 1913 and 1911. Under all the circumstances it is extremely satisfactory to have maintained our position so



France; last year Germany sent largely increased quantities to France as a result of the war in this country, and it is noteworthy that the ground so gained has been held during the past six months. She has also sent increased quantities to Belgium, Holland, Italy, Austria-Hungary, Russia and some other markets. In the first five months of the present year Germany exported 13,687,000 tons of coal, an increase of 664,000 tons on the corresponding period of last year; an even more remarkable expansion has taken place in the German coke export trade, 2,868,000 tons having been sent abroad in the same period, or 660,000 tons more than last year.

The war in the Balkans has affected our trade to a certain extent, and being almost wholly a land campaign, has been without the mitigation of creating any extra demand for naval fuel. The following figures, which show the exports of British fuel to the countries within the area affected by the war, are of interest:—

To	January-June.	
	1913. Tons.	1912. Tons.
Greece .....	323,058	268,343
Bulgaria .....	5,389	18,350
Servia .....	—	—
Montenegro .....	—	—
Roumania .....	70,144	54,873
European Turkey .....	38,836	93,904
Crete .....	—	3,460
Asiatic Turkey .....	32,961	64,259

It will be seen that, even when allowance is made for the abnormal conditions of last year, there is but little change. On the other hand, the increased exports to Russia—2,144,328 tons, as against 1,193,261 tons—are undoubtedly to some extent due to the war, which has been a contributory cause of the extreme scarcity of coal in the dominions of the CZAR.

#### EXPORTS OF COAL, COKE AND MANUFACTURED FUEL, ACCORDING TO DESCRIPTION.

	First six months.			
	1913.		1912.	
	Quantity. Tons.	Average value per ton. s. d.	Quantity. Tons.	Average value per ton. s. d.
Coal:—				
Anthracite .....	1,407,097...15	10 8...	974,193...15	10 7
Steam .....	26,034,245...14	1 7...	18,720,167...12	11 1
Gas .....	5,510,408...12	0 6...	4,487,837...10	5 8
Household .....	855,375...12	11 5...	640,455...11	10 2
Other sorts .....	1,719,110...12	4 7...	1,350,671...10	8 5
Total and average .....	35,526,235...13	9 4...	26,173,323...12	5 7
Large .....	19,962,606...15	4 4...	14,637,577...14	4 3
Thro'-and-thro' .....	7,189,763...12	1 0 7...	5,636,455...10	6 2
Small .....	8,373,866...11	5 5...	5,899,291...9	8 4
Coke .....	499,670...19	5 6...	388,108...15	6 5
Manufactured fuel .....	1,022,232...16	11 6...	635,283...15	4 7
Total fuel ex- ported and average .....	37,048,137...13	11 3...	27,196,714...12	8 7
Coal shipped in bunkers .....	10,087,037...	—	8,125,897...	—

#### EXPORTS OF COAL, COKE, AND PATENT FUEL BY MONTHS

	1913.		1912.	
	Quantity. Tons.	Average value. s. d.	Quantity. Tons.	Average value. s. d.
January .....	6,374,152...13	7 5...	5,683,978...12	0 4
February .....	5,822,925...13	8 1...	5,784,404...12	6 0 1
March .....	5,831,324...13	9 8...	1,655,145...13	8 2
First quarter ...	18,028,401...13	8 4...	13,123,527...12	5 4
April .....	6,605,214...14	1 6...	1,527,508...13	1 8
May .....	6,147,614...14	1 6...	6,629,247...13	1 4
June .....	6,266,908...14	3 0 5...	5,916,432...12	2 1
Second quarter..	19,019,736...14	2 1...	14,073,187...12	8 7
First six months	37,048,137...13	11 3...	27,196,714...12	7 1

#### EXPORTS OF COAL ACCORDING TO DISTRICT.

	First six months.		
	1913. Tons.	1912. Tons.	1911. Tons.
Bristol Channel ports .....	14,823,019...	10,654,263...	12,599,199
North-western ports .....	387,571...	289,300...	326,586
North-eastern ports .....	11,080,710...	8,781,526...	10,594,696
Humber ports .....	3,936,053...	2,320,738...	2,951,397
Other ports .....	182,543...	118,554...	146,418
Total .....	899...	47...	126
Ports .....	4,057,680...	3,256,087...	3,832,419
Ports .....	1,057,760...	752,803...	1,043,118
Ports .....	—	—	—

As to the immediate future, the opinion has already been expressed that duller times are coming; when that happens, there are many new questions affecting the coal trade that will have to be entertained most seriously. There is probably no one engaged in the industry who to-day ignores the menace of these problems—the supreme test of the minimum wage and of the generous wages agreements now in force will come when prices fall; the difficulties surrounding the application of the Coal Mines Act and the Regulations have scarcely reached the critical stage as yet; there are other Acts, such as the Workmen's Compensation and National Insurance Acts, the burdens of which are cumulative; there are altered methods of combustion and power supply—all these questions deeply concern the colliery owner, but to enlarge upon them here would be to extend this article beyond its proper limits.

#### Trade Summary.

The London coal trade remains very quiet, and very little new business is transacted. Prices, however, are steady, and in some cases small advances have been obtained. Forward prices are fully upheld, and where concessions are obtainable it is only for immediate orders for wagons actually loaded. The virtual settlement of the shipyard trouble and the withdrawal of the strike in the Midlands raise confident hopes of an early increase of business.

Tonnage is more plentiful on the Tyne, and merchants are operating more freely. Both steam and gas coals are firm. Coking coals are weaker.

The Durham coal trade is rather more active, although prices are easier. There is a better enquiry for gas and coking coals, but house coals and coke are dull.

The Lancashire house coal trade is quiet. Bunkers are rather easier, and slacks have a weaker tone.

In West Yorkshire there is an improved call for house coal for the south. Manufacturing coals are easier. Truck shortage is causing considerable trouble.

The South Yorkshire coal trade is fairly steady, although less actual business is passing. There is no surplus of best hards, but small coals are in lessened demand. The better classes of house coal are firm, but secondary sorts are weak.

There is little change in the position in Derbyshire, and the outlook for the autumn and winter is fairly promising.

At Cardiff there is little free coal available, the output being on the small side owing to holidays. Small coal continues in a depressed state. The Monmouthshire market is fairly steady.

Troubles at the docks continue to affect the shipping branch of the Scottish coal trade. Generally the market is slower.

**Mine Rescue Work in the Midlands.**—At the Birmingham University, Edmund-street, on Wednesday, Mr. Gilbert Barling (vice-chancellor), presented certificates of proficiency to a number of students who have successfully gone through a special course of instruction at the University under Prof. Cadman in mine rescue work. Prof. Cadman, in an introductory statement, referred to the state of affairs so far as mine rescue organisation was concerned in the South Midland coalfields. The scheme embraced five divisions—South Staffordshire, Cannock Chase, Warwickshire, Leicestershire, South Derby and Shropshire, and at one time it included North Staffordshire. At present there were stations and training centres in each of these divisions, and with one exception, active instruction was in progress. Classes had been in progress at the University for the past twelve months in order to train instructors to carry on the important work of training and commanding various brigades to be organised throughout the coalfields. He could not speak too highly of the way in which the men had acquitted themselves during the course, and he would like to remind them that they had done work in the experimental mine of a more severe character than they were likely to meet in actual practice. Upwards of 100 candidates had attended the course, and some 86 had successfully completed the examination. The vice-chancellor, after having presented the certificates, said it was a very interesting occasion, for it was the first time in which such a successful organisation of the kind had been carried through to that stage. He congratulated Prof. Cadman upon the success which had attended his efforts, and also thanked the Coalowners' Association for the help they had rendered. Mr. A. Sopwith, Cannock Chase, proposed a vote of thanks to the vice-chancellor; and Mr. W. Saint, H.M. inspector of mines, Stafford, in seconding, said they could not have rescue brigades without properly trained instructors. The men were volunteers, and they had taken up the work with great spirit, and that they were capable of doing valuable work was amply proved by what was recently accomplished in North Staffordshire, where a terrific explosion occurred last year. He congratulated the coalowners upon their wisdom in obtaining the co-operation of the University. Mr. Alexander Smith, hon. secretary of the Coalowners' Association, said the owners were grateful to the University for the part they had played in the rescue work organisation. It was a practical work, and a credit to the University.

#### LABOUR AND WAGES.

##### North of England.

The dispute at Walbottle Percy Colliery is virtually ended. A deputation of hewers interviewed Mr. Haggie, manager at the colliery, on Monday night at his residence, and arrangements were made for the men to examine the pit and ascertain how far it was fit for the men to resume work on Monday next. The question in dispute is to be dealt with as early as possible.

The claim of Ferney Beds miners for strike pay in respect of a stoppage at that colliery in December, was again before the executive committee of the Northumberland Miners' Association at Burt Hall, Newcastle, on Tuesday. The committee reaffirmed its previous decision, and, therefore, strike allowance was not allowed.

Mr. Thomas Burt, in his final monthly circular to the Northumberland miners, refers to the three-shift system, and the fact that the resolution for modification was carried by the council, though the ultimate decision would rest with the members. Mr. Burt expresses his agreement with the majority of the delegates. To him there seemed a possibility, not to put the prospect too high, of mitigating some of the worst evils, while by adhering to entire abolition they might get nothing. In opposing the system Mr. Burt states great stress has rightly been laid on its interference with the amenities of family life and of social intercourse. It has been pointed out that (a) in the case of large families the father and sons are often in different shifts, and that they are going to and returning from work at such various and untimely hours as to leave no chance of rest for the mother, who has to look after them and to prepare their meals. Then, again, (b) the lateness of the hour when the day's work ends makes social intercourse and attendance at meetings impossible for those who are employed in the late shift. He adds: "These are certainly very grave evils. But with goodwill on both sides, and an honest effort to remedy or minimise the hardship, is it not possible to effect some improvement?" I think that is possible. With regard to (a), the coalowners were evidently impressed with what was said when we brought the point before them. They expressed their readiness, as far as ever practicable, to put the lads of a family into the same shifts so that they might leave home and return about the same hour. This, I understand, has been done with advantage at some collieries. With regard to (b)—namely, getting the men and boys in the later shift out of the pit at an earlier hour—the difficulties are certainly greater, but they are not surely insuperable. At any rate, it should be practicable to make some considerable improvement on the present system. The crux of the problem here, it seems to me, is the number of hours given to the transit work and coal-drawing. There would probably be strong unwillingness on the part of the management to greatly diminish that period. At some collieries it was stated that during certain portions of the day there is some slackness in the coal-drawing. If this partially lost time could be filled up by keeping the machinery going, there might be saving of time without diminution of output. There are other details which were mentioned at the council meeting, such as overlapping, in the shifts of men and boys, practiced with advantage at some places. To get the later shift of men and boys out of the pit earlier by starting the foreshift sooner would naturally be most objectionable, and no doubt many collieries would prefer to bear their present ills rather than to seek a remedy in that direction. All this points to the desirability of allowing some elasticity in arranging details at the various collieries. The executive committee has given much time and thought to the formulating of a plan, and in case the vote of the lodges favours modification rather than abolition, some improvements may be, and I hope will be, effected."

A council meeting of the Durham Miners' Association was held at Durham on Saturday, when the council sanctioned the purchase of Red Hills Villa for the purpose of erecting a new miners' hall and agents' residences. The meeting discussed amendments to the Minimum Wage Rules, and these will be submitted to a district board composed of employers' and workmen's representatives, and if they fail to agree, then Sir Robert Romer will be called in as chairman.

Mr. Thomas Weighall, the general secretary of the Northumberland Colliery Enginemen and Firemen's Association, is in communication with the Home Office respecting an important point arising out of the Eight Hours Act. It appears that ever since the Act came into operation the pumping enginemen, who are continuously employed underground in the Northumberland pits, have not been able, owing to the provisions of the Act, to effect any change in their working shifts. As these men must only work eight hours per day they are at present obliged to remain in the same shift week after week, instead of changing shifts weekly.

As a sequel to the resolutions passed at the special council meeting of the Northumberland Miners' Association, held in the latter part of June, the branches are now invited to ballot on the propositions relating to the three-shift question, the abolition of "baff" Saturday, the wages of surface workers, laid-out fines, the cost of explosives, and the wages of men employed at coal-cutting machines.

A conference between the Cleveland ironstone mine-owners and the miners' representatives took place at Middlesbrough this week, when the wages to be paid to the miners for the ensuing quarter was considered. Sir Hugh Bell, Bart., presided. It was agreed to advance wages 0.25 (one quarter of one) per cent., to take effect from the 28th inst.

##### Federated Area.

The Notts District Disputes Board, held under the Coal Mines (Minimum Wage) Act, of which Mr. C. H. Williams is the independent chairman, held a further meeting at the Nottingham Victoria Station Hotel,



on Monday, July 14, to consider questions affecting timberers, rippers and stablemen at three collieries in the district. Evidence was taken, the sitting lasting for five hours.

Surface-workers' wages, hours and general conditions were the subject of a special conference which took place on Tuesday, at the Nottingham Victoria Hotel, between representatives of the Midland Counties Coalowners' Association and the Notts Miners' Association. After the various points had been discussed at length, the coalowners' representatives undertook to place the proposals of the miners' officials before their association. A further meeting will be held to hear the coalowners' decision.

The council of the Yorkshire Miners' Association met at Barnsley on Tuesday. The council had before them the position of affairs in regard to the threatened strike on the non-union and surface workers' grievances. It was reported that an interview had been held with the representatives of the South Yorkshire Coalowners' Association, at Sheffield. On account of the progress made it had been agreed to adjourn the meeting to the latter end of August. Mr. Wadsworth reported that the West Yorkshire owners had been more difficult to deal with. The council meeting had come to the conclusion that something must be done as far as West Yorkshire was concerned, seeing that the owners appear to be so stubborn on many important matters. The council resolved that failing a satisfactory reply from the West Yorkshire coalowners in answer to a joint letter from Mr. Wadsworth and Mr. Bailey (Amalgamated Union of Labour) a further joint meeting be arranged with the representatives of the various sections of the surface workers at an early date to decide when the notices shall be given in. The request to give in notices at the East Ardsley and Glass Houghton collieries was withdrawn, the dispute in question having been settled. The branches had voted in favour of allowing the men at the Hoyland Silkstone Colliery to take a ballot on the question of tendering notices. It is alleged the owners have failed to pay the last 5 per cent. advance on the minimum wage and day work in accordance with the Conciliation Board agreement.

A ballot is to be taken in North Staffordshire on the non-union question.

Some days ago Mr. Harper Parker, representing the National Amalgamated Union of Enginemen, together with a deputation of the men, had a conference at the colliery offices of the Lilleshall Company at Oakengates, with Mr. J. Mackinley (general manager) and other officials, when after consideration the following terms of settlement were arrived at:—Fast winding enginemen, 6s. 8d. per shift of eight hours. Hydraulic slow winding enginemen, 6s. per shift of nine and a-half hours. Water winding, 6s. per shift of 10½ hours. Fast winding enginemen on single shifts, 6s. 8d. per shift of nine and a-half hours. All time worked over the hours mentioned to be paid for. These rates to be the basis rates, and not subject to reduction. Rates for pumpmen, stokers, and other enginemen at the various collieries were also arranged. An agreement has been concluded for a period of two years from July 1.

#### Scotland.

The collieries at Carberry and Arniston were reopened on Monday, as were also two of the smaller collieries in Newbattle district. The Lady Victoria Mine, one of the largest in the district, is having extensive alterations carried out, and it is expected another week or more must elapse before work can be resumed, even if the dockers' strike at Leith is settled before that time.

It was reported to the executive board of the Fife and Kinross Miners' Association, at Dunfermline on Monday, that the strike last year, which lasted five weeks and two days, cost the union £60,202 for ordinary strike allowances, while £870 was paid for the relief of dependants of non-unionists. Notwithstanding this heavy drain the union has in hand £21,000 in money and heritable property.

At a meeting of the executive of the Scottish Miners' Federation in Glasgow on the 10th inst. matters to come before the annual conference in Edinburgh on August 19 and following days were dealt with. Resolutions were considered concerning the abolition of Sunday labour, and amendments to the Check-Weighing Act and the Workmen's Compensation Act, forwarded by various districts.

The 24th meeting of the Miners' International Congress will be opened at Carlsbad on Monday, July 21. Mr. Robt. Smillie, president of the Miners' Federation of Great Britain, will preside at the inaugural sitting on Monday.

The agenda of business contains a number of questions affecting the coalmining industry. The question of working hours again occupies a prominent place on the agenda. Great Britain and Belgium will propose that steps be taken to hasten the realisation of an eight hours working day from bank to bank for all workers underground, that an interval of 16 hours be made obligatory between shifts; and that the maximum shifts to be worked must not exceed six in each week. Germany, Austria and Holland will propose "that the hours of labour of workmen employed in the mining industry should be legally fixed at a maximum of eight hours from bank to bank. At hot or wet places the hours of labour must not exceed the maximum of six hours from bank to bank."

An interesting discussion should be produced by the resolutions on protective mining laws. Germany, Austria and Holland will propose "in view of the numerous mining catastrophes that have happened in recent years, and of the continually increasing number of separate accidents in the mining industry, this congress demands again and urgently better protection for the life and limb of the miners. In order to bring about that better protection, the appointment of miners'

inspectors, who are elected by the miners from their own ranks, by secret and direct ballot, and are paid by the State, is held to be urgently necessary by this congress." Belgium will propose that "this congress is of opinion that the laws should secure greater safety for the mining population in every respect."

Great Britain will raise the question of evictions during trade disputes.

The report of the International Committee on the regulation of the output of coal will be presented to the congress for discussion.

Belgium will propose: "This congress demands that collective working agreements be introduced by the trade unions in the mining industry, either for the various districts or for the whole country." With a Bill for the nationalisation of mines before Parliament, it is only expected that the British miners should bring this subject prominently before the International Congress. Britain will propose "that this congress is of opinion that all land, mines and railways should be nationalised in the interests of the community of the different countries."

The minimum wage obtained by legislation in the British coalfield is leading to a similar movement among the Continental miners, and Belgium will propose: "We demand that a minimum wage be fixed for underground workers, either by law or by collective agreement."

The Belgian miners will propose: "This congress is in favour of an annual holiday for miners of a fortnight's duration, with payment of wages."

The International Committee will present a report on the question of a national or international clearance card.

#### Iron, Steel, and Engineering Trades.

Seven days' notice to terminate engagements was posted on Tuesday at the Solway Ironworks, Maryport, employing 220 men, and owned by the Workington Iron and Steel Company.

Some difficulty has arisen in connection with the steelmelters' wages at the Parkgate Steel and Iron Works. By the arbitration award of Judge O'Connor, K.C., the men are entitled to an advance of 1s. per day, the award being retrospective and dating back to April 3. The company, it is stated, have deferred payment until a meeting of the directors have considered the matter. The men have decided to defer the handing in of notices to Saturday of next week, and thus give time for a communication to be received from the directors.

The ballot of the men on strike in Birmingham and district took place on the 11th inst. The question on the ballot-paper was—"Are you in favour of resuming work?" Eight thousand men were entitled to vote, but only 6,180 did so. The votes were counted at Wednesday, the result being:—For resuming work, 4,944; against, 1,236; majority for resumption, 3,708. A meeting of the Minimum Wage Council was subsequently held, and a resolution was passed advising the men to return as soon as the various works could be got ready.

Representatives of the 11 shipyard trade unions under the national agreement and of the Boilermakers' Society, which is now outside the scope of the agreement, met in Newcastle-on-Tyne, on the 14th inst., to count the pooled vote of their members on the employers' offer of increased pay. The figures were:—For acceptance, 15,702; against, 5,582; majority for, 10,120. A national stoppage in the shipyards is thus averted and wages will remain unchanged for a year. The minority votes were principally those of the boiler-makers, who are pieceworkers, and who, the employers assert, could, if they worked full time, appreciably

#### CONTINENTAL MINING NOTES.

##### Austria.

*Official Wholesale Coal Prices, Vienna Exchange.*—Ostrau-Dombrau-Karwin coals: Large 28-10-29-10 kronen, cubes 27-60-28-60 kr., nuts 26-60-27-60 kr., small 23-23-20 kr., washed smithy coals 29-29-20 kr., coke 38-40 kr. per ton net cash, ex shutes Nordbahnhof. Pilsen large coal, 33-20 kronen per ton, in 10-ton loads, Franz-Josefs Bahnhof. Rossitz-Zbeschau-Oslawan coals: Best washed smithy coals, large or small, 30-50-31-50 kr., coke 30-32 kr. per ton ex shutes Nordbahnhof or Staatsbahnhof. Upper Silesian coals: Best large or cubes 32-30-33-10 kr., medium large or cubes 31-50-32-30 kr., seconds large or cubes 26-70-27-80 kr., best nuts I. 32-70-33-50 kr., II. 29-60-30-10 kr., best smalls 23-50-24 kr., seconds 22-50-23 kr. per ton net cash ex shutes Nordbahnhof. In 10-ton loads: Best large or cubes 30-70-31-50 kr., best nuts 31-10-31-70 kr. per ton ex Nordbahnhof. Gas coke from Vienna Gasworks, 32-40-34 kr. per ton ex works. Lignite: Dux large 21-70-23-20 kr., Brux or Dux cubes 21-70-23-20 kr., nuts 21-20-22-70 kr., Mariaschein cubes 23-70-25-20 kr., nuts 23-20-24-70 kr. per ton ex shutes Franz-Josefs or Nordwest Bahnhof.

##### France.

*The Comité Central.*—The report rendered at the recent annual meeting of the Comité Central des Houillères de France contains some interesting information as to the progress of mining in France and in particular of the investigations, &c., instituted by this important body. During last year there were two serious mining accidents in France, one at La Clarence, the other at Nord d'Alais. In the first instance, the disaster was due to emissions of carbon monoxide, of which the Gard basin has the unenviable privilege; in the other, to firedamp, and the view is expressed that had the lessons of Liévin been applied, the severity of the explosion would at least have been greatly mitigated.

The committee find with satisfaction that last year imports of coal from abroad were stationary, and that the native collieries were able to meet the increased consumption. Thus the consumption of coal in France rose from 59,530,000 tons to 61,176,000 tons, whilst the imports advanced only from 21,445,000 tons to 21,525,000 tons. It is pointed out, however, that there is not the growth of new enterprises in France or the supply of labour adequate permanently to satisfy the needs of the country. Under these circumstances, the increasing burdens of legislation are, it is contended, manifestly unwise. According to enquiries circulated amongst the members of the committee, the allocations on behalf of the workmen, made according to law or voluntarily, amount to 45 million francs, or 45 per cent. of the divisible profits. They are divided as follows:—Relief funds, 3 million francs; pensions, 13 millions; accidents, 8 millions; hygiene, 800,000 fr.; free coal, 7,600,000 fr.; interest on and redemption of capital employed in workmen's dwellings, 7,800,000 fr.; education, 1,700,000 fr.; various social charges, 2,200,000 fr. There are, in addition, the fiscal charges, which add another 20 million francs.

Some interesting tables are given showing the production, exports and imports of coal, and the wages paid during the last 20 years. We give the following table, the figures of 1912 being provisional:—

Year.	Production. (1000's of tons.)				Exports. (1,000's of tons.)				Imports. (1,000's of tons.)		
	France.	Belgium.	Germany.	England.	France.	Belgium.	Germany.	England.	France.	Belgium.	Germany.
Average 1886-95 ...	24,748	19,472	69,623*	178,578	818	6,057	11,168*	37,503	11,088	1,510	4,613*
" 1896-1900 ...	31,722	22,073	96,705*	212,308	996	6,449	16,366*	51,050	12,994	2,736	6,772*
" 1901-05 ...	33,665	22,685	161,867	232,671	1,117	6,631	21,189	62,837	14,789	3,939	15,919
" 1906-10 ...	36,905	23,662	210,875	262,524	1,282	6,563	28,343	83,136	19,451	6,219	20,932
1911 .....	39,230	23,054	234,521	271,892	1,681	6,992	36,253	87,081	20,341	8,579	19,030
1912 .....	41,309	22,983	259,435	260,000	2,370	6,957	42,028	85,510	20,625	9,766	18,674

\* Exclusive of lignite.

increase their wages. A conference between the employers and the men will be held on July 31 to ratify the effect of the pooled vote.

**Grimsby Coal Exports.**—The coal exported from Grimsby during the week ended July 11 was as follows:—Foreign: To Ahus, 1,335 tons; Antwerp, 716; Christiania, 139; Cronstadt, 1,257; Dieppe, 1,257; Esbjerg, 513; Gefle, 4,056; Gothenburg, 2,991; Hamburg, 939; Hargshamn, 1,686; Helsingborg, 1,684; Kallundborg, 1,784; Malmö, 4,738; S. Petersburg, 2,329; Skien, 687; Wasa, 1,383; and Ystad, 2,638. Coastwise: To Larkwick, 600 tons; London, 105; Southwold, 34; and Whitstable, 260 tons. Total foreign 30,132, and coastwise 999 tons, compared with 19,365 and 1,107 respectively last year.

**University College, Nottingham: Department of Mining.**—This college provides complete courses in mining and in mine surveying. The course for the college diploma in mining engineering extending over three years is recognised by the Home Office as equivalent to two of the five years' underground training required from candidates for the colliery manager's certificates. The course of the college diploma in mine surveying extending over two years is also recognised by the Home Office. Students are also prepared for the B.Sc. degree of London University in mining. All information may be obtained from the registrar, T. P. Black, M.Sc., Ph.D.

In France, in 1911, the average daily wage paid to those employed below ground was 5-58 fr., or, taking all labour, 5-12 fr. These figures show increases of 19-23 and 20-75 per cent. when compared with the wages paid in 1892. The average daily production in 1911—959 kilogs.—is 0-10 per cent. higher than in 1892, but when taken over the whole of the labour it is reduced to 682 kilogs., or 0-29 per cent. lower. The cost of labour per ton raised was 7-45 fr. in 1911, an increase of 19-96 per cent. The average daily wage in the Nord was 5-25 fr., in the Pas-de-Calais 5-43 fr., and in the Loire 4-69 fr., increases, as compared with 1892, of 21-8, 22-85 and 10-35 per cent. respectively.

##### Germany.

*Coal Market in South Germany.*—Waterborne supplies to this district has increased greatly of late, and the favourable state of the river enables craft to reach Karlsruhe without lightening cargo at all, whilst, with a slight diminution of load, they are able to get up as far as Strassburg. The consignments are mostly fines for briquetting, and coals for other industrial purposes, but the shipments of house coal are barely in excess of current requirements, and leave only a very small surplus to



across the requirements of the autumn trade. Deliveries continue on a large scale, though the consumption of consumers of industrial coals are not in excess of the contracted quantities. The demand for house coals is better, especially in the kinds which will go up in price at the end of the month—anthracite, large nuts and broken coke—and there is also a more active enquiry for large bituminous nuts. Wholesale dealers in lignite briquettes are being obliged to stock a large proportion of the oncoming parcels, owing to the reluctance of retailers to take in stocks for the present.

**Ruhr Coal Market.**—Business is undoubtedly less active, buyers being no longer pressing for deliveries so insistently as heretofore; and stocks are growing, not only in those grades which depend on particular seasons, but also of industrial fuels. Coking coals are also in much smaller request since the demand for coke has been insufficient to absorb the output. Large consignments have been sent by water to South Germany, but owing to the falling demand a considerable amount has had to be stocked. However, a revival, in the house coal trade at least, is expected very shortly. So far as the export trade is concerned, France and Holland are still large takers, but the Belgian demand has receded.

**Coal Market in Upper Silesia.**—In spite of all indications of decreasing business in a number of branches, there is not the slightest sign of any such tendency in the fuel market; and although the railway traffic returns show an increase of over 2,000 coal wagons per diem over the corresponding figures for last year, consumers' requirements cannot yet be fully satisfied. This applies even to fuels for which the demand is normally smaller at this time of year, and the large specifications sent in for house coal show that the trade desires to make early provision for the autumn season, when a scarcity of railway wagons may be expected. Coking coals still keep scarce, since, contrary to anticipation, the demands of the cokemakers have not diminished, although there is apparently less doing in the pig iron industry. In the export trade it is difficult to meet the needs of buyers, the demand from Austria-Hungary being far in excess of the available supply, especially in large and cubes. Russian consumers are complaining of insufficient consignments. The chief demand is for small, industrial grades, but gas coals are also selling freely. The favourable condition of the coke market is maintained, even small kinds finding a ready sale.

**Official Coal Prices, Düsseldorf Exchange.**—Gas and open-burning coals: Gas-flaming coal, through-and-through, 12-25-13-25 marks per ton ex pit. Bituminous coals, through-and-through, 12-12-75 marks, best mixed 13-13-50 marks, coking coals 13-25-14 marks. Lean coals, through-and-through, 11-25-12-75 marks, best mixed 13-25-14-75 marks, anthracite nuts II. 22-26 marks. Coke: Foundry coke 19-21 marks, blast-furnace coke 16-50-18-50 marks, broken coke I. and II. 21-23 marks. Briquettes, 11-50-15 marks.

**German Mining Association.**—The twelfth general meeting of the German Mining Association will be held in Breslau September 2-5 next, when in addition to the reading of papers and the transaction of other business, visits will be paid to various works of interest in the vicinity. Applications for tickets should be made to the committee, "Aus-schuss für den XII. Allgemeinen Deutschen Bergmannstag zu Breslau," Kaiser-Wilhelmplatz 20, Breslau XVIII., to whom also papers intended to be read at the meeting should be addressed prior to August 1 next.

#### Russia.

The State Railway Department, it is stated, proposes a reduction of freight charges for Dombrova coal, in order to substitute in the Baltic provinces Russian for British coal.

### UNIVERSITY COLLEGE OF SOUTH WALES AND MONMOUTHSHIRE.

Lord Pontypridd presided on Tuesday over a special meeting of the council of the University College of South Wales and Monmouthshire at Cardiff, when two important appointments were made. They were those of Drapers' professor of engineering and professor of geology. The council made the following appointments:—Professor of engineering, Mr. Frederick Bacon, M.A. (Cantab), A.M.I.C.E., of the Royal Naval College, Greenwich; professor of geology, Mr. Thomas Franklin Sibly, D.Sc. (London and Bristol), F.G.S., of King's College, London. Mr. F. G. Bacon, who is 32 years of age, obtained a practical insight into engineering at the machine works of Messrs. Yarrow, Poplar, and at the British Westinghouse works, Manchester. His teaching experience included that of demonstrator in applied mechanics at the Royal Naval College, Greenwich, instructor in applied mechanics and electrical design at Borough Polytechnic Institute, lecturer on the photomicrographic study of metals at University College, London, and examiner of engineering to the Admiralty, London County Council, the Civil Service Commissioners, &c. Mr. T. Franklin Sibly, who is 29 years of age, was educated at Wycliffe College, Stonehouse, and at the University of Birmingham, where he obtained B.Sc. of London in 1903 in chemistry, with first-class honours in experimental

physics, and was granted the degree of D.Sc. by the Bristol University in 1910, having previously, in 1908, obtained the same degree at the London University. From April to December 1908 he occupied the position of lecturer and demonstrator in geology at King's College under the late Prof. H. G. Seeley, whom he succeeded in 1909. He has done a good deal of research work, including the investigation of the succession of zones in the lower carboniferous strata and the study of problems in the structural geology of the system. At present he is engaged in a detailed study of the Forest of Dean coalfield, and is also specially interested in the South Wales coalfield.

### THE LONDON COAL TRADE.

THURSDAY, JULY 17.

The London coal trade during the past week has remained very quiet, although prices have kept steady. With the exception of contract orders, very little tonnage has changed hands, and what new business has been transacted has mainly been from factors who have found it necessary at times to make a clearance of loaded wagons standing at the various sidings at some concession in the price. Colliery prices generally have kept very firm, and in the case of some qualities a slight advance has been obtained. The better class of large coals—such as Wallsends, Silkstones, and best brights—are in good steady demand, and easily maintain their former quotations. House nuts are still neglected, but the special "spot" prices in existence some few weeks ago are now withdrawn, and prices have levelled up again. Bakers' nuts and cobbles are slow, but prices are maintained. The various qualities of cheap coals are perhaps the weakest just now, and some special concessions have been made in the price to enable some of the collieries to clear their sidings. Nearly all the business being done just now is in merchants' and factors' wagons, and although the leading price for private wagons is fully maintained in many cases, colliery and railway wagons can be obtained at a considerable reduction. Hards are in good request, and fully maintain their price. The cheaper steams are quiet, but prices are steady. Small nuts and slacks have weakened, and some special prices have been reported, but this only applies to immediate orders, as the quotations for forward business are fully upheld. Coke is very quiet, and prices have weakened a bit. The reports from the depots point to a slightly better enquiry, but the immediate business doing still keeps very quiet, and in consequence buyers find contract supplies meet all their present demands. The seaborne market remains slow, but with practically nothing offering from either Durham or Yorkshire. Only small parcels change hands, mainly Yorkshire qualities, at the previous prices of 21s. 6d. for best and 20s. 6d. for seconds. The recent voting in the shipyards (boiler-makers' society) to accept the employers' offer it is hoped will now smooth over all the difficulties and enable the work now in hand and on the books to be pushed forward, which will give the needed impetus to a steady flow of orders to the collieries, and as work is now being resumed in the Midlands, a good period of steady business is hoped for, and an early advance in colliery prices is confidently anticipated.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/6	13/6
Do. nuts .....	12/6	12/6
Birley cube Silkstone.....	12/	12/
Do. branch coal .....	15/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone.....	12/6	12/6
West Riding Silkstone .....	12/	12/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	11/	11/
New Sharlston Wallsend .....	14/	14/
Wharcliffe Silkstone coal.....	14/	14/
Do. Flockton Main .....	13/6	13/6
Do. Athersley house coal.....	11/6	11/6
Newton Chambers best Silkstone.....	15/	15/
Do. Grange best Silkstone .....	14/	14/
Do. Hesley Silkstone .....	13/	13/
Do. Rockingham selected .....	13/6	13/6
Do. Rockingham Silkstone .....	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best.....	11/	11/
Do. large nuts .....	10/9	10/9
Do. small nuts .....	10/	10/
Do. kitchen coal .....	9/6	9/6
West Hallam Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Do. London brights .....	10/	10/
Do. bright nuts .....	9/6	9/6
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Shipley do. brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Mapperley brights .....	11/	11/
Do. hard steam .....	10/9	10/9
Cossall Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Trowell Moor brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Grassmoor Main coal .....	12/6	12/6
Do. Tupton .....	11/	11/
Do. do. nuts .....	12/	12/

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.).</b>		
Clay Cross Main coal .....	12/6	12/6
Do. do. cubes .....	12/	12/
Do. special Derbys .....	11/9	11/9
Do. house coal .....	11/	11/
Pilsley best blackshale .....	12/6	12/6
Do. deep house coal .....	10/6	10/6
Do. hard screened cobbles .....	10/	10/
Hardwick best Silkstone .....	12/6	12/6
Do. Cavendish brights.....	11/6	11/6
Do. cubes .....	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/	12/
Do. small hards.....	11/	11/
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards.....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	12/	12/
Do. cobbles .....	12/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/	14/
Bestwood hard steam coal.....	12/	12/
Do. bright cobbles .....	11/3	11/3
Hucknall Torkard main hards .....	12/3	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. ....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts.....	11/3	11/3
Sherwood H.P. hards .....	12/	12/
Do. hard steam.....	10/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/9	11/9
<b>Warwickshire.</b>		
Griff large steam coal.....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	11/	11/
Do. loco Two Yard hards .....	14/	14/
Do. Ryder nuts.....	11/6	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Haunchwood steam .....	10/9	10/9
Do. screened cobbles.....	11/	11/
Do. nuts .....	11/	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts.....	11/	11/
Exhall Ell coal spires.....	12/6	12/6
Do. large steam coal.....	10/9	10/9
<b>Leicestershire.</b>		
Snibston steam.....	10/6	10/6
Do. cobbles .....	10/3	10/3
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/6	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts.....	10/6	10/6
Netherseal hards .....	17/	17/
Do. Eureka.....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	10/	10/
Do. large nuts .....	10/	10/
Do. bakers' nuts .....	9/6	9/6
Do. Main nuts .....	10/	10/
Do. hards .....	9/6	9/6
Granville New Pit cobbles.....	11/6	11/6
Do. Old Pit cobbles .....	10/6	10/6
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/6	13/6
Sneyd best, selected .....	14/6	14/6
Do. deeps.....	14/	14/
Silverdale best.....	15/	15/
Do. cobbles .....	14/	14/
Apedale best .....	13/6	13/6
Do. seconds.....	13/	13/
Podmore Hall best .....	13/6	13/6
Do. seconds.....	13/	13/
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London .....		
Do. brights.....	13/	13/
Do. shallow one way.....	12/	12/
Do. deep nuts.....	11/6	11/6
Cannock steam.....	11/	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/	12/
Do. one way .....	12/	12/
Do. shallow coal .....	12/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles .....	12/	12/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards.....	11/	11/

#### From Messrs. Dinham, Fawcett and Co.'s Report.

Friday, July 11.—There were no seaborne house coal cargoes of either Durham or Yorkshire on offer at to-day's market, which continued quiet. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 17.

Monday, July 14.—The seaborne house coal market was again without supplies of either Durham or Yorkshire cargoes to-day, with little enquiry. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 27.

Wednesday, July 16.—The seaborne house coal market was quiet to-day, with no cargoes of Durham or Yorkshire on offer. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 6.

A proposal is being made by underwriters that the cost of strikes shall be borne half by the owner and half by the cargo reckoned at weight or bulk.



## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### STONEDUSTING.

SIR,—In the paper read before the Institution of Mining Engineers by the president (Dr. W. E. Garforth), entitled, "A Record of the Origin of the Principle of Stonedusting for the Prevention of Colliery Explosions," there are a few points which were not touched on in the course of the discussion which followed the reading.

Firstly, it will be observed that the word "prevention" is used in the title, whereas the paper refers only to the "arrestment" of flame in the roadways of a mine after an explosion has been initiated. Thus, when a body of firedamp or coaldust has been ignited, exploded, or detonated, stonedust can only act as an arrester. In this regard we may take a recent disaster—viz., Cadeby, as a practical illustration of the point, the evidence showing that although the flame of two explosions passed twice over the same roadways, it was "arrested" in each instance, either by the want of inflammable dust or by stonedust on the roadways. To prevent an explosion we must deal with the cause at the point of origin and not at a distance from it.

Secondly, the writer does not expect to find himself in the majority when he asserts that the coaldust danger is not yet done with, nor are colliery explosions so easily "prevented" as the paper would lead many people to suppose. Thus, he particularly notes that Dr. Garforth uses the word "detonation," and also that the chief inspector of mines (Mr. Redmayne) used the same word in his report on the Cadeby disaster. The use of this word is very significant when used by scientific men, and it is used by Dr. Garforth in connection with the results of the most disastrous experiment ever made at Altofts—viz., No. 25. This demonstration, as also Nos. 13 and 21 of the same series, and No. 287 of the Liévin series, was the main subject of a paper which the writer contributed to the South Wales Institute of Engineers in 1911 (vol. xxvii. No. 7). This paper had for its title, "Notes on Some Coaldust Explosion Problems," and pointedly called attention to the effects of detonation, concluding with the following paragraph:—"In conclusion, as neither stonedust nor watered zones can restrain a detonative or percussive effect, it results (in the writer's opinion) that there is at the present time no known means of controlling the extent of an explosion, excepting by preventing its initiation."

No one has yet come forward to controvert this conclusion, or to say a word against the arguments, which included the dangerous effect of a normal percentage of coaldust on the safety of miners' safety lamps (1879). The writer is therefore pleased to see that both Dr. Garforth and Mr. Redmayne have acknowledged that *detonation* is a factor which must be taken into account.

Experiments made in very long tubes, as at Altofts, may represent some pit conditions, but the pressures developed are not sufficiently restrained to attain the full force of a coalmine explosion, and, so far, no experiments have been made to introduce another factor, which has been present in almost every large colliery disaster where blasting was the originating cause—viz., the presence of a large air space near by. Thus, in the case of the Altofts explosion, there was Roper's drift, and the writer once discussed with Dr. Garforth the advisability of reproducing this feature, to ascertain its influence on the results, but he believes no such experiments were made.

Authorities are by no means in accord as to the minimum quantity of dust which it is necessary to have in the air to carry an explosion along a mine roadway, but Sir Henry Hall's experiments at Skelmersdale amply proved that it need not be more than the quantity of fresh dust which is normally floating in the air—the so-called "pioneering" cloud being quite unnecessary.

Dr. Garforth estimated the speed of an explosion in certain cases at 1,000 miles per hour, but he might have more than doubled it without exaggeration (see the Liévin experiments.) With the acknowledgment of such large figures as these, what do they represent in pounds per square inch and in percussive effects? No wonder, therefore, that air percussion has produced heat effects tantamount to burning, and the sudden death of miners who have been killed by concussion of the brain or some other result causing instantaneous death, before a note of warning has reached them.

[The writer has always argued that watering, as practised in mines, was no safeguard at all, and with this Dr. Garforth now agrees, but he (the writer) is in agreement that stonedust may be much more effective in minimising the effects of an explosion than the hydro-pathic cure.

The writer would like to know that some one is studying the electron theory, with the object of applying it to the explanation of colliery explosion phenomena.

In conclusion, the writer wishes to say that, whilst making this criticism of Dr. Garforth's paper, he recognises as fully as anyone else the great amount of labour and time which he has devoted to experiments and the study of the phenomena of coaldust explosions.

JAMES ASHWORTH.

930, Drake-street, Vancouver, B.C.

June 25, 1913.

[The following statement appears in a footnote on p. 4 of the Fourth Report of the Explosions in Mines Committee dated April 9, 1913, which is signed, *inter alios*, by Mr. R. A. S. Redmayne, the Chief Inspector of Mines:—"Fortunately, it does not appear possible to set up the explosion wave in mixtures of firedamp and air, or of coaldust and air."—ED. C.G.]

### MINERS' NYSTAGMUS.

SIR,—I have read with interest the correspondence on the above subject from Mr. Hailwood and Mr. Schontheil in the columns of your recent issues.

In my opinion, the introduction of the electric lamp on a sound footing into the mines will, instead of adding £400,000 to the cost of upkeep, reduce the same by at least 25 per cent., while it will at the same time increase the amount of illumination in the mines at least three times that produced by oil lamps.

Judging by my own experience with the electric lamp (which I may say has extended practically over 17 years), I am convinced that Mr. Hailwood has not obtained his information from a very reliable quarter as regards the working of same. While perhaps it should not be overlooked that a 2,000 lamp installation is above the average, it should also be borne in mind that a 100 lamp installation is very small, and much below the average. If the number were increased five-fold the cost of upkeep would not be much increased, seeing that the same labour charges would be quite adequate to deal with the whole.

Mr. Hailwood goes on to say that the cost of the skilled labour necessary for the upkeep of the electric lamp is particularly heavy. This is not necessarily so. With regard to the accumulators, it is not in every make of lamp that these need complete renewal in the period quoted by Mr. Hailwood. While the cells generally fail at between 9 and 15 months, it does not necessarily follow that the whole cell needs replacing. It is the positive plate which fails as a rule. The negative plates can be utilised often three times as long, so that by replacing the positive plates, practically another 12 or 15 months can be got from the cells at a comparatively small cost.

Then dealing with bulbs; in experimenting with some of the best makes Mr. Hailwood states that while keeping them quite stationary, he has only been able to obtain a life of 200 hours; he allows, however, for 500 hours. In my own experience results have occurred which work out at an average (during different years) from 800 to 1,000 hours per bulb, and this with lamps that had to stand the rough treatment of the mine; this average was struck from the actual number of bulbs supplied, and all breakages, some of which never reached the lamp, were included in the account. I have also had it on good authority that at another installation they are working at an average of 1,000 hours per bulb.

Mr. Hailwood then suggests that the general repairs to the electric lamp will add a goodly sum to his estimated figure. This item should compare most favourably with oil, as electric lamps can be obtained of so simple construction. What cleaning does the electric lamp take? Its glass, being dust-proof, can be readily cleaned with the finger if necessary. A small hand brush readily removes all dirt from the lamp, and machinery is absolutely unnecessary as the lamps are more readily handled by hand. To clean and despatch from 350 to 400 electric lamps in an hour is what is actually being carried out in practice, which is absolutely impossible if justice is to be done to the same number of oil lamps.

As to Mr. Hailwood's suggestion that makers must have realised the impossibility of constantly maintaining so high a candle-power as the Government regulations required in a practical portable lamp, this cannot possibly have been their motive when bringing such pressure to bear on the Home Office, as practical lamps are already on the market doing useful service. To get

a reduction of candle-power to 0.6-candle power, the motive, no doubt, was to make it possible to produce a lamp to compare in weight with the oil lamp, but this disadvantage, which is about the only reasonable one to bring forward, is more than counteracted by the extra advantages gained by the production of the extra amount of light which the regulations stipulate.

It appears to Mr. Hailwood strange that Mr. Schontheil should state that there is no diminution of light in the electric lamp, and in giving the results of his experiments on this matter at the end of six hours he tells us that he found 26½ per cent. drop in candle-power. But in this he is working from the highest initial voltage—at least 2.5 volts—which means in a very short space of time the voltage has dropped 20 per cent. in arriving at the normal voltage of the cell; but this state of affairs (except in very exceptional cases) cannot be obtained in practice, as the lamps have to be prepared for the miners coming to work, and the cells are off charge a considerable time before required for work, during which they have practically dropped to their normal voltage, which, with the up-to-date lamp, is readily maintained for the length of time required by the miner, with practically no appreciable drop. The regulations now provide that the cells must be designed to meet this, and require that this condition be maintained at least 10 hours, and with the up-to-date lamp the drop in candle-power is very small at the end of 16 hours.

In making mention of Murton Colliery, Mr. Hailwood quotes an example most damaging to his own arguments. At Murton Colliery, I take it, it is as necessary that every precaution should be taken as at most collieries. This precaution was taken 17 years ago by the introduction of the Sussmann electric lamp, and, with an adequate supervision equipped with oil lamp, the management have been able to overcome all the dangers attending their mining operations in a remarkable manner, while at the same time nystagmus is unknown at the colliery. The lamp there is a four-volt, and is fitted with the carbon filament bulbs, but even the candle-power of this lamp is much more reliable than an oil lamp, and is a great improvement on any oil lamp. As regards cost, the lamp compares favourably with oil. Now, however, with the more up-to-date lamps which are on the market, which, I may say, are two volts, the construction is very much simplified, and the light is more than double in some cases. These lamps are being worked at a much reduced cost at collieries where they have been installed.

I do not doubt the results of Mr. Hailwood's experiments in keeping the filament of the bulb incandescent after the bulb glass had been broken, but I submit that such a condition is a practical impossibility when fitted in a miner's lamp and protected by the stout outside glass. The device in which the entire glass has to be broken to operate a means of breaking the circuit is hardly a practical device, as Mr. H. points out, as our experience in the fractures of miners' lamp glasses proves that it is the odd chance in a thousand that the entire glass is broken. But much of this experience also goes to prove the dangers attending oil lamps, with most of which the only protection for the flame is the lamp glass. That there is a greater danger of the oil-lamp flame being exposed was evidently the opinion of the experts when framing the exacting regulations as regards the quality of the glass.

High-street, Eldon-lane,

Bishop Auckland,

July 14, 1913.

GEORGE SHAW.

[This letter, owing to its length, has been condensed.—ED. C.G.]

SIR,—In your issue of the 11th inst., Mr. Hailwood writes a further letter under the above heading, in which I am afraid he again strays from the point at issue. In doing so, he makes statements in regard to electric safety lamps, which, I feel sure, must be made under misapprehension, and, if I may also stray from the subject, I would like very briefly to offer Mr. Hailwood certain corrections.

I would first assure Mr. Hailwood that the experience on which I based the statements made in my last letter extends over a period of some six years, and installations of miners' electric safety lamps totalling somewhere about 40,000—not, of course, in this country alone.

Mr. Hailwood will, I am sure, be the first to acknowledge that just as there are oil lamps and oil lamps, so there are electric lamps of infinite variety and quality. In regard, however, to the particular lamp which I have in mind—and I think that Mr. Hailwood is referring to the same lamp—I would say that actual experience under daily working conditions extending over long periods has shown that the positive plate of the cell lasts some



months at least, and the negative plate double that of time. The replace cost of electrodes is below two shillings.

The metal filament lamps certainly do cost about 1s. each, but the average life of these bulbs is not 200-500, but more nearly 1,000 hours; many actually burn for 2,000 hours.

The breakage of a well-glass is, in contrast to oil lamp glasses, such an infrequent occurrence with the electric lamp in question that the replace cost is almost negligible, and is as nothing compared to the cost of replacing broken oil lamp glasses.

In regard to the cleaning and re-charging of electric miners' lamps, I can only suggest that a visit paid by anyone interested to a properly equipped electric lamp station will show what little cleaning is required, and what a great labour-saver the electric miners' lamp undoubtedly is.

As regards Mr. Hailwood's example of the upkeep cost of an installation of 100 lamps, surely he will admit that if my example of a 2,000 lamp installation is no criterion of cost, his must certainly be far less of a criterion.

Mr. Hailwood's figures in regard to diminution of candle power of electric lamps are manifestly incorrect, and I will only say that they cannot possibly have been obtained from a lamp with a properly constructed cell giving from 14 to 16 burning hours.

In conclusion—returning to the subject of miners' nystagmus—I think that, notwithstanding the various theories put forward, it has been abundantly proved that the propagation of this unpleasant disease is due to the oil lamp. It is also quite certain that the remedy is the miners' electric safety lamp.

THEODORE SCHONTHEIL.

11, Windsor-place, Cardiff.

July 15, 1913.

#### BOOK NOTICES.

**"The Electrician" Electrical Trades Directory and Handbook for 1913.** 1840 + cxii pp., 6 in. by 9½ in. London: "The Electrician" Printing and Publishing Company. Price 15s.

An extraordinary amount of information is contained in this annual, familiarly known as "the big blue book." In the forefront of the book is a collection of valuable tables, &c., such as the electrical engineer may have occasion to consult in the course of his work. A long section on lighting, power, and traction follows, containing a digest of the various Acts, regulations, rules, &c., that affect the use of electricity, whilst a liberal selection of foreign mining regulations is given. The "Notes of the Year" comprise reports of legal decisions during 1912-13, arbitrations and awards, a Parliamentary summary, and excerpts from reports, papers, &c. Other sections deal with telegraphs and telephones, a directory of directors, local authorities, institutions, associations, colleges, a directory of firms, &c., both in this country and abroad, the whole being supplemented by a biographical section. The book is a wonderful repository of information.

**The Story of the Forth.** By H. M. CADELL. xvii. + 299 pp.; 75 ill. and eight maps; 7 in. by 10 in. Glasgow: James Maclehose and Sons. Price 16s. net.

Whether it be that tradition sticks closer to the Scotsman than to the Sassenach or not, it is undeniable that the Scottish coal trade has been singularly fortunate in its historians. To these records of local industry Mr. Cadell's book is a notable addition. It has obviously been a labour of love, but the author's long association with the neighbourhood, both as a resident and as an official of the Geological Survey, coupled with a good literary style and access to private records of singular interest, endow the work with a scientific value that is not always possessed by works of this character.

In the Edinburgh district the lower carboniferous strata, including the oil shale group, have an aggregate thickness of about 5,500 ft. Discussing the origin of the oil shales, Mr. Cadell states that he has found that the mud of the Firth of Forth, when slowly deposited on the shallower parts of the foreshore, is well laminated, in leaves perhaps ½ in. or less in thickness, each representing the deposit of a single tide; oil shale differs in origin from most kinds of coal in being an undoubted aqueous deposit or precipitate composed generally of 70 to 75 per cent. of ash, originally inorganic mud, with 30 to 25 per cent. of organic matter, partly animal and partly vegetable in origin. The author's view is that the area was always submerged under an expanse of more or less shallow water inhabited by various kinds of fish, crustacea, and small aquatic animals connected remotely with a great estuary.

The regular evidence of the Dunnet shale seam shows that this lagoon had a surface of at least 330 square miles.

All this took place before the coals now mined were deposited, the first being the Houston coal—the oldest in Scotland. The old lagoon became shallower, or perhaps a slight upheaval took place which permitted vegetation to accumulate and prevail over the mudflats. Then came, with the intervention of a thin seam of shale, the deposit of the barren Houston marl, which denotes a complete change in the geological sequence and the prevalence of volcanic disturbances on a large scale. Once again life burst forth, the ocean submerged the quondam lagoon, and in the swampy estuary the deposit of the coal seam began, with the blackband ironstone, now worked out. Mr. Cadell concludes that these seams were formed *in situ* under conditions of extreme stagnation, with the intermission of violent volcanic explosions. One of the most curious discoveries made by the author is that of fossils in the lava streams that overspread the area at this period.

The Midlothian coalfield is the bottom only of a trough between two great arches, the crests of which have been entirely washed away. The coalfield, however, has been subjected to faulting on a gigantic scale, and in the case of the fault that runs along the foot of the Ochils in the Devon Valley, the amount of downthrow is no less than 11,000 ft. In the period preceding the birth of the Forth itself, Mr. Cadell believes that a "peneplain" was formed in which all the rocks were levelled down to a uniform even surface, which was subsequently upheaved *en bloc* without crumpling, but with a gentle "list" towards the east. It is Mr. Cadell's opinion that at one time a considerable portion of the present Clyde watershed was drained by the Forth. Whether this theory be accepted or not, the reader will find the author's account of the formation of the Forth and its tributaries, the Almond, Avon, Carron, and Devon, a source of great interest, illustrated as it is by beautiful illustrations. To the mining engineer these speculations are of great import, for on several occasions in this district serious disasters have resulted from the sudden striking of buried channels, and, as Mr. Cadell points out, proposals to tunnel beneath the Forth are for the same reason fraught with great danger.

With two captivating chapters on "The Ice Age" and "The Old Lochs of Edinburgh," the author brings his account of the early foundation of the district to a close. He then turns to the development of industry. In the middle of the 18th century the famous Carron Ironworks were founded; in the early days clay ironstone was used, until the world-famed blackband ironstone was discovered in 1801 by David Mushet. The first partners in the Carron Company were Dr. John Roebuck and his brothers, Mr. Samuel Garbett, Mr. William Cadell, senr., and his eldest son, and the first blastfurnace was blown in in 1760. The situation was chosen largely for the facilities as regards water supply and charcoal, advantages which were over-estimated. Mr. Cadell tells of the early struggles of the company, of the ill-fated managership of Charles Gascoigne, and the crash in 1772, when the wharf establishment of the firm failed with liabilities of £193,054. The company subsequently revived and became the largest concern in the whole of Europe. In 1770 Messrs. Cadell took a lease of the Grange coalfield, near Bo'ness, and three years later the family's connection with the Carron Company ceased, and Mr. William Cadell in 1786 established the Clyde Ironworks in Old Monkland Parish, near Glasgow. It is strange that after 150 years the Carron Works alone remain in the Falkirk district of all the many similar enterprises that sprang up in their train.

Another excellent chapter is devoted to the oil shale industry, a subject with which Mr. Cadell is singularly well fitted to deal. The two remaining chapters relate to land and foreshore reclamation in the Forth Valley, and the clearing of Blairdrummond Moss. In conclusion, we can only say that this book, heterogeneous as it may appear, is full of "good meat," and it is produced in a style that is worthy of the highest praise.

**Winding Engines and Winding Appliances: Their Design and Economical Working.** By GEORGE McCULLOCH and T. CAMPBELL FUTERS. London: Edward Arnold. viii. + 452 pp.; 175 figs. Price 21s. net.

This book will be generally welcomed, for not only does it attack a subject which is of fundamental importance from the standpoint of practical mining, but one also that, owing to its difficulty, has been generally eschewed by the writers of treatises. The authors, one of whom is the inspector of machinery to the Mines Department of West Australia, and the other the author of *The Mechanical Engineering of Collieries*, and a well-known colliery engineer, are well qualified for the task.

After a preliminary introduction, Chapters ii. to iv. of

Part I. are devoted to the general considerations arising in the design of non-condensing, duplex cylinder winding engines, and to the different effects of variations in the factor of safety of the rope employed, speed of winding, size and weight of the drums, initial acceleration moment, sizes of cylinders, &c. The comparative economy and efficiency of cylindrical and conical drum engines, and of systems with or without tail ropes, are also fully investigated. Chapter v. is devoted to compound and compound-condensing engines, and Chapter vi. to the effect of the use of cylindro-conical drums, and higher speeds and loads. Some tests as to the steam consumption are given in Chapter vii.

Part II. is devoted to winding from great depths and to coal winding, and Part III. to electrical systems. Part IV. treats of the various details directly connected with the engine, and Part V. of details indirectly connected therewith, such as ropes, cages, &c.

As regards the earlier part of their work, the authors urge the great need of a series of carefully conducted tests on the steam consumption of winding engines of various types and under varying conditions; but, as they admit, these are difficult to carry out in a reliable manner. In some respects the Dortmund Association of Engineers has met this demand, but the variation in conditions in that case was scarcely wide enough to be entirely satisfactory. The authors, however, have been very sedulous in accumulating data.

The lack of information referred to in the last paragraph must be obvious to all those who have followed the somewhat heated discussions that have taken place on the respective merits of steam and electric winding engines; neither side appears to be in a position to table all its facts. The authors, we think, adopt a sensible plan in making the coal cost the prime factor.

In discussing safety gears, such as controllers, the book has naturally been unable to keep pace with the impetus of latter-day legislation, and the examples described are few in number. On second thoughts, however, this may be due to an appreciation of the true relation which they bear to the main subject—a relation that may be exaggerated both from the technical and economic point of view. The authors are discreetly silent on the subject of safety catches.

The book, as a whole, is a happy blending of metaliferous and colliery practice and fills a niche which badly lacked a tenant. It is unfortunate that the *errata* are rather numerous, but this may be taken as a final evidence of care, which is exhibited at many points in the book. The production, from a typographical point of view, is unexceptionable.

#### MINING AND OTHER NOTES.

The *London Gazette* announces that the King has been pleased to ordain that the brother and sisters of the present Baron Tredegar shall hold the same title, rank, and precedence as the younger children of a baron to which they would have been entitled had their father, the Hon. Frederic Courteney Morgan, survived his brother, the late Baron Tredegar.

The lamp-house at Selston Colliery was gutted by a fire which broke out at noon on Saturday. The whole of the contents, including 600 safety lamps, were destroyed.

The Council of the Association of Chambers of Commerce has had under consideration resolutions submitted by the Birmingham Chamber with reference to the increase of railway and canal rates, the control over railway companies by the Board of Trade, railway amalgamations and agreements, development of canals, and ton-mile statistics. Communications from the Newcastle, Brighton, and Huddersfield Chambers were also read, and the Council decided that it was desirable to postpone any action with regard to the increase of railway rates until the effect of the increase in different districts could be seen.

The late Col. Sir Charles John Stoddart, V.D., of Blenheim House, Rotherham, iron and steel master, left estate of the gross value of £57,696, of which the net personalty has been sworn at £50,795.

The *Times* states that, owing to the complicated nature of the accounts and to the amount of detail required from the railway companies under the Act of 1911, it will be quite impossible for most of the railway companies to publish any figures for the first half of 1913—not even the amounts of the balance carried forward into the current half-year. As in the case of the larger industrial companies, only an interim dividend will be announced.

The washeries at the Bothwell Castle Collieries in Lanarkshire are of German design, and have an output of about 60 tons per hour of washed coal. The coal is separated into lumps and smalls on a 2 in. screen, the proportion passing through this screen being about 55 per cent. of the total coal sent to the washer. The lumps are hand-picked; the smalls are sent to a trommel which makes six sizes:—¼ in. to ⅜ in., ⅜ in. to ½ in., ½ in. to ¾ in., ¾ in. to 1½ in., 1½ in. to 1¾ in., and 1¾ in. to 2 in. The first two sizes are sent to jigs with feldspar beds, and the



other four sizes are washed in ordinary jigs. The large coals are drained on screens, and given a final sousing preparatory to shipment. The fines under  $\frac{1}{4}$  in. are sent to a settler, from which they are removed by a scraper conveyor, and then allowed to drain. They are used in the colliery boilers to raise steam. The waste water is stored in a tank where it settles for five to eight hours when the washing is stopped at night. This tank gradually accumulates fireclay and other impurities, and is discharged from time to time and refilled with fresh water. All water before final discharge is sent to outside settling ponds so as to avoid polluting the neighbouring streams. The cost of the washery has been about £14,000, and there is an increase of 11 per cent. in the average selling price of the coal, and an assured market, the ash being reduced from 18 per cent. to 5 per cent.

At a meeting of the Birmingham Chamber of Commerce on Monday, Professor Ashley mentioned that the scholarship which the Chamber provided in the University of Birmingham was now vacant, and during the long vacation they would proceed to fill it. The scholarship, which was of £40 for the year, and could be renewed for two succeeding years if the student's work were satisfactory, was open to students whose parents resided in Birmingham or within 20 miles of the Town Hall. He also stated that it had been strongly felt by the heads of some of the great engineering and kindred businesses in Birmingham and district that it would be desirable if a larger commercial element could be introduced into the training of engineers. The matter had been brought before the engineering department, and it was decided that the professional technical programme was already full. But they had decided upon a plan whereby all mining and metallurgist students were to be required to take an elementary course in accounting during the last year. They also contemplated a post-graduate course for engineers for the commercial diploma.

Although a month has elapsed since the Carhouse Colliery disaster at Rotherham, in which eight men were drowned by an inrush of water, only five bodies have been recovered.

The Bradford Chamber of Trade have instructed the hon. secretary to consult with the hon. solicitor in respect of the action of the mineral manager, at Doncaster, of the Great Northern Railway, who, in regard to a claim by the coal merchants' section on behalf of a member, has refused to recognise the Chamber. The hon. solicitor is to communicate with the railway company, and failing satisfaction, to take action in the county court without delay.

Electrical haulage on a fairly extensive scale has now been adopted at Messrs. A. Knowles' Clifton Hall and Wheatsheaf collieries, Pendlebury, current being supplied by the Lancashire Electric Power Company, Rushton, Walkden.

The work of opening out the new Trencherbone mine at Messrs. J. Speakman and Sons' Wood End Colliery, Bedford Leigh, Lancashire, is now being pushed forward. On the western side of the town of Leigh, at Westleigh, the Westleigh Colliery Company are also carrying out improvements in the shape of opening out new mines.

Mr. James Barrowman, mineral factor on the Hamilton estates, is next month to receive a substantial testimonial from the Mining Institute of Scotland. For a long series of years he was the secretary of that influential body, and, much to the regret of the members, he resigned at the beginning of the present session. The proposal is that the testimonial to Mr. Barrowman should be formally handed over at a joint excursion, to be held on Saturday, August 9, of the Mining Institute of Scotland, the Scottish branch of the National Association of Colliery Managers, and the East and West of Scotland branches of the Association of Mining Electrical Engineers.

The Hamilton Town Council are still continuing their negotiations for the acquisition of the Townlands Pit. It was explained at the last meeting of the Council that the price which was being asked for the pit by the present lessees was fully double that which the Council's own engineers suggested as a fair figure. Further, it was proposed by the present lessees that the corporation should work the coal within a stipulated time, failing which it was to revert to the sellers. In view of these conditions, the Council have decided not to close the bargain meanwhile.

Interesting experiments are being carried out by the Great Northern Railway Company at Doncaster in the use, upon some of their local running locomotives, of the fuel manufactured by the Doncaster Patent Fuel Company at their newly-established works at Bentley, near Doncaster. It is reported that the preliminary trials have given satisfaction, and that during the past week a number of locomotives attached to through express trains to and from the Kings Cross terminus in London have been run on this fuel. The fuel is compressed into "eggettes" about the size of large potatoes, and can be readily shovelled into the furnace. On a locomotive of the Atlantic type a load of about 8½ tons can be carried. The weekly output of the Bentley works is at present about 25 tons. It is stated that large quantities are being supplied to the Great Northern Railway Company, and that the patent fuel company are likely at no very distant date to establish works on the canal side in the Wheatley district of Doncaster for the manufacture of fuel for the export trade.

A case of considerable importance to those engaged in coalmining was heard by his Honour Judge Allen at the Mansfield County Court on Monday, June 16, the real point in dispute being whether a butty or the colliery company was the employer of the dayman. There were two claims, the defendants being the Blackwell Colliery Company. The first claimant was Edward Higginson, a miner of Stanton Hill, who claimed 21s., being 7s. per day for three days' work at the Sutton Colliery. The plaintiff gave evidence to the effect that the money was due to him, and that Berry, the stallmen, had gone off with it. When the money was not forthcoming he saw the colliery officials, who suggested he should go the police. He did so, but got no redress, and then he saw the management again, and they advanced a sovereign, which was immediately stopped, the manager saying he did not think he (plaintiff) was trying to catch the missing man. It was argued on behalf of the plaintiff that as the stallman had no authority to set on a man, that entirely resting with the management, the management therefore was responsible for the payment of the dayman's wages. His Honour gave judgment for the Blackwell Colliery Company, with costs on scale B. Leave was given to the plaintiff to appeal. The second case was ruled by the judgment given in the first case.

Parnsley people are much interested in the probable reopening of Pindar Oaks Colliery, which is situated on the fringe of the borough boundary. A company is being formed, with a capital of £50,000, and invitations are now issued for subscriptions for £25,000 cumulative 7 per cent. preference shares. The colliery was closed in September 1885, after the Barnsley bed, which lay at a depth of 226 yards, had been practically exhausted. The promoters state they have acquired mineral rights for an area of 1,000 acres. It is calculated that this area will last for 60 years, and the minimum rents are regarded as moderate, the royalties, including wayleave when payable, amounting to about 4d. per ton. The seams include the Winter bed, about 2 ft. 11 in. thickness of clear coal, the Summer seam, about 2 ft. 8 in. in thickness, and in these two beds it is estimated there are 7,000,000 tons of coal, equal to a life of 35 years at the rate of 200,000 tons per annum. The company have also the option of the refusal to lease the Melton field seam, about 3 ft. in thickness, Top Beamshaw, about 3 ft., Low Beamshaw, 2 ft. 2 in., and Kent's thin seam, 1 ft. 9 in. The geological conditions are said to be favourable for cheap working, the Winter seam being 88 yards deep in the shaft, and the Summer seam about 70 yards deep. The prospectus says it is proposed to equip the colliery with modern electrical plant, and the question of erecting a by-product plant, which should add considerably to the profit, will have the careful consideration of the directors. It is estimated that only a few months will elapse before it is possible to begin winding coal.

A preliminary summary of railway returns for the United Kingdom that has been issued by the Board of Trade gives the receipts from mineral traffic in 1912 as £29,148,000, as compared with £29,745,735 in 1911, and £29,208,287 in 1910. The expenditure on locomotive power last year was £21,776,000, as compared with £21,019,240 in 1911, and £20,623,351 in 1910. The quantity of minerals carried was 401,301,000 tons, as against 409,812,101 tons and 405,087,175 tons respectively.

Mr. Timothy Robinson, who has been engineer at Ryhope Colliery for the past 14 years, is leaving to take up a more important post as chief engineer at the collieries of Messrs. Crompton and Shawcross, at Hindley, near Wigan. Mr. Robinson was formerly employed at the Bridgewater Collieries.

Mr. Thomas Watson, oversman at Roslin Colliery of the Shotts Iron Company Limited, has been promoted to the post of manager of that colliery. Mr. Watson has been over 20 years in the service of the Shotts Iron Company, beginning as assistant oversman at the Loanhead Colliery, which appointment he held for 10 years.

Messrs. William Baird and Company Limited, of Coatbridge, last week shipped a second furnace for the treatment of ore in connection with their developments on the island of Raasay.

Mr. Francis L. Lane, who, as announced in last issue, has recently been appointed managing director of the Leeds Forge Company Limited, commenced his apprenticeship on the Great Eastern Railway and completed it on the Midland Railway at Derby. He was subsequently manager of the Tube Mills at Kingston Metal Works, Birmingham, of Messrs. Allan Everitt and Co., and for five years later was engaged with Sir Alex. Rendel and Co. on inspection work for the Indian State Railways. Mr. Lane was then for seven years manager of the Ashbury Railway Carriage and Wagon Company Limited, at Manchester, and in 1895 he took up the appointment of works manager at the Leeds Forge Company Limited, being some years later appointed general manager.

According to the *London Gazette* receiving orders have been made in regard to the following:—A. A. Whitfield, coal merchant and carrier, Bury; F. C. Page, coal and corn merchant, Bournemouth.

The North-West Engineering Trades Employers' Association are protesting against any alteration in the railway classification and method of charging valves and boiler fittings, such change involving a serious increase of rates.

Messrs. Thomas and Williams Limited, of Aberdare, inform us that they have received an intimation from the Home Office testing station that all their safety lamps have duly passed the official tests.

The Court of Appeal has dismissed the appeal of the owners of the steamer "Craster Hall" against the decision of a county court judge, sitting as arbitrator under the Workmen's Compensation Act, awarding damages to a seaman for injuries received in an accident on board the vessel. The claim to compensation had not been made within six months as required by the Act because the seaman was abroad, but the employers contended that he had had opportunities of returning as a distressed seaman to make his application for compensation.

## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Bute Bill Doubling Coal Charges—Adding £180,000 a Year to Coal Trade Expenses—Estimated Increase of 5,000,000 Tons in Output—More New Docks Called For—"Tied" Traffic to the Docks—Recent Legislation Adds 5d. per Ton to the Cost of Production—Population Doubled in Ten Years—Miners and Enginemmen Amalgamated—A Three Years' Strike—Local Opinion on Mines Nationalisation Bill.**

The most interesting feature of current news is the great contest in the Parliamentary Committee Room, still in progress, over the Cardiff Railway Company's Bill to double the charge for shipping coal and to make other increases which would operate against the coal trade. Now that the traders' case has opened, some striking facts are being disclosed. Every interest—Chamber of Commerce, two freighters' associations, the shipowners, even the trade unions—unites in opposition; and the evidence, especially the cross-examination of witnesses, is followed with keen attention not only throughout this district, but also over a far wider circle, because of the principles involved.

The South Wales Freighters' Association alone represents exporters of 27 million tons of coal per annum from local ports; and counsel pointed out that the Bill contained no provisions for new works, for the raising of new capital, or the reconstruction of the present undertaking, but simply proposed to add to the income of the holder of the ordinary shares (all held by Lord Bute). That was the only result which would be achieved by the passing of the Bill. On the other hand, there was no proposal of any kind for the benefit of the public. It was, he said, a form of Parliamentary proposal absolutely unheard of.

Mr. Talbot, K.C., who opened the case for the Freighters' Association, said, though they had been told that the docks did not pay as docks, he would produce evidence that docks which were the immediate rivals of Cardiff did pay. This Bill, if passed, would prove an excuse behind which the other dock companies would shelter themselves in making the same demand. He suggested that the Committee, before giving the promoters anything, should insist that the possibilities of the unused railway—on which the company has spent nearly three-quarters of a million sterling—should be tested. The provisions of the Bill would add £186,000 a year to Lord Bute's income; and counsel pointed out that in the second half of 1912 Lord Bute had received in dividends and royalties £68,885, and at that rate in a whole year would receive £137,770. After deducting money borrowed for purposes of the docks there was a net revenue—after debenture and other interest had been paid—of £108,000; and even this was not all, or anything like, the whole return which Lord Bute got from the docks.

Mr. Joseph Davies, secretary of the Freighters' Association, who has been for nearly 20 years connected with Parliamentary enquiries of this nature, gave evidence of a most striking character. His command of statistics is unique—like his knowledge of the recent history of the trade. He stated that the increased charges sought to be established by the Bill would, in regard to coal alone, amount to £180,000 per annum, and he gave an analysis of the dock accounts, contrasting them with those of Barry and Penarth, which are also within Cardiff Port. The costs of shipping coal at Cardiff had gone up, whilst at Barry and Penarth they were no greater than in 1906. Yet Barry Dock earned its full share of the company's 10 per cent. dividend, and he pointed out, in regard to Port Talbot Docks, that they earned 6·3 per cent.

Mr. Davies created some astonishment in the Committee Room by stating that the average profit on the collieries—taking them altogether—would not equal the average profit of Cardiff Docks. He stated, further, that any increase in dues would make Cardiff the dearest coal-shipping port in the country. An analysis of the returns of colliery companies producing 21 millions of tons a year in South Wales showed an average profit of 1s. per ton last year, and a year before the average was 1s. 1½d.

In his view, there would in the future be very much bigger shipments of coal at the docks, for a number of new collieries had been sunk in the district; and within the next five years at least 5 million additional tons of coal would come on the market. These increases would mean largely-increased earning power by the docks. From dividends and royalties Lord Bute received at the docks a clear income of £100,000; and if the powers



asked for were obtained and exercised, that income would jump from £100,000 to £280,000, and that was the only result the Bill would achieve.

The time was closely approaching, he asserted, when new docks would be required at Cardiff. The Chamber of Commerce had passed a resolution pointing this out. Whether these new docks were provided by the Cardiff Company, by the Taff Vale Company, or by the traders themselves, it would pay handsomely to make that provision. In answer to a member of the committee, Mr. Davies said the average profit made by the colliery owners was practically the same as it was 20 years ago, because the cost of production had gone up.

Mr. J. A. Jones, chairman of the Freighters' Association, gave evidence that he did not think the charges were justified. His firm exports 3 million tons per annum. South Wales coal had to meet increasing competition not only at home, but also abroad—severe competition with German and Belgian coal, and even coal from the countries in the East, and also from America. America was actually sending 60,000 tons this year to Egypt—business which had always previously been done by South Wales. The Cardiff Company would get an increased revenue if the whole of their property were in full working order, and proper hydraulic facilities had been provided. At present vessels were considerably delayed, because there was insufficient hydraulic power.

This witness was cross-examined by counsel as to the yield of the Burnyeat-Brown collieries, and also the United National, the object being to show that these were very prosperous concerns, paying high dividends; but it was stated that for the first 30 years of its existence Burnyeat-Brown did not return a penny in dividends; and that, moreover, collieries were altogether different from docks, inasmuch as collieries became worked out, whilst docks were a permanent investment.

During Tuesday's sitting of the Committee, Mr. Marsh, who is auditor for the Rhymney Railway Company as well as for several colliery companies, stated that a profit could be made in the docks on coal-shipping at 2½d. per ton. He did not agree with the statement that the charge ought to be 3½d. per ton in order to avoid actual loss.

Mr. T. Vivian Rees, giving evidence on the same day, made several statements of unusual interest. He is commercial manager for D. Davis and Son (Ferndale) and joint managing director of John Lancaster and Co., these companies having a combined output of 3½ millions of tons per annum, expected shortly to total 4 millions. He said that the new charges contemplated would seriously handicap and prejudice the trade of South Wales, bringing in a disturbing element as well as monetary loss. The object of the Bill was simply to augment the profit of an individual by placing a burden on the staple industry. It was essential that there should be uniform charges at the various ports of the district. The extra charges would entail upon his companies additional expenditure of £5,306 a year. Competition between South Wales and other parts of the world was becoming keener every year; and a very small figure would turn a contract. Germany was at the present time forcing into Italian ports in an endeavour to keep out Welsh coal, and competition in the future would be greater.

An important statement by Mr. Rees was that recent legislation had increased the cost of production by no less than 5d. a ton. Another point made was that in the Bute mineral leases of the collieries it was compulsory to ship a portion at Cardiff Docks, and that now this Bill sought to increase the charges upon that "tied" trade.

Another matter provoking considerable attention is the garden city movement, which in South Wales is steadily extending; and—following upon the new area which the Cambrian Combine are laying out at Gilfach, as well as that in connection with the Powell Duffryn new pits at Pengam—a further development took place last Saturday near Caerphilly. A Co-operative Village Society is putting up 100 houses not far from the new Bedwas collieries; and not more than 10 houses per acre will be erected on the estate, the Public Works Loan Board advancing a large proportion of the money required for erection. The houses are to be let at 22s. per lunar month, tenants paying rates.

Mr. Clement Edwards, M.P., was the chief speaker at the meeting which was held, and in the course of his remarks said that within 15 years that magnificent valley of the Rhymney would be transformed into the greatest coal area in the world. In 10 years the population of Caerphilly and Gelligaer had more than doubled; but the housing accommodation had not kept pace with the increase. Ten years ago, for every hundred houses in that area there were 516 persons; but to-day there were 570. He hoped that in the Rhymney Valley they would not have any recurrence of the appalling conditions which disgraced Dowlais, and were manifested on both sides of the Rhondda.

Nine teams from the various Ocean Collieries competed on Saturday in ambulance and other Red Cross work, for the challenge shield presented by Mr. David Davies, M.P. Maindy team, who did the work in 10 minutes, came first, and took the shield; Ynysybwll second, Cwmparc third, and Garw fourth. Team 56A (Mr. J. Evans' detachment) won the silver cup and was presented by Mr. W. Jenkins, managing director of the company, in the first-aid competition, Pentre Fawr first, Cwmparc third, and Treherbert fourth.

At a meeting of the joint committee of the Miners' Federation and Enginemen and Stokers' Association, held on Saturday, the final arrangements for unifying the two organisations were carried out. At preceding meetings the basis of agreement was laid down, and on Saturday details were settled. The two organisations in future become one. The officials of the enginemen will be retained, their members will be given representation at the conference, and certain of the existing enginemen's lodges will continue in existence.

One of the most interesting features of current news is the issue of a circular to Powell Duffryn shareholders which states that the directors intend to capitalise the sum of £541,407, which has been expended on capital account, and forms part of the company's general reserve funds. They therefore recommend the shareholders to declare a bonus of 10s. per fully-paid share, and they propose that the capital fund shall be increased by the creation of 541,407 ordinary shares of £1 each, which will be allotted as fully paid in satisfaction of the bonus. The distribution will be on the basis of one for every two fully-paid ordinary shares. An extraordinary meeting of the company is called for Monday next, in order, by special resolution, to carry through this scheme.

At a mass meeting of the Ferndale workmen it was decided to tender a fortnight's notice, because the management would not deduct money from the wages and hand it over to a medical committee, who should have full control and should pay the doctors an annual sum per head. The management were willing to continue the present system under which each of the doctors should be paid per head on the number of patients who send for them. This is only part of the general difficulty which is being experienced throughout the coalfield, there being a general endeavour on the part of the workmen to establish medical committees who shall control the doctors. In the present instance it was made manifest at the meeting that a considerable minority does not favour such immediate and drastic action.

The Rhondda miners have been informed that the Miners' Federation of Great Britain, at their conference in July, will inaugurate a national movement on behalf of surface workmen, the object being to raise the rates generally throughout the coalfield. A uniform minimum of not less than 5s. per day will be sought for all surfacemen; and a demand would be made to raise the rates of every other grade by at least 6d. per shift.

It is intended to draw the attention of Lord St. Aldwyn to the failure in grading a number of men under the Minimum Wage Act, it being asserted that a large number are still ungraded.

A final stage has been reached with regard to the extraordinary strike at the Gelli Colliery, in the Rhondda, which commenced nearly three years ago, and originally affected about 800 men. It was in September 1910 that the stoppage took place, the question at issue being the fixing of a price list for a new seam which was being developed. Repeated negotiations for a settlement have failed; and there remain less than 100 men on the funds of the Federation. It has now been decided to dissolve the local lodge; to issue transfers to members now on the books; and that no further negotiations be undertaken. Able-bodied men who are in receipt of strike pay will seek employment elsewhere; and it is said that those who are physically unfit will be maintained from the district funds.

The Bill for the nationalisation of mines introduced by the Labour Party has provoked some amount of comment, but no serious attention, its impracticability being apparent on the surface. Those who are in the coal trade, whether as merchants or colliery owners, are too fully cognisant of its peculiar risks to attach any weight to purely theoretical schemes of this kind, the provisions of the Bill being scouted even by those who may be advocates of public ownership in other respects. It is one thing to nationalise railways—which are a monopoly, with fixed routine of operation, and are a national necessity, being the high roads of business. It is quite another matter to nationalise a business which must be always speculative—one which, moreover, as to its product, is always liable to foreign competition should prices exceed a certain point.

By the nationalisation of railways, combining managements, there is recognised as probable a saving of perhaps 10 millions per annum in operating expenses, because the Clearing House would be done away with, and a great portion of the independent staffs of separate companies. No such saving would be brought about in respect of mines. Even from the point of view of the collier, nationalisation is objectionable, because it would limit employment. At present the speculative operations of capitalists competing against each other in different collieries of the several coalfields provides well-paid employment, whatever be the final result to the investor. It is notorious that there are numbers of mines carried on at a loss—some of them over a series of years—but during all that time the workman gets his wages equally with the workman in good-paying concerns. Under a national régime it is almost inevitable that non-paying properties would be stopped; and it is a certainty that the large mass of speculative effort (whereby mines are sunk in every direction) would be put an end to; and only such sinkings would be entered upon by the National Board as were needed for meeting anticipated requirements of consumption.

Beyond this, the wage-earners in other industries are enormously benefited at the present time by the competitive system of coalmining. The large output not only furnishes traffic for the railways, but it also supplies cheaper fuel for the manufactories. Indeed, the more the subject is discussed, the more objectionable appears any restriction of the present freedom of enterprise in mining. To substitute a national organisation for the present unlimited competition could not be otherwise than detrimental to the interests of the colliers, without mentioning the consuming and carrying industries.

South Wales discussion cannot, however, embody all the considerations, because of the higher quality of the local mineral, and the consequently better price which is obtained. Nationalisation applying to the whole country must bring into account coalfields like that of Somerset, where the mineral is not nearly so good, and the circumstances of working are altogether different; and it would be found—when all incidents are taken into account—that the anticipation of national profit, whether in dividends upon the National Coal Stock, or in the amount of labour provided, would be very far from realised.

Swansea Harbour Trustees had before them on Saturday a very gratifying report, which showed that there had been a gain of 10,314 tons in exports of tin-plates last month, a fifth of this increase having gone to China. Both Germany and Russia have also gone up over 1,000 tons, and there had also been a very large shipment for the United States. Mr. Roger Beck said that, although their great industry was depressed at the present time, it was very strongly established, and when peace had been restored in the Near East, he thought they would again open up a steady trade with that region. In this connection, it should be noted that the Liverpool liner "Manchester Castle" has this week been loading at Swansea no less than 90,000 boxes of tin-plates for New York to the order of the Standard Oil Company.

The executive council of the Miners' Federation met in Cardiff on Monday, and a committee brought up their report upon an application to be made to the coalowners for a meeting. This is to be called in order to fix the first minimum rate of wages for several classes of workmen left ungraded by Lord St. Aldwyn in his award; and at the meeting there will also be submitted proposals for a revision of rates already fixed by the award. The council had before them a deputation of workmen from Ebbw Vale in reference to the long delay in dealing with the dispute at the collieries referring to colliers' minimum; and it was decided that the general secretary should communicate with the coalowners' secretary calling attention to the delay, and giving intimation that unless the matter is promptly dealt with, the miners' executive will have to consider the advisability of giving the workmen permission to terminate contracts. Another matter dealt with at the executive meeting was to direct that the general secretary should issue a circular asking the lodges to consider the matter of increased contributions which was referred to them by the delegates at the annual conference.

Dean Forest miners had a large gathering on Saturday last, and they unanimously resolved that it was essential for all men to join the association, so that a fair and reasonable basis for working the lower seams should be obtained in a new agreement. The present agreement ends in September, and three months' notice has been given to divide the minimum wage into two parts—one for the steam coal and the other for the house coal. It was decided also by the meeting that the need of obtaining better conditions for surfacemen was urgent.

### THE BY-PRODUCTS TRADE.

*Tar Products.*—There is very little change in the general position. Benzols keep firm and in fair request. Carbolic acids are weak. Naphthas quiet. Pitch rules steady and not in very sharp demand. Other products are unaltered. Nearest values are:—

Benzols, 90's .....	1/1
Do. 50's .....	10½
Do. 90's North .....	1/0½
Do. 50's North .....	1/0
Toluol .....	1/11
Carbolic acid, crude (60 per cent.) .....	1/3 to 1/3½
Do. crystals (40 per cent.) .....	4½
Solvent naphtha (as in quality and package) ...	1/10
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3
Pitch (f.o.b. east coast) .....	41/6 to 42/6
Do. (f.a.s. west coast) .....	40/6 to 41/6
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

*Sulphate of Ammonia.*—The tone of the market in general is satisfactory, and the outlook promising. Shipments are decidedly more encouraging, and the statistical position as a whole by no means unsatisfactory. Business in all positions is quiet. Closing prompt prices are:—

London (ordinary makes) .....	£12/5
Beckton (certain terms) .....	—
Liverpool .....	£12/17/6
Hull .....	£12/16/3
Middlesbrough .....	£12/15/0
Scotch ports .....	£13
Nitrate of soda (ordinary) per cwt. ...	10/4½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]



## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

BLACKBURN, JULY 19.—The Electricity Committee is prepared to receive tenders for the supply and delivery of steam coal for the 12 months ending August 31, 1914. Specifications and forms of tender may be obtained on application at the Electricity Works, Jubilee-street, on and after Saturday, July 19, 1913. Sealed tenders, endorsed "Steam Coal," and addressed to the chairman of the Electricity Committee, will be received at the Town Hall up to mid-day Saturday, August 2, 1913. The lowest or any tender will not necessarily be accepted. P. P. Wheelwright, M.I.E.E., engineer and manager, Corporation Electricity Works, Jubilee-street.

EXMOUTH, JULY 29.—The directors of the Exmouth Gas Company invite tenders for the supply of 7,000 tons of best gas coal (screened or unscreened), to be delivered in such quantities and at such times as may be required from August 1, 1913, to August 31, 1914, and to weigh 20 cwt. to the ton over the gas company's or dock company's weighbridge, the coal to be fresh wrought, dry and free from hards, smudge, shale and pyrites. Tenders to be accompanied by practical works analysis. Prices may be quoted c.i.f. or f.o.b. by sailing vessels or steamers, or f.o.r. Exmouth Railway Station (London and South-Western Railway). Sealed tenders, endorsed "Tender for coal," to be sent to the undersigned not later than Tuesday, July 29, 1913. The directors do not bind themselves to accept the lowest or any tender. Special tender forms are not provided or required. James T. Foster, secretary and manager, Gasworks, Exmouth.

NEWPORT (MON), JULY 23.—The directors invite tenders for the supply of about 20,000 tons of best gas coals for 12 months commencing September 1, 1913, to be delivered on the company's sidings at their Crindau Works in such quantities and at such times as may be directed by the company's engineer, from whom further information may be obtained. Tenders will be received for the whole or part of the above quantity. Tenders, endorsed "Coals," to be delivered at the offices of the company not later than Wednesday, July 23, 1913. The directors do not bind themselves to accept the lowest or any tender. By order, T. H. Hazell, secretary.

## Abstracts of Contracts Open.

BALLYMAHON (IRELAND), JULY 24.—Best Whitehaven and best Irish coal, free from slack, for the Guardians. Tenders to Mr. P. MacGreevy, clerk of union, Poor Law Office, Ballymahon.

BARROW-IN-FURNESS, JULY 21.—About 5,000 tons of coal to the electricity works, for the Corporation. Forms from the Borough Electrical Engineer, at the Electricity Works.

BIRMINGHAM, JULY 23.—Coal and slack, for the Birmingham Municipal Technical School. For particulars and form of tender apply to Mr. Geo. Mellor, secretary, offices of the School, Suffolk-street, Birmingham.

BRIGHTON, JULY 21.—For the supply of not exceeding 4,500 tons and not less than 3,500 tons of coal of any one of the following descriptions, for the Corporation, viz.:—Best Durham unscreened (from Hollingside or Tanfield Moor Collieries), Harton rough small, Wearmouth rough small, Monk Bretton hard steam nuts, Featherstone washed pea small, old Roundwood Silkstone slack, Rhodes (Pontefract) Silkstone small, Shipley (Derbyshire) bright slack. Forms at the office of Mr. Hugo Talbot, town clerk, Town Hall, Brighton.

BRISTOL, JULY 24.—Unwashed small coal, for the Electrical Committee. Forms from Mr. H. Faraday Proctor, Electricity Department, Exchange, Corn-street, Bristol.

BROMLEY (KENT), JULY 21.—Coal and coke, for the Corporation, in accordance with the particulars and conditions, which may be obtained from the borough engineer, Bromley.

BRUSSELS, JULY 23.—Coal required by the Hospices Civils and Bureau de Bienfaisance, 10, Rue d'Autriche, Schaerbeek-lez-Bruxelles, where written tenders, addressed to the Administration des Hospices, are to be sent per registered post by July 23.

CLACTON-ON-SEA, JULY 21.—House and steam coal and coke to the Middlesex Hospital Convalescent Home, Clacton-on-Sea. Forms from the Matron at the Home.

CLAREMORRIS (IRELAND), JULY 23.—About 150 tons of best double-screened Orrell coal, for the Guardians. Forms, Mr. J. W. Judge, clerk.

DARLINGTON, JULY 26.—Household coal for the use of the various departments of the Corporation. Tenders from Mr. Hy. G. Steavenson, Town Clerk's Office, Houndgate, Darlington.

DARTFORD, JULY 26.—For the Urban District Council, 3,600 tons of coal. Tenders to Mr. W. Kay, clerk to the Council, Council Offices, Dartford.

DUBLIN, JULY 21.—About 200 tons of house coal, 200 tons of coke, 60 tons of Welsh steam coal, for the Board of Governors of Dr. Steevens' Hospital, Dublin. Tenders, marked "Tender for coal," to Mr. G. E. Pepper, secretary, Board Room.

DUBLIN, JULY 21.—About 1,200 tons of house coal during ensuing 12 months from August 1, for the Midland Great Western Railway of Ireland Company. Forms, Mr. P. A. Hay, secretary, Broadstone Terminus, Dublin.

DUBLIN, JULY 22.—Supply of 80,000 tons of best quality South Wales steam coal for locomotives, for the directors of the Midland Great Western of Ireland Company. Forms of specification tender from Mr. P. A. Hay, secretary, Broadstone Terminus, Dublin.

EASTBOURNE, JULY 21.—Coal and coke, for the Guardians. Forms from Mr. A. Hurst, town clerk, Guardians' Office, Avenue House, Eastbourne.

GREAT YARMOUTH, JULY 25.—House and steam coal and coke, for the Corporation. Approximate quantity: 620 tons of house coal, 200 tons of steam coal, and 200 tons of coke. Forms of Mr. W. E. Stephens, town clerk, Town Hall, Great Yarmouth.

HOLLINGBOURNE JULY 24.—Coal to the infectious diseases hospital, for the Rural District Council. Forms from Mr. H. J. Bracher, clerk, 33, Earl-street, Maidstone.

HOLLINGBOURNE, JULY 24.—Coal, for the Guardians. Forms from Mr. H. J. Bracher, clerk, 33, Earl-street, Maidstone.

HULL, JULY 24.—Steam and gas coal at the Hull City Asylum, Willerby, near Hull, for the Committee of Visitors. Forms from the town clerk's office, Guildhall, Hull.

LONDON, JULY 21.—House and steam coal to the Middlesex Hospital, W., and its steam laundry at Hendon. Forms from Mr. F. Clare Melhado, secretary-superintendent.

LONDON, JULY 24.—Coal, for the Guardians of Stepney Union. Forms from Mr. T. G. Stacey, clerk, Guardians' Offices, Barnes-street, Commercial-road-East, E.

LOWESTOFT, JULY 29.—About 4,000 tons of slack coal to the electricity supply, for the Corporation. Forms from Mr. W. R. May, A.M.I.E.E., borough electrical engineer, Electricity Works, Norwich-road, Lowestoft.

NEWPORT (I.W.), SEPTEMBER 11.—Fuel, for the Isle of Wight County Council. Particulars from Mr. J. Dufton, clerk, County Council Offices, Newport, I.W.

NORWICH, JULY 21.—Coal and coke, for the Norwich Education Committee. Forms of Mr. A. H. Miller, town clerk, Guildhall, Norwich.

OAKHAM, JULY 21.—Coal and coke, to the public elementary schools maintained by the Rutland Education Committee. Particulars on application at the Education Office, Oakham.

OXFORD, JULY 21.—Warwickshire or Leicestershire hand-picked cobbles, for the Education Committee. Tenders, marked "Tenders for coal," to Mr. Richard Bacon, town clerk, Education Office, Town Hall, Oxford.

PLYMOUTH, JULY 29.—About 400 tons of coal and 20 tons of chopped firewood, for the Education Committee. Forms from Mr. E. Chandler Cook, education secretary, Education Office, Cobourg-street, Plymouth.

PORTSMOUTH, JULY 21.—Coal, coke, and firewood, for the Portsmouth Education Committee. Forms on application to the Committee's Offices, Town Hall, Portsmouth.

SAWBRIDGEWORTH, JULY 26.—Coal (Bestwood hard cobbles), for the Sawbridgeworth Local Education Sub-Committee (Hertfordshire County Council). Tenders, marked "Tender for coal," to Mr. W. Morris, clerk to the sub-committee, 15, Bell-street, Sawbridgeworth.

STROOD, JULY 23.—About 100 tons of the best Welsh anthracite beans. Forms of Mr. W. Banks, city surveyor, Rochester.

SWINDON, JULY 26.—Steam coal, at their electricity works and waterworks respectively, for the Corporation. Forms from Mr. R. Hilton, town clerk, Town Hall, Swindon.

TORQUAY, JULY 21.—About 3,000 tons of gas coal or gas slack, for the Gasworks Committee. Forms from Mr. F. S. Hex, town clerk, Town Hall, Torquay.

VALETTA, JULY 24.—About 4,500 tons of coal to the Government of Malta. Forms on application to the Crown Agents for the Colonies, Whitehall-gardens, London.

WATFORD, JULY 21.—Coal and coke, for the Watford Urban and Bushey Urban School Managers. Forms from Messrs. Sedgwick, Turner, Sworder and Wilson, solicitors, Watford-place, Watford.

WATFORD, JULY 25.—Coal and coke for grammar schools, Watford, for the Governors. Form from Mr. F. Wilson, clerk to the Governors, Watford-place, Watford.

WIGAN, JULY 30.—Best house coal and a small quantity also of nuts and slack, for the Corporation. Tenders, stating name of fuel, endorsed "House fuel," to be delivered to Mr. William Henry Tyrer, town clerk, Wigan.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &amp;c.

CEFN CRIBBW. —Slant Driving.—For driving main slant at Ton Philip Colliery, Cefn Cribbwr, Bridgend. Applications for particulars to be sent immediately to the colliery manager.

CONWAY, JULY 24.—Extension.—For extension of the existing pumping station, additional pumping and gas-producer plant, excavating and refilling trenches, providing, hauling, laying, jointing and testing about 2,200 lineal yards of cast iron water mains (3 in. internal diameter), and about 550 lineal yards of galvanised service pipes, together with all sluice-valves, air-valves, hydrants, chambers and covers, wall fountains and fittings, and other works connected therewith, in the parish of Llysfaen, for the Conway Rural District Council, in accordance with drawings and specification prepared by Messrs. T. B. Farrington and Son, civil engineers, Llandudno. Drawings may be seen at the office of the Engineers, from whom copies of specification and forms of tender may be obtained.

DURBAN, AUGUST 1.—Coaling Plant.—With reference to the call for tenders for the supply and erection of additional coaling appliances at Durban Harbour, it is notified by the imperial trade correspondent at Johannesburg that the time for the receipt of tenders in this connection has been further extended to August 1. Tenders, on the proper form, will be received by the secretary to the Tender Board, South African Railway Headquarters Offices, Johannesburg, up to that date. Copies of the specification and form of tender may be obtained at the office of the High Commissioner for the Union of South Africa, 32, Victoria-street, S.W.

ECCLES, JULY 21.—Stokers.—For the supply and fixing of mechanical stokers for four Lancashire boilers at the electricity works, Cawdor-street, Patricroft, for the Electricity Supply Committee. Specification from the borough electrical engineer, Electricity Works, Patricroft.

MITENHAGE (SOUTH AFRICA), JULY 29.—Power House.—Tenders are invited by the South African Railways Administration for the supply and erection of a steel-framed building to form a new power-house at Mitenhage, Cape Province. Tenders, on the proper forms, will be received by the Secretary to the Tender Board, South African Railway Headquarters Offices, Johannesburg. Copies of the specification and form of tender may be obtained at the office of the High Commissioner for the Union of South Africa, 32, Victoria-street, S.W.

SHEERNESS, JULY 29.—Borehole.—Tenders invited for the sinking of a borehole, from 16 in. to 12 in. diameter, about 750 ft. deep; also for the sinking of a trial boring from the

bottom thereof to a further depth of about 700 ft., for the Urban District Council. Specification, schedules, and form obtainable at the office of the engineer, Mr. F. W. S. Stanton, A.M.Inst.C.E., 3, Victoria-street, Westminster, on deposit of £2 2s. (returnable).

SHIPLEY, JULY 22.—Turbines, &c.—For the steam turbines, (b) two 1,000 kw. alternators, (c) two surface condensers (for above plant), (d) one controlling switchboard, for the Urban District Council. Copies of specifications, from Mr. W. Redman, the Council's electrical engineer, Dockfield Works, Shipley, on the payment of £2 2s. (returnable).

THORNTON HEATH, JULY 28.—Boiler.—For the supply and erection of one Cornish boiler, 7 ft. in diameter and 24 ft. in length, for 100 lb. working pressure, to be placed on prepared seatings at the Croydon Union Workhouse, Queen's-road, Thornton Heath, for the Croydon Guardians. Also for supplementary tenders for builders' work in connection with the new boiler seatings, and for the supply and erection of wrought steel steam pipings and calorifiers and heating apparatus. Specifications may be obtained on application to Mr. H. List, clerk to the Guardians, at the Union Offices, Mayday-road, Thornton Heath.

TODMORDEN, JULY 26.—Converting Plant, &c.—For (Section A) converting plant for 300 kw.; (B) H.T. switchboards; (C) H.T. cables; (D) mechanical stokers; (E) superheaters, for the Corporation. Particulars from Mr. Joseph Boyce, borough electrical engineer, Electricity Works, Tormorden.

## THE HULL COAL TRADE.

According to the return made by the Hull Corporation's coal inspector (Mr. W. Herbert Truman), 729,830 tons of coal were imported into Hull during June—682,959 tons by rail, and 46,871 tons by river—as compared with 629,808 tons in June 1912. This brings the total for the half-year to 4,041,649 tons, as against 2,997,821 tons in the corresponding period of last year. The following gives the quantities consigned in the periods mentioned from the principal shipping collieries:

Name of colliery.	January to June 1913.	January to June 1912.
Allerton Bywater	62,101	31,550
Allerton Main (Bowers)	28,929	22,204
Aldwarke Main	115,167	94,880
Ackton Hall	58,950	28,085
Barnsley Main	11,470	18,417
Birley	42,089	27,265
Bestwood	18,456	9,119
Brodsworth	98,051	80,005
Barrow	26,594	15,202
Bentnck	18,742	11,912
Bentley	174,883	143,010
Bullcroft	130,939	8,242
Cortonwood	31,750	42,396
Carlton Main, Grimethorpe and Frickley	257,894	270,312
Clay Cross	15,975	459
Clifton	10,378	2,598
Dalton Main	131,981	128,623
Dearne Valley	4,529	10,330
Denaby and Cadeby Main	476,722	298,971
Darfield Main	24,331	12,584
Dinnington	84,256	104,869
Elsecar	75,580	68,893
Glapwell	41,368	34,237
Garforth	58,068	44,348
Glass Houghton	163,722	87,172
Gedling	10,990	2,310
Goldthorpe	18,447	9,314
Houghton Main	41,058	22,957
Hoyland Silkstone	21,153	18,486
Hodroyd	11,188	374
Hardwick	35,478	16,537
Hickleton	91,191	76,861
Kilnhurst and Thrybergh	50,227	45,722
Kiveton Park	24,187	16,452
Lofthouse	13,906	14,027
Low Laithe	58,802	26,409
Langwith	20,184	17,071
Manvers Main	131,886	113,982
Mitchell Main	53,204	39,752
Monkton Main	22,480	27,246
Monk Bretton	27,669	44,159
Manners	16,932	3,152
Maltby	77,115	19,373
Mansfield	49,307	58,560
New Sharlston	22,934	18,057
Prince of Wales' Castle	54,570	2,448
Park Hill	14,567	4,832
Peckfield	74,737	45,557
Rothervale	38,612	22,405
South Hiendley	11,386	13,922
Staveley	48,797	37,786
Shireoaks	20,617	21,957
South Kirkby, Featherstone and Hemsworth	124,102	70,618
Shirebrook	16,227	9,932
Sherwood	23,661	39,246
Shaw Cross	13,846	585
Thorncliffe	61,273	52,197
Tinsley	7,961	11,350
Wharfedale Silkstone	30,354	40,109
West Riding and Silkstone	47,390	32,101
Wombwell Main	95,776	76,052
Whitwood	86,310	48,188
Wheldale and Fryston	80,134	65,241
Woolley	10,210	7,956
Wath Main	52,182	64,621

Coastwise shipments from Hull in June amounted to 88,909 tons and exports to 499,772 tons, as against 433,642 tons; and in the six months 554,037 tons were despatched coastwise, as against 423,762 tons, whilst in the same period 2,132,890 tons were exported, as against 1,304,747 tons in the corresponding period of 1912.

The Denaby and Cadeby Main were the largest contributors in June, with 86,537 tons. Other collieries contributing over 10,000 tons are given as follows in their order of merit:—Carlton Main, Grimethorpe and Frickley, Bentley, Manvers Main, Glass Houghton, Bullcroft, Dalton Main, South Kirkby, Featherstone and Hemsworth, Aldwarke Main, Dalton Main, Wombwell Main, Brodsworth, Hickleton, Wheldale and Fryston, Elsecar, Dinnington, Park Hill, Whitwood, Allerton Bywater, Ackton Hall, Houghton Main, Low Laithe, Manners, Mansfield, Mitchell Main, Garforth.



## COAL IRON AND ENGINEERING COMPANIES.

**Coal Iron and Engineering Companies Limited.**—This private company has been registered, with a capital of £5,500 (5,000 preference shares of £1 each and 10,000 ordinary shares of 1s. each), to carry on the business of engineers, ironfounders, metal merchants, &c. First directors, C. H. Wright, 34, Clements-lane, E.C.; Geo. A. Jones, 35, Bucklersbury, E.C., and A. W. S. Aldridge, 28, Bush-lane, E.C. Qualification, 150 shares. Remuneration, one guinea each per meeting attended. Registered office, 78, Coleman-street, E.C.

**Ammonal Explosives (1903) Limited.**—Resolutions have been passed winding up this company voluntarily, and appointing Mr. Henry Maxwell Savage liquidator.

**Bessemer (Henry) and Co. Limited.**—The directors announce an interim dividend at the rate of 5 per cent. per annum, free of income-tax, on the ordinary shares for the half-year.

**Bridgend (Cardiff) Colliery Limited.**—In the Chancery Division, on the 11th inst., Mr. Justice Warrington appointed a receiver and manager. Mr. Arthur Sims, for the plaintiff, Mr. Tavier, a debenture holder to the extent of £15,660 out of a total issue of £20,000, said the principal money of the debentures was due by reason of the default of the company in the payment of interest. In order to assist the company the plaintiff made advances from time to time recently to the extent of £17,000. His lordship appointed the managing director of the company receiver and manager.

**Cortonwood Collieries Company Limited.**—A petition has been presented to the High Court to confirm an alteration and extension of the objects of the company in accordance with resolutions adopted at meetings of the shareholders.

**Evers (Samuel) and Sons Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to take over as a going concern, and carry on the business of firebrick makers and colliery owners now carried on by J. S. E. Swindell at Homer Hill, Cradley, Worcs., under the style of Samuel Evers and Sons, also to enter into an agreement with J. S. E. Swindell and J. A. Bartlett. First directors: J. S. E. Swindell, Royston, Kenilworth-road, Leamington; H. E. Swindell, Sunnyside, Redmore, near Stourbridge; and L. E. Swindell, East Raynham, Norfolk. Qualification (except J. S. E. Swindell), £500. Registered office, Homer Hill, Cradley, Worcs.

**Fraser and Chalmers Limited.**—The directors have declared an interim dividend of 7½ per cent. on the preference shares, less tax.

**Furness, Withy and Co. Limited.**—The report for the year ended April 30 last states that the directors have elected Sir Stephen W. Furness, Bart., M.P., to succeed the late Lord Furness as chairman of the company. The profits, including the balance brought forward, amount to £885,245, as compared with £768,622 for the previous year. The usual half-yearly dividend on the preference shares was paid on November 1, 1912, and interim dividends on the ordinary shares at 10 per cent. per annum for the nine months to January 31, 1913, have also been distributed, leaving an available balance of £691,381. The appropriation is as follows: Transferred to depreciation account, £350,000; to trades contingencies fund, £50,000; to reserve account for insurance and repairs, £75,000; six months' dividend on preference shares at 5 per cent. per annum, less tax, paid May 1, 1913, £35,310; quarterly dividend on ordinary shares at 10 per cent. per annum, free of tax, paid May 1, 1913, £50,000, carrying forward the balance of £131,020.

**Great Western Colliery Company Limited.**—An interim dividend at the rate of 10 per cent. per annum for the past half-year is announced.

**Guilford Syndicate Limited.**—Mr. Arthur Burr presided at the general meeting held at Dover on the 10th inst. He stated that the capital was £40,000, and altogether £83,795 had been spent in sinking three shafts, one being a pumping shaft, 300 ft. deep. The other shafts, each of which is 18 ft. in diameter, are now 1,133 ft. and 1,091 ft. deep respectively, and no water troubles have been encountered. The measures sunk through included 766 ft. of chalk, 144 ft. of gault, 5 ft. of greensands, 36 ft. of Sandgate beds, 24 ft. of Atherfield clay, 29 ft. of Weald clay, and 23 ft. of Hastings beds, and they ought to be in the coal measures by the end of August. The length of tubing put was 190 ft. in No. 2 and 170 ft. in No. 3 shaft. At an extraordinary meeting held subsequently an agreement with the Guilford Collieries and Fireclay Company Limited, a new company to be incorporated to take over the undertaking was carried. The nominal capital of the new company will be £467,500, divided into 450,000 10 per cent. preferred ordinary shares of £1 each, and 350,000 founders' shares of 1s. each, of which it is proposed to issue 270,000 of each, including the purchase consideration payable to the Syndicate. Out of the surplus profits in each year one moiety, or 50 per cent. thereof (subject to provision for reserve fund not exceeding 10 per cent. of such moiety) available for distribution among the members will be divided as to 75 per cent. among the holders of the preferred ordinary shares and as to 25 per cent. among the holders of the founders' shares, and the other moiety, or 50 per cent. of the surplus profits, will be payable to Kent Coal Concessions Limited. The purchase consideration payable to the Syndicate is: (1) £233,500 payable as to £133,500 by the allotment to the Syndicate or its nominees of 120,000 fully-paid preferred ordinary shares of £1 each and 270,000 fully-paid founders' shares of 1s. each in the company, and as to the balance of 100,000 in cash, or, at the option of the syndicate, partly in cash and partly in fully-paid preferred ordinary shares, treated as of par value, to enable the syndicate to discharge all its debts and obligations, including the sum of £50,000 or thereabouts due to East Kent Contract and Financial Company Limited for advances; (2) the 50 per cent. above mentioned payable to Kent Coal Concessions Limited; and (3) the allotment to the debenture holders of the Syndicate of debentures in the new company in exchange for the debentures of the syndicate of the same nominal amount.

**Harrishead Colliery Company Limited.**—This private company has been registered, with a capital of £12,500 in £1 shares, to acquire and take over as a going concern the business of the Harrishead Colliery Company at Harrishead, &c. First directors, J. T. H. Goodwin, F. H. Heath, T. Poole and A. E. Jones. Registered office, F. H. Heath, T. Poole and A. E. Jones, director, T. H. Goodwin, Erskine House, Longton,

Stoke-on-Trent; T. C. Wild, Lightwood House, Longton; F. H. Heath, Prospect House, Meir, Longton; T. Poole, High View, Lightwood, Longton; and A. E. Jones, Dun-robin House, Meir, Longton. Qualification, 100 shares. Registered office, Harrishead, near Tunstall, Stoke-on-Trent.

**Henderson (David and William) and Co. Limited.**—The profits for the year to April 30 last amounted to £40,294. After paying the preference share dividend for the half-year to April 30, 1912, £7,500, and deducting the debit balance brought forward, £33,132, there remained a debit balance of £337, to which falls to be added depreciation of 2½ per cent. on buildings and 5 per cent. on machinery, £5,277, leaving a debit balance of £5,614 to be carried forward. The directors have decided to pay the preference share dividend for the half-year to October 31 last out of the preference dividend reserve account, leaving £5,000 at the credit of the account.

**Kent Coal Concessions Limited.**—The report to be submitted at the meeting on the 16th inst., which covers the period ended March 31 last, states that the annual general meeting will be followed within a few days by an extraordinary general meeting to consider the proposals for an amalgamation of the four parent companies (South-Eastern Coalfield Extension Limited, Extended Extension Limited, Deal and Walmer Coalfields Limited, and Kent Coal Concessions Limited). Two large collieries are now actually raising coal, a third is within weeks rather than months of reaching its first seam, two others are in a forward position, and there is one more as to which the surface equipment is well in hand, and a seventh about to be commenced by the company's lessees, from all of which the company will be drawing profits. The company has already paid dividends upon preference capital amounting to £21,762 and debenture interest amounting to £11,771, besides the scrip dividend in 1907 of 100,000 East Kent Colliery Company's shares to the ordinary and deferred shareholders. The directors of the Amalgamated Company will now be in a position to commence the division of profits upon the ordinary shares according to their discretion. The auditors have assented to the principle of transferring the items comprising £190,545, now credited to a suspense account (except perhaps £53,419, "premiums received on issue of ordinary shares"), to profit and loss by reason of the great under-valuation of the assets, which do not even include the company's unascertained but large proportion of the properties acquired upon joint account, and which comprise upwards of 5,000 acres of freeholds and a large and most valuable acreage under leases.

**Lancashire and Yorkshire Wagon Company Limited.**—The report for the year ended June 30 last states that, after deducting what is required for the replacement of capital invested in wagons, depreciation of fixed plant, tools, &c., and the interim dividend for the half-year ended December 31, 1912, there remains a balance of £9,267, which the directors recommend be appropriated as follows—namely, £5,000 to payment of a dividend at the rate of 10s. per share and £2,000 to the payment of a bonus of 4s. per share, free from income-tax, for the half-year ended June 30, 1913, the balance of £2,267 to be carried forward.

**Lostock Colliery Company Limited.**—This private company has been registered, with a capital of £20,000 in £1 shares, to acquire and take over as a going concern, and carry on the business of colliery proprietors now carried on at the Lostock Colliery, West Houghton, Lancs., by H. S. Higginbottom Limited, also to enter into an agreement with H. S. Higginbottom Limited and H. S. Higginbottom, and W. H. Deakin. Signatories, James Tonge, The Grove, Westhoughton, and J. E. Wing, 70, Turin-street, Sheffield. Qualification of first directors, who are to be appointed by the signatories, £50.

**Maesmellyn Colliery Company Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to acquire and take over as a going concern and carry on the business of colliery proprietors now carried on by Edward Daniel and John Fredk. Bell at Maesmellyn, Glam., under the style of Daniel and Bell; also to enter into an agreement with the persons named. First directors, J. H. Taylor, The Rhyddings, Neath; T. Williams, Tewgaed House, Skewen; and D. Harris, Evelyn-road, Skewen. Qualification, £50.

**McCallums Malleable Castings Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of iron and steel foundries, and brass and metal casters; also to acquire and take over as a going concern the business carried on by Joseph Ramsay McCallum at 231-2, Aston-road, Birmingham, under the style of W. C. McCallum. First directors, J. R. McCallum and M. E. McCallum, both of Graham House, Fox Hollies-road, Acoccs Green, Worcestershire. Qualification, 25 shares. Registered office, 231-2, Aston-road, Birmingham.

**Monk Engineering Company Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to enter into an agreement with Wm. Elliott Townsend and Noel Plevins, trading in co-partnership under the style of the Monk Engineering Company, to carry on the business of engineers, iron and metal foundries, &c. First directors: O. Harmer, Spencer Park, Coventry; W. H. Herbert, Whetstone Pastures, Leicestershire; H. F. L. Hemmings, Dilton Road, Rugby; W. E. Townsend, 16, George Eliot-road, Coventry; and Noel Plevins, Exhall, Warwickshire. Qualification, £100. Registered office, High-street, Coventry.

**Mount Kembla Collieries Limited.**—This company has been registered, with a capital of £500,000 in £1 shares, to acquire any collieries in Australia, especially the undertaking and assets of the Mount Kembla Coal and Oil Company Limited, and to enter into an agreement with the said company. Minimum cash subscription, 7 shares. First directors: John Pound, 81, Leadenhall-street, E.C.; A. B. Marshall, Temple House, Temple-avenue, E.C.; G. B. Allen, 145, Woodstock-road, Oxford; A. W. Allen, Martin-place, Sydney, N.S.W.; Australia; A. G. McArthur, 28, Linden-gardens, W.; P. H. Pound, 81, Leadenhall-street, E.C.; J. R. M. Robertson, 38, Pitt-street, Sydney, N.S.W.; Australia; and Joseph Mickey, 201, Castlereagh-street, Sydney, Australia. Qualification, £2,000. Remuneration, £300 each per annum (chairman £350). Secretary, J. A. Russell.

**North's Navigation Collieries (1889).**—Interim dividend of 4s. per share on the ordinary shares for the half-year ended the 25th ult. Warrants will be payable on August 9.

**Powell-Duffryn Steam Coal Company Limited.**—The directors recommend that £541,407—part of the reserve fund—be capitalised in the form of a bonus of 10s. on each of the fully-paid, and 5s. on each of the partly-paid ordinary shares, and that a further call of 10s. per share be made. The new shares will be allotted to proprietors in the proportion of one for every two fully-paid and one for every four partly-paid shares now held.

**Scottish Wagon Company Limited.**—The directors announce an interim dividend at the rate of 7 per cent. per annum.

**Snowdown Colliery Limited.**—Extraordinary meetings of the shareholders have been held to authorise an increase of capital. Messrs. Archibald Bryson and J. Bell Beattie were appointed to the Board.

**Stonehall Colliery Company Limited.**—This private company has been registered, with a capital of £120,000 in £5 shares, to acquire and take over certain leases of coal at or near Stonehall, Kent, to carry on the business of colliery proprietors, ironfounders, steel and tin-plate workers, &c., and to enter into an agreement with Jules Bernard and Arthur Capel. First directors, J. Bernard (chairman), 13, Rue Lafayette, Paris; A. Capel and Comte François de Beauchamp, both of Little Watersend, Temple Ewell, Kent; and Sir Fredk. Harrison, Domey House, Weybridge, Surrey. Registered office, 4, Irongate, Chesterfield. Secretary, B. T. Winterbottom.

**Webster and Bickerton and Co. (of Goole) Limited.**—This private company has been registered, with a capital of £12,000 in £10 shares, to acquire and take over as a going concern, and carry on the business of engineers, boiler-makers, iron and brass founders now carried on by Geo. Webster and R. G. Bickerton at Goole, Yorks, under the style of Webster and Bickerton. First directors: Geo. Webster (manager), 17, Salisbury-avenue, Goole; R. G. Bickerton (chairman), Stansfield, Hook-road, Goole; and Albert Ward, 7, Salisbury-avenue, Goole.

**West Denton Colliery Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares (4,750 preference and 5,250 deferred), to carry on the business as colliery owners and workers, ironmasters, engineers, &c. First directors: A. L. Bird, 21, Grainger-street West, Newcastle-on-Tyne; G. F. Mounsey, 18, Grainger-street West, Newcastle; James Heslop, Denecroft, Jesmond Park East, Newcastle. Registered office, 18, Grainger-street West, Newcastle-on-Tyne.

**Whitstable and Canterbury Coalfields Limited.**—This private company has been registered, with a capital of £40,125 (40,000 ordinary shares of £1 each and 2,500 deferred shares of 1s. each), to carry on the business of colliery proprietors, ironmasters, steelmakers, &c., and to acquire any collieries, seams, or beds of coal. Minimum subscription, £15,000. First directors: Archibald Grove, J.P., Pollards Park, Chalfont St. Giles; The Hon. Rt. James, St. Nicholas, Richmond, Yorks; Albert Farquhar, Harworth, Darlington; Sydney Brown, Westfield, Whitstable; W. R. Elgar, The Limes, Sittingbourne; and A. W. Hart, 4, London Wall Buildings, E.C. Qualification, 200 ordinary or 50 deferred shares. Remuneration, £120 per annum for chairman and £70 each per annum for ordinary directors.

## THE FREIGHT MARKET.

The outward freight market has been fairly active during the week. On the north-east coast rates are very low, but appear to have reached bottom and to be inclined to advance once more. Coasting business is being done at from 3s. to 3s. 1½d., Tyne to London, and from 3s. 6d. to 3s. 7½d. to Hamburg. The Bay is based on from 6s. 1½d. to 6s. 3d. to Bordeaux, and the Baltic on from 4s. 6d. to 5s. to Cronstadt. The Mediterranean is very variable, at from 8s. 3d. to 8s. 9d. to Genoa. At South Wales, chartering has been lighter in volume. Mediterranean rates are steady. Those for the River Plate, Brazil and the Islands are unaltered. The Bay is flat, and coasting ports are easy with a poor enquiry. At the Clyde, business is quiet at about former figures. The Humber rates correspond fairly well with those at the Tyne. Homewards, an average amount of fixtures is recorded. The Black Sea is more active, chiefly owing to an improved German demand for grain. For early tonnage, the tone is firm. For next month and later, shippers are disinclined to operate. The Azof is quiet and unaltered. The River Plate has an increased enquiry, at steady rates. The Baltic is firm. The Mediterranean and ore trades are steady. America remains at recent figures.

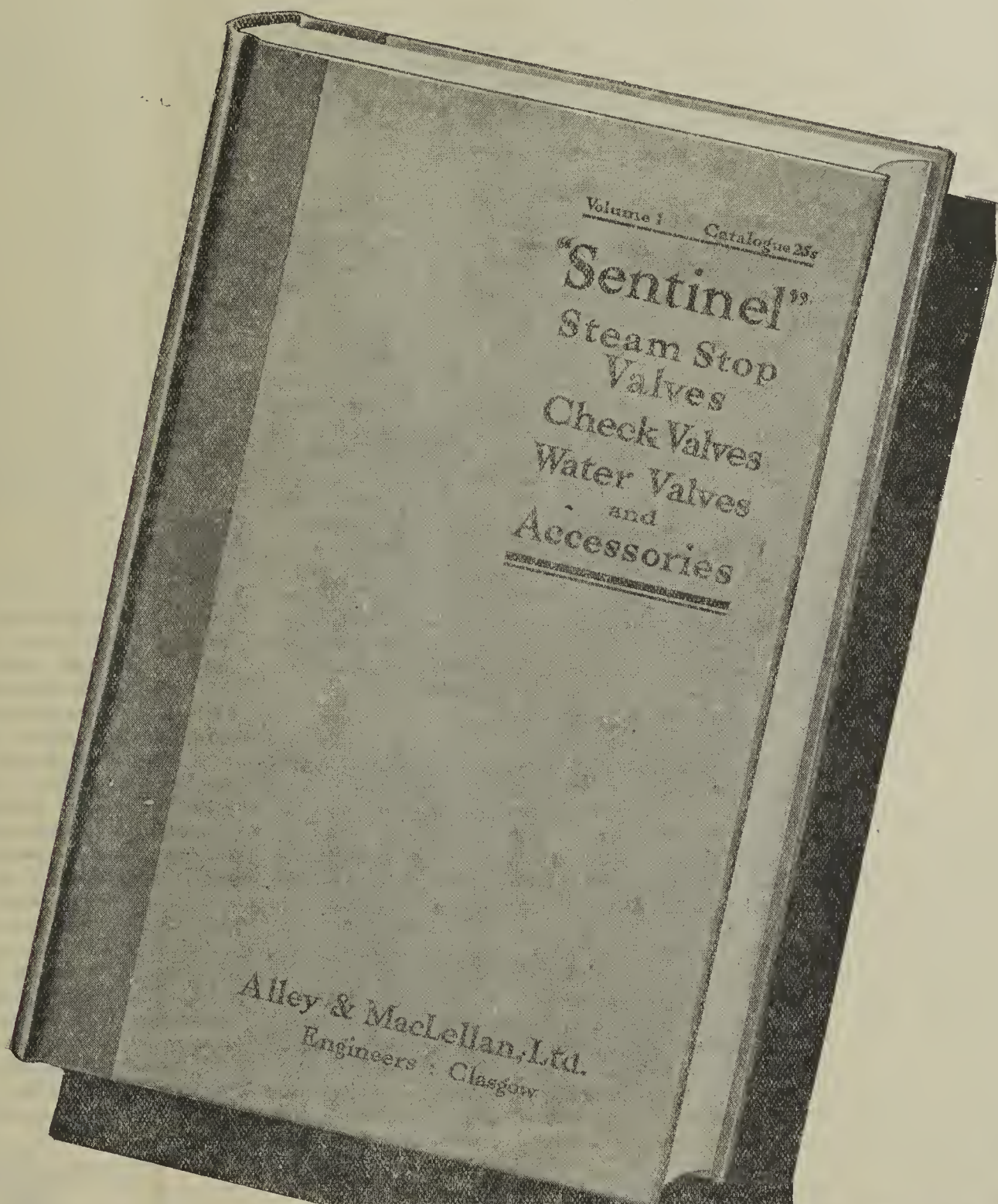
Tyne to Algiers, 3,000, 8s. 9d.; Archangel, 1,400, 5s. 9d.; Bordeaux, 2,800, 6s. 3d.; 3,000, 6s. 1½d.; 3,000, 6s. 3d., from Dunston; Buenos Ayres, 5,000, 19s. 6d.; Cronstadt, 4,100, 5s.; 4,200, 5s. 3d.; 5,300, 4s. 9d.; 3,200, 5s.; 4,800, 4s. 6d.; 3,400, 4s. 10½d., from Dunston; Copenhagen, 500, 6s., from Elswick; Canary Islands, 3,000, 10s.; Dahlsbruck, 1,250, 5s. 3d.; Genoa, 6,400, 8s., recharter; 4,500, 8s. 3d.; 4,500, 8s. 9d.; Hamburg, 2,100, 3s. 6d.; 1,800, 3s. 7½d.; 1,850, 3s. 6d.; 2,500, 3s. 9d., from Dunston; Havre, 1,600, 4s. 6d.; Kiel, 1,700, 5s. 3d.; London, 1,600, 3s.; 1,700, 3s. 1½d.; Lisbon, 3,100, 8s., 300; 2,000, 8s.; Licata, 2,200, 11s.; Las Palmas, 4,000, 9s.; 3,000, 10s.; Leghorn, 3,200, 9s. 6d., 500, 6½d., Genoa terms; Memel, 1,500, 4s. 6d.; Marseilles, 6,000, 8s., from Dunston; Oran, 2,100, 9s., 400; Piræus, 4,500, 9s.; Rotterdam, 1,800, 3s. 7½d.; River Plate, 5,000, 19s. 6d., July, reported; Sulina, 5,500, 11s.; Seville, 3,200, 10s.; 1,000, 10s. 6d.; St. Petersburg, 2,900, 5s. 3d.; 4,200, 5s. 3d.; Terneuzen, 1,700, 4s. 4½d.; Zeebrugge, 1,650, 3s. 3d., from Dunston.

Cardiff to Alexandria, 5,300, 9s., 500, July 23; 4,400, 9s.; Algiers, 6,600, 9½ fr., July 21; Bizerta, 4,000, 10½ fr., 800; Bona, 2,100, 13 fr., July 25; Brest, 1,350, 5s. 3d.; Buenos Ayres, 4,500, 19s. 3d.; 5,800, 19s.; Bahia Blanca, 5,500, 15s., option fuel, 18s. 9d., July 28; sail, 18s. 6d., August; Cherbourg, 950, 5s. 9d.; Cronstadt, 3,600, 6s. 3d.; 6,000, 5s. 6d.; 3,200, 6s. 3d., July 22; Caen, 2,000, 5s. 3d.; Dieppe, 2,200, 5s.; 1,400, 5s.; 1,600, 5s. 1½d.; Depots, 700, 4s. 9d.; Ferrol, 1,100, 7s. 9d.; Havre, 750, 5s. 6d.; Hamburg, 1,700, 4s. 9d.; Lisbon, 1,800, 7s. 9d., 300; 2,300, 7s. 6d.; 3,600, 7s. 3d., 500, 7s. 6d., 350; 3,400, 7s., 500; Las Palmas, 5,000, 8s. 9d.; Libau, 1,100, 6s. 9d.; 1,700, 6s. 9d.; 1,600, 6s. 9d., 400; La Pallice, 3,100, 6½ fr.; La Rochelle, 1,350, 6½ fr.; London, 950, 4s. 9d.; Marseilles, 1,400, 10 fr.; 3,500, 10½ and 11½ francs; 5,000, 10 fr.; 3,900, 10½ fr., early August; 4,600, 10 fr.; 5,000, 10 fr.; Malaga, 2,150, 10s., 350; Malta, 5,400, 7s. 6d., end July; Messina, 5,400, 7s., net, clear terms, July 24; Naval manœuvres, 1,235, 12s.; 3,553 g.r., 11s.;



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as, 4,200, 9s.; Port Said, 4,400, 8s. 6d.; River Plate, 19s. 3d., July 25; 3,600, 19s. 6d., July 23; Reval, 10, 6s. 9d.; Rio de Janeiro, 5,000, 16s. 6d., July 25; 5,200, 16s. 6d., August 1; 16s. 6d., August 6; Rio Grande, 16s. 6d., August 6; Rosario, 20s. 6d., end July; 4,500, 20s., August 5; Sierra Leone, 5,000, 13s. 6d.; Syracuse, 2,500, 10s. 6d., 350, end July; St. Malo, 750, 5s. 9d.; 900, 5s. 6d.; St. Servan, 1,800, 5s. 3d.; Skien, 1,900, 6s. 3d.; Sveaborg, 4,700, 6s. 6d.; 1,700, 6s. 9d.; 3,600, 6s. 6d., 500, July 31; Tarragona, 2,800, 9s.; Valencia, 2,800, 9s., end July; Venice, 3,000, 10s., July 21.

Newport to Bordeaux, 2,100, 8 fr.; Buenos Ayres, 4,500, 19s. 1½d., July; River Plate, 4,500, 19s. 1½d., July; Marseilles, 5,100, 10 fr., July 25; three ports Brazil, 20s., net terms, July; Algiers, 6,600, 9½ fr.

Fife port to Kallundborg, 1,200, 5s. 3d.  
Swansea to Tarragona, 1,250, 13s. 3d.; Rouen, 750, 6s.; 1,200, 5s. 9d.; Leghorn, 1,400, 10s.; Cagliari, 1,600, 10s. 6d.; St. Brieux, 580, 6s. 3d.; Fecamp, 900, 5s. 6d.; Cronstadt, 3,000, 6s. 3d. coal, 7s. 3d. fuel; Oran, 2,000, 12 fr. and 13 fr., July 18; Naples, 2,500, 10s. coal, 10s. 9d. fuel; Charente, 2,300, 8½ fr.; Honfleur, 900, 5s. 6d.; Candebec and Duclair, 640, 6s. 6d.; Hamburg, 1,850, 5s.; Stettin, 2,200, 5s. 6d.; Brest, 1,300, 5s.; Alicante, 1,200, 12s. 6d.; Rotterdam, 1,200, 5s. 3d.; La Rochelle, 2,400, 7½ fr.; Rochefort, 2,400, 7½ fr.; Alexandria, 5,500, 9s. 4½d. coal, 10s. 1½d. fuel, July 22; Chantenay, 3,400, 7 62½ fr.; 2,900, 7½ fr.; Alicante and Vinarcz, 2,650, 11s. 3d.; Calais, 1,000, 5s. 4½d.; Hommelvik, 1,000, 7s.

Wear to Rotterdam, 1,800, 3s. 7½d.; Gefle, 2,800, 5s. 3d.; Hamburg, 2,600, 3s. 7½d.; Cronstadt, 1,900, 5s. 6d.

Weser to Savannah, 10s. 3d., July; Pensacola, 10s. 3d., July-August.

Blyth to Cronstadt, 4,200, 5s. 3d.; 3,500, 5s.; 4,100, 5s.; Norrköping, 1,100, 5s. 3d.; Rendsburg, 2,000, 5s.; St. Petersburg, 4,200, 5s. 3d.; Norresundby, 1,250, 5s. 4½d.; Maesned-sund, 850, 5s. 4½d.

Hull to Cronstadt, 4,200, 5s. 3d.; 2,750, 5s. 6d., July 21; 5,000, 5s.; 4,500, 5s. 1½d.; Pernau, 1,500, 5s. 4½d., July 19; 2,800, 5s. 1½d.; 2,400, 5s. 3d.; St. Petersburg, 4,200, 5s. 3d.; 3,000, 5s. 6d., July 21; Hudiksvall, 1,600, 5s. 6d.; Riga, 1,500, 5s.; Fredericia, 900, 5s. 6d.; Monte Video, 5,500, 18s. 6d., 250, 18s. 9d., 225, July 15-28; Bordeaux, 2,000, 6s. 10½d.

Bo'ness to Honfleur, 950, 5s. 7½d.  
Immingham to Pernau, 2,400, 5s. 3d.  
Hamburg and Antwerp to Japan, four ports, 4,500, 26s. 9d., July.

East Norway to Melbourne, sail, 55s.  
Forth to Cronstadt, 3,100, 5s. 6d.; 2,750, 5s. 9d.; Kiel, 2,200, 6s.

Trames to South Australia, sail, p.t., 15s.  
Wales to West Coast South America and home to United Kingdom-Continent, sail, 43s.

Newport and Swansea to Santos-Rio de Janeiro, 20s., net terms.

Seaham Harbour to Hamburg, 2,500, 3s. 9d.  
Hartlepool to Bordeaux, 3,000, 6s. 1½d.; Hamburg, 1,800, 3s. 7½d.; Genoa, 5,500, 8s. 3d.

Antwerp to Lobito Bay, lump sum equal to 24s. 6d., rails.  
Norway to Buenos Ayres, sail, 19s.  
Grangemouth to Pernau, 1,600, 5s. 10½d.; Neustadt, 1,200, 6s.

Port Talbot to Algiers, 4,400, 9½ fr.; Rouen, 720, 6s.; 1,550, 5s. 9d.; Bayonne, 1,600, 7½ fr.  
Methil to St. Petersburg, 2,900, 6s.; Venice, 3,700, 11s. 3d.

Emden to Genoa, 4,850, 9s. 10½d.; Bordeaux, 1,750, 7s.; 6s. 7½d.; Malta, 5,500, 8s.; Savona, 4,850, 9s. 10½d.  
Fife port to St. Petersburg, 2,000, 6s.

Rotterdam to Port Said, 5,000, 9s.; Callao, sail, 2,647 n.r., 26s., coke; 2,235 n.r., 26s., coke; Bilbao, 4,300, 5s. 9d.; Naples, 4,000, 8s. 6d., steam coals and fuel, July 23; Marseilles, 5,400, 10½ fr., 600, 10½ fr., 900, 200 tons coke same rate; Porto Vecchio, 5,300, 8s. 10½d.; St. Nazaire, 3,400, 6s. 3d., Trignac terms; Leghorn, 2,700, 8s. 3d.; Algiers, 10½ fr., part cargo fuel; Civita Vecchia, 5,000, 10s.

Brunswick to Wilmington, 6,300 d.w., 10s. 6d., July.  
Hamburg to Savannah-Jacksonville, 10s. 9d., July.  
Grimsby to Gefle, 1,200, 5s.; Stockholm, 1,900, 5s.; Graso, 800, 5s. 6d.

Homeward charters:—Azof, 6,000 max., Rotterdam 10s. 9d., Emden 11s., Hamburg or Weser 11s. 3d., with 3d. less barley, ppt.; 3,950, Rotterdam, 10s. 9d., with 3d. less barley, ppt.; 4,500, 10s. 4½d., with 3d. less barley, ppt.; 5,400, 11s. 9d. any, 12s. 3d. Hamburg, 3d. less Rotterdam, 3d. less barley, August 10-25; 4,500, Bergen and Vaksdal, 13s., ppt.; Calcutta, 2,742 net, United Kingdom-Antwerp-Holland, 21s. 3d., d.w. basis, July-August; 2,764 net, Bombay or Kurrachee, Rs. 68, August; Kurrachee, 6,800, United Kingdom-Continent, 18s. p.p., 18s. 6d. London or Hamburg, 19s. France, July-August; Aden, 3,019 net, Calcutta, Rs. 512, August-September; Baltimore, 2,212 net, Rotterdam 2s. 4½d., Antwerp 2s. 6d., July-August; Villa Constitution, 6,400, 10 per cent., United Kingdom-Continent, 17s. o.c., no reduction, August 10-31; San Lorenzo, 2,500, 10 per cent., United Kingdom-Continent, 19s. 3d. o.c., less 6d., July; 4,500, 10 per cent., 18s. 9d. o.c., less 6d., cancelling August 10; 5,500, 10 per cent., 17s. o.c., less 6d., option Barcelona, Marseilles or Genoa 1s. 6d. extra, August 10-September 10; 4,200, 10 per cent., 17s. 6d. o.c., less 6d., with Mediterranean options, cancelling August 31; 4,200, 10 per cent., 17s. 6d. o.c., August 10-25; 5,600, 10 per cent., 18s. 6d. o.c., less 6d., cancelling August 5; 5,000, 10 per cent., 18s. 3d. o.c., less 6d., cancelling August 15; 5,600, 10 per cent., 18s. o.c., less 6d., August 10-25; Huelva, 4,600, Rotterdam, 5s. 6d., Tinto charter, July; Santander, 5s. 9d., Rotterdam, July; 2,200, 5s. 10½d., July; 1,400, 5s. 10½d., July; time charter, France-Morocco trade, about 2,800, 2925, six months' delivery Bordeaux; Gulf, 17s. 9d. p.p. United Kingdom-Continent, 18s. 3d. Hamburg, net, September-October; 47s. 6d. Liverpool or Bremen, 48s. 9d. Havre, cotton and 1,000 tons light general cargo, September-October; 2,455 net, United Kingdom-Continent, 10s., net form, August; 2,025 net, 3s. 4½d. p.p. United Kingdom-Continent, Hamburg 3s. 6d., early August; 16s. 10½d., United Kingdom-Continent, net form, two trips, September-October; 26,000 qrs., Rotterdam, 3s. 6d., August; 4,030 net, 3s. 4½d., August; Kherson, Nicolaieff, Odessa, Novorossisk or Theodosia, 7,400, basis Rotterdam 9s. 6d., with 3d. less barley, ppt.; Australia, 31s. 3d., United Kingdom-Continent, new season loading; Rosario, 4,700, 10 per cent., United Kingdom-Continent, ex France 17s. 6d. o.c., no reduction, August 10-25; Hornillo Bay, 4,000, Glasgow 4½d. p.p., West Australia, 3,500 loads, Bombay and

Beypore, 32s. 6d., August-September; Bombay, 2,796 net, United Kingdom-Continent, two ports, 20s. 9d., scale terms, July; Mobile, 750 stds., Fleetwood, 105s., July-August; time charter, Transatlantic trade, 6s., one trip, delivery Havana, re-delivery United Kingdom-Continent; two round trips, United Kingdom-Continent, via North-west Africa and Gulf ports, 4s. 3d.; 4s. 9d., two or three round trips, delivery Tenerife, re-delivery United Kingdom-Continent, via States; New York, 2,331 net, River Plate, basis 27½ c. one port, November; 2,362 net, Australia, four ports, 29 c., September; Baltimore, 2,242 net, Rotterdam 2s. 6d., Antwerp 2s. 7½d., August; Gulf timber port, 1,000 stds., 10 per cent., River Plate, 162s. 6d., August; 1,200 stds., 10 per cent., Sunderland, about 97s. 6d., mid-August; Smyrna, 2,250, Rotterdam, Hull, or Leith, 11s. one port, 12s. two ports, July; time charter, trans-Pacific trade, 4s. 6d., one trip, delivery Newcastle, N.S.W., re-delivery West Coast South America, August; Galveston, 17s. 9d. Liverpool, 18s. 3d. Bremen, net form, October-November; 20,000 qrs., 10 per cent., Rotterdam 3s. 4½d., July-August; New Orleans or Galveston, 3,387 net, Rotterdam 3s. 4½d., July-August; Santa Fé, 4,500, 10 per cent., United Kingdom-Continent, 19s. 3d. o.c., less 6d., August, Villa Constitution, 5,000, 10 per cent., United Kingdom-Continent; 18s. o.c., less 6d., option Mersey 17s. 3d., cancelling August 10; Porman, 4,000, West Hartlepool, 6s. 3d., ppt.; Huelva, 4,700, New York, Philadelphia, or Baltimore, 11s., f.d., July; Torrevieja, 5,000 max., Calcutta, 10s., salt, September; Algiers, 6,000, Rotterdam, 4s. 9d., July; St. Petersburg, 1,494 net, E.C. United Kingdom, 45s. per intaken fathom, option Sunderland 1s. extra, August; Uleaborg, 420 stds., London, 45s. per fathom, d.b.b. and ends.

## OBITUARY.

Mr. John Armitage Drake, managing director of Messrs. Drakes Limited, gas engineers, Ovenden, Halifax, and a Halifax borough magistrate, died at his residence, Heath Lodge, Halifax, on the 4th inst., at the age of 62 years.

The death has taken place of Mr. Joseph Walters, of Treeton, secretary of the Rothervale Colliery Company.

The death occurred at Hull on the 4th inst., of Mr. Walter Frederick Parkinson, the well-known manager of the Hull offices of the Denaby and Cadeby Main Collieries Limited, in Lowgate, Hull. Deceased was highly respected on the Hull Coal Exchange for his genial business qualities, and was regarded as one of the most able men in the business of the export of coal from the Humber. The late Mr. Parkinson had held this responsible post for 16 years, and prior to that was manager to Messrs. T. B. Morley and Clark, a now non-existent firm of Hull shippers. Earlier in his career deceased was in the service of the Bailey and Leatham line of steamships which since became amalgamated with the Wilson line. Mr. Parkinson recently underwent an operation for an internal complaint. He was 58 years of age, and leaves a widow, a son, and a daughter. He was a native of Hull.

At Uddingston, near Glasgow, Mr. Alexander Millar has died from peritonitis and other complications. Mr. Millar, who was 62 years of age, was a native of Kilsyth, near Glasgow. He went to Cumberland 34 years ago, and undertook some important mining contracts at various collieries in the district, and was later appointed under-manager of the Moresby Colliery, which post he held for eight years. Mr. Millar left the Moresby Company to take up the more important part of under-manager of William Pit, Whitehaven. Mr. Millar held this office for two years, when his health broke down. On his recovery he took to contracting, in which capacity he and his four brothers visited most of the pits in the west of Cumberland. About 13 years ago Mr. Millar returned to his native place, and until a short time previous to his death was, with his eldest son, Allen, following mining contracting in the collieries at Blantyre Ferme. Mr. Millar's family still maintain their connection with the Cumberland mines. Mr. Andrew Millar is manager of the Workington Iron and Steel Company's Harrington collieries, and his brother, Alexander, is under-manager at the Moresby Colliery. He leaves a widow and grown-up family.

The death took place very suddenly last week of Mr. R. W. Morgan, Danycamlas, Ystalyfera. Deceased, who was 70 years of age, was thrown from his horse. The injury caused such a shock to his system as to terminate fatally. The deceased was part proprietor of Brynhenllys Colliery. He is survived by a widow, a daughter, and two sons.

The sudden death has occurred of Mr. Siddell Watson, manager of the Settlingstone mines, Fourstones. Mr. Watson had been connected with the Settlingstone mines all his life, and had held the post of manager for 30 years, having succeeded his father in that position. Mr. Watson was about 57 years of age, and he is survived by his widow and a large family.

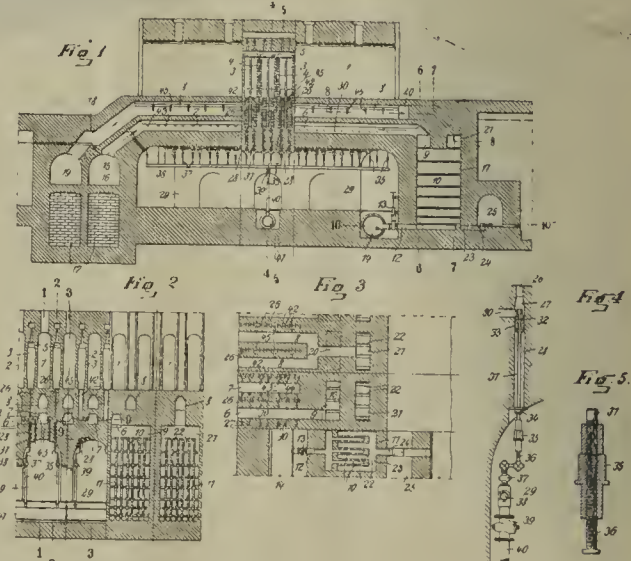
The death of Mrs. Wynne Corrie, wife of Mr. Alfred Wynne Corrie, took place at her residence, Park Hill, Oswestry, on the 20th ult., from the effects of shock due to a lift accident. Mrs. Corrie was the owner of considerable colliery property at Wigan. She married in 1866 the Hon. Robert Wellington Cotton, elder son of the second Viscount Combermere. This marriage was dissolved on her petition in 1879, and a few years later she married Mr. Wynne Corrie. She leaves no children.

A new company, composed of Crook and Bishop Auckland gentlemen, has been formed to work the West Beechburn Colliery, a new pit at Hargill Hill, Howden-le-Wear.

## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

3102 (1913). *Improvements in or relating to the use of Explosive Compositions for Blasting.* Société l'Air Liquide (Société Anonyme pour l'Etude et l'Exploitation des Procédés Georges Claude), of 48, rue St. Lazare, Paris, France.—Relates to compositions of the kind in which aluminium powder mixed with a light porous material, such as kieselguhr, in the proportion of 100 to 600 grammes of aluminium to each litre of the mixture, is immersed in liquid oxygen prior to being placed in position in the form of a cartridge for blasting purposes, the violence of the explosion being in proportion to the percentage of aluminium present in the cartridge. It is advantageous, when using cartridges of this kind, to guard against the entrance into them of external heat prior to the instant of explosion, since any such entry causes a premature evaporation of the liquid oxygen prejudicial to the power of the explosion and to its uniformity. On the other hand a certain interval of time is necessary between the instant of taking the cartridge out of the liquid oxygen and the instant of explosion, in order that the operator may reach a place of safety. To ensure such an interval, it has been proposed to encase the cartridge in a protective sheath or envelope adapted to take up a certain amount of liquid oxygen, which will be the first to evaporate. According to the invention the protective sheath or envelope is composed of inert porous material applied in the form of a paste. In the formation of this sheath or envelope it is convenient and satisfactory in most cases to employ the same material as that used as diluent for the combustible body of the cartridge proper, such material being kieselguhr, for example. A cartridge may consist of aluminium and kieselguhr mixed in the proportion of 100 to 600 grammes of aluminium to each litre of the mixture, and a sheath or envelope of light porous material such as kieselguhr applied as a thin layer of paste to a piece of fabric or canvas which is wrapped around the cartridge proper, the whole being dipped into a solution of a gummy substance. A method of applying a protective coating of kieselguhr to cartridges of the kind set forth may consist in preparing a paste by mixing the porous material with water or a gummy liquid such as silicate of potash or soda, applying the paste as a thin layer to a piece of fabric or canvas, and wrapping the fabric or canvas around the cartridge. (Five claims)

3147 (1913). *Improvements in or Relating to Coke Ovens.* Stettiner Chamotte-Fabrik Aktien-Gesellschaft, vormals Didier, of Schwarzer Damm 13a, Stettin, Germany.—Relates to coke ovens of the kind in which a mixture of the gas generated in the coke oven and of some poorer gas such as blast furnace gas or the like, is employed to heat the retorts. According to the invention, a uniform and economic heating of the coke furnace by a mixture of coke oven gas and poor gas is obtained by the coke oven gas being carried in cold state, and the poor gas in previously heated state, through separate valve-controlled conduits, to a point near the heating flues, so that the mixing of the two gases takes place only shortly before they are admitted into the heating flues. In that way any decomposition of the coke oven gas by injurious absorption of heat before its admission into the heating flues, is as far as possible avoided; whilst, on the other hand, the preliminary heating of the poor gas is not affected. As no decomposition of the coke oven gas takes place in that case, the composition of the gas mixture can be regulated for each flue, by adjusting the valves or other controlling members in the separate supply conduits for the two gases, exactly in

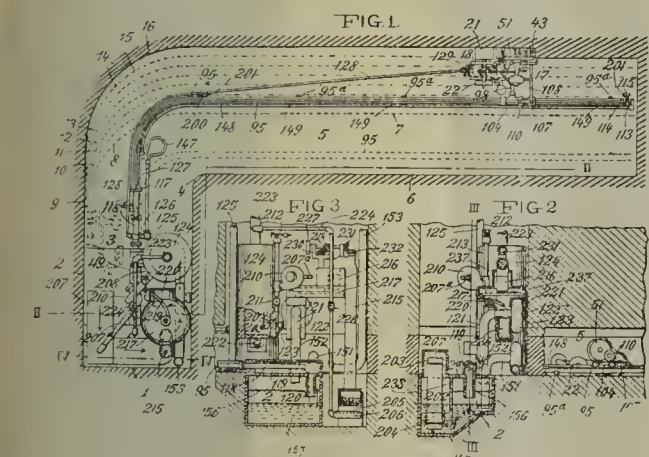


accordance with the changing nature of the poor gas, so that a uniform heating of the coke oven and a favourable yield of coke and by-products are ensured. One construction of a coke oven according to this invention is illustrated by way of example in the accompanying drawings, in which fig. 1 is a vertical longitudinal section through the oven, which, reading from the left, is made on the lines 1—1, 2—2 and 3—3 of fig. 2; fig. 2 is a cross-section through a portion of the oven, which, reading from the left, is made on the lines 4—4, 5—5, 6—6 and 7—7 of fig. 1; fig. 3 is a horizontal section through a portion of the oven, which, starting at the top, is made on the lines 8—8 of fig. 1, 9—9



of fig. 2, and 10—10 of fig. 1; fig. 4 shows in detail, on an enlarged scale, a portion of fig. 2; and fig. 5 shows a portion of fig. 4 in section, also on an enlarged scale. (Three claims.)

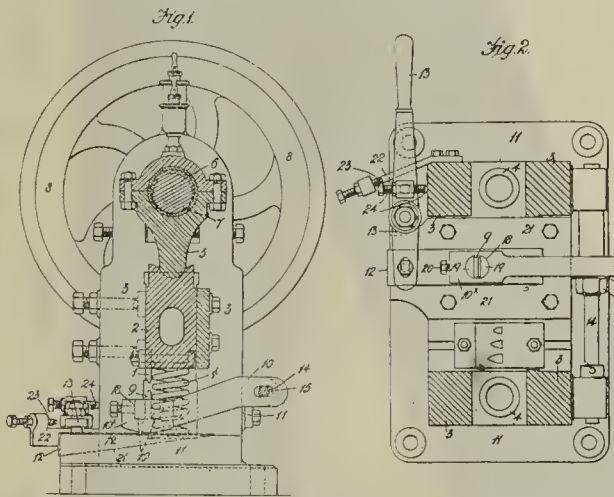
14194 (1912). *Improvements in Methods of Mining Coal, Converting it into Gas, and then Conveying the Gas from the Mine.* J. H. Hoadley, of 18, East Eighty-second-street, Manhattan, New York, U.S.A.—Embraces a general system of mining, transporting, converting and utilising coal to the end that large economies are introduced at every stage of the process, which constitutes a continuity of procedure beginning at the separation of the coal from its bed and terminating at its utilisation in the form of combustion gas and the various by-products. Fig. 1 is a plan view of a coalmine showing the machine which cuts the coal from the seam and reduces it to a powdered form; the other end of the figure illustrates the position and construction of the gas producer. Fig. 2 is a vertical section on the line II.—II., fig. 1. Fig. 3 is a vertical section on the line III.—III., fig. 2. Successive operations take off successive sections of coal. As the machine advances it cuts the lower portion of the section first, the upper portion second, the second and upper cut immediately following the first and lower cut, and it is the combined action of all the cutters which removes the entire body of any one of the horizontal sections of the coal. Means are provided also for adapting



the machine to a shrinkage in the vein. A tube or conduit is shown at 95 mounted in wheels 95<sup>a</sup> extending from the chamber 2 into the tunnel 3, 5. Beginning in the chamber 2 is the air suction, which creates and maintains in the operation a continuous current of air, beginning at the mouth of the mine, proceeding to a point where the machine is located, from thence moving into the contracted orifice of the returning tube, discharging therefrom into the chamber 2 and from this point drawn towards and forced into the producer. The outer end of the box 91 is open at the bottom, and the air moving in its direction carries the powdered coal directly into it, a broom and a plough serving to collect any large particles. Along the top and the entire length of the tube 95 is an opening. As the machine advances along the reach this opening is maintained at a point exactly opposite the machine and the comminuted product can here freely enter; at all other points this opening is kept closed. The invention also comprises a wetting device. As a means for facilitating the travel of the comminuted product through the pipe 95 in the event of a tendency to accumulate notwithstanding the propulsive impetus received from the continuously moving fluids, a conveyor is provided consisting of an endless belt or chain. As the machine moves down the long reach 5, it travels along the left wall and cuts by a milling action the coal from the vein, and the movement of the air towards the collecting box draws the powdered coal therein; from this point, after being moistened, it moves along the pipe, propelled by the air and water and facilitated when necessary by the mechanical accelerator consisting of the belt or chain 197 and its appurtenances. When the emulsion has reached the chamber 2 the air is drawn off from the top through the pipe 121 by the rotary pump 122, and as it leaves the pump 122 it is injected through the pipe 123 into the producer 124, supplying thereby one of the necessary elements which go to make up the gas producer process. The product is now in the separating chamber 2 in the form of an emulsion, and introduce them through different channels into the gas producer 124. There is an endless carrier 202 having perforated buckets 203; as it travels upward the buckets engage with, and lift the product lying in the bottom of the chamber 2, the perforations in the buckets permitting most of the water to leave the coal and fall back in the chamber 2. At the top of their excursion the buckets turn over, and discharge their contents on the sloping floor 205. Beneath this floor is maintained a fire or other heating contrivance 206; above the floor, an enclosing chamber 207. The comminuted coal as it passes over the floor becomes heated and the moisture still remaining on the coal is transformed into steam; as the steam rises it is conveyed out of the chamber by means of the pipe 207<sup>a</sup> and it is directed towards, and introduced into, the gas producer 124. The steam entering the producer discharges therein at the point 208 in proximity to the discharging point 209 of the air column bearing the powdered coal. By the time the product has reached the bottom of the sloping floor it has become fairly well dried,

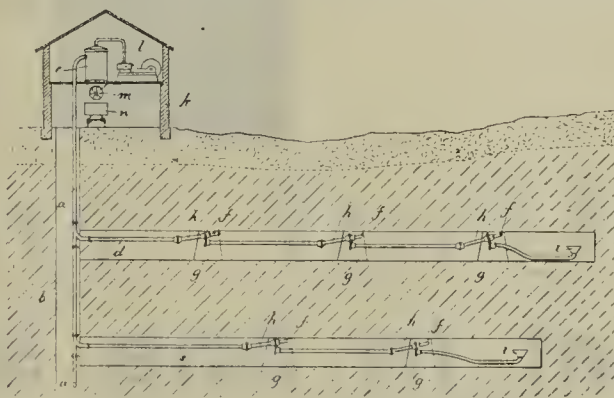
and at this point a vertical screw 214 brings the product to the top of the casing 215. The dry and powdered coal drops from the port 216 upon the rotating disc or plate 217. As it rotates it carries the deposit of powdered coal with it. The product is drawn into the pump 122 with the body of air from the upper part of the chamber 2, and from the pump the product and air are simultaneously injected into the producer 124 through the pipe 123 discharging into the producer at the point 209 tangentially to its interior wall. As coal-laden air is blown around it encounters the jet of steam entering the producer at the point 208. The gas leaves the top of the producer through the pipe 223 and by means of this pipe the gas may be conveyed out of the mine directly to the point of utilisation, or it may convey the gas to storage tanks, from which it can be drawn off as needed through any number of distributing pipes. (Four claims.)

21671 (1912). *Improvements in Machines for Sharpening the Bits of Rock Drills and the like.* W. E. Kimber, 63, Queen Victoria-street, London.—Relates to improvements in machines for sharpening the bits of rock drills and the like of the kind described in the Specification of prior Patent No. 28672, A.D. 1897, and in which the edge of the tool is acted upon between opposed cutters which are suitably shaped, and one of which has a small limited movement imparted thereto in relation to the other, so as to remove or shear off the necessary material to produce the requisite angle and degree of sharpness of the edge upon which it operates, and consists in means whereby the edge of one of the cutters may be adjusted with the greatest exactitude in relation to that of the other cutter, both in a transverse as well as in an angular direction, and thus permit of the extreme cutting edges of the two cutters being



brought absolutely opposite, and so ensuring the production of a perfectly accurate and sharp cutting edge on the tool upon which they operate. Fig. 1 is a vertical section of a machine with the improvements applied thereto, and fig. 2 a sectional plan view thereof. (Four claims.)

21979 (1912). *Improvements in Ventilating Mines and Conveying Mined Material to the Surface.* W. Hartmann, of 27, Löwenstrasse, Offenbach-on-Main, Germany.—Relates to improvements in apparatus which serve for ventilating mines, and simultaneously conveying to the surface by means of air pressure the material mined. The piping is so arranged that it may be extended by the addition of suitable extension pieces everywhere in the mine up to the working places, and offers no impediment in the further extension to the materials to be conveyed which are passed



through it. In place of the ordinary fans very powerful air suction pumps are employed, which produce the necessary vacuum in the conveying pipes, an ordinary vacuum conveyor receiver being interposed between the conveying pipes and the pumps. The material to be conveyed may be introduced in any suitable form by means of suitable suction mouthpieces, but it is preferable to break up on the spot material which is in large pieces. An example of construction of the apparatus is shown diagrammatically in the accompanying drawing. (One claim.)

23814 (1912). *Improvements in or Connected with Fitting Electric Lamps to Firemen's Helmets.* W. C. Angel, 23, Edward-road, Freemantle, Southampton, and E. A. Creane, 52, Wolseley-road, Freemantle, aforesaid.—Consists in placing an electric battery in the usual hollow comb of a fireman's helmet with an incandescent or



# **THE RECORD**

# **840**

**square feet in one shift with  
one "Siskol" Coal-Cutter.**

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**INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.**



The OFFICIAL figures recently published by H.M. Home Office show that in the Manchester District, for 1910, there were 152 Coal Cutters, of eleven different types, in use, of which 81, or more than half of the total number, were “SISKOL” machines.

Is any further proof needed as to which is the best Coal Cutter?

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INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.



15724. Platform or similar weighing scales. E. C. R. Marks. (Toledo Scale Company, United States.)
15726. Apparatus for cooling and purifying blastfurnace and similar gases. E. Hofmann.
15735. Reciprocating tools. Holman Bros. Limited. (James Howard Vivian, South Africa.)
15740. Apparatus or machines for making concrete posts, props, and similar articles. J. S. Rigby.
15758. Combustible elastic-fluid mixtures and their utilisation. A. C. Ionides, jun.
15788. Destroyer of smoke and gases in furnace and boiler flues. M. Chambers.
15848. Manufacture of chains. F. Theile.
15919. Manufacture of briquettes from iron ore and flue dust. M. Freiburger.
15922. Pyrometers. J. Churchward.
15923. Furnaces. J. Churchward.
15924. Treating steel and compositions of steel. J. Churchward.
15931. Dust collector for use with rock drills. A. W. Daw and Z. W. Daw.
15945. Method and apparatus for separating substances of different specific gravities. A. Gründler.
15955. Processes of soldering solid chain links. E. G. Bek.
15965. Process of separating light oils from washing oils and regenerating the latter. H. Koppers.
15980. Thermo-electric batteries and the like. C. D. McCourt.
16024. Means for shoring in excavations. G. G. Sinclair.
16031. Manufacture of nitro-products from petroleum and tar. A. S. Flexer.
16074. Boiler or the like furnaces of the return-flue tube type. E. O. Knight.
16093. Hose for hydraulic or pneumatic machines or the like. J. Muskett.
16107. Method of and means for conveying coke from vertical gas retorts. T. Cook.
16125. Rock-drills and detachable bits or cutters therefor. R. Jones.
16130. Apparatus for measuring the pressure of gases. P. Piller.
16131. Boilers. H. W. Jacobs.
16143. Manufacture of explosives. H. Wade. (Dynamit.-Akt.-Ges. vorm. Alfred Nobel and Co., Germany.)
16144. Feeding means of percussive rock-drills, coal-cutters, and the like. F. Simon and J. W. Scott.
16145. Mining columns. F. Simon and J. W. Scott.

#### Complete Specifications Accepted.

To be published on July 31.

1912.

8056. Gas producers. Alston and Houston.
15574. Surface apparatus for the transfer of heat. Allen.
15977. Process for increasing the yield of ammonia from gases of dry distillation. Burkheiser.
16001. Method of improving the physical nature of pig iron. Stobie.
16126. Electric battery lamps. Hunte.
16145. Control mechanism of variable-stroke pumps. Hele-Shaw, Martineau and Rickwood.
16353. Water-tube boilers. Soc. Anon. des Etablissements Delaunay Belleville.
16433. Combined metal cutting and punching machine. Buhler.
16436. Carburisers for internal-combustion engines utilising solid fuels. Schneider.
16484. Composition for use with explosives for neutralising noxious fumes therefrom after explosion. Mawdsley.
16501. Brake apparatus for railway vehicles. Luard.
17014. Tempering steel. Bynoe and Edwards.
18701. Steelyard weighing apparatus or the like. Gibbs and Sykes.
18799. Electrical apparatus for igniting gas or inflammable vapour. Nehmer.
19025. Centrifugal air pumps, compressors and the like. Rees.
19381. Explosives. Silberrad.
19800. Valves for regenerative and other gas furnaces. Tomey.
20572. Boiler furnaces. Holehouse.

21160. Steam generators. J. I. Thornycroft and Co., Donaldson and Mackie.
21331. Apparatus for exhausting or compressing air or other elastic fluid by means of an auxiliary liquid. G. and J. Weir Limited and Petermöller.
21482. Toothed and worm gearing. Seymour.
22679. Apparatus for preventing overspeeding or overwinding in colliery winding engines and the like. Moysey.
23363. Couplings for colliery trams and for other purposes. Hughes.
23371. Axle bearings. Stephens.
23556. Apparatus for measuring gases, vapours and liquids. H. Liese (firm of).
25342. Vertical retorts for the continuous carbonisation of coal. Duckham.
26203. Process of converting iron into steel. Palli.
26895. Manufacture of zinc sulphate from liquors obtained by treatment of galvanised iron scrap, zinc residues, or the like, with sulphuric acid. Kynaston and United Alkali Company.
27683. Weldless couplings for railway wagons. Pilot.

1913.

423. Manufacture of chilled metal rolls and of the chills and appliances by which they are produced. Brightside Foundry and Engineering Company and Firth.
1854. Method of and apparatus for generating producer gas for power and heating purposes. Servais.
2233. Remote controlled circuit breaker. Whipp, Bourne and Whipp.
2908. Construction of portable secondary batteries. Clark and Hart Accumulator Company.
3124. Process of oxidising sulphite. Collett.
11501. Furnace fronts. James Howden and Co., and Hume.

#### Complete Specifications open to Public Inspection before Acceptance.

1913.

2776. Hydraulic percussion drilling machines. Van Es.
9357. Process and apparatus for the separation of gaseous mixtures into their constituents. Pictet.
14470. Device for simultaneously cutting and closing hollow bricks. Johannesmann.
14862. Furnaces. Atterburg and another.
15273. Process and apparatus for intermittently producing oxygen for inhaling purposes. Matchinski.

#### CATALOGUES AND PRICE LISTS RECEIVED.

Catalogue No. 42 of the Chicago Pneumatic Tool Company describes the Boyer railway speed recorder.

"The Care and Use of Solid Tires" is the title of a pamphlet issued by the Dunlop Rubber Company Limited. It contains many useful hints, and a table showing the most suitable section of tire for various loads and different roads.

The Chicago Pneumatic Tool Company send bulletins dealing respectively with pneumatic motors and geared hoists, cylinder air hoists and jacks, and miscellaneous equipment for pneumatic drills.

We have received from the Mirrlees Watson Company Limited, of Glasgow, a pamphlet giving details of the surface condensing installation with "Mirrlees-Leblanc" air pumps, recently erected at the Pinkston power station of the Glasgow Corporation. This is working in connection with a 5,000 kw. high-pressure steam turbine, the condensing plant being of the surface type, designed to deal with 72,000 lb. of steam per hour, at which duty it is capable of giving a 28 in. vacuum when supplied with cooling water at 70 degs. Fahr. The condenser is of the wedge-shape type, without baffle plates, and has 10,200 square feet of cooling surface. The circulating water passes three times through the full length of the tubes. The air and condensate or water-extracting pumps are of the Mirrlees-

Leblanc rotary type, and, along with the centrifugal water-circulating pump, are directly coupled to a 120 B.H.P. "Curtis" steam turbine, the group running at a speed of 2,000 revolutions per minute. The circulating water pump is capable of delivering 6,000 gallons per minute against a total head of 20 ft. On account of the high speed of the turbine drive, the impellers are of small diameter, and to pass the quantity of water required, six of these are mounted on a common spindle, where they work in parallel. The efficiency of this pump is 62 per cent.

The St. Helens Cable and Rubber Company (Warrington) Limited have issued a new list of electrical cables and safety insulating devices. In this we notice some new items. The company have recently hit upon the happy expedient of adapting their cab tire for sheathing cables, and it will be readily appreciated that this construction is well designed to meet the exigencies of pit work, especially in connection with coal-cutters and portable motors. Specifications are given of various types thus protected. Other novelties include insulating shoes adjustable to various sizes of foot and insulating gloves with "cab tire" facing, rubber matting for switchboards similarly faced, and patent electric vulcanisers, specially designed for jointing and repairing cab tire sheathed cables, in which the wax is heated by spirals contained in it. This latter appliance should be especially useful in mines, in places where the use of steam or gas is inconvenient. It may be mentioned that cable prices are down considerably.

#### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

Bills, 1913: Crown Lands, 1d.; Bankruptcy (Scotland) Consolidation, 1s. 0½d.; Ditto, Report, 3½d.; Companies Consolidation Amendment, 1½d.

METALLIFEROUS MINES: FIRST REPORT, 1d.  
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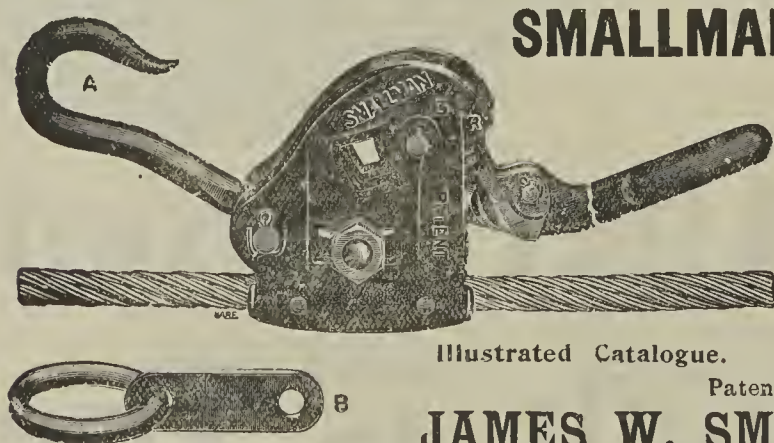
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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

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FRIDAY, JULY 25, 1913.

No. 2743.

## SOUTH WALES INSTITUTE OF ENGINEERS.

An ordinary general meeting of the South Wales Institute of Engineers was held at the Institute, Cardiff, on Thursday, July 17, the chair being occupied by Mr. W. N. ATKINSON, LL.D., I.S.O., president.

The following were elected to the institute:—As members: W. J. Evans, Ebbw Vale; R. G. Griffiths, Pontyberem, Carmarthenshire; F. Hargreaves, Brynamman, Glamorganshire; H. N. Liddell, Abercarn, Monmouthshire; and G. W. Walton, B.A., Pontyberem. As associate member: W. Falcon, Pontyberem.

### Underground Conveying.

The paper of Mr. Sam Mavor, M.I.E.E., F.R.G.S., on this subject was again discussed.

Mr. GEORGE HANN (Aberdare), in a written communication, said there was no doubt that the results from conveying had been very disappointing, especially where coal-cutters and conveyors had been used together. Where they had been put into operation on hand-cut faces there had been some success, but even these results were not as good as were anticipated. In every case these conveyors were of the continuous-running type, and where the coal was got by hand, this appeared to be the more suitable type. Where the coal was machine-cut, his opinion was that the intermittent type was the better, but it must be of the most simple construction. A machine of this sort would be better termed a "face haulage" than a conveyor, and should consist of a number of low trams which could be hauled along the face, and so constructed as to be easily discharged into the colliery trams on the stall road. He did not agree with Mr. Mavor when he attributed the non-success of the conveyor to the inefficiency of the colliery official. There was no doubt that some attempts at conveying had failed through want of well-considered planning and of interest in them by officials; but this was not generally the case. He knew of many cases where conveyors had had what might be termed a fair trial under the best conditions, but had had to be abandoned. The chief cause of failure had been difficulty with the roof owing to want of packing. Unless a seam had sufficient rubbish to stow the gobs, difficulties with the roof showed themselves very soon. They had been told that if the props were withdrawn, the roof would cut off and relieve the weight from the roof over the conveyor-path. This appeared to be the case in the other colliery districts, but in South Wales it did not behave in this way, but generally broke down after a week or so of the treatment at the edge of the coal, and so put an end to the working until the face has been reopened. When a conveyor had been invented which would lend itself to the cheap stowing of the gobs there would be some chance of its success. The other great disadvantage was the cost of making a double road, which was necessary if a large output was to be got from that road. This was generally equal in first cost to at least four ordinary stall roads, and the maintenance of conveyor roads was much greater than the maintenance of the number of stall roads required for clearing the coal from the same length of face. Assuming a seam 3 ft. thick and a length of 100 yards—which was certainly the maximum length that could be adopted in South Wales—and this length made machine cutting very difficult—the ordinary South Wales practice would require six stall roads, and if ripped to a height of 6 ft. 6 in. would cost, say, 4s. per yard, or in all 24s. plus percentage. A conveyor required one double road and one single road. The double road would cost, say, 16s. plus percentage, and the single road 4s. plus percentage, or a saving of 4s. and percentage. Out of this they had to meet (1) extra timber charges, (2) often extra repairing charges on the conveyor road, due to its size and want of packing; (3) cost of shifting conveyor; (4) cost of pipes, machinery and maintenance of same; (5) power. The advantages which a conveyor gave were greater output per yard of face and slightly less labour in filling coal, though this was largely discounted by the extra labour in shifting the rubbish a much greater distance across the conveyor-

path into the gob. The only direction in which a saving was likely to be found was in the haulage and the reduced area of workings required for a given output. It therefore appeared that the inventors of conveyors should endeavour to provide one which would handle the coal and also the rubbish necessary for stowing the gob. Further, to avoid making the double road, it should be made to work round the right-angle bend from the face to the stall road, so that it could discharge at a fixed position on the stall road into trams. This position should be such that the main mechanical haulage would convey the coal to the shaft without the necessity of using horses. If this could be accomplished it would be possible to effect a saving of about 6d. per ton on horse haulage, and would do away with the expensive double road which was required where conveyors discharge at the road head. He believed the failure of conveyors was largely due to the machinery being too delicate and unsuitable for the work which it had to perform.

Mr. WESTGARTH BROWN said the paper was a very valuable one. As to the statement that the roofs in South Wales in general were not to be differentiated from roofs elsewhere at similar depths, the speaker said that some years ago, when spending a considerable time in the Yorkshire coalfield, he was impressed with the system prevailing there of controlling their roofs and causing them to break where required, so as to free pressure on the face. An attempt was made about that time to adopt that system in South Wales in a modified form, but it was found impracticable. The success of the system depended upon being able to break the roof frequently and in short lengths; and in South Wales there were serious objections to this. There was only one system suitable to South Wales and this was to pack the goafs as tightly as possible to obviate blowers of gas, and to maintain their roads.

The PRESIDENT said he quite agreed with Mr. Westgarth Brown; nevertheless the statistics showed that as regarded the use of machine coal-cutters and conveyors there was not much difference between the districts. As a fact, there was no other district, except perhaps Scotland, where there were more conveyors in use than in South Wales. Thus there were 50 conveyors and 156 cutters in South Wales collieries in 1910, 43 conveyors and 113 cutters in 1911, and 47 conveyors and 114 cutters in 1912. The whole question depended upon different conditions—nature of roof, thickness of seam, nature of floor, &c.—and these points called for careful consideration in determining what to do. Conveyors had undoubted advantages in certain cases.

Mr. GEORGE ROBLINGS, Ystradgynlais, said the subject of underground conveying must be given more consideration in the South Wales coalfield in the near future than it had received in the past, owing to the attacks that would have to be made upon the thinner seams. There was, of course, the inherent conservatism of the workmen to be reckoned with where machinery was introduced. Nor were officials exempt from similar prejudices, and they must be taken into the manager's confidence. He was of opinion that a large number of machines and conveyors were now idle owing to a want of persistency and continuity of attention on the part of the management, and consequent "slacking" of the officials. Another cause of these machines finding their way to the surface was the operation of the Act of 1911 and the  $1\frac{1}{4}$  per cent. of firedamp restriction where electricity was in use. Another cause detrimental to the success of conveyors was the geological disturbances to which many South Wales collieries were subjected, which sometimes meant taking out the conveyors after a few months' work. He had had a conveyor at work for nearly two years in a seam 3 ft. thick, with a strong roof, the floor consisting of 18 in. of soft fireclay overlying a bed of hard siliceous fireclay. The output from a face of, say, 50 yards was about 50 tons per day, which gave an average yield of 2 tons per man employed about the face and road end, which was a trifle more than in the hand-wrought face. The length of the face

was governed by the clearance that could be given. Owing to the hard bottom, it cost 21s. per yard for a single road, but with compressed-air machines instead of electricity the work could have been done much more cheaply. It had since been decided to change the system and get in a road-end conveyor, by which better clearance could be given. The hard bottom would be left untouched, the soft underclay of 18 in. only being raised to give room for the road-end conveyor under the jib end of the face conveyor, the additional height being given to the roof. A double road could be carried on at the same price as the single road was being done. This would secure better clearance, and consequently a longer face. The effect of the output of 50 tons per day upon the results of a colliery where there was comparatively little pit room was a very real one. In this case several disturbances prevented the pit room being increased. The effect produced on the cost of the colliery, with an output of 500 tons per day, was to reduce working costs by 2d. per ton owing to the larger divisor. At another colliery where a road-end conveyor and cutters were being put in for the opening up of a face, it was expected there would be a saving of about 9d. per ton. Another thing which compelled consideration of the gate-end conveyor was the effect of the latest Explosives Order. The charge limited by the Order was far below that which was necessary to break up the ground unless a number of holes were bored, the cost of which would be prohibitive. Hence, the gate-end conveyor would be essential if the use of a conveyor was to be continued.

Mr. J. S. WARD (Cardiff), speaking of types of conveyors, said in seams containing bands of dirt, especially where these bands were hard and came out in flakes or bulk, the advantage of the traveller over the continuous type was material, and considerable labour was saved in the stowing process. A valuable feature also was the absence of noise during filling, and the quietness gained while discharging. He was a believer in concentration in conveyor work. To spread men intermittently over a length, say, of 100 yards conduced to slackness, but in the case of the traveller conveyor the men were together, and more consistent work was obtained.

Further discussion was adjourned.

### Recording Instruments for the Scientific Control of Iron Steel and Tinplate Works.

Supplementing his paper upon this subject, Mr. S. B. HASLAM, M.I.E.E., M.I.Mech.E., recalled a recent prosecution under the 1911 Mines Act of certain colliery officials for insufficient ventilation, and pointed out the importance of some method being adopted at collieries of recording the ventilation continuously, so that in case of dispute conclusive proof could be given of compliance with the Act. The present method of controlling mine ventilation, he said, was a crude one. Anemometers fell short of requirements in that they indicated the speed of the air-current only at the particular point where the reading was taken. Furthermore, no permanent record could be obtained by the use of that instrument. The new appliance for recording the entire working of the colliery ventilation that was illustrated in the paper took into account the fact that ventilation efficiency was entirely dependent on two causes—viz., the draught pressure created by the fan, and the volume of air dealt with. If the volume of air was greater than warranted by the water-gauge at a given moment, it was proof that the fan was dealing with air sucked from places nearer than the general workings. On the other hand, if the water-gauge increased without the corresponding increase of air volume, it followed that the area of the air passage had been curtailed by some cause or other.

Further consideration of Mr. Haslam's paper was deferred to the Swansea meeting of the institute.

### Proposed Visit to Ghent.

The PRESIDENT referred to the forthcoming meeting of the institute at Ghent in the first week in September, and to the desirability of members enabling the council



to make the earliest possible arrangements for what promised to be a successful and instructive occasion.

The proceedings closed with a vote of thanks to Dr. Atkinson, proposed by Mr. HENRY W. MARTIN, seconded by Mr. WESTGARTH BROWN.

### THE WATER-GAUGE.

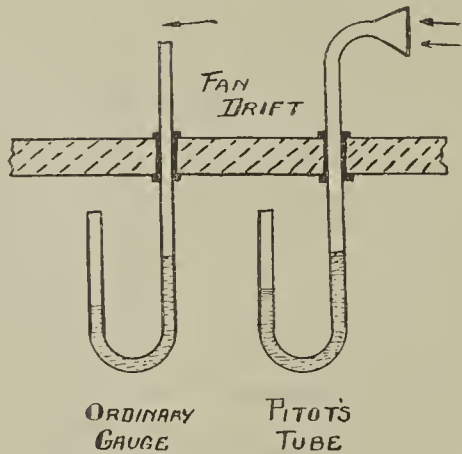
By M. E.

Much has already been said and written about the water-gauge or manometer and its uses, and yet it seems that many of the persons who habitually use the instrument are uncertain as to whether they use it as it ought to be used.

The manner of its use would seem to be determined by the person using it; but if the purpose for which the manometer is used is clearly understood, there ought to be no doubt whatever as to what its form should be, where it should be placed, and how it should be placed.

The water-gauge is used to measure the difference of pressure between the ends of a ventilating system—that is, the pressure which produces a flow of air through the workings of a mine from the downcast shaft to the upcast shaft. If the velocity of the air passing the water-gauge is low, an ordinary water-gauge may be used; but should the air-current be passing along with a high velocity, the gauge should be modified in shape and placed so that the air-current impinges on the end of the tube, which should be cone-shaped, preferably.

But, one might ask, why should the form be determined by the velocity of the air-current? The drift leading from the upcast shaft to the fan may be short and turn abruptly from the shaft. In such a case, experiment will generally show that the air does not pass along with uniform velocity throughout the whole area, and if the end of the water-gauge tube be moved



about the drift all over any section of it, it will be found that the difference of pressure varies as the velocity of the air varies, whereas if the modified form of gauge is used in exactly the same way, the water-gauge—i.e., the difference of pressure—remains constant, irrespective of the velocity of the air-current. The ordinary form of gauge cannot, therefore, be satisfactory unless the velocity is low.

When the ordinary gauge is used, the total depression recorded is the sum of the static head produced and the head due to the velocity of the air-current. Since the ventilating current is produced by a difference of pressure between the ends of the airway, it is evident that the true water-gauge can only be obtained by the elimination of the head due to velocity, which is considerable if the velocity is high, but may be neglected if the velocity is low. In the course of making experiments with the two forms of gauges while circulating air-currents of high velocity, the writer has found that the head due to velocity amounted in many cases to 70 or 80 per cent. of the total depression, and while passing currents of low velocity—e.g., about 500 ft. per minute—the difference between the readings on the two gauges could not be distinguished, due to the oscillations of the water in the gauges.

**H.M. Inspectorships of Mines and Quarries.**—An examination will be held soon to fill two vacancies for junior inspectors of mines and quarries. Nominations to compete at this examination will be given by the Home Secretary on the recommendation of the Board for Mining Examinations, and applications for nomination should reach the Private Secretary, Home Office, Whitehall, London, before August 9. Candidates must be between 23 and 35 years of age, must hold a manager's certificate, and must within the last five years have been employed for two years as manager or undermanager of a coalmine or in some other responsible capacity requiring regular attendance underground in a coalmine. The salary attaching to the posts is £300 p.a. by £15 to £450, with prospect of promotion to higher posts. Full particulars of the subjects of examination, etc., may be obtained from the Private Secretary, Home Office.

### COKE OVEN BY-PRODUCTS IN 1912.

#### Report Under the Alkali Works Act.

The 49th annual report of the chief inspector on Alkali, &c. Works Regulation Act, 1906, as usual, contains much useful information in regard to coke ovens. We give below some extracts from the report relating to the subject:—

Dealing with sulphuric acid works, the chief inspector (Mr. W. S. Curphey) observes that operations in this class of works were carried on actively for the greater part of the year, and were less interfered with than some others during the period of disturbance due to the coal strike. For many years past there has been a slow, but continued, reduction in the number of works registered as sulphuric acid works. This is not to be taken as an indication that there has been a corresponding shrinkage in production. The contrary is the case, but increase in aggregate production has been accompanied by the closing of some works, generally of small capacity, concurrently with increased productive capacity in other works already in operation.

The number of processes under inspection in the works classed as "sulphate and muriate of ammonia, and gas liquor works" was further increased, and reached a total of 639, or 9 more than in 1911. It was at one time anticipated that this increase would have been greater, but the coal strike in the early part of the year led to delay in the erection of several new plants which had been under consideration. It is likely, however, that this development has only been delayed, and that the future will permit of further extension in capacity for the production of by-products from the carbonisation of coal. The following table shows the quantity of ammonia recovered in the United Kingdom as a by-product from the various industries, expressed in terms of sulphate:—

	1912. Tons.	1911. Tons.	1910. Tons.
Gasworks .....	172,094 ...	168,783 ...	167,820
Ironworks .....	17,026 ...	20,121 ...	20,139
Shaleworks .....	62,207 ...	60,765 ...	59,113
Coke oven works .....	104,932 ...	105,343 ...	92,665
Producer gas and carbonising works (bone and coal) ...	32,049 ...	29,964 ...	27,850
Total .....	388,808 ...	384,976 ...	367,587

It is worthy of note that the production of sulphate of ammonia was greater by 3,332 tons in 1912, despite the widespread disturbance due to the coal strike. Two industries—ironworks and coke oven works—yielded a reduced production, whilst gasworks, shaleworks, and producer-gas with carbonising works yielded an increased production, sufficient to provide the net increase just mentioned. The decided increase in the production in gasworks is one result of the preparedness in so many gasworks to meet the demands for gaseous fuel at a time when the price and scarcity of solid fuel turned consumers' attention in other directions.

The "direct" method of producing sulphate of ammonia—i.e., by exposing the gases resulting from the carbonisation of coal to the action of sulphuric acid, instead of removing ammonia from these gases by a washing process producing gas liquor or ammoniacal liquor, was put into more extended use. It was chiefly in coke oven works, however, that this development occurred, the adoption of the method as adapted to gasworks practice did not expand to any great extent, although in those gasworks where the necessary plant was already in existence, it continued in satisfactory operation.

The remarks made in the two previous reports as to the loss of ammonia whilst handling and storing ammoniacal liquor have still reason for reiteration, but the loss from this source must be much less than that due to the many instances where ammoniacal liquor for the smaller or less conveniently situated gasworks is discharged unutilised into the sea or some adjacent watercourse, a valuable material becoming thus a possible source of offence. The loss throughout the country as a whole must be very considerable.

Attention continued to be given to the formation of a commercial salt of ammonia, such as the sulphate, from gases containing ammonia and sulphuretted hydrogen without the use of sulphuric acid, but so far as practical production in this country is concerned it cannot be said that permanent success has yet rewarded the perseverance, energy, and ingenuity of those actively associated with the introduction of the newer methods. Towards the end of 1911 advanced progress had been made with plant for operating one of these processes on a manufacturing scale of some magnitude, and a commencement was made in the early part of 1912. The plant had been modified in certain details, and so differed somewhat from that previously operated elsewhere, and the results were not so satisfactory as anticipated. After being in operation for a time the plant was stopped, and the further working of this

particular plant is still under consideration. Meanwhile no further actual progress has to be reported. There is, however, more than one process which it is claimed has satisfactorily solved the problem of obviating the use of sulphuric acid, and it is permissible to hope that an effective method of directly utilising the sulphuretted hydrogen associated with ammonia in the gaseous products of the destructive distillation of coal may call for notice in an early future report. In the meantime much of the sulphuretted hydrogen in question is now utilised in the manufacture of sulphate of ammonia through the intervention of the oxide of iron purifier or with direct combustion, and the chamber process of sulphuric acid manufacture.

No change falls to be noted as to the methods in use for dealing with the noxious gases evolved during the distillation of gas liquor. As in former years, part was utilised in the manufacture of sulphuric acid, part in the recovery of sulphur by the Claus process, part was burned and the resulting sulphurous acid neutralised by limestone, part was decomposed with formation of metallic sulphides, and much was absorbed in oxide of iron purifiers. The oxide of iron purifier has proved to be the most widely applicable of these methods, and was in use in all parts of the country. The older forms of box or brick walled purifiers, which were the immediate product of adopting the practice previously existing in gas purification for a different set of circumstances, are gradually being replaced by the more modern heap purifier, of which two varieties are now in use. The behaviour of oxide of iron during fouling and revivification, which was considered at some length in the preceding report, was the subject of further enquiry during 1912.

The number of tarworks registered under the Act continues to increase with each succeeding year. The number reached 179 in 1912, an increase of 16 over 1911. This increase in numbers is in part associated with a tendency for the erection of the necessary plant in works for treatment of tar at the place of production instead of sending the crude tar to chemical works where it may be dealt with collectively in larger quantities, in part to the erection of tar stills in new coke oven works provided with by-products recovery plant. The development of the use of tar for road surfaces, and the recognition that crude tar is not so desirable as the prepared material, have led to a local demand in many districts which has encouraged the erection of tar distillation plants to provide a convenient local supply of suitable material.

In his report on District No. 2 (North of England) Mr. E. Morley Fletcher, inspector, states that two new sulphate of ammonia and gas liquor works were registered during the year, making a total of 82. One plant is in connection with a gasworks, oxide of iron being adopted for dealing with the foul gases from the saturator. The other plant is in connection with coke oven plant, the ammonia being recovered by the direct process. The amount of sulphate of ammonia made shows a decrease on that for the previous year. This is due to the coal strike early in the year. Many coke ovens had to be shut down, and some time necessarily elapsed before these could be in full work again.

Reporting on No. 4 District (North and East Lancashire and part of Yorkshire), Mr. H. J. Bailey says there were 58 works in which processes for the production of gas liquor, and sulphate and muriate of ammonia were carried on during the past year. Of these, 51 were registered for the manufacture of sulphate of ammonia 10 for gas liquor, and three for muriate of ammonia. Ammonia liquor produced at coke oven plants has been distilled at four works; at two of these the Claus process continues to deal with the foul gases emitted, and at one coke oven works, where the foul gases are destroyed by combustion, the average total acidity of the chimney was 0.80 grain per cubic foot expressed in terms of SO<sub>2</sub>.

In the East Midland District, Mr. R. D. Littlefield states that there are 60 works registered under the same heading, of which number eight are gas liquor works. Consequent upon the successful working of the complete direct-absorption process at a coke oven works in the district, a further installation of this type is under construction. Plants generally have been maintained in good working order. Sulphate of ammonia is made at 52 works—at 50 of these by the continuous process and at two by the intermittent. The total output of sulphate of ammonia in the district shows an increase of 3.5 per cent. over the amount similarly produced last year. Taking the quantities of sulphate of ammonia made at "ordinary gasworks" and "coke oven" works respectively, the increase from the former class amounted to 4 per cent., and from the latter 3 per cent., over the output for 1911. These figures reflect the influence of the coal strike, the effect of which was to stop coke over



plants entirely for a time, whilst the obligations of the gas companies compelled them to manufacture gas in most instances with great difficulty and expense. It is noticeable that the output of sulphate of ammonia from coke oven and producer plants just exceeds that from the other two sources operating in the district. The proportions of ammoniacal liquor dealt with, using the sulphate of ammonia equivalent as the basis of the calculation, were as follow:—Gasworks, 47·3 per cent.; carbonising works, 2·2 per cent.; coke ovens, 46·9 per cent.; producer gas, 3·6 per cent.

In the South Midland and Norfolk district, according to the inspector (Mr. Edward Jackson), there are now 112 works registered where either sulphate, chloride or carbonate of ammonia is manufactured or gas liquor concentrated. At 104 works sulphate of ammonia is produced; at six works muriate of ammonia; and at 15 works gas liquor is concentrated. So that there are 125 different plants for carrying on the above processes. There have been six new registrations for works of this class during the year. Five of these have sulphate of ammonia plants, and the other is a gas liquor works. Four of the sulphate plants are connected with ordinary gasworks and have continuous stills, with hand-fishing saturators, efficient condensers, and in each case oxide of iron heaps are employed to arrest the sulphuretted hydrogen. The other sulphate plant is in connection with coke ovens, and the direct method of sulphate of ammonia manufacture is adopted. At the new gas liquor works registered this year, a Claus plant has been erected, to recover the sulphur from the sulphuretted hydrogen which is liberated from the liquor during the distillation. The plant referred to last year as having been erected at a small gasworks for the direct recovery of ammonia from the crude coal gas, by washing it with weak sulphuric acid, has continued to work satisfactorily during the year. In this district the number of patent coke ovens is still gradually increasing. At several works, already registered, additional ovens have been erected this year, and others are in progress of building. Though only one additional work has been added to the register this year, several plants are now in course of erection at works not hitherto registered. There are already 22 works on the register where ammonia compounds are recovered from coke ovens. Sulphate of ammonia is manufactured at every works save one, where all the liquor is concentrated. Liquor concentrating plants have also been erected at three other works, but are only occasionally worked. Three muriate of ammonia plants are also in operation for extraction of this compound from the thick tar from the gas mains. As stated, the sulphate of ammonia manufactured at these works is still increasing, but the coal strike interfered considerably with the output of sulphate in most of the works. Had it not been for this compulsory short charging of the ovens, there would have been a much larger production than there has been. However, this year the sulphate of ammonia produced from this source represents 38·0 per cent. of the entire production in this district. The plant which it was anticipated would be erected this year at a coke oven works, for operating one of the so-called “self-contained” processes—i.e., the utilisation of the sulphurous acids in the crude gases and uniting it to ammonia subsequently in this case as proposed, producing the neutral sulphate in lieu of purchasing sulphuric acid, has been abandoned. The direct method of sulphate of ammonia manufacture, by passing the oven gases through sulphuric acid, has been put into operation instead at this work. The two ironworks where ammonia and tar are recovered from blastfurnace gases (the only works of this kind in England) have been in operation as usual throughout the year. Six producer plants, all of the Mond or similar type, are in operation in the district. At one of the works where these producers are in use, very considerable extensions are in progress; 12·3 per cent. of the sulphate of ammonia manufactured in the district is derived from this class of work. The increase in the production of ammonia compounds in the district this year over 1911, calculated on a sulphate of ammonia basis, is 5·2 per cent. The figure for the ordinary gas works has remained nearly stationary again, representing less than 0·5 per cent. increase on the total production from this class of works this year, coke ovens and producer gas plants being responsible for almost all the addition to the total output for the district. The quantity of sulphate of ammonia recovered from blastfurnace gases shows a reduction on the 1911 figures equivalent to 7·6 per cent., possibly due to the coal strike.

In the South and South-Western district the number of works registered at the close of the year where either ammonium sulphate or ammonium chloride is manufactured is 105. Four new works have been registered this year for sulphate of ammonia manufacture; one

on the “direct” method. The ammoniacal salts manufactured in this district, says Mr. A. C. Fryer, the inspector, might be considerably increased if all the gas undertakings worked up their gas liquor or sold it to the manufacturer. The coast line of the district is more than 600 miles in extent, and at the present time many small gasworks, and some of even a larger output, run their gas liquor direct into the sea without any attempt at utilising it in the manufacture of sulphate of ammonia. There are also many small gas works in country districts that are unable to sell their gas liquor on account of the cost of carriage, and it is run to waste. This waste is to be seriously regretted now it is an established fact that sulphate of ammonia can to-day be profitably manufactured in gasworks where the annual output of gas is low. It is considered that gasworks producing as small a figure as 5,000,000 cubic feet of gas per annum can profitably enter into the manufacture of sulphate of ammonia. Small gasworks where difficulty exists in selling the ammoniacal liquor, and where the carriage heavily depreciates its value, will find that the simple direct method of making sulphate of ammonia will be a boon to them. Some managers of small sulphate of ammonia plants have much to learn in respect to economies that may be carried out by a simple, inexpensive re-arrangement of plant. For example, frequent loss is occasioned by injecting the milk of lime into the still at irregular intervals by a hand pump. Spasmodic pumping allows the fixed ammonia to be lost by passing into the effluent without liberating the ammonia, and, consequently, satisfactory results cannot be obtained. This defect has been superseded at several works by some simple form of injector which is so arranged that a fairly continuous feed of milk of lime is delivered on the still. At one or two works efficiency has been further obtained by increasing the seal of the trays of the still and obtaining extra agitation of the liquor. This is found specially beneficial when the free ammonia on the lower tray is in excess of what is regarded as desirable. At more than one works a loss of ammonia has been found to have resulted when the man in charge has allowed the contents of his saturator to get so low that the cracker pipe is liable to become unsealed. In a few small works considerable care is taken to regulate the supply of liquor to the saturator, while the sulphuric acid is poured in at irregular intervals and in such varying quantities that at one time the liquor is high in gravity while at another it possesses an undue alkalinity with a low gravity.

In South Wales and Monmouthshire there are 18 works of this class—the same number as last year. An increase in the near future is anticipated. Three new sulphate of ammonia plants are almost ready for registration, and in addition several by-product coke oven plants are projected. The total amount of ammonium salts, in terms of sulphate, produced in the district was 3½ per cent. less than last year, this reduction being more than accounted for by the stoppages due to the coal strike. In spite of this reduction the production was practically 10 per cent. more than that of the year 1910.

Gas liquor is concentrated or distilled for the manufacture of various ammoniacal compounds at 91 works in the Eastern District. The total products made in the district show an increase of some 400 tons (in terms of sulphate) compared with the preceding year, and this figure would have been greater but for the coal strike, which largely increased the make of carburetted water gas. The gasworks belonging to the statutory companies and local authorities produced 90·8 per cent. of the products—0·5 per cent. more than last year; and the balance of 9·2 per cent. has been made in the works of private firms. The proportion of saturator gases used for the direct manufacture of sulphuric acid in the past year was 66·2 per cent. of the whole. This figure shows an increase by reason of the absorption of three companies by a large company, and all ammoniacal liquor is now treated at the central works of the parent company.

Mr. J. W. Young, chief inspector for Scotland, states that the quantity of salts of ammonia (expressed as sulphate) made in 1905 was as follows:—Gasworks, 21,339 tons; Ironworks, 15,861; Shaleworks, 62,207; producer gas, coke, and carbonising works, 20,940—total 120,347 tons, against 121,339 tons in 1911. There were increased productions of 1,133 tons from gasworks, and 1,442 tons from shaleworks, and decreased outputs of 3,000 tons from ironworks, and 567 tons from producer gas, coke, and carbonising works. There were 107 works registered for these processes last year. The output would probably again have shown a slight increase if the miners’ strike in the spring had not caused a stoppage of many blastfurnaces. At ironworks, shaleworks, coke ovens, and producer gas works there has

been no change from former practice. At two coke oven works there is direct recovery of sulphate of ammonia from oven gas by scrubbing with acid, and at most producer gas works the vacuum principle is employed for concentrating weak solutions, otherwise the ammonia stills and saturators are akin to those seen at gasworks.

There was great activity at all the shaleworks, owing to the world’s increasing demand for oil. Five works were again registered as paraffin oil works. The average total acidity of their chimney gases was 0·33 grain of sulphuric anhydride per cubic foot. Investigations have been made at more than one works, in view of applying this acid to sulphate of ammonia manufacture—without success hitherto. The source of the acid is the sulphur naturally present in the shale. The greater part of this sulphur passes away from the retorts into the uncondensable gases, by which the crude oil stills are heated during distillation.

The following table relates to the production of sulphate at shaleworks:—

Year.	Total shale mined and quarried in Scotland.	Total sulphate of ammonia recovered from the shale in paraffin oil works.	Yield in lb. per ton of shale.
	Tons.	Tons.	
1903 .....	2,009,265	37,853	41·6
1904 .....	2,331,885	42,486	40·8
1905 .....	2,493,081	46,344	41·6
1906 .....	2,545,724	48,534	42·7
1907 .....	2,690,028	51,338	42·7
1908 .....	2,892,039	53,628	41·5
1909 .....	2,967,017	57,048	43·1
1910 .....	3,130,280	59,113	42·3
1911 .....	3,116,833	60,765	43·7
1912 .....	3,184,826	62,207	43·7

There has been comparatively limited variation in the ratio between sulphate of ammonia produced and shale mined in Scotland, although the general trend is upwards. It may be well to state again that this ratio is affected by various factors. One of these is that some shale is used elsewhere than in shaleworks. This tends to an understatement as compared with the sulphate of ammonia recovered per ton of shale subjected to destructive distillation in the shale oil works. The ratio is therefore not strictly accurate as applied to those works, although approximately so, and is comparable with the figures of past years. The limited fluctuations in the figures of the fourth column show that the standard of recovery already attained has left little room for improvement, despite the continuous effort to advance beyond the results of past years, which has for long characterised this industry.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending the 15th inst. is as follows:—Antwerp, 505 tons; Amsterdam, 913; Alexandria, 9,220; Aalborg, 1,136; Ancona, 4,051; Bilbao, 1,489; Buenos Ayres, 10,390; Bremen, 1,513; Copenhagen, 399; Cronstadt, 25,626; Dagerhamn, 674; Drontheim, 560; Ghent, 566; Hamburg, 5,401; Harlingen, 1,277; Hallsta, 1,098; Harburg, 7,607; Königsberg, 2,463; Libau, 409; Malmö, 1,257; Mariehamn, 484; Oxelosund, 1,653; Oporto, 1,302; Rouen, 2,597; Riga, 6,315; Reval, 3,827; Rotterdam, 9,989; Reykjavik, 596; Stege, 857; Stettin, 1,315; Stockholm, 1,500; St. Petersburg, 6,848; Trieste, 465; Trelleborg, 1,678; Venice, 290; Wyk, 188; total, 116,466 tons. Corresponding period 1912, 112,531 tons.

**Home Office Prosecution at Chesterfield.**—Before the Chesterfield county magistrates on Saturday, Thos. Henry Elliott, manager of the Langwith Colliery belonging to the Sheepbridge Coal and Iron Company, was summoned for three offences under the Electricity Special Rules: (1) A metallic covering of a lampholder not being earthed, on March 5; (2) not protecting live parts—namely, a switch and fuse; and (3) not having a metallic switchbox earthed, on March 7. On behalf of the Home Office, Mr. Gichard said the facts would not be contested. On March 5 there was an accident in the colliery which resulted in the death of a youth who, just before he fell to the ground, was standing near to a prop to which was fixed a lamp lighted by electricity. It was later noticed that the lamp was hanging downwards. The conclusion was that the lad had touched the lamp and had received a shock which resulted in his death. An inspector discovered that the lamp had not been “earthed.” He went into two other parts of the mine and found a switchbox which was not earthed in the required manner, and at the shaft bottom, in the office, were a small switch and a fuse, both uncovered. The defence was that the manager had done everything within his power to prevent any contravention of the rules by the appointment of qualified electricians. The man, who was responsible for the lamp being earthed, was so upset by the fatality that he had declared that he would never again go down a mine. The Bench were of the opinion that there had been some negligence respecting the lamp, and for that offence the defendant would be fined £1 and £5 5s. costs, but the other two cases would be dismissed.



COALMINING ACCIDENTS IN THE UNITED STATES.

The United States Bureau of Mines has published an account, compiled by F. W. Horton, of the coalmining accidents in the United States in the period 1896-1912. During 1912, 2,360 men were killed, giving a death-rate, based on an output of 550,000,000 tons and 750,000 men employed, of 4.29 per 1,000,000 tons raised, or 3.15 per 1,000 employed. The figures show a considerable improvement on recent years, as will be seen from the following table:—

Year.	No. killed.			Production per death (sh. tons).
	Total.	Per 1,000 employed.	Per 1,000,000 short tons raised.	
1907	3,197	4.88	6.93	144,000
1908	2,449	3.64	6.05	165,000
1909	2,668	4.00	5.79	173,000
1910	2,840	3.92	5.66	177,000
1911	2,719	3.73	5.48	183,000
1912	2,360	3.15	4.29	233,000

The maximum was reached in 1907, when four disastrous explosions occurred, in which 690 men were killed. From 1896 to 1907, the number killed per 1,000 gradually increased, with only slight fluctuations. In the same period the output increased by over 150 per cent.

The next table shows the deaths, classified according to cause, during the last three years:—

	1910.	1911.	1912.
Underground—			
Falls	1,310	1,321	1,151
Mine cars and locos.	375	393	362
Gas and coal dust explosions	518	379	301
Explosives	176	134	133
Electricity	79	87	76
Other causes	96	159	96
Total (underground)	2,554	2,473	2,119
Shaft accidents	75	63	54
Surface accidents	211	183	187
Grand total	2,840	2,719	2,360

In addition, 9,106 serious injuries and 22,228 slight injuries were reported in 1911, the former being cases in which at least 20 days' work was lost. It is interesting to note that the value of each life lost is estimated at 5,000 dols., which, together with the economic loss represented by the non-fatal accidents, gives a total loss of 14,142,000 dols. in 1911. On the same basis, the loss from fatalities in the 17 years 1896 to 1912 would amount to over 168 million dollars.

A long list of the more disastrous coalmine accidents in the United States since 1839 has been compiled, from which we take the following, showing those in which 50 or more lives were lost:—

Date.	Mine.	State.	Nature.	Killed.
1855	Midlothian	Virginia	Explosion	55
1869	Avondale	Pennsylvania	Fire	179
1883	Diamond	Illinois	Inrush of surface water	69
1884	Crested Butte	Colorado	Explosion	59
1884	Laurel	Virginia	Do.	112
1891	Mammoth	Pennsylvania	Do.	109
1892	Krebo No. 11	Oklahoma	Do.	100
1895	Red Canyon	Wyoming	Do.	60
1896	Twin, Pittston	Pennsylvania	Fall of roof	58
1900	Winter Quarters	Utah	Powder and mine explosion	200
1902	Fraterville	Tennessee	Explosion	184
1902	Rolling Mill	Pennsylvania	Do.	112
1903	Hanna No. 1	Wyoming	Explosion and fire	169
1904	Harwick	Pennsylvania	Explosion	179
1905	Virginia City	Alabama	Do.	108
1907	Stuart	W. Virginia	Do.	84
1907	Monongah	Do.	Do.	361
1907	Yolande	Alabama	Do.	56
1907	Barr	Pennsylvania	Do.	239
1908	Hanna No. 1	Wyoming	Do.	59
1908	Marianna	Pennsylvania	Do.	154
1908	Lick Branch	W. Virginia	Do.	50
1909	Do.	Do.	Do.	67
1909	Cherry	Illinois	Fire	256
1910	Primero	Colorado	Explosion	75
1910	Palos	Alabama	Do.	83
1910	Starkville	Colorado	Do.	56
1910	Delagoa	Do.	Fire & explosion	79
1911	Price-Pancoast	Pennsylvania	Fire	73
1911	Banner	Alabama	Explosion	128
1911	Briceville	Tennessee	Do.	84
1912	San Bois No. 2	Oklahoma	Do.	73
1912	Jed	West Virginia	Do.	82

Tables compiled from the records of the Prudential Assurance Company of America show the causes of mortality among coalminers and various other industrial workers:—

Occupation.	Cause of death.						
	Accidents.	Tuberculosis.	Pneumonia and other respiratory diseases.	Urinary diseases.	Apoplexy, paralysis, and other nervous diseases.	Heart disease.	All other causes.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Coalminers	22.9	11.1	20.7	8.0	7.7	6.8	22.8
Iron and steel workers	15.3	19.4	12.5	9.9	10.0	8.8	24.1
Machinists	10.0	27.7	10.4	10.0	9.1	8.7	24.1
Masons	9.0	17.7	13.4	13.0	10.1	10.1	26.7
Painters	8.6	23.8	9.9	15.1	10.7	8.1	23.8
Carpenters	7.8	16.1	11.1	13.4	13.6	11.4	26.6
Textile workers	7.0	28.4	12.4	11.5	9.4	9.1	22.2
Electricians	6.7	36.7	10.3	9.6	8.1	7.9	20.7
Engineers	5.8	10.2	11.9	12.9	17.1	12.7	29.4

The next table shows the principal causes of deaths among coal and metal miners (ages 25 to 64):—

Occupation.	Cause of death.		
	Accidents.	Tuberculosis and pneumonia.	All other causes.
	Per cent.	Per cent.	Per cent.
Coal miners (1907-1910)	22.92	25.28	51.80
Copper miners in one of principal copper-producing States (1907-1911)	17.06	43.45	39.49
Metal miners (1911)	30.51	31.63	37.86

FIREDAMP DETECTORS.\*

Of all the numerous devices which have been proposed for detecting firedamp, the miner's lamp, and the benzine lamp in particular, is the most reliable; but, on the other hand, it is attended with the drawback that it does not afford complete security from the risk of the gas becoming ignited. Conversely, the electric lamp, which can be made perfectly safe, is of no value in detecting the dangerous gas in the mine, and it was on this account that the Association for the Protection of Mining Interests in the Dortmund District offered a prize for an efficient electric pit lamp fitted with a reliable firedamp detector.

The fact that the value of the various proposed detectors is highly problematical is demonstrated by the circumstance that not one of them has established a permanent footing in practical use. Nevertheless, in view of the above-mentioned prize, it may be not without interest to review the ideas put forward by different inventors and the types of detector constructed in accordance with the same. The devices in question may be divided into nine classes, according as they are based on: (1) The absorptive capacity of platinum black; (2) the diffusion of gases; (3) the liberation of heat by the detecting flame; (4) the determination of the percentage of firedamp by means of the specific gravity of the gas mixture; (5) the explosive capacity of the pit air; (6) acoustic indications; (7) the change in volume of the air by the combustion of the gas; (8) changes in the illuminating value; (9) on sundry other reactions.

To the first class, in which platinum black is used as the absorbent, belong the devices of Aitken, Brunlechner, Siemens und Halske, Renkewitz, Prested, Divjak and Wollscheid, Hartmann, Braun and Della Santa, Philip and Steele, Schroeder, Dahlbokum and Otto, Pausinger and Guasco. The use of platinum black or other catalytic substance is, however, impracticable for the detection of firedamp in mining operations. The important thing for the miner is that he should be enabled to detect the presence of a very small proportion—about 1 per cent.—of firedamp in the air; and therefore any apparatus that cannot detect less than about 5 per cent. is insufficient, such gaseous mixtures being already of an explosive character. As ascertained by tests conducted at the experimental station, Gelsenkirchen, explosive mixtures containing 5 to 13.8 per cent. of methane have scarcely any appreciable effect on platinum black and the like; and it is not until the proportion approaches 60 per cent. that the mass begins to glow, or the fusing of wires—on which many of these devices are based—takes place. Consequently, none of these has found practical application; and many are far too complicated to be of use even as a check on the composition of the return air at the upcast.

The diffusion apparatus include those of Ansell, Libin, Binsfeld and D'Orville, Van der Weide, Lyncker and Schropp, Pabst, Prested, and Krause. However, the application of the principle of osmosis, the property according to which gases diffuse through a porous substance, at different rates, according to their relative specific gravities is not adapted for producing appliances of practical utility. Apart from the fact that these devices are very liable to become choked with dust, which lowers the permeability of the material (earthenware), they will only give correct indications for a comparatively short

\* Forstmann. Glückauf.

time after introduction into a mixture of firedamp and air, the difference between the outer and imprisoned air gradually disappearing as the time of immersion is prolonged, so that the reading becomes inaccurate.

To the third class of apparatus, in which the heat disengaged by a flame is sought to be utilised as a firedamp indicator, belong the detectors of Della Santa, Hartmann and Braun, Schleismann and Thiel, and Van Rosen. They are very similar to the ordinary miner's lamp, but are hardly suitable for use in mines, being complicated, and incapable of being properly used unless held quite still. In fact, only one of them, that of Von Rosen, is intended to be portable, and even this form has not come into favour in practice.

The next series is that in which the determination of the specific gravity of the pit air is used as a criterion of the gas content. It comprises the detectors of Wilson, Egger and Co., Krell, Cohn, Meissner, Albert and Overdick, Otto, Hauger and Pescheux, Steinberg and Zangemeister. These, also, are only suitable for use in fixed positions, and therefore are of small practical value. Moreover, they are attended with the defect that their indications are vitiated by the presence of carbon dioxide; and they are also put out of order by the presence of water vapour and dust, and by changes in temperature and atmospheric pressure.

The explosibility of pit gas is employed as a means of detection, in several forms of apparatus, such as those of Dr. Smith, Brückner, Bing, Shaw, Chatelier, Breitbart, and Rüsse. Some of these operate by exploding a compressed sample of the gas; others by completing an electric signal circuit when the gas (with or without enrichment) explodes in a test lamp. All, however, are either too complicated or insufficiently sensitive for practical application.

The apparatus of Forbes and Hardy give acoustic signals, which differ in pitch according to the amount of gas present in the air, but are both unsuitable for pit use, especially in the hands of ordinary miners. Besides, the gas content is only accurately indicated when the atmospheric air and test sample are at the same temperature, and when no other gas but methane is present in the pit air.

Detectors which act by the change produced in the volume of the air, by the combustion of the gases contained therein, have been proposed by Maurice Monnier, Coquillion, Schmid, and Swan. They are, however, too slow in operation, and too roundabout in action to find employment in practical mining; and, finally, the work would have to be carried out by a skilled operator, it being impossible for an ordinary miner to perform the test correctly.

The apparatus of Liveing, Buhl and Freise are based on the fluctuations produced in the intensity of a flame by the presence of gas. Some of them are only suitable for use in fixed positions, and are therefore of small practical utility; while those provided with selenium cells have the additional drawback that the permeability of the cells to electrical energy—and therefore the reliability of the apparatus—is influenced by the temperature. Finally, they are all troublesome to operate and require to be placed in skilled hands, a circumstance which shuts them out from general application.

The miscellaneous class includes the detectors of Perry and Groespeck (changes—expansion, reduction to metal and rise in temperature—set up by the presence of gas in palladium and its compounds), Koch (flame cap coloured by mineral salts), Haber (interferometer), Abel (length of electric spark increased when the air between the poles is heated by the combustion of methane), and Heckmann (reduction in air pressure or absorption of methane). These are all either too slow, insufficiently sensitive, require skilled operators, suitable only for fixed positions, or risky owing to the liability of unwatched lamps producing explosions.

Although the various forms mentioned are imperfectly adapted for practical use in comparison with the safety lamp, they nevertheless show that inventors are earnestly attempting to solve the important problem of firedamp detection along various lines, and that these endeavours may ultimately be crowned with success.

**South Wales Institute of Engineers.**—The autumn meeting of the South Wales Institute of Engineers will be held at Ghent on Monday, Tuesday, Wednesday and Thursday, September 1 to 4, 1913. Accommodation at the Hotel Flandria Palace, Ghent, has been provisionally reserved. Discussion will take place on the following papers: "The Sinking and Equipping of the Bedwa Colliery," by Mr. E. L. Hann; "Latest Developments in Connection with Mechanical Puddling," by Mr. David E. Roberts, M.Inst.C.E.; "Machine Mining in the South Wales Steam Coals," by Messrs. G. D. Budge and W. E. Jayne; and "Underground Conveying," by Mr. Sam. Mavor, M.I.E.E.



## MINERS' INTERNATIONAL CONGRESS.

[FROM OUR OWN CORRESPONDENT.]

The opening sitting of the Miners' International Congress at Carlsbad on Monday was devoted to the presidential address of Mr. Robert Smillie and the election of officers and committees.

## Mr. Smillie's Address.

In his inaugural address, Mr. SMILLIE gave a comprehensive review of the position of the mining industry during the past year, dealing with the coal boom and the share of the prosperity obtained by the workers. At the outset, he said the present Congress was the most representative which had ever been held, and this year he welcomed especially the representatives of the Metalliferous Miners of America. During the past 12 months, he said, there had been a boom in the world's trade. That boom had already made its appearance previous to their Congress at Amsterdam a year ago, and the trade expansion had continued unchecked up to the present time, though signs were not now wanting that the highest point of the boom had been reached. He had failed to discover a single instance in which the employing class in any industry had voluntarily offered to share their increased gains with their employees. Special efforts had been made by the miners in several of the countries represented to secure for the workers a share of the increased prosperity in the shape of higher wages; but those claims had been entirely due to the fact that their labour was strongly and well organised. In Great Britain the workers had been successful not only in the mining industries, but also in other trades, in raising the wages of the wage-earners. The mine workers of Great Britain were more strongly organised to-day than they had ever been in their history. He could safely say that the present year would see an addition of upwards of 100,000 men to the ranks of the Miners' Federation of Great Britain. The leaders of the miners of Great Britain had taken advantage of the boom in trade to press forward demands for increased wages. Referring to the world-wide labour unrest, he said it was partially caused by the fact that the improvement in trade had given an opportunity to the workers of claiming and securing a small increase in wages, but it had much more far-reaching social causes for its inception and development. It arose from a deep-seated desire existing among the wage-earners to improve not only their immediate condition, but to have the opportunity of living a freer and less laborious life, for a higher standard of personal comfort and of recreation for themselves and for their wives and families, and for the means to make their latter years free from the carking care and anxiety which were too often the workers' fate. But over and above all this a world-wide movement was going on—it might be unconsciously—of the protest against the existing industrial conditions which conferred upon the small section of the community who happened to own the means of life in the shape of land and capital, the power to practically manipulate the working-class life of the nation in whatever direction they might desire.

After referring to the Belgian and South African strikes, Mr. Smillie said that Congress recognised fully the necessity for improved mining legislation in the interests of greater safety to the mining community. Perhaps nothing could be said which would prove more conclusively the advance which had been made in the standpoint from which these legislative matters were viewed than the action of the British Government during the present year. He finally referred to the attitude of the workers towards war, and said they must play an important part in securing international peace. The time must come when, face to face with the serious crisis which might threaten to involve two nations or more in death grips with each other, steps of a more determined nature must be taken to prevent war breaking out. That, he believed, could be done if the workers were really in earnest. There was sufficient strength in the organised labour movement of Great Britain, the continent of Europe and America to prevent any threatened war taking place by the calling of an International Congress, and the carrying of a resolution that all work would be stopped in the nations concerned until they agreed to arbitration.

Herr JAROLIN, president of the Austrian Miners' Organisation, welcomed the delegates on behalf of the Austrian miners, as did Herr WITTS, in the name of the organised workers of Western Bohemia, and Herr SCHAFFER, M.P.

Herr SACHSE (Germany) regretted that they could not report such good progress from Germany as had been reported from Great Britain. When the British miners were making such splendid progress with their fight of last year for a minimum wage, the German Miners' Organisation determined to take advantage of that movement to secure concessions, but, unfortunately, they were not united. The miners lost their fight, and the result had been that their organisation had gone down. The worst feature of their failure was that it had discouraged the workers, many of whom had joined the blackleg unions formed by the mine-owners. This was a system which the German mineowners had introduced from France. The German miners were unable to agree to the discussion of the question of peace and war, because if a resolution was passed by the Congress on that subject their trade union would be declared a political organisation, the names of their members would be

taken by the police, and no person under 18 could become a member of their union.

M. BARTUEL, France, said the French delegates appeared in the Congress this year split into two factions, but he spoke for the large majority of the French miners. He said it was a matter of regret that the German delegates had not the courage to face this situation. Whether legally or not, the Miners' International Congress had discussed war, and passed a resolution binding the executive to call a congress in the event of war, to prevent it by a general strike.

M. CALLEWART, M.P. (Belgium), said that in Belgium the cause of trade union activity was progressing very well. All the miners were not in the union, but when there was a strike miners who were not trade unionists marched hand-in-hand with those who were trade unionists.

Herr ELFFERS (Holland) said that at the last general election in Holland 149,000 electors out of half-a-million voted the "red ticket," as the Labour and Socialist party was known. They had been working with the Liberal Government, and there was to be a meeting of the Socialist Democratic party on Sunday next to decide whether they should accept the invitation of the Liberal Government to give three seats in the Cabinet to the Labour party.

Herr CINGER (Austria) presided over Tuesday's session. Mr. HERBERT SMITH (Yorkshire) was British vice-president.

## Eight Hours from Bank to Bank.

Mr. W. ADAMSON, M.P. (Scotland) proposed that steps be taken to hasten the realisation of an eight hours working day from bank to bank for all workers underground, that an interval of 16 hours be made obligatory between shifts, and that the maximum shifts to be worked must not exceed six in each week. He was pleased to realise that with the exception of men working in hot and wet places, this resolution presented the united demand of the whole of the miners represented at the International Congress. As regarded Great Britain, he said the Mines Hours Act of 1908 gave them an eight hours working day, exclusive, however, of the time occupied in descending the mine and getting to the working place and returning to the surface. The eight hours law had been so loosely drafted that it gave the opportunity to the mineowner and the workman who desired to evade it more easily than they liked.

Herr DOUBIEL (German Poles) said the working hours in his district were supposed to be nine hours, but the men were compelled to work a shift and a-half, or 13 hours. For the nine hours day hewers were paid 4s. 2d., and the other underground workers 3s. 4d.

Herr JAROLIN (Austria) said, as the result of a strike in 1902, the Austrian Parliament was compelled to reduce the hours worked in Austrian mines to nine hours per day. Since that time no further progress had been made in the reduction of hours in Austria. Recently the Labour members had presented Bills for the further reduction of the hours of labour in mines, but he feared those Bills had but little chance of passing into law. That nine hours' work in hot and wet mines was ruinous to health was shown by the figures of sickness insurance. There were mining districts in Austria where with every hundred workers employed there were from 80 to 111 cases of illness every year; in other words, every worker was ill, and many on the funds more than once in the course of a year.

The resolution was carried unanimously; and it was also agreed that in hot or wet places the hours of labour must not exceed a maximum of six hours from bank to bank.

## Representation at the Congress.

Mr. D. WATTS MORGAN, South Wales, presented the report of the Credential Committee on the representation at the conference, which numbers 1,383,000:—

	No. of delegates.	No. of men in union.
Great Britain .....	72	603,000
Germany .....	22	175,000
France .....	15	60,000
Belgium .....	7	40,400
Holland .....	1	1,000
American mineworkers .....	3	500,000
Austria .....	28	14,620

## Mining Laws.

Mr. W. E. HARVEY, M.P. (Derbyshire) gave an address on the need for legislative protection of life and limb on the following resolution from Germany, Austria, and Holland:—

"In view of the numerous mining catastrophes which have happened in recent years, and the continually increasing number of separate accidents in the mining industry, this Congress demands again, and urgently, better protection for the life and limb of the miners. In order to bring about that better protection, the appointment of miners' inspectors who are elected by the miners from their own ranks by secret and direct ballot, and are paid by the State, is held to be urgently necessary by this Congress."

Mr. Harvey said in Great Britain they had succeeded in passing a new Mines Regulation Act which had come into operation, and they were hopeful that this would be the means of cutting down the death-rate, and considerably lessening the number of non-fatal accidents. One of the serious matters which had troubled the miners in Great Britain in recent years had been the use of electricity in mines. The owners had introduced electricity into the

mines for the sole purpose of increasing profits, though it was common knowledge that one, if not two big explosions were traceable to the use of electricity.

Mr. DUNCAN MACDONALD (American Mine Workers) said that in the United States, in the non-union districts, 12 men out of every 1,000 working were killed in the course of a year, while the death-rate was only 3.75 out of every 1,000 in the best organised districts.

The resolution was unanimously adopted.

## Regulation of Output.

For some years the Continental miners have pressed proposals upon the International Congress for the adoption of an international plan for the regulation of the output of coal, for the avowed purpose of maintaining wages at a uniform level by restricting the supply to the actual market demands. The report and proposals for a definite scheme decided upon by the Amsterdam Congress have been prepared for discussion at Carlsbad. The reports of the various nationalities clearly indicate the failure of the ambitious but impracticable proposals of the Continental miners. The British report points out the difficulties in the way of anything like a workable scheme, and puts forward the suggestion of a five days working week. This report was prepared previous to the ballot of the workmen, which showed a majority in favour of the proposal, but insufficient in number to put it into operation. The French miners favour the principle of the British proposal; Belgium also puts forward a number of suggestions, including an annual holiday, with payment of wages. America, Austria, and Germany all fail to put forward any proposals for restriction of output. It is obvious, from the character of the report, that the Congress can take no action on the proposal for an international scheme of restricting the output of coal.

On Wednesday Mr. THOS. ASHTON, for the Miners' Federation of Great Britain, presented the following proposals for draft scheme for the regulation of the output of coal:—

"There are various systems that might be put into operation for regulating the output; but unless some system of permanent uniformity can be adopted, it is not likely to be successful.

"The output cannot be successfully regulated by strikes. I am afraid that our brethren on the Continent would find a difficulty in getting all their men out and keeping them out for a week or a fortnight; and unless we could get all the men out and keep them out for that length of time, the International Committee decided the strike or stoppage would be a failure.

"The most perfect system that could be adopted would be a uniform working day of not more than eight hours and a working week of not more than five days. In the summer months in Great Britain a large number of the pits work only three or four days a week, while others are working six days. It is said that those pits that work full time all the year round regulate the contract selling prices, which detrimentally affect wages. Eight hours a day and five days a week would be fair all round to both the employer and workmen, and a week of five days is sufficiently long for men and boys to work underground.

"The miners of great Britain are being balloted on the question of the general adoption of a five days working week, and if the vote gives a fair majority in favour of a five-day policy, it will probably be adopted over the British coalfield. It must, however, be clearly understood that, even if a five days working policy were generally adopted internationally, though it might limit output for a time, it would not permanently regulate the supply of coal. The International Committee should have power to recommend at any time a reduction of working hours to four or three days a week for a period, and the miners' unions in the different countries should be strong enough to carry out the recommendation. This system, if adopted, would be better than a strike or the taking of a week's or a fortnight's holiday."

M. BARTUEL, the secretary of the French miners, reported that the execution of the plan proposed by their British comrades with regard to the five days a week working policy would result in a large reduction of the world's output of coal. The British proposal, which they adopted in principle, had the double advantage of both limiting the output and greatly diminishing the hours of labour in mines. In order to secure the efficacious action of this internationally organised working-class element it was necessary that the worker should find a direct advantage in the course to be pursued. That was to say, that it would diminish his hours of labour by one day per week, and that he would at the same time earn sufficient wages permitting him to live during the seven days of the week. That meant introducing or fixing a minimum wage equal to the wants of his existence during his working days and days of rest, according to the various districts. Their action must thus manifest itself in a joint demand comprising—

1. The five days working policy with an eight hours day
2. A minimum wage for these five days' work corresponding to the necessities of existence.
3. Joint and international solidarity in action until the demands of all have been satisfied.



Belgian report stated that annual holidays lasting a fortnight, a five days working week, simultaneous strikes in each of the countries, were all means which could be employed to attain their object. For the present it seemed that the best method of regulating the output of coal to meet the requirements of the world's consumers would be to apply—strictly, regularly and in its entirety—the law instituting an eight hours working day in mines with its corollary—a period of annual holidays, involving no loss of wages. In proportion as these reforms were applied, it would be possible to prevent the accumulation of stocks of coal, which was always prejudicial to the conditions of labour and wages of miners in every country.

The German miners' report gave details as to the output of coal and the conditions of the miners, but made no proposals for the limitation of output.

The Austrian miners' report considered it too soon to discuss this question of the output of coal. As long as the economic development had not reached the socialisation of the mines, they did not think it possible to solve the question of producing coal according to consumption in a lasting manner.

## FUEL FOR MOTOR VEHICLES.

### Spirit from Coal and Shale.

The subject of fuel for motor vehicles has been considered this week by the Imperial Motor Transport Conference, now being held in London. The first paper read was one on "Petrol Substitutes" by Sir Boverton Redwood and Prof. Vivian B. Lewes, in which they enumerated the only likely sources from which a substitute for petrol might be derived as being:—

1. Those portions of crude petroleum other than the petrol fraction;
2. Products of the destructive distillation of coal and shale; and
3. Products of fermentation.

Where oil existed it was usually accompanied by natural gas, which contained not only methane and traces of the other three gaseous members of the paraffin series, but also traces of the vapour of pentane and hexane; and a very important advance had been made in condensing these liquid hydrocarbons out of the natural gas instead of either letting them escape freely into the atmosphere or burning them for the creation of power. The process was still in its infancy and would undoubtedly be extended to all the oilfields, yielding a very important addition to the petrol supply. Much might yet be done in the direction of making carburettors better adapted for use with the heavier grades of petroleum products.

With the simple forms of hydrocarbons the process of cracking could unquestionably be employed with great success, and could be made to give an increase of between 30 and 40 per cent. in the lighter distillates. Attempts were also being made to utilise the catalytic action of nickel in various forms in bringing about a combination of hydrogen with hydrocarbons containing a high percentage of carbon, so as to produce distillates of sufficiently low boiling point to form motor spirit.

The idea of cracking had been extended during the past few months from heavy hydrocarbon oils to the distillates obtained from coal. The higher temperature tar was "benzenoid" in its character, and could not be cracked profitably, and the only possible treatment for it for the production of motor spirit was to distil off the benzene and toluene, which were the valuable portions for this purpose, and then to take the oil fractions and distil them through a column of red hot coke, when a small additional quantity of benzene and toluene was formed by the decomposition of the carbolic and cresylic acids in contact with the carbon surface. The cost of doing this, however, would be prohibitive, and only the fractions distilling from the tar direct could be reckoned upon. Although something like 15 million tons of coal were carbonised annually for gasmaking in this country, it was only the largest works that distilled their tar, and the quantity available for motor spirit would be only about 50,000 gallons per annum.

With vertical retorts a large percentage of the tar was distilled at a lower temperature and became more paraffinoid in character, a slightly larger fraction being fitted for motor spirit; but at present such tars were generally mixed with those from horizontal retorts and were not available for separate distillation. Coke-oven tar was also of this character, and by scrubbing the gas with heavy oil to wash out the benzene vapour and distilling the tar as much as 3 gallons of distillate fitted for use as motor spirit could be obtained per ton of coal.

True low-temperature tars of the character yielded by destructive distillation below 500 degs. Cent. were even more paraffinoid in character, and several processes had been brought forward lately for which it was claimed that about 3 gallons of motor spirit could be obtained by direct distillation of the tar from a ton of coal, and a further 2 to 5 gallons by cracking the naphtha distillates from the tar. The claim was a somewhat doubtful one, and it was remembered that although there might be a few in this country which, by careful treatment, fractionation, scrubbing of the gas, and cracking of the

suitable distillates, might be made to yield this quantity, the cost of treatment probably outweighed the advantages.

At the present time there was no commercial process working on a large scale which would yield more than the 3 gallons per ton of coal carbonised that could be obtained from coke-oven practice, and the total amount of benzene so recovered would amount to about 8 million gallons per annum, a large proportion of which was exported. Much might be done in the direction of replacing the beehive coking ovens by recovery ovens, but as matters at present stood the amount of benzene available was so small that any large demand would cause it to rise in price even more rapidly than petrol had done.

The Scottish shale oil industry was another source from which motor spirit might be obtained, but the 600,000 gallons which represented the annual output of distillates fitted for this purpose was only about 0.75 per cent. of the total petrol used last year, and a considerable proportion of it was marketed for solvent purposes. The heavier portions of the shale oil, however, lent themselves to cracking purposes, so that unless these fractions were all absorbed for fuel oil they might in the future prove a source of supply.

The authors concluded that any petrol substitutes made from petroleum, coal, or shale were obtainable only in limited quantity, for in each case the store of raw material was in process of depletion. On the other hand, alcohol was a motor spirit which could be continuously manufactured in any required quantity, and if the Imperial Motor Transport Conference only realised this fact and used its influence in the first place to stimulate the designing of an engine and carburettor best fitted for use with this liquid, and, secondly, to induce the Government to give the necessary facilities for the manufacture and use of methylated spirit for the purpose, it would have done much towards giving this country a home-produced source of power of which no foreign entanglements could rob us.

In a paper on the supply of hydrocarbon motor fuels, Mr. W. J. A. Butterfield pointed out that the range of temperatures of volatilisation or distillation of the several components was perhaps the most important factor in judging the fitness of a mixture of hydrocarbons for use as motor fuel, and this range did not depend on the series to which the hydrocarbons belonged. A commercial benzol might fractionate on distillation exactly as a standard grade of petrol. Hence all potential sources of supply of hydrocarbons of the requisite degree of volatility must be considered in this connection, irrespective of the series or class to which the hydrocarbons belonged. The components of any motor spirit must, however, include only limited quantities of sulphur and nitrogen compounds, since these compounds yielded on combustion products which attacked or corroded steel and most other metals, and were offensive in smell.

There were two sources of motor spirit in regard to which the British Empire was fairly well supplied with raw material. These raw materials were oil shale and bituminous coal and cannel. From both these materials motor spirit might be manufactured, and it became purely a question of the disposal for a reasonable return of the other products of the manufacturing process, whether such motor spirit could be put on the market in large quantities at a price comparable with that of imported petrol. It should be remembered that the production of motor spirit from shale or coal, or from any shale or coal products, was a manufacturing process of which the motor spirit could be only a minor product in respect of both quantity and value.

Oil shales occurred in a few parts of England and Wales, in Newfoundland, New South Wales, New Zealand, Nova Scotia, Queensland, Scotland, South Africa and Tasmania, and they were worked on a large scale for the production of oil in New South Wales and Scotland. With most Scotch crude oils it did not seem difficult to obtain, by processes which could be applied on a manufacturing scale, a yield of motor spirit amounting to 40 per cent. of the volume of crude oil treated, and there was no doubt that most other crude shale oils, by suitable modification of the cracking process, could be made to give a similar yield. Improvements in the cracking process, some of which were already in the laboratory stage, would undoubtedly result in a considerably higher yield being obtainable. Whether motor spirit could be manufactured from shale oil at a sufficiently low cost depended chiefly on the net cost of production of the crude oil from the shale, and this was largely governed by the yield of ammonia in the process. At present the Scotch shale distilleries obtained a yield of 12 lb. to 15 lb. of sulphate of ammonia per ton of shale distilled. The yield of crude oil was 25 to 30 gallons per ton. It might be said generally that shale working would be remunerative only if, when the yield of crude oil was less than that obtained in Scotland, the yield of sulphate of ammonia was considerably increased, and *vice versa*. Hence it might be predicted that shale as a source of motor spirit could be utilised only when the shale either, as in the case of the New South Wales mineral, was extremely rich in oil, or, as in the case of the Lothian shales, contained a sufficiency of combined nitrogen from which a large yield of ammonia was realisable. The cracking of native petroleum residues for the production of motor spirit was a matter which should receive serious consideration in Canada, the East Indies, and Egypt.

As the British Dominions had, perhaps, more of the world's deposits of bituminous coal than corresponded with their area, schemes for the production of motor spirit from bituminous coal and cannel were of special interest in this connection. The amount of motor spirit recoverable from coal gas depended partly on the quality of the coal carbonised and partly on the temperature and mode of carbonisation; but where both these were favourable to a yield of as much as 2½ to 3 gallons of motor spirit per ton of coal carbonised, there appeared to be sufficient margin of profit and advantage to the larger gas undertakings and their gas consumers to warrant the recovery of motor spirit from town gas. In most cases some fresh legislative authority would have to be sought and obtained before the change in quality of the gas, which the recovery of motor spirit would entail, could be made. On the other hand, there was very little obstacle beyond the necessary capital expenditure on recovery plant to the general extraction of motor spirit from coke oven gas. Generally speaking, the motor spirit recoverable from coke oven gas and town gas would closely resemble commercial 50 per cent. benzol.

The tar produced in the carbonisation of coal on gasworks and in coke ovens contained a relatively very small proportion of highly volatile constituents which could be utilised as motor spirit. The motor spirit recoverable from gasworks and coke-oven tar (as distinct from the motor spirit which might be extracted by special means from the gas) would not amount to more than 0.1 to 0.2 gallon per ton of coal carbonised. The remaining constituents (i.e., tar, oils, pitch, &c.) of ordinary coal tar, being themselves high-temperature products, did not yield by cracking any appreciable quantity of highly volatile oils which would serve as motor spirit. Many schemes had been propounded for carbonising coal in a manner which would give a tar containing a much higher quantity of constituents of the nature of motor spirit. The commercial success of schemes for the low temperature carbonisation of coal depended, however, only to a limited extent on the possible returns from motor spirit. The semi-coke or smokeless fuel produced at the same time must have a market value per ton at the point of production not less than about 75 per cent. of the market value at the same spot of a ton of good quality large coal, while the plant for the low temperature carbonisation must admit of the coal and semi-coke being handled throughout by mechanical means, and the process and the coal carbonised must be such that a yield of not less than 25 lb. of sulphate of ammonia per ton of coal was obtainable. It was only in conditions substantially such as those indicated that schemes for the production of motor spirit by the low temperature carbonisation of coal were likely to prove commercial successes.

As regards the quantities of motor spirit required, and the possible yields from certain sources, it had been estimated that about 100 million gallons of motor spirit were now being consumed in the United Kingdom alone in a year, and this quantity would increase rapidly for some time to come. The motor spirit recoverable from coal tar was trifling in quantity, and a large proportion of it was required as benzol in chemical industries. The extraction of benzol or motor spirit from all the coke-oven gas in the United Kingdom should give, on the basis of about 2 gallons per ton of coal coked, about 30 million gallons of motor spirit per annum. The stripping of coal gas in the larger gasworks alone should give a yield of about 30 million gallons of motor spirit per annum. The oil shale at present quarried in the United Kingdom—viz., about 3 million tons per annum—should be capable, by suitable cracking of the crude shale oil, of yielding about 30 million gallons of motor spirit. The production of this motor spirit from the shale at present quarried would mean the diversion of the latter from its present purposes, but there seemed no reason why, if the cracking processes proved economical when worked on a large scale, greatly increased quantities of oil shale should not be worked. The feasibility of obtaining supplies of motor spirit by the low temperature carbonisation of coal must depend entirely on the local market values of coal, semi-coke, and sulphate of ammonia.

Broadly speaking, coal could be regarded as a raw material for the production of motor spirit only to the extent to which local markets could be found for gas and gas coke, for metallurgical coke, or for semi-coke or smokeless fuel. For the further quantities required of motor spirit of a hydrocarbon nature petroleum and oil shale must be depended upon.

**Llandrindod Coal Company Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire and take over as a going concern the business of coal merchants, lately carried on by D. Meredith at Station Yard, Llandrindod Wells, Radnor, under the style of C. E. Weaver, Price and Son. First directors, D. Meredith, Somerset House, Newbridge-on-Wye; W. R. V. Morgan, Westdene, Llandrindod Wells.

**Cost of Shaft-sinking on the Rand.**—The City Deep have started to sink a circular shaft 18 ft. in diameter to a depth of 2,300 ft., the estimated cost being £70,000, spread over two years. The new Modderfontein shaft, which is of similar type, reaches a depth of 2,258 ft., the cost being £14 9s. 5d. per foot for sinking, and £7 12s. 2d. per foot for bricking. The new City shaft is being sunk purely for the purpose of improving the underground ventilation.



## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### EMERGENCY RESCUE APPARATUS.

SIR,—With reference to the death of Capt. Ramsay at Benwell recently while engaged in rescue work, there is no doubt that all the party should have seen that the oxygen valves were kept open, and that the apparatus was feeding properly. It is also believed that the bird was alive; if so, why was not the mouthpiece pulled out of the man's mouth, because if the bird could live, the man could also. The gauge on an apparatus will not register unless the oxygen valve is open, proving that the valve must be open to show whether the oxygen cylinders are full or empty. What ought to have been at hand, in my opinion, was an emergency apparatus; so that if the apparatus worn by the men should go wrong the mouthpiece of the wearer could have been pulled out and the small emergency one applied. This small appliance can be instantly attached to one of the spare cylinders carried by the team. The whole thing is so simple and is of the utmost importance in rescue work, and further, if an accident should take place in a mine and a rescue team went down and found men alive, this small apparatus could quickly be put on and the man brought back through the gas to the base. It would also be useful for sewage work or for exploring old workings.

I trust that you will publish this letter, so that the attention of mine managers and all those in charge of rescue stations and rescue work may be called to it. This letter is written on behalf of the No. 1 Oxcroft rescue team, and you will find enclosed a photograph of the emergency apparatus, showing it fixed on a man. All teams trained at the Mansfield rescue station have to be well able to apply this to each other in the training gallery without the man being subjected to any ill-effects from the sulphurous fumes. The ordinary apparatus used is the "Meco," the feed being constant and adjustable at will by a small adjustable screw. A plentiful supply of oxygen is obtainable, whether working hard or not, whilst the apparatus is very cool.

D. MILNER.

(No. 1 Oxcroft Rescue Team.)

136, North-road, Clowne.

[We have much pleasure in printing the above letter, as we believe that much advantage is to be derived from eliciting the views of men who have had

Mining Engineering Company Limited, of Sheffield. The appliance, which will sustain the wearer for 20 to 30 minutes, is supplied in two types. The mouthpiece type, when attached to the double cylinders, as normally used in the "Meco" apparatus, will last for a period of 1½ hours. The nose-clip of the larger apparatus can be used, or a nose-clip supplied with the emergency outfit. A face mask type is also supplied for use by individuals unaccustomed to the use of a mouthpiece. Either type, when used as a self-control unit, is equipped with a small oxygen cylinder slung over the shoulder, the apparatus itself being stowed, when not in use, in a tin case, also slung by a strap across the shoulders. The apparatus consists of a special fitting which is attached to the mouthpiece or the face mask. On this is placed a bag into which the oxygen is admitted at intervals as required. A small excess valve is placed on the fitting, which relieves any excess pressure, and at each exhalation allows a small percentage of the exhaled gases to pass into the atmosphere. The excess valve being of the non-return type, the supply of breathable air available in the oxygen bag is gradually diminished, but upon the wearer noticing that the bag is deflated, he turns on the oxygen valve for a fraction of a second, re-inflating the bag, the supply then being sufficient for another period. The cost of the nose-clip type is £4 5s., and of the face-mask type £4 10s., the oxygen cylinder costing £1 15s. extra.—ED. C.G.]

### MINING AND OTHER NOTES.

An enquiry has been held at Dover by the Light Railway Commissioners with reference to certain extensions by the East Kent Light Railways Company.

In recognition of the bravery of the iron ore miner, John Cairns, of Cleator Moor, at the time of the flooding of the Townhead Mine, Cumberland, he is to be awarded the Edward Medal of the second class.

The eighth annual ambulance competition for the Normanton and District Subscription Challenge Cup for senior teams and for the rose bowl presented by Dr. E. P. Pickersgill for junior teams, took place at Normanton on Saturday. The winners were:—Senior teams: Pope and Pearsons, West Riding Collieries, Altofts. Junior teams: Locke and Co., Newland Colliery No. 3. A. Coulthard, Snydale Colliery, was presented with a gold centre silver medal for the highest number of marks in the individual tests.

Members of the Yorkshire branch of the Association of Mining Electrical Engineers paid a visit on Saturday afternoon to the new works of the Askern Coal and Iron Co. Limited. Sinking was commenced at the colliery in May 1911, two pits being put down, each 21 ft. 6 in. in diameter in the clear. The Barnsley bed was reached at a depth of 568 yards—or 100 yards inside anticipations—in September last. Whilst the Barnsley bed is being developed, the downcast shaft is now being sunk to the Parkgate seam, which is estimated to be at a depth of 820 yards. An excellent deep soft 3 ft. 4 in. seam was passed through at 723 yards. Both shafts are intended for winding coal, and each is equal to dealing with an output up to 4,000 tons per day. The electrical generating sets consist of two Browett-Lindley engines coupled to 250-kw. three-phase 500-volt 50-cycle Westinghouse alternators, with direct-connected exciters, the sets running at 375 revolutions per minute.

At a meeting of the Railway Committee of the Newcastle Chamber of Commerce, a discussion took place on the demurrage question, and the secretary reported that no reply had been received from the railway companies in regard to the points placed before their goods managers at the Board of Trade conference on May 7 last. It was resolved to send a protest against these delays to the Board of Trade, and to the Railway Clearing House, and to press the point that in the case of goods of one ton and upward not arriving at their destination within one to four days, according to distance, the companies should be liable for demurrage at a fixed rate. The committee were of the opinion that, sooner or later, an enquiry into the subject of railway rates and charges will be necessary in accordance with the promise made some time ago by the Chancellor of the Exchequer.

At the Chisnall Hall Collieries, Coppull, belonging to Messrs. the Pearson and Knowles Coal and Iron Company Limited, there have recently been erected a large pair of air-compressing engines. The engines are of the horizontal non-compound two-stage type, with steam cylinders 26 in. diameter, and air-compressing cylinders 25 in. by 38 in. diameter. The valve gear is of the Meyer type, and controlled by a powerful governor of the centrifugal type, and also by an air-pressure governor in connection with the main air receiver. These engines are designed to compress 3,000 cubic feet of air per minute to a pressure of 60 lb. per square inch, for the purpose of driving the coal-cutting machinery underground. The makers are Messrs. John Wood and Sons, Wigan. At the inaugural ceremony last week Mrs. Harwood-Banner turned the steam into the engines and started them.

The Right Hon. the Earl of Plymouth has recently consented to succeed the Earl of Durham in the presidency of the Coal Trade Benevolent Association in 1914.

The council of the Royal Society of Arts attended at Buckingham Palace last Friday morning, when his Royal Highness the Duke of Connaught, president of the society, presented to his Majesty the King, for nine years president and now patron of the society, the society's Albert Medal for the present year, "in respectful recognition of his Majesty's untiring efforts to make himself personally acquainted with the social and economical conditions of the various parts of his Dominions, and to promote the progress of arts, manufactures and commerce in the United Kingdom and throughout the British Empire."

At a gathering of workmen held in the Masonic Hall, Wishaw, Mr. James Sneddon, manager of Chapel Colliery, was presented with several handsome gifts for himself and his wife, on the occasion of his leaving to fill an important appointment in England. Mr. Sneddon was presented with a travelling bag and a purse of sovereigns, while Mrs. Sneddon was gifted with a lady's handbag.

The coroner for the Doncaster division, holding an inquest at Bentley last week upon a miner who was killed by a fall of roof, made some pertinent remarks upon the frequency of such fatalities in coalpits. The jury concurred and recommended that when ripping is going on, a prop should be placed in the centre of the road to prevent falls of roof.

Messrs. the Roburite Explosives Company Limited, of Gathurst, near Wigan, inform us that they have acquired the business of the Ammonal Explosives (1908) Limited, of 29, Great St. Helen's, London, E.C., as from July 1, 1913, and the title of the company has been altered to "Roburite and Ammonal Limited."

Mr. Frederick Derbyshire, a mining surveyor, on the Earl of Ellesmere's staff at the Bridgewater offices, Walkden, Lancs, has been appointed mining surveyor to the Wingham and Stour Valley Colliery Company who are sinking two collieries in the Wingham district of Kent. Mr. Derbyshire has been at the Bridgewater collieries 4½ years, and was formerly with the Moss Hall Colliery Company in the Wigan area.

A correspondent says the Bryn Hall Colliery Company are opening out new places and effecting other improvements at their Countess-lane pits, Radcliffe, near Manchester, and the output is being increased.

Messrs. U. A. Ritson and Son Limited have notified the Tynemouth Corporation of their intention to work coal under and adjoining the Billy Mill reservoirs.

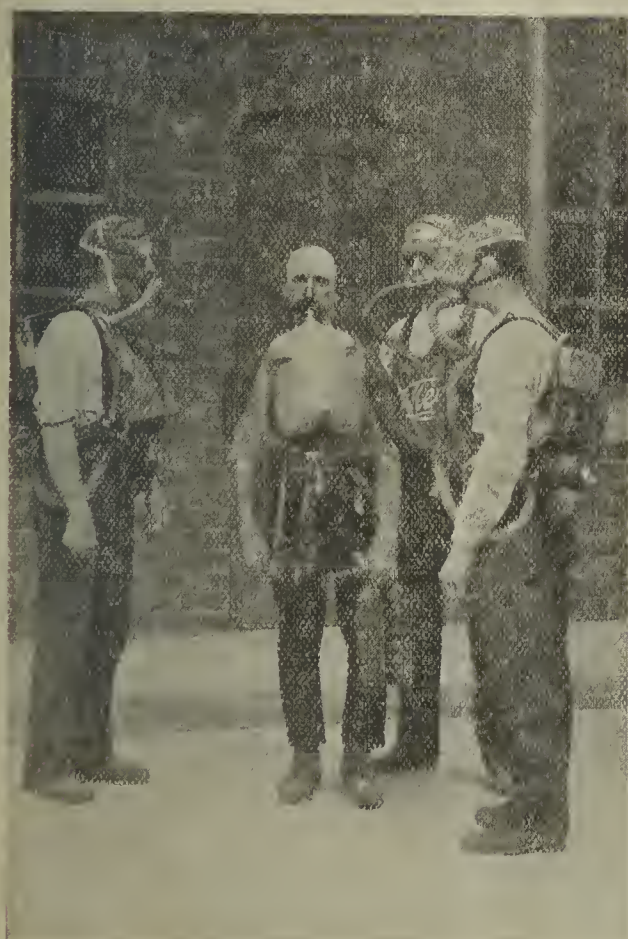
The prospectus of the Nottingham University College for 1913-14, which has just been issued, is divided into two parts, the first having reference to day classes, and the second to evening classes. The organised day courses prepare for Nottingham University College diplomas in commerce, engineering, mining and mine surveying, and colliery managers' certificates. The evening classes, for which the small fee of 7s. 6d. for the season is charged, prepares, amongst other subjects, for the colliery managers' and mine deputies' certificates. The college has of late extended very considerably the facilities for study in mining matters, and when the full university charter is obtained the engineering and mining sides of the work will be further extended.

Mr. L. A. P. Warner has been promoted from the post of goods manager of the Liverpool district for the London and North-Western Railway Company to a higher post at Manchester for the same company. He is to be succeeded at Liverpool by Mr. T. G. Phizackerley, who for some time has been manager of the traffic department of the Chester district, on the removal of Mr. Warner from Chester to Liverpool.

The Halkyn Mines Bill, which has now been passed by Parliament, provides for the construction of a new drainage tunnel, to be joined to the existing tunnel of the Holywell Tunnel Company, which will enable the water to be drained from mines at a much lower level than it has been able to drain them hitherto. The effect of this will be the opening of a number of new mines in the district, the employment of additional labour, and the development of the mineral wealth of the locality. Leadmining has been carried on at Flint since the time of the Romans.

Amongst the contracts recently closed by Ed. Bennis and Company Limited, of Little Hulton, Bolton, are the following:—Stanton Ironworks Company's Collieries Limited, Teversal, near Mansfield (two "Bennis" high-duty smokeless and gritless coking stokers and self-cleaning compressed air furnaces); the Clifton and Kersley Coal Company Limited, Wet Earth Colliery, Clifton, near Manchester (four "Bennis" furnaces, for hand-firing—repeat order); The Albion Clay Company Limited, Woodville, Burton-on-Trent (four "Bennis" stokers and self-cleaning compressed air furnaces—repeat order). The Southend-on-Sea Corporation Light Railway and Electricity Department have ordered a complete Bennis coal handling plant, consisting of bucket elevator, chain conveyor, coal storage bunkers, &c.

Messrs. Armstrong, Whitworth and Co. have purchased upwards of 900 acres near the River Ouse and the Selby and Goole Railway. The land, which formerly formed part of the Earl of Londesborough's estate, is to be used for the erection of steelworks, which are to give employment for 1,000 men.



practical experience of breathing appliances, and at the same time have no incentive to advertise the claims of any particular type. The photograph, which is reproduced herewith, shows the standard "Meco" apparatus and the emergency apparatus. This, the "Huskisson Emergency Self-rescue Apparatus," it may be mentioned, is also made by the



## THE COAL AND IRON TRADES.

THURSDAY, JULY 24.

## Scotland.—Western District.

## COAL.

Business in the coal trade has been very considerably curtailed this week owing to holidays and strikes. Shipments in the Clyde were comparatively good, amounting to 107,080 tons, compared with 106,183 in the preceding week and 72,620 in the corresponding week of last year. At Glasgow the deliveries were heavy, as many vessels clearing as possible owing to the holidays, and, of course, in the last day or two business has been very quiet. The clearances at the lower Clyde ports have been at Bowling 465 tons, Greenock 1,692, Ardrossan 3,108, Troon 5,913, Irvine 3,074, and Ayr 17,771 tons.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	12/ to 14/6	11/9 to 14/
Ell .....	12/6 to 13/	12/ to 12/6
Splint .....	12/9 to 15/	12/9 to 14/6
Treble nuts .....	12/6 to 12/9	12/ to 12/6
Double do. ....	11/6 to 11/9	11/9 to 12/
Single do. ....	11/3 to 11/6	11/3 to 11/6

## IRON.

The Glasgow iron market was closed for the holidays till Tuesday morning, after having passed through a very quiet week. Advices from abroad were somewhat doubtful, but as stocks continued to decrease sellers had a firmer attitude, and prices rose a few pence per ton. There is nothing like any considerable demand owing to the holiday season. Consumers in Scotland are not using Cleveland iron at the moment, and there seems to be the tendency to hold off as much as possible. Scotch pig iron is also very quiet, as the consumers' works are all closed. There are 88 furnaces in blast in Scotland, compared with 87 at this time last year, but most of the iron is going into store for the present. English hematite is quoted 72s. 6d. f.o.b. and Scotch hematite 79s. 6d. for delivery at the steelworks.

## Scotland.—Eastern District.

## COAL.

The shipping trade from the Forth has continued in a deplorable condition, owing to the strike of seamen and dock labourers. Ten important collieries in the district are entirely closed, and at others the produce of the mines is going into stores. Riots have been of daily occurrence, and both ingoing and outgoing traffic is held up, so that great damage is done to trade. The shipments of coal at Grangemouth in the past week reached 46,000 tons, Granton 2,818, Leith 639, B'nness 14,367—total 63,824, compared with 65,657 in the preceding week, and 101,829 tons in the corresponding week of last year. Owing to the disturbed state of the district, prices are nominal.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	12/9 to 13/	12/9 to 13/
Secondary qualities .....	11/9 to 12/	11/9 to 12/
Treble nuts .....	13/	12/6 to 13/
Double do. ....	12/ to 12/6	12/ to 12/6
Single do. ....	13/3 to 13/6	11/3 to 11/6

There has been a very active business lately in the Fife coal trade. All kinds of coal have shared in the activity and there is now a holiday feeling in the district. It is not expected, however, that this will last long.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/9 to 17/	16/9 to 17/
Unscreened do. ....	14/6 to 15/	14/6 to 15/
First-class steam coal .....	14/3 to 15/	14/3 to 15/
Third-class do. ....	11/6 to 12/9	11/6 to 12/9
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/9 to 13/3	12/9 to 13/3
Single do. ....	11/6 to 11/9	11/6 to 11/9

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 134,262 tons of coal and 2,341 tons of coke were despatched from Tyne Dock, a decrease of 11,874 tons of coal and an increase of 946 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 63,572 tons of coal and 757 tons of coke, a decrease of 4,547 tons of coal and 543 tons of coke. The Blyth shipments aggregated 85,063 tons of coal and coke, a decrease of 3,910 tons. The Christiania Gasworks, which recently invited tenders of 45,000 tons of gas coal for delivery over the ensuing 12 months, has contracted for 20,000 tons of Holmside coal at 13s. 6d. per ton, f.o.b., 5,000 tons Consett at 13s. 3d., 5,000 tons Easington at 13s. 8½d. and 5,000 tons Londonderry at 13s. 9d., leaving 10,000 tons still to be arranged for. The Holmside quantity is to be furnished by three Newcastle firms. The contract prices are considerably under those quoted by the collieries, and the business therefore appears to be somewhat of a speculative character. The contract to supply the La Rochelle Gasworks with 25,000 tons of gas coal over 12 months from October has been placed with local merchants for Tyne primes at, it is stated, 17s. 10½d. per ton, c.i.f., a price which is estimated to leave rather under 12s. 6d. per ton, f.o.b. The Altos Hornos Ironworks, Bilbao, are reported to have placed an order for Durham unscreened coking coal. The coals are to be shipped over the next 12 months. f.o.b. prices are stated at from 13s. to 14s. 6d. per ton, a compromise on the 12s. 6d. originally asked for, and the 13s. 6d. asked by the sellers.

A contract for 100,000 tons of best coking coal has been arranged, delivered next month, at 13s. 6d. per ton f.o.b. German coking coal, by the way, is stated to be offering freely on the Continent for next year's delivery at lower prices than are quoted for the British product, and it is stated that two Continental orders for which local merchants tendered have been secured by Germany. Some 13,000 tons of ordinary unscreened Durham bunkers, for delivery over the next 12 months, are stated to have been sold at a little over 12s. per ton f.o.b. For delivery over next year similar fuel is said to have been sold at 12s. f.o.b. Gas bests for delivery over 1914 are stated to have been sold by merchants at about 12s. 6d. f.o.b., and seconds at from 11s. 6d. to 11s. 9d.—prices which are somewhat below the colliery quotations for shipment over that period. A contract for 80,000 tons of Durham gasseconds for shipment to Genoa over next year has been arranged at 19s. 3d. per ton c.i.f. The Paris Gasworks, which have been making quiet enquiries as to supplies over next year, are stated to have decided to postpone purchasing at present. The Windau Railways invite immediate offers of 20,000 tons of best Newcastle steams for shipment to Windau from August to January, but excluding October. There is reported to be a strong enquiry for gas coals and other fuel for Italy, where the shortage is rather considerable. Steam coals are rather stronger this week, gas coals easier, bunkers inclined to fall, and coke weaker. Other descriptions of fuel are substantially steady. The prompt coal market is quiet. F.o.b. quotations for prompt shipment have varied as follow during the week:—Best steams, Blyths, 3d. advanced; Tynes, stronger; Tynes, seconds, firmer; Blyth smalls, 3d. to 4½d. dearer; gas bests, 1½d. reduced; seconds, 3d. lower; specials, firmer; unscreened bunkers, Durhams, 3d. decreased; foundry coke, weaker; and gas coke, 6d. to 1s. 6d. declined. Fuel not specifically mentioned is unchanged. With the Scottish holidays now on, some diversion of orders for spot coal should be made in this direction.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	15/ to 15/3	15/
Do. Tynes (Bowers, &c.) .....	15/	14/9 to 15/
Secondary, Blyths .....	13/	13/
Do. Tynes (Hastings or West Hartleys) .....	13/3 to 13/6	13/ to 13/6
Unscreened .....	11/9 to 12/6	11/9 to 12/6
Small, Blyths .....	9/6 to 9/9	9/3 to 9/4½
Do. Tynes .....	8/	7/9 to 8/
Do. specials .....	10/	10/
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	14/9 to 14/10½	14/10½ to 15/
Secondary gas coals (Pelaw Main or similar) ..	13/6 to 13/9	13/6 to 14/
Special gas coals .....	15/3 to 15/6	15/ to 15/6
Unscreened bunkers, Durhams	13/ to 14/	13/ to 14/3
Do. do. Northumbrians	12/ to 12/6	12/ to 12/6
Coking coals .....	13/6 to 13/9	13/6 to 13/9
Do. smalls .....	13/ to 13/6	13/ to 13/6
House coals .....	15/6	15/6
Coke, foundry .....	22/ to 24/	23/ to 24/
Do. blast-furnace .....	19/ to 20/	19/ to 20/
Do. gas .....	16/6 to 17/6	18/

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 93,045 tons of coal, and 395 tons of coke as compared with 94,900 tons of coal, and 985 tons of coke for the corresponding period of 1912, being a decrease of 1,855 tons of coal and 590 tons of coke. The coal market is inclined to be better; there is a fair amount of new enquiry circulating for prompt shipment, and this is helping to maintain recent prices. The gas trade is satisfactory, and there is a steady demand for bunker coals. Coking coals are also steady, but coke is on the weak side. Households are quiet. The Altos Hornos works, of Bilbao, are reported to have contracted for 80,000 tons of best Durham coking coals at 13s. f.o.b., delivery over twelve months. A contract is said to have been arranged for 60,000 tons of Durham second-class qualities, for Genoa, at 19s. 3d. c.i.f., shipment in monthly quantities over next year. The Christiania gasworks have contracted for 45,000 tons special Wear coals at 13s. 9d. to 14s. per ton f.o.b., the coals are to be shipped over twelve months. An enquiry is also circulating from the Windau railway authorities for 20,000 tons of best steams, to be delivered between August and January. Approximate quotations for shipment f.o.b. are as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/3 to 15/6	15/3
Secondary do. ....	13/6 to 14/	14/
House coals:—		
Best house coals .....	16/3	16/6
Ordinary do. ....	15/6	15/6
Other sorts:—		
Lambton screened .....	15/6	15/6
South Hetton do. ....	15/	15/3
Lambton unscreened .....	13/3	13/6
South Hetton do. ....	13/3	13/3
Do. treble nuts	16/6 to 16/9	16/6
Coking coals unscreened ..	13/9	13/6
Do. smalls .....	13/6	13/3
Smithies .....	13/6	13/
Peas and nuts .....	14/	14/
Best bunkers .....	14/ to 14/3	14/
Ordinary bunkers ..	13/ to 13/3	13/3
Coke:—		
Foundry coke .....	22/6	23/6
Blast-furnace coke (divd.)		
Teesside furnaces) .....	19/6 to 20/	20/
Gas coke .....	18/	18/

The freight market is quiet, and with more tonnage available the tendency is rather easy in all directions. Recent fixtures include:—Coasting: London 3s. 4½d., Havre 4s. 6d., Rouen 5s., Hamburg 3s. 9d. Bay: Lisbon 7s. 9d., Bilbao 7s. 6d., St. Nazaire 6s. 3d. Baltic: Cronstadt 5s., Reval 5s.,

Kotka 5s. 3d., Stettin 5s. 1½d., Malmo 5s. 3d., Odense 5s. 6d., Stockholm 4s. 10½d. Mediterranean: Genoa 9s. 3d., Naples 9s. 6d., Port Said 9s., Las Palmas 10s., and Rio 17s. 6d.

## Middlesbrough-on-Teess.

## COAL.

The fuel trade shows little change. There is more enquiry for gas coal, and deliveries are beginning to increase. Best Durham gas coal is in the neighbourhood of 15s. for early delivery, but second hands are understood to have made contracts over periods next year at 12s. 9d. f.o.b. For second qualities of gas coal the current rate runs from 13s. 6d. to 14s. f.o.b., but forward purchases over next year are possible at 11s. 9d. Bunker coal is a trifle easier, tonnage being rather less plentiful. Ordinary Durham bunkers are 13s. 3d. f.o.b., superiors 14s., and specials up to 15s. 6d. Household coal is quiet at about 15s. 3d. Coking coal is in good request, and the price is in the neighbourhood of 14s. Coke is coming down in value, and has already fallen to rates that cause makers to complain that cost of production barely leaves a profit. Local consumption is heavy. Average blastfurnace qualities are quoted at 19s. 6d. delivered at Teesside works, but that is now more a sellers' than a buyers' price. Foundry coke is put at 23s. f.o.b., and gas-house coke 16s. 6d.

## IRON.

The market is steady, so far as Cleveland pig is concerned. The position is somewhat strengthened by the rather better accounts from iron centres on the Continent and in America, but the trouble in the Balkans still interferes with business, and the transactions recorded are on only a limited scale, being for the most part confined to sales of small lots for early delivery. A 2s. reduction in Lincolnshire iron has had little effect upon the situation here. Production of pig in the Cleveland district is well taken up, and with demand to meet autumn needs expected, prospects must be regarded as brighter than they have been. No. 3 g.m.b. Cleveland pig is very firm at 56s. f.o.b.; No. 1 is 58s.; No. 4 foundry, 55s. 6d.; No. 4 forge, 55s.; and mottled and white iron, each 54s. 6d.—all for early delivery. A further reduction in east coast hematite pig has failed to bring in buyers, most of whom consider prices still too high, and the general opinion appears to be that a fall of 2s. more will have to occur before much business is likely to be done. Nos. 1, 2, and 3 are on sale at 72s. for either early or forward delivery. Foreign ore is lifeless, but sellers show no disposition to give way, and market quotations are still based on 20s. ex-ship Tees for rubio of 50 per cent. quality. Orders for manufactured iron and steel are very scarce indeed. As yet the only actual fall is one of 10s. for ship rivets, the price of which is now £9, but quotations for most other descriptions show a marked downward tendency, and reductions may be announced at any time.

## South-West Lancashire.

## COAL.

The demand for household coals for the inland trade for present consumption is quiet, but some amount of stocking is taking place where there are facilities for laying down stocks, and this is helping to keep up a fair summer trade. Good average quantities of screened coals are going into consumption for forges and other users of round fuels. There is little change to speak of in shipping. Bunkering requirements under contract show little or no falling off, and open-sale business is still quiet. Most collieries, however, are well placed as regards contracts, so that the absence of outside orders is not as much felt as it otherwise would be. Quotations for screened Lancashire steam coals range from about 13s. 3d. to 13s. 6d. f.o.b. for the cheaper qualities up to about 14s. f.o.b. for the very best, though in special cases spot lots might be obtained at some slight reduction. In the coastwise and cross-Channel trade the shipments of house coals continue very satisfactory and much above the usual July totals. Slacks get cleared away much as made. What little accumulates is either put to stock or else awaits broken time at the collieries to adjust itself.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/3	16/3
Do. (f.o.b. Garston, net)	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net)	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/3 to 14/	13/3 to 14/
Best slack .....	10/6	10/6
Secondary slack .....	9/9	9/9
Common do. ....	9/3	9/3

## South Lancashire and Cheshire

## COAL.

There was only a moderate attendance on the Coal Exchange on Tuesday. House coal is only in very poor demand. Furnace coal and coke are also easier in demand, with prices still unchanged. The demand for shipping coal is a little improved over that of last week. Slack still continues on the easy side with slight concessions being made here and there for present sale.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington)	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

## IRON.

There was a good attendance on 'Change in Manchester on Tuesday last, but very few buyers in evidence. The prices of pig iron remain unaltered. The majority of the forges are working short time, but are still asking £8 15s.



for crown bars, with second quality 10s. less, hoops £8 17s. 6d., sheets £9, less 2½ per cent., and are chiefly supplying against old contracts. Steelworks are fairly busy with bars at £8, less 2½ per cent., and billets £5 7s. 6d. nett. Engineers and wagon works very busy. Foundries fairly well off for orders.

### Yorkshire and Derbyshire.

Leeds.

#### COAL.

There was not a very large gathering on the Yorkshire Coal Exchange on Tuesday, and the market was featureless, except that there was a fairly ready outlet for prompt parcels of steam coal. It was reported that the pits had made better time this week, averaging almost five days' work. Empty wagons are somewhat more plentiful, and there has been an improvement in the transit of minerals.

**House Coal.**—Taken altogether the house coal trade for the time of the year is satisfactory. Business with the distant markets has shown further improvement on the week, and a fairly large tonnage of the best qualities is being bought in the open market. Further orders for stocking at the London depots are reported. One such concerns 4,000 tons of Silkstone house, which is said to have been sold at 11s. 6d. per ton at the pit. The coastwise trade is also rather brighter, but the demand in this department is for the very cheapest qualities, such as Silkstone cobbles, Beeston and Stanley main house coal and similar sorts. Freight is about the same as last week. In the West Yorkshire markets merchants are more fully employed, as the retail trade has improved. Pit prices are well maintained, and average as under:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

**Gas Coal.**—A good many additional acceptances are reported, and in each case it is said that the full 1s. per ton advance has been realised. It is reported that Bradford Corporation have bought nearly 200,000 tons this week at the official advance. The bulk of the business is said to have been placed with West Yorkshire pits, but a fair quantity has also been bought from the Barnsley district. The open market trade is quieter, the deliveries under the new contracts being now in full swing, and the pits are able to keep clear of siding stocks of these qualities.

**Manufacturing Fuel.**—Washed and ordinary nuts maintain recent prices, but all descriptions of slack are appreciably weaker. It is said that some collieries have offered clearances of slacks at 7s. 6d. per ton at the pit which three months ago realised 9s.

**Washed Furnace Coke.**—There is no improvement in this branch of the trade. Stocks are fairly plentiful, and the demand is, if anything, quieter than last week. No sales are reported from the Middlesbrough district, and there is also very little being sent to the Midlands. The demand from Frodingham and the local iron and steel works in the Leeds district is about an average. Open market sales are mentioned at 13s. 6d. per ton at the ovens, with special qualities at about 14s.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	14/ to 14/6	14/
Wallsend & London best	13/ to 13/6	13/ to 13/6
Silkstone best	13/3 to 14/	13/ to 13/6
Do. house	11/6 to 12/6	11/9 to 12/3
House nuts	11/ to 11/6	11/ to 11/6
Prices f.o.b. Hull:		
Haigh Moor best	16/6 to 17/3	16/ to 16/9
Silkstone best	15/6 to 16/	15/6 to 16/
Do. house	14/6 to 15/6	14/6 to 15/
Other qualities	14/ to 14/9	13/9 to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal	12/3 to 12/9	12/3 to 12/9
Gas nuts	11/6 to 12/6	11/6 to 12/6
Unscreened gas coal	10/6 to 11/	10/6 to 11/
Other sorts:—		
Prices at pit:		
Washed nuts	11/6 to 12/3	12/ to 12/6
Large double-screened engine nuts	11/ to 11/6	11/ to 11/6
Small nuts	10/ to 10/6	10/ to 10/9
Rough unscreened engine coal	10/ to 10/6	10/6 to 11/
Best rough slacks	8/ to 9/	8/6 to 9/3
Small do.	7/6 to 8/3	8/ to 8/6
Coking smalls	7/9 to 8/3	7/9 to 8/3
Coke:—		
Price at ovens:		
Furnace coke	13/6 to 14/	14/ to 14/6

#### COAL.

Although not of any material extent, there is some improvement in the export demand for steam and gas coal, not only for prompt delivery but also on forward account. Exporters are making stronger enquiry for supplies of the best hards, and there is every belief that a large bulk of this class of coal is required to supply contracts before the end of the shipping season. Sellers are able to maintain their prices and are seeking better figures to cover the next month. The market is also slightly firmer with regard to secondary descriptions of large steams, but although the demand for home purposes continues to be more than of an average character, there is a good deal of this class of fuel on offer on the market, which prevents values showing any substantial improvement. On the other hand, some indication of the extent of the business by way of Hull is shown by the fact that the railway companies are fully engaged, and in some cases more than this, in handling the traffic promptly. There has been no alteration during the week in respect to small fuel suitable for manufacturing purposes, and though the collieries generally continue to work full time, the output is a very extensive one. The consumption is being reduced, owing to various causes, including that of the stoppage of works for holidays and the restricted make of coke, and buyers again find prices somewhat unstable, although the best quality fuel pretty well made late quotations. The gas coal collieries are kept fully at work in the production of supplies to fulfil contracts, and a big bulk of fuel is going from this district for export to South America and the Continent. There is little extra

buying on current account. The house coal trade continues to be rather of a fluctuating character. Merchants report there is considerable difficulty in obtaining ready supplies of the best class of coal. Evidently orders are still being placed from London and the eastern counties for stocking purposes. This keeps values on a firm basis, although there is some competition prevailing in regard to other descriptions of house coal, largely due to the fact that these collieries are not putting down ground stocks. With regard to coke, the position becomes worse from the makers' point of view, although the output has been considerably reduced by the setting out of ovens. Prices continue to fall and stocks at the works are accumulating. There appears to be very little prospect at the present of buyers seeking to make contracts, and a further reduction in values appears to be almost inevitable.

#### Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone	14/6	14/6
Best Barnsley softs	14/	14/
Secondary do.	11/ to 13/	11/ to 13/
Best house nuts	12/ to 13/6	12/ to 13/6
Secondary do.	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals	13/ to 13/3	12/9 to 13/3
Secondary do.	12/ to 12/3	12/ to 12/3
Best washed nuts	12/	12/
Secondary do.	11/	11/
Best slack	8/9 to 9/	9/
Rough do.	8/ to 8/3	8/ to 8/3
Gas coals:—		
Screened gas coals	12/ to 12/6	12/ to 12/6
Gas nuts	11/ to 12/	11/ to 12/
Furnace coke	13/6	13/6

Hull.

#### COAL.

Business has ruled quiet, but values have been maintained, especially for steam hards. The dockers' strike, which terminated on Tuesday, did not interfere with the coal shipments at Hull, and in this respect the shippers were fortunate, as the export business is good; and there is good demand for abroad and coastwise.

#### Approximate prices for prompt shipment f.o.b. Hull, &c.

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards	16/3 to 16/6	16/3 to 16/6
Washed double-screened nuts	13/3 to 13/9	13/3 to 13/9
Unwashed double-screened nuts	13/	13/
Washed single-screened nuts	13/6 to 13/9	13/9 to 14/
Unwashed single-screened nuts	13/	13/
Washed smalls	10/6 to 10/9	11/
Unwashed smalls	9/ to 9/6	10/
West Yorkshire:—		
Hartleys	13/3 to 13/6	13/3 to 13/6
Rough slack	10/9 to 11/	10/9 to 11/
Pea slack	9/9	9/9
Best Silkstone screened gas coal	13/3 to 13/6	14/3
Best Silkstone unscreened gas coal	13/	13/ to 13/3
Derbyshire and Notts:—		
Best steam hards	15/6	15/6
Do. (Grimsby)	15/	15/ to 15/3
Derbyshire nuts (doubles)	13/6	13/6
Derbyshire nuts (doubles) (Grimsby)	13/ to 13/3	13/3
Derbyshire large nuts	14/3 to 14/6	14/6
Do. do. (Grimsby)	14/	14/
Nottinghamshire hards	15/6	15/6
Do. do. (Grimsby)	15/0	15/ to 15/3

The freight market has been quietly steady with rates to Cronstadt at 5s. to 5s. 3d. and Genoa 9s.

Chesterfield.

#### COAL.

The demand for house coal is, for the time of year, satisfactory, and orders are more numerous than they have been for some time past. Prices remain firm, and they will probably be advanced much earlier in the autumn than usual. Stocks are comparatively light. There is a full demand for coal for industrial purposes, and, when the holiday season is ended, there is every prospect of a renewed spell of activity in this branch of the trade. Cabbles and nuts for gas-producers continue in good request without any change in prices. Slack for steam-raising purposes is in quieter demand at the moment. This is due, in a great measure, to the reduced requirements of the Lancashire cotton industry, owing to the suspension of work at the mills caused by the operation of the local "wakes." In many cases the mills are closed for practically a week. With a resumption of work, the position with regard to slack will become much stronger, seeing that the production is already fully disposed of under contract, and that supplies are gradually becoming less, owing to the increasing needs of the colliery by-product plants, which consume so large a proportion of the output. Steam coal for locomotive purposes is in steady demand. The export trade is active, and heavy shipments are being made at Hull and Grimsby. For steam coal the demand is very brisk, and supplies are by no means equal to it. There is every prospect of a continuance of the present active condition of things until the close of the shipping season. Prices remain firm at 15s. 6d. to 16s. per ton, delivered free alongside steamer at Grimsby, for the best brands of Derbyshire Top Hards. Cabbles and nuts for near Continental ports

#### Prices at pit.

	Current prices.	Last week's prices.
Best house coals	14/6	14/6
Secondary do.	12/6	12/6
Cobbles	12/	12/
Nuts	11/	11/
Slack	9/	9/

find a ready sale. Washed fuel also moves freely, at prices that show no change on the week. The coke market is very languid, both in respect of demand and prices, and unless there is a speedy turn for the better, it will become necessary to reduce the production. Coking fuel is in fairly steady request.

#### IRON.

There is a little more enquiry for pig iron, and hopes are entertained that the resumption of work in the Staffordshire district will cause a revival in this branch of the iron trade. There is little or no improvement in the demand for finished iron, and the works of the district are chiefly occupied with the execution of old orders. Prices, however, are unchanged. Engineers, ironfounders and wagon builders are all fairly well employed, but new work is not coming forward as well as manufacturers would like.

### Nottingham.

#### COAL.

The tone of the coal trade in Nottinghamshire is much the same as a week ago. Generally speaking, business is on a moderate scale for the time of the year, and there is little likelihood of an improvement until work is resumed, following August Bank Holiday. In the branch for household fuel there is a quiet demand for nearly all qualities. Merchants are ordering, in many cases, only to meet present needs, though a few are commencing to lay in stocks, believing that prices will shortly harden. Owners are showing no disposition to lower rates for best qualities, whilst with respect to common sorts, values are somewhat irregular, and cheap lots are being eagerly sought for. Considering the present state of trade, some of the pits are making good time, but stocks are increasing. Steam coals continue in moderate demand. A slight improvement has taken place in regard to exports, but the home demand has not manifested much change. With pits making nearly full time stocks are growing, and it is not quite so easy to obtain late rates. Gas fuel is going out of hand moderately well, mostly on contract account, and prices are keeping steady. The position of slacks is less satisfactory, there having been a marked falling-off recently for some qualities and consequently values are unsteady.

#### Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights	12/ to 13/	12/ to 13/
Good house coals	11/ to 12/	11/ to 12/
Secondary do.	10/ to 11/	10/ to 11/
Best hard coals	11/6 to 12/6	11/6 to 12/6
Secondary do.	10/6 to 11/3	10/6 to 11/6
Slacks (best hards)	8/3 to 9/	8/6 to 9/
Do. (seconds)	7/3 to 8/	7/6 to 8/
Do. (soft)	7/3 to 8/3	7/6 to 8/3

### Leicestershire.

#### COAL.

There may be—if there be any movement—a slight tendency towards more active business. But the aspect generally is that of a summer condition. There has been in the past week in some directions a little more business in household coals of the better qualities, but the ordinary course of the demand for these is for the lower qualities. The demand for steam coals and slacks is still fairly good, and it looks as though these particular coals will not decline to any great extent in enquiry. The general industrial conditions continue to cause a demand for steam coals, which is not as pressing usually as this year. Slacks are wanted also, especially slacks for special uses. The distribution of business is still unequal; some collieries are full but others are experiencing quiet times. The average of time worked remains much the same. Stocks on the whole are rather heavy, but there are exceptions. The quotations do not vary much, late rates being obtained, but there are still some stocks on offer at a reduction on the ruling rates.

### South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

#### COAL.

The condition of the coal trade throughout the Cannock Chase district is fairly satisfactory for the time of year, and what is usually the slackest period of the year is now nearly over. There is no change of consequence to report in prices. The collieries are not working full time, but in some cases they are running from four to five days a week. The demand for coal for manufacturing purposes is improving, but there is not much change as yet in the house coal trade. There is a good enquiry for slack. Railway and canal sales are fairly satisfactory, but business continues quiet at the landsale depots.

Birmingham.

#### COAL.

Recent quotations continue to rule, and with the prospect of business improving after the holidays are over, there is not likely to be any downward movement. The pits are working three to four days a week, and are not making much stock. The call for household fuel is slow, but for works fuel there is a fairly active demand. Quotations:—

#### Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep	18/	18/
Do. seconds deep	16/6	16/6
Do. best shallow	14/6	14/6
Do. seconds do.	13/	13/
Best hard	14/	14/
Forge coal	11/	11/
Slack	8/6	8/6
Warwickshire:—		
House coal, best Ryder	16/	16/
Do. hand-picked		
coals	13/9	13/9
Best hard spires	14/6	14/6
Forge (steam)	10/	10/
D.S. nuts (steam)	9/6	9/6
Small (do.)	8/6	8/6



## IRON.

Trade is now fairly normal, but it is of small volume, and no marked improvement is expected for a few weeks. There are those who predict that a speedy settlement of the troubles in the Balkans would be followed by a sharp movement, and, come when it will, it will be very welcome. In the meantime, new business is coming in very slowly and prices are weak. For the ordinary qualities of Northamptonshire pig iron used in the district, the average price is about 53s., and sales are said to have taken place at 51s. There are still fairly heavy stocks to be got rid of. Derbyshire is 55s. and makers in this district are in the happy position of having practically no stocks. Staffordshire iron is firm at recent rates. For finished iron, enquiries continue to be of small volume. There is yet no sign of any drop in marked bars from £10. The difference between them and merchant bars is now from forty to fifty shillings, compared with 30s. which is regarded as about the right figure—the price for the latter qualities being £7 12s. 6d. to £7 15s. The mills are going about four days a week, and the common iron mills three and four. Squares, rounds and flats are quoted at £7 17s. 6d. to £8 for three-eighths basis, and the demand shows some improvement. For once in a way the galvanised sheet branch was more hopeful. Some houses have given instructions to the agents not to quote less than £11 a ton, subject, too, to an advance without notice. Business, however, may still be done between a wide range of figures, starting at £10 15s. and going up to £11 5s. for export trade. Both the Indian and South American markets are more active, and the fact that merchants are more disposed to buy than they have been is an encouraging sign. Makers of gas strip, following the general trend of the market, have reduced prices by 10s. a ton, and the standard now becomes £7 10s. for lots of 25 tons and upwards. A moderate amount of business is passing, but this branch was badly disorganised by the recent strike. The steel trade has undergone no change. Continental billets are dearer, and are not much below English quotations, which are £5 to £5 7s. 6d.

## Forest of Dean.

## Lydney.

## COAL.

The pressure for the steam coal of this district is not so pronounced this week. The pits, however, are kept at full work and all produced is easily placed, though prices show a tendency to weaken. House coals have been in better demand since last writing, and many of the pits have managed five days' work. This is considered very satisfactory for the summer season especially when it is borne in mind that last winter's prices are still in force. Shipments are very good, railborne orders only fair.

## Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	16/6	16/6
Forest .....	15/6	15/6
Rubble .....	15/9	15/9
Nuts .....	14/	14/
Rough slack .....	10/	10/
Steam coal:—		
Large .....	13/	13/6 to 14/
Small .....	10/ to 10/6	10/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

**Home Office Prosecution at Nottingham.**—A case of considerable interest to mineowners and miners in the district was heard at the Shire Hall, Nottingham, on Wednesday, July 23, when Mr. John Whyte, of Gresley, was charged with two offences under the Mines Act for breaches of the electricity rules. Mr. W. M. Gichard, of Rotherham, appeared for the Public Prosecutor, and stated that on April 10, in one of the seams of the New London Colliery of the Digby Colliery Company, the Home Office electrical expert, who was accompanied by Mr. E. H. Fraser, his Majesty's inspector of mines, found the metallic cover of a starting switch of a pump-motor not "earthed," as required by the rules. Mr. F. Berryman, of Nottingham, for the defence, explained that on the day prior to the visit of the Government officials the resistance was burned out in the original switch, and the one which had been obtained to replace it was too large. The work of remedying the effect was, however, actually in progress when the inspectors called, but the electrician had been called away, and that was the reason why the switch was not "earthed." The prosecution accepted this explanation, Mr. Gichard observing that it was a pity that it had not been given sooner, as in such circumstances the case would not have been brought forward. This case was accordingly withdrawn. There was a second charge against the defendant of having electric wire in the pit that was not insulated in parts. Evidence was given that in several places the wire covering was damaged, with the result that part of the cable was exposed, and there was great danger to anyone coming in contact with it. Mr. Berryman said that it was obvious a certain time must elapse before anything that was defective in a pit could be made good. The proprietors of this pit had been spending on an average over £75 a week in the provision of material to remedy existing defects. This indicated that there was every desire on their part to comply with the law. He suggested that the few pits not covered were but a small part of the total, and that unless a man put his finger on the defect it would not be in serious danger. The magistrates fined the defendant £5 and three guineas costs, the presiding magistrate remarking that a technical offence had been

## THE WELSH COAL AND IRON TRADES.

THURSDAY, JULY 24.

## North Wales.

## Wrexham.

## COAL.

There is a continued weakness in the general coal trade of this district, and things are fairly quiet all round at the time of writing, except in regard to labour questions. It is stated that there is a spirit of unrest abroad among the surface workers and the miners on several questions. There is no change in the general demand for house coal. Some collieries hold a little stock, and are endeavouring to send same away among their other trade, which, of course, means a reduction in price, which, after all, is better than blocking the sidings and causing the pits to stand for want of wagons. The landsale depots are doing very little business, a number of house coal contracts have been settled, and 1s. to 1s. 6d. advance on last year's prices has been realised. The trade in gas coal remains normal; there is no undue demand now that the old contracts have nearly all terminated, and the average quantities are being taken by the gas companies on account of their new contracts. Steam coal shows a steady demand, but there is no rush, and as some of the house coal has to be disposed of in this department, the supply is quite up to the demand. The railway companies take their average supplies, and some are negotiating for new contracts. There has also been a slight falling off in the demand for shipment coal, but it is considered that this is only a temporary lull, and that by next week the demand will be as good as ever. Small coal, such as nuts and slack, also gas coke, remain pretty much in the same state as they were at the time of writing last week. The average selling prices this week are as below:—

Prices at pit f.o.r. :—	Current prices.	Last week's prices.
Best house coal .....	14/ to 15/	14/ to 14/6
Secondary do. ....	13/ to 14/	13/ to 13/9
Steam coal .....	12/3 to 12/9	12/6 to 13/
Gas coal .....	13/ to 14/	13/ to 14/
Bunkers .....	12/ to 12/6	12/ to 12/9
Nuts .....	11/6 to 12/	11/3 to 11/9
Slack .....	6/ to 7/9	6/ to 7/6
Gas coke (at works) .....	15/ to 16/8	15/ to 16/8
Prices landsale:—		
Best house coal .....	18/4 to 19/2	18/4 to 19/2
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

## Monmouthshire, South Wales, &amp;c.

## Newport.

## COAL.

The coal trade has just passed another unsatisfactory week—scanty business, a poor enquiry and receding values all round the market. A month ago it might well have been thought that prices had reached the nadir of their present orbit, but the succeeding weeks have shown only too plainly the error of such a premise. Since last writing, values are down fully 6d. a ton, smalls even more so. House coals and patent fuel are quoted nominally the same figures, but concessions are easily obtainable, and the trend of the market is plainly in buyers' favour. The freight market as at present shows little indication of a quick recovery of prosperity. An easy enquiry prevails, while outward freights have a plain tendency towards lower values. Pitwood: Best French fir, 22s. ex ship.

Prices f.o.b. cash 30 days, less 2½ per cent.

Steam coals:—	Current prices.	Last week's prices.
Best Black Vein large ...	17/ to 17/6	17/6 to 17/9
Western-valleys, ordinary	16/6 to 16/9	16/9 to 17/
Best Eastern-valleys .....	15/9 to 16/3	16/3 to 16/6
Secondary do. ....	15/6 to 15/9	15/6 to 16/
Best small coals .....	7/6 to 8/	8/3 to 8/6
Secondary do. ....	7/ to 7/3	7/6 to 7/9
Inferior do. ....	6/6 to 7/	7/ to 7/3
Screenings .....	8/	8/6
Through coals .....	13/ to 13/6	13/ to 13/9
Best washed nuts .....	13/9 to 14/3	14/ to 14/6
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	20/ to 20/6	20/ to 20/6
Furnace coke .....	22/ to 24/	22/ to 24/
Foundry coke .....	26/ to 28/	26/ to 28/

## IRON.

A better feeling is generally expressed locally in the iron and steel trades, and considerably more business has been doing during the past week. Work is more satisfactory at bar mills, where specifications are coming to hand more freely. A large enquiry is on the market, and buyers are showing more disposition to cover for their forward requirements. At rail mills work continues on current orders with only a moderate enquiry. Quotations remain firm. The pig iron trade shows some improvement, considerable business having been placed, and a better enquiry for the later months of the year. Here values are firm at last quoted figures. Tin-plates show a set back of 3d. per box since last week, but this has had the effect of bringing in a certain amount of new business, and it is hoped that the bottom of the market has now been reached. Following will be found latest approximate quotations:—Steel rails: Heavy sections, £6 10s. to £6 15s.; light ditto, £6 15s. to £7. Tin-plate bars: Bessemer steel, £5 to £5 2s. 6d.; Siemens ditto, £5 5s. Pig iron: Welsh hematite, 78s. to 79s., delivered locally. Iron ore: Best rubio, 19s. 6d. to 20s. c.i.f. Tin-plates: Bessemer primes, 20 x 14, 13s. 3d.; Siemens ditto, 13s. 3d. to 13s. 4½d. Finished black-plate, £10.

## Cardiff.

## COAL.

The chief feature of the market is the scarcity of enquiries for coal. Owing, however, to the large demands by the Admiralty on account of the Naval manœuvres, the shipments for the week were again very heavy, amounting to over 439,000 tons, an increase of nearly 120,000 tons as compared with the corresponding week of last year. This was about the same as in the preceding six days, and for so heavy a fortnight's shipment one has to go back to the middle of April for a parallel. It is said that the Naval manœuvres which commenced on Tuesday last, will be on a more extensive scale than in any previous year. A good deal of secrecy is being observed as regards the shipments of coal from the South Wales ports, upon which the Navy is wholly dependent, but judging from the fact that the number of vessels taken up—and the majority of which are on time charter—is about 40, the extra quantity of coal taken from the market will probably not be far short of 150,000 tons. Collieries producing best steams are just now practically out of the market. Indeed, most of them are not in a position to accept any fresh orders for this month's loading, and consequently high prices have to be paid for what little free coal is available. Best Admiralties command from 20s. 6d. to 21s. net, whilst secondary qualities rule from 18s. 3d. to 19s. 9d. From some of the middlemen buyers have been able to fulfil their requirements at 18s. and even a shade less. Although nothing is yet officially known as to the successful competition for the 40,000 tons of best steam coal required by the Greek Government, there is reason to believe that the contract will be placed with the Ferndale Collieries. Delivery is to take place by the end of October. The only important enquiry in the market just now is that by the White Star Steamship Company, who ask for tenders for 100,000 tons for the twelve months commencing from September 1, or alternatively for half that quantity for delivery over a period of six months, also 30,000 tons of large and small coal in equal proportions. Tenders are to go in on August 1, but very little interest is taken in this contract. It is never of a very speculative character, for, as a rule, when the company have the tenders before them, they invariably approach one or two collieries, not necessarily in the first-class Admiralty ranks, and make arrangements with them for supplies. Chartering still continues slow, the total tonnage taken up last week being less than 230,000 tons, or only about 8,000 tons more than in the preceding week, but this is accounted for in some measure by the large number of steamers of a handy size which have been engaged by the Government. Still, the number of vessels in the Cardiff, Penarth and Barry docks have averaged over 200 a day, whilst this week opened with over 220 vessels in port. The chief exports from the Bristol Channel ports to foreign countries last month were as follow:—

	June 1912.	June 1913.
	Tons.	Tons.
Russia .....	52,023	69,412
Sweden .....	16,657	16,646
Norway .....	11,064	6,715
Denmark .....	5,074	3,960
Germany .....	18,139	16,951
Netherlands .....	11,275	9,388
Belgium .....	19,279	40,599
France .....	502,661	650,067
Algeria .....	42,968	51,911
French Somaliland .....	3,185	5,217
Portugal .....	49,512	83,376
Madeira .....	20,729	12,727
Spain .....	102,555	112,011
Canary Islands .....	50,155	46,880
Italy .....	393,240	432,918
Italian East Africa .....	3,484	5,301
Austria-Hungary .....	19,201	15,743
Greece .....	10,057	23,291
Roumania .....	7,394	15,678
Turkey .....	17,443	5,563
Egypt .....	113,902	134,034
Tunis .....	11,204	11,018
China (exclusive of Hong Kong) .....	—	6,736
Peru .....	5,716	3,239
Chili .....	63,385	64,213
Brazil .....	128,815	137,732
Uruguay .....	51,428	59,897
Argentine Republic .....	201,273	267,069
Channel Islands .....	5,956	4,386
Gibraltar .....	11,449	13,496
Malta .....	4,577	24,354
Mauritius .....	2,802	9,007
Aden .....	15,482	12,639
British India .....	—	11,910
Ceylon .....	19,802	29,153
West Africa (French) .....	7,656	17,909
„ (Portuguese) .....	17,185	15,590
„ (British) .....	5,213	7,628

No little interest has been excited by the announcement by Mr. Winston Churchill that the time will probably come when oil will be substituted for coal in many of the war vessels. On 'Change the opinion is very generally expressed that it will never do for Great Britain to rely for supplies of oil from foreign countries, and that until oil can be distilled from our own coal measures in sufficient quantity to meet naval requirements, a circumstance which is not likely to occur for a considerable time, there is not much to fear that coal itself will be dislodged. There are ample supplies of small coal, and in anticipation of the August holidays, buyers seem more anxious to cover their requirements, with the result that prices are slightly firmer. Best bunkerings are 10s. 3d. to 10s. 6d. and cargo sorts 8s. to 8s. 3d. As Monmouthshire coals do not participate in the Admiralty demands, there is not the same pressure for them, and prices have fallen about 3d. per ton, Black Veins being 17s. 3d. to 17s. 6d. and western-valleys 16s. 9d. to 17s. f.o.b. Cardiff. There is no change in fancy house coals. So far as Rhondda bituminous coals are concerned, the demand is very slow, and prices are distinctly weaker. For No. 3 Rhondda large the top price is 17s., whilst for No. 2 large sellers quote 13s. 3d. to 13s. 6d. Shipments of patent fuel for the week exceeded 34,000 tons, of which Swansea despatched 23,720 tons, the Crown Fuel Company, Cardiff, 9,105 tons, and other local makers 1,650 tons. Best brands still command 22s. to 22s. 6d. There is an enquiry in the market from the Algerian State Railways for 90,000 tons of fuel for delivery from August next to December 1914. Tenders have to be sent in by the end of this month.



Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	20/6 to 21/	20/6 to 21/6
Superior seconds .....	19/6 to 19/9	19/6 to 20/
Ordinary do. ....	18/3	18/ to 18/9
Best bunker smalls.....	10/3 to 10/6	9/9 to 10/
Best ordinaries .....	9/6 to 10/	9/ to 9/3
Cargo qualities .....	8/ to 8/3	7/9 to 8/3
Inferior smalls.....	7/ to 7/6	7/
Best dry coals .....	18/ to 18/6	18/ to 19/
Ordinary drys .....	15/9 to 16/	15/6 to 16/
Best washed nuts .....	16/6	16/6
Seconds .....	15/6	15/3 to 15/6
Best washed peas .....	14/6	15/
Seconds .....	13/6	14/ to 14/3
Dock screenings .....	10/3 to 10/6	10/
Monmouthshire—		
Black Veins .....	17/3 to 17/6	17/6 to 17/9
Western-valleys .....	16/9 to 17/	17/ to 17/3
Eastern-valleys .....	16/6	16/3 to 16/6
Inferior do. ....	14/9	15/3 to 15/6
Bituminous coals:—		
Best house coals (at pit)	20/	20/
Second qualities (at pit)	18/	18/
No. 3 Rhondda—		
Bituminous large .....	17/	17/ to 17/6
Through-and-through...	15/	15/
Small .....	12/3 to 12/6	12/ to 12/6
No. 2 Rhondda—		
Large .....	13/3 to 13/6	13/6 to 14/
Through-and-through...	11/6	11/6 to 12/
Small .....	8/3 to 8/6	8/6 to 9/
Best patent fuel .....	22/ to 22/6	22/
Seconds .....	20/	20/
Special foundry coke .....	31/ to 32/	30/
Ordinary do. ....	27/ to 28/	26/
Furnace coke .....	20/ to 22/	21/ to 22/
Pitwood (ex-ship) .....	22/6	22/6

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

## IRON.

The tinplate trade continues in a very depressed condition. The renewal of trouble in the Near East has affected the market, the shipments for the week being 16,000 boxes less than the receipts from works, so that stocks have been increased to 421,000 boxes. This, however, is some 40,000 boxes less than at the corresponding date of last year. The proposed stoppage in September is meeting with unexpected opposition, the members of the Welsh Artisans Union having taken the advice of their general secretary, and resolved not to present notices on the first Monday in August. Mr. Hodge (the secretary) believes that if this were done, it would not only dislocate trade, but probably bring about the termination of the Conciliation Board. What effect the decision of his union will have on the ballot which is being taken by the four other unions embraced in the tinplate and sheet industry remains to be seen. Prices are weaker, Bessemer standard coals selling at from 18s. 1½d. to 13s. 3d., and oil sizess at 13s. 7½d. to 13s. 9d. per box. Rather more foreign bars, billets, &c., have come forward during the week, but the only effect is to keep down local prices. Siemens tin bars are offering at £5, and Bessemer at £4 17s. 6d. This is many shillings above quotations of foreign makers. The galvanised sheet trade is much stronger, a large amount of business having been done both for India and South Africa. Twenty-four gange corrugateds are £10 12s. 6d. to £11. A good business continues to be done in colliery rails at from £6 15s. to £7, but most of the contracts for large sections are rapidly being worked off. Welsh pig iron has fallen to 75s. f.o.t. Best rubio iron ore is 18s. 6d. to 19s. Scrap metals continue to fall in price, new steel crop ends being 60s., heavy steel and cast 55s., and heavy wrought 52s.

## Swansea.

## COAL.

The returns of the trade of the port last week show a considerable improvement over the preceding period. Activity was experienced in the coal and patent fuel trades, the shipments together totalling 122,330 tons. There was a good attendance on 'Change this morning, but there was no improvement in the general condition of the anthracite coal market, whilst the undertone continued weak. All classes

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/ to 23/	21/ to 23/
Secondary do. ....	18/6 to 20/	18/6 to 20/
Big Vein large (less 2½ per cent.) .....	16/ to 17/6	16/ to 17/6
Red Vein large do. ....	12/ to 13/	12/ to 13/
Machine-made cobbles (net) .....	21/ to 22/	21/ to 22/
Paris nuts (net) .....	22/6 to 24/	23/ to 24/
French do. do. ....	22/6 to 24/	23/ to 24/
German do. do. ....	22/6 to 24/	23/ to 24/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	11/6 to 13/6	11/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.)	6/6 to 7/	6/6 to 7/
Duff (net) .....	5/9 to 6/3	5/9 to 6/3
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/ to 12/	11/ to 12/
Small do. ....	8/ to 9/6	8/ to 9/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/6	17/ to 18/6
Through-and-through (less 2½ p.c.) .....	14/ to 15/	14/6 to 15/6
Small (less 2½ per cent.)	11/ to 12/	11/ to 12/
Patent fuel do. ....	18/ to 19/	18/ to 19/

of large, both Big and Red Vein brands, were freely offered for immediate delivery, and parcels were obtainable at very cheap prices. Machine-made nuts were barely maintaining their position, and cobbles were very weak. There was a slightly better demand for rubbly culm, but prices were not any firmer. Duff was very strong, and difficult to obtain. In the steam coal market, the demand was not good, and quotations for all descriptions closed weaker.

## IRON.

There is still no improvement to report in the condition of the tin-plate trade, orders being scarce, and prices unremunerative. Many of the tin-plate mills were working short time. Three additional new mills were started at the Aber works, Llansamlet, and this makes seven during the past fortnight. The production of pig iron was lower than usual, and the steelworks were not so busy. The Mannesmann Tube Works were actively engaged. Last week the shipments of tin-plates were 106,354 boxes, receipts from works 122,705 boxes, and stocks in the dock warehouses and vans 421,353 boxes.

## Llanelli.

## COAL.

The coal trade of the district is still anything but satisfactory, and the collieries generally are having more idle days than they have had for a long while. New business is scarce, and what enquiries there are are being much cut. The depression in the steam coal market is very bad, and some of the pits can only manage two days weekly. Many of the manufacturing works are shut down, with the result that smalls of all kinds are a glut. Prices, too, have come down much lower than was anticipated, and from present appearances it looks as if no improvement can be expected for another two or three months. The anthracite market is slightly better than it has been, and enquiries are more plentiful. Shipments during the week have been good, and stocks are not so heavy. Some of the large kinds are in better request, and prices are not so easy. There is plenty of room for improvement in most of the machine-made kinds. German nuts and beans are easily obtained at low figures. Quotations this week are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	21/ to 23/	20/ to 23/
Secondary do. ....	19/ to 21/	18/ to 19/
Big Vein large .....	17/ to 18/	17/ to 18/
Red Vein do. ....	12/6 to 13/6	12/ to 13/
Machine-made cobbles ...	18/ to 20/	18/ to 20/
German nuts .....	20/ to 21/	20/ to 21/
French do. ....	22/ to 23/	22/ to 23/6
Paris do. ....	22/ to 23/	22/ to 23/6
Machine-made beans .....	19/ to 21/	19/ to 21/
Do peas .....	11/6 to 13/6	12/ to 13/
Rubbly culm .....	7/ to 7/6	7/ to 7/6
Duff .....	5/ to 5/6	5/ to 5/6
Other sorts:—		
Large steam coal .....	16/ to 17/	17/ to 18/
Through-and-through ...	11/ to 11/6	11/6 to 12/6
Small .....	10/ to 11/	10/ to 11/
Bituminous small coal ...	11/ to 12/	11/ to 12/

## THE IRISH COAL TRADE.

THURSDAY, JULY 24.

## Dublin.

Business is becoming slack locally in the house coal trade, so many of the better-class consumers being away for the rest of the summer, but in other qualities there is a fairly even demand generally. Prices of all classes are without change, viz.:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best kitchen, 24s.; Orrell slack, 21s.—all less the usual 1s. per ton discount for cash; steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. Irish coals at Wolfhill (Queen's County) are:—Best large coal, 20s. per ton; best household coal, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth. The import trade has been good during the past week, the coaling vessels arriving amounting to 77 as compared with 58 the week previously, chiefly from Whitehaven, Preston, Garston, West Bank, Newport, Ayr, Saundersfoot, Manchester, Neath Abbey, Cardiff, Liverpool and Irvine. The total quantity of coal discharged upon the quays was 30,500 tons. Freights from Garston to Dublin are from 4s. to 4s. 6d. At a recent meeting of the Slieveardagh District Council, a resolution was passed to draw the attention of the Department of Agriculture to the state of affairs now existing in Slieveardagh in regard to its great undeveloped coalfields, and to urge the Department to ask the Development Commissioners to give a grant for their development.

## Belfast.

The local coal trade is rather quiet upon the whole, although demand from the inland districts continues to be brisk. There is a good supply in the port, particularly of small coal, prices of which are somewhat easier, other qualities remaining unchanged. Quotations in the city are:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current prices ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Cargoes arriving during the week were chiefly from Glasgow, Garston, Girvan, Ayr, Ardrossan, Neath Abbey, Irvine, Sharpness, Newport, Preston, Maryport, Troon, West Bank, Point of Aire and Burryport. From June 29 to July 12 the total number of steam and other colliers entering the harbour was 110.

At Wednesbury, on Tuesday, the Mayor (Alderman A. E. Pritchard) laid the foundation stone of a new metallurgical and engineering institute, which is being erected by the Staffordshire County Council, in conjunction with Wednesbury Town Council and other local authorities.

## CONTINENTAL MINING NOTES.

## Belgium.

The following shows the exports and imports of fuel during the first half of the present year:—

	Exports.		Imports.	
	1912.	1913.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.
Coal .....	2,451,753	2,400,839	3,884,851	4,482,544
Coke .....	463,406	520,291	454,372	610,361
Briquettes ...	338,828	282,969	201,295	236,557

Of the total increase of 788,944 tons in the imports, 440,485 tons represent increased entries of German fuel; in the six months 2,543,105 tons of German coal, 519,820 tons of coke, and 230,560 tons of briquettes were imported, being increases of 288,630 tons, 104,738 tons, and 47,117 tons respectively as compared with the corresponding period of 1912.

## France.

The Transatlantique Shipping Company consumed coal to the value of 18,918,705 fr. in 1911, and in 1912 22,277,285 fr.

## Germany.

Fifteen miners were killed on Tuesday by the collapse of a new shaft at Uebach.

**Ruhr Coal Market.**—To judge from the traffic returns up to the present, the high figures of June will not be reached this month, a result which was evidently anticipated by the Syndicate in deciding to restrict the output. A decrease in the consumption is manifest all along the line, being most conspicuous in industrial fuels. The requirements of the iron industry are still large, but are steadily becoming smaller, and there is no longer any pressing demand for delivery, so that the Syndicate is finding some difficulty in disposing of the output. The house coal trade is naturally quiet just at present, but the settling of new contracts will soon begin. Deliveries of gas and flaming gas coals continue extensive, but less so than hitherto, and in the coke market things are getting worse than before, for even with the reduced output, the production is in excess of the demand and stocks are growing, though blastfurnace coke still meets a ready sale. Briquettes are also in smaller request. The favourable state of the Rhine has enabled large consignments to be sent forward to South Germany, but in spite of the fair demand in that market, a portion of the arriving cargoes has had to be stocked. Interest in house coal is increasing, while that for industrial coals is on the decline. English coals are not in much demand, the price being too high; but, on the other hand, their competition is being felt in certain foreign markets. At the same time, the export trade to Holland, France and Belgium remains fairly considerable, though it is scarcely possible to obtain the high prices ruling until lately.

**Coal Market in Upper Silesia.**—The favourable condition of this market has not suffered any change, for although the iron industry, *inter alia*, is not so flourishing, the calls for fuel show no diminution on the whole; and the pits are finding it difficult to satisfy the requirements of consumers in full, the stocks exhausted during the strike not having yet been replenished. In these circumstances the number of wagons despatched daily is very large, and the average will scarcely be lower than in June. In this connection the requirements of the export trade play an important part. Austria-Hungary is taking large consignments, and open for more; and it is found impossible to satisfy the demands of consumers in Russia. The more remote German districts continue to take coal freely, and the competition of the southern and western coalfields has not yet become noticeable, the same applying also to English coals. In the different grades, house coal is selling well for the time of year, possibly in anticipation of the shortage of railway wagons in the autumn; and the cokeries have large requirements. In the coke market, too, the conditions remain favourable, consumers complaining of insufficient supplies, though the output of the cokeries has been raised to the utmost.

The Gwaun-cae-gurwen Colliery Company Limited commenced winning coal from their new East Pit on Monday morning. The pit has been sunk to their celebrated Peacock Vein coal, passing through the Big Vein, which, however, will be developed as soon as the Peacock Vein has been opened out and worked sufficiently in advance. The shaft is 18 ft. in diameter and 346 yards deep. The winding and all other surface and underground machinery is driven by electricity, and has been designed to deal with an output of 1,500 tons per day. The electric winder has been supplied by Messrs. Siemens Brothers. The headgear, screens and coalbreaking and sizing machinery have been supplied by Messrs. G. R. Turner Limited, Langley Mill, Notts. Two trams are lifted at each wind. The first two trams of coal were wound by Mrs. Joseph Hargreaves, wife of the manager. Working places have been opened out at the bottom of this pit from one of the other pits owned by the company, and by the end of this week it is estimated that an output of 200 tons per day will be obtained.



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(A Classified List appears on page 196.)

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\*\* For other Miscellaneous Advertisements see Last White

Page.

## Forthcoming Annual Meetings.

International Geological Congress—  
August 21, 1913 (Toronto)

North of England Institute of Mining and Mechanical  
Engineers ... August 2, 1913

Manchester Geological and Mining Society—  
October 14, 1913

Institution of Mining Engineers—  
Sept. 24, 25 & 26, 1913 (Manchester)

Midland Counties Institution of Engineers, Sept. 1913

South Staffordshire and Warwickshire Institute of  
Mining Engineers ... October 20, 1913

## The Colliery Guardian.

LONDON, FRIDAY, JULY 25, 1913.

The 24th International Miners' Congress  
began on Monday at Carlsbad. The president,  
Mr. Smillie, in his inaugural address, suggested  
that whenever there was danger of war the  
miners should hold an extraordinary inter-  
national congress which could decide upon  
preventive measures. Resolutions were passed  
in favour of a maximum working day of eight  
hours for all miners, of an obligatory rest of  
16 hours between shifts, and of a maximum day  
of six hours for those who work in hot or wet  
places. On Wednesday, various schemes to  
regulate the output of coal were placed before  
the Congress.



Lord Mersey attended this week at meetings of the Northumberland Joint Board, under the Minimum Wage Act, to consider amendments that have been put forward by both sides. His decision will be given in September.

A meeting of the sub-committee appointed by the South Wales Conciliation Board to deal with special cases of banksmen's wages and hours was held at Cardiff last Friday. The owners' representatives put forward proposals, and the committee adjourned until Monday next.

On Monday Mr. J. A. Pease introduced a Bill to give immediate financial relief to local educational authorities and outlined the intentions of the Government next year. These will impose an obligation upon authorities to provide intermediate education and opportunities of education of a more advanced character. Advisory provincial councils are to be appointed.

The Midland Institute of Mining, Civil and Mechanical Engineers held a dinner in Sheffield on Tuesday evening, in honour of Mr. J. R. Robinson Wilson, an ex-president of the institute, who has just been appointed his Majesty's divisional inspector of mines for the Northern District.

At the Imperial Motor Transport Conference, which was opened on Monday in connection with the Commercial Vehicles Exhibition at Olympia, several important papers on petrol substitutes were read and a resolution was carried directing attention to the possibilities of alcohol as a fuel.

No further progress is to be made this session with the Duchy of Lancaster (Mining Leases) Bill.

The executive of the Miners' Federation is arranging for a special conference to be held at the end of the present month to decide whether to issue ballot papers asking members to vote for or against a resolution "approving the furtherance of political objects within the meaning of the Trade Union Act, 1913."

The South Wales owners have decided to appeal against the decision of Mr. Justice Pickford in the case of Williams v. the Glamorgan Coal Company as to the period over which wages shall be averaged under Rule 7 of Lord St. Aldwyn's award. Until then they will continue to take the average over a period of two weeks. This decision was communicated at a meeting of the South Wales and Monmouthshire Conciliation Board held at Cardiff on Monday.

An examination will soon be held to fill two vacancies for junior inspectors of mines and quarries. Nominations to compete at this examination will be given by the Home Secretary on the recommendation of the Board for Mining Examinations, and applications for nomination should reach the Private Secretary, Home Office, Whitehall, London, before August 9.

The quarterly meeting of the South Wales Institute of Engineers took place at Cardiff last week, when the paper read by Mr. Sam Mavor on underground coal conveyors was discussed.

On Wednesday a debate took place in the House of Commons on the Home Office vote. Discussion centred mainly on the duties of factory inspectors. Major Hope called attention to the operation of the Explosives Order, and pleaded for local exemptions. For the Home Office, Mr. Ellis Griffith held out no hope of remission; he said the regulation that all unused explosives should be brought out at the end of the shift must be adhered to.

The annual meeting of the North of England Institute of Mining and Mechanical Engineers will be held at the Wood Memorial Hall, Newcastle-upon-Tyne, on Saturday, August 2, at 2 p.m. The following papers will be read:—

"Notes on Coalmining in the United States of America, with special reference to the Treatment of Coaldust and Haulage by Electric Locomotives," by Mr. Samuel Dean, and "The Comparative Inflammability of Mixtures of Pit Gas and Air by Momentary Electric Arcs," by Prof. W. M. Thornton. Mr. T. A. Saint's paper on "The Lighting Efficiency of Safety Lamps" will come up for discussion.

#### The Concealed Coalfield of the East Midlands.

ALTHOUGH for the moment public attention has been to some extent diverted from coal to oil, the FIRST LORD OF THE ADMIRALTY has said nothing which can be held in any way to affect the paramount position which British coal must continue to occupy as the main-spring of our national prosperity. Undiminished interest is, therefore, still being manifested in the progress of exploration in the concealed coalfields of the Midlands, to which subject important contributions have lately been made from authoritative sources. In calling attention to these, we propose briefly to comment upon their bearing upon this question, and to examine to what extent they confirm or refute the conclusions of the Royal Commission on Coal Supplies, published in 1905, and hitherto regarded as the last official pronouncement as to the area over which investigations might be prosecuted with any reasonable hope of success.

It will doubtless be remembered that Prof. KENDALL's report suggested a decidedly "euomphalic" (if we may coin the word) extension of the Nottinghamshire coalfield, beyond the Wash and ranging south-eastwards well towards Cambridge. The Geological Committee of the Royal Commission, however, regarded this extension as too hypothetical, although, with some hesitation, admitting his eastern limit along a line both parallel and proximate to the Louth-Willoughby anticlinal axis, where Prof. KENDALL inferred that the coal measures would either terminate or be buried too deeply for profitable working.

Upon these assumptions the Royal Commission of 1905 adopted as the eastern boundary of the coalfield a line near the outcrop of the lower cretaceous rocks, 20 to 30 miles east of the Trent, the former Royal Commission of 1871 having placed it only 2 or 3 miles to the east of that river.

Quite lately we have had the advantage of the publication of a memoir by the Geological Survey, a summary of which has appeared recently in our columns, in which the whole question has been reconsidered by Dr. WALCOT GIBSON in the light of the most recent evidence afforded by boreholes, with the result that a great reduction appears necessary in the estimates of 1905, and a return to the more limited area adopted by the 1871 Commission is advocated, the estimated available coalfield in the concealed area in this district being thus reduced from 2,550 to about 900 square miles.

The evidence upon which Dr. WALCOT GIBSON arrives at this conclusion is fully set forth in the memoir to which we are referring. Since 1905 much additional information has been obtained from borings. At that date, for example, the Clipston boring had not been commenced, and the Owthorpe boring had not yet told its full story. In both of these a thickness of nearly 1,000 ft. of coal measures, lying nearly flat, seem to indicate a considerable extension of the area of the coalfield in this direction, and possibly, as Dr. GIBSON points out, Prof. KENDALL's line may prove to be

correct in regard to the southerly limit of the concealed area, in which case a portion of the loss in the above estimate would be recovered.

We cannot here enter into a discussion of the evidence upon which Dr. GIBSON bases his conclusions, but we may refer to certain of the difficulties involved in the problem. Two of these are obvious. It is necessary to ascertain the form of the palæozoic floor which is concealed beneath the cover of newer strata, and it is also necessary to evolve the relation of the surface of this floor to the outcrops of the buried coal measures.

With regard to the latter, Dr. STRAHAN, in his presidential address before the Geological Society, has recently pointed out that the form of the palæozoic platform gives no obvious clue to the strike of the rocks that compose it. This is somewhat disconcerting, and is different from what might be expected from observations in the exposed portion of the coalfield, where denudation has resulted in the production of a marked connection between strikes and contours. The reason for the absence of this relationship in the concealed area is probably to be found in the fact that the greater part of the platform has never been exposed to sub-aerial waste since it was planed down by the sea. This is Dr. STRAHAN's explanation, and it is a point which must be taken into consideration in any discussion of the extent of the buried coalfield. It introduces an important consideration which apparently has not hitherto been fully appreciated. Too much may have been made of bold structural features, such as the hypothetical concealed Charnian axis. It throws a doubt upon the existence of any such buried mountain chain. Irregularities in the palæozoic platform, of considerable magnitude, do certainly occur, but these are not, in Dr. STRAHAN's view, the result of pre-triassic sub-aerial weathering so much as the effect of warping and sagging of the deep-lying strata. We must, therefore, follow the arguments of Prof. KENDALL and Dr. GIBSON in the light of the possibility that the outcrop of the buried coal measures has not undergone the kind of erosion which has so powerfully operated upon the exposed parts.

Prof. KENDALL, again, relies mainly upon the theory of posthumous folding, which bulked so largely in the classic researches of GODWIN-AUSTEN; but, in the light of present knowledge, it is doubtful whether this theory is sound. We know, for example, that the Wealden anticlinal is superimposed upon a pronounced synclinal, and it is, therefore, unsafe to conclude that there is any necessary coincidence between the platform folds and those which can be traced in the overlying strata.

On the whole, we are compelled to take the view that only by means of borings can the problem of the extent of the buried coalfield be solved. The importance of adding to our knowledge by this means gives additional weight to the recommendation of the Royal Commission that adequate machinery should be provided for the preservation, in a Government office, of boring records. At the present time boreholes are put down in a most unsatisfactory manner. Dr. STRAHAN very aptly describes our methods of exploration as happy-go-lucky and unworthy of our great mineral heritage. That there are difficulties in carrying out the proposal of the Royal Commission may be admitted, but we do not think they are insuperable. At any rate, some effort should be made to ensure that boreholes yield the utmost scientific results, and these results should be rendered available so far as private interests permit.



### Infant Mortality in Colliery Districts.

DR. NEWSHOLME, the medical officer of the Local Government Board, has just made a second report on infant and child mortality. The first report, published in 1910, dealt with the rural districts of England and Wales, and the present report gives similar experience in regard to 241 urban areas. The intrinsic importance of this subject, as well as its relation to the housing question, is an ample excuse for further reference to it in these columns.

The first thing that strikes the eye on opening this report is a map showing the incidence of infant mortality in the registration counties. This map, at first sight, might be mistaken for a map of the British coalfields, for the dark areas—those in which the deaths exceed 140 per 1,000 births—are exclusively those in which coal-mining is carried on—viz., Northumberland, Durham, Lancashire, the West Riding of Yorkshire, Notts, Staffordshire and Glamorgan-shire; the blackest of all is Lancashire. Of the counties in the next grade, with average rates of infant mortality of over 130 per 1,000, all with the exception of the North and East Riding of Yorkshire, are coalmining shires—viz., Denbigh, Warwickshire, Carmarthenshire and Monmouthshire. Of course it may be said, with some justice, that these areas are also those that are the most thickly populated, but we fear that the indictment against the coal-mining industry cannot be so summarily dismissed. The list of 25 towns that have the highest rates in the kingdom contains the following 17 which are typical colliery towns:—Ince, Burnley, Farnworth, Ashton-under-Lyne, Stoke, Chesterfield, Aberdare, Ilkeston, Wigan, Dewsbury, Merthyr Tydfil, Rhondda, Hindley, Bilston, Barnsley, Leigh and Batley. If overcrowding were the sole test, there is no reason why the colliery towns of Glamorgan and South Lancashire should not show at least as favourable figures as, say, the East End of London; yet only one of the metropolitan districts (Shoreditch) appears in this black list. Indeed, Dr. NEWSHOLME points out that the extreme variations within single towns and in the same unit of sanitary administration point to the conclusion that geographical position and climatic circumstances have only a minor influence on infant mortality, and that particular local conditions special to certain limited areas or in certain social classes are responsible to a high degree for the variations.

According to figures prepared in connection with the annual report of the Registrar-General for 1911, amongst miners there is the high infant mortality rate of 160 per 1,000, as compared with 97 amongst agricultural labourers, and 148 amongst textile operatives. The ascertained causes of infant mortality, *i.e.*, poverty, uncleanness, overcrowding, alcoholic indulgence and disease, are closely inter-related; thus drunkenness, which, as Dr. NEWSHOLME says, reaches its maximum in the mining counties, may produce any of the others, and indirectly prejudice the life of the child.

It is satisfactory to know that, by increased attention to what may collectively be termed "welfare" work, the picture is not so black as it was ten years ago, but much remains to be done, and it is "up against" the mining community to bring about a much greater improvement than has yet been effected. Not only is this waste of life a hideous tragedy, but it is well to ponder on the fact that the observations of Prof. KARL PEARSON and others bring out the conclusion that "in the circumstances conducive respectively to

high or low infant mortality high or low mortality continues at higher ages, and they make it probable that the mortality figures of high or low mortality correspond to low or high standards of health of those who survive." Finally, it should be remembered that high infant mortality is not a necessary concomitant of the coalmining industry; there is no peculiar feature of the employment that can be said to induce it. Could not the miners' leaders—when they return from Carlsbad—employ some of their time profitably in bringing home to the men such facts as are demonstrated in this report?

### Trade Summary.

The London coal trade is still exceedingly slow. Collieries are working short time and yet the stocks are accumulating. The public demand is very feeble and the delivery trade is slack. All contract prices in the wholesale market are 1s. higher since July 1, but advertised public prices are unchanged. All household qualities are very plentiful, and in many cases "spot lots" are the only sales made. Factors and merchants find considerable difficulty in dealing with loaded wagons invoiced. Coke and all small coals are offering freely and at lower prices. Kitchen coal and bakers' nuts are easy.

The steam coal market at Newcastle is rather stronger, but gas coals, bunkers and coke are easier. The prompt market is quiet.

The Durham coal trade is fairly active, gas and coking coals and bunkers all being steady.

The demand for Lancashire house coals is quiet. Other varieties are in fairly steady request, but slacks are easy.

Rather better time has been made in West Yorkshire. The demand for house coal is of a good average character for the time of year. Slacks are appreciably weaker.

There is some improvement in the export demand for South Yorkshire steam and gas coals. The consumption of slack has been reduced and house coal fluctuates considerably.

In Derbyshire there is some influx of house coal orders and stocks are comparatively light. There is a full demand for industrial purposes.

There is a great scarcity of orders at Cardiff. Supplies of small coal are ample, but prices are rather firmer. Monmouthshire coals are weaker, as are Rhondda bituminous coals. Patent fuel is steady.

Business in Scotland has been seriously curtailed by strikes, and trade generally is quiet.

## — PROGRESS. —

### The United States Bureau of Mines.

The United States Bureau of Mines continues to do most useful work, and the record of progress contained in Mr. Holmes' annual report contains many features of interest. With regard to the Bruceton experimental mine, enlargements are contemplated which will increase its resemblance to a commercial. According to the director, the chief results of the experiments during the past year were:—(1) The mining public has been convinced that coaldust explosions can be produced at will in a mine as well as in a gallery; (2) coaldust explosions may be caused by relatively small quantities of long-flame explosives in an unsafe shot which expends its energy outside the hole; and (3) violent coaldust explosions may be produced in a comparatively short distance—*i.e.*, 600 or 700 feet. This is a matter of much importance, since it indicates the necessity of trying to prevent explosions from starting rather than trying to check them after being started. The laboratory study of the comparative inflammability of coaldust from various parts of the United States and the factors that affect the inflammability of the dust is being continued at Pittsburg and Urbana, as also have been the investigations of the geologic conditions governing the occurrence of gas in mines. The plans for 1912-13 include investigations of atmospheric conditions, the supervision of gas-air mixtures used in testing explosives or mine equipment, the collection of data bearing on the explosibility and the physiological action of mine gases and of noxious and explosive gases formed by blasting, and also investigations relating to the use of gasoline locomotives and acetylene lamps, and the control of firedamp in coalmines.

During the year 32 explosives were added to the "permissible list" and 25 withdrawn, leaving 95 on the list. A number of tests have been made with a new methane indicator, and this investigation, it is stated, promises an instrument of decided value. One form, to be placed in any desired part of a mine, records the percentage of gas in the atmosphere; another type is portable. Tests are being made on a substitute for the Abel test for stability of explosives, and other studies

are in progress, notably in regard to the exudation of nitro-glycerine from explosives and the action of explosives on rocks of different physical characteristics.

The electrical investigations have included tests of safety switches, incandescent lamp filaments, on the action of acid water upon the insulation of electrical conductors, and of the effectiveness of explosion-proof motor casings. Miscellaneous work included the development of an electrically-driven centrifugal humidifier for moistening mine air, work on an electric pressure indicator, on an electrical device for detecting methane, the development of a system of symbols for representing electrical apparatus on mine maps, preliminary tests of portable electric lamps, and tests in connection with an electrically-heated thaw house.

The laboratory at Pittsburg is at present occupied chiefly with investigations concerning the causes of mine explosions, and an investigation of the influence of carbon dioxide on the explosibility of mine gases has been concluded.

Another of the investigations undertaken by the Bureau is the development of a method for preventing the corrosion of iron and steel used in mine equipment, whilst the production of noxious gases by gasoline mine locomotives has been studied. Progress was made in the development of a simple, cheap and workable emergency breathing apparatus, and a comprehensive study is being made of the failure of hoisting and haulage ropes.

The fuel investigations have been conducted at Washington, and have resulted in considerable economies to the Government. It is stated that one boiler plant is spending between 4,000 and 5,000 dollars a year less than formerly by a judicious change of fuel. In 1912 the purchases of coal by the Government, under specifications providing for payment according to the quality of the coal delivered, amounted approximately to 1,500,000 tons, costing 4,750,000 dols. An important feature of the new specifications is that the heating value of the coal is stated on the "dry coal" basis, and not on the "as received" basis as heretofore.

In co-operation with the Navy Department, a series of boiler trials was made to determine the relative steaming values of samples of Pocahontas coal after several months' storage under different conditions. Other lines of study have been concerned with gas producers, briquettes, coking, lignite and peat, &c., in addition to the investigation of the constitution of coal by means of the extraction of soluble constituents with organic solvents and microscopical examination. In the latter category the following problems have been studied incidentally:—Microchemical tests have shown that no cellulose is present in any of the coals examined; the tissues that were originally composed of cellulose are now some derivative of cellulose, the nature of which is unknown. It has been demonstrated that coals and peats contain typical colloids which may be brought into colloidal solution. The effect of the condition of the original coal-forming material has been studied.

The Bureau has continued its investigation of the actual loss of heating value in stored coal and the factors that cause spontaneous heating, whilst an investigation of the effect of weathering on the composition and character of the coal in the Pittsburg bed was undertaken at Bruceton.

Preparations are being made to damp down one of the large furnaces at the Cleator Moor Ironworks, in consequence of the lack of delivery orders for pig iron against contracts. Not only will the damping down of this furnace affect these engaged at the ironworks, but the iron ore mines or quarries will be more or less affected.

**The Institute of Metals.**—Arrangements have now been completed for the visit of the Institute of Metals to Ghent for the purpose of holding the autumn meeting on Thursday and Friday, August 28 and 29. On this special occasion of the institute's first foreign meeting, members may be accompanied by friends, and ladies are particularly invited to attend the forthcoming meeting. The following is a list of the papers that are expected to be submitted:—"Second Report to the Corrosion Committee," by Dr. G. D. Bengough, M.A., and Mr. R. Jones, B.Sc.; Mr. J. H. Chamberlain, M.Sc., on "A Further Study of Volume Changes in Alloys"; Dr. Cecil H. Desch and Mr. Samuel Whyte, on "The Micro-Chemistry of Corrosion: I. Some Copper-zinc Alloys"; Mr. H. Garland, on "Metallographical Researches on Egyptian Metal Antiquities"; Dr. W. M. Guertler, on "The Specific Volume and Constitution of Alloys"; Prof. S. L. Hoyt, on "Copper Rich Alloys"; Mr. F. Johnson, M.Sc., on "A Method of Improving the Quality of Arsenical Copper"; Prof. A. A. Read, M.Met., on "The Influence of Phosphorus on Some Copper-aluminium Alloys"; Dr. T. Kirke Rose, on "The Annealing of Gold"; Dr. W. Rosenhain, F.R.S., and Mr. D. Ewen, M.Sc., on "The Intercrystalline Cohesion of Metals—Second Paper"; Mr. T. West, M.Sc., on "The Determination of Oxygen in Copper and Brass".



## LAW INTELLIGENCE.

## SUPREME COURT OF JUDICATURE.

## COURT OF APPEAL—July 16.

Before the MASTER OF THE ROLLS, Lord Justice KENNEDY, and Lord Justice SWINFEN EADY.

## Workmen's Compensation—Imprisonment of Workman.

**McNally v. Furness, Withy and Co.**—This was an appeal from an award of the Southwark County Court judge, sitting as arbitrator under the Workmen's Compensation Act, 1906. The county court judge held that the applicant was not to be deprived of the right to be paid compensation through being in prison. The employers appealed.

The Court dismissed the appeal.

The Master of the Rolls, in his judgment, said counsel had urged that the incapacity was due to the imprisonment, not to the accident; that the employer was prejudiced by not being able to give him light work; and that the employer could not have him examined by his own doctor. But in January of the present year there had been a case of *Harwood v. Wyken Colliery Company* (1913, 2 K.B., 158, 29), in which the Court of Appeal had deliberately laid down a principle from which his lordship would be sorry to depart. In that case the workman had met with an accident, which had disabled him from doing work as a collier, but heart disease, which was in no way caused by or connected with the accident, had supervened. The Court of Appeal held that the workman was not disentitled to compensation by reason of the supervening incapacity. If it was found as a fact that the man was suffering from a partial disability by reason of what happened in the employers' works, the employers' liability was not affected by reason of what supervened—namely, that the man could not get out of prison to get work. The test was not what he was earning, but what was his capacity to earn. The other points raised did not seem to be of great importance.

July 21.

## Workmen's Compensation—Res Judicata.

**Green v. Cammell, Laird and Co. Limited.**—This was an appeal from an award of the Birkenhead County Court judge sitting as arbitrator under the Workmen's Compensation Act, 1906. The applicant, J. R. H. Green, was employed by the respondents as an apprentice riveter, and on February 17, 1912, a hot chipping entered his right eye, with the result that he was incapacitated. The respondents paid him compensation at the rate of 10s. a week up to November 11, 1912. At that time the respondents had offered employment to the applicant at his old rate of pay, and on the applicant's declining this they stopped paying compensation. Thereupon the applicant began proceedings for compensation, but when the matter came before the county court judge on February 4 last he made his award in favour of the respondents. On March 10, 1913, the applicant began further proceedings for compensation, but when this application came before the county court judge on May 2 last he found that the question which had arisen between the applicant and respondents was *res judicata* having regard to his award of February 4, and he dismissed the application. The workman appealed.

The appeal was dismissed.

The Master of the Rolls said it was contended by counsel that there was no power to make, on an original application, what was known as a suspensory award for one penny a week, and that Green could not have appealed from the first award. It seemed to his lordship that, whether under an original application or under an application to review, it was equally competent to the Court to make an award of a penny a week. He felt no doubt that a penny a week might be awarded on an original application, and that if no such award was made it was competent to the workman to appeal against the award. No such appeal was presented in the present case and no such appeal could now be presented. In these circumstances the decision of the House of Lords in *Nicholson v. Piper* ([1907] 2 Appeal Cases, p. 215) was conclusive. The Court awarded in favour of the employers without any reservation of the right to the workman to apply in the future. It made no difference that there had not been any prior award and that the payments of 10s. per week had been by voluntary agreement.

## THE TIN-PLATE TRADE

## Liverpool.

The general tone of the market is a depressed one. Prices show no improvement, and although the reduction in cost of raw materials is assisting makers to some extent, values are still below cost of production. A moderate amount of business is being placed, but it is almost entirely confined to plates required for prompt shipment. Buyers are not disposed to book ahead at all. Current quotations may be called:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 13s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.), 27s. to 27s. 3d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 10½d. to 14s. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 10½d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 10½d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 10½d. per box; I C squares and odd sizes, 13s. 10½d. to 14s. basis. Charcoal tins run 15s. 9d., 16s. and upwards, according to finish, and are in but moderate request. Coke wasters are quiet. Quotations run:—C W 14 × 20, 12s. 9d. per box; C W 28 × 20, 26s. per box; C W 14 × 18½, 11s. 9d. per box; C W 20 × 10, 16s. 9d. per box—all f.o.b. Wales, less 4 per cent.

## LABOUR AND WAGES.

## North of England.

Meetings of the Northumberland District Board under the Minimum Wage Act for the revision of district rules was held at the Coal Trade Offices, Newcastle, on Monday and Tuesday, Lord Mersey presiding. Amendments were suggested by the men's representatives to the rules regarding absence from work, full time working, and the exclusion of aged and infirm workers from benefits. There was a full discussion, and Lord Mersey is expected to give his decisions on the rules about the beginning of September.

On Saturday, at Morpeth, the annual gala of the Northumberland miners was held; on the same day the Durham miners held their yearly demonstration at Durham. At Morpeth Mr. Charles Fenwick warned his audience against the present agitation for the abolition of the joint committee, and, amidst considerable dissent, denounced the "down tools" policy as the greatest and maddest infatuation ever known. Progress, he said, was best achieved through conciliatory methods.

At Durham a financial statement was read from each platform showing the income and expenditure from June 27, 1912, to June 26, 1913. Contributions amounted to £173,527; entrance fees, £522, and interest on investments, £5,636; amongst the disbursements were the following: sickness and accidents, £120,158; death benefits, £8,180; breakages of machinery, £9,748; strikes and lock-outs, £2,929; unemployment relief, £22,289; arbitrations and awards, £1,195; minimum wage, £872; compensation, £1,742. The value of the fund (less property) had declined from £113,043 to £112,151. The membership on January 1913 was 113,256 full members and 20,710 half members, as against 111,940 full members and 20,074 half members a year previously.

A meeting of the Durham District Board under the Minimum Wage Act was held on the 17th inst. at the Coal Trade Offices, Newcastle, to consider the revision of district rules which have operated since the Act was passed last year. A good many points were discussed, and the amendments proposed will be afterwards considered by the chairman of the District Board, Sir Robert Romer.

The annual meeting of the Cumberland Coal Trade Conciliation Board was held last week, when Mr. W. Graham was re-elected president; Mr. T. Cape, vice-president; Messrs. T. P. Martin and Andrew Sharp, joint secretaries; Mr. H. C. Howard, neutral chairman; and the Rev. W. E. Roberts, Great Clifton, neutral vice-chairman.

A meeting of the Cumberland and North Lancashire Federation was held at the Miners' Association offices at Workington on Saturday afternoon. A lengthy discussion took place on the dispute at present pending in Cumberland between the winding enginemen and the steel smelters with reference to enginemen at the coke works. After the matter was thoroughly considered, the following resolution was carried, the only dissentient being Mr. W. Stevenson, the representative of the winding enginemen: "That the lines of demarcation already fixed by this Board be adhered to, and that all men going from one department to another transfer to the union catering for the men of that department." The Federation also unanimously decided "that this Board recommends the two associations directly concerned mutually to settle the matter in dispute or submit it to arbitration as early as possible."

## Federated Area.

A special meeting of the council of the Leicestershire Miners' Association was held at Coalville, last week, to consider what action shall be taken with regard to the dispute over the method of applying three recent advances of 5 per cent. on the 1888 rates in addition to the minimum wage. The agent (Mr. L. Lovett) reported that the Conciliation Board could not agree on the question, and had referred it back to the owners' and men's representatives. The council resolved that the deputation request the owners to meet them again on the matter, and that if they fail to agree with the owners, the council empower the agent to issue ballot papers to the men asking whether they are prepared to hand in their notices to obtain the advances on the 4s. 9d. basis instead of 4s. 1d., as suggested and paid upon by the owners. The miners' agent has issued a lengthy statement showing the case for the workmen. In the course of this statement, Mr. Lovett says: "The coalowners in this district, instead of paying the 5 per cent. advance in addition to the minimum wage rate on the 1888 rates as provided for in the above resolution, have paid the advance on an entirely new basis, and upon a rate which has never existed in this district till created by them for the purpose of applying the 5 per cent. advance—namely, on a basis for stallmen of 4s. 1d., and wagemen employed in stalls of 3s. 4d. Then they have taken two-thirds of 6s. 2d. as a basis rate, making 4s. 1d. for stallmen. They have then put 5 per cent. on the 4s. 1d., thus making 2.45d. or 2d. per shift in addition to the minimum wage of 6s. 2d., making 6s. 4d. per shift, as decimal points below 50 with us are counted as nothing, 0.50 and over being counted as 1d. The basis, 3s. 4d., which the masters have created for the wagemen employed in stalls, who are paid the minimum wage, is arrived at by the same method, by taking two-thirds of 5s., and making a new basis rate of 3s. 4d."

An important meeting took place at Nottingham on Friday, July 18, between a committee of the Notts and Erewash Colliery Owners' Association and representatives of the Derbyshire and Notts Enginemen and Firemen's Union respecting the wages and percentage paid to the enginemen and firemen. After some discussion, an amicable understanding was arrived at that the matter should be laid before the whole of the body of colliery owners, a further meeting to be arranged by

the secretary of the owners, Mr. Hind, and the secretary of the Enginemen and Firemen's Association, Mr. Rowarth.

At a meeting of the executive of the Lancashire and Cheshire Miners' Federation, held in Salford on Saturday last, the tendering of notices to cease contracts against the employment of non-unionists at Messrs. R. Evans and Co.'s pits in the Haydock district of Southern Lancashire, was sanctioned. Between 5,000 and 6,000 men and youths are affected.

## Rates of Enginemen, &amp;c., in Shropshire.

A dispute recently arose in the Shropshire coalfield with reference to the wages paid to the enginemen and stokers, but same has now been settled at a conference between Messrs. G. F. Eager and H. Cook, representing the coalowners, and Mr. J. W. Wright, agent of the National Amalgamated Union of Enginemen and Firemen. The following rates have been agreed upon for winding enginemen, generator and pumpmen, and stokers, to take effect from the first making-up day this month, and to remain in force until the last making-up day in July 1915:—

	s.	d.	Hours.
First winding enginemen.....	6	8	for 8
Second winding enginemen.....	5	0	" 8
Second winding enginemen (winding water only).....	6	0	" 10½
Generator attendants.....	5	3	" 12
Pumpmen.....	4	10	" 9
Stokers (chargemen).....	4	4	" 8
Stokers (assistants).....	3	4	" 8

It was also agreed that married men should have free coal. Except in the case of the winding enginemen, these rates will be reduced or increased *pro rata* with the rise and fall of the miners' wages, and are to include all extras such as have hitherto been paid for as separate items.

## Miners and Parliament.

The Labour Party, in addition to the 40 seats for which they have representatives in the House of Commons, have now secured candidates in 12 other constituencies. Amongst these, Mr. H. Twist will stand for Wigan, Mr. T. Greenall for Leigh, and Mr. Robert Brown for Mid-Lothian. Mr. Burt, who is classed as a Liberal, will be succeeded at Morpeth at the next election by a Labour Party candidate, but no selection has yet been made. To these may soon be added Mr. J. A. Seddon as candidate for the Newton Division of Lancashire. Of the 40 members in the House of Commons, Mr. Tom Richards, the member for West Monmouthshire, is the only one so far who has intimated his intention to resign at the next General Election. It is thought likely that Mr. Alfred Onions will be selected as the candidate for this constituency. The candidature of Mr. Barnet Kenyon, the Derbyshire Miners' secretary, for the Chesterfield Division, in succession to Mr. James Haslam, is to be further considered, on the ground that Mr. Kenyon has been adopted by the Liberal party in the constituency. The special conference of the Miners' Federation of Great Britain which has been called to discuss plans for giving effect to the Trade Unions Act will also discuss the question of increased Parliamentary representation for the miners. A scheme has been prepared as the result of reports submitted from the respective districts, and this scheme, which involves a considerable increase in the number of Labour party candidatures under miners' auspices, will be submitted to the delegates.

## THE BY-PRODUCTS TRADE.

**Tar Products.**—The market is quiet, and prices much about the same. Benzols keep firm and in fair request. Pitch is quiet. Carbolic and naphthas remain on the easy side. Creosote steady. Nearest values are:—

Benzols, 90's.....	1/0½
Do. 50's.....	1/10½
Do. 90's North.....	1/0
Do. 50's North.....	1/10
Toluol.....	1/11
Carbolic acid, crude (60 per cent.).....	1/3 to 1/3½
Do. crystals (40 per cent.).....	4/4½
Solvent naphtha (as in quality and package) ...	9/9½
Crude ditto (in bulk).....	5/5
Creosote (for ordinary qualities).....	3/3
Pitch (f.o.b. east coast).....	40/6 to 41/6
Do. (f.a.s. west coast).....	40/ to 41/
Do. (f.o.b. gas companies).....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—The market is dull and very quiet. There is little or no alteration in prices, but there is also next to no business doing. The northern market is at a standstill, owing to the intervention of the annual holidays, and buyers are glad of the chance to leave the market alone. All the same there is little doubt but that any quickening of the demand would bring a corresponding advance in prices. Closing prompt prices are:—

London (ordinary makes).....	£12/3/9
Beckton (certain terms).....	—
Liverpool.....	£12/17/6
Hull.....	£12/15/0
Middlesbrough.....	£12/13/9
Scotch ports.....	£13
Nitrate of soda (ordinary) per cwt. ...	10/4½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

A battery of 65 waste-heat by-product coke ovens is being built at the Redcar ironworks of Messrs. Walker, Maynard and Co. Limited by the Coal Distillation Company of Middlesbrough, a branch of the Actien Gesellschaft für Kohlendestillation, of Düsseldorf. This installation will be arranged on the direct-recovery principle, and tar and sulphate of ammonia will be produced, whilst there will also be a plant for the recovery of benzol.



## INDIAN AND COLONIAL NOTES.

## Africa.

It is stated that the South African Railways have decided to reduce the rate for the product of Transvaal collieries to Cape Town to 14s., rebating 1s. on bunkering coal, as from October.

*Coal Resources of Rhodesia.*—Mr. H. D. Maufe, director of the Geological Survey of Southern Rhodesia, states in his report the north-western portion of the Wankie coal-field, including the main basin in which the colliery is situated, has been mapped by Mr. Lightfoot. The geological work has determined the succession of rocks and the structure of this field. The discovery of fossil plants is interesting, as proving what perhaps was never seriously doubted by geologists, that the Wankie coalbeds belong to the lower part of the Karoo system. The main coal-seam is known to be a very thick one, and the best in the sub-continent for steam-raising purposes. The survey of the district now shows that the basin in which the colliery is situated, although bounded in part by faults, is simple in structure, and remarkably free from faults and other disturbances. Estimates of the resources of the field made previous to the survey showed a very large reserve. Not only is this now confirmed, but a large addition may be made with considerable confidence. Mr. Lightfoot points out that it is probable 600,000,000 tons of coal could be taken out of the district mapped by him. The question of the coal resources of Rhodesia generally has also occupied the attention of the survey. At the request of the Committee of the International Geological Congress, an estimate was prepared for their forthcoming report on the coal resources of the world. The estimate is believed to be an exceedingly moderate one, in view of the fact that only those seams were taken into account the quality of which was known from analysis and the extent of which was known from prospecting operations. In fact, as a result of the survey of the Wankie field, the total may be raised by the addition of 400,000,000 tons. The revised total gives 969,411,000 tons, of which 825,852,000 tons, or 85 per cent., are steam coal, the remainder including both semi-anthracite and bituminous coals.

## Australia.

*Australian Coal in India.*—It has been pointed out, in reply to the New South Wales Commercial Agent in the East, who asserted that a good trade in Australian coal could be opened up at Calcutta, that all the Commonwealth coal shipped to that port is on board steamers carrying horses, and requiring dead weight cargo in the bottom, which, consequently, cannot be landed at ports en route, nor would the shippers of horses agree to such being done. Moreover, the coal pays only a nominal freight, or is imported on steamer's account. The Calcutta supplies are cheaper than those imported.

*Proposed Special Court.*—The proposal of the New South Wales Government to establish a special court, consisting of a Supreme Court judge, for the consideration of all mining disputes in the northern districts, has been rejected by the men, who, disregarding the precedent of the Federal Arbitration Court, want the judge to have the assistance of two representatives of the miners, and a like number for the employers.

*Equal to Newcastle.*—A colliery manager in the north-west district of New South Wales, giving evidence before a State Parliamentary Committee, said that the coal from his portion of the State was quite equal to Newcastle coal for industrial purposes, and the field was capable of immense development.

## New Zealand.

The Government Geologist of New Zealand, Mr. J. G. Morgan, gave some interesting facts and figures to the Dominions Royal Commission, when sitting in Wellington, on March 7. Mr. Morgan said that conditions in the Dominion were unfavourable for full mining, and probably only 100,000,000 tons of the 374,000,000 tons of proved bituminous coal would be mined. Of brown coal, there was 513,000,000 tons, but not more than one-fourth or one-fifth would be mined. The total quantity of proved coal of all classes was estimated at 1,001,000,000 tons, and certainly not more than a quarter of that quantity could be mined. Probably the whole quantity of coal in New Zealand, including proved, was 3,385,000,000 tons, of which less than one-fourth could be mined. For present requirements there seemed to be a sufficient quantity, but the supplies of good coal that could be mined were limited, and would probably be exhausted in 100 years. As regards bituminous coals Mr. Morgan thought there was very little more to be discovered. There would probably be greater discoveries of brown coal or lignite. There was no proved oil in New Zealand; Taranaki could hardly be said to be proved—the production was not sufficient to warrant plant of any great size.

Prof. Park, of Otago University, in his evidence before the Commission at Dunedin, also referred to the same, and stressed the necessity to reserve coal areas for the use of the State and also for Imperial purposes. This matter is more than domestic interest. It was a matter of importance for the defence of the Empire

in connection with the motive power for the navy. So far as New Zealand was concerned the popular idea was that coal was very abundant. That, however, was a fallacy due to the fact that coal was found scattered throughout the length and breadth of the Dominion in very small isolated patches. The total amount was very small. The coal deposits of New Zealand were: Brown coal, 520,000,000 tons; pitch coal, 306,000,000 tons; and bituminous coal (confined to West Coast), 254,000,000 tons. He thought there was no chance of new discoveries of coal being made here, though there might be extensions of the present coal fields. He considered it was a tactical mistake on the part of the Government to work the coalfields on the West Coast.

## Canada.

Mr. Reginald E. Hore succeeds Mr. J. C. Murray as editor of the *Canadian Mining Journal*. Mr. Hore is a native of Hamilton, Ontario, and has acted as assistant State geologist of Michigan.

## THE LONDON COAL TRADE

THURSDAY, JULY 24.

The London coal trade is still very depressed, and the actual sales are very slow. Factors who have bought somewhat heavily at comparatively low prices over the summer months, find considerable difficulty in moving the loaded wagons invoiced from time to time, and as the majority of these have very few depots in which to stock the coal in transit, they must perforce sell at the low rates prevailing, and frequently clear at a loss, and much below the colliery quotations. The attendance on market has been very thin at times, and all the sales are of a "hand-to-mouth" character. Practically nothing has been doing in the sea-borne market. No cargoes of either Durham or Yorkshire are on offer, and the market quotations are nominally the same, viz., 21s. 6d. for best Wallsend, and 20s. 6d. for seconds. Only seven vessels were reported on Monday's market in the Thames, and all under contract. In the inland market, although the demand was so small, the prices are becoming steadier, as apparently few of the old sales at cheaper prices are left now. The weather also has been helpful during the week, and a slight improvement is reported from the depots. Factory smalls and slacks are offering very freely, and the demand is distinctly lower. The reduced consumption in many of the electric works, and the large manufactories, has had a telling effect upon the prices for this quality of fuel, and although in many cases collieries have been working short time, yet stocks have accumulated. Many of the pits, however, have very little tonnage to offer on the open market, and maintain their prices very firmly. Coke continues very plentiful, and prices are weaker. Steam coals are easier, and the same may be said of all classes of kitchen coals. The lowest summer prices are still in force for the public advertised rates, although it was thought at one time that an early advance must take place this year, seeing that all contract rates in the colliery prices advanced 1s. per ton from July 1. The underselling and special "spot lot" rates have prevented any general advance in the public prices, and the limited demand has also operated largely against any general movement in price. The time is now approaching for the various wakes and feasts in the colliery towns and villages, which interfere largely with the output of the various collieries, but beside this there is still a great deal of unrest in the labour world.

## Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/6	13/6
Do. nuts .....	12/6	12/6
Birley cube Silkstone .....	12/	12/
Do. branch coal .....	15/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	12/6	12/6
West Riding Silkstone .....	12/	12/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	11/	11/
New Sharlston Wallsend .....	14/	14/
Wharfedale Silkstone coal .....	14/	14/
Do. Flockton Main .....	13/6	13/6
Do. Athersley house coal .....	11/6	11/6
Newton Chambers best Silkstone .....	15/	15/
Do. Grange best Silkstone .....	14/	14/
Do. Hesley Silkstone .....	13/	13/
Do. Rockingham selected .....	13/6	13/6
Do. Rockingham Silkstone .....	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best .....	11/	11/
Do. large nuts .....	10/9	10/9
Do. small nuts .....	10/	10/
Do. kitchen coal .....	9/6	9/6
West Hallam Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Do. London brights .....	10/	10/
Do. bright nuts .....	9/6	9/6
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Shipley do. brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Mapperley brights .....	11/	11/
Do. hard steam .....	10/9	10/9
Cossall Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Trowell Moor brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Grassmoor Main coal .....	12/6	12/6
Do. Tupton .....	11/	11/
Do. do. nuts .....	12/	12/

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal .....	12/6	12/6
Do. do. cubes .....	12/	12/
Do. special Derbys .....	11/9	11/9
Do. house coal .....	11/	11/
Pilsley best blackshale .....	12/6	12/6
Do. deep house coal .....	10/6	10/6
Do. hard screened cobbles .....	10/	10/
Hardwick best Silkstone .....	12/6	12/6
Do. Cavendish brights .....	11/6	11/6
Do. cubes .....	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/	12/
Do. small hards .....	11/	11/
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	12/	12/
Do. cobbles .....	12/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/	14/
Bestwood hard steam coal .....	12/	12/
Do. bright cobbles .....	11/3	11/3
Hucknall Torkard main hards .....	12/3	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. .....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/	12/
Do. hard steam .....	10/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/9	11/9
<b>Warwickshire.</b>		
Griff large steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	11/	11/
Do. loco Two Yard hards .....	14/	14/
Do. Ryder nuts .....	11/6	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Hannuchwood steam .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Exhall Ell coal spires .....	12/6	12/6
Do. large steam coal .....	10/9	10/9
<b>Leicestershire.</b>		
Snibston steam .....	10/6	10/6
Do. cobbles .....	10/3	10/3
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/6	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	17/	17/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	10/	10/
Do. large nuts .....	10/	10/
Do. bakers' nuts .....	9/6	9/6
Do. Main nuts .....	10/	10/
Do. hards .....	9/6	9/6
Granville New Pit cobbles .....	11/6	11/6
Do. Old Pit cobbles .....	10/6	10/6
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/6	13/6
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	15/	15/
Do. cobbles .....	14/	14/
Apedale best .....	13/6	13/6
Do. seconds .....	13/	13/
Podmore Hall best .....	13/6	13/6
Do. seconds .....	13/	13/
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London .....		
Do. brights .....	13/	13/
Do. shallow one way .....	12/	12/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	11/	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/	12/
Do. one way .....	12/	12/
Do. shallow coal .....	12/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles .....	22/	22/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/	11/

## From Messrs. Dinham, Fawcus and Co.'s Report.

*Friday, July 18.*—There was no alteration on the sea-borne house coal market to-day, which remained quiet, with no cargoes of Durham or Yorkshire on offer. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 27.

*Monday, July 21.*—There was very little enquiry for sea-borne house coal at to-day's market, but no supplies of either Durham or Yorkshire forthcoming. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 23.

*Wednesday, July 23.*—The sea-borne house coal market was very quiet to-day, with no sales reported. Best Durham 21s. 6d., seconds 20s. 6d. Cargoes 7.

The additional 50 by-product ovens at Harrington are ready for lighting, and the new ovens at Oughterside, near Maryport, 40 in number, are practically completed.



# DIRECT RECOVERY OF TAR AND AMMONIA FROM COKE-OVEN GAS BY THE STILL PROCESS.\*

The object of the Still process is to obviate the troublesome method of the indirect cooling of the case in tubular condensers, and to enable the ammonia to be recovered direct. At the same time it prevents the loss of ammonia liable to occur when the cooling water is re-cooled in the usual open type of apparatus. The system has been in use for some little time at several German works, notably in connection with a battery of 56 coke ovens at the Concordia Colliery, Oberhausen.

The gas from the coke ovens passes to the condensing plant, where it enters the condenser *a*, about half-way up, at a temperature of about 80 degs. Cent. This condenser, which is nearly 80 ft. high and 10 ft. in diameter, forms, at its lower extremity, a tar separator, from which the tar runs away in a warm state and ready for sending out, the water content being less than 4 per cent. The upper part of the condenser is fitted with baffle plates, over which the cooling liquid—condensed ammonia water, containing 3 to 4 grammes of ammonia per litre—flows, meeting in its downward course the ascending gas. In this way the gas is cooled down to about 40 degs. Cent., and passes at that temperature into the intermediate condenser, whilst the cooling liquid issues below at a temperature of about 70 degs. Cent. The bulk of the hot condensate, free from tar, escapes at the top of the liquid chamber—which is shut off from the gas chamber by a domed top and sealing pipe—running away through a siphon trap direct to the still. The amount of condensate to be evaporated in the still is under control, and is regulated so that there is no increase in the volume of liquid in circulation as time progresses. The amount of water

quantity of moisture (in the form of vapour) corresponding to its temperature, so that the ammonia saturation can be effected without any supply of heat to the saturation bath.

The actual saturator at the Concordia pit is an improved form of the one diagrammatically shown in the figure, more especially as regards the accessibility of the parts most exposed to wear. It consists of two tanks into which the gas is admitted through a main and six vertical pipes which dip into an acid bath. On issuing from the saturators the gas is passed through an acid separator and thence to the final cooling apparatus. Owing to the heat generated by the reaction in the saturator, the gas issues at a higher temperature (about 80 to 85 degrees Cent.) than that with which it enters. The final cooling apparatus, *f*, may be of the tubular or direct pattern, and its object is to cool the gas down to the proper temperature for benzol recovery, and to prevent troublesome condensation in the return mains leading to the ovens. If the saturation plant be properly worked the condensate in the cooling apparatus contains only traces of ammonia, and can be discharged as effluent or used for other purposes.

A noteworthy feature of the whole process is the simplicity of the operations and the success with which it works from the start. Apart from the motive power required for the coking plant as a whole, the by-product recovery plant is kept going by one gas-suction fan and a pump *g*—an electric centrifugal pump which delivers the cooled condensate from the evaporator to the top of the first condenser, whence it returns by gravitation. The tar also is recovered at such an altitude that it can be run down into the delivery tank without the aid of a pump; and there is only one low-level tank *h*, from which the cold condensate has to be

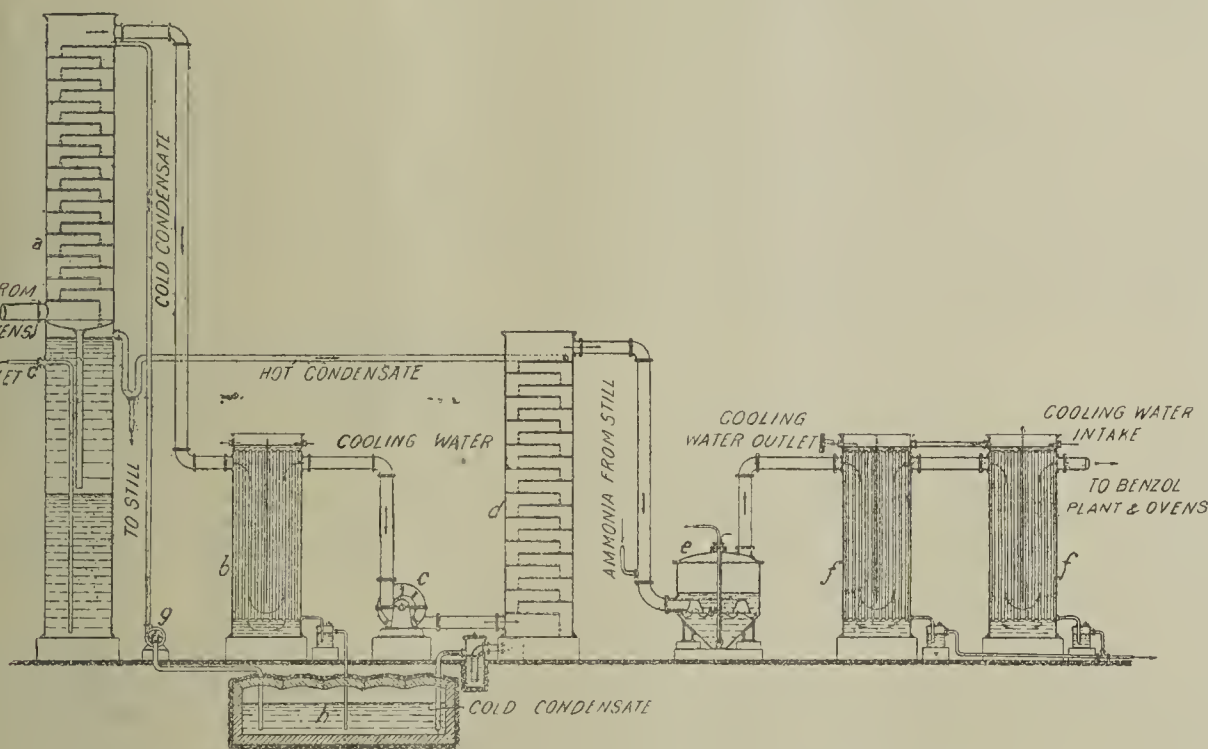


DIAGRAM OF STILL RECOVERY PLANT AT THE CONCORDIA COLLIERY.

to be dealt with in the still is so small that the apparatus has only to be worked intermittently.

The intermediate condenser *b* into which the gas next passes is a tubular condenser of the ordinary pattern. It fulfils a dual purpose, in the first place by eliminating the final traces of tar and furnishing practically cold gas to the blower *c*, in order to increase the working efficiency of the latter; and secondly, it cools down the hot condensate for use over again, thereby enabling as much gaseous ammonia as possible to be returned to the flowing gas. The blower plant consists of a pair of turbo fans (Kühnle, Kopp and Kausch), with a capacity of 406,000 cubic feet per hour. The blower in constant use is driven by a 80-horse power enclosed electromotor at a speed of 2,920 revolutions per minute; whilst the auxiliary blower is run at 3,600 revolutions by an 80-horse power steam turbo-generator.

The blower forces the gas, at a temperature of about 30 degs. Cent., into the evaporator *d*, which, like the first condenser, is fitted with baffle plates. In trickling down this apparatus, the hot condensate parts with nearly the whole of its volatile ammonia, and gives up its heat to the gas, which issues at about 70 degs. Cent. It then passes through a lagged pipe to the saturator *e*. Shortly before reaching this, the gas is mixed with the ammonia from the still, and thus enters the saturator at a temperature of about 75 degs. Cent. There is no difficulty attending this addition of distillate to the warm gas, as no condensation occurs on contact with the cooler gas, nor is there any fear of the saturation bath becoming diluted. The gas contains just the right

raised, together with any tar deposited in the pit, to the condenser by means of the pump in question. Throughout the process, except for the loss of heat carried away by the cooling water in the intermediate condenser, there is a complete circulation of heat between the gas and water and *vice versa*.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—A. S. Bullock and H. G. Merry, carrying on business as coal and coke merchants, at Culver-street, Colchester, under the style of H. G. Merry and Co.; J. Jones and J. P. Ratcliffe, carrying on business as coal merchants, at Rhyl-street, Bolton, under the style of John Ratcliffe and Co.; J. Aldred and W. Aldred, carrying on business as coal merchants, at Ordsall-lane, Salford, and at Weaste and Patricroft, under the style of J. and W. Aldred.

**Grimsby Coal Exports.**—The return of coal exported from Grimsby during the week ended the 17th inst. is as follows:—Foreign: To Ahus, 1,109; Antwerp, 714; Copenhagen, 2,548; Cronstadt, 3,771; Drammen, 1,707; Esbjerg, 319; Dieppe, 1,006; Gefle, 3,557; Gothenburg, 1,534; Hamburg, 848; Helsingborg, 1,893; Helsingfors, 1,650; Malmö, 2,859; Middegart, 1,499; Otterlochen, 293; Port Kinda, 1,325; Randers, 255; Rotterdam, 258; Stockholm, 2,016; Ystad, 2,072 tons. Coastwise: To London, 216 tons. Total: Foreign 31,033 tons, and coastwise 216 tons; compared with 29,746 and 2,676 of last year. The exports from Immingham were:—Foreign: To Rotterdam, 2,543; Cronstadt, 2,917; Hamburg, 3,314; Bombay, 501; Port Vecchio, 5,858; Perna, 1,343; Stockholm, 1,773; Wismar, 1,781; Riga, 3,045; Rönne, 722; Alexandria, 5,424 tons. Coastwise: To Devonport, 1,400; London, 1,580 tons. Total: foreign 29,921, and coastwise 2,980 tons, compared with 22,401 of last year.

F. Korten. Glückauf.

## MIDLAND INSTITUTE OF MINING, CIVIL AND MECHANICAL ENGINEERS.

Presentation to Mr. J. R. R. Wilson.

Mr. W. HARGREAVES (president) occupied the chair at a dinner of the Midland Institute of Mining, Civil and Mechanical Engineers in Sheffield on Tuesday, July 22, the chief purpose of the gathering being a presentation of a portrait in oils to Mr. J. R. Robinson Wilson, divisional inspector of mines for Northumberland and Durham, who was for many years stationed in the Yorkshire Division, during which time he took an active part in the work of the institute, and passed the presidential chair. The president made the presentation, and remarked that Mr. Wilson had made a name for himself which would long live in their recollection. He had shown himself a man of well-balanced mind and sound judgment, and it was a great pleasure to them to find that he was taking high rank in the mining inspectorate.

Mr. WILSON, in reply, said they had inspectors now to look after practically everything. There was a gentleman to see that they did not take blind ponies into the pit, and it seemed to be generally recognised that the only blind thing that might now go into a mine was the inspector.

In addition to the presentation, there were important comments made on the subjects of oil fuel for the Navy and the safety of mines.

Mr. C. L. ROBINSON, inspector of mines, Leeds, proposed the toast of "The Mining Industry." Despite fearful odds against which it had to contend, they could always report progress in that industry. Unfortunately in that division there was a reduction of one and a-half million tons in the output for the last year. The cause was not far to seek, though it was, of course, up to the workmen to do the best they could for themselves. Yorkshire was specially interested in the development of mining in new areas, because such development was apparently increasing the dangers of mining. Increased depths, increased rock pressures and temperatures demanded the careful consideration of the best brains available, and of these he was confident Yorkshire had its full share. Mining involved such a multitudinous variety of sciences that specialisation must receive more consideration in the future in order to deal with all the difficulties that had to be faced.

The secretary of the institute, Mr. G. BLAKE WALKER, replied. He alluded to the enormous rapidity with which mining had advanced within the last ten or twenty years, and said that the various governments would have to consider how soon we were going to use up the minerals which the world contained. Every nation now wondered what was going to happen two hundred years hence. Of iron ore the world was getting exceedingly short, though it might be that in some undeveloped countries, such as China, immense deposits might be found which would last a considerable time. Though coal was at present the essential source of power, there were other sources. The other night in the House of Commons the First Lord of the Admiralty had informed them that so far as the Fleet was concerned they were going over from coal to oil. He had travelled in various parts of the world where oil was found, and he had the opinion that the oil supplies were not very persistent or very reliable, and that the time was not in the very distant future when we should be looking in vain for further supplies of petroleum. He hoped, therefore, that we might not be committed absolutely to the use of oil as against coal. They had found that the best method of using coal was not that of burning it under boilers, but that of gasifying it and using it for internal-combustion engines; and although for the moment it was simpler to burn oil in small craft in the Navy and in some merchant vessels, the internal-combustion engine had probably a longer life. Everyone now realised that we could no longer waste coal, and everywhere efforts were being made in the direction of economy. They must look to the gasification of coal to give at least twice the amount of power.

Mr. Blake Walker made reference to a remark of Mr. Smillie's at the Carlsbad conference, and said that Mr. Smillie looked to the nationalisation of mines and other things as the way in which coal was to be produced more cheaply and more safely, and to be sold more cheaply to the poor. Mr. Smillie regarded capitalism as a great ogre, which was to be fought and killed, but the man who imagined that the mining industry was going to dispense with capital was making a fundamental mistake. Whether, if a change took place, the miners would like the State masters better than private masters was a thing they could only tell when it had happened, but he thought they would find they had got King Stork instead of King Log. There was an impression that the return on mining capital was very unequally divided, and that the men got far less than they ought to have, but those who had to do with the wage bills knew that 10 per cent. on a wage bill meant a great deal more in the course of a year than a similar percentage on the owners' capital.

Mr. W. H. CHAMBERS, of the Denaby and Cadeby Colliery Company, made an important speech on the subject of safety in the mines. He said it was not fair to draw comparisons between the present and the past, for the conditions and difficulties of to-day were so different. Collieries had



be worked for the production of a commodity at the best price for the benefit of the community at large, and they did that at the least possible risk to life. One object was certainly to give a return, so as to induce the investment of capital in the enterprise, but safety had never been lost sight of, and there was no manager and no mining engineer who did not put the safety of the mine and those engaged in it paramount above everything, no matter what anybody else might say. Consultations between managers, engineers and inspectors did more for the attainment of safety and better organisation than all the Acts of Parliament ever evolved, and while there was that co-operation they would go on improving.

"Success to the Institute" was proposed by the Vice-Chancellor of Sheffield University (Mr. H. A. L. Fisher), who said that he would make it one of his prime considerations as long as he was connected with the university, that it afforded every possible assistance to the mining industry.

Prof. HARDWICK, replying, mentioned that the institute had raised a sum of over £1,800, which it was asked to contribute to an endowment fund for the Institution of Mining Engineers. The South Yorkshire Coal Trade Association had consented to give £1,200, the West Yorkshire Association £600, and other subscriptions had also been raised.

### COMMERCIAL MOTOR VEHICLE EXHIBITION.

The above Exhibition, which opened at Olympia on the 18th inst., and closes to-morrow (Saturday), is the first of its kind to be held. Undoubtedly this mode of road transport is rapidly replacing that of its predecessor, the horse-drawn conveyance, and the various industries indicated on the name plates on the vehicles at the present show are convincing evidence that the motor now bids fair to revolutionise the different forms of transport used in most industries. The Exhibition was officially opened by H.R.H. Prince Arthur of Connaught.

The following comprise a few of the firms whose vehicles are more suitable to the industries with which this journal is connected:—

FODENS LIMITED, Elworth Works, Sandbach, Cheshire. This firm show a 3-ton steam-propelled covered lorry, together with a flat platform lorry of the same weight. A vehicle of 5 tons capacity is also to be seen on their stand. All are fitted with rubber tires, and central steering gears and single chain drives are adopted.

Messrs. AVELING AND PORTER LIMITED, of Rochester, show a 5-ton Aveling compound steam motor wagon, constructed to comply with the motor-car regulations existing in this country. A 3-ton petrol lorry, mounted with rubber-tired wheels, is another of this firm's exhibits.

DENNIS BROTHERS (1913) LIMITED, Guildford. This firm have a very complete array of motor and turbine fire engines, consisting of three of 60, 45, and 20 horse-power, the capacities being respectively 400, 300, and 150 gallons.

NAPIER MOTORS LIMITED, 14, New Burlington-street, W., whose extensive works are situated at Acton Vale, W., show several of their commercial vehicles, ranging from 15 to 40 horse-power. We are informed that an ambulance vehicle had recently been supplied to the Rhondda Rescue Station at Dinas. It is of 30-horse power, is replete with operation table, stretcher, and suitable cabinets for holding medicines and all the numerous first-aid necessities, which are to be ready at hand in colliery accidents.

ALLDAYS AND ONIONS' PNEUMATIC ENGINEERING COMPANY LIMITED, Birmingham. This firm, perhaps, show the widest range of commercial vehicles, ranging from a small "Midget" van of 5 cwt. capacity to that of a 5-ton van, the horse-power ranging from 8/10 to 30/40. A splendid exhibit is made complete by the introduction of six other vehicles, the horse-power of which range from 12/14 to that of the above-quoted 5-ton vehicle, but which is of slightly smaller capacity, being a 3-tonner.

SIDNEY STRAKER AND SQUIRE LIMITED, Nelson Works, Blackfriars-road, S.E. A wide range of this firm's well-known transport vans and lorries were to be seen, mostly of the same horse-power, 21 to 28, but with capacities of 1½ to 4 tons.

JOHN I. THORNYCROFT AND CO. LIMITED, Caxton House, Westminster, S.W. This well-known firm exhibit some six different types of their vehicles, including two lorries of 30-horse power and 45 cwt. to 3 tons, two delivery vans of the same horse-power and 40 cwt. to 3 tons capacity, together with a 30-horse power 28-seated char-à-banc and a 30-horse power "Subsidy" type vehicle being one of a number built for the War Office.

Application has been heard before Mr. Registrar Hope, at the London Bankruptcy Court, for an order of discharge on behalf of Mr. Arthur Burr. The adjudication was made in October 1898, and proofs to the amount of £109,623 had been received by the trustee. The assets were estimated to produce £249,815, but less than £550 has been realised, and no dividend has been declared. The Court is now asked to grant an order of discharge, subject to a judgment for a sum of money to satisfy all the outstanding liabilities and the costs of the proceedings. His Honour appointed November 7 next for the resumed hearing.

### NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Keen Discussion on Oil Fuel versus Coal—Some Interesting Considerations—Princely Gift by a Coalowner—Coal Trimmers seek Saturday Half-holiday—Coalowners' Liability for Subsidence: Important Conference of Urban Councils—Federation's Scale for New Work—Owners' Appeal against Decision upon Wage Average—How the Coal Strike Injured the Tin-plate Trade.**

Mr. Churchill's speech concerning the adoption of oil fuel in the Navy has been very much discussed in South Wales circles—but discussed by some persons upon an assumption that is not yet verified, nor even sustained by argument. That assumption is that the Admiralty intend to substitute oil fuel for coal in the whole of the Navy as soon as this becomes practicable. Such a design, however, does not clearly appear in Mr. Churchill's speech, and therefore the expressed fears of, for instance, the workmen's journal as to loss of employment by miners have no foundation in fact. Mr. Churchill would use oil for the destroyers, some cruisers and some capital ships, but coal is still an essential requisite.

So far as regards South Wales and its exports, it is the general consumption by merchant steamers that exercises the greatest influence upon the trade, for the exports to the depots—such as Cape de Verde Islands, Gibraltar, Malta, Port Said, and other places—is mainly of coal that is required by merchant steamers. It is fully recognised that the Diesel engine is being adopted in very many vessels, and is proving a great success. But this is not a steam engine; and it has to be borne in mind that for the tramp steamers the life of an ordinary steam engine driven by coal is very much longer than would be the life of a Diesel engine. Upon a calculation of working costs—with due regard to the life of engines and plant—the coal-fired boilers (raising steam) still hold the field. As to the use of oil for steam-raising purposes, the chief question is facility of supply and cost of that fuel. Mere working costs are not the governing factor, standing alone. The widespread distribution of coal has to be contrasted against the fact that the oil supplies of the world are in the hands of two or three great combinations, able to exact their own price. But a steamer, if unable to get British coal, has German, French, Belgian, Russian, American, and other resources—even to those in the Far East; resources which can be drawn upon according to the location of the vessel needing fuel. With the oil supplies held entirely by one or two organisations, the vessels would—even if supplies could be everywhere available, which they are not—be at the mercy of any price that the monopolists chose to exact, just as motor-car owners are at present in respect of the price of petrol.

One other fact with direct application to the coal trade is that Mr. Churchill referred to the extraction of oil from shale in Scotland, and to the production of oil fuel from the coal measures. This, of course, would depend upon the relative proportion of volatiles; and whilst South Wales in its steam coal and anthracite has no very high proportion of volatiles, it is significant that experiments are in progress for the production of benzol and other residuals at several places in the district. By-product plants are being constructed, with special reference to the extraction of benzols, and whether the price of that product would warrant the lessening of the price of the coke (consequent upon its deterioration) is a subject now receiving careful consideration. As to the fears expressed by the Labour journal concerning loss of employment, these may be set aside; for whether the coal be mined for direct consumption or for use in the extraction of liquid fuel, mined it certainly will be, and thereby the extent of employment be maintained.

One more consideration. South Wales, in exports alone, increased from 12½ millions of tons in the first half of 1911 to over 14½ millions in the first half of 1913. (Last year is out of account because of the strike.) That increase is still in progress, with fair prospect that our exports this year will be from 25 to 30 per cent. above 1911. For power-producing, therefore, coal not only holds the field; but must continue to hold it—a world output of 1,200 millions of tons contrasting with (say) 10 millions of tons of oil which has been applied as fuel for heavy engines, the remainder going to other work. Coal has in 10 years increased, in world output, by 50 per cent.; and oil supplies are not anywhere near the possibility of meeting the needs of business.

The subject invites comment, its considerations being most attractive of discussion; but only one other point can now be mentioned—namely, the great improbability (amounting almost to impossibility) that any material proportion of steam-users will convert their boiler-furnaces to oil-fuel use, in view of the risk which attends both quantity of supply and the monopolists' price.

A princely gift by a local coalowner is announced. Mr. W. J. Thomas, of Ynyshir, having undertaken to defray the cost of the new Medical School at Cardiff. This will exceed £20,000, and may run to nearer £30,000. The school will occupy the site of the old University College at Cardiff, and will work in conjunction with the college. The buildings will form an imposing addition to the architectural features of the city, and will be immediately contiguous to the Rhymney Railway Station, within a short distance of the hospital, to which Mr. Thomas has been previously a munificent donor.

The Coaltrimmers' Union held a meeting in Cardiff on Sunday upon the "one o'clock Saturday" question. There was a large and representative meeting. The suggestion is that work shall cease at one o'clock on all Saturdays, instead of that, as at present, the ordinary stopping time should be five o'clock, with an extension to eight o'clock in those cases where the workers are able to finish the ship for sea by that hour. A National Conference being about to take place in Birmingham, the Cardiff delegates (who represent also the workers at Penarth and Barry) were instructed to vote in favour of an all-round one o'clock movement for the United Kingdom as a whole.

The conference of urban councils, held at Llandrindod Wells at the end of last week, was representative of municipal authorities all over the country; and one important matter which they dealt with was the motion relating to mining. The representative from Risca (in Monmouthshire) moved that the conditions under which the leaseholder is deprived of his claim for compensation for damage caused by mining are unjust; and that the executive committee of the urban district councils should consider what action to take in order to secure payment of compensation. The speaker dwelt upon the fact of loss suffered through subsidence by the owners of dwelling-houses; and his motion was seconded by another Monmouthshire man—Mr. Carter, of Abertillery. An amendment which simply asked the executive to consider and report was, however, carried; and in supporting it, Mr. W. P. Nicholas (clerk to the Rhondda Council) said that if the executive would consider the whole question of the rights of all kinds of property, he would let them see privately the opinion of an eminent counsel. Mr. Nicholas said that he represented the largest mining community in the kingdom. His council felt this question acutely, and it was a very complex one.

Seeing that this matter has been taken up by a central body like that of the urban councils, it is evident that a movement is on foot that may be carried to considerable length, with important results to colliery proprietors.

The decision of the South Wales Miners' Federation to set up their new schedule as the sole scale of payment for new work in collieries has already occasioned difficulty. A dispute has arisen at the Celynen sinkings over the schedule, and the men are working out notices to terminate contracts. The same question arises also in two other places, and meetings are being held. The attitude of both sides leads to fear that serious extension of the dispute may take place in other directions.

At the meeting of the Conciliation Board, on Monday, the employers' representatives drew attention to this action of workmen in the new district of Celynen Colliery, these having given notice before the matter in dispute had come before the Conciliation Board, their action being, therefore, a breach of agreement. The workmen's representatives undertook to enquire into the matter.

It has been arranged that the workmen shall have three days' holiday—Monday, August 4, and the two following days.

From the owners' side of the Conciliation Board, notice has been given to the men's representatives that the employers are appealing against the decision of Mr. Justice Pickford in reference to the period for averaging the wages, and that, pending this, they will continue to average piece-workers' wages over the old period of a fortnight. This is the term under Rule 7 of the independent chairman's award, made in pursuance of the Minimum Wage Act; but in the case of Davis v. Glamorgan Coal Company, which the Federation had taken into court on this point, Justice Pickford's decision substituted a week.

The prospecting for coal in Radnorshire proceeds steadily; and the Radnor Coal Syndicate has appointed additional directors. The work of proving the coal is to be proceeded with by means of a drift which is in progress at Folly Bank, near Presteign.

Mr. T. Thomas, chief mechanical engineer at the Trane and Llewellyn pits, Gilfach Goch, has been the recipient of a gold watch, subscribed for in recognition of his bravery in rescuing three men after the stage on which they were working had collapsed. Several men were dashed to the bottom; but Mr. Thomas, though the ground was still falling, descended at the risk of his life, and sent up three to a place of safety, by means of a rope. Mr. Leonard Llewellyn, who was one of the speakers at the meeting, said he knew of no braver deed. Representations are being made by the coroner and the mines inspectors with a view of obtaining award of the King Edward medal.

The death is announced of a gentleman who was very well known in the coalfield, Mr. T. Rees, Llantrisant. He was one of the oldest contractors in South Wales, and has carried out important sinkings for some of the chief colliery concerns in the district.

The idea that there will be a stop-week in the tinplate industry was very strongly antagonised by an experienced workmen's leader on Saturday, when Mr. J. H. John, general secretary of the Welsh Artisans' United Association, spoke at a council meeting of that body. He referred to the circular which the Steel Smelters' Organisation had issued to their tinplate



members, urging a stoppage in the first week of September; and he described this as a crisis graver than any that had arisen since the formation of the Conciliation Board. It involved the crippling of the export trade, for the Welsh makers had now no monopoly, the Americans being large manufacturers. There was, he said, a striking lesson last year when a general stoppage of tin-plate workers took place owing to the coal strike. Owing to that stoppage, debarring supplies from South Wales, the average exports of American tin-plates had increased by 100 per cent. in the period immediately succeeding the strike, the Americans capturing the work of 37 Welsh mills. This was the direct result of the general stoppage caused by the national coal strike; and he regarded it as a forecast of what might happen if a general stoppage were brought about by the present movement. Speaking further upon the Conciliation Board, he pointed out that the idea of a general stoppage had been considered, and had been rejected upon the weight of fact and argument; and the new proposal was to ignore all this—to dislocate trade, and endanger the existence of the Conciliation Board. He advised the members of his union to take no part in what might bring about a calamity in the Welsh tin-plate industry. As a result, the council of the Artisans' Association decided not to present notices.

The difficulties which had arisen at Ferndale Collieries concerning the doctor question (as to which there was some talk of the giving in of notices), have so far been overcome that no such drastic action is likely to be resorted to. Negotiations are in progress, which are expected to have satisfactory results.

**The Law as to Property and Conveyancing.**—The text of the Lord Chancellor's Real Property and Conveyancing Bills has now been published, with an explanatory White Paper [119]. Speaking generally, the object of the Bills is rather the improvement of the working machinery of the law than the introduction of changes as regards ownership itself. The Bills are not intended to proceed further than second reading in this Session. The Bill proposes that all copyholds shall at once be enfranchised, so as to be capable of being held and dealt with in the same way as ordinary freehold land, but leaving the pecuniary rights of the lord, the steward and the copyholder unaffected for five years. During the five years all dealings will have to be registered with the steward, and various facilities and inducements are given to the parties to settle the amount of the capital sum or of the fixed rent charge to be paid by way of compensation. After the five years the rights will cease—subject to the payment of compensation, which will be fixed by the Board of Agriculture. As to mines and minerals, the Bill provides the means whereby either lord or tenant may compulsorily buy out the rights of the other: if both wish to buy, the Board of Agriculture is to decide what is to be done. The Bill abolishes the custom of gavelkind and borough English. Perpetually renewable leases are also converted into long terms. The improvements of the Land Transfer Acts follow closely the recommendations of Lord St. Aldwyn's Commission. They include a provision for the maturing of "possessory" titles into "absolute" on the expiration of 12 years from the date of first registration, and a power for the registrar to enter a title as absolute in any case where the evidences produced either on first registration or on a transfer appear to justify it, whether the applicant has applied for such a title or not. Important concessions are made with regard to the Inland Revenue charges for death duties as affecting purchasers. Under the Bill a purchaser of land will take possession free from all charges for death duties—the claims of the Crown following the purchase moneys instead. Amendments of the general law comprise, among other things, the abolition of the technical rule by which the words "and his heirs" or "in fee simple" are absolutely necessary in an ordinary conveyance of land, and of the need of enrolment of disentailing deeds; a power for a tenant in tail in possession to dispose of the land by will without going through the formality of a disentailing deed; provisions whereby on transfers and discharges of mortgages a conveyance or reconveyance of the estate is rendered unnecessary; and reduction of the length of title required on open contracts from 40 to 30 years. There is a modification of the rule, whereby advances on certain mortgages to secure future advances will be made easier and safer. The amendments also include an extension of the objects which count as "improvements," such as an agent's house, structural additions and alterations to buildings, boring for water or minerals, heating apparatus, and installations for electric, gas, or other artificial light. Other subjects dealt with include leasing powers, compound settlements, powers of trustees on trust for sale, dedication of land to the public, and minorities. The Conveyancing Bill is founded on the Bill prepared by the late Mr. Wolstenholme on instructions of the Council of the Law Society, which was introduced in 1897 by the late Lord Davey in the House of Lords, where it was read a second time. Some existing evils are proposed to be remedied by relegating all partial interests in land to the position of trusts, and so reducing all "estates" to two forms, the fee simple and the term of years, called in the Bill "proprietary estates," and to liberate a purchaser of a proprietary estate from the obligation to take notice of trusts. At the same time a new protection is afforded to persons interested under settlements and trusts, in the shape of a register of cautions and inhibitions.

### CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

**BISHOP STORTFORD, AUGUST 2.**—The Guardians of the above union invite tenders for the supply of 500 tons (more or less) of best steam hard coal, the same to be delivered at the workhouse between August 6, 1913, and June 30, 1914, at such times and in such quantities as the Guardians or their officers may direct. Colliery weight tickets to be furnished on delivery. Forms of tender to be obtained at my office. Sealed tenders to be sent to my office before one o'clock on Saturday, August 2, 1913. The Guardians do not bind themselves to accept the lowest or any tender. By order of the Board, Alfred G. Gwyn, clerk, 29, North-street, Bishop Stortford.

**BLACKBURN, AUGUST 2.**—The Electricity Committee is prepared to receive tenders for the supply and delivery of steam coal for the 12 months ending August 31, 1914. Specifications and forms of tender may be obtained on application at the Electricity Works, Jubilee-street, on and after Saturday, July 19, 1913. Sealed tenders, endorsed "Steam Coal," and addressed to the chairman of the Electricity Committee, will be received at the Town Hall up to mid-day Saturday, August 2, 1913. The lowest or any tender will not necessarily be accepted. P. P. Wheelwright, M.I.E.E., engineer and manager, Corporation Electricity Works, Jubilee-street.

**WIGAN, AUGUST 2.**—The Corporation of Wigan invite tenders for the supply of best quick-firing slack and (or) washed peas, to be delivered free at the electricity works, Wigan, in such quantities and at such times as may be required during the 12 months commencing September 1, 1913. The estimated quantity of fuel required is 15,000 tons. Form of tender may be obtained on application to the electrical engineer, Bradford-place, Wigan. Sealed tenders, on Corporation's printed form only, and endorsed "Tender for fuel," must be delivered to me not later than Saturday, August 2. The Corporation do not bind themselves to accept the lowest or any tender. William Henry Tyrer, town clerk, Wigan.

### Abstracts of Contracts Open.

**ANTWERP, JULY 31.**—Fuel for heating Custom House buildings at Antwerp and at Lillo—viz.: (1) 272 tons of unscreened cobbles coal, (2) 3,500 hectolitres (9,625 bushels) of unwashed coke. Information at the Hôtel des Douanes, Anvers, or Antwerpen.

**BARNLEY, JULY 31.**—House coal, steam nuts, slack and steam coal, for the Corporation. Forms from Mr. W. P. Donald, town clerk, Town Clerk's office, Barnsley.

**BARNSTAPLE, JULY 28.**—Best Lydney coal and coke, for the Education Committee. Tenders to Mr. G. W. F. Brown, secretary, The Strand, Barnstaple.

**BATLEY, AUGUST 6.**—For the Corporation, 20,000 tons of screened gas coal. Forms from the manager at the gas-works.

**BRIGG, JULY 30.**—About 250 tons of household coal, for Glanford Brigg Guardians. Sealed tenders to Mr. Frank C. Hett, clerk to the Guardians, Brigg.

**BRUSSELS, AUGUST 9.**—Fuel, necessary to heat the communal buildings of Etterbeek-lez-Bruxelles. Specifications at the Bureau des Travaux Publics, Maison Communal.

**BURY ST. EDMUND'S, AUGUST 11.**—Steam and house coal for the Electricity Supply Committee. Forms from Mr. S. E. Day, borough electrical engineer, Corporation Electricity Works, Bury St. Edmunds.

**CLACTON-ON-SEA, AUGUST 6.**—About 5,000 tons of best screened gas coal, for the Urban District Council. Forms from Mr. Sydney Francis, Town Hall Buildings, Clacton-on-Sea.

**EXMOUTH, JULY 29.**—The directors of the Exmouth Gas Company invite tenders for the supply of 7,000 tons of best gas coal (screened or unscreened). Tenders, endorsed "Tender for coal," to Mr. James T. Foster, secretary and manager, Gasworks, Exmouth.

**FLEETWOOD, AUGUST 5.**—Rough coal required in the electricity department, for the Fleetwood Urban District Council. Forms from Mr. A. Cottam, clerk, Town Hall, Fleetwood.

**GLASGOW, JULY 28.**—Coal, dross and tripping, for the Corporation. Forms from Mr. J. Lindsay, town clerk, City Chambers, Glasgow.

**GREENOCK, AUGUST 4.**—For the Corporation, 22,000 tons of steam coal (washed singles and pearls). Forms, on payment of 5s. (returnable), from Mr. J. A. Robertson, borough electrical engineer, Municipal-buildings, Greenock.

**HAILSHAM, JULY 30.**—About 80 tons Hetton Lyons, Wear Wallsend or Bonds Main coal, for the Guardians; also about tons of Linby hard steam coal. Forms from Mr. Edmond Catt, clerk to the Guardians, 17, London-road, Hailsham.

**HASTINGS, AUGUST 13.**—For the Guardians, 650 tons of hard steam cobbles. Forms from Mr. A. R. Inskip, clerk, 11, Wellington-square, Hastings.

**JARROW-ON-TYNE, JULY 29.**—Coal and coke, for the Education Committee. Forms from Mr. T. H. Spencer, secretary, Education Office, Town Hall, Jarrow.

**KILDARE (IRELAND), JULY 28.**—About 45 tons of best screened house coal to the Kildare County Infirmary, for the Joint Committee. Tenders to Mr. Charles Bergin, hon. secretary, Kildare.

**KINSALE (IRELAND), JULY 30.**—About 120 tons of best red ash Newport coal, for the Guardians. Forms, Mr. John Murphy, clerk of Union, Board-room, Workhouse.

**LONDON, JULY 29.**—About 10,000 tons of large steam coal, for the directors of the Grenville United Mines Limited, Granville House, Arundel-street, Strand, London, W.C. Tenders to the secretary at the address given above.

**LOWESTOFT, JULY 29.**—About 4,000 tons of slack coal to the electricity supply, for the Corporation. Forms from Mr. W. R. May, A.M.I.E.E., borough electrical engineer, Electricity Works, Norwich-road, Lowestoft.

**NEWPORT (I.W.), SEPTEMBER 11.**—Fuel, for the Isle of Wight County Council. Particulars from Mr. J. Dufton, clerk, County Council Offices, Newport, I.W.

**PLYMOUTH, JULY 29.**—About 400 tons of coal and 20 tons of chopped firewood, for the Education Committee. Forms from Mr. E. Chandler Cook, education secretary, Education Office, Cobourg-street, Plymouth.

**SOUTHAMPTON, JULY 28.**—For the supply of 250-300 tons best seaborne house coal to the Royal South Hants and Southampton Hospital, for the committee. Also for 50 tons kitchen cobbles. Tenders to Mr. T. A. Fisher Hall, secretary.

**THERFIELD (HERTS.), JULY 29.**—About 23 tons of coal (hard cobbles), for the Boteman Charity Trustees. Tenders to Mr. J. Graut, secretary, Boteman Charity, Therfield, Herts.

**WIGAN, JULY 30.**—Best house coal and a small quantity also of nuts and slack, for the Corporation. Tenders, stating name of fuel, endorsed "House fuel," to be delivered to Mr. William Henry Tyrer, town clerk, Wigan.

The date given is the latest upon which tenders can be received

### CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

**DURBAN, AUGUST 1.**—Coaling Plant.—With reference to the call for tenders for the supply and erection of additional coaling appliances at Durban Harbour, it is notified by the imperial trade correspondent at Johannesburg that the time for the receipt of tenders in this connection has been further extended to August 1. Tenders, on the proper form, will be received by the secretary to the Tender Board, South African Railway Headquarters Offices, Johannesburg, up to that date. Copies of the specification and form of tender may be obtained at the office of the High Commissioner for the Union of South Africa, 32, Victoria-street, S.W.

**LONDON, JULY 29.**—Girders.—Tenders are invited for the supply of about 227 tons of steel bridge girders and other iron and steel work of British manufacture, for the directors of the Great Western Railway Company.

**PRETORIA (SOUTH AFRICA), AUGUST 12.**—Steel Framed Brass Foundry.—Tenders are invited by the South African Railways Administration for the supply of material necessary for the construction of a steel-framed building for a new brass foundry at Pretoria. A copy of the specification and form of tender may be seen by United Kingdom manufacturers at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, London, E.C.

**SCOTSWOOD-ON-TYNE.**—Shaft Cleaning.—For the cleaning out of a 6 ft. diameter shaft from the present working seam to the adjoining seam below. Tenders must be sent to manager, West Denton Colliery, Scotswood-on-Tyne.

**SHEERNESS, JULY 29.**—Borehole.—Tenders invited for the sinking of a borehole, from 16 in. to 12 in. diameter, about 750 ft. deep; also for the sinking of a trial boring from the bottom thereof to a further depth of about 700 ft., for the Urban District Council. Specification, schedules, and form obtainable at the office of the engineer, Mr. F. W. S. Stanton, A.M.Inst.C.E., 3, Victoria-street, Westminster, on deposit of £2 2s. (returnable).

**THORNTON HEATH, JULY 28.**—Boiler.—For the supply and erection of one Cornish boiler, 7 ft. in diameter and 24 ft. in length, for 100 lb. working pressure, to be placed on prepared seatings at the Croydon Union Workhouse, Queen's-road, Thornton Heath, for the Croydon Guardians. Also for supplementary tenders for builders' work in connection with the new boiler seatings, and for the supply and erection of wrought steel steam pipings and calorifiers and heating apparatus. Specifications may be obtained on application to Mr. H. List, clerk to the Guardians, at the Union Offices, Mayday-road, Thornton Heath.

### THE FREIGHT MARKET.

The outward freight market has been rather more active on the north-east coast this week, and rates in most directions show some advance. At South Wales chartering is rather restricted, owners holding back their tonnage for higher rates. The market is firm for the Mediterranean and for South America, but the demand for the Bay and coasting ports is restricted. At the Clyde, business is inactive owing to the annual holidays. The Humber is quiet, but firm. Homewards, the amount of fixtures reported hardly reaches the average. At New York the general tone is steady, and prospects are brighter. The demand for prompt tonnage is small, and the supply of vessels is not excessive. Grain and cotton orders are somewhat scarce. Timber tonnage chartering is fairly brisk at steady figures. Time-charter business is quiet and unaltered. The Black Sea market maintains a fairly steady tone. Tonnage supplies are ample, however, and, with a scarcity of grain cargoes, there is no advance in rates. Owing to unsuitable weather, new crop grain is not expected to reach the seaboard in any quantity until mid-August. The Eastern markets show a good demand at firm figures. The Mediterranean and ore trades are firm. The Baltic is steady. The River Plate is quiet and tends towards ease.

Tyne to Archangel, 2,500, 5s. 7½d.; Bayonne, 3,400, 6s. 4½d.; 500; Barcelona, 4,300, 9s. 6d.; Bilbao, 2,900, 7s. 6d.; Bjorkoe, 1,350, 5s. 6d.; Boulogne, 1,500, 4s. 6d.; Cronstadt, 2,700, 5s.; 4,500, 5s.; 2,400, 5s. 3d.; 1,600, 5s. 1½d.; 5,000, 5s.; Canary Islands, 3,200, 10s.; Caen, 1,000, 5s. 6d.; Fredrikshaven, 750, 5s. 6d.; Genoa, 3,800, 9s. 3d.; from Derwenthaugh, 4,000, 9s. 3d.; 4,800, 9s. 3d.; 4,500, 9s. 4½d.; 5,500, 9s.; Helsingfors, 2,200, 5s. 3d.; Hamburg, 2,200, 3s. 9d.; 2,100, 3s. 11d.; 1,500, 3s. 9d.; Havre, 2,400, 4s. 6d.; 700, 4s. 9d., from Elswick; Lisbon, 3,300, 7s. 9d.; Las Palmas, 3,200, 10s.; London, 1,500, 3s. 4½d.; 1,800, 3s. 4½d.; Norrköping, 1,800, 5s.; 400; Nakskov, 1,000, 5s. 6d.; Naples, 3,500, 9s. 6d.; 800; Pozzuoli, 4,200, 11s., from Elswick and Dunston; Piræus, 6,600, 8s. 9d.; Port Said, 6,300, 9s.; 5,000, 9s.; Reval, 3,000, 5s.; Riga, 1,400, 5s. 6d.; 2,800, 5s.; Rouen, 2,000, 5s.; Sonderburg, 1,150, 5s. 6d.; Stettin, 2,800, 5s. 1½d.; Stockholm, 2,750, 4s. 10½d.; Svendborg, 750, 6s.; St. Nazaire, 3,000, 6s.; 600; 3,000, 5s. 9d.; Savona, 4,000, 9s. 3d.; Spezzia, 4,000, 9s. 3d.; Zea, 6,600, 8s. 9d.; Zeebrugge, 1,700, 3s. 6d.

Cardiff to Alexandria, 6,500, 9s., July 29; 5,500, 9s. 3d., 500, July 30; Algiers, 2,500, 9½ fr.; 2,100, 12 fr.; Ancona, 5,000, 10s. 6d., August 1; Brest, 5s. 3d.; 1,200, 4s. 10½d.; 300, 5s.; Bombay, 6,600, 13s. 10½d., August 7; Bari, 3,000, 10s. 6d.; Barcelona, 4,500, 10s.; Bilbao, 1,300, 6s. 9d.; Boulogne, 650, 5s. 3d.; Cronstadt, 3,400, 6s. 3d.; Casa



anca, 1,000, 20s. 6d., pig iron; Civita Vecchia, 3,800, 3d.; 5,400, 10s. 3d.; 400; Caen, 2,000, 5s. 3d.; Calais, 1,700, 5s.; 1,600, 4s. 10d.; Cherbourg, 1,300, 5s. 9d.; Charente, 1,450, 8½ fr.; Dieppe, 1,100, 5s. 3d.; 1,700, 5s.; 2,100, 4s. 9d.; Gibraltar, 3,000, 8s. 6d.; Genoa, 6,000, 8s. 6d.; July 29; 7,000, 8s. 6d., August 1; 5,000, 8s. 9d., July 30; 6,000, 8s. 6d., July 26; 8s. 9d.; Honfleur, 900, 5s. 9d.; Islands, 4,800, 8s. 9d.; Lappvik, 2,400, 6s. 3d.; Leghorn, 4,400, 7s. 9d.; Lisbon, 2,700, 7s. 3d., 400, August 5; La Rochelle, 3,000, 6½ fr.; La Pallice, 3,000, 6½ fr.; 1,350, 7½ fr.; Marseilles, 10 fr., July 26; 6,000, 10 fr.; Muros, 800, 8s. 6d.; Madeira, 4,200, 8s. 9d.; Monte Video, sail, 3,600, 16s., August 1; 16s. 3d.; 6,000, 18s., July 29, steamer; Naples, 5,200, 8s., 800; 5,800, 8s. 3d.; Nantes, 3,400, 7 fr.; Naval manœuvres, 12s.; 11s.; Oporto, 1,000, 8s. 6d.; Pembroke, 320, 8s. 6d.; Piræus, 3,100, 9s., July 29; 4,100, 9s.; 4,800, 9s., August 30; Port Said, 3,700, 9s. 3d., end July; 4,500, 9s. 3d., end July; 3,800, 9s.; 4,500, 9s.; 5,700, 9s., July 26; 5,500, 9s., August 5; Queensferry, 300, 5s.; River Plate, 4,400, 19s.; 5,000, 18s. 10½d.; 5,000, 19s., August 10; Rio de Janeiro, 5,700, 15s. 9d.; 4,600, 15s. 9d., July 31; Rosario, 20s.; Rochefort, 1,450, 8 fr.; St. Vincent, 4,500, 9s. 6d.; 4,000, 9s. 6d., August 1; St. Nazaire, 2,200, 7½ fr.; 3,200, 7½ fr.; St. Servan, 1,900, 5s. 10½d.; Santa Liberata, 4,000, 10s. 6d.; Syra, 3,100, 9s., July 29; 4,100, 9s.; Savona, 6,000, 8s. 6d., July 29; Teneriffe, 4,500-4,800, 8s. 9d.; Taranto, 4,600, 8s. 10½d., 500; Torre Annunziata, 3,800, 10s. 3d.; 5,400, 10s. 3d., 400; Venice, 4,600, 10s., 500; 5,200, 10s. 6d.; 5,000, 10s. 6d., 500; 5,000, 10s. 6d.; August 1; Valencia, 1,400, 11s. 6d., 300; Zee, 4,100, 9s.

Blyth to Cronstadt, 2,700, 5s.; 1,600, 5s. 1½d.; 4,200, 4s. 9d.; Helsingfors, 2,200, 5s. 3d.; Reval, 2,200, 5s.; 3,200, 5s.; Nakskov, 1,000, 5s. 6d.; Bjorkoe, 1,300, 5s. 6d.; St. Petersburg, 3,500, 5s.; Malaga, 1,900, 1s. 9d.

Wear to Veile, 2,000, 5s.; Odense, 1,300, 5s. 6d.; Kotka, 1,000, 5s. 3d.; Rio de Janeiro, 4,300, 17s. 6d.; St. Nazaire, 2,900, 6s. 3d.

Hull to Reval, 4,700, 5s.; Pernau, 2,800, 5s. 1½d.; 1,600, 5s.; Oporto, 1,050, 9s. 9d.; Libau, 2,200, 5s.; 1,100, 5s. 3d.; Riga, 1,900, 5s. 1½d.; Charleston-Savannah, 10s. 6d., Tinto terms, July; Cronstadt, 3,300, 5s.

Forth to Cronstadt, 3,100, 5s. 6d.

Burntisland to Stugsund, 5s. 10½d.

Port Talbot to Nantes, 1,250, 8½ fr., 450, Civita Vecchia, 3,400, 10s., 500; Genoa, 4,600, 8s. 9d.; La Pallice, 1,300, 7½ fr.; Alexandria, 4,400, 9s., July; Rouen, 900, 5s. 3d.; 900, 5s. 6d.; Cronstadt, 3,000, 6s.; Casa Blanca, 1,000, 20s. 6d., pig iron.

Goole to Boulogne, 950, 5s.; Ostend, 950, 4s. 3d.; Bruges, 600, 4s. 6d.

Seaham Harbour to Malmo, 1,700, 5s. 3d.

Swansea to St. Malo, 650, 5s. 6d. coal, 6s. fuel; Naples, 3,400, 9s., 800; Torre Annunziata, 3,400, 9s., 800; Civita Vecchia, 2,800, 10s. 3d.; Rouen, 400, 5s. 3d.; Oran, 1,500, 13½ fr. coal, 14½ fr. fuel; La Pallice, 2,800, 7 fr.; Havre, 980, 5s.; Trouville, 650, 5s. 7½d.; Hamburg, 1,500, 5s.; Calais, 1,000, 5s. 3d.; 800, 5s.; Alicante, 700, 12s. 6d.; Fecamp, 700, 5s. 6d.; London, 980, 4s.; Leghorn, 3,500, 9s. 3d. coal, 10s. fuel; Nice, 1,250, 11s.; Bayonne, 1,200, 9 fr.; Castellon, 1,400, 14s. 3d., fuel.

Birkenhead to Genoa, 8s. 9d.

Methil to Stugsund, 5s. 10½d.

Glasgow and Liverpool to Bombay, 22s. 3d., general cargo.

Grangemouth to Cronstadt, 2,700, 5s. 3d.

Hamburg to Shanghai and three ports Japan, 25s. 6d., option p.c. Antwerp £250 extra.

Wales to Rio de Janeiro, sail, 18s., fuel; Bahia, sail, 18s. 6d.; Maranh, sail, 19s.; West Coast S. America and home to United Kingdom-Continent, sail, 2,500 d.w., 42s. 6d., in and out, nitrate, March; 42s. 6d. in and out, 43s. stiffened; direct nitrate port, sail, 18s., fuel; Frey Bentos, sail, 25s.; Monte Video, sail, 1,800 d.w., 16s. 3d.

Antwerp to Rio de Janeiro, sail, 20s.; Buenos Ayres, sail, 20s.; Boca, sail, 19s. 6d., 100, 19s. 3d., 150.

Glasgow to Chanteny, 2,200, 7½ fr.; Cronstadt, 1,800, 5s. 7d.

Forth to Cronstadt, 3,100, 5s. 9d.

Newport to Bilbao, 1,300, 6s. 9d., 300; Port Nolloth, sail, 1,400, 25s. 6d., coke, September; Vigo, 1,750, 7s. 6d.; Aguilas, 1,500, 12s. 6d., August; Marseilles, 6,600, 10 fr., August 1; 3,500, 10½ fr.; Leghorn, 4,400, 8s. 9d.; Gibraltar, 6s. 6d., Admiralty, July 26; Lilcoes, 1,300, 8s. 6d.

Hartlepool to Hamburg, 1,800, 4s.; Barcelona, 4,100, 9s. 6d.

Grimsby to Norrköping, 1,700, 5s. 3d.; Gefle, 1,700, 4s. 10½d.

Llanelli to Calais, 650, 5s. 4½d.; Dundalk, 200, 5s. 3d.

Rotterdam to Barcelona, 6,000, 9s. 6d.; Civita Vecchia, 500 tons steam coals 10s., 2,000 tons coke 13s.; Leghorn, 2,700 tons steams 8s. 9d., 300 tons fuel 9s. 6d., 600 tons coke 10s. 9d.; Bagnoli-Porto Ferrajo, 6,500, 8s. 4½d., August 6; St. Nazaire, 1,550, 6s. 1½d., Trignac terms, end of July; Naples, 4,000, 8s., early August.

Fife port to St. Petersburg, 450, 5s. 10½d.

Homeward charters:—Kherson, Nicolaieff or Odessa, 4,800, Rotterdam 9s., Weser 9s. 3d., Hamburg 9s. 9d., with 3d. less barley up to half cargo, ppt.; 6,000, Rotterdam 9s. 1½d., Hamburg 9s. 7½d., with 3d. less barley, July-August; Azof, 6,200, Rotterdam 10s., Emden or Weser 10s. 3d., Hamburg 10s. 6d., with 3d. less barley, ppt.; 3,400, Adriatic, 13½ fr., ppt.; 4,800, Rotterdam, 10s. 6d., with 3d. less barley, July 30; 6,500, 10s. 6d., with 3d. less barley, completing outside 1s. 6d. less, August 1-15; 7,400, 10s. 6d., with 3d. less barley, completing outside 1s. 6d. less, August 5; Sydney, N.S.W., 5,500, U.K.-Cont., 30s. 4½d., August; Kurrachee, 9,300, Birkenhead, 17s. 6d., August; 17s. 6d. Bristol Channel, 17s. 9d. p.p. United Kingdom-Continent, barley; 18s. 9d. United Kingdom-Continent, August; 2,789 net, 18s. p.p., with options, net terms, August; 7,500, Antwerp, 17s. 6d., 3,000 tons barley guaranteed, August; Buenos Ayres or La Plata, 4,900, 10 per cent., United Kingdom-Continent, 15s. 6d. o.c., less 6d., August; San Lorenzo, 5,900, Adriatic, 18s. 3d. one port, 18s. 9d. two ports, 19s. 3d. three ports, July-August; 6,700, 10 per cent., United Kingdom-Continent, 17s. 6d. o.c., less 6d., option Barcelona or Marseilles 1s. 6d. extra, August; 17s. o.c.; about 5,000, 10 per cent., 16s. 9d. o.c., less 6d., August; 4,600, 10 per cent., 17s. 9d. o.c., less 6d., early August; 7,000, 10 per cent., Barcelona, 18s. 6d., completing below 2s. 6d. less, early August; Gulf timber port, 1,350 stds., 10 per cent., Savannah, 105s., August; Huelva, 5,000, 10s. 6d., Savannah, Tinto charter, July; Carthage, 1,100, Rotterdam, ppt.; 5,000, Emden, 5s. 6d., ppt.; 3,600, Glasgow, 4½d., end July; Tunis, two places, 2,800, Antwerp, 7½d., ppt.; Sagunto or Agua Amarga, 3,007

net, Philadelphia, 8s. 6d., f.t., end July; Bilbao, 3,000, Rotterdam, 5s. 3d., August; 2,000-2,400, 5s. 7½d., July; 3,200, 5s. 1½d., Aug.; New Caledonia, sail, 33s., United Kingdom-Continent; Newcastle N.S.W., sail, 29s., Guayaquil; Savannah, 50s., United Kingdom-Cont., September-October; Kherson and Odessa, 5,300, Rotterdam, 9s., ppt.; Calcutta, 6,000, Kurrachee, Rs. 612, August; 3,546 net, Bombay or Kurrachee, Rs. 612, August; Baltimore, 30,000 qrs., 10 per cent., Rotterdam, 2s. 7½d., August; 2s. 9d., Antwerp, Rotterdam or Amsterdam, August; 28,000 qrs., 10 per cent., Havre, 3s. 3d., July-August; Garrucha, 6,300, Rotterdam, 5s. 4½d., July; time charter, Eastern trade, 5s. 3d., one trip, delivery United Kingdom-Continent, re-delivery East; Rangoon, 25s. Alexandria, 26s. 3d. Marseilles, August; time charter, States and West Indies, 4s. 6d., about nine months, delivery and re-delivery North of Hatteras; Nicolaieff or Odessa, 5,600, Rotterdam 9s., Hamburg 9s. 6d., with 3d. less barley, ppt.; Nicolaieff, 7,000, Rotterdam 9s. 3d., Hamburg 9s. 6d., with 3d. less barley, July 28; Philippines, 2,908 net, Marseilles-United Kingdom-Continent, 38s. 9d., August-September; La Goulette, 3,500, East Coast United Kingdom, 8s. 10½d., f.t., July; Seville, 2,100, Glasgow, 8s. 4½d., ppt.; Novorossisk or Theodosia, 5,600, Rotterdam, 9s. 6d., with 3d. less barley, August 1; Burmah, two ports, 2,587 net, Fiume, 28s. 6d., August; Gulf, 18,000 qrs., 10 per cent., Rotterdam, 3s. 6d., August; 25,000 qrs., 10 per cent., Rotterdam 3s. 4½d., Antwerp 3s. 6d., August; Buenos Ayres, 5,000, 10 per cent., United Kingdom-Continent, 15s. 6d. o.c., less 6d., less 6d. more if Rotterdam, ppt.; La Falaise, 3,400, Glasgow, 8s., August 12; New Orleans or Galveston, about 25,000 qrs., 10 per cent., Rotterdam 3s. 6d., Antwerp 3s. 7½d., August.

## COAL, IRON AND ENGINEERING COMPANIES.

**Avery (W. and T.) Limited.**—The directors announce a balance dividend of 7½ per cent., making 10 per cent. on the ordinary shares for the past year; £8,296 is placed to depreciation, £10,000 to reserve, and £8,501 is carried forward.

**Bayless, Jones and Bayless Limited.**—An order confirming the reduction of capital from £400,000 to £250,000 has been registered.

**Consett Iron Company Limited.**—The directors announce a final dividend of 70s. per share on the ordinary shares, making 90s. per share (60 per cent.) for the past year. An extraordinary general meeting is to follow the ordinary meeting on August 2 to adopt resolutions "(1) that each of the existing ordinary shares of the company of £10 each be divided into 10 shares of £1 each upon each of which the sum of 15s. shall be credited as paid up; (2) that each of the existing preference shares of the company of £5 each be divided into five fully paid up shares of £1 each," and other resolutions consequent upon these, altering the articles of association of the company. Included in the proposed substitution is one to enable the company in general meeting to "pass resolutions to the effect that it is desirable to capitalise the whole or some part of the reserve fund or undivided profits or any other accumulated profits for the time being of the company, and that the sum so capitalised be distributed as a bonus amongst the holders of the ordinary shares in proportion to the ordinary shares held by them respectively; and any such bonus may either be paid in cash or applied in or towards payment of any sum for the time being called up and unpaid in respect of such ordinary shares, according as may be provided by the resolution." If the resolutions are passed and confirmed, the directors intend to make the ordinary share capital fully paid up, by calling up the unpaid amount of each share and contemporaneously capitalising a corresponding amount of the undivided profits of the company, by distributing it as a bonus on the ordinary shares, and applying it in payment of the call. A resolution enabling this to be done will be submitted to the subsequent meeting of the company, immediately after the special resolutions referred to have been confirmed. When these steps have been completed, the effect will be that the ordinary share capital will stand at £1,000,000, divided into 1,000,000 shares of £1 each fully paid. In order to preserve the existing relative voting power of the preference shareholders, it is proposed to make certain alterations in the company's articles of association, and to divide each existing preference share into five shares of £1 each, so that the preference share capital of the company will consist of 500,000 shares of £1 each, fully paid.

**Don Coal and Iron Company Limited.**—This company has been wound up voluntarily, Mr. D. J. Williams, secretary of the company, being appointed liquidator.

**Duffryn Rhondda Colliery Company Limited.**—In the Chancery Division on Tuesday, Mr. Whinney presented the petition of the Duffryn Rhondda Colliery Company Limited for confirmation of the reduction of their capital and sanction to a scheme of arrangement. Counsel said the proposal involved an alteration in the rights of certain preference shareholders, and the petition was brought under section 45 of the Companies Act. The company had a capital of £250,000, of which there was £200,000 represented by ordinary shares of £1 each. It was now proposed to write £75,000 from the ordinary shares and, for the purpose of raising capital for the further working of the colliery, to issue £70,000 pre-preference shares. The trading losses showed £73,773, and the working out of the collieries showed an expenditure of at least £5,000, so that over £75,000 was shown as unrepresented. His lordship confirmed the reduction of capital and sanctioned the scheme of arrangement.

**Frodair Iron and Steel Company Limited.**—Application has been invited at par for 60,000 6 per cent. cumulative preference shares of £1 each. The company has a capital of £150,000, divided equally into preference and ordinary shares, and was formed in 1905.

**Gloucester Railway Carriage and Wagon Company Limited.**—The report states that, as foreshadowed at the last general meeting, the accounts are made up to May 31, 1913, instead of to June 30, as in previous years. The profit on the 11 months' trading, after making the usual provision for depreciation, is £50,448, and the disposable balance, after deducting the interim dividend paid March 1 last, amounts to £45,848. The directors propose to transfer £10,000 to the reserve fund, which will then amount to £150,000, and recommend the payment of a dividend at the

rate of 5 per cent. (7s. per Class A share, and 3s. 6d. per Class B share, less income-tax), making 7½ per cent. for the 11 months, and a bonus at the rate of 2½ per cent. (3s. 6d. per Class A share and 1s. 9d. per Class B share, less income-tax), and that the balance £8,257 be carried forward. The company now repair and maintain 26,067 wagons, including those belonging to the company.

**Graham, Wells and Co. Limited.**—This private company has been registered, with a capital of £100 in 1,000 shares of 2s. each, to purchase and work coal and other mines, and carry on the business of owners or managers of mines of any description, colliery proprietors, ironmasters, ironfounders and dealers. Subscribers, D. G. Macfie and A. W. Stannott, both of 1 and 2, Great Winchester-street, E.C. Remuneration of directors (who are to be appointed) £2 2s. Registered office, 1 and 2, Great Winchester-street, E.C.

**Kelham Rolling Mills Company Limited.**—The final meeting of the contributories to the company was held at Sheffield on the 18th inst. Mr. William Wing, liquidator, who was in the chair, presented his report on the winding up of the company, and it was unanimously decided that the liquidator be instructed at an early date to declare a return on capital of 7s. 9d. per share on the 85 9 shares entitled to participate. The company went into liquidation on June 24, 1910.

**Lancashire Explosives Company Limited.**—An order confirming the reduction of capital from £35,000 to £12,500 has been registered.

**Maiden and Co. Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to acquire and take over as a going concern the business of Maiden and Co., now carried on at Hyde, Chester, also to carry on the business of ironfounders, mechanical engineers, toolmakers and brassfounders. First directors, T. C. Redfern, F. S. Hammersley, A. Denton, and J. Parker. Qualification, £500. Registered office, Alexander-street, Hyde, Chester.

**Northern Union Mining Company Limited.**—This company has been registered, with a capital of £500,000 in £1 shares, to acquire and take over from Arnold Lupton, 7, Victoria-street, S.W., certain leases referred to in an agreement with A. Lupton and Hugo Stinnes, mineowner, of Mulheim Ruhr, Germany, and to acquire any collieries, mining grounds, &c. Minimum cash subscription, 25 per cent. of the shares offered to the public. First directors, Hugo Stinnes, Mulheim Ruhr, Germany; J. R. Ferguson, 3, Fenchurch-avenue, E.C.; Gustave Koepper, Bochum, Westphalia; Arnold Lupton, 7, Victoria-street, S.W. Qualification (except first directors), £1. Registered office, 3, Fenchurch-avenue, E.C.

**Natal Ammonium Limited.**—Applications have been invited for 212,000 7 per cent. participating preference shares at par in this company, which has a capital of £325,000 (225,000 preference and 100,000 ordinary shares). The directors are the Earl of Selborne (chairman), Messrs. E. S. Mond, Robt. Armitage, M.P., Robt. Mond and H. W. Morrison, and the company has been formed to manufacture sulphate of ammonia, gas and other by-products by the Mond recovery process and to acquire large coal-bearing areas in the Vryheid district of Natal.

**Powell Duffryn Steam Coal Company Limited.**—An extraordinary general meeting of the shareholders was held on Monday. The purpose of the meeting was to alter the articles of association in order to provide for the payment of a bonus, and the resolutions provided for the capitalisation of any part of the undivided profits of the company standing to the credit of the company's reserve fund, and to the distribution of the same as a bonus amongst the holders of the ordinary shares. The chairman (Mr. Joseph Shaw, K.C.) said the scheme provided for the capitalisation of £541,407. The motion was agreed to.

**Richmond Iron and Steel Company Limited.**—A private meeting of the shareholders was held on the 18th inst., when it was decided to wind up the affairs of the company. The deficiency was stated to be about £35,000.

**South Durham Iron and Steel Company Limited.**—The directors have declared a second interim dividend of 10 per cent. (2s. per share).

**Tinsley Rolling Mills Company Limited.**—The directors, in their seventeenth annual report and balance-sheet for the year ending June 30, state that there is a profit, including the balance brought forward from last year, of £5,771 7s. 11d. Of this there has been appropriated in payment of dividends on the preference shares to June 30 £500, leaving a balance available for disposal of £5,271 7s. 11d. The directors now recommend the payment of a dividend of 8s. per share on the ordinary shares; that the sum of £1,000 be transferred to reserve fund, £1,000 to renewals account, and the balance, £1,271 7s. 11d., carried forward to next year.

**Wythemoor Colliery Company Limited.**—Special resolutions have been confirmed disposing of the business to T. H. Good, Sir Alfred Gelder, M.P., and others, and winding up the company voluntarily.

**Yorkshire Electric Power Company Limited.**—The directors report there has been a considerable increase in the revenue from the sale of current for the past half-year, but the gross profit has been adversely affected by the high price of coal. The gross profit on the revenue account for the three corresponding half-yearly periods ended June 30 is:—To June 30, 1913, £10,240 7s.; to June 30, 1912, £5,805 5s. 7d.; to June 30, 1911, £6,633 8s. 2d. The net profit, after payment of mortgage interest for the same period, is £6,971 18s. 9d., £3,349 2s. 8d., and £4,137 6s. 9d. respectively. The balance available, including £644 11s. 5d. brought forward from 1912, is £7,616 10s. 2d., and the directors recommend that this amount should be dealt with as follows:—To pay for the half-year ended June 30, 1913, at the rate of 6 per cent. per annum on the amount paid up on the cumulative preference shares, a dividend amounting to £3,307 14s. 9d., and to carry forward £4,308 15s. 5d. The station for generating current from waste heat at Barugh will shortly be at work and will, when completed, add a further 5,000 kw. to the generating plant. At the date of the report one-half of the recent issue of £50,000 of 6 per cent. cumulative preference shares of the company and £17,450 of the issue of £25,000 of 5½ per cent. first mortgage debenture stock of Yorkshire Waste Heat Company Limited have been applied for. The directors anticipate that the whole of both issues will shortly be taken up. Mr. F. J. Kitson, of Leeds, has accepted a seat on the Board. New head office accommodation has been provided at Wellington-road, Dewsbury.



# THE COLLIERY GUARDIAN

## MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below:—

Am. Gas Jl. = American Gas Journal.  
 Berg- Hüttenmänn. Rdsch. = Berg- und Hüttenmännische Rundschau.  
 Ber. Handel Ind. = Berichte über Handel und Industrie.  
 Bl. Diam. = Black Diamond.  
 Canad. Min. Jl. = Canadian Mining Journal.  
 Cassier's Mag. = Cassier's Magazine.  
 Chem. Engin. = Chemical Engineer.  
 Coal and Coke Op. = Coal and Coke Operator.  
 Coal Min. Inst. of Am. = Coalmining Institute of America.  
 Coal Tr. Bull. = Coal Trade Bulletin.  
 Colliery Eng. = Colliery Engineer.  
 Colliery Guard. = Colliery Guardian.  
 Compr. Air Mag. = Compressed Air Magazine.  
 D. Bergwerks Ztg. = Deutsche Bergwerks Zeitung.  
 D. Strassen- Kleinbahnztg. = Deutsche Strassen- und Kleinbahnzeitung.  
 El. Kraftbetr. = Elektrische Kraftbetriebe und Bahnen.  
 El. Maschbau = Electrotechnik und Maschinenbau.  
 Engin. Mag. (N.Y.) = Engineering Magazine (New York).  
 Engin. Min. Jl. = Engineering and Mining Journal.  
 Geol. Survey = Geological Survey.  
 Indian Ind. = Indian Industries and Powers.  
 Inst. Gas Engin. = Institution of Gas Engineers.  
 Iron Coal Trades Rev. = Iron and Coal Trades Review.  
 Jl. Chem. Soc. S. Afric. = Journal of the Chemical, Metallurgical and Mining Society of South Africa.

Jl. Clevel. Engin. Soc. = Journal of the Cleveland Engineers' Society.  
 Jl. Gas Light. = Journal of Gas Lighting.  
 Jl. Ind. Engin. Chem. = Journal of Industrial and Engineering Chemistry.  
 Jl. Inst. Engin. Chem. = Journal of the Institute of Engineering Chemistry.  
 Jl. S. Afric. Inst. Eng. = Journal of the South African Institute of Engineers.  
 Jl. Soc. Chem. Ind. = Journal of the Society of Chemical Industry.  
 Kartell-Rdsch. = Kartell-Rundschau.  
 Kohle Erz = Kohle und Erz.  
 Mex. Min. Jl. = Mexican Mining Journal.  
 Min. Engin. = Mining Engineering.  
 Min. Engin. World = Mining and Engineering World.  
 Min. Mag. = Mining Magazine.  
 Min. Science = Mining Science.  
 Min. Scient. Press = Mining and Scientific Press.  
 Montan. Rdsch. = Montanistische Rundschau.  
 Montan-Ztg. = Montan Zeitung.  
 Nachr. Handel Ind. = Nachrichten für Handel und Industrie.  
 Railw. Age Gaz. = Railway Age Gazette.  
 Railw. Engin. R-v. = Railway and Engineering Review.  
 Rev. Econ. Int. = Revue Economique Internationale.  
 Sci. Art. Min. = Science and Art of Mining.  
 Stahl Eisen = Stahl und Eisen.  
 S. Wales Inst. Engin. = South Wales Institute of Engineers.

S. Afric. Min. Jl. = South African Mining Journal.  
 Techn. Bl. = Technische Blätter.  
 Techn. Mitt. Nachr. = Technische Mitteilungen und Nachrichten.  
 Times Eng. Supp. = Times Engineering Supplement.  
 Trans. Inst. Min. Engin. = Transactions of the Institution of Mining Engineers.  
 U.S. Bur. Min. Bull. = United States Bureau of Mines Bulletin.  
 U.S. Geol. Survey = United States Geological Survey.  
 Volksw. Mitt. (Ungarn) = Volkswirtschaftliche Mitteilungen (Ungarn).  
 Welt Kaufm. = Die Welt des Kaufmannes.  
 Z. Bayr. Revis.-Ver. = Zeitschrift des Bayerischen Revisions-Vereins.  
 Z. Berg- Hütten Salinwes. = Zeitschrift für das Berg- Hütten- und Salinenwesen im Preussischen Staate.  
 Z. Dampfkessel-Betr. = Zeitschrift für Dampfkessel- und Maschinenbetrieb.  
 Z. Oberschles. Berg- Hütten- Ver. = Zeitschrift des Oberschlesischen Berg- und Hüttenmännischen Vereins.  
 Z. Schiesswes. = Zeitschrift für das Gesamte Schiess- und Sprengstoffwesen.  
 Z. Ver. D. Ing. = Zeitschrift des Vereins Deutscher Ingenieure.  
 Z. Zentr. Berg. Betrbsl. Oest. = Zeitschrift des Zentral-Verbandes der Bergbau-Betriebsleiter Oesterreichs.

\*\*\* We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

### I.—General.

Preliminary Review of the Results of the Coalmining (and Brown Coalmining) of Prussia in 1912 compared with 1911. (Vorläufige Uebersicht über die Ergebnisse des Steinkohlenbergbaues in Preussen fuer das Jahr 1912, verglichen mit dem Jahre 1911.) "Z. Berg- Hütten- Salinenwes.," 1913, 1, p. 42-3.  
 Glencoe Collieries, Natal. "S. Afric. Min. Jl.," vol. 22, 1127, p. 233-5; 3 ill. 2s.  
 The Coal Crisis in Russia. (La Crise Charbonniere en Russie.) M. Lauwick. "Rev. Econ. Int.," vol. 10, 1, 2, p. 347-57.  
 The Mine Production of the Lower Rhine, Westphalia (Germany), Mining District in 1912. (Die Bergwerksproduktion des niederrheinisch westfälischen Bergbaubezirks im Jahre 1912.) E. Jüngst. "Glückauf," 1913, p. 660. 2s. 6d.  
 The Mexican Coal Industry. (Die mexikanische Kohlenindustrie.) "Ber. Handel Ind.," vol. 19, 8, p. 500-2.  
 Mining and Metallurgy in Hungary in 1911. (Das Berg- und Hüttenwesen in Ungarn im Jahre 1911.) "Volksw. Mitt. (Ungarn.)," 1913, 2, p. 191-8.  
 Remarks on the Coal Production and Coal Trade at Home and Abroad. (Mitteilungen über Kohlenförderung und Kohlenhandel des In- und Auslandes.) "Nachr. Handel Ind.," 1913, 45, 6 p.  
 The Coal Production in Upper Silesia in 1912. (Kohlenproduktion Oberschlesiens im Jahre 1912.) "Kohleninteressent," 1913, p. 107. 2s.  
 The Dangers of Mining and Their Combatting. (Die Gefahren des Bergbaues und ihre Bekämpfung.) L. Tuebben. "D. Bergwerks Ztg.," 1913, p. 108.  
 Colliery Office Organisation and Accounts. J. W. Innes. 138 p. London: Pitman. 1913.  
 Development and Organisation of the Workmen's Movement in the Principal Industrial Countries. (Entwicklung und Organisation der Arbeiterbewegung in den Hauptindustrielländern.) "Bergbau," 1913, 8, p. 137-8; 9, p. 151-3; 10, p. 170-1. 6s.  
 The Renewal of the Brown Coal Briquette Association. (Zur Erneuerung des Braunkohlenbrikett-Verkaufsvereins.) "Kartell Rdsch.," vol. 11, 3, p. 185-90.  
 United States Coalmine Accidents. F. W. Horton. "Coal Age," vol. 3, 21, p. 789. 1s. 3d.  
 The Price Policy of the Coal Syndicate. (Zur Preispolitik des Kohlensyndikates.) R. Saspach. "Welt Kaufm.," vol. 9, 1, p. 24-9.  
 Coalmining in New South Wales. "Colliery Guard.," vol. 106, 2742, p. 120. 6d.

### II.—Education.

Mine Managers' Examinations. "Colliery Guard.," vol. 105, 2739, p. 1410. (Papers for second-class certificates set at May examination). 6d.

### III.—Geology.

Origin and Deposition of Coal. W. B. Richards. "Coal Age," vol. 3, 22, p. 832-4; 12 fig. 1s. 3d.  
 Geology and Coalfields of the Lower Matanuska Valley, Alaska. G. C. Martin and F. J. Katz. (U. S. Geol. Survey) 100 pp.; ill. London: Wesley.

Nova Scotia Geology. G. A. Young. "Canad. Min. Jl.," vol. 34, 11, p. 333; 1 tab. 1s. 6d.  
 Microscopy in Economic Geology. R. Beck. "Engin. Min. Jl.," vol. 95, 22, p. 1087-9. 1s. 6d.  
 Our Coals. An Introduction into the Geology of our Coals, with consideration of the Winning, Use and Economic Importance. (Unsere Kohlen. Eine Einführung in die Geologie der Kohlen unter Berücksichtigung ihrer Gewinnung, Verwendung und wirtschaftl. Bedeutung.) P. Kukuk. 60 ill.; 2 tab.; 120 pp. Leipzig und Berlin: B. G. Teubner, 1913.  
 The Mining Districts of the Western United States. J. M. Hill. (U. S. Geol. Survey.) 310 p.; ill. London: Wesley, 1913.  
 The Coal Deposits of Austria. (Die Kohlenlager Oesterreichs.) W. Petrascheck. "Montan. Rdsch.," 1913, p. 403. 2s. 6d.  
 The Bering River Coalfield. H. D. Pallister. "Coal Tr. Bull.," 1913, p. 47. (Paper read before Coal Min. Inst. of Am.)  
 The Concealed Coalfield of Yorkshire and Nottinghamshire. W. Gibson. "Colliery Guard.," vol. 105, 2739, p. 1385; vol. 106, 2740, p. 31; vol. 106, 2741, p. 83. (From Geol. Survey Memoir, concluded). 1s. 6d.

### IV.—Mine Surveying.

Keeping a Record of Mine Working Places. "Bl. Diam.," 1913, p. 20; ill.  
 Land and Mining Surveying: As Applied to Collieries and other Mines. G. L. Leston. 382 p. London: C. Lockwood, 1913.  
 Underground Levelling. S. Kennedy. "Min. Engin.," vol. 17, 228, p. 109-11; 7 fig. 9d.  
 Rectangular Co-ordinates. "M. E.," "Colliery Guard.," vol. 106, 2742, p. 121; 1 fig. 6d.  
 Zeiss Levels and Theodolites. "Colliery Guard.," vol. 106, 2742, p. 120; 2 figs. 6d.

### V.—Mining Technology.

Mechanics of Mining. R. J. Strohm. "Colliery Eng.," vol. 33, 11, p. 633-5; 5 fig. (An explanation of the principles underlying calculations relating to engines, pumps and other machinery.)  
 Chemistry Applied to Coalmining. Dr. John Harger. "Jl. Soc. Chem. Ind.," 1913, p. 460. 4s.  
 The Advantages of the Rotating Drilling Method. (Die Vorteile der drehenden Bohrmethode.) A. Haiek. "Montan Ztg.," 1913, p. 167. 1s. 3d.  
 The Winning of Coal. "Times Eng. Supp.," vol. 9, 433, p. 23. (Mechanical cutting appliances, power plant, safety in working, &c.) 9d.

### VI.—Working of Minerals.

Quarrying Coal at Tofield, Alberta. J. H. Sinclair. "Colliery Eng.," vol. 33, 11, p. 601-3; 4 fig. (Methods of mining coal from beds so situated that they may be stripped and loaded directly into railroad cars.)  
 Suggestions on the Development of New Colliery Districts, with the Special Reference to the Support of the Surface. H. Bradshaw. "Trans. Inst. Min. Engin.," vol. 45, 2, p. 171-81; diag. 8s.

Longwall Mining in Illinois. S. M. Dalzell. "Colliery Eng.," vol. 33, 11, p. 606-9. (Description of the methods in use at the mines of the Spring Valley Coal Company.)  
 Rearer Workings at Podmore Hall Collieries, with Special Reference to Alluvium Saturated with Water. W. Barber. "Trans. Inst. Min. Engin.," vol. 45, 2, p. 373-85; 1 pl. 8s.  
 Concerning Working of Coalmining Plants in England. (Aus dem Betriebe der Steinkohlenbergwerke in England.) K. Seidl. "Z. Oberschles. Berg- Hüttenm. Ver.," 1913, p. 138; ill.

### VII.—Boring, Shaft Sinking, and Tunnelling.

Calyx Core Drills for Coal Prospecting. S. H. Painter. "Compr. Air Mag.," 1913, p. 6810; ill. 1s.  
 Recent Practice in the Congelation Process of Shaft Sinking. By Rex. "Sci. Art. Min.," vol. 23, 21, p. 492-3. 9d.  
 The Sinking of Shaft III. of the Minister Achenbach Mine to the Coal-bearing Rocks (Germany). (Das Abteufen des Schachtes III. der Zeche Minister-Achenbach bis zum Steinkohlengebirge.) Norkus. "Bergbau," 1913, p. 273, ill.; and p. 289, ill. 4s.  
 Notes on Shaft Sinking. E. M. Heriot. "Mex. Min. Jl.," 1913, p. 253.  
 Sinking Against Water on the Rand. "Engin. Min. Jl.," vol. 95, 24, p. 1201-2; 2 fig., 1 tab. (A process of sinking a seven-compartment shaft against a water flow of 1,300 gallons per min.) 1s. 6d.

### VIII.—Explosives, Blasting.

Note on the Quantitative Determination of Nitrous Fumes in Firing (Cheesa) Sticks. L. Heymann. "Jl. Chem. Soc. S. Afric.," vol. 13, 10, p. 464-7. (Concerning the new mining regulation prohibiting the use of Cheesa sticks made with blasting gelatine.) 4s.  
 Modern Explosives and Their Use. F. H. Gunsolas. "Jl. Clevel. Engin. Soc.," vol. 5, 6, p. 406.  
 Lime as Explosive. (Kalk als Sprengstoff.) "Kohle Erz.," 1913, 5, p. 123. 2s. 6d.  
 Selection of Explosives used in Engineering and Mining Operations. C. Hall and P. Howell. 8vo, 50 p. U.S. Bur. Min. Bull. 48.  
 An Apparatus for Measuring the Ignition Capacity of Powder. (Ein Messapparat fuer die Entzündungsfähigkeit des Pulvers.) N. L. Hansen. "Z. Schiesses.," 1913, p. 165; ill.  
 The Heat Test for Explosives. A. C. Egerton. "Jl. Soc. Chem. Ind.," vol. 32, 7, p. 331-41. 4s.  
 The Technic of Initial Ignitions of Explosives. (Die Initialzündungen der Sprengstofftechnik.) Neitzel. "Z. Schiesswes.," 1913, p. 167.

### IX.—Timbering, Packing, &c.

Colliery Practice in Concreting. E. E. Selwyne and A. J. Shurick. "Coal Age," vol. 3, 24, p. 910-13; 15 fig. 1s. 3d.  
 The Use of Hydraulic Water in Mining. (Die Verwendung von Druckwasser beim Bergbau.) "Berg Hüttenmänn. Rdsch.," 1913, p. 189.



Coalmining on the Surface. "Colliery Eng.," 11, p. 617-22; 6 fig.

Mine Construction Work. C. Scholz. "Coal Age," vol. 3, 20, p. 757-9. (Steel tipples can be moved to new locations when the coal is exhausted; description is given of the method of cheaply lining a shaft with steel and concrete.) 1s. 3d.

Concrete in Mine Construction. A. F. Allard. "Coal Coke Op.," 1913, p. 73. "Colliery Eng.," 33, 11, p. 623, 4 fr. (Abstract of paper read at fuel conference at Urbana, Ill.) 2s. 3d.

Hydraulic Stowing at Crowgarth Iron Ore Mines. "Iron Coal Trades Rev.," vol. 86, 2360, p. 846. 1s.

Supporting Underground Roadways. D. Beveridge. "Min. Engin.," vol. 17, 227, p. 79-80; 2 fig. (Maintaining the main drawing and haulage roads in a coalmine.) 9d.

Adjustable Steel Mine Supports. (Nachgiebiger eiserner Grubenausbauring.) "Bergbau," May 15, p. 325; ill. 2s.

On the Suitability of Different Tars for the Impregnation of Wood. Fred Moll. (Ueber die Eignung der verschiedenen Teere zur Holzimprägnierung.) "Bitumen," 1913, p. 113.

On the History of the Hasselmann Wood Impregnation Method. (Zur Geschichte des Hasselmannschen Holzimprägnierungsverfahrens.) F. Seidenschneur. "Bergbau," 1913, p. 306. 2s.

A New System of Pit Propping. "Colliery Guard.," vol. 105, 2739, p. 1385; 5 fig. (The Reinhard system of "migrating" props.) 6d.

#### X.—Surface Arrangements.

Concrete Houses at Lackawanna Mine. "Coal Age," vol. 3, 22, p. 851-4; 12 fig. 1s. 3d.

The Coventry Colliery. "Colliery Guard.," vol. 106, 2741, p. 71. 6d.

#### XI.—Winding and Haulage.

Recent Compressed Air Locomotives for Mine Railways. (Neuere Druckluftlokomotiven fuer Grubenbahnen.) Th. Giller. "Techn. Mitt. Nachr.," 1913, 4, p. 106-11; 5, p. 131-6; 2 fig., 7 ill. (Details; comparison with other locomotives. Experiments with a triple expansion locomotive.) 3s.

The Importance of Hoist Investigations. G. E. Edwards. "Min. Engin. World," vol. 38, 21, p. 993-6; 7 fig. 1s. 3d.

Repairing a Large Rope-sheave. H. L. Handley. "Colliery Eng.," vol. 33, 11, p. 604-5; 4 fig.

Electrical Winding Plant for Collieries. G. O. Scampton. "Faraday Ho. J.," vol. 5, 3, 63-6; 1 fig.

Hauling from Great Depths. "Jl. S. Afric. Inst. Eng.," vol. 11, 10, p. 266-75; 3 fig.

Shaft Winding Engines. (Die Schachtfördermaschinen.) K. Teiwes and E. Foerster. 8vo., 431 pp.; 323 ill. Berlin: Springer. 1913.

Three-phase Commutator Motors for Driving Winding Engines. (Drehstromkollektormotoren fuer die Antrieb von Schachtfördermaschinen.) Masling. "El. Maschbau," 1913, 2, p. 38. (Description of plant built by Brown, Boveri and Co. Two motors are fixed on one shaft and speed regulation is effected by moving the brushes.)

The Change in the Design of Electric Winding Engines by the Introduction of the Alternating Current Commutator Motor and Special Safety and Controlling Devices. (Die Neugestaltung der elektrischen Foerdermaschine durch die Einfuehrung des Wechselstrom-Kommulators und neuartiger Sicherheits- und Steuereinrichtungen.) L. Thalmayer. "El. Kraftbetr.," 1913, 2, p. 27-35; 7 fig., 9 ill.

Underground Conveying. S. Mavor. "Colliery Guard.," vol. 105, 2739, p. 1401; 3 fig. (Abst. paper read before S. Wales Inst. Engin.: concluded.) 6d.

A New Protector for Pit Ponies. "Colliery Guard.," vol. 106, 2741, p. 83; 1 fig. (The "Pongard" Protector.) 6d.

#### XII.—Signalling.

Notes on Signals, Bells and Batteries. W. A. Heyes. "Iron Coal Trades Rev.," vol. 86, 2358, p. 776-7; 2 fig. 1s.

Davis-Fryar Mechano-Electric Signals. "Colliery Guard.," vol. 106, 2741, p. 73; 2 fig. 6d.

#### XIII.—Lighting.

Acetylene Mine Lamps. (Acetylen Grubenlampen.) "Kohle Erz," 1913, p. 442; ill. 2s. 6d.

The Lighting Efficiency of Safety Lamps. J. A. Saint. "Trans. Inst. Min. Engin.," vol. 45, 2, p. 327-36; 18 tab., 1 plate. 8s.

The "Varta" Mine Lamp for Shift Use. (Die "Varta" Grubenlampe fuer Schichtbetrieb.) "Montan. Rdsch.," 1913, p. 407; ill. 2s. 6d.

#### XIV.—Ventilation.

Mine Ventilation. "Colliery Eng.," vol. 33, 11, p. 632-3. Ventilation Locks with Chain-haulage Equipment at the Concordia Mine (Germany). (Wetterschleusen mit Kettenförderanlage auf der Zeche Konkordia.) Dobbstein. "Glückauf," 1913, p. 697; ill. 2s. 6d.

Alternating-current Fan Motors. F. B. Crosby. "Coal Age," vol. 3, 21, p. 801-6; 13 fig. 1s. 3d.

Some Comparisons on Mine Ventilation. Th. Weinshank. "Coal and Coke Op.," 1913, p. 69. 2s. 3d.

The Testing of Fans: A Plea for Standardised Test Conditions. J. Watson. "Trans. Inst. Min. Engin.," vol. 45, 2, p. 403-9; 2 fig. 8s.

The Orifice of Passage of the Fan. "M. E." "Colliery Guard.," vol. 106, 2741, p. 73. 6d.

#### XV.—Mine Gases, Testing.

Gas Testing in Mines. J. Harger. "Trans. Inst. Min. Engin.," vol. 45, 2, p. 269-78; 3 tab. 8s.

On the Influence of Weather on Mine Gases. (Ueber den Einfluss der Wetter.) C. Recktenwald. "Montan. Rdsch.," 1913, p. 171.

Gases met with in Coalmines. "Colliery Eng.," vol. 33, 11, p. 631-2. (Measurement of atmospheric pressure, the barometer, Mariotte's law, and the diffusion of gases.)

The French Coal-dust Experiments. "Colliery Guard.," vol. 106, 2742, p. 119. 6d.

On the Kinetic Theory of Gases. Sir Henry Cunyng-hame. "Colliery Guard.," vol. 105, 2739, p. 1383. (Concluded.) 6d.

Ignition of Mine Gases by the Filaments of Incandescent Lamps. H. H. Clark and L. C. Ilsley. "Colliery Guard.," vol. 106, 2741, p. 69. (From Bull. 52, U.S. Bur. Mines.) 6d.

#### XVI.—Coaldust.

Recent Experiences with Coaldust and Means for Combating its Dangers. (Neue Erfahrungen ueber den Steinkohlenstaub und ueber die Mittel, seine Gefahren zu bekampfen.) J. Taffanel. "Z. Zentr. Berg. Betrsl. Oest.," 1913, p. 260; ill.

Handling Dry or Dusty Coal Mines. D. Victor. "Coal and Coke Op.," 1913, p. 67. 2s. 3d.

#### XVII.—Explosions.

Slips and Explosions in the Kladnör (Austria) Coal Region. (Erschuetterungen und Detonationen im Kladnör Kohlenrevier.) G. Wunderlich. "Montan. Rdsch.," 1913, p. 445; ill. 2s. 6d.

#### XVIII.—Mine Fires.

Fire Protection and Fire Proofing in Mines. H. M. Wilson. "Min. Scient. Press," vol. 106, 21, p. 776-8. 1s. 4d.

Fire Protection in Mines. G. E. Lyman. "Colliery Eng.," vol. 33, 11, p. 624-7.

Fire Protection in Mines. J. Taylor. "Coal and Coke Op.," 1913, p. 88. (Abstract of paper read at Fuel Conference at Urbana, Ill.) 2s. 3d.

Some Experiences of Gob Fires in Fife Coalfield. J. Hendrie. "Iron Coal Trades Rev.," vol. 86, 2356, p. 648-9; 10 fig. 1s.

Underground Fires. H. Rowan. "Trans. Inst. Min. Engin.," vol. 45, 2, p. 396-402; 1 pl. (Spontaneous heating and firing of underground workings.) 8s.

#### XIX.—Rescue and Ambulance.

Rescue Apparatus and Its Use in Mining. (Rettungsapparate und ihre Verwendung in Bergbau.) Heinrich. "Tech. Bl.," 1913, p. 129; ill.; p. 138; ill. 1s. 10d.

Resuscitation Appliances for Mine Rescue Service (Wiederbelebungsapparaturen fuer den Grubenrettungsdienst.) Breyhan. "Glückauf," 1913, p. 645 and p. 685. 5s.

#### XX.—Drainage, Pumping, &c.

The Hydropulsor. (Der Hydropulsor.) "Braunkohle," 1913, 11, 43, p. 688-9. 2s.

A New Water Lifting Device. (Eine neue Wasserhebevorrichtung.) "Vulkan," 1913, 4, p. 18-19. 2s.

Flood Protection at the Illinois Mines. "Coal Age," vol. 3, 22, p. 828-32; 8 fig. 1s. 3d.

An Ingenious Plan for Unwatering a Mine. "Bl. Diam.," 1913, p. 21.

#### XXI.—Preparation.

Modern Steel Tipple Design. J. A. Garcia. "Coal Age," vol. 3, 21, p. 786-8; 2 fig. 1s. 3d.

Gates for Run of Mine Coal. F. V. Hetzel. "Coal Age," vol. 3, 24, p. 921-2; 6 fig. 1s. 3d.

A Tipple and a Shaker Frame Built of Concrete. "Bl. Diam.," 1913, p. 16; ill.

A Combined Screening and Picking Table. F. E. Müller. "Coal Age," vol. 3, 18, p. 668-70; 4 fig. 1s. 3d.

A Novel Screening Plant. W. F. Schadell. "Coal Age," vol. 3, 18, p. 682-3; 2 fig. (To obviate the destructive shaking of the structure in which it is mounted, the screen is balanced in the reciprocating parts and suspended in a framework entirely independent of it.) 1s. 3d.

Methods and Machines for Cleaning Coal. A. Langerfeld. "Coal Age," vol. 3, 18, p. 685-90; 12 fig. 1s. 3d.

Mechanical Coal Picking. F. H. Kneeland. "Coal Age," vol. 3, 18, p. 680-1; 3 fig. (Two machines are described, one of which picks slate of any shape, flat or otherwise, mostly used for anthracite.) 1s. 3d.

Preparation of Anthracite. H. Archibald. "Coal Age," vol. 3, 18, p. 673-5; 3 ill. (Recent methods of cleaning and sizing hard coal in the anthracite field, Scranton, Pa.) 1s. 3d.

The Preparation of Coal. G. Buchanan. "Coal Age," vol. 3, 20, p. 750-3; 8 fig. 1s. 3d.

Coal Preparation in Eastern Kentucky. "Coal Age," vol. 3, 18, p. 670-1; 3 fig. 1s. 3d.

Coal Preparation in Franklin Co., Illinois. R. D. Hall. "Coal Age," vol. 3, 19, p. 719-21; 7 ill. 1s. 3d.

#### XXII.—Briquettes.

Briquetting Lignite. (Uber Braunkohlenbrikettierung.) E. Gmeyer. "Montan. Rdsch.," 1913, p. 396, ill.; and p. 453, ill. 5s.

Measurement of Quantities of Dust Developed in Briquette Works. (Messungen der Staubbmengen in einigen Brikettfabriken.) Herbing. "Braunkohle," vol. 12, 1, p. 1-8; 2, p. 19-24. 5s.

#### XXIII.—Coke Ovens.

Mechanical Coke Quenching and Loading Apparatus at the Neumuehl Mine (Germany). Maschinelle Koksloesch- und Verladeeinrichtung der Zeche Neumuehl. Braunsteiner. "Glückauf," 1913, p. 653; ill. 2s. 6d.

The Mechanical Handling of Coke from Coke Ovens. II. G. F. Zimmer. "Cassier's Mag.," vol. 43, p. 564-9; 10 ill. 1s.

Coal Washery and By-product Coke Oven Installation at Holmewood Colliery. "Iron Coal Trades Rev.," vol. 86, 2357, p. 728-9; 10 fig., 1 pl. 1s.

Coking Installation at "B" Winning Colliery. Blackwell Colliery Company Limited, Derbyshire. "Gas World," vol. 58, 1507, p. 771-5; 7 ill. (The plant consists of 50 waste heat coke ovens with a by-product plant on the patent Otto direct recovery principle for tar and ammonia.) 10d.

Semet-Solvay Coke Plant at Cleveland. J. E. Pierce. "Coal Age," vol. 3, 23, p. 868-9; 3 fig. 1s. 3d.

Coke Crushing and Screening Plants. F. W. Hetzell. "Coal Age," vol. 3, 23, p. 876-8; 8 fig. (Typical Pennsylvania plants are considered, and special features in feeding and elevator buckets described.) 1s. 3d.

Improving Coke from Beehive Ovens. N. G. Alford. "Coal Age," vol. 3, 23, p. 883-5; 1 chart. 1s. 3d.

Coking the Semi-Bituminous Johnstown Coals. J. W. Gocher. "Coal Age," vol. 3, 24, p. 906-9; 3 fig.; 2 tab. 1s. 3d.

Coke Oven Carbonisation. W. Chaney. "Gas World," vol. 58, 1509, p. 857-66; 11 fig.; 1 tab. 10d.

The Utilisation of Nitrogen in Coal in the Shape of Ammonia. (Ueber die Nutzbarmachung des Stickstoffes der Kohle in Form von Ammoniak.) W. Heckel. "Stahl Eisen," 1913, 10, p. 402-5; 1 fig. (Report by the Coking Commission of the Association of German Metallurgists.) 2s. 9d.

Production and Industrial Application of By-product Coke Oven Gases. J. Becker and L. B. Robertson. "Jl. Inst. Eng. Chem.," vol. 5, 6, p. 491-5; 3 tab.

Coke Oven and By-product Plants at Birchenwood Colliery. J. R. L. Allott. "Iron Coal Trades Rev.," vol. 86, 2357, p. 733-4. 1s.

Physical Properties of Blast Furnace Coke. (Ueber die Festigkeit von Hochofenkoks.) "Bergbau," 1913, p. 321. 2s.

Coke Oven Plant at Gasworks. W. Chaney. "Colliery Guard.," vol. 106, 2742, p. 123; 2 figs. 6d. (Abst. paper read before Inst. Gas Engin.) 6d.

#### XXIV.—Fuels, Testing, &c.

Heat in the Volatile Matter of Coal. A. M. Peter. "Coal Age," vol. 3, 22, p. 842-4; 2 tab. (Analyses of Kentucky coal, which appear to show that the heat from volatile combustible matter is greater than from fixed carbon.) 1s. 3d.

Coal Testing. Q. Schramm. "Gas World," vol. 58, 1505, p. 709; 2 fig. (A Simplified method employed in Westphalia.) 10d.

Sampling of Coal Deliveries. "Chem. Engin.," vol. 17, 5, p. 218-20. 2s. 3d.

Selection of Locomotive Coal. M. Brown. "Indian. Ind.," vol. 10, 8, p. 360-1. (Selection of suitable locomotive coal in India. Classification of the qualities of coal.)

The "Agglutinating" Power of Coal. J. T. (Dunn. "Jl. Soc. Chem. Ind.," 1913, p. 397. 4s.

Burning of Pea Coals. (Verheizung von Grieskohlen.) Frisch. "Z. Bayr. Revis. Ver.," vol. 17, 3, p. 33-4. (By using an aero-economiser furnace and a mixture of small coke and pea coal, a saving of 20 per cent. in cost of fuel was obtained with an existing boiler plant.)

The Specific Heat of Coal and its Relation to the Presence of Combined Water in the Coal Substance. H. C. Porter and G. B. Taylor. "Chem. Engin.," vol. 17, 5, p. 179-84. 2s. 3d.

The Economic Combustion of Low Grade or Waste Fuels. D. M. Myers. "Engin. Mag. (N.Y.)," vol. 45, 3, p. 358-71; 15 fig. 2s.

Refrigeration as Preventive of Spontaneous Combustion in Coal. "Ice Cold Stor.," vol. 16, 183, p. 141-4; 5 fig.

Sub-bituminous and Lignite Coal as Locomotive Fuel. S. B. Flagg. "Railw. Engin. Rev.," vol. 53, 23, p. 530-1; 3 fig. 1s. 7d.

On the Sulphur Contents of American Coals. (Ueber den Schwefelgehalt amerikanischer Kohle.) O. Simmersbach. "Berg- Huettenmänn. Rdsch.," 1913, p. 169.

Sulphur in Coal. P. Baker. "Jl. Ind. Engin. Chem.," vol. 5, 6, p. 524-5; 2 tab. 3s. 6d.

Moisture in Coal. W. F. Hillebrand. "Jl. Inst. Engin. Chem.," vol. 5, 6, p. 521-2. 3s. 6d.

Determination of the Calorific Power of Coals. H. C. Dickinson. "Jl. Ind. Engin. Chem.," vol. 5, 6, p. 525-8. 3s. 6d.

Determination of Ash in Coal. S. W. Parr. "Jl. Inst. Engin. Chem.," vol. 5, 6, p. 523-4. 3s. 6d.

Processes and Results of Fuel Analysis. F. W. Hinrichsen and S. Taczak. "Glückauf," 1913, p. 773. 2s. 6d.

Preparation of Laboratory Samples of Coal. A. C. Fieldner. "Jl. Inst. Engin. Chem.," vol. 5, 6, p. 518-21; 5 tab. 3s. 6d.

Preliminary Report for the Committee on Coal Analysis of the American Society for Testing Materials and the American Chemical Society. W. A. Noyes. "Jl. Inst. Engin. Chem.," vol. 5, 6, p. 517-8. 3s. 6d.

A Laboratory Method of Fractionating Coal to Determine its Output of Gas and By-products. Q. Schramm. "Am. Gas Jl.," vol. 98, 23, p. 365-6; 2 fig.

Notes on the Chemistry of Gas Coal. E. F. Wilson. "Am. Gas Jl.," vol. 98, 22, p. 353-9. 1s. 6d.

Shrinkage of Carload Lots of Lignite Coal. J. G. Crawford. "Coal Age," vol. 3, 19, p. 716-7; 1 fig.; 1 tab. 1s. 3d.

Economy in Purchasing and Using Coal. A. O. Doane. "Engin. Mag. (N.Y.)," vol. 45, 3, p. 398-404. 2s.

The Specific Properties and Differences of the Solid and Liquid Fuels and their Technical Significance. (Die spezifischen Eigenschaften und Unterschiede der festen und fluessigen Brennstoffe und ihre technische Bedeutung.) "Glückauf," 1913, p. 601; ill. 2s. 6d.

#### XXV.—Steam Engines and Boilers.

Turbines for Mines. C. H. Barley and R. H. N. Vaudrey. "Birm. Eng. Min. Jl.," vol. 11, 2, p. 56-6; 6 fig.



A New Device for Waste Heat Recovery. A. T. Shurick. "Coal Age," vol. 3, 23, p. 870-1. 1s. 3d.  
 Mechanical Stoking Plant for Steam-boiler Furnaces. (Mechanische Bekohlungsanlagen fuer Dampfkesselfeuerungen.) Pradel. "Z. Dampfkessel Betr.," 1913, 5, p. 51-3; 6 fig. (Description of a new mechanical stoker "Ballist" built by Topf and Son, Erfurt.)  
 Exhaust Steam Plant at Scottish Collieries. "Colliery Guard.," vol. 106, 2740, p. 13; 4 fig. 6d.  
 Gas Power for Collieries. S. F. Walker. "Colliery Eng.," vol. 33, 11, p. 613-6; 4 fig.  
 The Archbutt - Deeley Water Softener. "Colliery Guard.," vol. 106, 2741, p. 72; 2 fig. 6d.  
 An Improved Lancashire Boiler. "Colliery Guard.," vol. 106, 2742, p. 124; 2 fig. 6d.

#### XXVI.—Compressed Air.

Carbonising Oil as a Cause of Air-Compressor Explosions. "Min. Science," vol. 67, 1731, p. 348-9.  
 Innovations in the Field of Compressed Air Boring Machines and Hammers. Grahn. (Neuerungen auf dem Gebiete der Pressluft-Bohrmaschinen und hämmer.) Grahn. "Techn. Bl.," 1913, p. 145; ill. 1s. 10d.  
 Comparative Efficiencies of Compressed Air v. Hydraulic Power for Mining Operations. G. A. Denny. "Canad. Min. J.," vol. 34, 10, p. 302-5. 1s. 6d.  
 Practical Points on Coal-cutting by Compressed Air. A. Sneddon. "Iron Coal Trades Rev.," vol. 86, 2360, p. 851. 1s.  
 Compressed-air pumps. Hempel. (Druckluftpumpen.) "Kohle Erz," 1913, 3, p. 35-6. 2s. 6d.  
 Experience with the Single Gas-driven Blower. A. West. "Iron Age," vol. 91, 22, p. 1303-5; 3 tab. 2s.  
 Time Studies and Air Consumption. A. Formis. "Engin. Min. J.," vol. 95, 24, p. 1183-5; 4 fig.

#### XXVII.—Electricity.

Notes on Colliery Generating Plant. W. B. Shaw. "Iron Coal Trades Rev.," vol. 86, 2358, p. 770-1; 3 fig. 1s.  
 Electricity in Mines. H. S. Webb. "Colliery Eng.," vol. 33, 11, p. 629-30; 3 fig.  
 The Electrification of Cannock Colliery. S. F. Sopwith. "Trans. Inst. Min. Engin.," vol. 45, 2, p. 350-71; 9 fig. 8s.  
 Electrical Engineering for Mechanical and Mining Engineers. H. J. S. Heather. London and New York. 322 p.; ill.  
 Substation Loads in Lackawanna Collieries. H. M. Warren and A. S. Biesecker. "Coal Age," vol. 3, 19, p. 712-4; 6 fig. (Tests on 15 substations show that the 24-hour load factor is 12.5, and for 365 days is only 8.6 per cent.) 1s. 3d.

#### XXVIII.—Surface Transport.

Coal and Ash Handling at Lake Shore Plant. A. D. Williams. "Power," vol. 37, 22, p. 768-71; 11 fig. 1s.  
 Coal-handling Plant at the Orleans Gasworks. M. Bourgenot. "Jl. Gas Light.," vol. 122, 2614, p. 806-7; 3 fig. 1s.  
 Loading Coal by Means of a Quick-acting Power Shovel. (Kohlenverladung durch Schnellschaufelbagger.) Graefe. "Kohle Erz," 1913, p. 415; ill. 2s. 6d.  
 Bleichert Electric Telfer Plant at the Deutschland Pit. (Bleichertsche Elektro-Hängebahn auf der Deutschlandgrube.) "Z. Ver. D. Ing.," 1913, 2, p. 75-6; 1 fig., 2 ill. 2s. 6d.  
 Aerial Ropeway with Single Carrying Rope. "Min. Mag.," vol. 8, 6, p. 432-3. (A Sardinian type for small mines, owing to the low initial cost).  
 Canadian Pacific Coal Unloading Dock. "Railw. Age Gaz.," vol. 54, 22, p. 1173-6; 8 fig. (New plant at Fr. William, Ont.) 1s. 6d.  
 The Transport of Loaded Mine Cars on the Aerial Tramway. (Der Transport von beladenen Foerderungswagen auf dem Luftwege.) W. Schulz. "Techn. Bl.," 1913, p. 137; ill. 1s. 10d.  
 Over and Underground Tramways at the Deutsch-Luxemburg Mine and Smelter, near Dortmund. (Die ober- und unterirdische Seilbahn der Deutsch-Luxemburgischen Bergwerks- und Hütten-A.G. bei Dortmund.) Rath. "Glückauf," 1913, p. 725 and 756; ill. 5s.  
 The Electrically Worked Coal Railway in Sumatra. (Eine elektrisch betriebene Kohlenbahn auf Sumatra.) "D. Strassen-Kleinbahnztg.," 1913, 7, p. 101-3; 9 ill.  
 An Ingenious Coal-handling Plant. "Colliery Guard.," vol. 106, 2742, p. 123. (Proposed plant at Hammer-smith Electricity Works). 6d.

#### XXIX.—Sanitation, Diseases, &c.

Electricity and Dust. Sir T. Oliver. "Colliery Guard.," vol. 106, 2742, p. 122; 2 fig. (From address at Paris Congress on Industrial Hygiene.) 6d.

#### XXX.—Mining Laws, Royalties.

Official Regulations on the Working of Fuel Mines, published by the Central Committee of French Colliery Owners, with Tables and Notes of Reference. (Recueil des Textes Officiels Relatifs à l'Exploitation des Mines de Combustibles, Publié par les Soins du Comité Central des Houillères de France, avec Tables et Notes de Référence.) L. Aguilon. Svo, 330 p.; tab. Paris, 55, rue de Chateaudun.  
 Draft General Regulations. "Colliery Guard.," vol. 105, 2739, p. 1387; vol. 106, 2740, p. 14. (Proceedings before Referee.) 1s.

The consumption of electrical current for various purposes in connection with collieries in the Pendlebury district of south-east Lancs is now rapidly increasing. Last week the local district council passed plans for a sub-electricity station to be built in the Pendlebury district, for the Lancs Electric Power Company.

#### BOOK NOTICES.

The South Wales Coal Annual for 1913. Edited by JOSEPH DAVIES and C. P. HAILEY. xx. + 374 pp., 5½ in. by 8½ in. Cardiff, London and Newcastle-on-Tyne: The Business Statistics Company. Price 7s. 6d. net.

This constitutes the tenth annual issue of this annual, which serves a valuable purpose in bringing buyers in close touch with the development, working and transport of South Wales coal, and provides, in addition, a concise statement of wages, rates, production exports, shipment charges, freights, &c. An illustrated article is this year included on the firm of L. Gueret Limited.

Past and Present Metal Markets. By W. E. FIGGIS. 5½ in. by 9 in., 45 pp. and 2 charts. Melbourne: Critchley Parker.

The charts show the movements of copper, tin, zinc, lead and silver from 1890 to the present time, the letterpress giving a useful clue to the existing sources of production and the future possibilities of the markets.

Biggar's Contracting World Directory. Edited by C. W. BIGGAR. 223 pp., 7 in. by 10 in. Price 10s. 6d. London: Contractors' and Engineers' Publications Limited.

This useful directory, as its name implies, gives the names and addresses of contractors for various classes of materials and works, supplemented by lists of architects, surveyors, mechanical and civil engineers, and of public works under construction.

Hull as a Coal Port, and the Yorkshire, Derbyshire and Nottinghamshire Coalfield. Edited by H. E. C. NEWHAM. xvi. + 110 pp. 7 in. by 9½ in. Hull: H. E. C. Newham. Price 2s. 6d. net.

The port of Hull has been well "boomed," and this little volume should assist in the good work. In his interesting preface, Sir Albert Rollit commends the book "as a most useful and reliable guide," and with this opinion there must be complete acquiescence. In the first place the docks and facilities are dealt with, with large-scale plans of the North-Eastern Railway riverside quay, the Alexandra Dock and new joint dock, dock rates and charges, &c. It is pointed out that there are now 380 collieries having access to the port, and it is common knowledge that the individual capacity of some of them is very large. Statistics of exports, &c., follow, with a summary of the geological developments of the past few years. The most useful section of the book is that which gives an account of the characteristics of the various seams worked in the coalfield, with particulars of some of the principal collieries, and a good map of the district showing the pits and railway connections.

British Standard Specification for Copper Tubes and their Screw Threads (primarily for domestic and similar work). Engineering Standards Committee. London: Crosby Lockwood and Son. Price 2s. 6d. net.

This is No. 61 of this invaluable series of reports, and deals with copper tubes for low, medium and high pressures. There are tables of dimensions and several illustrations.

South Wales Coal and Iron Companies, 1913. Cardiff: Business Statistics Company Limited. Price 1s. net.

An extremely useful little manual for the investor and those generally interested in the commercial side of the South Wales coal industry. Every company is treated separately, the information given including lists of directors, the amount of capital and debentures, the position of the collieries and their approximate annual output, with a summary of the last issued balance-sheet and profit and loss account, the profit made annually during the last six to 14 years, the dividends paid and the sums placed to depreciation, reserves, &c. At the end there is a list of the approximate highest and lowest prices of ordinary shares during each year for the past 14 years.

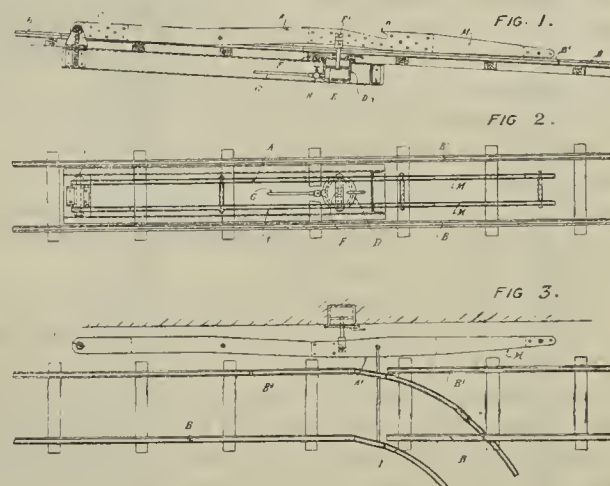
The People's Money. By J. W. DE KAY. 7 in. by 4½ in.; 105 pp. Price 1s. London: Effingham Wilson.

This book traces the formation and points to the abuses of the great trusts in America, and shows the part which the banks are able to play in using the money of the public for the creation of such institutions. The author, who declares he is not opposed to the trust system, suggests, as a remedy for its abuses, the establishment of a central bank based on the communal principle.

Messrs. Henry Good and Son Limited, of 12, Moorgate-street, have published a full index to Mr. P. D. LEAKE'S work on *Depreciation and Wasting Assets*, already reviewed in the *Colliery Guardian*, which should certainly increase its value. The price of the index is 6d., and of the complete work 10s. 6d.

#### ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

13733 (1912). *Improvements in or connected with Apparatus for Arresting Wagons, Tubs and the like when Travelling at an Abnormal Rate Down an Inclined Way.* J. M. Martin, of 5, Broomhill-avenue, Carmyle, Lanarkshire.—Relates more especially to mining systems wherein the speed of travel of the tubs down the incline is normally restrained by means such, for example, as a haulage rope to which the tubs are coupled at intervals, or arranged in trains connected to the end of a haulage rope. The conditions which this invention contemplates dealing with, arise when a tub breaks or slips its coupling with the haulage rope and runs down the track at an abnormal rate of speed. According to the invention, the track is provided with means so located as to be acted upon by the tubs as they descend the incline, the means offering a resistance which can only be overcome by action continued over a predetermined period of time corresponding approximately to the period of time occupied by each tub in its normal passage while in contact with the aforesaid means, associated with apparatus for arresting the tub if the resistance is not overcome. The means may consist of a part turning about a horizontal pivot—for example, as shown at figs. 1 and 2, it may consist of a depression beam A set between the rails B B' of the track and mounted on a horizontal pivot C at its upper end. The resistance may be obtained by using a fluid medium—for example, a liquid such as oil or water may be adopted, operating in a cylinder D having a piston E and rod F connected to the depression beam at F'. For supplying the cylinder with water a reservoir may be provided, arranged at such a height as to give a head or pressure sufficient

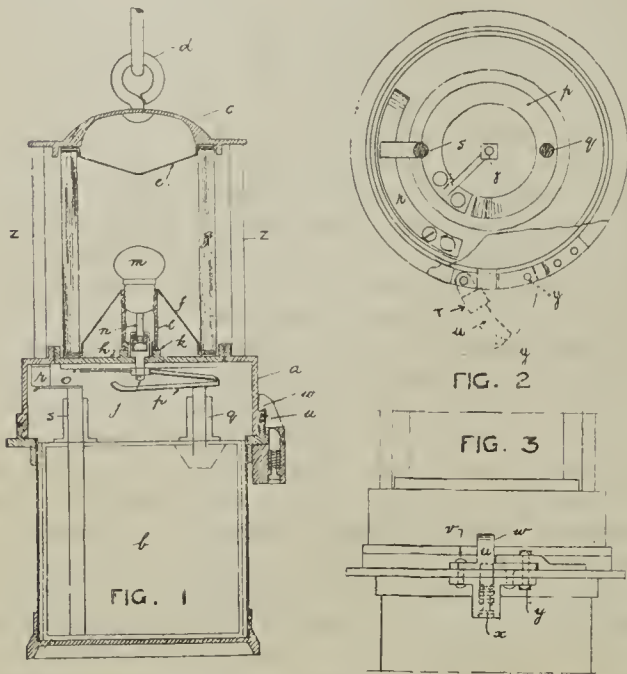


for normally supporting the beam in its raised position—for example, a tank, not shown in the drawing, may be placed in a recess in the side of the working and be connected with the foot of the cylinder D by a pipe G. The beam may be otherwise normally supported in its raised position—for example, by means of a spring or by a weight. For regulating the period of resistance, means—such, for example, as a valve H—are provided in the connection between the base of the cylinder D and the tank, for restricting the speed of expulsion of the liquid from the cylinder D, and, if required, provision may be made to cause a quick return flow of the liquid into the cylinder. With arrangements of this character, it will be recognised that a tub travelling down the way at a normal speed, by coming into contact with the upper end and travelling over the beam A, will cause it to be gradually depressed, but if the speed of the tub is excessive, the period of contact will not be sufficient to permit the water to be expelled from the cylinder D or to pass to the opposite end thereof, and consequently the depression of the beam A will be prevented by the piston E. Fig. 3 illustrates a modified form of construction in which a depression beam A' is mounted to turn about a vertical axis C', in which case the beam is depressed laterally by the side of the tub in passing bearing against it. The operation of the beam may be utilised to remove means out of the path of travel of the tubs which would otherwise arrest their progress, divert, derail, or possibly demolish them. (Eight claims.)

14202 (1912). *Improvements in Miners' Electrical Safety Lamps.*—W. Thomson, 79A, Princess-street, Manchester, and J. H. Rothwell, Anstey House, Lambton-road, Worsley, near Manchester.—The electrical cell with two projecting lugs is by preference cylindrical and placed in the cylindrical case. The metal base plate h is cast with a projection k provided with a screw, on to which is screwed the tube l, into the top of which is screwed or otherwise fixed the glow lamp m, the bottom of which comes in contact with the spindle n, which is depressed against a spiral spring around it so as to give good electrical contact with the central portion of the glow lamp. The other end j of this spindle passes through the metal base plate h and the vulcanised fibre washer or other insulator o, and comes in contact with the circular spring p (see fig. 2) which engages one of the lugs q of the cell, when the cylinder b (containing the cell) is screwed home on to the case a. To the rim of the upper portion of the metal case a is attached the spring r, a narrow strip of spring brass in the form of a quarter or the whole of a circle (see fig. 2) which comes in contact with the case by means of metal screws, and which engages the lug s of the battery. When the body a is

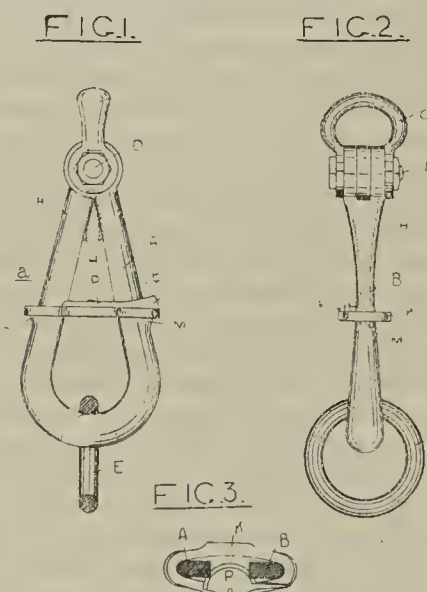


into the bottom case *b*, the lugs *q* and *s* engage the springs at any point and remain in contact with the springs. The lugs *q* and *s* only come in contact with the springs *p* and *r* when the bottom is screwed home, but when unscrewed to the extent of one-quarter of a turn the contact is broken and the light of the lamp is extinguished, therefore the bottom portion *b* acts as a switch by screwing home or unscrewing to the extent of a quarter to half a turn of the screw. The lock shown in detail in fig. 3 can be



used either as a magnetic lock or can be locked by the lead rivet *y* in the usual way. It consists of the portion *U* (figs. 1 and 3), which is swivelled at the point *v* (fig. 3). The upper portion of *U* is bent over, as shown at *w* (fig. 1), so as to engage the rim on the outside of the upper portion *a* when closed, and prevent either *a* or *b* from being completely unscrewed until it has been unlocked by a magnet acting on and pulling down the bolt *x* (fig. 3) or by removal of the lead plug *y* and then pulling away the lock, as shown at *U* and *y* (fig. 2). (One claim.)

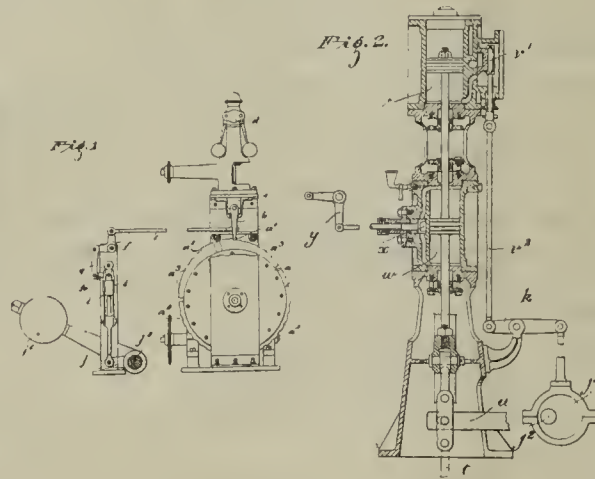
14753 (1912). *An Improved Safety Hook*. W. Brown and A. C. E. Brown, both of 243 and 245, Rundle-street, Adelaide, South Australia, and T. B. Merry, 160, Gilles-street, Adelaide, aforesaid.—Relates to safety hooks of the kind having a pair of side members pivoted together and normally restrained from spring actuated separation by an encircling locking ring slidable thereon. Figs. 1 and 2 are front and side views of the safety hook closed, the two members of the hook being held together by the locking ring. Fig. 3 is a cross-section on line *a b* of fig. 1 just above



the locking ring. The locking ring *K* encircles the side members *A* and *B*, and, when in normal position, holds them together against the pressure of the spring. Upon the two side members *A* and *B* are stop lugs *L* and *M*, which limit the downward movement of the ring *K*. Upon the top side of the ring *K* is pivoted a catch *P*, the edge of which engages small notches in the face of the side members *A* and *B*, and prevents the accidental raising of the ring. (One claim.)

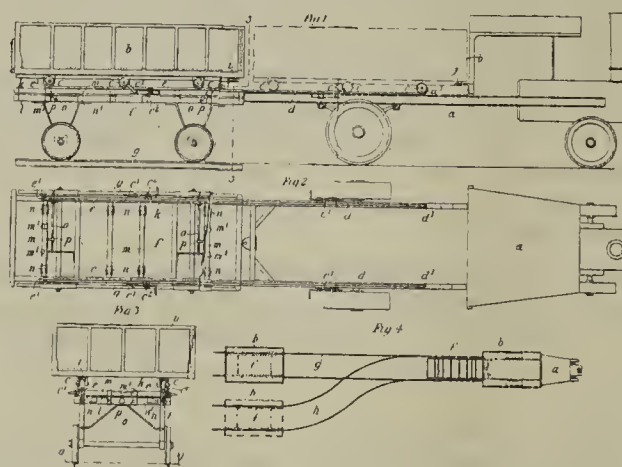
15113 (1912). *Improvements in or relating to the Brakes used in connection with Mine Cages, Elevators and the like*. J. Wilson and W. Reah, both of Edmondsley Colliery, county of Durham.—Refers to the type of brake having a cataract or dash-pot device for graduating the application of the brake, said cataract or dash-pot device being operated automatically by a governor. According to the invention the fluid, by virtue of which the cataract device acts, is adapted to pass in the operation of the cataract apparatus from one side of the piston to the other, and in such passage it is controlled by a valve or the equivalent operated automatically by the governor in such a manner that the opening of the valve is positively effected. Fig. 1 illustrates a winding appliance forming subject of prior Application dated June 28, 1912. Fig. 2 illustrates an application of the invention to a dead-weight brake in which *u* is the dead-weight rod, *v* the brake lever, *w* the

steam cylinder, and *w* the dash-pot cylinder; *x* is a valve controlling the fluid contained in the dash-pot, and allowing it to flow from one side of the piston to the other. If the engine is running at a high speed the governor, through mechanism *y*, more or less closes this passage, but gradually opens it as the engine slows down. The dead weight is retained in the elevated position by steam contained in the steam cylinder *v* at a position below the piston therein so that upon the slide valve *v'* thereof being appropriately operated the steam is exhausted therefrom allowing the brake to be applied. On steam being again admitted to the



cylinder the weight is lifted to its normal position. The slide valve in the cylinder *v* may be operated by any suitable mechanism, as for instance an eccentric *j* on the shaft *j* through the medium of the lever *k* and valve rod *v*, and suitable means may also be incorporated for operating the slide valve by hand without having to rotate the shaft *j* or release the weight *j*. (Two claims.)

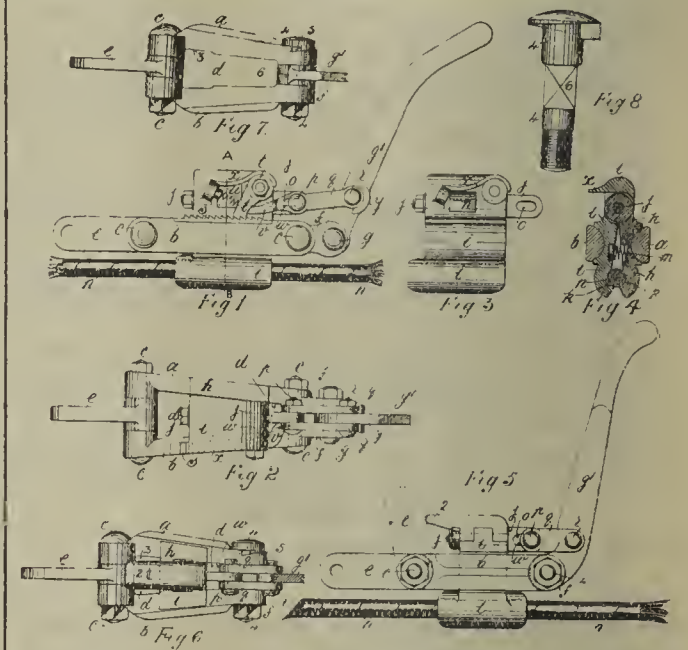
17326 (1912). *Improvements in the Transport of Coal and Merchandise and Means therefor*. F. M. Smith, of 22, Park Village East, Regent's Park, London.—Relates to that method of transport wherein bodies or receptacles for the goods to be transported are mounted upon wheels designed to run upon rails so that when corresponding rails are arranged upon the wharves, railway trucks, or ordinary road transport vehicles, such bodies or receptacles can be readily transferred from a railway truck or wharf to a road transport vehicle or vice versa. According to the invention use is made of a motor vehicle for the road transport and in order to avoid loss of time in placing the vehicle so that



the rails upon it are in alignment with the rails on the wharf or railway truck to permit the body or receptacle to be readily transferred from one to the other, such rails, either on the motor road vehicle or on the railway vehicle or wharf are capable of being moved laterally to a certain extent to permit of the desired adjustment. In a suitable arrangement for carrying out the invention the rails either on the railway or road vehicle are carried on a supplementary frame running in guides upon the main frame so as to permit of their movement by means of a screw or rack. Fig. 1 is a side elevation showing a motor tractor or lorry in conjunction with a transferable body running upon rails, fig. 2 is a plan view of the same but without the body, fig. 3 is a section on the line 3-3 (fig. 1), and fig. 4 is a diagram illustrating the operation of the arrangements for loading or unloading. (Three claims.)

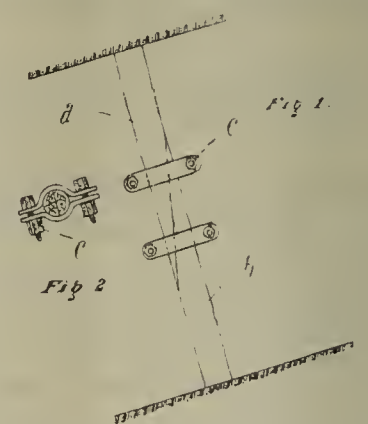
18246 (1912). *Improvements in Haulage Clips*. M. Stubbs, of 29, Shell Heath-road, Smallthorne, Staffordshire.—Has reference to that type of clip having a pivoted jaw grip in which the jaws are closed by the pull of the load on a wedge-shaped frame engaging the sides of the jaws, and comprises a frame made in two parts adjustably secured together so as to leave a wedge-shaped slot between them and at the same time form guides, gripping jaws hinged together at their upper ends by a pin or bolt, mounted slidably on the guides, an operating lever pivoted on the frame and linked to the jaws, a pawl pivoted to the jaws engaging with a rack on the frame and an extension from one of the links. Fig. 1 is a side elevation. In the clip the grip on the cable becomes tighter as the load increases, and when the clip is drawing only; but in the example illustrated by figs. 5 to 8 the greater the load the greater the grip both when drawing and holding back the load. The gripping jaws (fig. 5) are as before, excepting that the upper part of one jaw has an extension 2 which takes

the link *e* or hook when the load is going down a decline. On a decline the wagon or load would over-run the speed of the clip and rope when the hook or link *e* would automatically move up into the dotted position against the projection 2, and the weight or load would force the grips tighter on the haulage cable. This arrangement does away with the pawl and rack. In fig. 1 the handle is connected to the frame by an ordinary bolt, whilst in the clip shown at fig. 5 the gripping action may be severe, and it would be awkward to disengage the grips if the handle was connected by an ordinary bolt. To overcome this objection the handle is connected to the frame by a cam-headed bolt 4, fig. 8 having a head formed at its inner side as a circular wedge which engages with a correspondingly shaped wedge



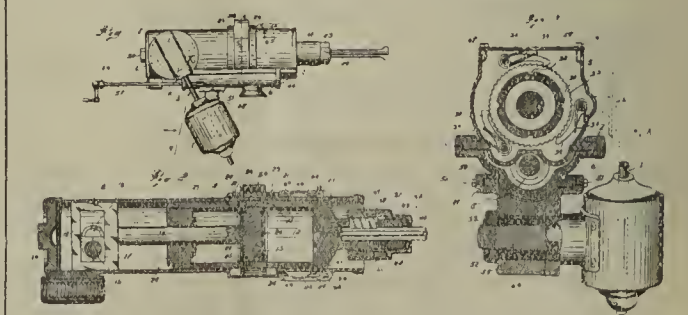
5 on the frame. The lever *g* has a square hole engaging the squared part 6 of the cam bolt 4, so that by the lever the cam bolt is slightly rotated. This action allows a slight expansion of the side frame nearest the handle. Such expansion of frame allows the gripping jaws to be released easily, and to be moved back into the wider part of frame. (Two claims.)

17557 (1912). *Improvements in Collapsible Wooden Mining Props*. H. Heidkamp, of 117, Blütenstrasse, Hamborn-Neumühle, Rheinland, Germany.—The object is a mining timber or prop obliquely cut through at about the centre, the two parts being held together by means of a clamping device. Fig. 1 shows a side view of the timber adjusted between



ground and roof of a mine; fig. 2 represents a horizontal cross-section through the mining prop and its clamping device. The two halves *a* and *b* of the mining prop are pressed together by means of clamping rings, which can be fastened by bolts and nuts *c*. Instead of the bolts and nuts wedges can be used. (One claim.)

24726 (1912). *Improvements in Rock Drills*. H. Deitz, 416, West Fourth-avenue, Denver, Colorado, U.S.A.—Relates to improvements in rock drills in which a reciprocating drill member is provided with an air chamber ported to prevent the formation of a vacuum, but in the opposite extremities of which the air is compressed by a piston



located in said chamber and connected with an actuating pitman rod or stem; and such improvements consist primarily in arranging the ports which are provided to admit air to the said chamber approximately the same distance apart as the width of the piston head which reciprocates therein, and so that they only communicate respectively with corresponding ports in the casing in which such reciprocating drill member works at given points in the travel thereof. Further improvements consist in means for preventing the rotation of the air chamber in its casing



BRUSSELS EXHIBITION: "GRAND PRIX."

ROUBAIX EXHIBITION, 1911: GRAND PRIX."

# HOPKINSON-FERRANTI

## PATENT

# STOP VALVE

For Steam and High Pressure Water Service.

The **GREATEST ADVANCE** in VALVE CONSTRUCTION of the TIMES.

### Less Weight, Cost & Leakage.

This Valve has been invented and designed to enable a valve having operative parts of half the ordinary diameter to pass a large amount of steam through a small working part.

#### PRINCIPLE:

Converting the pressure of the fluid into velocity and re-converting the velocity into pressure, thereby passing an amount of steam equal to full carrying capacity of pipe.

#### SELLING POINTS:

Passes the same quantity of steam as a full-bore valve.  
Reduction in cost over ordinary fullway valves.

Considerably less weight.

Seats half diameter of ordinary sluice valve, therefore halves possible leakage.

Reduces vibration in pipes.

Graded opening—no sudden rush of steam in opening.

No bye-passes necessary, thereby saving their cost.

Is not subject to wedging action or mechanical strain.

The discs slide with a flexible pressure upon the seats, thereby preventing cutting and scoring.

When the valve is open the seats are protected from the flowing fluid by the eyepiece.

Always easy to open and close under pressure.

It is an ideal valve for high temperature superheated steam, as there are no cast iron internal working parts.

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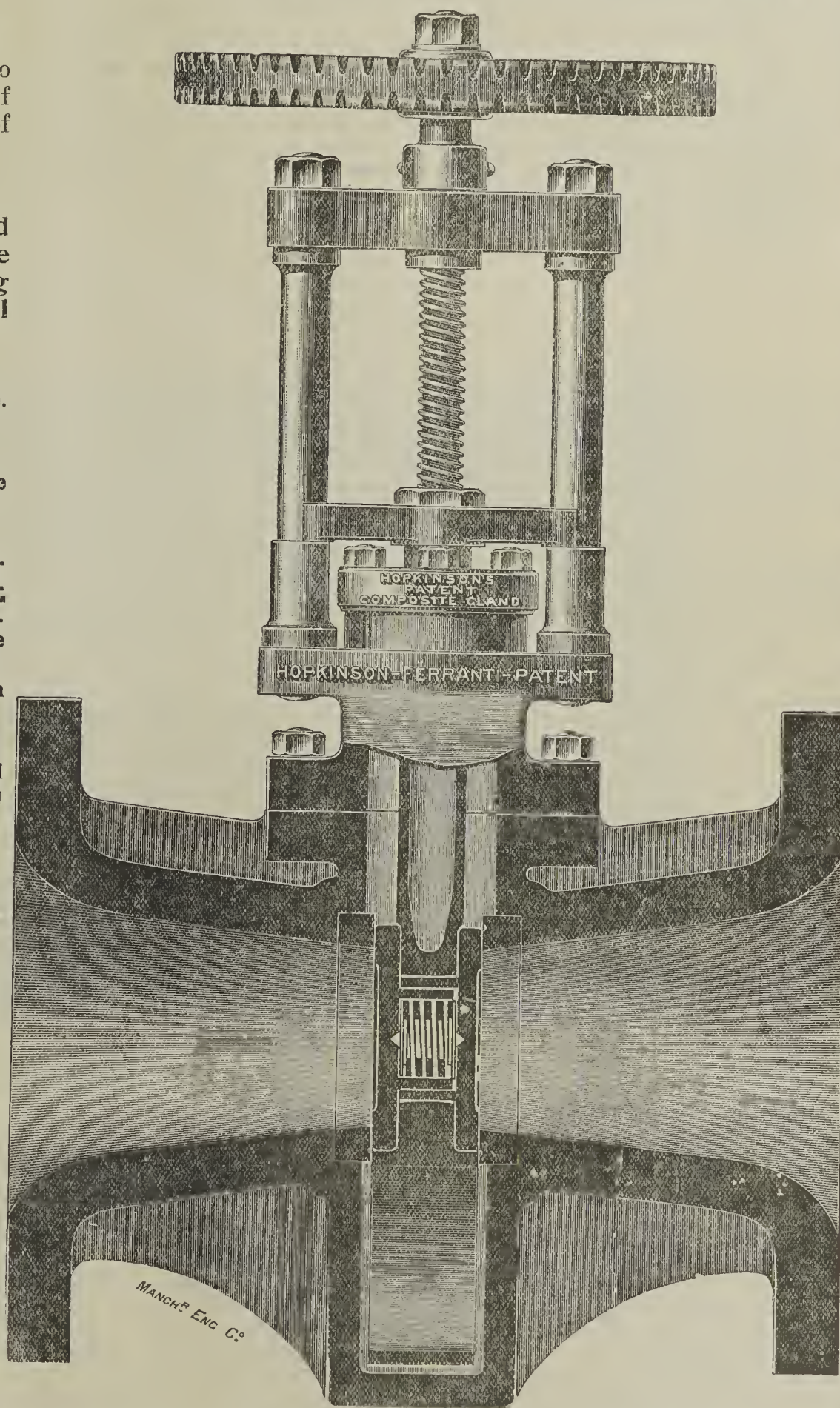
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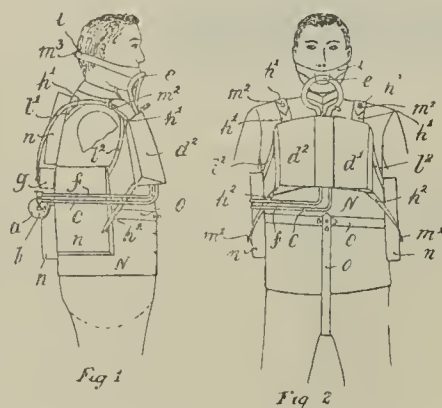
165, Queen Victoria Street, LONDON; 41, Bothwell Street, GLASGOW; 2, York Buildings, York  
Place, EDINBURGH; Royal Buildings, Park Place, CARDIFF; 7, Manchester Street, OLDHAM;  
PARIS and ST. PETERSBURG.





when desired and for guiding the movement of the yoke through which the piston working in the air chamber is actuated from a suitable motor. Fig. 1 is a side elevation of the drill; fig. 2 is a vertical longitudinal section taken through the same shown on a larger scale; and fig. 4 is an irregular section drawn to a larger scale, the upper part being taken on the line 4-4, fig. 1. and the lower part through the bearing by which the motor is supported. As soon as the motor shaft J is set in motion, the crank shaft will be rotated, imparting a reciprocating movement to the piston and consequently to the drill holder. In case the drill bit is stuck in the hole, the continuation of the rotary movement of the crank shaft will not result in breaking any of the parts of the mechanism, since the reciprocation of the piston within the hollow drill holder will simply act on the air cushions in the opposite ends of the drill holder chamber. (Three claims.)

24688 (1912). *Improvements relating to Apparatus for Breathing under Water, and more particularly intended for Life-saving Purposes.* Maschinfabrik "Westfalia" Aktien-Gesellschaft, of Gelsenkirchen, Westfalia, Germany.—Relates to apparatus for breathing under water, and especially to life-saving equipments for the crews of submarines. According to the invention the breathing equipment is connected to the jacket by hooks, buttons, or



the like in such a manner as to be readily detachable, so that when the wearer comes to the surface he can easily release himself from the breathing equipment by unfastening the same, and the jacket then supports him in the water. The accompanying drawing illustrates such an arrangement in side view fig. 1 and front view fig. 2. (Two claims.)

#### CATALOGUES AND PRICE LISTS RECEIVED.

The Klinger Company's monthly "Engineering Notes" for May contains a description of a new valve, the principal features of which are the high seat and the strength of the valve spindle. There are also readable articles on lubrication in mines and the joints of water-tube boilers.

A list dealing with the "Rex" totally-enclosed fuses has been received from the General Electric Company. The spring clip type fuse may be fitted in existing fuse boards with the ordinary 2½ in. brake. The fuses are supplied in ironclad fuse boards for circuits up to 550 volts.

Mr. John F. Wake, of Darlington, has issued a comprehensive catalogue of secondhand machinery. These include, in addition, a large lot of 3,000 railway wagons, a variety of air-compressors, steam boilers, cranes, electric motors and fittings, winding and haulage engines, locomotives, machine tools, &c.

Messrs. David Brown and Sons (Huddersfield) Limited send us two lists relating to double helical gears and spur reduction gears. As regards the former, the method of cutting adopted is such that the centre or V portion is retained and the teeth are in one continuous piece from face to face. The firm supply reduction cases provided with either spur or double helical gearing, according to the speed and the class of work.

The Chicago Pneumatic Tool Company's Compressor Department, Bulletin No. 34 L, gives much general engineering information of value to users of compressed air. It contains tables giving efficiencies of air compression at different altitudes, density of gases and vapours, mean effective pressures and horse-powers, loss of pressure due to friction in pipes, and many others. Views of various types of compressors are shown in miniature, as well as illustrations showing the interior of the Pneumatic Tool Company's compressor plant at Franklin, Pa.

A new sectional catalogue on surveying instruments has been sent to us by Messrs. John Davis and Son (Derby) Limited, which contains several new designs of transit theodolites and improved details of many other of the instruments made by them. Practically all the theodolites and dials are now constructed with legs of a new telescopic pattern, the lower portion being circular and sliding between two curved strips. This arrangement greatly facilitates adjustment. Further recent improvements in the transits and dials consist in a reconstruction of the clamping and fine adjustments of the centre and horizontal axes. These now occupy the same relative position, the theodolite being thus able to find the various clamps, &c., without taking his eye off the object. The surveyor will find in this list practically everything of which he stands

#### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named **post free**.

Consular Reports, 1912: Germany (Mannheim), 2d.; Portugal (Angola), 3½d.; Trade of Portugal, 2d.; U.S.A. (Porto Rico), 2d.; Italy (Turin), 3d.; Paraguay (Budget for 1913), 1d.; France (Réunion for 1912), 1½d.; France (Rouen), 8s.; Mexico (Tampico), 3d.; Ditto (Salina Cruz), 1½d.; Turkey (Erzurum), 1½d.; Brazil (Sao Paulo), 2½d.; France (Society Islands), 1½d.; Italy (Rome), 2d.

Census of England and Wales, 1911, Vol. 12, 8d.  
Board of Education: Regulations for Technical Schools, Schools of Art and other Forms of Provision of Further Education in England and Wales, 1913, 2½d.

Education (Scotland) Bill Report, 1½d.  
Labour Gazette, July, 2½d.

Rules and Regulations Relating to Chemists of the Research Department, 1½d.

Scientific Investigations, 1912, No. 1, 6½d.

Trade Boards Act Provisional Orders Bill, 1d.

Railway Accidents, General Report for 1912, 3½d.

Real Property Bill, 1s. 2d.

Conveyancing Bill, 9d.

Real Property and Conveyancing Bill Memorandum, 5d.

#### PUBLICATIONS RECEIVED.

"Engineering Notes" (Vol. 5, No. 25), July; "United States Bureau of Mines: Monthly Statement of Coalmine Accidents in the United States, January to February," compiled by F. W. Horton; "The Journal of the Chemical, Metallurgical and Mining Society of South Africa" (Vol. 13, No. 11), May, price 3s.; "Bulletin Mensuel de la Société du Nord de la France" (No. 193), June; "Fabian Tract No. 171, 'The Nationalisation of Mines and Minerals Bill,'" by H. H. Schloesser, price 1d.; "The Mining Magazine" (Vol. 9, No. 1), July, price 1s.; "Bulletin de la Société d'Encouragement pour l'Industrie Nationale" (tome 119, No. 6); "University of Illinois (Bulletin No. 66), 'The Properties of Saturated and Superheated Ammonia Vapour,'" by G. A. Goodenough and Wm. Earl Masher; "University of Illinois (Bulletin No. 67), 'Reinforced Concrete Wall Footings and Column Footings,'" by Arthur N. Talbut; "Transactions of the North-East Coast Institution of Engineers and Shipbuilders" (Vol. 29, Part 6), July, price 5s.; "Annuaire de la Société de l'Industrie Minérale, 1913-4"; "The Free Trader, Special Agricultural Number," price 1d.; "Peru To-day" (Vol. 5, Nos. 1 and 2), April and May, price 5d.; "The Journal of the British Chamber of Commerce for Italy" (Vol. 3, No. 10), July; "The Journal of the Franklin Institute" (Vol. 176, No. 1), July, price 50 cents.

#### NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

##### Applications for Patents.

16162. Adjustable cutter for boring bars and the like. T. E. Pattinson.  
16165. Detonators and the art of producing the same. Nobels Explosives Company Limited, D. Corrie and C. M. W. Grieb.  
16181. Means for synchronising revolving bodies. Sir C. A. Parsons and S. S. Cook.  
16195. Retorts for the distillation of shale. J. W. Fell.  
16199. Water-tube boilers. Clarke, Chapman and Co. Limited and W. A. Woodeson.  
16217. Lamp for use in the mines for all kinds of workmen. A. Pickard.  
16225. Ventilating fans and the like. J. H. Wickett and Troup, Curtis and Co.  
16237. Instruments for making calculations in regard to toothed gearing and other problems. H. Young.  
16257. Electric miners' lamp with firedamp indicator. J. C. Rigaux.  
16273. Method of separating barytes from ores. C. J. Greenstreet.  
16277. Process of reducing ore to metal. J. A. McLarty.  
16302. Concentration of ores. Minerals Separation Limited and H. H. Greenway. (Partly communicated from H. Lavers and A. H. P. Lowry, Australia).  
16307. Metallurgical furnaces and the metallurgy of copper. L. Addicks and C. L. Brower.  
16311. Hoop-guard for cables. Weil and Reinhardt.  
16312. Three-part wedge-joint or lock for cable-guards. Weil and Reinhardt.  
16318. Ovens for generating gas and producing coke. H. Koppers.  
16333. Safety shackle or coupling pin. E. A. F. Smith and P. J. Smith.  
16334. Manufacture of bricks, blocks, and like articles. R. Parry.  
16340. Grinding mills. A. Leggett and L. Turner.  
16362. Pick-holders. S. Young.  
16370. Process and apparatus for converting hydrocarbons into gas. H. C. Empis.  
16407. Device for spreading stonedust in a mine. A. Hopkinson and T. H. Elliot.  
16411. Fuel economisers for steam boilers. W. L. Cooper and A. Sudron.  
16433. Means for stoking fuel in furnaces. J. A. Hope and A. H. McDiarmid.  
16456. Method of manufacturing explosive charges for mining and military purposes. C. Claessen.  
16467. Miners' safety lamp. F. Faerber.  
16473. Automatic lubricating device for the rails and ropes of elevators, transporting mechanism, and the like. Fabrikations Ges. Automatischer Schmier-apparate "Helios" Otto Wetzel and Co.

16477. Device for automatically raising loose or heapable material. J. Pohlig Akt.-Ges. and P. Volkenborn.  
16479. Process of rolling thin-webbed I and H beams by means of universal mills. Deutsch Luxemburgische Bergwerks und Hütten Akt.-Ges. and P. Würth.  
16484. Extraction of metals from their ores. F. J. Goslett, M. Fradd, and Metals Extraction Corporation Limited.  
16491. Scraper for shot holes in mines and quarries. O. Lewis.  
16496. Shackle for haulage and other purposes. E. Wilding and W. Wilding.  
16500. Adjustable chuck for use in the spindles of drilling and boring machines and the like. J. Buckton and Co. Limited, and J. H. Wickstead.  
16502. Weighing machines. H. Pooley and Son Limited, and J. Dobson.  
16530. Apparatus employed in casting metals. L. Ferman.  
16532. Method of and apparatus for strengthening substrata. C. Ferrar.  
16540. Electro-deposition of iron. S. O. Cowper-Coles.  
16542. Process for coating or plating metal sheets with other metals. S. O. Cowper-Coles.  
16545. Plugs for boiler tubes, hollow shaftings and the like. H. T. Mason.  
16557. Governing mechanism for elastic fluid turbines. Warwick Machinery Co. (1908) Limited. (General Electric Co., United States.)  
16565. Manufacture of electrolytic iron. Société "La Fer."  
16599. Regenerative coke ovens. E. Lecocq.  
16611. Process for the production of light oils from crude, heavy, or lighting oils. J. Moeller and H. C. Woltereck.  
16612. Process for the distillation of bituminous material. J. Moeller and H. C. Woltereck.  
16638. Process of corrugating tubes and the product thereof. L. H. Brinkman.

#### Complete Specifications Accepted.

To be published on August 7.

1912.

16300. Apparatus for the automatic analysis and indication of gases. Boulton.  
16441. Method of and apparatus for preventing the spreading and reducing the effect of coaldust and firedamp explosions. Kahler and Junker.  
16762. Construction of conveyor and means for varying its position. Read.  
16949. Automatic balancers for rotating masses. Soc. Anon. pour l'Exploitation des Procédés Westinghouse, Leblanc, and Leblanc.  
17155. Water-proof and damp-proof coating material especially applicable to explosives. Hunter.  
17189. Combined cap and eye-guards or like head coverings or protectors for pit ponies and the like. Macfarlane.  
18587. Treatment and utilisation of peat. Leadbeater.  
19841. Method of and apparatus for producing gas mixture. Osthoff.  
19842. Combined punching and shearing tool. Blanc, Dutrut, Bernier and Desrues.  
23056. Smoke-consuming furnaces. Therrien.  
23445. Gripping or safety devices for cages. Hafner.  
23660. Brakes for locomotive and other cranes, steam navies, and the like. Goring.  
25611. Drilling and boring machines. J. Archdale and Co. and Coxon.

1913.

1144. Water softening or purifying, or both water softening and purifying plants. Good.  
3245. Use of explosive compositions for blasting. Soc. l'Air Liquide (Soc. Anon. pour l'Etude et l'Exploitation des Procédés Georges Claude).  
4443. Riddle to enable ore or the like to be discharged from ships direct to railway wagons in a riddied condition. Donaldson, and British Riddling Company.  
5041. Travelling grates for furnaces. L. and C. Steinmuller (firm of).  
6020. Safety device for mine cages, lifts, elevators, and the like. Sampson.  
6257. Packing for the sliding or rotary parts of steam, compressed air, and hydraulic engines, which allows of progressive tightening, and is adapted to be taken to pieces. Chappeau.  
6681. Couplings. Rundlof.  
9227. Attachments for ropes for haulage and like purposes. Ringrose and Stevenson.

#### Complete Specifications open to Public Inspection before Acceptance.

1913.

13929. Apparatus for and mode of manufacturing wood gas and by-products. Poole.  
15344. Conveyors, more particularly intended for conveying coils of wire. Fr. Krupp Akt.-Ges.  
15376. Process for manufacturing steelplates, armour-plates, hollow bodies, and the like. Braun.  
15719. Storage-battery grids. Wackwitz.  
15919. Manufacture of briquettes from iron ore and flue dust. Freiburger.  
16130. Apparatus for measuring the pressure of gases. Piller.

**Increase in Railway Rates.**—The railway companies, including the Cheshire Lines Committee, Great Central, Great Central and Midland Joint Committee, Great Central and North Staffordshire Joint Committee, Great Northern, Great Western, Lancashire and Yorkshire, London and North-Western, Manchester, South Junction and Altrincham, Midland, Oldham, Ashton-under-Lyne and Guide Bridge Junction, and Wirral railway companies, have given notice that they intend to increase, on and after September 1, the rates for coal and coke from collieries in Derbyshire and Nottinghamshire to depots and sidings in Lancashire and Cheshire. Among the places included are Liverpool depots and sidings, Birkenhead and sidings, Chester, Warrington, Manchester, Seacombe and Egremont, Marsh-lane and Strand-road, and Spital. The increases are from ½d. to 3d. per ton.



# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

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FRIDAY, AUGUST 1, 1913.

No. 2744.

## TELPHERAGE PLANT AT A GERMAN ELECTRICITY WORKS.

The electrical works (I) belonging to the town of Frankfurt-on-the-Main are separated from the quay by a number of railway tracks, bridged by an elevated track about 590 ft. long erected over the railroad, on which the traffic in coal was formerly handled.

As the plant in its old form was no longer equal to the requirements of the works, a reconstruction was determined upon, and the choice fell upon a "Bleichert" telpher, which would not only do the former work in a mechanically automatic way, but also make it possible to make convenient use of a storage ground at a point some distance from the river. Various parts of the old plant were intended for employment again on the new installation—namely, the slewing crane and the elevated

on one track, and the empty ones on the other, always in one and the same direction, whereby the stipulated spacing on the entire track is kept up by means of the patent blocking system.

Fig. 2 shows the interior of the elevated bridge at the point where the material is loaded into the bucket conveyor, whose duty it is to charge the boiler-house bunkers. One track is outside the actual bridge girders, whilst the other runs over the hopper. Here the bottom flaps of the carrying buckets are automatically disengaged during the trip by contact with a detent, so that the coal falls out on both sides. The loaded and empty lines are connected behind the hopper by a loop, so that the cars can reverse and return immediately to the river.

If the points which connect the loop with the

the crane operator, whose duty it is to stop the cars at the loading point by means of a switch, open the escape gates of the hopper and again connect the switch for travelling, whereupon the next car will move up automatically.

The contents of the carriers and the working speeds are so arranged that an hourly capacity of 60 tons of coal can be reached between the extreme points of the plant with safety.

As illustrating the adaptability of the telpherage system, mention may be made of the plant built for the Hedwigshütte, Stettin, the installation in Charlottenburg, for the gasworks at Bromberg, and for the Stinnes firm, at Mulheim-on-the-Ruhr, &c. In some of these cases the telpher carriers are also provided with winches for lowering or hoisting their buckets. This class of

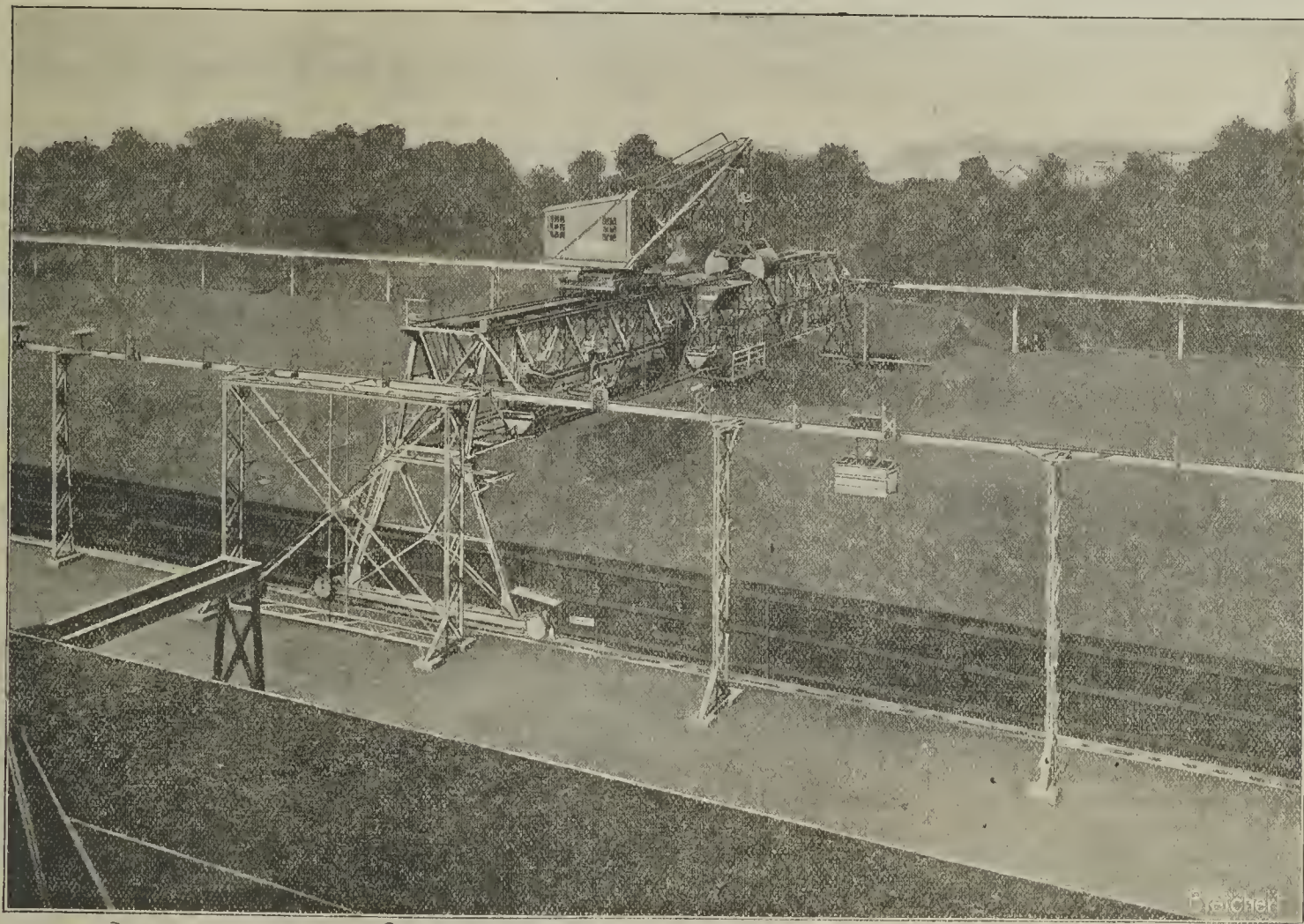


FIG. 1.—VIEW OF TRACK BETWEEN RIVER BANK AND ENGINE HOUSE.

bridge over the railway tracks, but the extensive running track to serve the storage ground with a length of about 395 ft. and a width of about 130 ft. was entirely new.

At the present time the coal can be handled in the following ways:—(1) From the riverside to the boiler-house; (2) from the railway trucks to the boiler-house; (3) from the riverside to the storage ground; (4) from the trucks to the storage ground; (5) from the storage ground to the boiler-house. The automatic service on the storage ground at such a remote point from the quay, and so conveniently served by the telpher, constitutes one of the special features of the plant. Only quite a short length is now required on the riverside to deal with the extensive stocks.

The telpher is shown in the accompanying illustrations. Fig. 1 gives a clear view of the track between the banks of the river and the engine-house, the crane being in the act of conveying coal from the barges to the hopper located on the elevated track. In the foreground will be seen the elevator for coal arriving in railway trucks. It transfers the coal into a hopper, from which the suspension railway cars can be loaded by opening the escape gates, just as at the river station. Both the tracks of the telpher are hung on yokes fitted on the existing elevated bridge. The loaded cars run

longitudinal tracks are opened, the loaded cars will proceed to the storage ground. It will be seen from fig. 3 that the two bridge lines are here extended, one on each side of the storage ground, and connected by means of a travelling bridge. This forms a connection with the longitudinal lines by means of movable tongues, so that the cars can run on to one side and cross over to the other side on to the fixed return track in any position of the bridge, thus forming a complete circuit. A portable detent is fitted on the bridge, which disengages the lockflaps of the buckets in passing, so that the load will fall on to the storage ground. As the bridge runs along the ground in a longitudinal direction, and the detent is shifted transversely to it, coal can be discharged at any desired point. A travelling slewing crane is provided on the bridge to rehandle the coal, which takes up the coal in an automatic grab and transfers it to a hopper fitted at the centre of the bridge, where the telpher cars returning empty from the boiler-house are filled. On being restarted the cars will run back to the boiler-house and discharge over the hopper of the bucket conveyor, returning then immediately to the storage ground to repeat the process.

For the attendance on the plant, when handling traffic from barges, or from the storage ground, to the boiler-house, only a single workman is required in addition to

plant—the so-called telpher—can also operate without grab cranes, lowering their own buckets into the vessel or railway truck, and then hoisting and carrying the material.

The plant for the Frankfurt Elektrizitätswerk also provides an example how the single transport agents can be united to a uniform system by the automatic Bleichert telpher, which will work reliably under all conditions, with a minimum amount of labour and under most complicated local conditions, even when older conveying plants of various kinds are in use, although, of course, the pure telpher, or telpher with winch, is superior to such combined plants consisting of cranes and telpher line for working safety, and more especially for simplicity in attendance. To give a few examples of the many telpher lines carried out by the firm Adolf Bleichert and Co., which require so little attendance that they can be run in case of need by the foremen or office officials, we will only mention the gasworks at Bromberg, Erlangen, Vienna, Leopoldau, Agram, Barunbeck, and many others; further, the electrical works at Düsseldorf, Duisburg, Aachen, Berlin-Rummelsburg, and Leipzig-Kulkwitz, &c. At the present time, we understand, there are more than 400 Bleichert telfers in work or in course of construction. The entire installations, with all parts, are



manufactured throughout from the raw material in the works of the firm Adolf Bleichert and Co., in Leipzig, and Lichtenegg, Austria.

Even in English-speaking countries, and for English clients, numerous Bleichert telfer lines have been installed, as we are informed by the makers, Bleichert's Aerial Transporters Limited, Egypt House, 36, New Broad-street, London, E.C. Amongst the more important of these may be mentioned the coal-transporting plant in the Sydney gasworks, and the coke-handling plant in the Ostend gasworks, which are at present in course of construction. Bleichert telfers have also

## A NEW METHOD OF COOLING GAS ENGINES.\*

By Prof. BERTRAM HOPKINSON, F.R.S.

The most important peculiarity of the gas engine, that which determines the characteristic features of its design and operation, is the heat-flow from the hot gases into the cylinder walls. About 30 per cent. of the heating value of the fuel passes into the metal of the engine in this way, and it is necessary to provide means for its removal as fast as it goes in. In all engines hitherto made (except the small air-cooled engines) the removal of the heat has been effected by the circulation

result in wrecking the engine. Finally, pre-ignitions are entirely prevented.

In the method of internal injection described in the paper, cold water is injected through a hollow casting projecting into the combustion chamber and provided with a number of holes or small nozzles about  $\frac{1}{32}$  in. in diameter. The jets so formed are comparatively coarse, so that even when projected into the flame the water reaches the part of the wall against which it is directed with but little evaporation on the way. The jets are directed to all parts of the surface of the combustion-chamber and against the face of the piston.

When the author first began to consider the use of internal injection as a means of cooling, the difficulties of corrosion and lubrication seemed to be an insuperable bar, until it occurred to him that they could probably be overcome by the simple device of regulating the amount of water injected in such a way that the temperature of the whole of the engine is kept well above 100 degs. Cent. Under such conditions (which, of course, are only rendered possible by the absence of all external water-cooling) every drop of injected water is boiled when it reaches the walls, and no liquid can accumulate. That corrosion may be completely prevented in this way has been proved by actual trials, of which particulars are given.

The practical application of this system of cooling has been much facilitated by a discovery made by the author soon after he began experimenting with it. It was well known that the rate of heat-flow from the gas into the metal is far more rapid at, and soon after, the moment of ignition than at any other time. It seemed likely from these experiments that for practical purposes the heat-flow into the barrel of the cylinder during the last three-fourths of the expansion stroke might be so small compared with that in the first period that direct cooling of this portion of the cylinder could



FIG. 2.—INTERIOR OF BRIDGE.



FIG. 3.—VIEW OF TRACK TO STORAGE GROUND.

been introduced in mining operations, of which the telfer line at the Randfontein mines, in South Africa, provides an example.

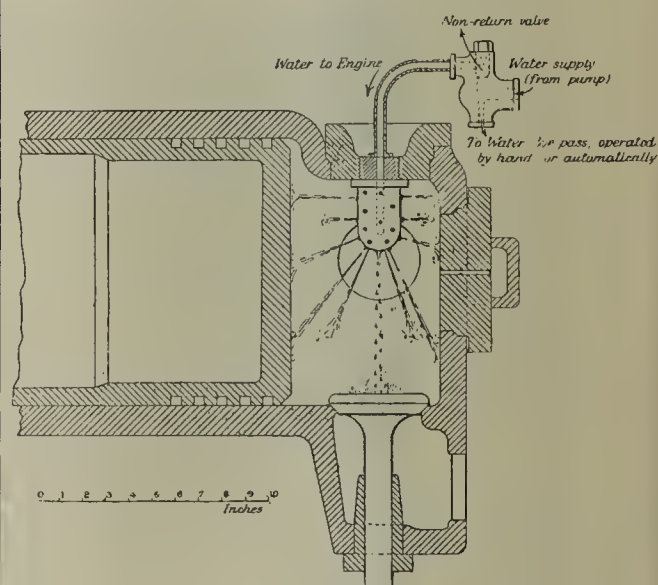
**Cost of the Minimum Wage Act.**—A statement as to the cost of the Minimum Wage Act to the colliery owners of the United Kingdom appears in the last issue of the *Economist*. The article says that "in individual cases the cost of the Act has already been ascertained, and in these cases the burden has not proved anything like so great as was originally feared. Mr. D. A. Thomas, the managing director of the Cambrian Combine, authorises us to state that in the case of the collieries falling within the sphere of influence of that combination, and employing between 10,000 and 12,000 miners, the added expense necessitated by the payment of the minimum rates has amounted to less than 1d. per ton on the output. Moreover, he is of the opinion that the experience of the Cambrian Combine collieries has been that also of the majority of the other South Wales collieries. At this rate the cost of the Act over the entire coalfield will have amounted to between £150,000 and £200,000; while on the assumption that the average cost for the country as a whole has not been higher, the Minimum Wage Act has involved an addition to the national wages bill of the underground workmen of something between £800,000 and £1,000,000. The greater part of this—probably 75 per cent.—has gone into the pockets of the colliers employed in abnormal places, but of the ordinary day-wage men, on whose behalf, it will be recalled, the Miners' Federation demanded a minimum of 9s. per day."

of water round the cylinder, and (in large engines) in the substance of the piston and exhaust-valve. External water-cooling is the ultimate cause of most of the disadvantages under which the gas engine has hitherto laboured and which have retarded its development in large sizes.

When once these difficulties, and their cause, have been clearly stated, it seems fairly obvious that they can be overcome by applying the cooling medium on the inside of the cylinder instead of to the outer surface. If water can be injected internally against the surfaces to be cooled, the heat is removed on that side of the metal on which it is generated, and therefore there is no heat-flow through the metal and no difference of temperature between the inner and outer surfaces. The water may be distributed by means of jets so that each part receives it in proportion to the rate at which it receives heat from the hot gases. Thus the engine can be maintained at substantially the same temperature all over and the stresses due to unequal heating may be eliminated. A simple single-walled casting can be used for the cylinder, resulting in a great saving in weight and cost and in improved reliability on account of the elimination of casting stresses. The arrangements for cooling the piston, which are necessary in large engines, can be dispensed with—a point of great importance, because these arrangements, besides being costly, frequently give trouble, and their failure may easily

\* From a paper read before the Institution of Mechanical Engineers, Cambridge. July 29, 1913.

FIG. 1.—Section of Cylinder with Water-Injection Rose



be dispensed with altogether. This anticipation has been found to be correct. It is sufficient to inject water on to the surface of the combustion-chamber and the head of the piston only, the whole of the cooling of the barrel being effected by conduction into the piston, which is itself kept cool by the projection of water on to the head when it is near the in-centre. By taking advantage of this fact, the application of water is confined to places where it can do no harm, none falling on the sliding surfaces. This is a point of some importance if the water contains much dissolved matter.

In order to put these ideas to a practical test, a Crossley engine, 11½ in. diameter by 21 in. stroke, rated at 40 b.h.p. (with coal gas) at 180 revolutions per minute, was fitted with a new cylinder consisting of a plain barrel without any water-jacket. The valve motions were retained, and the valves and the shape of the combustion chamber were the same, the only change being the removal of all external water-cooling. A section of the new cylinder with water-injection rose is shown in fig. 1.

Immediately after erection with the new cylinder, the engine was run continuously for 120 hours on an electrical load with coal gas. Continuous observation was kept of the gas consumption and of the load. The engine developed during this period 43 b.h.p. on the average, and ran very smoothly and steadily. The average mean effective pressure was 101 lb. per square inch. When jacketed, the engine would not develop more than 40 b.h.p. continuously without overheating, and mixtures giving a mean pressure of more than 100 lb. per square inch produced excessive maximum pressures (over 500 lb.) with violent thumping explosions. The reduction in maximum pressure, under these circumstances, by water-injection is over 100 lb. per square inch, and the effect is very



marked, the explosion becoming almost inaudible. The quantity of water used on this trial was on the average 102 lb. per hour, equivalent to 2.4 lb. per b.h.p.-hour. The temperature of the engine varied from 150 degs. to 180 degs. Cent. No water was visible on the piston or the spindles of the valves, and when the engine was stopped at the end of the trial the inside of the combustion-chamber was found to be perfectly dry. When the engine was jacketed and giving the same power for short periods, the jacket water removed about 67,000 B.Th.U. per hour, which would be sufficient to evaporate 108 lb. of water at a temperature of 20 degs. Cent. under atmospheric pressure. The agreement between the available heat and the amount of water evaporated is satisfactory, such difference as there is being accounted for partly by greater radiation loss consequent on the higher temperature of the engine, and partly by the reduction in flame temperature produced by the steam, which somewhat reduces the total amount of heat passing into the walls. The engine consumed in this trial 15 cubic feet of Cambridge coal gas per b.h.p.-hour reckoned at atmospheric temperature and pressure. This is approximately the same as it burnt when developing the same power for short periods when jacketed. Tests at other loads have shown that with a weak mixture the gas consumption is slightly increased by the water-injection, but with very strong mixtures it is a trifle less. The difference, however, does not exceed 5 per cent. either way, and on the average it may be said that the economy is unaffected by the use of this method of cooling. Indicator diagrams taken in this long trial compared with similar diagrams taken from the jacketed engine show that the reduction in maximum pressure is counterbalanced by a slightly-raised expansion line. The pressure is better sustained, partly by the formation of the steam and partly by the reduced loss of heat, with the result that the diagram is "fatter" and less "peaky."

After the trial just described, the engine was put to drive a dynamo in a factory engine-room. Its speed was increased from 180 to 195 revolutions per minute. It was left in the hands of the ordinary engine-room

to make the whole thing automatic. For this purpose a simple form of thermostat has been designed, which opens the by-pass valve if the temperature falls too low.

In order to minimise the inconvenience and to guard against any danger arising from failure of the water supply, the engine is provided with a fusible plug screwed into the wall of the combustion chamber. Should the temperature rise above about 200 degs. Cent.—quite a safe working temperature—the plug melts, and the noise of the escaping gases warns the attendant,

From the nature of this method of cooling it seemed almost certain that its effectiveness would be independent of the size of the engine. The truth of this anticipation has been proved by applying the method to the cooling of larger engines—one an engine of 18½ in. bore giving 105 b.h.p., the other a 1,000-horse power Oechelhauser engine of 36 in. bore. The trials of the large engine, which continued for a considerable time, proved beyond any question that the largest cylinders now built can be cooled entirely by water injection, if applied in accordance with the principles enunciated. They also showed, however, as might be expected, that for ordinary commercial use the cylinder must be properly designed with a view to the employment of this method of cooling. The most obvious point is that the cylinder must be a plain barrel without any jacket.

#### A MINE RESCUE TROLLEY.

The Vereinigte Isolatoren-Werke A.G., of Pankow-Berlin, in order to facilitate rescue operations, have constructed a mine rescue trolley for conveying rescue men underground. The light and easily-movable vehicle, of great stability and suitability, is equipped with an electric lighting device, comprising an accumulator for 24 hours' charge, and two lamps with the necessary cables mounted ready for use. The car is arranged to receive a complete rescue outfit, consisting of two pulmotors, two oxygen twin-cylinders, four potash cartridges for the rescue apparatus, and one



staff for several weeks; and was worked continuously for long periods of time at excessive loads. During this time it developed at times 50 b.h.p. with coal-gas for several hours together—an increase of 25 per cent. on the maximum continuous load which it could safely carry when jacketed. Since then the engine has been brought to Cambridge, and is now engaged in regular service with a suction producer driving the workshops and producing electric current for the engineering laboratory. It is left to itself like an ordinary gas-engine, giving no trouble at all, and has now been in regular work for two years, the total time of running being 5,000 hours.

Anthracite coal is used in the producer, and this coal contains a considerable proportion of sulphur. Yet there has been no trace of corrosion in the engine. The ordinary working temperature of the cylinder is about 160 degs. Cent., but the engine will run satisfactorily at any temperature between 120 degs. Cent. and 200 degs. Cent. In order to keep the temperature between these limits, some regulation of the water supply in accordance with the load is necessary. With a throttle governor it is easy to connect the gas supply and the water supply in such a way that the correct amount of water is delivered at all loads. In smaller engines it is important

to make the whole thing automatic. For this purpose a simple form of thermostat has been designed, which opens the by-pass valve if the temperature falls too low. In order to minimise the inconvenience and to guard against any danger arising from failure of the water supply, the engine is provided with a fusible plug screwed into the wall of the combustion chamber. Should the temperature rise above about 200 degs. Cent.—quite a safe working temperature—the plug melts, and the noise of the escaping gases warns the attendant,

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**Grimsby Coal Exports.**—During the week ended July 24, the exports of coal from Grimsby, according to the official returns, totalled 22,032 tons foreign, and 30 tons coastwise, compared with 27,965 tons foreign and 2,030 tons coastwise during the corresponding week of last year. The detailed shipments were:—Foreign: To Antwerp, 713 tons; Christiania, 99; Dieppe, 1,081; Esbjerg, 482; Gefle, 4,208; Gothenburg, 3,209; Holmestrand, 548; Landskrona, 1,616; Libau, 2,127; Malmo, 494; Riga, 2,219; Rostock, 867; Rotterdam, 406; St. Petersburg, 1,687; Treguier, 160; Tvedestrand, 647; Valloe, 780; and Westervik, 689. The only coastal shipment was to Southwold, and consisted of 30 tons.

#### MINERS' INTERNATIONAL CONGRESS.

[FROM OUR OWN CORRESPONDENT.]

The Miners' International Congress at Carlsbad was concluded on Friday, after a session extending over five days.

##### Evictions during Labour Disputes.

On the 23rd ult. a discussion took place on the question of evictions during labour disputes. On a motion proposed by Great Britain,

Mr. S. ROEBUCK (Yorkshire) moved that Labour members of Parliament in every nation press upon their Government to pass a measure to prevent employers of labour evicting workmen from their houses during any trade dispute. He said Yorkshire had been hard and heavily hit, and they had suffered more than any other part of the British coalfields. The remedy they proposed was by legislative enactment, but if they failed to secure remedial legislation they were determined to take other action to prevent evictions. A short time ago they met the Prime Minister on this subject. Mr. Asquith received them very courteously, listened patiently to what they had to say, and he admitted that the weapon of eviction was a barbaric one and that it ought not to be one of the rules of the game. He asked the other countries to co-operate with Great Britain in securing legislation which would not only make evictions during trade disputes a violation of the moral law, but a violation of the constitutional law.

Herr BARTELS (Germany) said the system of housing of workmen by employers in Germany was included in what was generally termed the workers' welfare. He could see but little welfare for the workers in this system, but a great deal of welfare for the employers. In Germany there were not many evictions from strikes.

Herr EBERT (Austria) said it was part of the contract of employment that a workman should occupy a house belonging to the employer, and if the miner left his employment he could be evicted in three days. Then if a man did not send his sons into the mine his rent was raised against him.

M. QUINTIN (France) said in the mining districts of France there were villages built by the coalowners. In those villages all freedom was denied to the workmen. The only newspapers allowed in those villages were clerical newspapers. If any Labour or Socialist newspaper was introduced the workmen would be evicted. Parents were persecuted if they tried to get any employment for their children outside the mines.

Mr. CHAS. MOYER (U.S.A. Mine Workers) said the American delegates were in full accord with the resolution. In British Columbia and Vancouver, and also in the United States, at Colorado and elsewhere, workmen had been evicted from their homes, and their household goods thrown on to the roadside during strikes.

M. DEJARDIN (Belgium) supported the resolution, which was unanimously adopted.

##### Regulation of Output.

Mr. THOS. ASHTON (International secretary) read the report from the various nationalities on a proposal for the regulation of the output of coal. It was decided, on the proposition of Herr SACHSE, seconded by Mr. T. GREENALL, Lancashire, to accept the report without discussion.

The reports were given in last week's *Colliery Guardian*.

##### The Minimum Wage.

On Thursday, the 24th ult., the Belgian miners proposed that the miners of each nationality demand that collective working agreements be introduced by the trade unions in the mining industry, either by the various districts or for the whole country, and that a minimum wage be fixed for all workers in and about the mines either by law or by collective agreement. The speeches of the Continental delegates indicated a strong desire to secure a fixed minimum wage in the various countries on the lines of the British Minimum Wage Act of last year. Mr. ALBERT STANLEY, M.P., who spoke for the British Federation, made an interesting announcement as to the future policy of the British miners. Mr. Stanley said that when the present wage agreements terminated in 1915 a determined effort would be made to obtain one national wage board for Great Britain in place of the present five boards.

The resolution was carried.

##### Nationalisation.

The Miners' Federation scheme for the nationalisation of the coalmines of Great Britain was submitted to the consideration of the Congress.

Mr. BRACE, M.P., president of the South Wales Miners' Federation, in moving the British resolution, said that the nationalisation of the land and the railways was essential to any scheme for nationalisation of coalmines. Mr. Brace said that unless they moved upon the lines of nationalising the land, there was a possibility, when they came to deal with the mines as a distinct unit of itself, they might be overwhelmed by the powers that be. It was true that some of the nationalities represented had collieries belonging to the State; but he gathered from the reports that the workmen employed in those State mines were no better off than the workmen employed by private companies. Therefore it appeared to him, if they were to have that standard of life for their people, that it was no use attempting this matter piecemeal, but they should go forward to nationalise



land, mines and railways. The Miners' Federation of Great Britain had introduced a Bill in Parliament to nationalise the mines of the United Kingdom. This was the first time in the history of the world that a trade union had prepared and introduced a Bill into Parliament to nationalise its own particular industry. They did not propose to confiscate the mines, but to purchase them. They had tabled the Bill in Parliament as a private member's Bill, but before they could look forward with hope and confidence to see this Bill become an Act of Parliament they must have the power necessary to make it a Government Bill. There had been much talk about oil superseding coal. Four years before he became a member of Parliament he sat on a Commission to enquire into the question of oil, and all the authorities of the world called before that Commission admitted that it was impossible to supersede coal with oil, because the supply of oil would not meet the world's demand. They must therefore take it as an assured fact, based upon expert evidence, that coal was the great driving power of the world. He noticed with interest that Mr. Winston Churchill, as they had begun to use oil in the British Navy, had been making arrangements for Great Britain to have some control over the oilfields of the world, to make sure that there should be a supply for the use of the British Navy. If that was a good policy for the Government to pursue in connection with oil, their demand that the nation should own the coalmines was unimpeachable. When they came to argue this matter in the House of Commons they would point out that the Admiralty had shown the way, and they must insist upon this Bill being made a Government measure, with all the power of the Government behind it. When the Minimum Wage Bill was before Parliament, their difficulty was that they were calling upon the Government to do something with property which belonged to private persons. Had the nation owned the mines there would have been no difficulty. When this Bill passed into law they would go to Parliament on matters relating to wages not only as a legislative machine, but as the representative employer owning the land and the mines. Their difficulty every time when they had been pushing the battle to the gate was to get over the question of cost. When they had to deal with private-owned property they had always that difficulty to meet. If the community owned the mines, and labour had its full representation in Parliament, and held the controlling power in the Government, they could use that power not only for better wages, but for greater safety for the men who had to go below ground to win what was a national necessity.

On the following and last day the resolution was further discussed. M. GEMIN, one of the French delegates, spoke frankly in favour of Syndicalism in preference to nationalisation. The recent railway strike in France had shown the workers that they would be no better off with the land, mines and railways in the possession of the State. He said the State was hardly any better than the private employer in the wages which it paid and the conditions which it imposed upon the worker. Recently they had a strike on the French railways, and the treatment of the workers was not a bit better on the State railways than on the private-owned railways. The resolution was not sufficiently explicit. It was asked that the mines should be nationalised in the interests of the community of the various nations. What was meant by the community? Were the profits to be divided among the whole community, including the capitalists? The French miners preferred the socialisation of the mines, so that the profits obtained from their working might be expended for the benefit of the worker, and not for the benefit of the community as a whole.

M. LOMBARD (Belgium) considered they could best obtain nationalisation by means of an international strike. The resolution was carried, all the nationalities voting for it, with the exception of the German Poles.

#### Miners' International Clearance Card.

The PRESIDENT (Mr. Robert Smillie) presented the report of the committee as to an international clearance card for the organised miners of all nations. He said this question was remitted to the international committee who had discussed it, and they had agreed to put a resolution to the Congress continuing the international clearance card as it had been established, carrying with it full trade union rights and responsibilities. Thus a miner going from one country to another would carry with him a card bearing their stamp which would give him full trade union benefit, but not the friendly society, sickness, old age and death benefits. They proposed that for two years they should continue on these lines, and that the international committee should before the next congress endeavour to secure an extension of all the benefits to men removing from one country to the other.

In answer to one of the Austrian delegates, Mr. SMILLIE stated that a miner could not obtain an international clearance card until he had been a member of his own organisation for 12 months.

#### Suggested Miners' Holidays.

M. GEMERLAIN (Belgium) proposed that this Congress should recommend an annual holiday for miners of a fortnight's duration with payment of wages. He said the adoption of his resolution in all mining countries would have the

double advantage of reducing the accumulation of coal stocks, which was always a danger to wagos, and of benefiting the health of the men. The miner, from his arduous and dangerous occupation, stood more in need of holiday than any other worker.

Herr GODDERTS (Germany) said the German miners heartily supported the proposal, but, unfortunately, were not in a position to carry it into effect. The first thing the German miner had to obtain was a wage agreement with the coalowners on the lines of the British agreement. As to the necessity of holidays, there could be no two opinions.

M. BEXANT (France) supported the proposal, and suggested that the miners ought to be sent to Carlsbad for a fortnight to drink the waters and recuperate.

Mr. LOCKE (Northumberland) said the multiple system of shifts in the north of England was a danger to the health and home life of the miners, and strengthened the demand for an annual holiday. In one of their mining villages an experimental scheme was about to be tried for an annual holiday.

The resolution was carried.

The PRESIDENT regretted to inform the Congress that the International treasurer (Mr. W. Abraham, M.P.) was unable to attend that Congress owing to illness. He also regretted to say that Mr. James Haslam, M.P., was for the first time absent from an International Congress. Unhappily, Mr. Haslam was very seriously ill. He moved that the Congress express its sympathy with Mr. Abraham, M.P., and Mr. J. Haslam, M.P., on their illness. The resolution was passed unanimously.

#### Disunion among French Miners.

The PRESIDENT stated that the International Committee proposed to meet at an early date in Paris, in the hope of reuniting the French miners. He asked both parties to send a statement to Mr. Ashton, the International secretary, and the committee would see if they could adjust the differences. The hostile French sections desired to fight out their differences in Congress, but it was agreed to refer the matter to the International.

#### Election of Officers.

Mr. Robt. Smillie, Scotland, was re-elected president, Mr. Thos. Ashton secretary, Mr. Wm. Abraham, M.P., South Wales, treasurer, and Mr. W. E. Harvey, M.P., Derbyshire, a member of the committee.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, July 22, 1913, is as follows:—Amsterdam, 2,738 tons; Antwerp, 865; Abo, 202; Bergen, 93; Bremen, 1,843; Brunsbittel, 1,069; Cimbrihamn, 449; Corfu, 2,927; Cronstadt, 18,284; Christiania, 680; Drontheim, 923; Delfziel, 1,309; Fredericia, 835; Genoa, 5,257; Ghent, 961; Hamburg, 12,296; Harlingen, 2,319; Harburg, 7,402; Horton, 517; Husum, 918; Libau, 412; Marseilles, 313; Naples, 295; Oxelosund, 2,557; Oran, 210; Rouen, 684; Rio de Janeiro, 1,383; Rodby, 627; Rokkola, 1,286; Riga, 6,541; Rotterdam, 5,740; Stettin, 175; Skiensfjord, 506; St. Petersburg, 9,801; Stockholm, 456; Victoria, 53; Wasa, 75; total, 92,998 tons; corresponding period last year, 92,586 tons.

**Midland Fatal Accident Relief Society.**—The vexed question of the deduction of club contributions when wages are paid at colliery offices was again raised at the hundred and twenty-first quarterly meeting of the Board of Management of the Midland District Miners' Fatal Accident Relief Society, at Derby, on Tuesday, July 29. The membership returns revealed a decrease of 1,067 as compared with the position a year ago, the total standing at 41,189, and this was more than accounted for by the defections at one colliery, Pinxton. It was stated that there was a strong probability of the large majority of the lapsed members rejoining, and that 1,400 of them had balloted in favour of their weekly payments being stopped by the company, while 400 had returned the ballot papers unsigned. Under the circumstances, the management had declined to make the deductions, but there were hopes that they would be induced to reconsider their decision. Reporting on the annual conference of the Central Association for Dealing with Distress Caused by Mining Accidents, Mr. A. Saxton attributed the decline in the membership and funds of the association to the alienation of the employers' interest in the societies owing to the increasing demands made upon them by the passing of the Workmen's Compensation Act and the Insurance Act. He claimed, however, that the good relations which had always existed in the Midland district between employers and employed through this society were fully maintained. The board resolved to invest another £3,000 in Great Northern preference stock, yielding £4 1s. 9d. per cent. Acting on the assurance of the actuary that the funds were fully able to bear the liability, it was also decided to extend the benefits by increasing the funeral allowance on the death of unmarried members from £15 to £25, and by continuing the allowance to children until they reach the age of 14 instead of 13, as at present. It was reported that there were now 280 widows and 353 children in receipt of benefit, as compared with 271 and 338 respectively a year ago. Mr. A. G. Barnes was re-elected as chairman, and Mr. R. E. Martin as vice-chairman, of the board.

### WESTINGHOUSE LOOSE-HANDLE OIL-IMMERSED DRUM TYPE STAR-DELTA STARTER.

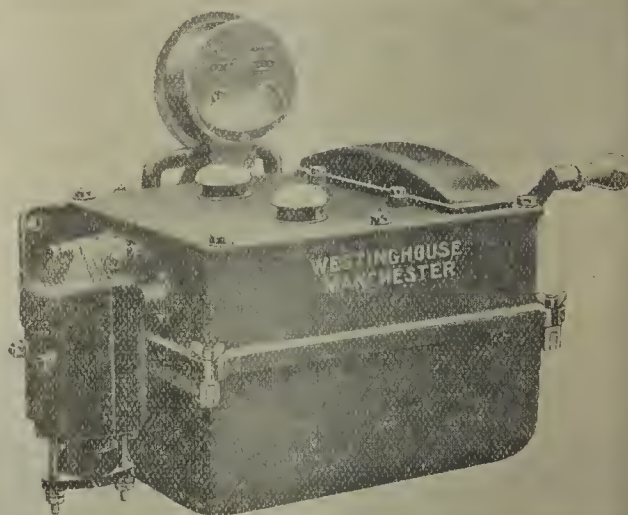
A new design of star-delta starter has been placed on the market by the British Westinghouse Electrical and Manufacturing Company Limited, embodying some interesting features and advantages in its construction, and designated type "O.R.S."

The internal parts are mounted in a cast iron frame, with a cover having a suitable vent for gases. The oil tank is below, forming the lower half of the starter, and can easily be lowered away when necessary. The contact drum is made on the metal and mica principle, and consists of a mica insulated square steel shaft on which are securely clamped spider castings carrying renewable segmental copper contact strips. The contact fingers are of the same type as those employed in standard Westinghouse controllers. Each finger has a large, cheaply and easily renewable arcing tip for taking all spark wear. All circuits are broken under oil. Adjustable phosphor bronze springs are fitted to each individual finger, giving good constant and firm pressure.

The no-volt and overload releases are fitted in the starter above the oil tank. The no-volt coil is connected across one phase, and is so arranged that the circuit to the motor can only be closed when there is voltage on the line. This release is worked by gravity, and acts quite independently of the overload release.

The overload coil is connected in two phases and is cut out in the star position, and can be set between approximately full-load current to 100 per cent. overload. The setting is effected by means of a screw on the top of the coil.

The operating handle is of the "loose" crank-handle



"O.R.S." STAR-DELTA STARTER.

type, and the mechanical operation from the off to the star position and thence to the delta position is so designed with interlocks that the starter can be operated in no other way. A device is fitted making a slight pause necessary at the star position before it is possible to move the handle through to the delta position. The handle cannot be left in the star position, since when it is released it flies back to the off. The contact drum is returned to the off position (thus stopping the motor), in the event of an overload or no-volt occurring, and cannot be held either in the star or delta position in such a case. A trigger release is also conveniently provided on the outside of the case.

Ammeters can be mounted on these starters when desired, the instruments being of the moving iron type, and are not in circuit when the drum is in the star position.

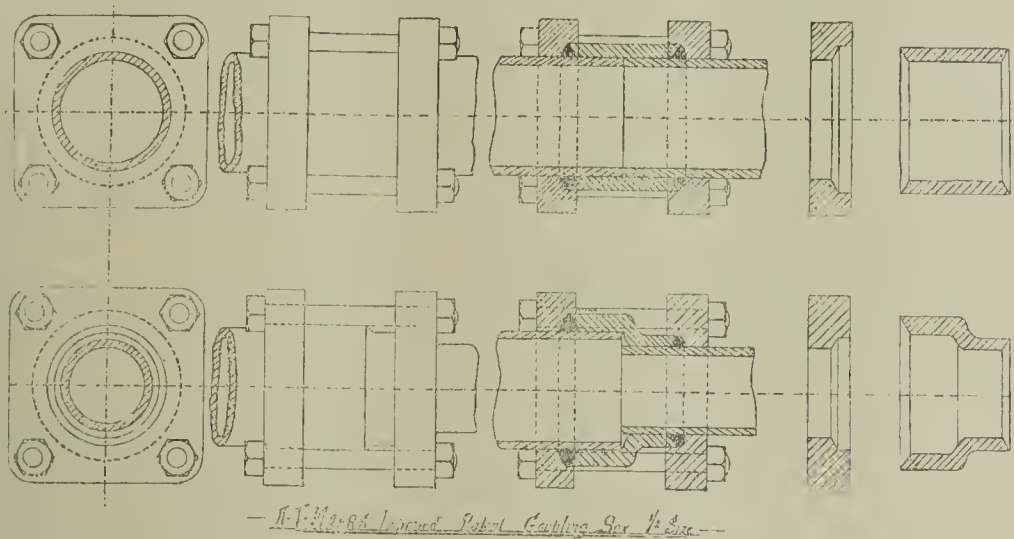
Trifurcating boxes can be fitted if required, in which case the starter fully conforms with the new mining rules. Finally, following the well-known Westinghouse control gear practice, the type "O.R.S." starters are constructed on the metal and mica principle throughout.

Three miners who had been entombed in the Wallsend G Pit for about 18 hours were rescued on Tuesday morning shortly after 10 o'clock. Mr. C. A. Nelson, agent, and Mr. Hugh Wilson, manager, who had directed the rescue party throughout the night, stated that the men were working at the face of the Bensham seam, about a mile and a-half from the bottom of the shaft, when, about half-past three on Monday afternoon, a large fall of stone shut them in. The rescue party, fortunately, were able to utilise the mechanical coal-cutting machines and drills, and the work was proceeded with expeditiously. A way was driven along the side of the fall, and as progress was made, the places cleared were carefully timbered. A hole was eventually bored through to the men and they were reached at 9 o'clock on Tuesday morning.



## AN IMPROVED PIPE COUPLING.

Mr. A. T. Marr, of Royston, is the patentee of an improved pipe coupling which is being made by Messrs. Qualters and Smith Bros., of the Old Foundry, Summer-lane, Barnsley. The invention, as applied to pipes of various diameters, is illustrated in the accompanying sections, an ordinary coupling being shown in the upper portion of the drawing, and a reducing coupling in the lower. Various dimensions in both types are kept in stock, or couplings can be supplied to order to accommodate any size of pipes. The couplings are suitable for making fast joints in steam, water and air pipes, and have been successfully applied to flexible pipes used in connection with coal-cutters and other portable machinery, the efficiency of which so largely depends



— Mr. A. T. Marr's Improved Patent Coupling for Pipes —

upon the tightness of the connections. We understand that one of the couplings was recently subjected under test to a water pressure of 180 lb. per square inch, and no sign of leakage was observable.

**Private Owners' Wagons in Scotland.**—The Select Committee of the House of Commons, on the 27th ult., approved the preamble of the North British Railway Bill, under which power is sought for the construction of a number of new railway lines to connect various parts of the Lothian coalfield with the port of Leith. The only opposition was that of the Caledonian Railway Company and the Glasgow and South-Western Railway Company, who opposed Clause 9, which was inserted by the Lords' Committee. This clause provides that traders may use their own wagons instead of those supplied by the company, and at the same time it relieves the railway company of the statutory obligation to provide wagons for such traders as elect to use their own. Counsel for the opposing companies said an enquiry had taken place in 1911 before a Select Committee in regard to the rates and charges on Scottish railways, and these rates and charges were settled for the whole of Scotland on the basis that wagons were to be supplied by the railway companies, and the rates to be charged should include the use of wagons to be supplied by the railway companies. If the North British were obliged by statute to apply the terms proposed in the clause to the Lothians, they might be pressed to extend them to Lanarkshire, and would have to accede to the demand. If that were done the Caledonian Company would have to follow suit. The preferable course in the interests of everybody was that the whole supply of wagons should be provided by the railway companies. He admitted, however, that there was nothing in the existing law to prevent the North British Company entering into a similar agreement to that embodied in the clause if the Bill were not passed. It may be mentioned that the clause which gave rise to this controversy was that the colliery owners in the Lothians should have the right to provide their own or private wagons for the conveyance of all coal traffic connected with their collieries, but if they exercised this option they were not to hold the railway company bound to supply wagons for the same traffic, but the railway company could, of course, supply wagons without being under an obligation to do so. The three Scottish railway companies serving the coalfields had agreed among themselves that they would recognise no obligation to supply wagons except for the strict purposes of conveyance, and on no account to recognise the storage of coal in wagons except strictly limited to the conveyance of traffic. The retention of wagons at a colliery beyond certain fixed times was subject to demurrage charges at 1s. 6d. per day per wagon, while the hire of similar wagons cost only 2s. 6d. to 3s. per week. The traders complained of the irregularities in the supply by the railway companies, the interest of the railway officials being that delays, if any, should be on the colliery sidings, and delivery not promptly taken to the railway lines. The three railway companies made an agreement among themselves to prohibit as far as possible any increase of traders' wagons, making differences between traders who had a private supply nearly equal to their wants and those who had only a partial supply. The hearing of the case before the Committee was attended by traders representing collieries in Lanarkshire, &c., who desired the clause. The Caledonian manager in his evidence referred to demands already made on him for similar rights. One position contended for by the Caledonian Company was to arrange one general "pool" of wagons on all the railways, including those of the railway companies and those of the traders.

## COLLIERY ACCIDENTS.

## Stoke.

A verdict of "Accidental death" was returned at the enquiry held by the North Staffordshire coroner (Mr. Hugh Adams) at the Berry Hill Colliery, on the 25th ult., into the deaths of Joseph Key (52), underlooker, Joshua Williamson (62), pit shaft repairer, and Harry Warrington (21), pit shaft repairer, who lost their lives in the accident at the colliery about midnight on the previous Sunday.

Mr. G. H. Greatbatch, manager at the colliery, said repairs to the shaft became necessary owing to the cage getting off the rods. In order that the three men who lost their lives could proceed down the shaft, four girders were placed across the pit mouth, with three clamps on the top to hold the cage rope in position. The cage was suspended about 20 ft. from the bottom of the shaft, and the clamped

rope was unwound from the winding drum. The men were then lowered by another rope in a "bowk," and on the night of the accident they took with them, lashed to the "bowk," two new rods for repairs, made of timber, about 30 ft. long, and each weighing about 2 cwt. Witness said that from his examination of the shaft after the accident he had come to the conclusion that the rope to which one of the rods was attached broke, and the falling timber, obtaining the velocity of 140 ft. a second, struck the suspended cage with a force equal to a weight of 30 tons, causing it to descend to the bottom of the shaft and dragging the rope with it through the clamps. The falling rope knocked Key out of the "bowk," and the other two men were killed in the "bowk" by the smashed timber of a wooden rider placed above the "bowk." The "bowk" was about 112 yards from the bottom of the shaft at the time the rope fell, and the wooden rod fell with such force that it went through the cage. The men were using a rope and blocks for raising and lowering the rods which witness had condemned and had told Williamson he must not use.

Joseph Mould, colliery engineer, gave evidence as to the clamps being tested and found safe. The rope was chalk marked and examined every day to see if it had moved, and it was found that no movement had taken place. Witness admitted that extra security would have been given by taking a turn of the rope round the headgear in addition to clamping it; but this would have been a difficult matter.

Several witnesses were called to prove that Mr. Greatbatch had forbidden the use of this rope and blocks, which were afterwards found at the pit bottom.

The jury added a rider that they considered the clamping of the rope was satisfactory.

## Rotherham.

At the Rotherham Court House, on Tuesday, the inquest was opened on the victims of the Carhouse Colliery disaster of June 16. The sudden flooding of the mine involved the loss of eight lives, and up to the present only seven of the bodies have been recovered. The men whose remains have been discovered are:—Sampson Nightingale, 22, miner; George Alfred Ackroyd, 29, deputy; George William Cooke, 26, miner; John Edward Stacey, 22, engine driver; Robert Rodgers, 49, miner; Peter Nightingale, 20, miner; Alfred Preston, 36. The man missing is Charles Palmer, 32, miner.

The coroner (Mr. J. Kenyon Parker) at the outset stated that he had heard from the inspector that the place where the water burst in had been reached and inspected by the Government inspectors and by the representatives of the workmen.

Mr. Fincken, certificated manager of Carhouse Colliery, said the colliery belonged to Messrs. John Brown and Company Limited, who were also the owners of the Aldwarke Main Colliery. One of the beds of coal worked at both collieries was the Parkgate seam. There were in this seam roadways connecting Carhouse and Aldwarke. In the Eastwood plane of the Aldwarke Colliery there was for some years an accumulation of water. For some time past the Carhouse workings, in what was termed the minimum level district, had been gradually approaching the old Aldwarke workings in the Eastwood plane. It was intended to connect No. 1 minimum level at Carhouse to the lower end of Eastwood plane, and a range of pipes was arranged to deal with the accumulated water when it should

be tapped. To effect this junction, as the old Aldwarke workings were being more nearly approached by means of a heading or narrow working 5 ft. wide, a system of boring was adopted with the express object of getting the earliest possible intimation that the old Eastwood plane and the water in it had been reached. The system of boring was commenced about April 3, when the Carhouse No. 1 minimum level was estimated to be at least 50 yards from the Eastwood plane. The system was adopted of boring holes in the solid coal in advance of the working face, both "advance holes" and "flank holes." The flank holes had been bored not more than 10 ft. apart. All the holes, both advance and flank, had as far as possible been bored during the night so as to allow the day shift working coal off and still keep the advance borehole well advanced. Instructions were given and repeated to all deputies of the district in which the work was proceeding that on no account must there be more than 5 yards between any two flank holes, and that the advance boreholes must be kept not less than 6 yards forward and deep, and the flank holes 5 yards in depth. On Saturday, June 14, an advance hole 7 ft. deep showed a few drops of water and he stopped boring there. The working of other holes was dealt with, and the carrying out of the instructions of Mr. Whalley, the agent of the colliery, that a competent person must always be in charge. About 6 a.m. on the Monday, June 16, charge deputy Maxon told him by telephone that the advance hole was 27 ft. and was quite dry. At the end of this shift, shortly before 2 p.m., he told him that the whole face and the floor were quite dry and dusty. At about 8 p.m. on Monday Ackroyd telephoned from the pit that water was bleeding through the floor of the coal, and that he had stopped the men working. When he reached the pit he received a message by telephone from the engineman or run-rider, he believed, at the minimum level, that there had been an influx of water, and that it was feared that Ackroyd and the trammer working in the heading had been lost. He (witness) found the water rising rapidly 3 or 4 yards below No. 18's gate in the minimum level. On going to the top of the balance he found gas, and with his oil lamp could not get more than 2 yards down the balance, which was full of gas. He took steps to relieve the ventilation, as the return airway at No. 18's gate was by that time wholly or partly blocked by water. The pump was working at very high pressure, and two separate joints burst in consequence, and had to be repaired. He had the electric wires cut off where the water was short-circuiting them. The system of boring in his (witness's) opinion was a very good one, and he could not account at present for the water having come into the heading as it did. Witness said he was guided by plans that were in existence. He expected to get to a heading, and he considered the system of boring he adopted sufficient to deal with the approach to a heading of the description he expected to find.

Alan H. Badger, surveyor at Aldwarke Main, was examined in regard to the Carhouse plans. In answer to a juror, witness was understood to say that the thickness when the water broke through was 4 ft. 6 in. in the centre.

On the following day Mr. Fincken, the manager, was recalled. He said the system of boreholes adopted complied with the Coal Mines Act, and he could not have taken any more precautions than he did. When they got to anything over 8 or 9 yards there was a possibility of being set fast by bumps. His orders as to withdrawing the men were confined to this particular spot, and he had not anticipated the water drawing over workings where the men were. The deputy spoke to him on the night of the accident about 8 o'clock, and from his report he understood he had just found the water and had come to tell him immediately. Witness had not the faintest idea that two hours had elapsed since the discovery.

Mr. C. L. Richardson, H.M. inspector of mines, said he agreed generally with Mr. Fincken that the accident would have been avoided if one of the boreholes had cut the Aldwarke level. The exception was that if they had waited until they got to a corner, the thickness would have been the same and the result the same.

Mr. E. B. Whalley, agent for Messrs. John Brown and Co. Limited, said the system of boreholes undoubtedly complied with section 63 of the Coal Mines Act. They had good reason to believe from the plans they had allowed a sufficient margin of safety. For 120 lb. pressure 6 ft. of solid coal was ample.

The coroner, in summing up, said he thought Mr. Fincken made a mistake in not ordering the men to be withdrawn at 8 o'clock, when Ackroyd told him by telephone about the water. If the orders given by the deputy had been carried out it seemed to him highly probable that all the men would have been saved. There was a loss of time of something like two hours. There was a good deal of bravery shown by the men in the pit in their endeavours to warn and get out their comrades. He thought the evidence showed that Mr. Fincken, too, was not afraid to run any risk in the way of gas and water and so on. The jury found that the seven victims recovered were drowned by an influx of water from the Aldwarke workings due to the boreholes missing some workings; that in their (the jury's) opinion the system of boring holes was not sufficient; and that this was due to an error of judgment and not to negligence on the part of the management of the colliery.



## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### EMERGENCY RESCUE APPARATUS.

SIR,—Under the above heading in your last issue, you describe a small breathing apparatus designed for use in case of an accident with the ordinary rescue apparatus, or as a means of saving men found alive in a pit after a disaster.

Will you kindly allow us space in your columns to state that we have been making an apparatus for similar work during the past three years, one of the first sets having been supplied by us to Dr. Arnold Greene, of the Lancashire and Cheshire Coalowners' Association, How Bridge, in June 1911.

The price of the apparatus, for three-quarters of an hour's work, complete with oxygen cylinder, is £7.

R. H. DAVIS, Director,  
Siebe, Gorman and Co. Limited.

187, Westminster Bridge-road,  
London, S.E., July 28, 1913.

### INCREASE IN RAILWAY RATES.

SIR,—Adverting to my letter of the 28th ult. enclosing copy of a letter this association recently forwarded to the President of the Board of Trade on the above subject, I have pleasure in forwarding herewith copy of a letter from the Board of Trade in reply thereto, together with copy of a letter from this association addressed to the President of the Board of Trade commenting on the latter communication.

I am instructed by my executive committee to request that you will kindly insert these two letters in the columns of your paper, as the adoption by the Board of Trade of the scheme suggested in the second letter would prove of very great value to the trading community, and it is therefore to the general interests of traders that full publicity should be given.

On behalf of the executive committee,  
15, Cross-street, J. HAWORTH, Secretary.  
Manchester, July 28, 1913.

[COPY.]

DEAR SIR,—I am desired by Mr. Buxton to say that he has given very careful consideration to your letter of June 26, on the subject of the recent increase of railway rates.

It appears to Mr. Buxton that you somewhat misapprehend the effect of the Railway and Canal Traffic Act, 1913. That Act did not give the railway companies any power to increase rates which they had not previously possessed, nor did it in any way alter the principle of the Act of 1894 or the procedure it prescribes. It is still the case, as you say, that the burden of proof as regards the reasonableness of any increase of rate lies on the railway companies, and the only alteration effected by the Act of 1913 was to lay down certain conditions under which increased cost of labour is to be taken as justifying an increase of rate.

It is, therefore, hardly correct to suggest, as you appear to do in your letter, that the Act created new difficulties and provided new subjects for litigation between traders and the railway companies.

Mr. Buxton desires me to add that if, in the present case, objection is taken to the increase on the ground that the total amount of the increase of rate is more than is reasonably required to meet the increased cost of labour, it would appear possible to deal with the question by a limited number of test cases. If, on the other hand, a trader is of opinion that the proportion of the increase allocated to the traffic in which he is interested is unreasonable, it would seem to be clearly for him to take action either by himself or through a responsible association.

Yours faithfully,

(Signed) R. W. MATTHEW.

Board of Trade,

July 10, 1913.

Whitehall-gardens, S.W.

The Secretary,

Employers' Parliamentary Association.

[COPY.]

The President of the Board of Trade,  
Whitehall Gardens,  
London, S.W.

### RE INCREASE IN RAILWAY RATES.

SIR,—I have submitted your letter of the 10th inst. to the executive committee of this Association, and they desire to express their great regret that your reply offers but little comfort to traders generally in their present grave position.

They fully point out that in their previous communications did not suggest that the Act of 1913

created new difficulties, but that serious difficulties had arisen as a direct consequence of that Act.

On the understanding that the increase in wages resulting from the settlement of the trouble some 18 months ago would be good ground for an advance in rates under the provisions of the Act of 1913, the railway companies have made a sweeping advance in respect of a large proportion of the traffic.

It is true, as you say, that the traders have their remedy, should they feel aggrieved, by appealing to the Railway and Canal Commissioners. In view, however, of the difference in the character and conditions of traffic, my committee respectfully suggest that it would be impossible to deal with the question by a limited number of test cases.

Any such method, therefore, of seeking redress would involve an action of great complexity at great expense.

Having regard, therefore, to the character of the issue, the fact that it has arisen directly as the result of the action of the Government, and, finally, to the fact that it is peculiarly the duty of the Board of Trade to watch over the interests of the trading community, my committee venture to appeal to the Board of Trade to assist in providing some simple and effective method of adjusting this question between the railway companies and the traders on some broad lines of principle.

My committee suggest that the Board of Trade should arrange a conference with representatives of the traders and of the railway companies, to which the railway companies would be invited to show exactly the amount of the increase in wages involved, and to satisfy the conference as to the amount of such increase which might reasonably be allocated to that part of the traffic affected by the proposed increase in rates.

The conference would also take into consideration all such other attendant circumstances as would properly be taken into account in proceedings before the Railway and Canal Commissioners.

By these means it is likely that, without great difficulty, agreement would be reached at some figure which would represent some percentage, possibly 4 per cent. as claimed by the railway companies—possibly something substantially less as claimed by the traders.

My committee submit that a solution of the difficulty arrived at by friendly negotiation under the Board of Trade in this manner would in every sense be more desirable and more in the general interest than if sought by prolonged and costly litigation with its attendant bitterness and hostility, even were such a course practicable.

On behalf of the executive committee of the Employers' Parliamentary Association,

I am, sir,

Your obedient servant,

JOHN HAWORTH, Secretary.

15, Cross-street, Manchester.

July 28, 1913.

### ELECTRIC LAMPS AND MINERS' NYSTAGMUS.

SIR,—Mr. George Shaw accuses me, in your contemporary journal, of being biassed in my dealings with the electric lamp question. In the same letter, however, he states that I am not in a position to form conclusions from performances of electric lamps *hitherto* made, as the recent legislation now calls for an *entirely different* lamp.

Mr. Shaw apparently forgets that these new rules have now been before the country for some time and prior to my starting the present controversy and therefore my confounding the misleading statements of the electric lamp makers—and which, so far as suits their convenience, they have based on experience with lamps constructed anterior to the new legislations—proves that, instead of being biassed, I have more correctly appreciated the position of affairs, and if in doing this I have saved otherwise intending buyers from being misled, I am quite content to treat with calmness Mr. George Shaw's unfounded allegations.

From Mr. Shaw's statement it is evident that neither myself nor anyone can at present state with certainty what will be the expense and success of lamps which are now having to be altered to comply with the new regulations. One of the regulations calls for a constant candle-power far in excess of that given by the lamps with which Mr. Shaw has had most of his dealings, and it remains to be seen yet whether these new regulations can be complied with successfully and at a reasonable rate. So that obviously it will be the best policy for colliery proprietors who do not wish to have their fingers burnt to "wait and see."

If an increased candle-power is necessary, and if the colliery proprietors will pay only a fraction of a penny per lamp per week extra over and above the present rate for flame lamps there will be no difficulty in providing a flame lamp to give a candle-power quite equal to the alleged "superior" candle-power of the electric lamp, and even this cost will be far below that of electric lamps.

The remarkable thing to the writer is how Mr. Shaw obtains his costs when all the reports we hear are that

the electric lamp is so very costly. Within only the last two or three days I have been informed by a party who has been trying about 100 of three of the most recent electric lamps on the market that, do what they will, they cannot keep the cost under 7d. per lamp per week, and this firm after this experience are now installing oil lamps.

E. A. HALLWOOD.

Morley, July 30, 1913.

### OBITUARY.

Ald. Sam Wood, for four years consecutively Mayor of Wigan, died suddenly in London on the 21st. ult., after an operation for appendicitis. Mr. Wood, while Mayor of Wigan, organised the Maypole Colliery Explosion Fund, raising £24,000.

The death has occurred of Mr. Thomas Hunt, who passed away at his residence, Manchester-road, Higher Ince. The deceased gentleman's father was killed at the explosion at the Bottom Place pit, Ince, when Mr. Hunt was two years old, and at nine years of age he started to earn his living at the Ince Hall Collieries, where he acted as post-boy. He continued to be identified with the Ince Hall Collieries and the Ince Coal and Cannel Company until the pits were worked out. He served under the late Mr. Gidlow Jackson for a long number of years. When the Northern Employers' Mutual Indemnity Company Limited was formed by some of the principal Lancashire coalowners, Mr. Hunt was given the position of chief clerk. He leaves a widow, six daughters and three sons.

Major W. E. Jones, V.D., has passed away at his residence, 6, Llanbleddian-gardens, Cardiff. The deceased gentleman, who was taken ill the latter part of last week, had reached the age of 61. A native of Risca, he had been for the last 30 years at the head office of the Glamorgan Coal Company Limited, at Cardiff, and for some years acted as private secretary to the late Mr. Archibald Hood. Major Jones, who was unmarried, leaves two brothers, Messrs. J. A. Jones (of Messrs. Watts, Watts and Co. Limited) and Mr. T. P. Jones.

**New Coaling Staiths on the Tyne.**—In addition to the new coaling staiths at West Dunston-on-Tyne, which have been under construction now for about 18 months, and are expected to be ready for service at the end of next year, the North-Eastern Railway Company are completing the designs for the provision of a new riverside station and coaling staith at Jarrow Slake, immediately west of the entrance to the Tyne Docks. This new riverside quay will be 1,865 ft. in length, of which 945 ft. at the eastern end will be devoted solely to coal shipping, and will be equipped with two fixed hoists capable of shipping coal at 60 and 65 ft. above high water. This length of staith will be on a gradient of 1 in 75, falling from the east to the west. The western portion of the quay, 920 ft. in length, is to be utilised for general goods and passenger traffic, and there will be one 10-ton, two 3-ton, and three 30-cwt. cranes, each having a working radius of 44 ft. 9 in. It is proposed to construct the whole of this riverside station in timber framework, consisting generally of 13-in. piles, with bracing 13 in. by 6½ in., and a deck of 3 in. by 6 in. diameter, carried upon double 14 in. by 14 in. beams. The average width of the quay will be 55 ft. and the quay level 5 ft. above high water, or 20 ft. above low water. The River Don, which flows into the Tyne on the west side of the Tyne Dock entrance, is to be diverted 500 ft. westward into Jarrow Slake, so as to permit of the establishment of sidings to supply the riverside quay. A passenger station, having a platform 600 ft. in length, forms portion of the scheme, and here will be the usual accommodation, inclusive of offices for Customs and mail purposes. There will be a transit shed 220 ft. in length at the west end of the quay. Three groups of sidings, two for serving the coal hoists, and one for the goods and passenger traffic, will be laid down. The laden traffic will be propelled up a gradient of 1 in 75, and then returned by gravity to the hoists. The empty trucks will leave the hoists at a high level on an overhead viaduct, and return to the empty mineral sidings by gravitation. These sidings will have a total standage capacity of 750 wagons. There will be an available depth of water alongside the quay of 25 ft. at low tides, so that the Norwegian mail steamers may arrive and depart at all states of the tide. The drawings have been prepared by Mr. Charles A. Harrison, of Newcastle-upon-Tyne, the engineer-in-chief of the North-Eastern Railway Company, under whose direction the work will be carried out. It is anticipated that tenders will be invited in the course of the next few months, and that the new staiths will be ready for service within three years from date. In this connection, it may be recalled that since the opening of the Tyne Dock at Newcastle in 1859, the huge total of 254,000,000 tons of coal has been shipped, the export now reaching 7,500,000 tons per annum. There are four shipping staiths, carrying 42 spouts, and one of the staiths is fitted with electric belt conveyors, each having a capacity of from 400 to 500 tons per hour. The quays are equipped with 41 electric, hydraulic and steam cranes, including one 30-ton electric crane, whilst dock facilities are also provided for dealing with all descriptions of cargoes. In comparison with the exports, the imports are small, but some 400,000 tons of iron ore are dealt with annually, as well as 200,000 tons of timber and 50,000 tons of grain. Land extending over 215 acres is available for storing timber and undamageable goods, whilst warehouses capable of accommodating 120,000 qrs. of grain, as well as a general traffic requiring cover, are provided in the vicinity of the dock.



## CONTINENTAL MINING NOTES.

## Austria-Hungary.

The Austrian Government have purchased for 5 million kroner the Brzesz Colliery, situated near Oswiecim.

## Belgium.

The Coke Syndicate have decided upon a reduction in the output of 15 per cent. Foreign coke is plentiful.

Exports and imports during the six months were as under:—

	Imports.		Exports.	
	1913. Tons.	1912. Tons.	1913. Tons.	1912. Tons.
Coal .....	4,482,500	3,884,900	2,400,800	2,451,800
Coke .....	793,500	590,700	676,300	602,400
Briquettes ..	212,900	181,100	254,700	304,900

**Coalmining Concessions.**—The Government have issued a circular in which it is stated that they are now prepared to deal without delay with the numerous applications for concessions which have remained in abeyance for a considerable period.

The production of coal in Belgium during the first half of the present year was as follows:—

Province.	Output. Tons.	Stocks at June 30. Tons.	Persons employed.
Hainault—			
Couchant de Mous...	2,147,000	106,040	32,664
Centre .....	1,691,030	113,660	21,756
Charleroi .....	4,001,800	288,150	49,169
Namur .....	402,800	32,740	4,911
Liège—			
Liège-Seraing .....	2,396,420	182,980	32,688
Plateau de Hervex...	582,500	18,620	5,859
Total 1913 .....	11,221,550	742,190	147,047
Total 1912 (first half)	11,135,290	627,220	142,850

**New Explosives.**—The following new explosives have been added to the Belgian "permitted list" of explosives (explosifs S.G.P.):—"Pulverite" made by the Matagne Dynamite Company, and "Alsilite S.G.P." made by Ghini-jonet and Co. The composition of Pulverite is as follows:—Collodion cotton, 0.5 per cent.; barium sulphate, 20; meal, 50; nitroglycerine, 6.0; sulphate of ammonia, 7.0; trinitrotoluol, 7.0; chloride of sodium, 18.0; perchlorate of potassium, 24.0; nitrate of ammonia, 30.5; maximum charge, 0.850 kilog.; equivalent weight in No. 1 dynamite, 0.504 kilog. "Alsilite" contains the following constituents: Nitrate of ammonia, 62.0; chloride of sodium, 22.0; trinitrotoluene, 11.0; ferro-silicate of aluminium, 5.0; maximum charge, 0.9 kilog.; equivalent weight in No. 1 dynamite, 0.594 kilog.

## Germany.

The Upper Silesian Coal Syndicate have decided, in view of the continued satisfactory demand, to maintain the present prices for the third quarter of 1913.

**Profits of German Mining Companies.**—The *Kölnische Zeitung* publishes interesting tables showing the profits realised and the dividends paid by the "pure" coalmining corporations in the Ruhr district in 1912 and 1910 respectively. From these the following are extracted:—

Companies.	Production. (1,000 tons.)		Net profit (deducting redemption) at December 31. (1,000 marks.)		Dividends at December 31. (Per cent.)		Participation in Syndicate at December 31. (1,000 tons.)	
	1910.	1912.	1910.	1912.	1910.	1912.	1910.	1912.
Harpen .....	6,713	7,530	6,465	8,529	7	9	7,540	8,040
Hibernia .....	5,455	5,846	5,857	8,084	8½	11½	5,417	5,417
Essenir Steink.-B. ....	1,978	2,292	2,950	2,928	10	10	1,989	1,989
Arenberg .....	1,757	2,346	2,652	3,515	16	22	1,873	2,273
Consolidation .....	1,661	1,798	3,538	4,270	19	23	1,740	1,740
Mülheimer Bergw.-Ver. ....	1,541	1,422	1,901	1,906	11	11	1,740	1,740
Concordia .....	1,373	1,467	1,703	3,055	11	22	1,526	1,526
Dahlbusch .....	1,079	1,157	1,961	2,099	14½	16	1,210	1,210
Königsborn .....	1,008	1,038	1,894	2,778	12	18	1,125	1,125
König Wilhelm .....	1,004	1,075	1,846	2,453	15	18	1,040	1,040
Köln-Neuessemer B.-V. ....	1,521	1,754	3,636	3,956	29.1	33.7	1,674	1,674
Magdeburger Bw.-A.-G. ....	490	533	1,111	1,174	35	37	550	550
Bochumer Bw.-A.-G. ....	379	376	96	550	—	8	406	406
Aplerbeck .....	285	311	183	286	6	10	300	300
Total and average .....	26,244	28,945	36,753	45,583	13.35	17.84	28,130	29,030

In 1912 26,255,000 marks were set aside by these companies for redemption, as against 23,642,000 marks in 1910; the total capital was 284,819,000 marks, as against 280,819,000 marks; loans, debentures, &c., amounted to 119,353,000 marks, as against 106,642,000 marks; taking each ton of participation as a unit, the capitalisation amounted to 9.81 marks per ton, as against 9.98 marks, or adding debentures, &c., 13.92 marks, as against 13.77 marks. The net profit in 1912 was 1.57 marks per ton of output, as against 1.40 marks in 1910, 1.49 marks in 1908, and 1.63 marks in 1906. In 1908 the average dividend paid was 15.92 per cent., and in 1906 18.7 per cent.

The following interesting table, showing the comparative position of the "pure" mining companies and the mixed concerns owning both coalmining and iron and steel works, &c., has also been compiled from official statistics by the *Kölnische Zeitung*:—

Financial year (July 1 to June 30).	Share capital ranking for dividend.		Percentage of capital receiving no dividend.		Average dividend distributed.	
	Collieries.	"Mixed" concerns.	Collieries.	"Mixed" concerns.	Collieries.	"Mixed" concerns.

	1,000 marks.	1,000 marks.	Per cent.	Per cent.	Per cent.	Per cent.
1907-1908 .....	491,794	797,583	14.0	5.09	12.6	9.5
1908-1909 .....	369,252	943,233	17.79	5.70	10.65	7.79
1909-1910 .....	396,003	995,209	21.99	6.58	8.55	8.98
1910-1911 .....	398,145	1,060,721	22.39	4.94	9.02	9.98

Taking first the collieries on the basis of capital, in 1910-11 22.7 per cent. received no dividend, 6 per cent. from nil to 6 per cent., 43.12 from 6 to 10 per cent., 15.24 from 10 to 15 per cent., and 12.87 above 15 per cent. The corresponding figures for the mixed concerns were:—Nil, 4.94 per cent.; nil to 6 per cent., 13.8; 6 to 10 per cent., 41.77; 10 to 15 per cent., 32.2; above 15 per cent., 7.29.

**Ruhr Coal Market.**—There is no change in the situation, except that the market is not so receptive in consequence of the less active condition of the iron and other consuming industries. Business in house coal is dull, and the ironmasters are taking smaller supplies of blastfurnace coke, so that the coke market is suffering considerably. Large deliveries are still being made in gas and open-burning coals, but not sufficient to absorb the output. Exports to France and Holland are fairly large, though not up to the previous level; and Belgium's requirements have not increased much since the strike.

**Coal Market in South Germany.**—The position still continues satisfactory, though in some industries—textiles, cement and brickmaking—the demand for coal is receding. In other respects, consumers are taking their regular contract supplies, but not many are anxious to have more. House coal, on the other hand, is in much better request, especially in those kinds due to advance in price in August, though in other kinds dealers are taking freely in order to get their full quota during the autumn and winter. Shipments have been coming forward better, but still not enough to keep stocks from depletion. Broken coke is also in demand, owing to the scarcity of gas coke.

**Coal Market in Upper Silesia.**—The best indication of the situation is that, in contrast to former years, the pits have not been able to make arrangements to meet the increased demand for the autumn and winter season, nearly all the output being sent away at once, leaving only a small surplus for stocking. For the moment the needs of the iron industry are smaller, but this is compensated by an increased demand from other quarters. Thus the orders from Austria-Hungary are about 20 per cent. greater than last year, the Prussian railways are taking more and Russian Poland is also a larger buyer—especially for steam coals. Gas coals are in good request, and the demand for coking coals is unabated, though the pig iron industry is less active. There having been no cessation in the demand, fears are expressed of a scarcity of fuel in the autumn, and that prices will be raised again, so that dealers are beginning to lay in their supplies earlier than usual. English competition in the

Calais and Nord during the first half of the present year:—

	Pas-de-Calais.		Nord.	
	1913. Tons.	1912. Tons.	1913. Tons.	1912. Tons.
Coal .....	11,039,919	10,798,746	3,906,105	3,742,998
Coke .....	810,445	786,080	421,917	423,950
Briquettes .....	286,648	316,207	605,804	565,134

There was thus an increase in the output of the two departments of 404,280 tons of coal, 21,332 tons of coke and 11,111 tons of briquettes, as compared with the first half of 1912. In the Pas-de-Calais 101 were in operation, and in the Nord 48.

## PARLIAMENTARY INTELLIGENCE.

## HOUSE OF COMMONS.—July 30.

## Treatment of Pit Ponies.

Mr. W. F. PERKINS asked the Home Secretary if his attention had been directed to the alleged ill-treatment of pit ponies in the Maunders Main Colliery, and would he say if there had been any relaxation in the matter of periodical inspection, and if reports of inspectors disclosed a recrudescence of ill-treatment?

Mr. McKENNA replies: "There is no colliery of this name on the Home Office list. If the reference is to Manvers Main Colliery, in Yorkshire, certain allegations of ill-treatment of animals at the mine were enquired into early last year, and it was found that the conditions, though there was no evidence of actual cruelty, left a good deal to be desired. The animals at the mine have since that date been kept under observation by the inspectors, and the state of matters according to recent reports is now satisfactory."

## The Admiralty and Shale Oil.

Major HOPE asked the First Lord of the Admiralty if he was taking any steps to promote and encourage the full development of the resources of the Scottish shale fields, and whether, in view of the strategic advantage of using for the Navy, as far as possible, oil fuel produced in the United Kingdom, he would, in negotiating contracts, give treatment to British oil-producing companies preferential to that accorded to the Mexican Eagle and other foreign oil companies.

Mr. CHURCHILL, in reply, said the best means of securing development of shale and other home sources of supply of fuel oil is receiving, and will continue to receive, very careful consideration. All pertinent considerations will be taken into account in negotiating for supplies of oil from various sources; but it would not be in the public interest, in securing adequate supplies on the best terms, that degrees of preference of one supply or another should be promised. No one could doubt the substantial advantages in a domestic supply over a foreign supply.

## THE IRISH COAL TRADE.

THURSDAY, JULY 31.

## Dublin.

The house coal trade is now very dull and there is no great demand for steam coal, but prices of all qualities are well maintained at late rates—viz.:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best kitchen, 24s.; Orrell slack, 21s.—all less the usual 1s. per ton discount for cash; steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. Irish coals at Wolfhill (Queen's County) are:—Best large coal, 20s. per ton; best household coal, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth. The import trade continues to be active, and stocks are accumulating. The coaling vessels arriving during the past week amounted to 58 as compared with 77 the week previously, chiefly from Garston, Point of Aire, Swansea, Girvan, Ayr, Manchester, Troon, Workington, Newport, Preston, Newcastle, Barryport, and Liverpool. The total quantity of coal discharged upon the quays was 24,000 tons. The Midland Railway Company recently decided to take powers to make the connection between the proposed mining railway between the Arigna coalmines (county Leitrim) and the Midland Great Western main line at Calloney, so that there is a reasonable prospect of a further development of Irish coal in that district.

## Belfast.

With the exception of house coals, demand for which is rather quiet, business generally is good, and prices continue to be firm and without further change. The cross-Channel trade is unusually good for this time of the year, and stocks in this port are assuming very substantial proportions. Freight rates are somewhat easier. Quotations in the city are:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current prices ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Cargoes arriving during the week were chiefly from Garston, Workington, Ayr, Maryport, Cardiff, Preston, Manchester, Partington, Irvine, Ellesmere Port, Ardrossan, Troon, Whitehaven, Neath Abbey and Point of Aire. A contract is open in connection with the County Down Asylum for the usual 12 months' supply, representing about 1,700 tons of house, steam and gas coals.

## France.

During the present year it is stated that over 25,000 tons of iron ore from the Briey basin have been exported to Great Britain, and have been employed in British furnaces with satisfactory results.

Based upon the ascertained price of Cleveland No. 3 g.m.b. pig iron and the prices of Belgian and Saarbrücken coal, the price of blastfurnace coke delivered at the works in the Meurthe-et-Moselle district has been fixed at 27.825 fr. during the third quarter of 1913, as against 27.78 fr. in the preceding quarter.

The following shows the production of fuel in the Pas-de-



## THE COAL AND IRON TRADES.

THURSDAY, JULY 31.

## Scotland.—Western District.

## COAL.

Trade in this district has been restricted by holidays, which have been the main cause of the curtailment of shipments. Last week 72,836 tons were shipped from the Clyde ports, as compared with 107,080 tons in the previous week, and 104,690 tons in the corresponding week of last year. At Glasgow the clearances were 43,150 tons, as against 75,057 tons and 69,829 tons respectively. Shipments at Bowling were 258 tons, Greenock 683 tons, Ardrossan 4,345 tons, Irvine 1,736 tons, Troon 5,714 tons, and Ayr 16,950 tons.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	11/9 to 14/	12/ to 14/6
Ell .....	12/6 to 13/	12/6 to 13/
Split .....	12/6 to 15/	12/9 to 15/
Treble nuts .....	12/ to 12/6	12/6 to 12/9
Double do. ....	11/6 to 11/9	11/6 to 11/9
Single do. ....	11/ to 11/3	11/3 to 11/6

## IRON.

The pig iron warrant market has been firm, but transactions have been few. Last week 82 furnaces were in blast, as against 86 at the same date last year. The following are quotations f.a.s. Glasgow:—Gartsherrie, Summerlee, Snotts, Calder, Langloan and Clyde, Nos. 1, 75s. 6d., Nos. 2, 70s. 6d.; Govan and Monkland, Nos. 1, 69s. 6d.; Nos. 3, 68s.; Carnbroe, No. 1, 75s., No. 3, 71s.; Coltness, No. 1, 98s., No. 3, 80s. F.a.s. Ayr-Dalmellington, No. 1, 71s., No. 3, 69s.; f.a.s. Ardrossan-Garnock, No. 1, 77s., No. 3, 72s.; Eglinton, No. 1, 70s., No. 3, 69. Carron (f.a.s. Grangemouth), No. 1, 76s., No. 3, 71s. Last week 1,797 tons of Scotch pig iron were shipped foreign and 2,833 tons coastwise, as compared with 2,529 tons and 1,824 tons respectively in the same week last year. Cumberland hematite is quoted rather lower at 71s. 9d. f.o.b. On Monday the pig iron workers at Grangemouth struck work.

## Scotland.—Eastern District.

## COAL.

The coal trade in the Lothians is still restricted by the dockers' strike at Leith, six pits being idle in the district on Monday. At Leith last week only 572 tons were loaded (as against 38,128 tons in the corresponding week of last year); at Bridgness, 2,078 tons; Bo'ness, 3,219 tons; Grangemouth, 43,130 tons; and Granton 2,889 tons—total 51,898 tons, as against 78,254 tons in the previous week and 102,825 tons in the corresponding week of last year. Shipping prices are nominally as under:—

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal .....	12/9 to 13/	12/9 to 13/
Secondary qualities .....	11/9 to 12/	11/9 to 12/
Treble nuts .....	13/	13/
Double do. ....	12/ to 12/6	12/ to 12/6
Single do. ....	11/3 to 11/6	11/3 to 11/6

Holiday influences have been predominant in Fifeshire, the results being reflected in the reduced shipments. The clearances were:—Methil, 35,244 tons; Burntisland, 6,860 tons; Kirkcaldy, 1,003 tons; Wemyss, 869 tons; Charleston, 250 tons; Tayport, 499 tons; Alloa, 2,637 tons—total, 47,362 tons, as compared with 121,740 tons and 84,641 tons respectively in the previous week and the corresponding week of last year. Shipments were resumed on Tuesday.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/9 to 17/	16/9 to 17/
Unscreened do. ....	14/6 to 15/	14/6 to 15/
First-class steam coal .....	14/3 to 15/	14/3 to 15/
Third-class do. ....	11/6 to 12/9	11/6 to 12/9
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/9 to 13/3	12/9 to 13/3
Single do. ....	11/6 to 11/9	11/6 to 11/9

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 148,372 tons of coal and 2,018 tons of coke were despatched from Tyne Dock, an increase of 2,898 tons of coal and a decrease of 476 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 57,332 tons of coal and 3,326 tons of coke, a decrease of 8,138 tons of coal and an increase of 1,237 tons of coke. From 15,000 to 20,000 tons of Best Blyth steams are stated to have been sold for shipment from August to February at 13s. 9d. per ton f.o.b. The contract to supply the Windau Railways with 20,000 tons of steam coals for shipment from August to January (excluding October) is stated to have been placed with Russian merchants for best Blyths at 19s. 6d. per ton, c.i.f. Windau. The coals, it is believed, have still to be purchased in this market by the contractors. A quantity of ordinary unscreened Durham bunkers is stated to have been sold for shipment over August-October at 13s. 3d. per ton f.o.b.; some 18,000 tons of similar coal are stated to have realised from 12s. 7½d. to 12s. 9½d. per ton f.o.b., for shipment over the ensuing 12 months, and from 25,000 to 30,000 tons are stated to have been sold for delivery over next year at 11s. 3d. per ton f.o.b.—a price which is fully 1s. per ton below that offered by the collieries for such delivery. A parcel of screened coking coal for shipment during the month of August was sold at 13s. 6d. per ton f.o.b. Tenders of 100 tons of gas bests are due to be received from the Danish Cement Works Combine for August 6. Some 2,000 tons of

gas coke have been sold for August shipment at 17s. 6d. per ton f.o.b. The exports of gas coke from the Tyne during the first half of the year are stated to have been satisfactorily large. In the case of one big producer, indeed, the returns for the six months have broken the record. The coke market is very dull at present, however, and prices are on the down grade. For early shipment the coal market is brisk. There is a considerable amount of congestion of loading turns, especially so far as the steam coal collieries are concerned. F.o.b. quotations for prompt shipment have undergone little variation during the week, the following being the only changes on last report:—Best steams, Blyths, from 3d. to 6d. advanced; Tyne, 3d. increased; Tyne, smalls, easier; gas bests, from 1½d. to 3d. improved; specials, stronger; unscreened bunkers, Durhams, firmer; coking coals, weaker; smalls, 3d. reduced; foundry coke, from 2s. to 2s. 6d. cheaper; and blastfurnace, 1s. down.

Later.—Considerable perturbation has been caused by the decision of the North-East coast trimmers and teamers to cease work at noon each Saturday, commencing with Saturday August 2. This decision follows on the men's rejection of a compromise offered by the shipowners—viz., that work shall continue up to 4 p.m. on Saturdays, as heretofore, but that the overtime rates shall be increased by 3d. per hour. The men appear to be determined to have their 12 o'clock Saturday, and the shipowners, on the other hand, appear equally resolute in affirming that, if an effort is made to enforce that shorter working day, they will lock out the men as from Tuesday next. Such a lock-out would, of course, mean a total suspension of coal shipments, the laying-idle of collieries, the laying-up of collier vessels, and, in short, all the inconvenience which characterised the miners' strike last year would be duplicated so far as shippers were concerned.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best Blyths (D.C.B.) .....	15/6	15/ to 15/3
Do. Tyne (Bowers, &c.) .....	15/3	15/
Secondary Blyths .....	13/	13/
Do. Tyne (Hastings or West Hartleys) .....	13/3 to 13/6	13/3 to 13/6
Unscreened .....	11/9 to 12/6	11/9 to 12/6
Small Blyths .....	9/6 to 9/9	9/6 to 9/9
Do. Tyne .....	7/9 to 8/	8/
Do. specials .....	10/	10/
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) .....	15/	14/9 to 14/10½
Secondary gas coals (Pelaw Main or similar) .....	13/6 to 13/9	13/6 to 13/9
Special gas coals .....	15/6	15/3 to 15/6
Unscreened bunkers, Durhams .....	13/3 to 14/	13/ to 14/
Do. do. Northumbrians .....	12/ to 12/6	12/ to 12/6
Coking coals .....	13/3 to 13/9	13/6 to 13/9
Do. smalls .....	13/3	13/ to 13/6
House coals .....	15/6	15/6
Coke, foundry .....	20/ to 21/6	22/ to 24/
Do. blast-furnace .....	19/	19/ to 20/
Do. gas .....	16/6 to 17/6	16/6 to 17/6

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 99,685 tons of coal, and 1,235 tons of coke as compared with 106,550 tons of coal, and 1,025 tons of coke for the corresponding period of 1912, being a decrease of 6,865 tons of coal and an increase of 210 tons of coke. There is a distinctly better tone in the coal market, there being an active enquiry on all sides. Supplies will be scarce up to the middle of August, as the production will be restricted next week owing to the holidays, so that the outlook for prompt shipment is good. Buyers who have been holding off have evidently now come on to the market. Best gas coals are in demand, and Durham coals generally are steadily held. Coke, however, is on the weak side and nominal; there is a steady forward enquiry, and the position of best steams is strong. A contract for 10,000 tons of best coking coals has been arranged at 13s. 6d. free on board, for delivery over next month. Ordinary bunkers, for shipment August, September, October, have been sold at 13s. 3d., whilst for shipment over the year 12s. 9d. f.o.b. has been paid. The Danish Cement Works Combine is in the market for about 50,000 tons best gas coals for delivery over next year. Quotations are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals .....	16/	15/3 to 15/6
Secondary do. ....	13/9	13/6 to 14/
House coals:—		
Best house coals .....	16/	16/3
Ordinary do. ....	15/	15/6
Other sorts:—		
Lambton screened .....	15/6	15/6
South Hetton do. ....	15/3	15/
Lambton unscreened .....	13/3	13/3
South Hetton do. ....	13/	13/3
Do. treble nuts .....	16/9	16/6 to 16/9
Coking coals unscreened .....	13/6	13/9
Do. smalls .....	13/3	13/6
Smithies .....	13/9	13/6
Peas and nuts .....	14/	14/
Best bunkers .....	14/	14/ to 14/3
Ordinary bunkers .....	13/ to 13/3	13/ to 13/3
Coke:—		
Foundry coke .....	22/6	22/6
Blast-furnace coke (divrd. Teesside furnaces) .....	19/ to 20/	19/6 to 20/
Gas coke .....	17/6	18/

The freight market is on the slow side, merchants holding for easier terms, but rates are fairly well maintained. Recent fixtures include:—Coasting: London 3s. 6d., Hamburg 3s. 9d., Rotterdam 4s., Havre 4s. 9d. Bay: Bordeaux 5s. 6d., St. Nazaire 6s. 6d., Bayonne 7s., Lisbon 7s. 3d. Baltic: Cronstadt 5s., Fairwater 5s. 1½d., Pillau 5s. 1½d. Mediterranean: Genoa 9s., Marseilles 9s., Piræus 8s. 9d., Civita Vecchia 10s., Malta 7s. 6d., Oran 9s., Venice 10s. 3d., Ancona 10s., and Port Said 9s.

## Middlesbrough-on-Tees.

## COAL.

There is little new to report concerning the fuel trade. Coal prices are firm, and with the Baltic season at its height shippers and producers are well placed. Enquiry for gas coal is rather better, and deliveries are increasing with the shortening days. Best gas coal is quoted 14s. 10½d., seconds 13s. 6d. to 14s., and special kinds up to 16s. Bunker coal is in fairly good request, with an ample supply to meet needs. Ordinary Durhams are quoted 13s. to 13s. 3d. f.o.b., superiors 14s. to 14s. 3d., and specials 15s. to 16s. Household coal is quiet, and prices range from 15s. 3d. to 16s. There is a steady demand for coking coal, and the price is in the neighbourhood of 15s. 3d. Though in heavy local consumption furnace coke is weak, sellers offer medium blastfurnace kinds freely at 19s. delivered at Teesside works. Foundry coke is put at 22s. 6d. f.o.b., and gashouse coke at 16s. 6d.

## IRON.

Statistics issued by the Middlesbrough Chamber of Commerce show that at the end of June of the 77 blast-furnaces within the port of Middlesbrough 60 were in operation, and the make of pig iron for the second quarter of the year reached 715,000 tons, as compared with a production of 709,000 tons for the previous three months, and 520,000 tons for the second quarter of 1912. Imports of foreign iron ore into Middlesbrough last quarter reached 608,749 tons, as compared with 587,234 tons for the previous three months, and 338,378 tons for the second quarter of last year. Values of pig iron show little movement. Merchants are now selling No. 3 g.m.b. Cleveland pig at 55s. 9d. f.o.b., and that is regarded as the general market quotation, though many makers hold out for a higher figure. No. 1 Cleveland is in the neighbourhood of 58s. 3d., No. 4 foundry 55s. 6d., No. 4 forge 55s. to 55s. 3d., and mottled and white iron each 54s. 9d. All the foregoing quotations are for early delivery. East coast hematite pig is weak, and few sales are recorded. Second hands offer Nos. 1, 2, and 3 freely at 71s. 6d. for either early or forward delivery, and possibly contracts could be made at 71s. Business in foreign ore is idle, but dealers being well sold continue to take a firm stand, and market rates are still based nominally on 20s. ex-ship Tees for rubio of 50 per cent. quality. There is little new to report concerning the manufactured iron and steel trades. Prices are unaltered, but reductions are looked for, and lower rates for some descriptions may be announced at the end of next week. Large Australian work may shortly be given out, and hopes are entertained that a portion of it will come to this district. An order has been placed with the Cargo Fleet Iron and Steel Company for 10,000 tons of conductor rails for the London and North Western Railway needed in connection with electrification developments.

## South-West Lancashire.

## COAL.

There is nothing of note to report with regard to the inland household trade; naturally, with the weather we are having, it is quiet. In screened coal for forges and manufacturers using round coal the present delivery is said to be a bit easier. Shipping is much as it was. Contract bunkering requirements keep fairly well up to the usual average, and as the excursion steamers are now taking maximum deliveries shipments are of a substantial character, notwithstanding the limited amount of new business. Prices are practically unaltered, ordinary qualities of Lancashire steam coals being quoted at 13s. 3d. to 13s. 6d. f.o.b., with the very best grades at 13s. 9d. to 14s. f.o.b., though, as named last week, spot lots may possibly be obtained at slightly lower prices. With regard to slacks, there is a little surplus about at the moment, but no doubt the holidays, which commence on Friday evening, and in many cases last until next Wednesday morning, will restore the balance. On the whole, for present delivery prices are just a shade easier. This does not apply to renewals on contract.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/3	16/3
Do. (f.o.b. Garston, net) .....	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/3 to 14/	13/3 to 14/
Best slack .....	10/3	10/6
Secondary slack .....	9/6	9/9
Common do. ....	9/0	9/3

## South Lancashire and Cheshire.

## COAL.

There was a fair attendance of members on the Manchester Coal Exchange on Tuesday. Business in all directions is on the quiet side—house coal being especially dull, naturally owing to the summer weather. Furnace coal is not so brisk as it has been, whilst shipping coal is moderate, and prices are a little easier without change in official prices. There is some enquiry for slack, but at present merchants prefer not to contract and to take their chance in the open market. Prices generally are, as at foot.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

## IRON.

There is not much weight of new business going through; consumers are buying very much from hand to mouth. The forges have at last reduced their prices for iron, making the price £8 for crown iron, £7 10s. second quality, £8 7s. 6d.



hoops. They are not too fully employed at the moment. Good foundry iron is readily obtainable at 68s. to 64s. equal to Manchester, but there is very little business doing. Steelworks are busy at £7 15s. for bars and £5 5s. for billets, with foreign still considerably lower. Wagon works are still well employed, but delivery is more easy to obtain. Founders and engineers are moderately employed.

Yorkshire and Derbyshire.  
Leeds.  
COAL.

The market on Tuesday was not very numerously attended, and business on the whole was on the quiet side. There were one or two requests for extra supplies of steam coal in view of the holidays, but apart from this business was dull. The pits have worked quite five days this week, and stocks of house coal have been reduced. Generally speaking siding stocks comprise only secondary qualities. Empty wagons have again been fairly plentiful. It is expected that the West Riding pits will suspend work on Friday night until the following Wednesday morning. There will be no market at Leeds next Tuesday.

House Coal.—Reports from Castleford, Normanton, Pontefract, and the collieries on the Goole branch all indicate an entire absence of stocks of best house coal. This is surprising, in view of the recent spell of hot weather, and is accounted for by the fact that a good many stocking orders are being dealt with for London and the eastern counties, and the further fact that many of the larger houses in the West Riding are taking in stocks for the winter. Under the circumstances pit prices are firmly held, and approximate the new contract figures. London merchants have taken extra supplies during the week, both in private and colliery wagons, and it is said that some of the pits supplying the best qualities of house coal are 10 days behind with their orders. The coastwise trade is fairly good, but prices in this department are not so satisfactory, as the bulk of the business done is in secondary qualities. There is very little alteration in the freight market. Small steamers from Goole to London average about 4s. per ton. The retail trade at the West Riding depots is about the average for the time of the year, apart from the sales of best coal mentioned above. Pit prices average as under:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

Gas Coal.—The bulk of the new contracts are now placed, and open market business is quiet. The pits have a ready outlet, however, for all the coal they can raise, and throughout the district there are no stocks of gas coal. It now transpires that Bradford Corporation have bought about 120,000 tons, and not 200,000, as reported last week. For this they have paid the full 1s. advance, but have deferred buying the remainder in the expectation of lower prices a little later on. In this they are most likely to be at fault, as practically the whole output of the Yorkshire gas coal collieries is now sold.

Manufacturing Fuel.—There has been a better demand this week for nuts and slacks—probably in view of the stoppage for Bank Holiday. Spot lots of slack, however, are still being freely offered at very low prices, while forward business is practically at a standstill.

Washed Furnace Coke.—Prices of washed furnace coke seem to go from bad to worse. Sales of washed patent oven coke have been made this week at under 13s. per ton at the ovens. Quite a number of old type beehive ovens have been damped down, and this has had an effect on the price of coking slacks. It is reported that a number of iron and steel works have taken advantage of the present low quotations for coke to buy forward to the end of the year. We understand that a sale has been booked during the past few days for 500 tons per week of a well-known brand of coke at 13s. 1d. per ton at the ovens.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	14/ to 14/6	14/ to 14/6
Wallsend & London best	13/ to 13/6	13/ to 13/6
Silkstone best .....	13/6 to 14/6	13/3 to 14/
Do. house .....	12/ to 12/6	11/6 to 12/6
House nuts .....	11/ to 11/6	11/ to 11/6
Prices f.o.b. Hull:		
Haigh Moor best.....	16/6 to 17/3	16/6 to 17/3
Silkstone best .....	15/6 to 16/6	15/6 to 16/
Do. house .....	14/6 to 15/6	14/6 to 15/6
Other qualities.....	14/ to 14/9	14/ to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/3 to 12/9	12/3 to 12/9
Gas nuts .....	11/6 to 12/6	11/6 to 12/6
Unscreened gas coal ...	10/6 to 11/	10/6 to 11/
Other sorts:—		
Prices at pit:		
Washed nuts .....	11/6 to 12/3	11/6 to 12/3
Large double-screened engine nuts .....	11/ to 11/6	11/ to 11/6
Small nuts .....	10/ to 10/6	10/ to 10/6
Rough unscreened engine coal .....	10/ to 10/6	10/ to 10/6
Best rough slacks .....	8/ to 9/	8/ to 9/
Small do. ....	7/6 to 8/3	7/6 to 8/3
Coking smalls .....	7/6 to 8/	7/9 to 8/3
Coke:—		
Price at ovens:		
Furnace coke .....	13/ to 13/6	13/6 to 14/

Barnsley.  
COAL.

The demand on export account continues to be of a vigorous description, but the heavy output with the collieries working full time is more than sufficient to meet the requirements. Most of the new large pits are sending a big tonnage to the Humber, and railway companies are fully engaged in dealing with the traffic. In fact, in some instances delays are reported. In regard to values exporters are still showing a keen demand for the best hards, of which there is no extensive surplus, and prices remain very firm on the week with a good forward tone operating. The position in respect of secondary descriptions hardly continues so favourable, but sellers, owing as stated to the large amount of fuel which is on offer, and although the demand is strong, offer lower prices in some parts of

the district, whilst buyers are able to make arrangements with greater advantage to the end of the season. The tonnage of gas coal which is being sent for export, particularly to South America, is also of an unusually large bulk, and accounts in a considerable degree for the active state of affairs at the port. The home trade generally is active, but buyers are not so pressing for deliveries as formerly, and find prices rather easier. The railway companies, however, are taking full contract supplies, but the requirements of industrial firms are less substantial. Small manufacturing fuel shows little alteration, and with the collieries working full time, and the holiday season being much in evidence, buyers are meeting with cheaper offers to effect clearances. Best washed nuts show little change, but slacks are considerably cheaper, especially the rougher qualities. The output of gas coal is more than of an average, and is well taken, although there is practically no buying outside contract arrangements. The demand for best house coal continues to be remarkably good despite the weather, and prices are very firmly established. Business is not so good for other qualities of house coal, but by resorting to stocks at the collieries coalowners are able to maintain the prices at something like the schedule quotations. The depression in the coke trade continues to be well marked, and in spite of the efforts to reduce the output smelters continue to dominate the position. The demand is now practically confined to the Midland districts, and prices have gone weaker with practically no enquiry for forward delivery.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone .....	14/6	14/6
Best Barnsley softs.....	13/9 to 14/	14/
Secondary do. ....	11/ to 13/	11/ to 13/
Best house nuts .....	13/ to 13/3	12/ to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	13/ to 13/3	13/ to 13/3
Secondary do. ....	12/ to 12/3	12/ to 12/3
Best washed nuts .....	12/	12/
Secondary do. ....	11/	11/
Best slack.....	8/6	8/9 to 9/
Rough do. ....	7/6 to 8/	8/ to 8/3
Gas coals:—		
Screened gas coals .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 12/	11/ to 12/
Furnace coke .....	13/ to 13/6	13/6

Hull.

COAL.

There has not been much variation in the market this week, the holiday having restricted operations. This has been due mainly to the fact that the pits will be laid idle. As to the freight market, operations are firm on the basis of 5s. Hull-Cronstadt and 9s. Hull-Genoa. The following are the approximate prices for prompt shipment, f.o.b. at Hull:—

	Current prices.	Last week's prices.
Approximate prices for prompt shipment f.o.b. Hull, &c.		
South Yorkshire:—		
Best steam hards.....	16/3 to 16/6	16/3 to 16/6
Washed double-screened nuts .....	15/3 to 15/6	13/3 to 13/9
Unwashed double-screened nuts .....	13/	13/
Washed single-screened nuts .....	13/ to 13/3	13/6 to 13/9
Unwashed single-screened nuts .....	12/6	13/
Washed smalls.....	10/6 to 10/9	10/6 to 10/9
Unwashed smalls.....	9/ to 9/6	9/ to 9/6
West Yorkshire:—		
Hartleys .....	13/3 to 13/6	13/3 to 13/6
Rough slack .....	10/9 to 11/	10/9 to 11/
Pea slack .....	9/9	9/9
Best Silkstone screened gas coal .....	13/3 to 13/6	13/3 to 13/6
Best Silkstone unscreened gas coal .....	13/	13/
Derbyshire and Notts:—		
Best steam hards .....	15/6	15/6
Do. (Grimsby) .....	15/ to 15/3	15/
Derbyshire nuts (doubles) .....	13/	13/6
Derbyshire nuts (doubles) (Grimsby).....	12/9	13/ to 13/3
Derbyshire large nuts ...	14/ to 14/3	14/3 to 14/6
Do. do. (Grimsby) .....	13/9 to 14/	14/
Nottinghamshire hards ...	15/6	15/6
Do. do. (Grimsby) .....	15/ to 15/3	15/0

Chesterfield.

COAL.

There is very little business passing in house coal just now, the warm weather having caused a considerable falling off in the demand. The outlook, however, is good for a satisfactory autumn and winter trade. The bulk of the expiring contracts have been renewed at an average advance of 1s. per ton. The pits are working better than they have done at this period of the year for a long time past. Stocks are also abnormally low. There is no slackening of the demand for fuel for manufacturing purposes and prices are well maintained. It is quite probable that a renewed demand for this class of fuel will set in after the holiday season. There is no great pressure at the moment for slack for boiler firing, owing to the temporarily reduced requirements of the Lancashire cotton mills, many of which are closed for the customary holidays. With the resumption of work, the position will rapidly change and some difficulty will be experienced in coping with the demand. Prices for current delivery are firm, while for contracts for forward execution, 1s. per ton advance is insisted upon. Steam coal for export is now in brisk demand and supplies are more difficult to obtain than has been the case at any time during the present season. Prices are very firm, and are fully 3d. per ton higher on the week. To-day's price of best Derbyshire Top Hards is 15s. 6d. to 15s. 9d. per ton delivered free alongside steamer at Grimsby. There is a well-sustained demand for cobbles and treble-screened nuts for near Continental ports and a substantial tonnage is going forward. Washed nuts are busily enquired for and the

whole production of this fuel is readily taken up. Washed slack, however, is quiet, in sympathy with other kinds of slack. The coke market continues dull. The demand is much restricted and prices continue weak. Until there is an improvement in the pig iron market, matters will not be any better. Coking fuel is now in quite sufficient supply to meet the requirements of the ovens.

IRON.

There is no change in the condition of the iron trade, which continues very quiet. With regard to forward business, there is, if anything, a slightly better enquiry for pig iron, which indicates a possible improvement with the close of the holiday season. This applies equally to the finished iron branch of the trade. Old orders are now being rapidly worked off and some anxiety is felt with regard to new work, which is becoming more difficult to secure.

	Current prices.	Last week's prices.
Prices at pit.		
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

Nottingham.  
COAL.

The approach of Bank Holiday week has caused a little more activity in the coal trade of Notts, but apart from this the general tone is much the same as a week ago. In the domestic fuel section, the recent spell of warm weather had a detrimental effect on the demand, which is slow at the landsale depots, and local merchants are experiencing a quiet time. With stocks accumulating, some of the collieries are having recourse to shorter time, but it is hoped that an improvement will set in following the holidays. There has been no particular change in the condition of the steam coal branch, except that larger supplies on contract account have been requested in view of next week's stoppage. Industrials are in moderate request, and the amount of fuel which is being sent away for shipment is about up to the average for the end of July. The position in regard to slacks is weakening, and in some cases where stocks are increasing, slightly easier rates are conceded, but generally speaking, owners are holding out for recent prices. Gas coal is in fair demand, quotations being practically unchanged.

	Current prices.	Last week's prices.
Prices at pithead.		
Hand-picked brights .....	12/ to 13/	12/ to 13/
Good house coals.....	11/ to 12/	11/ to 12/
Secondary do. ....	10/ to 11/	10/ to 11/
Best hard coals .....	11/6 to 12/6	11/6 to 12/6
Secondary do. ....	10/6 to 11/	10/6 to 11/3
Slacks (best hards).....	8/3 to 8/9	8/3 to 9/
Do. (seconds) .....	7/3 to 7/9	7/3 to 8/
Do. (soft).....	7/3 to 8/	7/3 to 8/3

Leicestershire.  
COAL.

The average amount of business being transacted in this district is not bad considering that we are in midsummer. There is a continued fairly good demand for steam coals of all sorts, and a little more movement for household coals. There is, as may be expected, no urgency in the demand for any coal, but it is satisfactory to experience a steady though quiet run of business. There is a movement noted in the better qualities of household coal and local merchants are rather busier, consumers being somewhat inclined to buy. At the same time the demand for steam coal and slacks is maintained, the factories generally being fully employed. The pits will make fairly good time this week, and will generally close down on Friday for the holidays. There is not any special holiday demand for delivery. The general aspect of business is not discouraging. Some collieries have rather heavy stocks on hand, but others are light, at any rate there is no abnormal accumulation, and a revival in the enquiry is anticipated at no distant date. Quotations remain fairly firm, and there is no general disposition to take a less price, though some weakness is apparent to lift stocks.

South Staffordshire, North Worcestershire  
and Warwickshire.  
Birmingham.  
COAL.

Thursday's market was stagnant, and the pits will be closed until Wednesday, and in some cases Thursday of next week. Prices remain as under:—

	Current prices.	Last week's prices.
Prices at pit.		
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep .....	16/6	16/6
Do. best shallow .....	14/6	14/6
Do. seconds do. ....	13/	13/
Best hard .....	14/	14/
Forge coal.....	11/	11/
Slack .....	8/6	8/6
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked cobs .....	13/9	13/9
Best hard spires .....	14/6	14/6
Forge (steam) .....	10/	10/
D.S. nuts (steam) .....	9/6	9/6
Small (do.) .....	8/6	8/6

IRON.

Despite a small attendance a hopeful tone pervaded the market, and steady business is looked for after the holidays



Last week marked bars have been reduced by 10s. a ton, the basis now being £9 10s. for B.B.H. Crown and Lion brands, with 12s. 6d. extra for the Earl of Dudley's L.W.R.O. Crown and 20s. extra for John Bradley and Co.'s S.C. Crown. The announcement caused no surprise, and as a matter of fact has already been discounted. Apart from this the returns of the Midland Wages Board for May and June are in themselves sufficient to prevent any further fall in the other branches. Contrary to expectations the figures do not permit of any reduction in wages, which, including the bonus of 6s. a ton, remain at 11s. 3d. for puddlers. The selling price works out at £8 7s. 11d. a ton, which is only 10d. less than that for the preceding two months, and indicates that the firms on whose sales the returns are based have been working on substantial contracts booked previous to the slump. The effects of the strike are shown in the output, which for the months under notice amounts to 29,917 tons, a drop of 2,547 tons, confined entirely to strips and hoops. The output for the corresponding months of 1912 were 43,494 tons. A welcome feature of the finished branches is the revival in galvanised sheets. The tonnage recently booked for India runs into many thousands, and this is accompanied by a distinct improvement in the South American market. All the large houses have made large additions to their order books, and substantial lines have also been picked up by smaller concerns. The result is reflected in the stiffening of quotations, the minimum now being £11 per ton ranging up to £11 10s., according to order for export trade, f.o.b. Liverpool. Unmarked bars of good quality are in slow demand at £7 12s. 6d. to £7 15s. delivered Birmingham, and common iron remains at £7 7s. 6d. to £7 10s. Foreign competition is eased somewhat by a recent advance in Continental prices. Lancashire bars, which have stood at £8 15s. nominally for a considerable time, have been officially reduced to £8, and Yorkshire bars will probably follow suit. The best that can be said of pig iron prices is that they are no weaker. It seems to be recognised that the bottom has been reached. Northamptonshire forge averages about 52s. and 53s., Derbyshire 56s., and South Staffordshire common 52s. 6d.; part mine 56s. and 57s. Steel sections have not been altered, with the exception of joists, which have dropped 10s. a ton. The basis is now £7. Billets and sheet bars are unchanged.

**Rednesford.****COAL.**

The coal trade of the Cannock Chase district is keeping up fairly well, and the collieries are working more regularly this week, but this is due to some extent to the proximity of the August holidays, when they will probably be standing for the first three days of the week. Prices are about the same as when last reported. The demand for house coal is quiet, but not unusually so for the time of the year. For coal for manufacturing purposes, the enquiry is keeping up fairly well, and slack is in good request. There is not much doing at the landsale depots.

**Forest of Dean.****Lydney.****COAL.**

Much warmer weather has prevailed since last writing, but it is satisfactory to note that the demand for the house coal of this district is well maintained, and the collieries for the most part are engaged up to five days in the week. Stocks are rather below the summer average. Good shipments are made. Steam coals continue to sell well, and stocks are practically nil. All the pits are in full work.

Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	16/6	16/6
Forest .....	15/6	15/6
Rubble .....	15/9	15/9
Nuts .....	14/	14/
Rough slack .....	10/	10/
Steam coal:—		
Large .....	13/6 to 14/	13/
Small .....	10/ to 10/6	10/ to 10/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

**Devon, Cornwall, and South Coast.****Plymouth.****COAL.**

Messrs. W. Wade and Son report that there has been no animation in the south coast wholesale coal trade during the past fortnight, and imports have been unusually restricted. Whatever current business has been transacted has been in temptingly cheap cargoes, but buyers generally decline to entertain contract offers of house coal that may be based on anything like present prices. A few steam coal contracts have been arranged at considerably higher rates than last year's. Freight for steamers remain at last quotations, with a sufficient number on offer, but sailing colliers are rather scarce for the time of the year.

**D. Davis and Sons**—The directors have paid an interim dividend at the rate of 10 per cent. per annum upon the ordinary shares of the company, together with a bonus at the rate of 2½ per cent. per annum, in respect of the half-year ended June 30 last, both free of income tax; and also a dividend of 6 per cent. per annum upon the preference shares for the same period, less income tax.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—R. Wiggins and E. J. Storton, carrying on business as coal merchants, at Pitsford and Brampton Station and Althorp Park Station, in the county of Northampton, under the style of Browning and Storton; F. C. Fedden and E. Levinsohn, carrying on business as merchants and shipbrokers, at Milburn House, Newington, N. York, under the style of Fedden Brothers; and J. J. Oakes, James Oakes and W. Oakes, carrying on business as brick, tile and pottery makers, at Darley Dale and Coal Brick and Tile Works, both at Farnworth, under the style of James Oakes.

**THE LONDON COAL TRADE.**

THURSDAY, JULY 31.

The London coal trade for the past week has shown very little change from the chronic inactivity of the preceding weeks. Occasionally a slight spurt is experienced in the market, arising from the fact of a little more speculative buying from the factors, but merchants generally are content to wait until the colder weather sets in and the general consumption becomes more apparent. Those merchants who have steadily refused to renew the contracts at the recognised 1s. advance are finding their stocks for the usual descriptions of fuel very low, but it has been a good harvest for less-known qualities, and also for the cheaper classes of coals, which have been taken somewhat freely in the hope of being able to replace the coals usually sold. As, however, the winter months draw nearer, the difficulty of substituting other coals for those used for so many years will make itself more felt. Meanwhile the actual war against the proposed 1s. advance is as keen as ever, and collieries are beginning to realise the fact that they will have more than the usual quantity to sell in the open market during the winter months. Many collieries have, however, for years past refused to enter into contracts for the winter, and it has been a recognised fact that contract prices as a rule during the winter months are lower than the open current market prices, especially if the winter proves to be a severe one. The only advantage, therefore, to a colliery is to have a fixed monthly quantity to deliver in the summer months, and now that the worst two months are past—viz., June and July—the colliery representatives are not eager to enter into more contracts than are absolutely necessary. Stocks at many of the London depots are getting unusually heavy, and huge piles of coal may be seen on many of the railway sidings in and about the metropolis. The bulk of the merchants, however, have orders on hand from the general public, which will have to be delivered during the holiday season in August, and some even extending into September, so that the delivery trade, it is quite anticipated, will improve rather than diminish, notwithstanding the holiday season. House coal in particular has been quiet, but the sales of manufacturing coals continue fairly strong. Nuts and cobbles are moving very slowly, but some of the Leicestershire collieries are adapting their screens to the sizes usually required for the London trade, so as to enter the ranks against Warwickshire qualities, and as these are usually selling at lower prices than Warwickshire, some fierce competition is anticipated when the demand springs up. The seaborne market is extremely quiet. Quotations are still nominally at 21s. 6d. per ton for best Wallsend, and 20s. 6d. per ton for seconds. Thirty-two vessels were reported in the Thames for Monday's market, and eight on Wednesday. Factory requirements are falling off in anticipation of the coming cessation of work for the holidays, and, on the other hand, August is always recognised as a broken month on account of the various feasts and wakes. The shipping trade shows a distinct falling-off in tonnage, and the demand is not so firm.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/6	13/6
Do. nuts .....	12/6	12/6
Birley oube Silkstone .....	12/	12/
Do. branch coal .....	15/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	12/6	12/6
West Riding Silkstone .....	12/	12/
Kivetou Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	11/	11/
New Charlton Wallsend .....	14/	14/
Wharfedale Silkstone coal .....	14/	14/
Do. Flockton Main .....	13/6	13/6
Do. Athersley house coal .....	11/6	11/6
Newton Chambers best Silkstone .....	15/	15/
Do. Grange best Silkstone .....	14/	14/
Do. Hesley Silkstone .....	13/	13/
Do. Rockingham selected .....	13/6	13/6
Do. Rockingham Silkstone .....	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best .....	11/	11/
Do. large nuts .....	10/9	10/9
Do. small nuts .....	10/	10/
Do. kitchen coal .....	9/6	9/6
West Hallam Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Do. London brights .....	10/	10/
Do. bright nuts .....	9/6	9/6
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Shipley do. brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Mappersley brights .....	11/	11/
Do. hard steam .....	10/9	10/9
Cossall Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Trowell Moor brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Grassmoor Main coal .....	12/6	12/6
Do. Tupton .....	11/	11/
Do. do. nuts .....	12/	12/

**Derbyshire—(cont.).**

	Current prices.	Last week's prices.
Clay Cross Main coal .....	12/6	12/6
Do. do. cubes .....	12/	12/
Do. special Derbys .....	11/9	11/9
Do. house coal .....	11/	11/
Pilsley best blackshale .....	12/6	12/6
Do. deep house coal .....	10/6	10/6
Do. hard screened cobbles .....	10/	10/
Hardwick best Silkstone .....	12/6	12/6
Do. Cavendish brights .....	11/6	11/6
Do. cubes .....	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/	12/
Do. small hards .....	11/	11/
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	12/	12/
Do. cobbles .....	12/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/	14/
Bestwood hard steam coal .....	12/	12/
Do. bright cobbles .....	11/3	11/3
Hucknall Torkard main hards .....	12/3	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. .....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/	12/
Do. hard steam .....	10/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/9	11/9

**Warwickshire.**

	Current prices.	Last week's prices.
Griff large steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	11/	11/
Do. loco Two Yard hards .....	14/	14/
Do. Ryder nuts .....	11/6	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Haunohwood steam .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Exhall Ell coal spires .....	12/6	12/6
Do. large steam coal .....	10/9	10/9

**Leicestershire.**

	Current prices.	Last week's prices.
Snibston steam .....	10/6	10/6
Do. cobbles .....	10/3	10/3
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/6	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	17/	17/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	10/	10/
Do. large nuts .....	10/	10/
Do. bakers' nuts .....	9/6	9/6
Do. Main nuts .....	10/	10/
Do. hards .....	9/6	9/6
Granville New Pit cobbles .....	11/6	11/6
Do. Old Pit cobbles .....	10/6	10/6

**North Staffordshire.**

	Current prices.	Last week's prices.
Talk-o'-th'-Hill best .....	13/6	13/6
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	15/	15/
Do. cobbles .....	14/	14/
Apedale best .....	13/6	13/6
Do. seconds .....	13/	13/
Podmore Hall best .....	13/6	13/6
Do. seconds .....	13/	13/

**South Staffordshire (Cannock District).**

	Current prices.	Last week's prices.
Walsall Wood steam coal, London .....		
Do. brights .....	13/	13/
Do. shallow one way .....	12/	12/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	11/	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/	12/
Do. one way .....	12/	12/
Do. shallow coal .....	12/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles .....	12/	12/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	12/6	12/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/	11/

**From Messrs. Dinham, Fawcett and Co.'s Report.**

Friday, July 25.—The seaborne house coal market continued quiet to-day, with no cargoes on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 23.

Monday, July 28.—The seaborne house coal market was very quiet to-day, with no cargoes on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 32.

Wednesday, July 30.—The seaborne house coal market continued very quiet to-day, no transactions reported. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 8.

At a meeting of the Normanton Urban Council on Tuesday, it was decided to apply to the Local Government Board to borrow £16,475 for the erection of 76 houses under the Housing of the Working Classes Act.



## LABOUR AND WAGES.

## North of England.

The votes of the Northumberland miners' lodges on the question of moving for, alternatively, the abolition or modification of the three-shift system in operation at a number of collieries in the county, were counted on Saturday at the Burt Hall, Newcastle. The result is declared to be a substantial majority for modification.

The quarterly meeting of the Cumberland Miners' Association was held at Workington on Thursday the 24th ult. The question of an annual summer holiday was considered, and the resolution, "That all the pits in the county have a week's holiday in the summer," was carried unanimously. It was decided to make arrangements for carrying it out next year. It was agreed to bring before the Cumberland Coal Conciliation Board, a demand that the standard rate of mechanics shall be 5s. per day, plus current percentage, and that all surface labourers and handlers of coal shall be paid 4s. per day, plus current percentage. The question of the surfacemen's representation was deferred.

## Federated Area.

A conference on the wages of all the men and boys employed on the surface at the collieries in St. Helens, Haydock, and district, was held, on the 23rd ult., at St. Helens. The scale of prices paid in the Leigh and Tyldesley district was asked for, these being an increase of from 7d. to 10d. per day on the different grades at the St. Helens pits. The matter was debated thoroughly, and at the conclusion the mineowners' representatives asked for time to consider the proposal. The conference was adjourned to August 15.

The result of a ballot of miners in North Staffordshire Federation on the question of non-union labour has resulted in an overwhelming majority in favour of giving 14 days' notice to terminate contracts with the object of forcing all non-union miners into the Federation. The figures are—In favour of giving notice, 16,874; against, 841. A delegate meeting, representing all lodges in the North Staffordshire coalfield, was held at the Miners' Hall, Burslem, on Monday, when it was arranged to hold a special meeting in about three weeks' time to decide the date and method of giving notices.

At a meeting of Lord Ellesmere's miners employed at the Ellesmere Colliery, Walkden, near Manchester, held on Thursday, July 24, who came out on strike on the previous Tuesday, alleging that they were insufficiently paid for working abnormal places, it was stated that temporary terms had been arranged between his lordship's officials and the men's representatives, and it was agreed that the men should restart (on Monday) this week. Independent witnesses are to visit the places complained of.

## Iron, Steel, and Engineering Trades.

The notice issued by the Workington Iron and Steel Company dispensing with the services of the workmen at the Solway Ironworks, Maryport, on a seven days' notice, has been withdrawn owing to the strike of limestone quarrymen at Rowrah having been settled. Another notice, however, has been posted, to the effect that all the workmen would be on day to day engagement until further notice.

At the annual conference of blastfurnacemen, ore miners, and kindred trades, at Scarborough, on the 3rd ult., the question of the abolition of Sunday labour at blastfurnaces led to a long discussion. The opinion was generally expressed that such wages should be demanded for Sunday labour as would make it unprofitable to employers, and a resolution was adopted strongly urging the necessity of the abolition of Sunday labour. Ald. Wallis, of Workington, the general secretary, reported that the membership of the Federation had increased by about 1,600, and was now 12,644. Wages during 1912 had increased in the Cleveland and Durham districts by 16 per cent.; in the Cumberland and Lancashire district by 24½ per cent.; in the Midland district (Staffordshire) by 14½ per cent.; in the Eastern Midland (Lincolnshire) by 16½ per cent.; and in the South Wales district by 6½ per cent.

The half-yearly meeting of the Board of Conciliation and Arbitration for the Manufactured Iron and Steel Trade of the North of England was held at the Station Hotel, Newcastle, on Monday. Mr. W. Thackray, of Sunderland, presided. The standing committee reported a decrease of two in the number of works connected with the Board since the last report was presented six months ago. This was due to the closing of the Moor Works in March last, and of the Richmond Works within the past two weeks. The membership was now nine works, owned by seven firms. The average number of operative subscribing members during the past half-year, or some part thereof, had been 4,346, as compared with 4,269 in the previous six months, an increase of 77. Three ascertainties of the average net selling price of finished iron had been received since the last report. The particulars of the same, and the effect upon wages under the sliding scale, are shown in the following table:—

Period.	Tons.	Average net selling price.	Effect upon wages under sliding scale.
		£ s. d.	
Two months ended			
Dec. 31, 1912 ...	12,437 ...	7 1 9.38 ...	No change.
Feb. 28, 1913 ...	13,503 ...	7 7 3.89 ...	2½ p.c. advance.
April 30, 1913.....	13,009 ...	7 10 2.82 ...	2½ p.c. advance.

The wages of steel millmen at those works governed by the operations of the sliding scale that specially applied thereto were advanced 2½ per cent. from the beginning of April last, and 2½ per cent. from the beginning of the present month.

The dispute between the Sheffield moulders and Messrs. Edgar Allen's works at Tinsley over the employment of non-union labour culminated on Monday night in a general strike of moulders throughout Sheffield.

This extreme action will affect about 1,200 moulders and 180 coremakers, and may bring out the pattern makers.

The secretaries of the Midland Iron and Steel Wages Board announce that the returns for May and June show that puddlers' wages and all other mill and forge wages must remain without alteration from August 4 to October 4. The total puddling rate, including bonus, will continue at 11s. 3d. per ton. The new average selling price is £8 7s. 11.78d. This is a reduction upon last return of 10d. per ton. Sales amounted to nearly 30,000 tons, or 2,500 tons reduction.

## Federation of General Labourers.

Another great trade union fusion scheme, involving a membership of about 250,000 and total funds which will aggregate to something like £50,000 at the outset, is on foot. The attempt that is about to be made is one having for its object the amalgamation of ten unions of mostly unskilled men employed in from 70 to 80 different trades. One of the reasons advanced for the junction of forces is the repeated attacks made upon their membership by certain unions of skilled workmen. The labourers' unions complain that they have organised certain classes of semi-skilled workers that years ago the skilled unions refused to touch, and now the latter are endeavouring to take the semi-skilled men from the societies which organised them. It is understood that two schemes have been formulated—one for immediate and definite amalgamation and the other a modified scheme which provides for partial fusion in the near future with complete amalgamation probably later—the partial scheme being intended to work up to a complete one.

## Miners' Federation of Great Britain.

The special conference of the Miners' Federation which has been called to consider the wages and conditions of surface workers, and the three-shift system in Northumberland, was opened in the Westminster Palace Hotel, London, on Tuesday. As regards the former question, a joint meeting of coalowners and men representing the West Yorkshire coalfield is being held at Leeds to-day (Friday), and with negotiations going on in other districts it was thought likely that the Congress would decide to continue these negotiations instead of advising drastic action in the form of a strike. In some of the larger districts of the Federation considerable progress has been made towards an amicable settlement of the question. The basis is also being laid for future peace in the coalfield by an arrangement under which wages of men and boys employed on the surface will automatically rise and fall with those of the underground workmen, with the same safeguard of a minimum wage. This provision exists in the agreement which has been made in the South Yorkshire coalfield by the National Federation of Colliery Surface Workers and the South Yorkshire Coal Trade Association. Clause 3 of this agreement provides that the basis wage of all able-bodied men over 22 years of age shall not be less than 3s. 7d. per day plus 17½ per cent. to rise and fall as regards those employed as banksmen and screenmen and manipulators of coal at the same rate as miners are raised or lowered by the decision of the Conciliation Board, those otherwise employed to be raised or lowered 3 per cent. for every 5 per cent. rise or fall in miners' wages. The agreement represents a minimum wage, of 1s. 2d. per day for boys beginning work at 13 years of age, and of 4s. 2d. for adult workmen. The present wage with the three advances added represent a wage for boys at 13 of about 1s. 6d. per day, with advances each half-year up to the adult wage, when the wage will be about 4s. 9d. per day. In Lancashire, agreements have been signed at nearly half the collieries in the county, with wages at the present level for boys of about 2s. per day, and for men of about 5s. per day—the figures asked for in the Minimum Wage Act of last year. In South Wales, agreements have been made at a number of collieries which represent a considerable advance. In these cases the basis wage for adult surface workers has been raised from 2s. 8d. to 3s. 4d. per day, which, on the existing percentage, is equal to a wage of 5s. per day. The wages of boys have been increased from 1s. 6d. to 2s. per day. There is still a large number of collieries at which agreements have not been effected.

Mr. R. Smillie (Scotland), president, was in the chair. Mr. Albert Stanley, M.P., and Mr. D. Gilmour reported at the adjournment that Mr. R. Brown, general secretary of the Scottish Miners' Federation, had reported that, owing to a strike in the Leith dockyards, 7,000 miners had been thrown out of employment. By the rules of the Federation, there is no power to grant strike pay. In view of the distressed condition of the unemployed miner, it was agreed that the executive should immediately consider the case and make such a grant as they thought necessary. The executive met later in the day and made a grant of £1,250, with a weekly grant of £250, so long as the stoppage continues.

Mr. W. E. Harvey, M.P. (Derbyshire), reported with regret the serious condition of his colleague, Mr. Jas. Haslam, M.P. for Chesterfield. The president proposed a vote of sympathy with Mr. Haslam and his family, which was passed. It was stated that Mr. Haslam, M.P., was among the founders of the Federation, and had throughout taken a leading part in its administration.

The delegates then considered the draft rules for the taking of a ballot under the Trade Union Act, 1913, for the formation of a political fund. The rules, when sanctioned by the Chief Registrar, will authorise the expenditure of money on (a) the payment of any expense incurred either directly or indirectly by a candidate or prospective candidate for Parliament or to any public office, on (b) the holding of any meeting or the distribution of any literature in support of any candidate, (c) on the maintenance of any person who is a member of Parliament or who holds a public office (d) in connection with the registration of electors or the selection of a candidate, and (e) on the holding of

political meetings. The draft rules have been prepared in full accord with the new Act, and there is not expected to be any difficulty in the way of their registration.

The conference was resumed on Wednesday. The consideration of the surface workers' question proved to be one of unusual difficulty. The difficulty was in selecting any one proposal which would bring the Federation into a straight line and on which united action could be taken. The proposal which met with the most favour was one asking for a general advance of 15 per cent. in the wages paid to men working on the surface of the pits. The position is somewhat complicated by the fact that in the new agreements which have been signed at the collieries in South Yorkshire, at nearly half the collieries in Lancashire, and at a number of collieries in South Wales, advances equal to this sum have been conceded by the coalowners. It was agreed to press for an immediate advance of 15 per cent. at all those collieries at which agreements have not so far been obtained, and the agents in the various districts will now communicate with the employers for joint meetings to consider proposals on these lines. The reports as to the results of the negotiations outstanding are to be sent to Mr. Thomas Ashton, secretary of the Federation by August 30.

The executive reported that they had agreed to make a grant to the Lothian miners who have been thrown out of employment by the Leith dock strike of £1,250 and with a payment of £250 per week so long as the strike continues. The decision of the executive was confirmed.

Mr. J. Ramsay Macdonald, M.P., attended the conference for the purpose of making an appeal to the Federation on behalf of the *Daily Citizen*. A resolution was passed, "That this conference strongly recommends the Federation to invest in the *Daily Citizen* a sum equal to 1s. per member per annum for three years and that we seek fair representation on the board of directors. Further, that the decision of the districts be sent into Mr. Ashton within four weeks of this date.

The resolution carried on the surface workers' question was in the following terms:— "This conference hereby confirms the resolution passed at the annual conference of the Federation held at Swansea last year in connection with the necessity for fixing a minimum wage of not less than 5s. per day for surface workers; but in view of the immediate need for steps being taken to improve the condition of this class of labour, we claim at once an immediate increase of 15 per cent. on the rate of wages prevailing in February 1912, for surface workers who are members of this Federation. Where since February 1912 separate advances have already been obtained other than the general advance secured under the various wages boards agreements, we seek the additional amount that may be necessary to bring the separate advances up to 15 per cent. Further, as a Federation, we endeavour to get these workmen included in the Minimum Wage and Eight Hours Acts. That in order to put this resolution dealing with the surface workers' wages into operation, representations of all districts seek immediate interviews with their employers with a view to securing this advance, and reports be forwarded to the general secretary not later than August 30."

The conference also discussed the three-shift system which has been in operation in Northumberland since the coming into operation of the Mines (Eight Hours) Act. Messrs. R. Smillie (president), W. G. Harvey, M.P. (vice-president) and T. Ashton (secretary) have been co-operating with the representatives of the Northumberland miners in joint meetings with the owners, trying to get these grievances remedied. These negotiations are still in progress, and the conference authorised the officials to continue to render what assistance they could in the matter.

## THE BY-PRODUCTS TRADE.

*Tar Products.*—Things are decidedly quiet, and prices almost without alteration. Benzols still hold well, and seem likely to remain a fairly steady market for some time to come. Pitch firm, but rather slow to move. Carbolic acids are weak, both crude and crystals. Naphthas quiet. Creosote steady. Nearest closing values are:—

Benzols, 90's .....	1/ to 1/0½
Do. 50's .....	1/0½
Do. 90's North .....	1/1½ to 1/1¼
Do. 50's North .....	1/10
Toluol .....	1/1¼
Carbolic acid, crude (60 per cent.) .....	1/3 to 1/3½
Do. crystals (40 per cent.) .....	4/4
Solvent naphtha (as in quality and package) ...	1/10
Crude ditto (in bulk) .....	5/
Creosote (for ordinary qualities) .....	3/
Pitch (f.o.b. east coast) .....	40/6 to 41/6
Do. (f.a.s. west coast) .....	40/ to 41/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually easels included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

*Sulphate of Ammonia.*—There is little, if any, change in position. For forward there is neither business nor enquiry of any account, but sellers are very firm in their ideas, holding well in expectation of a quickening in demand in the near future. Closing prompt prices are:—

London (ordinary makes) .....	£12/3/9
Beckton (certain terms) .....	—
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Nitrate of soda (ordinary) per cwt. ...	10/6

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]



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(A Classified List appears on page 244.)

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\*\* For other Miscellaneous Advertisements see Last White Page.

## Forthcoming Annual Meetings.

International Geological Congress—	August 21, 1913 (Toronto)
North of England Institute of Mining and Mechanical Engineers ...	August 2, 1913
Manchester Geological and Mining Society—	October 14, 1913
Institution of Mining Engineers—	Sept. 24, 25 & 26, 1913 (Manchester)
Midland Counties Institution of Engineers, Sept. 1913	
South Staffordshire and Warwickshire Institute of Mining Engineers ...	October 20, 1913

## The Colliery Guardian.

LONDON, FRIDAY, AUGUST 1, 1913.

The jury's verdict on the recent accident at the Carhouse Colliery, in which eight men were killed by an inrush of water, was that the accident was due to the advance boreholes missing the water-logged workings, that the system of boreholes employed was not sufficient and there was an error of judgment, but no negligence on the part of the management.

In the House of Commons, on Wednesday, the First Lord of the Admiralty gave the assurance that the best means of securing the development of shale and other home sources of crude oil was receiving, and would continue to receive, very careful consideration.

The summer conference of the Institution of Mechanical Engineers was opened in the Senate House at Cambridge on Tuesday.

A Bill has been introduced in the House of Commons to amend the law relating to feus and leases for building in Scotland and to secure compensation for injury caused by mineral works.

In the House of Lords, on Monday, judgment was given in an appeal arising out of the case of *Daff v. Midland Colliery Owners' Mutual Indemnity Company Limited*. The question was as to whether the respondents were liable to continue



the payment of compensation after the default, as contributors, of the company employing the workman. Judgment was given reversing the decision of the Court of Appeal, from which the workman had appealed.

Mr. H. S. Witty, of Denaby Main, has been appointed general manager of the Thrybergh Hall Colliery.

The Miners' International Congress at Carlsbad came to a close last week. No discussion took place on the schemes put forward by the various sections for the regulation of the output. A resolution was carried in favour of the nationalisation of mines, land and railways. An important announcement as to the future policy of the miners of the United Kingdom was made by Mr. Albert Stanley. He said that on the termination of the existing wage agreements, in 1915, a determined effort would be made to have a uniform Board for the whole of the United Kingdom.

The proxy vote of the Northumberland miners' lodges upon the question of the abolition or modification of the three-shift system shows a majority in favour of the modification of the system.

The annual meeting of the North of England Institute will be held at Newcastle to-morrow (Saturday). Papers by Mr. Samuel Dean and Prof. Thornton will be read. An excursion to the Nenthead mines will be held on Friday next.

A fine of £65 was imposed by Sheriff Shairp at Ayr Sheriff Court on Wednesday on John Barr, colliery proprietor, for various contraventions of the Coal Mines Regulation Act in respect of the Maxwell Coal Pit, Dailly. The defendant unsuccessfully pleaded that he had not engaged in the technical management of the mine.

The representatives of the owners met the Home Office authorities on Wednesday with reference to the new baths regulations.

An Order has been published containing the new General Regulations, which are to come into force two months from July 10. The text of the regulations is given as a supplement to this issue of the *Colliery Guardian*.

An important conference of the Miners' Federation of Great Britain to consider the three-shift system in Northumberland and a general price list for surface workers. Difficulty was experienced in formulating any general proposal on the latter point. To-day representatives of the West Yorkshire owners meet representatives of the various unions affected.

Meetings of the Royal Commission on Metaliferous Mines and Quarries were held on Tuesday and Wednesday, July 29 and 30, at Winchester House, 21, St. James's Square, S.W. The Commission had their report under consideration.

A statement circulated that the Government are appointing a Royal Commission to enquire into labour unrest is now stated to be incorrect. The question of labour unrest has been under consideration by a Committee of the Cabinet, which has temporarily suspended its sittings. It will, it is understood, resume its work when the report of the Industrial Council on the matter has been received. This report has just been issued as we go to press.

Lord H. Cavendish-Bentinck this week brought in a Bill to amend and extend the Truck Acts, 1831 to 1896. He stated that the promoters of the measure wished to sweep away all fines and deductions from wages.

The House of Commons Committee, on Wednesday, gave their decision on the Bill of the Cardiff Railway Company, which was to the effect that the maxima rates for shipping,

wharfage and tonnage should be raised 1½d. per ton. This is considerably less than the increase asked for by the company, but is an important concession in principle.

The trimmers at Tyne Dock have decided to stop work at noon to-morrow.

We regret to announce the death of Mr. James Haslam, M.P., one of the founders and first general secretary of the Derbyshire Miners' Association.

By agreement between the parties concerned, the code of General Regulations, which have been the subject of a statutory enquiry, held by Lord MERSEY under section 86 of the Coal Mines Act, 1911, will come into force two months after the date of their first publication in the *London Gazette*. The Regulations have been made by the SECRETARY OF STATE under the date of July 10, 1913, and notice thereof was published in the *Gazette* on July 15 following, and will accordingly come into operation (except as regards signalling) on September 15 next.

These Regulations embody an attempt which has been made by Parliament to secure uniformity of administration throughout the coalmines of the kingdom in respect of the conduct and guidance of the persons acting in the management or employed in or about the mines, as may appear best calculated to prevent dangerous accidents and provide for the safety, health, convenience and proper discipline of the persons so employed, but time alone can show if the experiment is feasible. Uniformity, no doubt, possesses many charms, but it is often the refuge of the feeble, and its application to a complex and dangerous industry is viewed with distrust and alarm by many who possess an intimate knowledge of the intricacies of mining. Englishmen are, however, generally speaking, a law-abiding race, and history leads to a belief that now that the General Regulations have become the law of the land, every reasonable endeavour will be made to comply with them, provided that sufficient time is given for the purpose.

The change is a great one—much greater, probably, than appears at first sight—and undue haste in attempting to put the new Regulations into operation may be attended in many cases by fatal results, both to life and property and to the welfare of the industry itself. It is therefore to be devoutly hoped that the Government will show patience and moderation especially in the earlier stages of their introduction, and will exercise discrimination between honest endeavour to carry out the new law and passive resistance. Colliery owners and their managers must perforce go slowly, in order that they may recognise a new and unsuspected danger before it is too late and the step has become irrevocable. An illustration of this is afforded by the decided views of the witnesses at the recent enquiry, in reference to Regulation 91, as to the construction of stoppings.

In giving evidence at the enquiry, Mr. W. C. BLACKETT stated that he had devoted a considerable part of his life to the subject of stoppings, and that he wished everyone to believe that what he said was his honest conviction and with a view to general safety. The whole of Mr. BLACKETT's experience, which included personal knowledge of the Trimdon Grange, Tudhoe, Wingate Grange, Washington, Whitehaven, West Stanley, and other explosions, was to the effect that it was due to the giving way of stoppings that so many men had been rescued, and that unless these stoppings had given way, the death-rate

would have been greater than it was. The learned referee, Lord MERSEY, agreed with Mr. HOLLAND, one of the witnesses, that the nature and extent of the stoppings should be left to the judgment of the management of the mine so that each case might be dealt with on its merits, but in view of the fact that section 42 of the Act itself required that all stoppings between main intake and main return airways should so far as practicable be constructed as not to be liable to be destroyed in the event of an explosion, his lordship was powerless in the matter.

The new Regulations will inevitably cast a heavy additional burden upon coalowners, and materially affect the margin between prices and cost of production. The coal trade has no doubt recently experienced a period of prosperity, but there are already signs of the tide having reached its flood. Wages are practically at a maximum, and difficulties are sure to arise in their readjustment with the less prosperous conditions of trade which usually follow good times. It is clear, therefore, that the near future would be most inopportune for the stringent and hasty enforcement of new regulations affecting the conditions of coalmining, and that a policy of moderation on all sides is absolutely essential. In giving the HOME SECRETARY facilities for revoking, altering, or adding to Regulations made under section 86 of the Coal Mines Act, 1911, Parliament implicitly admitted the principle of trial and error in making Regulations, and it would, therefore, be inconsistent to administer them as if they were "the law of the Medes and Persians, which altereth not." The maximum of safety consistent with the economical prosecution of a national industry must be to the ultimate benefit of all concerned, and if more credit were given to a wider recognition of this fundamental principle, much unnecessary legislation would be avoided.

#### Trade Summary.

The London coal trade continues very quiet, especially for all household qualities. Slightly increased buying has been noticeable during the week, but stocks at nearly all the London depots are rapidly increasing. Public orders are reported fairly strong for delivery during August and September, so that a fair depot trade is anticipated. Manufacturing qualities are selling more freely, but nuts and cobbles and all classes of smalls are exceedingly slow. The shipping trade has fallen off, and prices for all descriptions of fuel are weak. With the turn of the month a firmer tone is anticipated, and a lessened output on account of holidays, wakes and feasts.

The market at Newcastle has not undergone any marked change. Best steams, gas coals and bunkers are firmer. Small steams and coking coals are weak, and trade is dull.

The Durham coal trade is brighter, there being an active enquiry on all sides. This especially applies to gas coals. Coke is weak.

The Lancashire house coal trade continues quiet. There is a rather lessened demand for screened forge and manufacturing coal. Shipping business is a fair average. There is some surplus of stocks.

Business in West Yorkshire is dull, but, in anticipation of the holidays, stocks have been drawn upon to some extent. There is a strong export demand in South Yorkshire, and prices are firm. Gas coal is rather easier, and slacks are cheaper. House coal is fairly well placed for the time of year. Coke remains depressed.

Derbyshire house coal is now a drug on the market, but the situation is not unpromising. There is no slackening in the demand for manufacturing fuel, and large supplies of steam coal are being sent for export.

Chartering has been brisk at Cardiff, and there is more pressure for steam coals. The small coal market is rather firmer. Monmouthshire coals are rather better. Rhondda bituminous coals are unchanged.

The Scottish coal trade has been quiet in consequence of the annual trade holidays.

The steamship "Indian," belonging to Messrs. Leyland, of Liverpool, left Barry one day last week carrying 14,000 tons of coal, including 12,000 tons of cargo and 2,000 tons of bunkers. The steamer was loaded by Messrs. Cory Bros. and Co., Cardiff, and is bound for Rio Janeiro.







the appellant's employers, the Alma Colliery Company Limited, then in course of voluntary liquidation. In June 1898 the Alma Colliery was owned and worked by a Mrs. Elizabeth Turner, who insured with the respondents. On March 27, 1903, the colliery was acquired by the Alma Colliery Company, and the register of the members of the respondent company duly altered by inserting the name of the Alma Company in place of Mrs. Turner as the owner of the colliery. The colliery continued on the company's books as a protected mine, and the colliery company duly paid all calls and contributions down to May 26, 1911. On June 15, 1909, the appellant, John Daff, met with an accident. The accident totally incapacitated him from work, and he was paid compensation by the Alma Company under the Act at the rate of 11s. 7d. a week. On May 26, 1911, the respondent company made a call on their members, due to be paid on July 24, 1911. On that date the Alma Company went into liquidation. On July 28 the Alma Company were reminded that they were in default in the payment of the call, and on August 2, 1911, their liquidator sent a cheque in payment of the call. On August 4 the directors of the respondent company passed a resolution, under Clause 9 of their articles of association, determining the protection of the Alma Company on account of their breach of regulations in making default in payment of the call. The cheque was returned the same day. The liquidator by letter informed the company that the returned cheque was retained by him under protest. The Alma Company paid the workman compensation until October 1911. Later the workman, by section 5 (1) of the Act, claimed compensation from the indemnity company. The deputy judge decided for the respondents. The workman appealed. The Court of Appeal held, on the construction of the articles of association of the indemnity company, that the protection of the employers was validly determined, and their rights in respect of the accident to this workman were gone; the workman accordingly had no rights against the indemnity company, as he stood in the same position as his employers. Accordingly they dismissed the appeal.

Their lordships now gave judgment allowing the appeal.

Lord Shaw said he was of opinion that it was not open to the respondents, having pointed out a default, and invited and received a cheque for payment of a call, to purge this default, to adopt at a subsequent date such a resolution of determination of the membership and protection. He did not think it doubtful that the sole object in view in passing such resolutions was to endeavour to escape obligations in respect of one of its own members whose firm was by that time in liquidation; and to effect this escape on the ground of the default above-mentioned and even after the default had been purged. In his view that was a ground which in the circumstances the respondents were not entitled to take up, and this part of the defence was unavailing in law. Accordingly he moved that the judgment appealed from be reversed, and that the cause be remitted to the county court, to have the arbitration on the claim proceeded with should the parties not see their way to arrange on the question of amount. The appellant was to have his costs there and below.

Lord Dunedin read a judgment to the same effect. He said in the construction to be put upon section 5 of the Workman's Compensation Act he agreed with what was said by the Master of the Rolls and what was decided in the case of *King v. the Phoenix Insurance Company* ([1910] 2 K.B., 600). The appeal ought to be allowed.

Lord Moulton read a judgment in which he came to the same conclusion. He ended by saying that he was of opinion that at the date of the beginning of the liquidation there was a right of indemnity vested in the employers against all payments to be made to the workman in respect of the accident, and that under section 5, subsection (1), of the statute, that right passed to the workman. Their lordships had not in that case to consider the question whether the respondents could have set up against that right any set-off which at that date they might have lawfully raised against the Alma Collieries Company Limited, because there was no evidence of any sum being at that date due to them from that company. The appeal should therefore be allowed, with all costs there and in the courts below, so far as they were by the rules of court payable in view of the fact that the appellant was appealing *in forma pauperis*.

Order accordingly.

#### SUPREME COURT OF JUDICATURE.

##### COURT OF APPEAL—July 21.

Before the MASTER OF THE ROLLS, Lord Justice KENNEDY, and Lord Justice SWINFEN EADY.

#### Workmen's Compensation: Intervening Cause of Accident.

**Brown v. Kent Limited.**—This was an appeal from the Luton County Court judge sitting as arbitrator under the Workmen's Compensation Act, 1906. The applicant, Albert Brown, was employed by the respondents to clean their windows, and on March 1, 1912, he fell from a stool while doing this work and jammed his knee. On April 3, 1912, an operation was performed on the cartilage of the knee-joint. This operation was quite successful, but on April 6, 1912, he showed symptoms of scarlet fever and was removed next day to the isolation hospital. While there his knee began to suppurate and he was subsequently removed to a London

hospital, where the knee-joint had to be excised, with the result that he was left with a stiff leg which was half an inch shorter than the other. The county court judge held that the probabilities of the case went to show that the scarlet fever was the cause of the accident and that, in any case, it had not been proved that the incapacity resulted from the accident. He therefore made his award in favour of the employers. The workman appealed. Their lordships delivered judgment allowing the appeal.

Lord Justice Swinfen Eady said if the incapacity was the result of the accident, the chain of causation remained unbroken, although a fresh cause arising casually and "uninvited" by any special condition of the workman might have aggravated the original injury. Whether there existed any lowered vitality of the workman in the present case, or whether such condition did or did not invite the scarlet fever, was not material, when once it was established that the incapacity was the result of the original accident, from the direct effects of which the workman never recovered.

#### Workmen's Compensation—Third Parties' Liability.

**Bradley v. Wallaces Limited (Thompson, McKay and Co. Limited, Third Parties).**—This was an appeal by the third parties from a decision of the judge of the Huddersfield County Court sitting as arbitrator under the Workmen's Compensation Act, 1906. The applicants were the dependants of a workman called Bradley, who was a teamster in the employment of Messrs. Wallaces Limited. On December 30, 1912, the workman had occasion to bring a horse from the stable in which it was kept, in order to put it into a cart. At that time a rully came along belonging to the third parties to deliver a consignment to the employers. A chain-horse was brought to the yard by a man in the third parties' employment called Rhodes. While the horse was standing unattended, Bradley came into the yard leading his horse, and, as he passed close to the chain horse, he brushed against it and the horse kicked out and inflicted on him the injuries from which he died. The county court judge held that it was immaterial that the third parties had no knowledge that the led horse was a vicious animal, accustomed to kick mankind, that there was no contributory negligence on Bradley's part, and that as the injuries to Bradley were caused by the third parties' trespassing upon the premises of the employers by bringing the chain horse upon their premises and by their negligently leaving the horse there unattended, they were liable under section 6 of the Act to indemnify the employers for the claim brought by the dependants, and he ordered them to pay to the employers the amount of compensation awarded to the dependants and the costs. The third parties appealed.

The court allowed the appeal.

The Master of the Rolls said in substance this application must be tried as though the workman was bringing an action against the owner of the horse. In his opinion, the judgment of the Court of Common Pleas in *Cox v. Burbidge* (13, C.B., N.S., 430) was conclusive in favour of the present appellants. Chief Justice Erle in that case said the owner of an animal was answerable for any damage done by it, provided it was of such a nature as was likely to arise from such an animal, and the owner knew it. . . . The damage in the present case did not naturally flow from the trespass, and was not an ordinary consequence of the trespass. The negligence of the owner was not a vital point. The negligence could only render the owner liable for the ordinary and reasonable consequences of the negligence, and not for any damage which could not fall within those terms.

#### SCOTTISH COURT OF SESSION.

##### FIRST DIVISION.—July 19.

Before the Lord PRESIDENT and Lords KINNEAR and MACKENZIE.

#### Workmen's Compensation—Legal Notice of an Accident.

**R. Park v. Coltness Iron Company Limited.**—In an arbitration under the Workmen's Compensation Act Robert Park, oncostman, claimed compensation from his employers, the Coltness Iron Company Limited, in respect of injuries which he received on November 12, 1912, while repairing a shaft at the Ponfeigh Colliery. Sheriff-Substitute Scott Moncrieff found in law the employers had been prejudiced in their defence by the workman's delay in giving notice of the accident, which delay was not occasioned by mistake or other reasonable cause, and accordingly refused the claim. When the case was before this court previously their lordships remitted to the Sheriff-substitute to find whether the statutory notice of the accident was given by the appellant as soon as practicable. The Sheriff-substitute reported that upon the assumption that failure on the part of relatives to give intimation of the accident was immaterial, notice so far as the claimant himself was concerned—he having been ill—must be held to have been given as soon as practicable.

The Division decided that notice had been given by the claimant as soon as practicable, recalled the judgment of the Sheriff-substitute, and remitted to him to award compensation at the rate of 18s. 9d. per week for the period from November 16, 1912, till January 6, 1913, and found the appellant entitled to expenses.

In the House of Commons last week, Sir W. Menzies asked the Home Secretary whether the Coal Mines Act, in so far as it concerns the hours of winding engines in coalmines in Lanarkshire, had yet been enforced. Mr. McKenna said, in reply, that he was informed, so far as the inspectors have been able to observe, the provision of the Act as to the hours of winding engines is being generally complied with in Lanarkshire, and that only two complaints had been received by the inspectors in regard to that county from the Scottish Enginemen's Association.

#### THE WELSH COAL AND IRON TRADES.

THURSDAY, JULY 31.

##### North Wales.

##### Wrexham.

##### COAL.

As mentioned last week there is undoubtedly a spirit of unrest abroad in the ranks of the workers connected with this coalfield, and the latest innovation is the formation of a union of the dock labourers and river-side workers at various ports along the coast, where a considerable quantity of coal in the coasting trade is handled, and sent inland from vessels which loaded at the Mersey ports. Most of the collieries are very short of tonnage just now. At one colliery recently the management were compelled to cease work at three-quarter time owing to lack of empties. This the men resented, and refused to go to work the next day, but the matter was amicably arranged at a joint meeting of the management and men. The general state of the market continues to be dull, and only a small business is being transacted. In the house coal trade the weather continues unfavourable, but some further contracts have been settled for forward deliveries in the Autumn, the prices slightly favouring the buyers. The lack of tonnage is particularly keen in respect to the better class of house coal. There is a steady tone in the steam coal market, and the tonnage disposed of has been satisfactory on the whole, the bulk being taken by the railway companies on account of contracts; and also a fair quantity has been supplied to the various industrial contracts. The shipping trade has been moderately brisk, but prices are not of the best at the time of writing owing to more coal being on the market for this class of trade through the quick despatch and return of the wagons. There is little new to write in reference to gas coal. Most of the gas companies hold fairly large stocks from the expired and expiring contracts, and new contracts have not yet got running, though there are not many more to settle now. There is an average demand for slack and other small fuel, and there are no large stocks to be seen at the collieries at present. Current prices are as below.

Prices at pit f.o.r. :—	Current prices.	Last week's prices.
Best house coal .....	15/ to 16/	14/ to 15/
Secondary do. ....	14/ to 15/	13/ to 14/
Steam coal .....	12/3 to 12/9	12/3 to 12/9
Gas coal .....	13/ to 14/	13/ to 14/
Bunkers.....	12/ to 12/6	12/ to 12/6
Nuts .....	11/ to 12/	11/6 to 12/
Slack .....	6/ to 8/6	6/ to 7/9
Gas coke (at works) .....	15/ to 16/8	15/ to 16/8
Prices landsale:—		
Best house coal .....	17/6 to 18/4	18/4 to 19/2
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

##### Monmouthshire, South Wales, &c.

##### Newport.

##### COAL.

The coal trade has just passed through a quiet week, quite apart from the stoppage of work owing to the dock strike. This strike was a queer one, quite unofficial as regards the trade unions, and not caused by either hours or wages, the customary causes, but by the well-grounded belief that men's lives were imperilled through trains being worked around the docks with only one man on the rear end. However, once the parties got to grips, a settlement was swift, and work speedily resumed with mutual respect. There is at present a fair number of steamers in dock, enough to keep tips busy up to close of work on Saturday, while the reduction of output which next week's holiday will enforce upon the trade helps to steady quotations, which are fairly well marked at last week's figures. For forward business, the better grades of coal maintain present values, but secondary qualities hardly exhibit so firm a feeling. Smalls continue steady at former rates, likewise household. Pitwood rules a shade easier, sellers finding much difficulty in securing wagons. Chartering has been rather quiet in the outward freight market, tonnage more plentiful, and rates easier in consequence.

Prices f.o.b. cash 30 days, less 2½ per cent.

Steam coals:—	Current prices.	Last week's prices.
Best Black Vein large ...	17/ to 17/6	17/ to 17/6
Western-valleys, ordinary	16/6 to 16/9	16/6 to 16/9
Best Eastern-valleys .....	15/9 to 16/3	15/9 to 16/3
Secondary do. ....	15/6 to 15/9	15/6 to 15/9
Best small coals .....	7/6 to 8/	7/6 to 8/
Secondary do. ....	7/ to 7/3	7/ to 7/3
Inferior do. ....	6/6 to 7/	6/6 to 7/
Screenings .....	8/	8/
Through coals .....	13/ to 13/6	13/ to 13/6
Best washed nuts .....	13/9 to 14/3	13/9 to 14/3
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	20/ to 20/6	20/ to 20/6
Furnace coke .....	21/9 to 22/	22/ to 24/
Foundry coke .....	25/6 to 27/6	26/ to 28/

##### IRON.

The improvement recorded last week in local conditions of the iron and steel trades is well maintained, and while some works are inclined to act with considerable caution, others are now coming on the market, and a better amount of business is being done than for some months past. In all departments except the tinplate trade full time and average output are reported, and prices generally trend upwards. There is little change to record at bar mills, where work remains good, and quotations steady at last week's figures. At rail mills the position is quite unchanged. Only a small business is passing just now, but the output is satisfactory, and values are unaltered. Work continues good at blastfurnaces, and somewhat more orders



being placed here at values which are fully upheld. The tinplate trade continues very quiet in the tinplate trade, and most mills will be closed down for the whole of next week. Fresh business coming on the market is of the most limited description, and while official quotations remain unaltered these are not really being adhered to.

**Cardiff.****COAL.**

As the whole of the extra coal required by the Admiralty for the naval manœuvres has now been shipped, a good deal more tonnage has been thrown on to the market. This has given a fillip to chartering, the amount of tonnage taken up last week being nearly 330,000 tons, or nearly 100,000 tons more than in the preceding six days. Shipments, of course, are once more at about their normal level, the total last week being 343,000 tons, but in view of the three days' holiday which takes place next week it is expected that the present week will witness a substantial increase. Indeed, at the time of writing there was considerably more pressure for coals by shippers, who were anxious to get away from the port ere the collieries are stopped. This has had a firming effect on prices, which, with the completion of the Admiralty demands, would under ordinary circumstances have no doubt shown some little weakness. Best steams are 20s. to 20s. 6d., whilst in one or two cases sellers quote as much as 21s., but buyers as a rule refuse to pay the latter figure. Superior second Admiralties are 19s. 9d. to 20s., and ordinary qualities 18s. 3d. to 18s. 6d. Where prompt shipment was guaranteed, some sellers were inclined to slightly discount these prices. Generally, however, most shippers had completed their arrangements for this week's supplies, and therefore there was very little business doing. As hinted in last week's report, the Greek Government, for the 40,000 tons of best steams which they require for their fleet, have given the preference to Ferndale coal. The order has been placed with Messrs. Michalinos and Co., of London, and the price is understood to be 31s. 6d. c.i.f. Piræus. Allowing for a freight of 9s. 6d., and other incidental charges, this leaves between 21s. 6d. and 22s. per ton f.o.b. The coal has to be double-screened, and to be delivered—20,000 tons in August, and the remaining 20,000 tons in September. Nothing is likely to be known of the result of the enquiry by the White Star Steamship Company until after the holidays. There have been a few more enquiries in the market for delivery over next year, but they are looked upon more as feelers than with any serious intention to enter into contracts. In one or two cases it is stated that contracts have been made by middlemen with buyers abroad on the basis of about 18s. per ton, which represents a rise on the prices obtainable during the latter part of 1912 of about 1s. to 1s. 6d. per ton. Whether sellers will be able to cover themselves at this figure remains to be seen; but assuming that in the present condition of the freight market they had allowed for a higher freight than the average of the past few years, they may look for a remunerative return on a lower freight—which, indeed, they think they are justified in anticipating for next year. The freight market, however, is usually full of surprises. The small coal market, as is usually the case in the few days preceding a long holiday, owing to the collieries withholding considerable quantities for the running of the engines during the three days' idleness, is rather firmer. Best bunkerings are 10s. 6d. to 10s. 9d., best ordinaries 10s. to 10s. 3d., and cargo qualities 8s. 3d. to 8s. 6d. per ton. Dock screenings are 10s. 3d. to 10s. 6d. In Monmouthshire coals also there has been an advance of about 3d. per ton, Black Veins realising 17s. 3d. to 17s. 6d., and western-valleys 17s. to 17s. 3d., in each case f.o.b. Cardiff. The Custom House returns of the exports of coal to foreign countries for the half-year are now accessible. From the Welsh ports the shipments amounted to 14,823,019 tons, as against 10,654,268 tons in the corresponding period of last year, being an increase of 4,168,751 tons. Of course, the figures given for last year included the national strike period, when there was a considerable falling off, but even allowing for that the result cannot but be regarded as satisfactory. The following table shows the exports to the chief countries of the world, together with the increase or decrease as compared with the first six months of last year:—

	Total Jan.-June Tons.	Increase. Tons.	Decrease. Tons.
Russia .....	193,378	65,540	—
Sweden .....	126,563	52,231	—
Norway .....	48,921	1,072	—
Denmark .....	16,251	—	225
Germany .....	139,651	34,629	—
Netherlands .....	61,062	3,822	—
Java .....	15,060	—	3,635
Dutch possessions in Indian Seas .....	12,448	2,538	—
Belgium .....	274,023	161,805	—
France .....	3,607,672	1,224,916	—
Algeria .....	393,021	167,253	—
French Somaliland .....	33,285	17,267	—
Madagascar .....	5,728	2,123	—
Portugal .....	424,997	139,281	—
Azores .....	12,392	—	225
Madeira .....	73,969	23,711	—
Spain .....	655,464	188,975	—
Canary Islands .....	381,149	49,808	—
Italy .....	2,624,229	537,075	—
Italian East Africa .....	5,301	—	20,811
Austria-Hungary .....	193,944	151,612	—
Greece .....	154,073	42,430	—
Roumania .....	57,155	16,001	—
Turkey (European) .....	26,118	—	15,845
" (Asiatic) .....	27,752	—	25,041
Egypt .....	941,040	262,617	—
Tunis .....	83,699	38,095	—
China (exclusive of Hong Kong) .....	12,501	1,818	—
Japan .....	314	—	15,207
Mexico .....	14,598	3,147	—
Peru .....	8,697	2,147	—
Chile .....	310,334	19,066	—
Brazil .....	883,973	267,186	—
Argentina .....	307,940	—	2,275
Uruguay .....	1,569,549	453,435	—
Chann. Islands .....	26,449	—	6,476
Guernsey .....	119,934	—	5,414
Jersey .....	314,073	205,977	—

	Total Jan.-June Tons.	Increase. Tons.	Decrease. Tons.
Cape of Good Hope .....	13,587	2,513	—
Mauritius .....	21,628	12,128	—
Aden .....	72,835	—	22,876
British India .....	66,749	34,796	—
Straits Settlements .....	8,534	1,673	—
Ceylon .....	121,335	14,201	—
Hong Kong .....	27,910	7,202	—
Newfoundland .....	7,004	4,869	—
Falkland Islands .....	6,114	5,364	—
West Africa: French .....	88,954	47,066	—
" Portuguese .....	137,005	5,269	—
" British .....	54,734	15,989	—

It will be seen that in only three cases were there decreases of 20,000 to 25,000 tons, whilst the increases went up to as much as nearly one and a-quarter million tons. That was for France. In fancy house coals there is no change, as much as 20s. being quoted for best qualities. It is an anomalous state of things—and in some quarters it is characterised as scandalous—that buyers at St. Ives, Cornwall, should be able to buy these coals at 2s. 9d. per ton less c.i.f. than the f.o.b. price quoted to Cardiff buyers. There is no material change in Rhondda bituminous coals. No. 3 large is still quoted at 17s., and through-and-through and small in proportion. No. 2 large, however, is a drug on the market and though some sellers who are well situated as regards contracts still talk of 13s. to 13s. 6d. per ton, the more marketable value is 12s. 6d. to 12s. 9d. Small is 3d. dearer, being 8s. 6d. to 8s. 9d. per ton. Shipments of patent fuel for the week amounted to nearly 36,000 tons, of which the Crown Company exported 13,867 and other local makers 5,400 tons, Swansea 11,530 tons, and Newport 5,200 tons. Best brands still realise from 22s. to 22s. 6d. The Phoenix Patent Fuel Company have acquired about 20,000 square yards of land alongside the King's Dock at Swansea, not only for the manufacture of patent fuel, but also for the washing of coal. The scheme has the support of the Swansea Harbour Trust and the joint expenditure contemplated is something like £70,000. Pitwood remains extraordinarily steady, best French fir still commanding 22s. 6d. per ton.

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam	20/ to 21/	20/6 to 21/
coals .....	19/9 to 20/	19/6 to 19/9
Superior seconds .....	18/3 to 18/6	18/3
Ordinary do. ....	10/6 to 10/9	10/3 to 10/6
Best bunker smals .....	10/ to 10/3	9/6 to 10/
Best ordinaries .....	8/3 to 8/6	8/ to 8/3
Cargo qualities .....	7/6	7/ to 7/6
Inferior smals .....	18/ to 18/6	18/ to 18/6
Best dry coals .....	15/9 to 16/3	15/9 to 16/
Ordinary drys .....	16/ to 16/6	16/6
Best washed nuts .....	15/ to 15/6	15/6
Seconds .....	14/ to 14/6	14/6
Best washed peas .....	13/3 to 13/6	13/6
Seconds .....	10/ to 10/6	10/3 to 10/6
Dock screenings .....		
Monmouthshire—		
Black Veins .....	17/3 to 17/6	17/3 to 17/6
Western-valleys .....	17/ to 17/3	16/9 to 17/
Eastern-valleys .....	16/6	16/6
Inferior do. ....	15/3	14/9
Bituminous coals:—		
Best house coals (at pit)	20/	20/
Second qualities (at pit)	18/	18/
No. 3 Rhondda—		
Bituminous large .....	17/	17/
Through-and-through .....	15/	15/
Small .....	12/6	12/3 to 12/6
No. 2 Rhondda—		
Large .....	12/6 to 12/9	13/3 to 13/6
Through-and-through .....	11/3 to 11/6	11/6
Small .....	8/6 to 8/9	8/3 to 8/6
Best patent fuel .....	22/ to 22/6	22/ to 22/6
Seconds .....	20/	20/
Special foundry coke .....	31/ to 32/	31/ to 32/
Ordinary do. ....	26/ to 28/	27/ to 28/
Furnace coke .....	20/ to 22/	20/ to 22/
Pitwood (ex-ship) .....	22/6	22/6

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

**IRON.**

Steel bars have come down considerably in price. The South Wales Siemens Bar Association had been endeavouring for some time to maintain the official quotation at £5 5s., but they have been compelled by the force of circumstances to reduce the price by nearly 9s. per ton. Siemens tin-bars are now £4 16s. 3d., and Bessmer 2s. 6d. less. It is difficult, however, to do business even at these prices, and cases are reported of orders having been booked at 1s. 3d. per ton less. These reductions will afford a much needed relief to the tin-plate makers. Foreign bars are, it is said, still being offered to Welsh consumers at 82s. 6d. net, and the imports during the week of plates, bars, billets, &c., amounted to close upon 10,000 tons. Prices for tin-plates show no improvement, and the ballot of the workmen on the question of curtailing production, so as to bring about a revival, has ended in an adverse vote. At several works an intimation was given to the men that if the mills were brought to a standstill during the first week in September, as proposed, they would remain closed indefinitely. This no doubt had great influence with the men, and as the Welsh Artisans' Union had already decided against a general stoppage, the officials of the three other trade unions concerned reported on Tuesday that the result of the ballot did not justify the presentation of notices. Manufacturers state that it is impossible to secure new business at anything like remunerative prices, and in some cases standard coals have been sold at 13s., or at an actual loss. Unless an improvement soon takes place it is feared that a number more mills will have to be shut down. The galvanised sheet trade is in a very healthy state. Some good orders have been taken, and leading makers report that they have sufficient business on hand to keep the works employed for some time to come. Prices keep firm, and 24-gauge corrugateds are £11 to £11 2s. 6d. A serious

strike has occurred at the Ebbw Vale Iron and Steel Works, and though the number of recalcitrants is but small, consisting solely of the roll turners who ask for higher wages, yet if they remain out it will mean the stoppage of the whole of the works. Mr. Mills, the general manager, refuses to discuss their grievances unless they first of all go back to work, and the steelworkers have appealed to them to do so, assuring them that if they do their grievances could be remedied in a very short time. A portion of the South African order for rails has been placed, and some 25,000 tons have been divided between Messrs. Guest, Keen and Nettlefolds, and the Cumberland Mills at the full price of the day. Welsh pig iron has fallen to 73s. 6d. to 74s. f.o.b. New steel crop ends are also offering at 60s.

**Swansea.****COAL.**

The returns of the trade of the port during last week were again highly satisfactory. The coal trade was active, but there was a drop in exports of patent fuel. Together the shipments amounted to 113,570 tons. There was a capital attendance on 'Change this morning, but there was no improvement in the general condition of the anthracite coal market, which opened with a quiet tone, enquiries being very limited. Swansea Valley and Red Vein large continued weak for prompt loading. Machine-made nuts were fairly steady, but cobbles were easy, with little demand. Rubbly culm was very weak, and prices were again marked down. Duff, on the other hand, was scarce, with values again moving in an upward direction. There was not a good demand for steam coals, and this department closed easy.

**IRON.**

During the past week the iron and steel trades were fairly brisk, although they showed a slight decline as compared with a month ago. Several stoppages of short duration have taken place in the steel trade during the present month. There was more activity in the tinplate trade due to unexpected orders received. The whole of the Beaufort works, Morriston, were closed down at the beginning of the week, but several mills were again operating at the end. The engineering works and foundries in the district were actively engaged. Last week the shipments of tinplates were 114,361 boxes, receipts from works 86,005 boxes, and stocks remaining in the dock warehouse and vans 392,997 boxes.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/ to 23/	21/ to 23/
Secondary do. ....	18/6 to 20/	18/6 to 20/
Big Vein large (less 2½ per cent.) .....	16/ to 17/6	16/ to 17/6
Red Vein large do. ....	12/ to 13/	12/ to 13/
Machine-made cobbles (net) .....	21/ to 22/	21/ to 22/
Paris nuts (net) .....	22/6 to 24/	22/6 to 24/
French do. do. ....	22/6 to 24/	22/6 to 24/
German do. do. ....	22/6 to 24/	22/6 to 24/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	11/6 to 13/6	11/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.)	6/ to 6/6	6/6 to 7/
Duff (net) .....	5/9 to 6/3	5/9 to 6/3
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/ to 12/	11/ to 12/
Small do. ....	8/ to 9/6	8/ to 9/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/6
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	14/ to 15/
Small (less 2½ per cent.)	10/6 to 11/6	11/ to 12/
Patent fuel do. ....	18/ to 19/	18/ to 19/

**Llanelli.****COAL.**

Not for a long time has the steam and bituminous markets been in such an unsatisfactory position. Coals of all kinds are most difficult to place, and now that all the manufacturing works of the district will close down for the next ten days, the collieries will have but few orders to go on with, and their best policy would be to shut down as well. The prospects of the future are not at all satisfactory and bad times will, it is feared, be experienced for the remaining months of the year. The gas coal collieries have reduced their prices 2s. per ton on future business and on contracts now running. This seems rather a foolish thing to do, as the amount of extra coal they will sell will be very small, as the manufacturing works cannot take more of their contract quantity than they are now using. The anthracite trade is showing signs of improvement, and it is hoped that the demand will be sufficient to keep collieries going full time at better prices. Stocks are still heavy, but the holidays next week will assist in reducing the quantity. Prices this week are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	20/ to 22/6	21/ to 23/
Secondary do. ....	19/ to 20/	19/ to 21/
Big Vein large .....	17/ to 18/	17/ to 18/
Red Vein do. ....	12/6 to 13/6	12/6 to 13/6
Machine-made cobbles ...	18/ to 20/	18/ to 20/
German nuts .....	20/ to 22/6	20/ to 21/
French do. ....	22/ to 24/	22/ to 23/
Paris do. ....	22/ to 24/	22/ to 23/
Machine-made beans .....	19/ to 21/	19/ to 21/
Do. peas .....	12/ to 13/	11/6 to 13/6
Rubbly culm .....	7/ to 7/3	7/ to 7/6
Duff .....	5/ to 6/	5/ to 5/6
Other sorts:—		
Large steam coal .....	16/ to 17/	16/ to 17/
Through-and-through ...	11/6 to 12/	11/ to 11/6
Small .....	9/6 to 10/6	10/ to 11/
Bituminous small coal ...	11/ to 12/	11/ to 12/



## BOOK NOTICES.

**Shale Oils and Tars and their Products.** By Dr. W. SCHIETHAUER. Translated from the German by CHARLES SALTER. viii. + 183 pp.; 70 figs., 8½ in. × 5½ in. London: Scott, Greenwood and Son. Price 8s. 6d.

Another of Messrs. Scott, Greenwood and Co.'s useful translations of German technical works. Dr. Schiethauer's treatise deals mainly with the Scottish shale oil industry, the Saxon-Thuringian mineral oil industry, forming a branch of the lignite mining industry of Germany, and the Messel tar industry, the raw material of which consists of a peculiar mixture of bituminous clay and lignite. The former of these subjects has, of course, been very thoroughly treated in the memoir issued by the Scottish Geological Survey; but the author has a personal knowledge of Scottish practice, and the comparison of methods is in itself of interest. It may be observed that the translator takes care at the outset to point out that in the German original the chief products of the distillation of both shale and lignite are classed as "tar," and it has been necessary to retain the term "shale tar" in place of "crude oil."

It is of interest to note the author's statement that, whereas the Scottish crude oil has improved in quality in late years, owing to the use of superior retorts, and in consequence the yield of paraffin has increased, the value of lignite tar has declined owing to the inferior quality of the raw material; the specific gravity is higher and the melting point has declined. In the Saxon industry, moreover, the ammonia liquor products of little value. The gas produced in Scotland has a rather lower heating value owing to the larger percentage of moisture; in both industries it is principally used for heating the retorts. The residues in Germany, however, consisting of a coking substance of granular character, have a considerable value for domestic heating in stoves of special construction. At Messel no use is made of the residue except for the manufacture of stove polish.

There never has been a time when what we may call mineral chemistry has attracted attention to the extent it does at the present time, for the by-product of to-day may easily be the main product of to-morrow, and in the account which Dr. Schiethauer gives of Continental practice, with the working up and appraising of the various products, there is much to interest the reader. There is scarcely anyone who does not come in touch with this remarkable industry at some point or another.

**Acetylene Lamps in Mines.** By R. CREMER. 7 in. by 4½ in.; 40 pp.; 35 figs. London: The Mining Journal.

Increased use is being made of the acetylene lamp in metalliferous mines, and the proposals to reduce the oxygen content of mine air have also invited attention to the employment of this powerful illuminant in mines subject to firedamp, on account of its imperviousness to carbon dioxide. Mr. Cremer, in the first place, describes the various types of hand and cap lamps employed in metal mines and underground quarries, and it is interesting to note that their use does not extend further back than 1902, when they were first adopted on the Continent, notably in the ironmines of Alsace-Lorraine; now, he estimates, there are 250,000 acetylene lamps in use on the European continent. Contemporaneously in North America, South Africa, Australia and elsewhere their application has extended, but in Great Britain the progress made has been exceedingly small, although in 1906 Sir Henry Hall called attention to this form of lighting as being well adapted for the Welsh slate mines. Amongst the places at which they have been used are the Nenthead mines, in Cumberland, the Dolcoath mine, in Cornwall, the Bedminster Colliery, near Bristol, and the Llanwrst leadmines in North Wales.

The most tangible advantage of the acetylene lamp is its high lighting power, which the authorities in Germany have repeatedly recognised as a valuable safeguard against falls, especially in lofty workings. Acetylene lamps have, further, an advantage over oil and candle lamps in that they withstand air-currents of high velocity to a much greater degree; on the other hand, they are liable to extinction through sudden variations in air pressure and concussions due to shot-firing, &c.

The capacity of the acetylene lamp to burn in an atmosphere depleted of oxygen has, it may be observed, somewhat discountenanced its use in the past, owing to being regarded as giving inadequate indications of low air; but Dr. Cremer contends that, with a little practice, no difficulty should be experienced in this respect. As to the cost, the author gives the following figures showing the average cost of various illuminants in practice:—Candles, 0.21d. per man per hour; oil

lamps, 0.17d.; acetylene, 0.10d.; or, taking into account the higher illuminating power, we have the following proportions: candles, 25.2 per candle-power; oil lamps, 8.5; acetylene, 1.0.

The concluding section deals with acetylene safety lamps, the development of which has been comparatively recent. Dr. Cremer thinks the endeavour in constructing acetylene lamps must be directed to prevent the formation or accumulation of high explosive mixtures inside the lamp and, possibly, to abolish the use of internal relighters, which, on the other hand, are desirable in order to provide against the inconvenience due to liability of the lamp to be extinguished by violent air pressures.

## THE AUTOMATIC DISTRIBUTION OF STONEDUST.

At a recent meeting of the Société de l'Industrie Minérale, M. Hyve, engineer of the Escarpelle Colliery, described two ingenious and practical processes for distributing stonedust in the underground roadways of mines by means of the ventilating current and the expansion of the gases due to blasting operations.

Two different methods have been employed. In one the appliance consists of a conical distributor *a*, terminating in a fixed horizontal and cylindrical portion *b* in line concentrically with a second cylindrical part *c* *d* operated by a turbine and having two openings *d* and *e* for the escape of the stonedust. The common axis is that of the turbine *f* *g*, on which is formed an archimedean screw. A modification for use with less rapid currents is shown in fig. 2, and other arrangements are possible by which the speed and propulsive

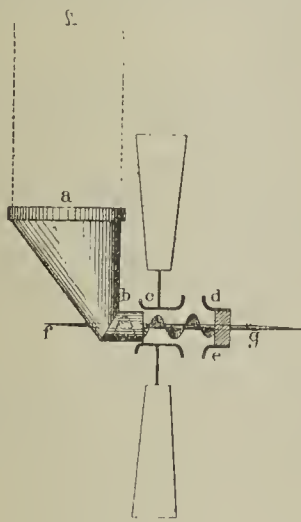


FIG. 1.

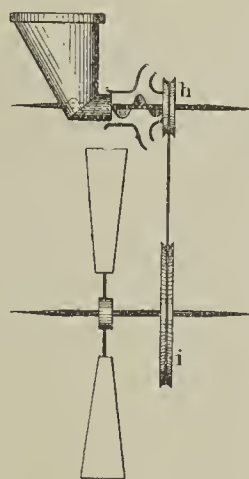


FIG. 2.

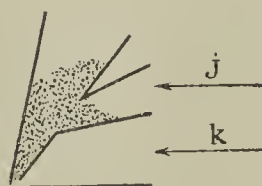


FIG. 3.

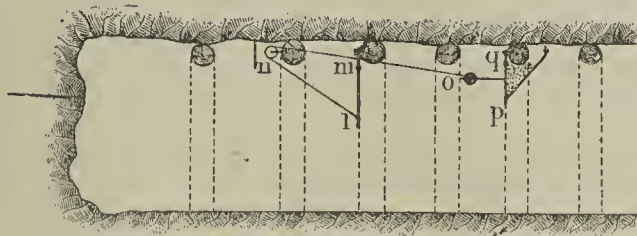


FIG. 4.

force may be varied. Another appliance is shown in fig. 3. In this case the stonedust descends by its own weight down an inclined plane of 35 degs., the air forcing it out at *j* and exhausting at *k*. The orifice is minute. The appliances may be mounted on a tub, one before and one behind, arranged so as to distribute the dust in different parts of the roadway.

A further device employed in connection with blasting operations is shown in fig. 4. In the form shown the board *l* *m*, moving on the hinge *m*, opens, by means of a cord *l* *n* *o*, the shutter *p* *q*, which is movable on the axis *g* and normally is closed, with the charge of dust it contains, by the counterweight *o*. The distances and charges may be regulated. The whole device is operated by the expansion of the gases due to blasting.

Before Mr. Justice Eve, in the Chancery Division on Tuesday, an application was made on behalf of the Cleator Moor Urban District Council for an injunction to restrain Lord Leconfield or his servants from mining under certain streets at Cleator Moor. Mr. Austen Cartmell, on behalf of the defendant, objected to the plaintiff's nominee for the inspection, his lordship upholding the defendant's objection to the plaintiff's nomination.

## MINING AND OTHER NOTES.

Messrs. W. and G. Foyle, the well-known booksellers, of 121-123, Charing Cross-road, W.C., have just opened a foreign book department, which comprises a large selection of second-hand technical works in various languages.

New electric plant has been installed at the Prestonlinks Colliery, Prestonpans, and a new heapstead is now under completion. This Lothian colliery has a large output, and as the workings are under the sea, the coalfield is of great extent. An endeavour is being made to have coal-loading facilities erected at Cockenzie to admit of coasting vessels being laden near the pits. With the prospect of increased railway communication to the coal-shipping port of Leith, whence the Lothian coals are sent to all parts abroad, the collieries are at present taking every possible step to increase the output.

Capt. F. I. Leslie Ditmas, F.G.S., agent to the Neath Merthyr Colliery Company Limited and the New Gored Merthyr Collieries Limited, Resolven, South Wales, has taken up the appointment of agent to the Coppice Colliery Company, Cannock, Staffs.

The Portuguese Government have granted a concession authorising Messrs. Blandy Brothers to establish a coaling station at St. Vincent, Cape Verd.

In the Chancery Division recently Mr. Justice Neville heard the actions *Anglo-Westphalian Kent Coalfields v. Sidders*, and *Kent Coal Concessions Limited v. Sidders*. The plaintiffs in the first action claimed specific performance of an agreement in writing, dated March 26, 1913, for the sale of the mineral rights of the farm comprising 46 acres, in what is described as the coal district of Kent. The plaintiffs in the second action alleged a verbal agreement for the sale to them of the rights, made on March 22, which they said was confirmed by a contract in writing, dated March 28, 1913. It was stated in the evidence that the bidding for the rights had varied from £12 to £25 per acre, eventually reaching £50 per acre, which, apparently, both parties bid. In the first action his lordship granted a declaration that plaintiffs had a valid agreement, and he ordered the Kent Coal Concessions to pay the costs of Mr. and Mrs. Sidders. The second action was dismissed, with costs.

In the annual hill-climbing contest of the Sutton Coldfield and Mid-Warwickshire Automobile Club, recently, the 25-horse power Invincible Talbot secured many successes, winning the gold medal for the fastest time, a gold medal for first on formula, and the Barker challenge cup for the best performance of the meeting.

The Manchester Coal Exchange Directory has been issued, and shows an ample improvement on previous issues. Portraits are given of Mr. James Roscoe, president for 1892-1913, and Mr. Ralph Peters, first president of the Exchange in 1879, who was president for the second time in 1900, and has been a member since its foundation in 1879; Mr. F. W. Hughes, who was president for three years, 1908-1910; and although three or four others have served for two years, he is the only one who has enjoyed a sort of record distinction. It is with some amount of regret that we notice the portrait of Geo. Pearson, V.D., J.P., president 1904. He died May 6, 1913. He rendered great service in connection with the extension of the accommodation on the Exchange. In connection with the Coal Trade Benevolent Association, the committee of the Manchester district branch have sent a letter of congratulation to Sir W. Scott Barrett, D.L., J.P., on the honour of knighthood conferred upon him by the King.

In a few weeks' time the additional 90 ovens at Harrington and at Oughterside will be lighted, and there will then be 360 patent ovens in operation in Cumberland.

The Crompton and Shawcross Limited, Grange and Hindley Hall Collieries officials and workpeople have presented a testimonial to their late manager, Mr. J. R. Hark, who is leaving to take up a position at the Hulton Collieries, in the shape of an album and purse of gold.

The deputies and underground officials of the five collieries of the Blackwell Colliery Company have presented Mr. Leonard Cutts, the son of Mr. J. W. Cutts, a manager of the Blackwell Colliery Company, and now an official at the Maltby Main Colliery, Yorkshire, with a gold hunter watch. Mr. Cutts instructed the officials in gas testing and air measuring.

The Coal Distillation Company, of Middlesbrough, a branch of the Aktien Gesellschaft fuer Kohlendestillation, of Düsseldorf, have just recently received a contract from Messrs. John Bowes and Partners Limited, of Newcastle-on-Tyne, for 20 additional waste heat coke ovens, together with by-product plant, to form an extension of the existing coke ovens and by-product plant built five years ago by the same company at the Marley Hill Colliery, county Durham. These coke ovens, which are to be of large dimensions, will be charged with stamped coal and provided with an inclined coke bench. At the bottom of the incline there will be a conveyor arranged for transporting the coke to a screening plant, and a 600-ton coal bunker will form part of the installation. The Coal Distillation Company have also received a contract for a battery of 65 waste heat by-product ovens for erection at the Redcar Ironworks of Messrs. Walker, Maynard and Co. Limited. This by-product plant will be arranged on the direct-recovery principle, and there will also be a plant for the recovery of benzol from the



ases. In this instance, the coke will be taken from the bench to the blastfurnaces by means of electrically-driven platform wagons, and the coke will be loaded at the coke ovens directly into the furnace barrows, which will be placed on the platform cars and taken to the furnace hoist. These ovens will be capable of producing 2,200 tons of coke per week, and it is estimated that there will be a considerable amount of surplus heat available for producing electricity. In addition to the foregoing, the Coal Distillation Company have a contract for the extension of their coke oven and by-product installation at the Holbrook Colliery, Killamarsh, near Chesterfield, where 10 additional "Collin" regenerative ovens, with the necessary by-product and benzol plant, will be laid down.

It is officially announced that the King has awarded the Edward medal of the second class to John Cairns for an act of bravery under circumstances involving the gravest risks. Cairns, when an inrush of water occurred at Townhead iron ore mine, Egremont, Cumberland, suddenly bethought himself, while making his escape with others, of a man named Ward left alone in the workings, and unaware of his danger, he rushed back to warn him. Meanwhile the water had risen, and the two men found it impossible to reach the shaft. Luckily they reached a stone drift above water level connected with the surface by a borehole. For five and a-half days they remained imprisoned, food being passed down to them until the mine was cleared and they were rescued.

Mr. T. F. Brass, manager of the Primrose Colliery, Barnsley (son of Mr. T. F. Brass, Charlaw House, Sacriston, agent for Sacriston collieries), has been presented with a eanteen of silver, together with a silver sugar basin and cream jug for his intended wife, the gifts of the officials and workmen of East Hetton or Kelloe Colliery Colliery and other friends. Mr. Brass had been under-manager at the latter colliery for about 16 months before going to Barnsley.

Mr. Frederick P. Mills, of Werneth, Oldham, has been appointed chief officer of the Durham and Northumberland Collieries Fire and Rescue Brigade, in succession to the late Mr. W. H. Ramsay. Mr. Mills obtained his mining education at the Wigan Mining and Technical College, where he won the Knowles gold medal for the most distinguished student in mining in 1907-8. He also obtained first-class honours in mining surveying at the City and Guilds Institute. He has been a lecturer in mining and surveying at the Wigan Mining College, and is at present lecturer in mining at the Municipal School of Technology, Manchester. He has had considerable experience in rescue work in Lancashire, and assisted in the rescue work after the big explosion at the Maypole Colliery.

A large number of miners employed at Messrs. Strakers and Love's Brancepeth and Oakenshaw collieries attended on Saturday the opening ceremony of the 12 aged miners' cottages at Willington, co. Durham.

The late Mr. James Pain, of Corby, Northants, ironstone merchant, left property of the gross value of £134,397.

A special delegate meeting of the Northumberland and Durham Miners' Permanent Relief Fund was held on Saturday in Newcastle, for the purpose of considering proposals arising out of the administration of the National Insurance Act. It was explained by the general secretary (Mr. Wm. Barnes) that the Insurance Commissioners had called attention to the necessity of making certain additions to the rules, so as to authorise and provide for the payment of remuneration to delegates and others in respect of their duties connected with the administration of the Act. To authorise this expenditure the general committee submitted five resolutions. The chairman (Mr. Stubbs), in the course of his remarks, said the administration of the Act by their society had been found to be most cumbersome. Their expenses under the head of sickness were very severe, and unless something was done to amend matters they were going to have a struggle to get along, even if they were not in danger of being wiped out. There could be no doubt that the sickness benefits were excessive. As an old member of that society, he thought the Government had dealt harshly with them in reducing their benefits, and, though something had been done to rectify this, he thought the three-quarters of a million additional benefits proposed looked a great deal bigger than they were. The resolutions were carried unanimously.

The Local Government Board have issued a circular to sanitary authorities in England and Wales reminding them of the importance of taking all practicable measures for the prevention of epidemic diarrhoea and other infectious diseases of infants.

Mr. Robert Small, agent for the Scottish Shale Miners' Association, has received a letter from the Home Secretary on the question of the exemption of oil shale mines from the requirement in the Explosives in Coal Mines Order. Specially in regard to bringing unused explosives out of a mine, the Home Secretary states he can find no grounds for distinguishing in the matter between shale mines and other classes of mines under the Act.

Mr. H. S. Witty, who for 21 years was the manager of the Thrymby Colliery, and was appointed agent to the Thrymby and Cadeby Company a year before the disaster at Cadeby, has been appointed general manager of the Thrymby and Cadeby Colliery. Mr. Witty takes over his new duties at 6.

We are informed that Mr. David Bowen, having resigned his appointment as head of the Mining Department of the University of Leeds, has recently opened offices in Leeds as a consulting, mining and civil engineer. Mr. Bowen has had a long and wide experience in both coal and metal mining, in addition to geological work of a varied nature. He has reported on several coalmining properties in South Wales, the Yorkshire and Midland District, and the North of England, and has, besides, an extensive acquaintance with metal-mining conditions both in this country and abroad. His lectures at the University of Leeds will be remembered for his specialised treatment of mining

time within six months after the passing of this Act, to resume possession of the land with the buildings thereon on payment of their value, which, failing agreement, shall be determined by arbiters. Such conditions are to be ignored in fixing the value.

### COASTWISE SHIPMENTS IN JUNE.

According to the monthly coal tables, the following were the quantities of coal shipped coastwise during June:—

From	Total cargo.		Total bunker.	
	1912.	1913.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.
Bristol Channel ports .....	354,625	344,274	16,977	23,948
North-western ports .....	272,518	281,653	64,350	64,050
North-eastern ports .....	514,064	605,568	26,403	26,639
Humber ports.....	180,226	222,643	9,484	10,099
Other ports on east coast.....	21,404	23,214	3,835	8,193
Other English ports .....	3,531	2,919	6,920	4,818
Total from England and Wales .....	1,346,368	1,483,271	127,969	137,747
Ports on east coast of Scotland.....	105,343	133,576	10,910	14,584
Ports on west coast of Scotland.....	177,136	134,420	28,089	43,722
Total from Scotland .....	282,479	267,996	38,999	58,306
Irish ports .....	—	203	3,175	3,914
Total from United Kingdom .....	1,628,847	1,751,470	170,143	199,967

questions, and especially in connection with mining economics. His position as managing director of various mining concerns should entitle his opinions on mining propositions to considerable weight.

Prof. Wm. A. Bone, D.Sc., Ph.D., F.R.S., Professor of Chemical Technology, of the Imperial College of Science and Technology, inventor of the Bonecourt system of flameless incandescent surface combustion, and technical adviser to Bonecourt Surface Combustion Limited, has been awarded by the Franklin Institute of Philadelphia, U.S.A., its "Howard N. Potts' Gold Medal for distinguished work in Science or the Mechanic Arts," in recognition of his work on "Surface Combustion," upon which subject he gave a lecture before the institute on October 30, 1911.

Mr. James Edward Anderson has been appointed works assistant to the chief mechanical engineer of the Midland Railway, Derby. Mr. Anderson is succeeded as chief draughtsman of the mechanical engineer's department by Mr. S. J. Symes.

Sir Walter Menzies, in the House of Commons last week, asked the Home Secretary whether the Coal Mines Act, in so far as it concerned the hours of winding enginemen in coalmines in Lanarkshire, had yet been enforced. Mr. McKenna said he was informed that, so far as the inspectors have been able to observe, the provision of the Act as to the hours of winding enginemen is being generally complied with in Lanarkshire, and that only two complaints have been received by the inspectors in regard to that county from the Scottish Enginemen's Association.

The Denaby and Cadeby Collieries appeal was again before the House of Lords on Monday on an application to confirm a minute of agreement between the parties. The appeal, in which Messrs. Lambert Bros. London, were the respondents, had reference to a coal contract to supply fuel to Germany. Their lordships now sanctioned the agreement made between the parties giving effect to their previous judgment in the case.

A further meeting of the Cleveland ironmasters concerned in the proposal to establish a distributing company for the sale of their output, and to fix prices and control production was held at Middlesbrough this week. The scheme and the objections to it by merchants who have important distributing agencies for Cleveland was discussed at considerable length, and eventually the meeting was indefinitely adjourned without any definite decision being arrived at.

A private Bill has been introduced in the House of Commons to amend the law relating to feus and leases for building in Scotland, and to secure compensation for injury caused by mineral works. It is proposed that where land is or has been feued or let for the purpose of erecting buildings thereon, any condition or stipulation contained in a feu contract or lease purporting (a) to entitle the superior or lessor to do any act whereby the buildings may be injured, which but for such condition or stipulation he would not have been legally entitled to do, without making full compensation for the injury thereby caused; or (b) to release the superior or lessor from any obligation to pay damages for doing injury to such buildings, which but for such condition or stipulation he would have been liable to pay; or (c) to bind the feuar or lessee to accept any compensation on damages less than full compensation for the injury actually caused, shall be null and void. Where, prior to the passing of the Act, land has been feued or leased for building subject to any such condition or stipulation, it shall be lawful for the superior or lessor, at any

The destination of cargo shipments was as follows:—

To ports in	June 1912.	June 1913.
	Tons.	Tons.
England and Wales .....	1,001,974	1,166,752
Scotland .....	165,279	160,573
Ireland .....	461,594	424,145

Total shipments to London were 699,568 tons.

### NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Conditional Decision of Cardiff Company's Bill to Raise Rates—Great Development of Coal Trade Outlined—Remarkable Forecast—Coal Trimmers to take Half-holiday on Saturdays—Joint Conference of a Dock Authorities—Oil versus Coal Controversy still Active—Coal-cutters for Thin Seams—Dock Charges for Coal-mixing—Joint Committee of Banksmen's Hours—Men's New Schedule and its Difficulties—Firm Action at Ebbw Vale.**

After several weeks of strenuous conflict, a decision has been reached upon the Cardiff Railway Company Bill, which proposed, amongst other things, to double the charge for coal-tipping (2d. to 4d.) and to add 50 per cent. to wharfage rates, with other additional charges. The Bill went to the Lords, and was there approved, and on Wednesday the House of Commons' Committee announced its decision—which, briefly, is to give the promoters about one-third of what they asked for coupled with conditions which are onerous; and on Friday the promoters are to declare whether they will accept the Bill on these terms.

Roughly speaking, if the new tolls as sought were levied up to the maximum, they would have given an additional income of £186,000 per annum to the Dock Company without any additional service being rendered to the traders; and the opponents made much of this fact. A wide range of questions was opened up as to the dealings of the company with the coal traffic—chief among them being whether the alleged unsatisfactory earnings at the docks were not due to lack of facilities which the company ought to have provided, and especially sidings for the storage of the coal.

By their decision the committee offer to grant an increase of 1½d. per ton in the company's charges, the 1½d. to be divided over the different services in such way as may be suggested by the company and approved by the committee on Friday: but they make it a condition that the company shall provide necessary storage accommodation for the coal traffic; and it is a matter for discussion at the moment whether the company will accept the Bill subject to these conditions.

One of the most interesting witnesses was Mr. A. Prosser, manager of the Rhymney Railway, who stated that his company carried annually more than 4 millions of tons to and from the docks. Their main work was in carrying coal to the docks, and the dominant interest was that the greatest possible business should be done there. But if rates were so raised as to divert traffic to Penarth or Barry, his railway would lose, while the Cardiff company might recoup their selves out of the higher rates. Loss of trade would be of considerably more importance to the Rhymney company than to the dock owners, for the latter might expect a larger revenue on decreased tonnage; and would be induced to delay expenditure upon improving their existing facilities, or providing additional accommodation.

Moreover, he added, Cardiff company's railway (now unused) might give opportunity for manipulation



carrying traffic thereon at unduly low rates and coupling themselves out of the dock dues, and this could mean unfair competition with the Rhymney company.

A strong point in Mr. Prosser's evidence was his complaint of the lack of storage sidings at the docks, his allegation being that land which ought to have been set for sidings had been let for works, thus hampering the railway service.

The general manager of the Crown Preserved Fuel Company (Mr. Thomas Cochrane) stated that their firm has spent £129,000 on their works at the docks, and employed 300 hands. They shipped 300,000 tons of patent fuel from Cardiff every year; and objected to the increased charges, because these would affect them in their competition with other manufacturers, not only in South Wales, but also in Germany and Belgium.

For the promoters, Mr. Honoratus Lloyd asserted that the position of the company financially was getting worse, and, therefore, they ought to be entrusted with such powers as would enable them to maintain adequately a public service, and make improvements from time to time. The figures put in had shown that although Lord Bute had been in possession of the docks since 1900, so far from taking out of the undertaking the large sum stated by the opposition, every farthing he was entitled to—whether as royalty owner or dividend receiver—had been put back into the concern, and half a million besides. Not a single farthing had Lord Bute put into his pocket from the docks since he came to his title. It was not right that a man should have to mortgage his property in order to put money into an undertaking which at its best would not return more than 4 or 5 per cent. Where was the money to come from for providing what was said to be necessary? It was impossible to get it from the public at the rate of dividend which the company could show—either now or in the future.

These are but a few points in an exhaustive enquiry which has been of commanding interest to all engaged in the coal trade.

In the course of a speech on Monday evening, Mr. Joseph Davies, secretary of the 'South Wales Freighters' Association, referred to the growth of the coal trade in South Wales. He said that there must be for many years a continuation of great developments and steady expansion in the commerce of the district. This depended, primarily, on the colliery industry; and every part of the coalfield new pits were being sunk, and owners of the older existing collieries were taking steps to largely increase their output. At Cardiff, Barry, Newport and Port Talbot the output of the recent year would show a huge advance on that of any previous year; but in addition to this the developments in progress would, in the course of the next four or five years, add a further 7 or 8 millions of tons to the annual output of the coalfield. Ten years ago the shipments in the ports named were under 25 millions; but in the present year they would probably reach 34 millions. As each million tons output meant an addition of something like 20,000 people to the population of the coalfield, it would be seen that the influx—which had made Monmouth and Glamorgan during the past generation practically a colony, drawing from all parts of the United Kingdom—must be continued. Side by side with colliery development they had manufacturing industries developing, there being new works for galvanised iron, Portland cement, and tensions at the iron and steel works, and the engineering and ship-repairing establishments. No one could examine the industrial prospects without feeling assured that South Wales and Monmouthshire had a future of immense development and prosperity.

At the meeting of Swansea Chamber of Commerce on Friday, Mr. W. T. Farr (the president) directed special attention to the question of coal-trimmers' hours on Saturday. He pointed out that at the conference of coal-trimmers, held in Birmingham, a resolution had been passed that in every coal port shipments should cease from 1 p.m. on Saturdays, after a given date. Swansea Chamber of Commerce had considered this subject, and had passed a resolution strongly objecting to any departure from the arrangement made three years ago, declaring that they could not entertain a proposal to cease work at 1 p.m. on Saturdays. It appeared that the matter was not yet decided. At some ports there was a desire for an interval at 12 noon, with continuance of work till 4 o'clock; whereas, on the other hand, there was a desire to cease work altogether at 1 o'clock. It had been suggested that a small joint committee might be appointed to consider the question with the representatives of the men. He considered it very important that something should be done, and proposed that the committee of the Chamber which had dealt with the trimming question should deal with this matter of the hours, and should arrange a joint conference on the subject, at which the Chambers of other Bristol Channel ports and the dock managers could be represented. Mr. Farr's suggestion was adopted, and a resolution to that effect was passed.

Among the organisations represented at the conference in Birmingham upon the coal trimmers' "clear deck-end" were several from South Wales as well as the north-east coast, with railwaymen and labourers' unions. The resolution passed was that employers could be given notice to amend agreements now in force, so that the new scheme could come into operation on September 6.

In further development of the coalowners' scheme for their mining school at Treforest, Prof. Knox and Mr. Hugh Ingledew have attended as a deputation before the Merthyr Committee. Their request was that that committee would adapt the curriculum of their mining classes, so as to enable the students to pass into the new School of Mines; and the chairman promised that the request should be duly considered.

In the controversy upon oil *versus* coal, aroused by the speech of the First Lord of the Admiralty, widely divergent opinions continue to be expressed as to the effect which a change would have upon South Wales trade. The points indicated in this column last week are repeatedly emphasised, scarcely any new considerations being adduced; but the chief point of all—the enormous growth in the demand for coal—seems to be generally ignored. Yet this is a governing factor. Given such a huge increase of demand as 50 per cent. growth in ten years, which was stated last week, the effect of competing power-producers such as oil is minimised. In short, there is room for oil without any appreciable harm to the coal trade; and opinion seems to be settling down to this conclusion.

Interviewed upon the question, Mr. L. W. Thomas, county mining teacher under the Monmouthshire Council, said he did not think there was any occasion for alarm; and that any loss in trade by the substitution of oil for coal in steam-raising was likely to be met by the extra work involved in extracting oil from the upper seams of coal. Steam coals would hold their own against all competition; and the demand for fuel was such as to provide room for both products.

Referring to the subject of coal-cutters (as to which some discussion has been current), he said that if introduced in this district it would result in thin seams being worked which were at present untouched; and the Ebbw Vale Company had such a scheme under consideration for that district. Coal-cutters could be made a blessing to all concerned.

The final stage in the controversy concerning coal-mixing at the South Wales Docks is marked by the issue of a circular from the dock companies. This gives the terms under the recent arrangement; and the charges are to be 2d. per ton where single wagons have to be mixed, ranging from that figure down to ½d. per ton for lots of eight wagons. Where the lots exceed eight wagons, no charge is made, and when there is no sorting of empties no charge is made for mixing lots of over five wagons. In cases of five wagons and under, when no sorting out is required afterwards, there is a reduction of 25 per cent. in the charges. The scale is charged back to January 1 of this year, but (except as regards the Cardiff company, who may withdraw on six months' notice) it will prevail in relation to the other docks until the end of a period of five years.

The joint committee of the Conciliation Board to deal with banksmen's hours held a sitting on Monday and took evidence as to the practice at a number of collieries. Statements were submitted as to the hours worked, the rates of wages and the general duties both in the day and night shifts. These vary considerably in different districts and (so it was said) even in different pits of the same company, as well as in different shifts. Further evidence has to be taken before the committee can consider the question of a uniform method for the whole coalfield.

It was reported to the Western Valleys Miners' Council, on Saturday, that, in conformity with the Federation's new schedule, the workmen at a new colliery had attempted to bring the colliery under the new rates, and for that purpose had tendered 14 days' notice. Astonishment was expressed that the executive had not decided to finance these men, and a deputation was appointed to wait upon the executive on the matter.

A strong line has been necessary at the Ebbw Vale Works, where roll turners stopped work without giving the managing director an opportunity of hearing their grievances; and because of their stoppage there was risk that a large number of other men would have to be stopped also, intimation to the finishing departments being made to the secretary. Consequently, a crowded meeting took place on Sunday; and one of the speakers pointed out that while they would all sympathise with fellow-employees who were trying to better their position, it was very serious if a couple of thousand men were going to be affected by a misunderstanding. If the works closed down on Saturday, he said, it would mean to the Steelworkers' Society £1,000 a week in lock-out pay. The position of the management was that the men must return to work before a deputation would be received to submit their requirements. Ultimately a resolution was passed asking the roll-turners to go back to work "and thereby prevent a stoppage, believing that their grievances could be remedied in a short time afterwards."

An action brought by a collier against one of the Rhondda companies was decided by the stipendiary on Monday. The workman sued for payment for 36 trams of rubbish, sent to bank, his argument being that he was entitled to be paid whatever the destination of the rubbish. On the other side, the employers contended that they paid only for rubbish that was stowed in the gob, and that no payment ought to be made for rubbish sent to the surface. The Stipendiary said that it clearly involved greater effort to place the rubbish in the gob than merely to put it in the tram and send it to

the surface. The company were, under the price-list, paying a premium upon rubbish stowed in the gob. In view of the mass of evidence adduced by Mr. Kenshole on behalf of the employers—evidence which had been investigated by the men themselves at the colliery office—he was bound to come to the conclusion that the price-list did not bear the interpretation that the plaintiff sought to put upon it, and he therefore gave judgment for the defendant company.

Although it was understood that the miners' executive and the enginemen and craftsmen's leaders had reached agreement upon the proposed amalgamation, there appears to be still some hindrance. At an executive meeting of the Enginemen and Stokers' Association, the question of placing the terms of amalgamation before the members was discussed, and it was adjourned till next meeting. Afterwards, the whole of the members will be balloted.

During the dinner of Newport Harbour Commissioners, on the occasion of their annual inspection, Mr. F. Mills, manager of the Ebbw Vale Works, said his company had shipped 2 millions of tons of coal at Newport last year, and he hoped shortly to double the quantity. On the previous day, he had gone round the dock extensions, and was agreeably surprised at the magnitude of the work.

The officials of Dowlais and Cyfarthfa Works have made a presentation to Mr. T. Faenor Jones, who was recently appointed manager of the Wishaw Steelworks, near Glasgow. Mr. W. Surridge made the presentation—a service of silver, &c.—on behalf of the subscribers; and among the other speakers were Major Jenkins (manager of the steelworks) and Mr. J. H. Jones (deputy colliery agent).

Swansea Harbour Trustees' executive have ordered that the agreement with the Phoenix Patent Fuel Company shall be sealed, and it is understood that the expenditure, jointly by the Trust and the company, will approximate to £70,000. A site on the King's Dock has been taken, and plant for coal-washing and the manufacture of patent fuel will be installed. An output of some hundreds of thousands of tons per annum is anticipated.

Mr. David Evans, formerly manager of Tytrist Colliery, having been promoted to the larger Oakdale Colliery, under the Tredegar Company, has been made the recipient of a testimonial by officials and employees, the gifts including a gold watch, silver tea and coffee service, diamond pendant for Mrs. Evans, &c. In acknowledging the gifts, Mr. Evans said that in his colliery work he had always received the help of all grades of men—on questions of output from the hauliers, on questions of work at the coal face from colliers, and so on from others. From whatever source help came he willingly accepted it, fully recognising that it was only by co-operation that it was possible to carry on the important duties of colliery manager.

## THE TIN-PLATE TRADE.

### Liverpool.

There has been quite a lot of buying the last week or so, but for quick delivery only and at very low prices. Forward business is almost at a standstill owing to the difference between buyers' and sellers' ideas. For shipment over the last quarter of the year makers are quoting as follows:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 13s. 3d. to 13s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 9d. to 27s. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 9d. to 14s. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 9d. per box (nominal); I C 14 × 19½ (120 sh. 110 lb.), 13s. 9d. per box (nominal); I C 20 × 10 (225 sh. 156 lb.), 19s. 9d. per box (nominal); I C squares and odd sizes, 13s. 9d. basis for approved specifications. Charcoal tins are quiet at 15s. 6d. basis and upwards, according to tinning. Terne plates are in moderate demand for early delivery only; 23s. 6d. is generally quoted for I C 28 × 20 unassorted. Coke wasters are fairly steady at the following rates:—C W 14 × 20, 12s. 6d. per box; C W 28 × 20, 25s. 9d. to 26s. per box; C W 14 × 18½, 11s. 9d. per box; C W 20 × 10, 16s. per box—all f.o.b. Wales, less 4 per cent.

A serious fire occurred in the early hours of Monday morning at Bogfield Colliery, Carmyle, which is owned by Messrs. Dunn and Steven, coalmasters. The Cambuslang detachment of the Lanarkshire County Council Fire Brigade was summoned, and on their arrival they found that practically the whole of the pithead framework and the engine-house were in the grip of the flames. Great difficulty was experienced in locating water hydrants, and after considerable delay one was discovered about half-a-mile distant from the scene of the conflagration, and to cover the distance it was found necessary to lay down no fewer than 17 lengths of hose pipes. When the firemen ultimately settled down to work they soon gained a complete mastery over the flames and prevented the outbreak from reaching the pit shaft. The fire originated in the haulage engine house, but the cause of the outbreak has not been ascertained. The engine-houses were gutted, most of the pithead frame, which was constructed of wood, was destroyed, and much valuable plant, including the coal-washing machinery, was rendered useless. The damage is estimated at between £1,000 and £2,000.



## STEEL, IRON AND ENGINEERING COMPANIES.

**Allen (Edgar) and Co. Limited.**—The directors have declared a dividend at the rate of 10 per cent. for the year, together with a bonus of 2½ per cent.

**Bedwas Navigation Colliery Company Limited.**—An extraordinary meeting has been held, Mr. Joseph Shaw, K.C., presiding, when resolutions were passed authorising the directors to increase the capital from £250,000 to £300,000 by the creation of 10,000 new shares of £5 each, to be called preference shares, and to carry a fixed preferential cumulative dividend of 6 per cent. per annum.

**British Metal and Mining Corporation of Scandinavia Limited.**—This company has been registered, with a capital of £100,000 in 10s. shares, to carry on the business of miners and coal and iron masters, &c. Minimum cash subscription, seven shares. Subscribers: Baltic Lead Mines Limited, T. A. Henningsen, New Rhodesia Mines Limited, A. J. Hall, W. H. Heckford, Kurt Richter, J. K. Bradley, B. Hunter, and W. H. Rort. Remuneration of first directors (not yet appointed), £75 per annum. Registered office, 53, New Broad-street, E.C.

**British Metal Spray Company Limited.**—This company has been registered, with a capital of £70,000 in £1 shares, to carry on the business of ironfounders, manufacturers of machinery, brassfounders, and iron and steel converters, &c. Minimum cash subscription, seven shares. Subscribers: R. H. Monom, H. Litthauer, L. Rothenstein, F. J. Dand, H. H. Horley, W. J. Littleworth, and E. G. F. Upton. Qualification of first directors (not yet appointed), £1,000. Remuneration, £500 per annum.

**British Wagon Company Limited.**—The directors announce the usual interim dividends of 4s. per share on the £3 paid shares and 1s. 4d. per share on the £1 paid shares.

**Brush Electrical Engineering Company Limited.**—The accounts for 1912 show, after paying debenture interest, a loss of £7,710, increasing the adverse balance brought forward to £243,412.

**Bynoe Low-pressure Superheater System Limited.**—This company has been registered, with a capital of £25,000 in £1 shares, to carry on the business of mechanical engineers, ironfounders, and manufacturers of all kinds of machinery and tools, &c. Minimum cash subscription, £7. First directors, R. M. Albany, P. Hopkins, E. W. Hopton, E. H. Taporell, H. Bontell, and H. C. Watson. Qualification, £200. Remuneration, £150 per annum.

**Cash (Thomas) and Co. Limited.**—This private company has been registered, with a capital of £10,100 in £1 shares (10,000 preference), to carry on the business of ironmasters, steelmakers, steel converters, colliery proprietors, and ironfounders, &c. First directors: C. W. Woodall, Thos. Cash, Thos. Maskall, and H. A. H. Cole.

**Consett Iron Company Limited.**—The report of the directors for the year ended June 30 last shows a profit for the year of £581,998 7s. 3d. The directors recommend that this amount be appropriated as follows:—In meeting the interim dividends paid on February 15 last of 4s. per share on the preference shares, £20,000; 20s. per share on the ordinary shares, £100,000; in extinguishing the special expenditure shown on the creditor side of the balance-sheet, £4,296 9s. 10d.; in further providing for works reconstruction, &c., £37,000; in further providing for writing down investments, £20,000; in paying on August 5 next to the members registered in the company's books on August 2, dividends of 4s. per share on the preference shares £20,000, 70s. per share on the ordinary shares £350,000; in carrying forward an undivided profit of £30,701 17s. 5d.; accounting for the above-named sum of £581,998 7s. 3d. It has been thought desirable to take steps to make the ordinary shares fully paid, and to divide these and the preference shares into shares of £1 each. An explanatory circular-letter was issued to the members of the company on July 18, 1913. The plant of the company has been well maintained. It has been decided to erect a hy-product coke oven plant at the Langley Park Colliery. There will be 75 ovens, with tar, sulphate of ammonia, crude and refined benzol plants. The work has been commenced. The extension in steel and ferro-concrete of the company's staiths at Derwenthaugh-on-Tyne is expected to be ready for work in August this year. The directors record with very deep regret the death of Mr. Thomas H. Bainbridge, who was for so many years a director of the company, and since the death of Sir David Dale, Bart., acted as vice-chairman. The vacancy so caused has been filled by the appointment of Mr. George B. Bainbridge, of Newcastle-upon-Tyne. Mr. Mark Fenwick has been elected vice-chairman.

**Consett Spanish Ore Company Limited.**—The report of the directors for the year ending June 30 states that the net revenue for the year amounts to £32,445 16s. 8d. The directors advise that this amount be dealt with as follows:—In meeting the interim dividend of 3s. 6d. per share, paid in February, £9,660; in paying, on August 5, to the members registered in the company's books on August 2, a dividend of 8s. per share, £22,080; carrying forward, £705 16s. 8d. The undivided profit will then stand at £5,314 3s. 11d.

**Eccles (Fred.) Limited.**—This private company has been registered, with a capital of £2,000, in £1 shares, to carry on the business of colliery owners, coal merchants, coal masters, brass, iron and steel founders, &c. Subscribers: A. Greaves, jun., Gorsemore, Dudley-road, New Brighton, and C. R. Harrison, 5, Coltart-road, Liverpool.

**Gibb's Navigation Collieries Limited.**—This private company has been registered, with a capital of £120,000 in £1 shares, to acquire any coal or other mines, mining grounds and minerals, and to carry on the business of coalmasters, ironmasters, smelters, ironfounders, and contractors for coal and iron. First directors: R. Gibb, R. Gibb, jun., W. F. Gibb, Robt. McEwen, C. L. Clay, and J. Scobbie. Qualification, 500 ordinary shares. Registered office, Post Office-chambers, Port Talbot, Glamorgan.

**Hornby (John) and Sons Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares (500 cumulative preference), to carry on the business of iron, steel and machinery merchants. First directors, John Hornby, H. Hornby, J. H. Hornby and James Hornby. Registered office, 50 shares. Registered office, 1, Essex-street, London.

**Insole Limited.**—In their report for the year ended June 30 the directors state that the balance to the credit and loss account is £31,598 8s. 8d. after

charging interest on debentures, and interim dividend on preference and ordinary shares to December 31, 1912. The directors recommend the following payments: A dividend at the rate of 6 per cent. per annum on the preference shares for the six months ended June 30 last, a dividend of 15 per cent. on the ordinary shares, making with the 5 per cent. interim dividend 20 per cent. for the year; and a further bonus dividend on the ordinary shares of 50 per cent.; to place £1,500 to debenture redemption fund, leaving a balance to carry forward of £298 8s. 8d. The debenture debt of the company has been reduced by £22,500. In view of the large amounts which have from time to time been spent upon the property, and the largely increased output, the directors recommend that the ordinary share capital of the company be increased by the creation of 60,000 ordinary shares of £1 each. Further, that the present £10 ordinary shares be divided into £1 shares, and that the £10 preference shares be divided into £1 preference shares. Notice of an extraordinary general meeting to give effect to these recommendations is given. The directors have elected Mr. Eric Raymond Insole to a seat upon the board. The profits, which amount to £51,307, are the highest obtained by the company since 1901.

**International Coal Company Limited.**—The report of the directors of the International Coal Company Limited for the year ended June 30, 1913, states that the directors regret that they find it necessary to trouble the shareholders with some observations respecting the circular-letter distributed by Mr. Hirsch (a shareholder) on the 3rd ult., which contains extracts from a report and letter prepared by Mr. Hirsch's engineer, Mr. Leonard Llewellyn, relating to the company's properties. The profits amount to £12,445 18s. 4d., as compared with £7,115 15s. 10d. for the year ending June 30, 1912. The gross output from the properties was very seriously reduced by reason of the directors finding it necessary to suspend operations altogether in the Caedfaid seam, consequent upon the serious disturbances in that seam and the adjoining strata, which caused an enormous increase in the cost of working, and had involved a loss of £3,695 in the four months ending October 31 last. Nos. 1 and 2 pits have now been equipped, and the openings in the new seam, as well as those in the Nine-foot seam upon the respective coals, have made satisfactory progress. The directors recommend a dividend of 10s. per share (free of income-tax), leaving a balance on the past year's operations of £3,945 18s. 4d. to be carried forward. The directors recommend that the vacancy on the board be filled by the appointment of Mr. Robert T. Rees, M.E., of Aberdare. The directors in a lengthy circular state that the royalties payable by the International lessees amount to nearly 2s. 4d. per ton on large coal, and close upon 1s. per ton on through coal, which is almost three times the average royalties paid for similar properties in the country; but, notwithstanding this enormous disadvantage under which the company are operating their collieries, they have according to Mr. Hirsch's circular, enjoyed during the last fourteen years profits amounting to £206,168—nearly two and a-half times the amount of their capital of £85,000. The directors give notice of an extraordinary general meeting at the Angel Hotel, Cardiff, on Saturday, August 2, when resolutions will be submitted to the meeting to the following effect:—1. That the recommendations and suggestions contained in the report of Mr. Leonard Llewellyn, dated March 11, 1913, be carried into effect by the directors of the company without delay. 2. That the directors forthwith employ some competent independent mining engineer to act in an advisory capacity to the company in the carrying out of recommendations. 3. That the directors shall before July 1, 1914, furnish to each shareholder of the company a full report setting forth what works and developments have been or are in course of being carried out, and the cost. 4. That the mining engineer employed shall in the capacity of advising engineer to the company, not less than one month before the date of the annual general meeting for the year 1914, be instructed to prepare a report on the condition, working, and development of the colliery.

**Jackson and Ogden Limited.**—This private company has been registered, with a capital of £8,000 in £1 shares, to acquire and take over as a going concern the business of ironfounders, lately carried on by J. C. Jackson and J. Ogden in co-partnership under the style of Jackson and Jackson at Lansdowne Works, Middleton-road, Chadderton, near Oldham; also to carry on the business of ironmasters, ironforgers, ironfounders, ironplate makers, colliery proprietors, &c. First directors: F. Radcliffe, C. Radcliffe, J. T. Jackson, F. T. Kale, and W. Clarkson. Qualification, £250. Registered office, Lansdowne Works, Ward-street, Middleton-road, Chadderton, near Oldham.

**Lancashire Wire Company Limited.**—This private company has been registered, with a capital of £6,400 in £1 shares, to carry on the business of wire drawers and manufacturers, steelmakers, iron, brass and other metal founders, machine and engineering toolmakers, and colliery owners, &c. First directors: W. T. MacLellan, J. Cook, J. D. F. Scott, and C. K. Carter.

**Lowood (Grayson) and Co. Limited.**—The directors in their annual report for the year ending June 30, state that the year's working has resulted in a profit of £8,879 15s. 9d. To this has to be added the sum brought forward from last year, £405 8s. 8d., making £9,285 4s. 5d. The directors deduct interest on debentures to June 30, £2,250, and write off for depreciation £2,216 1s. 10d., leaving a balance of £4,819 2s. 7d. Out of the available profit it is proposed to pay a dividend of £6 per cent, free of tax, on the paid-up capital of £47,952, absorbing £2,877 2s. 5d., to write off a further sum of £1,500 for depreciation, and carry forward £442 0s. 2d. to the next account. A considerable sum has been expended during the year on electric power plant for pumping, drilling, &c., in the Deepcar mine; but as this is largely in substitution for the old steam power plant, the cost has been charged against revenue.

**Main Colliery Company Limited.**—The report for the year ended June 30 states that, after payment of all charges, including the amount brought forward from the previous year, there is a net balance of £14,357. The directors have paid an interim dividend of 3 per cent. (£1,500) upon the preference shares, and they now recommend payment of a further dividend of 3 per cent. upon the preference shares and also the full year's dividend of 6 per cent. upon the ordinary shares, which will absorb £12,042, and leave a balance of £815 to be carried to the account for the current

year. The prospects for the ensuing year are again better, a larger proportion of the output having already been sold at remunerative prices.

**Mirror Consolidation Land Syndicate (London) Limited.**—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of mine-owners, colliery proprietors, iron masters and founders, &c. Subscribers, W. Sparks and E. Sparks, both of 32, Walbrook, E.C. Qualification of directors (not yet appointed), one share. Registered office, 32, Walbrook, E.C.

**Normanby Ironworks Company Limited** recommend final dividend of 4 per cent. on the ordinary shares, making 7 per cent. for the year ended June 30.

**Scott (Walter) Limited.**—The directors recommend, subject to audit, the payment of dividends for the half-year ended June 30 last, upon the ordinary shares, of 7½ per cent., making, with the interim dividend, 10 per cent. for the year, and upon preference shares at the rate of 6 per cent. per annum.

**South Durham Steel and Iron Company Limited.**—A second interim dividend of 10 per cent. (2s. per share), less tax, on the ordinary share has been declared.

**Taylor's (Charles) Sheffield Tools Limited.**—This private company has been registered, with a capital of £2,500 in £1 shares, to purchase the business of edge-tool manufacturers, now carried on by L. F. Muller, at Old Jail Wheel, Bishop-street, Sheffield, under the style of "Charles Taylor." First directors, L. F. Muller, Oak Villas, Dore, Sheffield, and E. C. Robins, 82, Grange-crescent, Sheffield. Qualification, 100 ordinary shares.

**Taylor (George) (Brassfounders) Limited.**—This private company has been registered with a capital of £10,000 in £1 shares (2,500 preference), to acquire and take over as a going concern the business of brassfounders carried on at All Saint's-street Brass Works, Bolton, by J. R. Tate and F. Tate under the style of George Taylor; also to carry on the business of brass, iron, steel and metal founders, millwrights and metal workers, &c. First directors: J. R. Tate and F. Tate. Remuneration £350.

**Thames Smelting and Refining Company Limited.**—This private company has been registered, with a capital of £15,000 in £1 shares, to acquire and take over as a going concern the business now carried on by the Syndicate of London Limited and to carry on the business of ironfounders, toolmakers, brassfounders, metal workers and iron and steel converters, &c. First directors: C. A. Bann, A. Croft, W. Nussey, G. MacElwee and J. Adams. Qualification, 100 shares. Registered office, Norfolk House, Norfolk-street, Strand, W.C.

**Uitkyk Collieries Limited.**—Applications have been invited for 75,000 preference shares. The company has a share capital of £175,000, divided into 100,000 ordinary shares of £1 each (of which 39,410 shares have been issued and are fully paid) and 75,000 8 per cent. cumulative convertible preference shares of £1 each. The company was formed in 1909 (under the name of the Vaalbank Coal Company Limited), to acquire the freehold of a portion of the quit-rent farm Vaalbank No. 182, Middelburg district, Transvaal, South Africa. Since the company was formed additional freehold and leasehold properties have been acquired. The estimated saleable coal contents of the properties is stated to be well over 120,000,000 tons. The present output capacity of the colliery is 500 tons a day, and with the larger equipment now being separately erected will amount to at least 1,500 tons per diem. The directors have arranged for the sale of all coal available during the remainder of this year. Contracts have been entered into with the South African Railways and other consumers from 1914 inclusive for a period of several years, covering a minimum of about 160,000 tons a year. Should the preference shareholders convert their holdings into ordinary shares the capital issue would be £115,000 and unissued £60,000. The directors are Capt. A. St. John Cooke, D.S.O. (chairman), Sir James Heath, Bart., John O'Connell, W. F. Hamilton and L. S. Amery, M.P. The South African committee consists of C. L. Anderson (chairman) and the Hon. H. A. Wyndham, M.L.A. The general manager is Mr. J. G. Howard, late general manager of the Transvaal and Delagoa Bay Colliery, Witbank.

**United Irish Mining Company Limited.**—This company has been registered, with a capital of £10,000 in £1 shares, to acquire mines and coal deposits and carry on the business of colliery proprietors, coal merchants, ironmasters, steel makers and converters, &c. Minimum cash subscription, seven shares. Subscribers, J. T. Williams, T. George, F. Moore, P. George, A. Hill, G. Smith, and C. E. Parr. Qualification of directors (not yet appointed), 100 shares. Remuneration, £300 per annum. Registered office, 23 and 24, Wormwood-street, E.C.

**Vickers Limited.**—Interim dividend for the half-year ended June 30 last of 1s. per share, free of tax, on the ordinary shares, including the 740,000 recently issued, payable on August 26.

**Walker (C. and W.) Limited.**—The directors have resolved to pay an interim dividend for the six months ended July 31 at the rate of 5½ per cent. per annum, less income tax, on the cumulative preference shares, and on the ordinary shares at the rate of 10 per cent. per annum, free of income tax.

**Warner and Co. Limited.**—The report shows a profit in the year of £19,761, which, with the balance brought forward and amount taken from reserve, which has reached the maximum of £25,000, makes £23,192 for distribution. It is proposed to pay final dividend of 3 per cent. on the preference and 17½ per cent. on the ordinary shares, making 6 per cent. on the preference and 22½ per cent. on the ordinary shares for the year.

**Windsor Steam Coal Company (1901) Limited.**—The report of the directors for the year ended June 30 last states that after charging all expenses, including interest on debentures, there is a profit on the year's trading of £30,112 9s. 10d. The new winding engine for the North pit, the duplicate air-compressing plant and additional hauling engines, referred to in the last report, have been installed and are working satisfactorily. The output during the 12 months has been increased, which has resulted in a considerable reduction in the cost of working. Since the last report the company has been enrolled upon the membership of the Monmouthshire and South Wales Coal-owners' Association. The directors have elected Mr. Eric Raymond Insole to a seat on the board. Whereas the



adverse balance on profit and loss account stood at £95,211 12 months ago, this has now been reduced to £51,260.

**Yorkshire Coking and Chemical Company Limited.**—This private company has been registered, with a capital of £120,000 in £1 shares, to purchase or otherwise acquire any collieries, mines and mining grounds, &c. First directors: A. Woolley-Hart, A. V. Kochs and F. Woolley-Hart.

**Yorkshire Railway Wagon Company Limited.**—The directors have declared the usual interim dividends of 2s. 6d. per share on the £2 paid shares, and 1s. 3d. per share on the £1 paid shares for the half-year ended June 30.

### THE FREIGHT MARKET.

A moderate amount of outward chartering has been done on the north-east coast during the week. Coasting business is based on about 3s. 6d., Tyne to London, and from 3s. 9d. to 3s. 10½d. to Hamburg. The Baltic has been done at from 5s. to 5s. 3d. to Cronstadt. The Bay is steady, at 6s. to Bordeaux. The Mediterranean has been fixed for at from 8s. 9d. to 9s., according to size and position of vessel. At South Wales, chartering has been moderately active. Orders are now generally scarce, and tonnage is pressing on the market; the result is that Mediterranean rates are weak, whilst the Bay and coasting ports are dull. The River Plate is steady. At the Clyde only a moderate business is being done, at unaltered rates. At the Humber rates are weaker, but the market is fairly brisk. An average amount of homeward business is recorded. There is a fair demand from the Far East, and rates are firm. The Mediterranean and ore trades are steady. The Black Sea and district show an improving tendency. The Baltic is firm. America and the River Plate are substantially unaltered.

Tyne to Ancona, 4,500, 10s.; Aalesund, 700, 6s.; Bari, 2,400, 10s. 6d.; Bas-Indre, 3,000, 6s.; Bagnoli, 5,500, 9s. 3d.; Bayonne, 1,600, 7s.; Barcelona, 6,800, 8s. 6d.; Cronstadt, 3,600, 5s. 3d.; 2,500, 5s. 3d.; 2,300, 8s. 6d.; coke, 4,900, 5s.; Civita Vecchia, 3,800, 10s.; Cartagena, 1,500, 11s. 9d.; Fairwater, 1,300, 5s. 1½d.; Genoa, 4,000, 9s. 4½d.; 3,200, 9s. 9d., river loading; 6,600, 8s. 9d.; 3,100, 9s.; 4,000, 8s. 9d.; 4,200, 9s.; Hamburg, 2,700, 3s. 9d.; 2,750, 3s. 9d., from Dunston; 1,700, 3s. 10½d.; 2,000, 3s. 9d.; 2,200, 3s. 10½d., from Dunston; Helsingborg, 2,000, 5s.; Havre, 1,500, 5s.; 1,700, 4s. 7½d., from Dunston; Lisbon, 3,100, 7s. 3d.; London, 1,650, 3s. 6d.; Marseilles, 2,800, 9s.; 5,700, 8s. 3d.; Malta, 1,200, 7s. 6d.; 4,500, 7s. 6d.; Naples, 4,000, 8s. 6d., 700; Ostend, 2,600, 3s. 9d., f.d.; Oran, 3,000, 9s.; Port Said, 5,100, 9s.; Porto Ferrajo, 5,500, 9s.; Piræus, 4,400, 8s. 9d., 500; Pillau, 2,300, 5s. 1½d.; P-zzuoli, 3,200, 10s. 9d. coal, 11s. 9d. goods; Rotterdam, 900, 4s.; Reval, 600, 7s.; Rouen, 2,000, 5s.; Rochefort, 2,500, 6s. 3d., 500; 1,800, 6s. 6d.; Savona, 3,100, 9s.; 3,600, 9s. 9d., 300; 4,200, 9s.; Spezzia, 4,200, 9s.; Terneuzen, 1,700, 4s. 3d.; Venice, 5,000, 10s. 3d.; 4,800, 10s. 3d., from Dunston; Zeebrugge, 3,000, 3s. 3d.

Cardiff to Algiers, 4,500, 10 fr.; 3,000, 11 fr.; 3,500, 9½ fr.; 2,700, 9½ fr.; 3,600, 9½ fr.; Alexandria, 5,000, 9s., August 6; 5,000, 9s., August 7; Ancona, 5,700, 10s., August 6; 5,300, 10s. 3d.; Almeria, 3,200, 9s. 3d.; Bombay, 4,400, 12s. 9d., 500, August 11; Buenos Ayres, 4,300-4,700, 19s. 3d., August 5-15; Bayonne, 1,800, 7½ fr., 350; Belfast, 300, 4s. 6d.; Barcelona, 3,600, 9s. 3d.; Bahia Blanca, 6,500, 19s. 4½d., August; Brindisi, 4,400, 8s. 9d., 500; Cape Verde, 5,500, 9s. 9d., second half August; 9s. 6d., August 10; Caen, 780, 5s.; 720, 5s. 4½d.; Civita Vecchia, 4,400, 10s., August 15; Dakar, 5,500, 11s., second half August; Djibouti, 11s. 10½d., August 15-30; Ferrol, 900, 7s. 9d.; Genoa, 6,000, 8s. 6d.; 5,800, 8s. 3d.; 5,400, 8s. 6d., August 3; 6,600, 8s. 3d., August 4; 4,700, 8s. 9d.; 5,400, 8s. 9d.; Gibraltar, 2,200, 8s. 6d.; 1,500, 8s. 6½d.; Havre, 1,900, 4s. 9d.; 2,400, 4s. 9d.; 1,500, 5 fr.; Helvoetsluis, 1,000, 5s. 3d.; Islands, 4,400, 8s. 10½d.; 5,000, 8s. 9d., August 15; 5,000, 8s. 10½d., August 7; 3,200, 9s.; Kiel, 2,000, 6s., 400, August 5; La Rochelle, 1,800, 7 fr.; Leghorn, 4,700, 9s., 500; 4,700, 8s. 6d.; 4,000, 9s. 3d., 500; Las Palmas, 5,000, 8s. 9d., August 15; 4,400, 8s. 10½d., August; 5,000, 8s. 10½d.; 4,300, 9s.; 9s., August 10; 3,200, 9s.; Marseilles, 5,500, 10 fr., August 4; 5,000, 10 fr.; Mentone, 1,250, 12s., 300, August 6; Malta, 3,700, 7s. 3d., August 7; Madeira, 4,300, 9s.; Massowah, 4,300, 16s. 3d.; 4,000, 15s., fuel; Monte Vide, sail, 15s. 9d.; Nantes, 8 fr.; 2,200, 7 fr.; Naples, 5,300, 8s. 3d.; 4,700, 9s., 500; 4,700, 8s. 6d.; 3,800, 8s. 3d., 800; 4,000, 9s. 3d., 500; 5,400, 8s. 3d., 800; Piræus, 4,800, 9s., August 3; 4,000, 8s. 9d., August 12; 5,000, 8s. 6d., August 20; Port Said, 5,500, 9s., August 5; 4,500, 9s., August 6; 6,000, 8s. 9d., August 5; 5,000, 8s. 9d., end August; Palma, 2,000, 11s.; Pembroke, 320, 2s. 3d.; Palermo, 2,200, 10s. 6d.; 5,000, 8s. 9d., 800; Rosario, 3,400, 20s., August 15; 4,800, 20s., August 5; Rouen, 1,400, 5s. 9d.; 1,200, 5s. 7½d.; River Plate, 18s. 9d.; 4,000-5,000, 19s.; 6,000, 19s. 3d.; 5,800, 19s. 3d., August 5; 4,200, 19s. 3d., second half August; 19s. 3d., August 10-25; 4,300-4,700, 19s. 3d., August 5-15; Reggio, 3,500, 10s., 350; Syracuse, 2,300, 11s., 300; Salerno, 3,000, 10s. 9d.; 2,700, 10s. 6d.; St. Vincent, 5,500, 9s. 9d.; Santa Liberta, 10s. 6d.; St. Malo, 1,900, 5s.; 750, 5s.; Simonstown, 5,000, 16s. 6d., August 1-15; Admiralty, Sables, 1,500, 7-62½ fr.; Syra, 4,800, 9s., August 3; St. Servan, 1,900, 5s.; 1,350, 4s. 9d.; St. Nazaire, 2,200, 7½ fr.; Salonica, 3,000, 12s. 9d.; Savona, 5,400, 8s. 6d., August 3; Taranto, 2,100, 10s., 600, August 6; 4,500, 10s. 9d., 400; Torre Annunziata, 4,400, 10s., August 15; Teneriffe, 5,000, 8s. 9d., August 15; 4,400, 8s. 10½d., August; 3,200, 9s.; Tripoli, 3,200, 15s., 200; Tarragona, 2,800, 8s. 6d.; Tunis, 3,200, 14 fr. coal, 15 fr. fuel, early August; Valencia, 2,400, 10s. 6d.; 2,000, 10s. 6d., 400; 1,250, 11s. 6d., 200; Venice, 6,400, 10s.; 5,700, 10s., August 6; 5,500, 10s. 3d.; 10s., 500, August 2; 5,000, 9s. 7½d., August 16.

Newport to Gibraltar, 2,100, 8s. 6d.; St. Nazaire, 2,200, 6½ fr.; Leisoes, 1,300, 8s. 6d.; Leghorn, 4,000, 8s. 9d.; Algiers, 2,700 9½ fr.; 4,400, 10 fr.; Pernambuco, 2,700, 16s. 9d., August 4; Santander, 1,800, 7s. 9d.; Salonica, 3,100, 12s. 9d.; Almeria, 3,300, 9s. 3d.; Vonic, 5,400, 10s.; Ancona, 5,400, 10s.; Tripoli, 3,000, 15s.; Genoa, 6,000, 8s. 6d.; Marseilles, 5,000, 10 fr.; Bahia Blanca, 19s. 4½d.; Puerto Militar, 20s., August 11.

Swansea to Genoa, 1,500, 9s. 6d., coal, 10s. 3d. fuel; 1,500, 9s. 3d.; Caen, 9s.; Savona, 1,500, 9s. 3d.; 9s. 9d.; Sables, 1,200, 8 fr.; Caen, 680, 5s. 6d.; 1,000, 5s. 4½d.; Honfleur, 600, 5s. 6d.; Rochefort, 1,700, 8 fr.; Granville, 900, 5s. 3d.; Dublin, 450, 4s. 6d.; 400, 4s. 3d.; Alexandria, 3,000, 9s. 6d.; 9s. 6d. coal, 10s. 3d. fuel; Charente, 1,900, 8 fr.; Charvet, 700, 5s. 6d.; Rouen, 900, 5s. 9d.; 1,900, 5s. 9d.; Melilla,

1,300, 14s. 3d. and 15s.; Nantes, 1,300, 8 fr.; La Pallice, 2,300, 7 fr.; La Rochelle, 2,900, 7 fr.; Leghorn, 9s. 6d.; Genoa, sail, 2,250, 9s. 9d., August; Catania, 2,100, 10s. 6d. coal, 11s. 3d. fuel.

Hartlepool to Genoa, 5,200, 9s. 3d.; Savona, 5,200, 9s. 3d.; Spezzia, 5,200, 9s. 3d.; Civita Vecchia, 3,800 10s.; Reval, 1,550, 5s. 3d.

Forth to North Norway, 1,200, 6s.; Assens, 1,800, 5s. 4½d.; Cronstadt, 3,700, 5s. 4½d.

Walos to Casa Blanca, 2s. 6d., fuel, August 5; Monte Video, sail, 16s., August; 16s., early August; 15s. 9d., 125 discharge; Chili and home to United Kingdom-Continent, sail, 43s.

Blyth to Malaga, 1,900, 10s. 9d., 350, 11s., 300, option coke, 13s. 9d.; St. Petersburg, 3,300, 5s. 4½d.; Rouen, 2,000, 5s.; Havre, 1,900, 4s. 9d.; 1,400, 4s. 9d.; Trapani, 2,200 10s. 6d.; Rostock, 1,600, 5s. 3d.

Rotterdam to Genoa, 3,400, 8s. 6d., August 10; Adelaide, Port Pirie, or Wollaroo, sail, 1,994 n.r., 18s. one port, 22s. two ports, coke; Barcelona, 3,400, 9s. 9d.; Huelva, 5,400, 8s.; Bilbao, 3,500, 5s. 9d., August 6; Naples, 4,000, 8s., first half August, Bordeaux, 3,900, 6s. 1½d. steam coals, 5s. 10½d. fuel, first half August; Algiers, 1,200, 10 fr., August 2.

Seaham Harbour to St. Nazaire, 1,700, 6s. 6d.; Malmö, 1,800, 5s. 4½d.

Hull to Riga, 2,500, 4s. 10½d.; 2,400, 5s., 400; 2,100, 5s.; Cronstadt, 2,300, 5s. 3d.; 2,300, 5s.; 4,000, 4s. 9d.; 3,000, 5s.; 4,500, 5s.; Pernau, 1,700, 5s. 3d.; Nakssov, 1,050, 5s. Glasgow to Alexandria, 9s., Genoa, 3,800, 9s.

Immingham to Riga, 2,500, 4s. 10½d.; 1,800, 15s.; 2,400, 5s., 400; Cronstadt, 4,000, 5s.; Pernau, 1,550, 4s. 9d.

Goole to Bruges, 750, 4s. 3d.; Cherbourg, 650, 5s. 6d.

Hamburg to San Francisco, sail, 18s.

Lareilly to Dieppe, 900, 5s. 1½d.

Wear to Bordeaux, 4,000, 5s. 6d.; Cronstadt, 4,900, 5s. Antwerp to Libau, 2,100, 6½ marks, phosphate; San Francisco, sail, 20s., August; Buenos Ayres, sail, 19s. 3d.

Forsey to Rouen, 600, 7s.

Port Talbot to Fowey, 240, 4s. 6d.

Homeward charters:—Sulina, 4,400, Northern ports, basis about 13s., ppt.; Azof, 10s. 9d., Antwerp or Rotterdam, 11s. Emden or Weser, 11s. 3d. Hamburg, with 3d. less barley, August; 6,000, Rotterdam, 10s. 3d., with 3d. less barley, August; 7,400, Rotterdam 11s. 6d., Hamburg 12s., on d.w., early August; 5,100, 12s. auy, 12s. 6d. Hamburg, 3d. less barley, 3d. less Rotterdam, August 10; South Russia, 4,400, Rotterdam 10s., Weser 10s. 3d., Hamburg 10s. 6d., with 3d. less barley, August 10-25; Baltimore, 2,333 net, Antwerp or Rotterdam, 2s. 9d., August; 2,488 net, Rotterdam, 2s. 7½d., August; 25,000 qrs., 2s. 7½d., August-September; San Lorenzo, 4,500, 10 per cent, United Kingdom-Continent, 17s. 9d. o.c., less 6d., September; 4,400, 10 per cent., 17s. o.c., less 6d., October; 5,700, 10 per cent., 18s. o.c., less 6d., cancelling September 10; 17s. 3d. o.c.; 4,800, 10 per cent., 18s. 6d. o.c., less 6d., August 5; 5,200, 10 per cent., 17s. o.c., less 6d., September-October; 5,500, 10 per cent., 19s. o.c., less 6d., August; 4,200, 10 per cent., 19s. 6d. o.c., less 6d., August 5-28; 6,600, 10 per cent., 17s. o.c., less 6d., August 15-28; Gulf, 1,100 stds., 10 per cent, Genoa or Castellamare, 142s. 6d., August-September; 1,200 stds., South Africa, 165s., August-September; 30,000 qrs., 10 per cent., Rotterdam, 3s. 6d., August; 2,250 net, 3s. 6d., August; 2,512 net, United Kingdom-Continent, 16s. 6d. net form, end August; Carthage, 5,500, Rotterdam, 7s. 3d., f.t., ppt.; Bilbao, 3,000, Cardiff, 4s. 6d., ppt.; 2,200, St. Nazaire, 7 fr., ppt.; 3,200, Boulogne, 5s. 6d., August; 3,200, Middlesbrough, 5s. 3d., ppt.; 2,300, 5s. 6d., ppt.; 3,200, Rotterdam, 5s. 9d., ppt.; Narvik, 6,500, Philadelphia, 7s. 3d., ppt.; North Pacific, 2,971 net, U.K.-Cont., 40s., with options, September; Castro Urdiales, 3,000-3500, Middlesbrough, 5s. 6d., ppt.; nitrate ports, 2,140 net, United States, 24s., August-September; sail, 30s. 3d., United Kingdom-Continent, less 9d., September-October; New York, sail, 21½c, Monte Video or La Plata, oil; Port Pirie, 7,460 net, Antwerp, 28s., ore, early August; Archangel, 700 stds., Hull, 50s.; Novorossisk, 2,900, Denmark, 14s. 9d. one port, 15s. 3d. two ports, oil cake; Haiphong, 2,737 net, Havre or Dunkirk, 27s. one port, 28s. both ports, Rouen 28s. 6d., rice, 1s. extra if maize, August-September; St. Petersburg, 5,700, Rotterdam 1s. 6d., London 1s. 7½d., wheat basis, early August; Huelva, 4,800, Savannah, 9s. 6d., Tinto terms, August; 4,000, Rotterdam, 7s. 6d., f.d., August; Campbellton, 1,800 stds., United Kingdom, pp., 52s. 6d. one port, 54s. 6d. two ports discharge, August; New Orleans or Galveston, 28,000 qrs., Antwerp or Rotterdam 3s. 6d., Hamburg 3s. 9d., August; 2,700, 10 per cent., Antwerp, Rotterdam or Middlesbrough, 3s. 9d., October 1-29; Newcastle, New South Wales, sail, 24s., Valparaiso or Taltal; Mejillones, sail, 30s., United Kingdom-Continent, spot; Taltal, sail, 30s., United Kingdom-Continent, completing North 30s. 9d., September; Montreal, 2s. 9d., Avonmouth or Rotterdam, August; Savannah, 48s. 6d., United Kingdom - Continent, September; Kherson, Nicolaieff or Odessa, 5,800, Rotterdam 10s., Hamburg 10s. 6d., August 4; Odessa, 4,000, Rotterdam, 9s. 7½d. on d.w., spot; Kurrachee, 4,500, United Kingdom-Continent, 18s. 9d. p.p., 19s. 6d. Marseilles or St. Louis du Rhone, 20s., Dunkirk, August; Gulf timber port, sail, 16½ dols., River Plate; British Columbia, sail, 75s., Cape Town; Puget Sound, sail, 50s., Callao; time charter, Baltic trade, £725, about four months, delivery and redelivery United Kingdom-Continent; time charter, European trade, 2,800, £675, 12 months' delivery, October; Saigon, 27s. one port, 28s. 6d. two ports, Marseilles, Havre or Dunkirk, option Bordeaux 29s.; Nicolaieff or Odessa, 4,800, London or Rotterdam 10s. 6d., Hamburg 11s., no reduction, barley, August 5; Kherson, Nicolaieff, Odessa or Theodosia, 6,000, Rotterdam, 10s. 6d., August 15; Burmah, 2,474 net, United Kingdom-Continent, 27s. 6d. o.c., September; New York, 1,938 net, Rotterdam 2s. 7½d., Antwerp 2s. 9d., mid-August; Nantes, 2,000, Rotterdam, 4s. 1½d., ppt.; Villaricos, 5,400, Rotterdam, 5s. 6d., ppt.; Rivadesella, 1,750, Rotterdam, 6s. 6d., mid-August; Bordeaux, 1,800, Bristol Channel, 5s. 6d., ppt.; Saigon, 28s. 6d., Liverpool, for 2,500 tons rice meal, August; Baltimore, 2,296 net, Rotterdam, 2s. 7½d., August-September; Wilmington, 150 fathoms, Liverpool or Bremen, 43s. 9d., September-October; Ghent, 6s. 6d., Pillau or Newfairwater, phosphate, ppt.

It is stated that the advisability of resorting to oil fuel is engaging the serious attention of the railway companies, and experiments and reports are being prepared by experts at the instance of the directorates of three of the leading trunk lines.

### CONTRACTS OPEN FOR COAL AND COKE

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

#### Abstracts of Contracts Open.

ALDERSHOT, AUGUST 5.—80 tons (more or less) of best Welsh steam and house coal, for the Urban District Council. Particulars from Mr. Fred C. Uren, the surveyor.

BARNSELEY, AUGUST 14.—House coal, nuts and coke, for the Corporation Education Committee.

BATLEY, AUGUST 6.—For the Corporation, 20,000 tons of screened gas coal. Forms from the manager at the gas-works.

BRUSSELS, AUGUST 9.—Fuel, necessary to heat the communal buildings of Etterbeek-lez-Bruxelles. Specifications at the Bureau des Travaux Publics, Maison Communal.

BURY, AUGUST 15.—About 40,000 tons of gas coal, 500 tons of boiler slack, 500 tons of burgy, 300 tons of house coal, 50 tons of Wallsend coal, for the Corporation. Forms from the engineer and general manager, Gasworks.

BURY ST. EDMUND'S, AUGUST 11.—Steam and house coal, for the Electricity Supply Committee. Forms from Mr. S. E. Day, borough electrical engineer, Corporation Electricity Works, Bury St. Edmunds.

CAMBRIDGE, AUGUST 9.—Coal and coke to schools in the administrative county, for the Cambridgeshire Education Committee. Forms from Mr. Austin Keen, education secretary, County Offices.

CLACTON-ON-SEA, AUGUST 6.—About 5,000 tons of best screened gas coal, for the Urban District Council. Forms from Mr. Sydney Francis, Town Hall Buildings, Clacton-on-Sea.

CORK, AUGUST 12.—Twelve months' supply from August 13 of best double-screened steam coal, for the Harbour Commissioners. Forms at the engineer's department, Commissioners' Offices, Custom House-street.

DARLINGTON, AUGUST 30.—Best steam coal, for the Tees Valley Water Board, up to June 30, 1914, at the Merrybent Siding, Darlington, approximately 60 tons per week.

DOWNPATRICK (IRELAND), AUGUST 15.—Good English and Scotch household coal, 200 tons, more or less; steam coal, about 1,200 tons; gas coal, about 300 tons, for the Committee of Management of Down District Lunatic Asylum. Forms from Mr. Samuel Rea, clerk.

DROMBANA (IRELAND), AUGUST 4.—100-120 tons of best steam coal, for the Drombanna Co-operative Creamery Company.

FLEETWOOD (LANCS), AUGUST 5.—Moderately rough coal required in the Electricity Department, for the Urban District Council. Forms on application.

GREENOCK, AUGUST 4.—For the Corporation, 22,000 tons of steam coal (washed singles and pearls). Forms, on payment of 5s. (returnable), from Mr. J. A. Robertson, burgh electrical engineer, Municipal-buildings, Greenock.

HASTINGS, AUGUST 13.—For the Guardians, 650 tons of hard steam cobbles. Forms from Mr. A. R. Inskip, clerk, 11, Wellington-square, Hastings.

HAVERFORDWEST, AUGUST 18.—About 2,000 tons of double screened gas coal of the very best quality, for the Corporation. Forms from Mr. R. T. P. Williams, town clerk.

LINTON (CAMBS.), AUGUST 6.—180 to 230 tons of coal, for the Guardians, of the following kinds, viz., Newstead hards, Annesley hards, Portland hards, mixed hards (hand picked). Forms from Mr. Wm. Richardson, clerk to the Guardians.

LONDON, AUGUST 12.—300 tons of house coal, for the Managers of the Poplar and Stepney Sick Asylum District. Forms from Mr. Sydney G. Wright, clerk to the Managers, Bow, London, E.

NEWPORT (I.W.), SEPTEMBER 11.—Fuel, for the Isle of Wight County Council. Particulars from Mr. J. Dufton, clerk, County Council Offices, Newport, I.W.

NORTHALLERTON, AUGUST 16.—Coal and coke, for the North Riding of Yorkshire County Council (Education Committee), to any or all of the elementary schools in the North Riding. Forms from the secretary, Education Offices, County Hall, Northallerton.

PLYMOUTH, AUGUST 6.—25 tons of coal and 35 tons of coke to the Plymouth Royal Eye Infirmary. Forms from Mr. Ernest Howard, hon. secretary, 7, Princess-square, Plymouth.

RAMSGATE, AUGUST 5.—500 tons of steam coal of the following qualities, for the Board of Trade, as the Board may select:—Yorkshire, North Country. The coal to be delivered and stacked into store at Ramsgate Harbour, free of all charges.

STRATFORD-ON-AVON, AUGUST 8.—6,000 tons of good screened gas coals or nuts, for the Corporation. Forms from the engineer and manager, Mr. J. S. Cranmer.

The date given is the latest upon which tenders can be received.

### CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

AMSTERDAM (HOLLAND), OCTOBER 13.—Refuse Plant Installation.—For the delivery and erection of a complete installation for a refuse-sorting and incineration plant. Conditions, the Municipal Printing Works (Stadsdrukkerij), Nes (7 sh.). Detailed information at the Town Hall.

ARDBRACCAN (IRELAND), AUGUST 6.—Wells, &c.—For sinking and building pump wells, and erecting pumps thereon, at Ardbaccan and Balreask, for the Navan Rural District Council. Particulars from the clerk.

ARDCLOUGH (IRELAND), AUGUST 8.—Pump.—For the sinking of a well and the erection of a public pump at Ardcloagh.

HARRINGTON.—Shaft Enlargement.—For the ripping and enlarging of a shaft at Harrington Collieries, Cumberland. Particulars, the manager.

LONDON, AUGUST 6.—Wheels and Axles.—Wheels and axles, for the directors of the East Indian Railway Company, as per specification to be seen at the company's offices.

LONDON, AUGUST 14.—Flat Iron Bars, &c.—The London Agent for the Egyptian Flat Iron notices that tenders are invited by that Department for the supply of flat iron bars



angle iron. Forms, &c., from the office of Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.\*

MELBOURNE (AUSTRALIA), AUGUST 19—SEPTEMBER 2.—*Steel Rails, &c.*—H.M. Trade Commissioner for Australia (Mr. G. T. Milne) reports that tenders are invited by the Railways Construction Branch of the Commonwealth Department of External Affairs for the supply and delivery of about 7,625 tons of 80 lb. steel rails, 498 tons of steel fish-plates, 250 tons of iron dog spikes, 69½ tons of steel fishbolts, and 127,000 steel sleepers, required for the Pine Creek to Katherine River Railway. Also by the Railways Construction Branch of the Commonwealth Department of Home Affairs for the supply and delivery of about 44,850 tons of 80 lb. steel rails, 2,998 tons of steel fishplates, 1,866 tons of iron dog spikes, and 183 tons of steel fishbolts and nuts required for the Kalgoorlie to Port Augusta Railway.\*

OUULTON, AUGUST 7.—*Storage Tank*.—Storage tank for cold water, of 1,400 gallons capacity, constructed with cast iron plates, properly bolted together, at Oulton Workhouse, for the Mutford and Lothingland Guardians. The tank to be similar to the existing tank, which measures 10 ft. by 5 ft. by 4 ft. 6 in., and to be connected up to same.

PLYMOUTH, AUGUST 27.—*Turbo-alternator, &c.*—For a steam turbo-alternator, condenser, &c., for the Corporation. Particulars from the borough electrical engineer, deposit 1 guinea.

SHANGHAI (CHINA), AUGUST 26.—*Turbo-Alternators, &c.*—For the supply and delivery f.o.b. British port of the following, for the Municipal Council:—(No. 1) two steam turbo-alternators, each of 5,000 kw. capacity, complete with surface-condensing plant, &c.; (No. 2) four water-tube boilers, evaporating 23,000 lb. each, with integral superheaters, mechanical stokers, economisers, &c. Specifications from Messrs. Preece, Cardew, and Snell, 8, Queen's-gate, Westminster, S.W. Deposit £2.

TOMBEGH (COUNTY CARLOW), AUGUST 12.—*Girder Bridge*.—For the building of a steel girder bridge over the Deeren River at Tombegh, in the county of Carlow. Plans, &c., at the secretary's office.

TOTTENHAM, AUGUST 5.—*Steelwork*.—For the supply and delivery of steelwork for a proposed cartshed at the Central Depot, Tottenham, for the Urban District Council. Plans, &c., Mr. W. H. Prescott, M.Inst.C.E., engineer to the Council, at the Council Buildings, The Green, Tottenham.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

The Middle Ward District Committee of Lanarkshire have resolved to make application to the Local Government Board for Scotland for authority to prepare a town planning scheme for Shotts and Dykehead districts.

**Doncaster and Town Planning.**—Real progress is being made with the town planning of the new colliery districts around Doncaster. This statement was substantiated at a Local Government Board enquiry, held at the Poor Law Offices last Friday, by Mr. Thomas Adams, who attended to take evidence relative to the application of the Doncaster Rural District Council for authority to prepare a town planning scheme for Askern and portions of the parishes of Sutton, Campsall, Norton, Moss, Owston, Fenwick and Burghwallis. The enquiry was largely attended by representative people, and a pleasing circumstance was that no opposition was offered.—The clerk to the Doncaster Rural District Council, in opening the proceedings, reminded those present that the Local Government Board had for some time been in communication with authorities in the area as to the desirability of a town planning scheme, and the council he represented were convinced such a scheme might be of value to them in the development of their area, which had come about suddenly in consequence of the opening up of so many collieries. It had been decided that the whole of the Doncaster Union area should be town-planned, and that a commencement should be made at once with the northern part of the district. This was convenient, because there was a boundary at the north, and also because of the colliery which had recently been sunk at Askern, and where houses were being rapidly erected. Houses were urgently required by the Askern Main Colliery Company at Askern, who quite recently advertised for the erection of 1,000 dwellings. Taking the Askern Colliery as the centre, it would be necessary that these 1,000 houses should be erected somewhere in the vicinity, so the council had included other parishes in the area to be town-planned. A radius of a mile and a-half had been fixed, so as to make the inclusion of the 1,000 houses a certainty. In some cases plans had been submitted where owners took full advantage of the present by-laws, which allowed as many as 56 houses to the acre. Under the by-laws one owner might generously reduce his houses to 40 to the acre, and another to 30, while yet another took full advantage of the total allowed. To the man who desired to give more air space to the houses, this was unfair. The council had recently disapproved plans which proposed 50 houses per acre, whereupon amended plans were submitted for 30 to the acre. If Askern was to be the centre of a large mining industry, it would become very busy, and so the council desired power to widen the roads when property was demolished. If there were a large number of claims for compensation it would be absolutely impossible for the scheme to proceed.—The Mayor of Doncaster (Councillor J. T. Kay) made an interesting statement. The town-planning scheme, he said, was going forward, and there would be five applying authorities. The co-operation of the borough of Doncaster would certainly be forthcoming, and the full scheme would incorporate the whole of the district.—The borough surveyor of Doncaster (Mr. F. O. Kirby) said, so far as Doncaster was concerned, he was hoping the application, which would include Balby, Wheatley, and a portion of Bentley, would be made within two months.—It was mentioned that town planning was necessary at Thorne, where developments had been delayed in consequence of the difficulties met with at the colliery, but where work had now been recommenced. If it proceeded the district would be rapidly.—The inspector elicited that Thorne is detached from Doncaster to be dealt with alone, so that the people there obtain their drinking water from the canal.—The enquiry, which lasted three hours, then closed.

## CATALOGUES AND PRICE LISTS RECEIVED.

Mr. Chas. H. Blume, of Mitcham, Surrey, sends us revised list of "Megomac" and "Insulac" insulating varnishes for electrical machinery.

Messrs. Siemens Bros. Dynamo Works Limited (38 and 39, Upper Thames-street, E.C.) send us leaflets relating to tumbler and other switches and "chain-pull" switch lamp-holders.

The "Bijoli" concrete block press (Shircliff patent) is made by Messrs. Shircliff Brothers, of Hampton Hill, Middlesex, and makes both solid and hollow blocks, either plain or moulded, half blocks, quarter blocks, and slabs.

Mr. Fred. J. Down (6, 7 and 8, Crutched Friars, E.C.) has favoured us with a catalogue relating to a new style of tool for drilling holes. This is a type of spring hammer, the spring being equipped with a tension adjustment, operated by means of a ratchet and crank. A telescopic extension is supplied for overhead drilling, and there are various suitable forms of drill for different materials. A further leaflet relates to a "gear shield," a non-grease graphite lubricant that is in use at a large number of collieries in this country.

Messrs. Erith's Engineering Company Limited (70, Gracechurch-street, London) have issued a second edition of their list of recording heaters and heater softeners for condensing plants, &c. This heater showers the water in fine particles over a series of cataracts, through an oil-free steam bath. The make-up cold water is admitted by an automatic float valve. The heated and filtered water slowly passes through a Weir tank, in which the recorder is situated, and thence to the feed pump. The measuring apparatus possesses the feature that the quantity of water is directly proportional to the head, so that the depth is an accurate measure of the weight. With these heaters, which are specially applicable to exhaust steam plants, there may be associated the Erith softener on the "no lime" process.

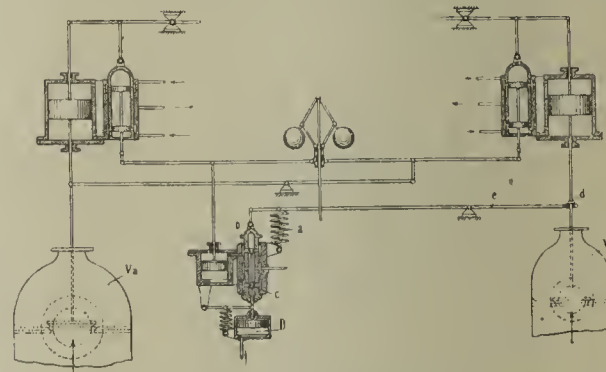
We have received from Messrs. Tuck and Co. Limited (103, Bute Docks, Cardiff), catalogue information relating to a new tram shackle and other appliances. Hughes' patent "Acme" tram shackle is self-locking, and existing shackles can be converted. Another shackle of the rigid type is made in three sizes, for light-rope, horse and heavy haulage. Hughes' patent swivel conical-grooved wedged haulage sockets allows all twist to leave the rope; a socket for Lang's lay ropes is made with or without tapered recess. In a test by Lloyds with a 3½ in. Lang's lay steel wire rope, the rope commenced to draw through the wedges at 14 tons, and the rope broke on the wedges at 43·7 tons. The firm are makers also of bottle or other types of winding and haulage sockets and capels, guide clamps, &c. Reference may also be made to the "Alpha" cable connector, made in brass or aluminium.

## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

1384 (1913). *Improvements in or relating to the Purification of Coal and other Gas.* The Manchester Paint and Varnish Company Limited and T. W. Jordan, both of Grace-street, Ancoats Vale, Manchester, Lancashire.—Relates to the purification of coal and other gas, and has for its object to provide an improved liquid or material for and process of treating such gas for the purpose of preventing the deposit of naphthalene therefrom in the mains and service pipes. According to the invention, solvent naphtha is saponified and the gas brought into direct or actual contact with same, whereby the naphthalene is taken up or absorbed by the solvent naphtha, which volatilises and passes forward with the gas and acts to prevent the naphthalene from depositing in the mains and service pipes. According to one way of carrying the invention into practice, 15 lb. of soft soap are added to 2½ gallons of water. The water is then added to and thoroughly mixed with 5 gallons of solvent naphtha to saponify the same. (Three claims.)

5317 (1913). *Improvements in Governing Turbines Operated by High- and Low-pressure Elastic Fluid.* Bergmann Elektrizitäts-Werke Aktien-Gesellschaft, of 23/32, Oudenarderstrasse, Berlin, Germany.—In Specification No. 4694 of 1913, an arrangement for governing engines is described in which the movement of the exhaust steam throttle valve is utilised to re-set to its mid-position the slide valve of the piston motor which operates the live steam valve, whereby the latter retains its position as long as the exhaust steam valve is affected by the speed governor, whilst the movement of the exhaust steam throttle valve due to the action of the pressure governor starts an adjustment of the live steam throttle. If the two-pressure turbine is coupled in parallel with other machines, it will either drive such machines or be driven by them when the speed varies in this manner, which of course is undesirable. These objections are overcome by the present invention. The movement of the pressure governor to the connecting rod of the speed governor is transmitted indirectly by means of an auxiliary control. The pressure governor D adjusts a piston slide c in a movable cylinder b. The return movement of the slide c is effected by the pressure governor D itself, so that only with a certain pressure in the collector does the low pressure control come to rest. The cylinder b can be set to the same amount as, with increasing pressure

in the collector, the pressure governor is in a position to move. The adjustment of the cylinder is dependent on the movement of the live steam valve. If the latter is closed, the stop d on the live steam valve spindle has lifted the cylinder b through lever e to its upper position. The stroke of the pressure governor D is so proportioned that the piston slide c closes the ducts in the cylinder b when the latter is in its uppermost position and when the pressure governor is in its highest position. In this position of the cylinder b—that is, with the live steam valve V<sub>1</sub> closed the pressure governor, even with the highest pressures in the collector, will not open the exhaust steam throttle valve V<sub>2</sub>, whilst as the pressure drops in the collector the pressure governor uncovers the ports in the cylinder b, so that the exhaust steam valve is closed sufficiently to enable the original pressure to be attained again—that is, until the pressure governor and with it the piston slide c has recovered its original position. If, on the other hand—for example, when running with both live and exhaust steam—the live steam valve is also opened to a certain degree, the



spring a draws the cylinder b into its lower position, since the stop d has released the lever e. In the position of rest the pressure governor is removed from its highest position by a certain amount. Under these conditions both rising and falling pressure in the collector cause the pressure governor to adjust the exhaust steam valve, since the piston slide c can uncover the ports in the cylinder b. The live steam valve follows the conditions of the exhaust steam valve in a reverse sense. As the pressure increases in the collector the exhaust steam valve is open until the live steam valve is closed. In this position of the live steam valve, the cylinder b is again drawn into the upper position, so that the action of the pressure governor when pressure rises in the collector is completely prevented. The exhaust steam throttle valve can be further opened correspondingly with the load, only by means of the speed governor. Obviously the pressure governing can be made dependent, instead of on the live steam valve, on the position of some other organ or on the condition of the steam, which varies according to the position of the fresh steam valve. (Two claims.)

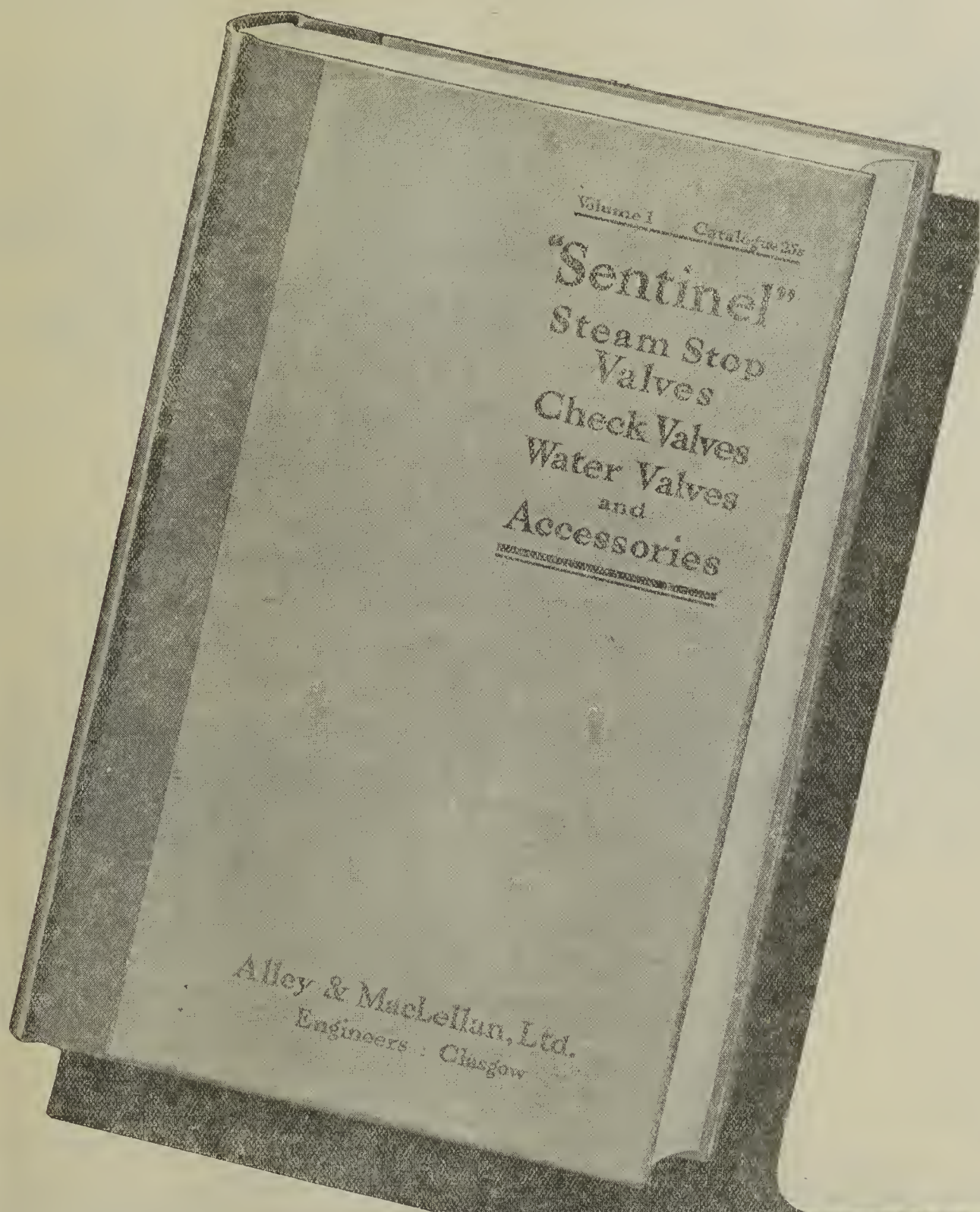
5416 (1913). *Improvement in the Treatment of Coal or Carbonaceous Waste Materials for the Manufacture of Briquettes or Fuel Blocks.* J. Wetter, of 37 and 39, Essex-street, Strand, London (a communication from Naamlooze Vennootschap Briquet Company (Briquet Maatschappij), manufacturers, of 29, Keizersgracht, Amsterdam, Holland).—Recent experiments have shown that by using any kind of tar, even thick tar, instead of pitch, the same or even a better effect may be obtained, provided that the mixture of coal and tar is intensely treated for some time in a heavy edge runner mill, by which the at first moist mixture gradually becomes less moist, plastic and more sticky under the pressure of the runners and by the kneading and friction thus produced, until it finally assumes a dry and briquettable condition. The quantity of tar varies from about 7½ per cent. to about 12½ per cent. according to the quality of coal, and is usually 9 to 10 per cent. of the weight of coal. The solidification and hardening of the actual binding substance (viz., the pitch) which is necessary for proper cohesion or binding, takes place by the fact that in consequence of the intense friction and comminution produced by the edge runner the most volatile and liquid constituents of the tar are absorbed by the coal, thus leaving behind a kind of solid pitch as an adhesive substance, which under the mechanical influence of the very heavy pressure of the edge runners produces a very strong surface adhesion. The constituents absorbed by the coal take part in the binding, probably by causing the particles of coal themselves to become adhesive on their surface (as is the case with bituminous lignite). Instead of coal, waste materials chiefly consisting of coal may be used. Specially important is the fact that the tar briquettes are less liable to soften under the influence of heat and that they stand better in the fire. (One claim.)

19424 (1912). *Improvements in Valve Apparatus for Percussive Rock Drills and like Tools.* G. Rayner, of Grange Farm House, Carterknowle-road, Abbeydale, Sheffield.—Relates to a valve mechanism in which a circular valve has three collars or pistons which provide two annular recesses or chambers, the middle collar serving in one construction to divert the supply of motive fluid to each end of the cylinder alternately, and in another construction to control the exhaust and the end collars serving to control the exhaust outlets in one construction, and in another construction to control the inlets, the end collars or the ends of the



## All Users of Valves

of any kind, or for any purpose,  
will find much information in this  
volume. It is not the usual trade  
catalogue.



A free copy will be sent to  
engineers and other responsible  
enquirers on application to

**Alley & MacLellan**  
LTD

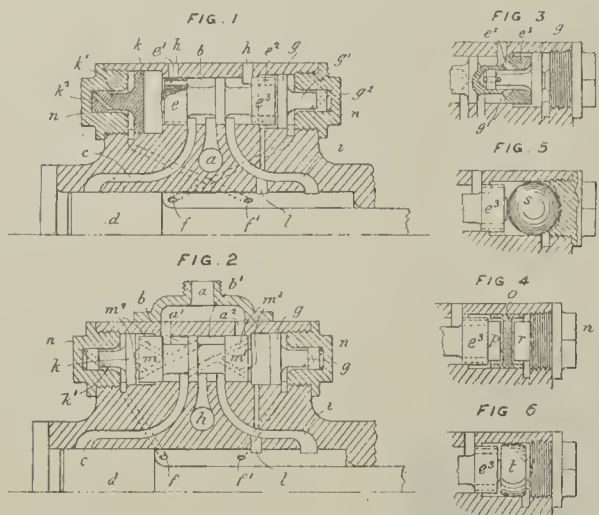
"Sentinel" Works  
Polmadie - - Glasgow

Telegrams :  
Alley, Glasgow.

Telephone :  
751 Queen's Park  
(5 Lines)

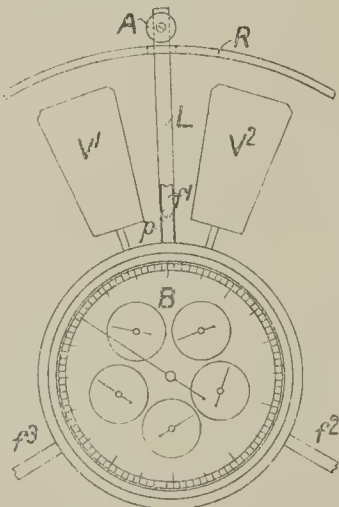


chest being provided with separate plungers which independently of the valve. The invention has for its object improvements therein whereby separate plungers or their equivalent of improved design are utilised to drive the valve into position, and special ports formed in the valve end collars are provided to lock the valve in its extreme positions. According to the invention, the separate plungers are formed with a larger area than the valve collars and work in correspondingly enlarged ends of the valve chest, which communicate with the main cylinder by means of passages which are alternately uncovered and covered by the main piston. The end collars of the valve, and in some cases the middle collar also, are formed with ports which permit of the motive fluid passing freely to the



ends of the valve in order to lock the valve in position, or to exhaust air from the valve ends, according to the position of the main valve. Such ports also provide the motive fluid to return the auxiliary pistons or plungers to their original positions. Several examples of valve apparatus constructed according to the invention are illustrated in the accompanying drawings. Fig. 1 is a section of a valve apparatus provided with disc auxiliary pistons, wherein the supply of motive fluid is controlled by the middle collar; fig. 2 is a similar section showing a modification of fig. 1, wherein the exhaust is controlled by the middle collar; figs. 3, 4, 5 and 6 illustrate various types of auxiliary pistons. (Four claims.)

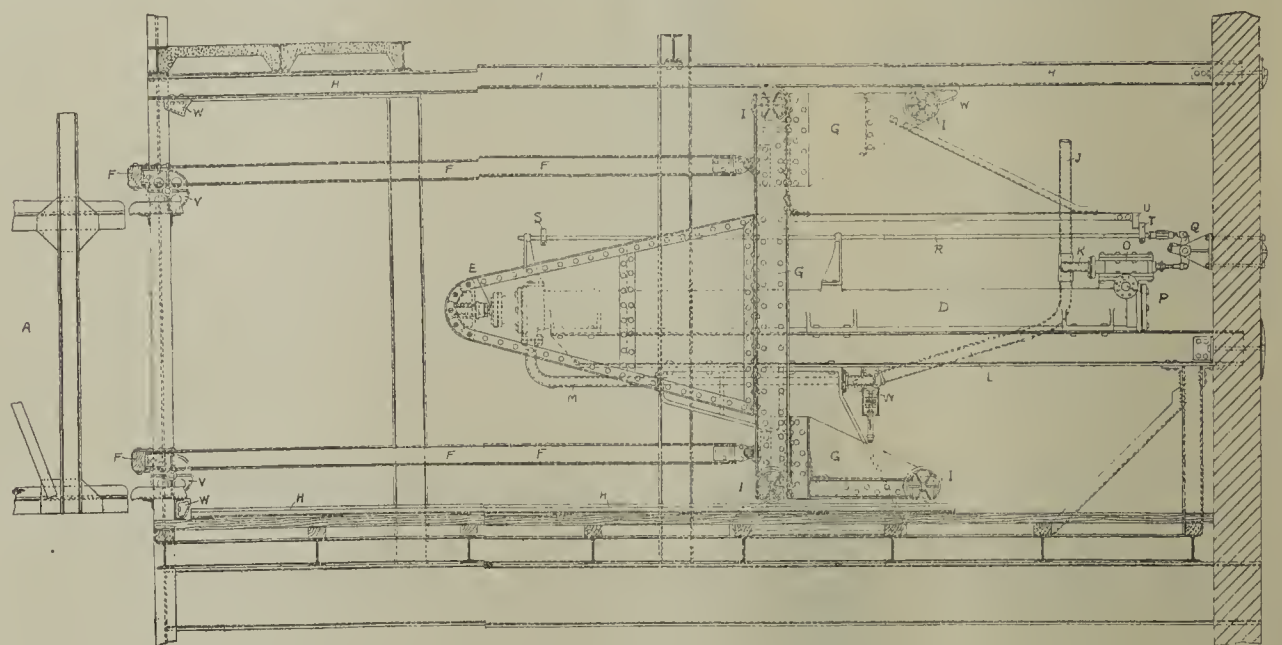
16032 (1912). *Improvements in and Relating to the Counting Mechanism of Anemometers.* H. Briggs, Heriot-Watt College, Edinburgh.—Consists in the attachment of a weight to a lever or catch, or otherwise of making the lever or catch sufficiently heavy, so that, when the anemometer is jerked to one side the weighted lever or catch throws the counting mechanism into gear, while when the instrument is jerked in the opposite direction the weighted lever



or catch throws the said mechanism out of gear. The invention is particularly useful when the anemometer is supported on the end of a rod, inasmuch as it allows of the counting mechanism being thrown in or out of gear at pleasure and merely by a quick turn of the wrist. The invention is illustrated in the accompanying drawing, in which B is the dial face in the middle of an anemometer of the Biram type. (Two claims.)

20755 (1912). *Improvements in or relating to Decking Plant for Collieries and the like.* W. J. B. Leech, of the firm of Leech, Goodall and Co., of Pepper-road, Hunslet, Leeds, and the Rother Vale Collieries Limited, of Treton, near Rotherham, Yorkshire.—Relates to improvements in connection with decking plant for collieries and the like, more especially of the type in which the full tubs are discharged from the cages and the empty tubs are simultaneously loaded into the same cage by fluid-pressure ram apparatus, the cages having two, three or other convenient number of decks or floors, and each deck being adapted to receive two, three or more tubs. Said invention consists more particularly in the application, to a colliery decking plant of this type, of a special form of compressed-air or other fluid-pressure ram apparatus, adapted to be put into motion for its working stroke by lever connections actuated by the attendant from any convenient part of the decking plant, and having an automatic return movement independent of the attendant. The accompanying drawing is a plan view showing arrangement of cylinder and ram. According to the invention, tub lifts for the empty tubs are

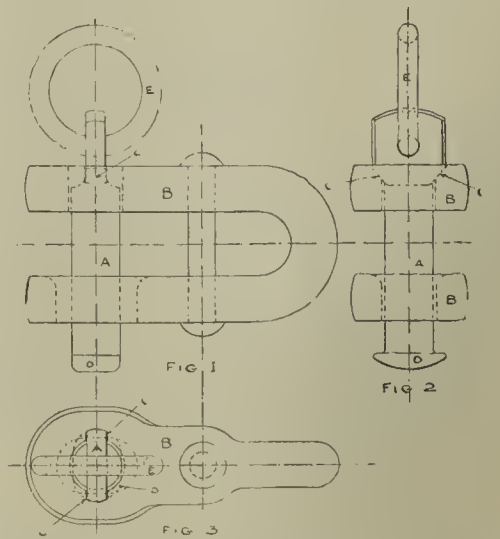
provided at one side of the winding shaft top in the usual manner, these being actuated by electric hoisting gear and having decks to correspond with the main cages. At the opposite side of the winding shaft top, the usual decked drop cages for the full tubs are provided, these being preferably controlled automatically by means of a cataraot cylinder and balance weights in the ordinary manner. A compressed-air or other fluid-pressure cylinder D with ram E is mounted in front of each set of tub lifts A (at the upper level), this ram E carrying or actuating a series of hinged horizontal push rods F (one for each deck of the cage) supported on a carriage G having under and over head guide rails H and runners I. J is the compressed-air main inlet pipe, with branch pipes K to the front or high-pressure ends of the respective cylinders D, and with a pipe L connecting by further branch pipes M to the rear or low-pressure ends of the cylinders, which are fitted with a Royle or other type of reducing and safety valve N interposed in the pipe M. O is the inlet valve box P the exhaust, Q the counterbalanced operating lever for the ram, R a sliding rod connected to the lever Q and having knock-off catches S and T at opposite ends, and U a projection for engaging said catches at each end of the travel of the carriage. V are runners supporting the outer ends of the push rods F, and W are stops for preventing overrunning of the carriage G at each end. The loaded main cage, on coming to bank, releases the catches holding the empty tubs



in their lift A. The attendant then, by suitable connecting mechanism, actuates the lever Q, opening the inlet valve O and admitting pressure (say 100 lb.) in front of the ram E. This puts the ram in motion, causing the carriage G and push rods F to simultaneously move forward and push the empty tubs from tub lift A into the main cage, discharging the full tubs from the opposite side of the main cage into the drop cage, from whence they are delivered to the screens or the like in the ordinary manner. During this forward movement of the ram E, a predetermined pressure (say 25 lb.) is automatically maintained on the opposite side of the ram by means of the valve N, which is set to blow off, say, at 30 lb. pressure. On the ram approaching the end of its forward or working stroke, the projection U on the carriage engages the catch S on the outer end of the sliding rod R, reversing the lever Q and thus opening the exhaust P. This causes the ram E to be reversed and automatically returned under the influence of the low pressure maintained on the opposite side of the ram; and as the ram approaches the end of this return stroke, the projection U on the carriage engages the catch T on the inner end of the sliding rod R, resetting the lever Q in its normal position in readiness for the next actuation by the attendant. (Two claims.)

23307 (1912). *An Improved Coupling for Colliery Trams and like Vehicles.* A. Cryer, 10, Penywain-place, Roath Park, Cardiff, Glamorgan, and J. T. Jones, 48, Wood-street, Cilfynydd, Pontypridd, Glamorgan. The object is a shackle and pin especially adapted for coupling colliery trams or wagons, also for use in coupling other vehicles for which they may be suited. Figs. 1, 2 and 3 of the accompanying drawings are respectively a side elevation, a front elevation, and a plan according to the invention. The complete coupling consists of two D-shaped shackles with perpendicular round pins, connected by one or more links. The pin A is shown in its normal position when the coupling is in use. The top hole of the shackle B is round, but for two semi-circular or rectangular notches CC, one on each side of the hole. The purpose of these notches is to allow the bottom corners of the splayed head of the pin A to fall therein, and prevent the pin from turning when in the position shown. Or, instead of being provided with notches, the hole may be approximately oval for a little distance from the top for the same purpose. After having been passed through the top hole of the shackle the lower end of the pin is burred up as usual, so as to prevent its complete withdrawal, but part of the burring is removed when the burred end becomes approximately oval in shape as shown at D, concentric with the axis of the pin and not eccentric

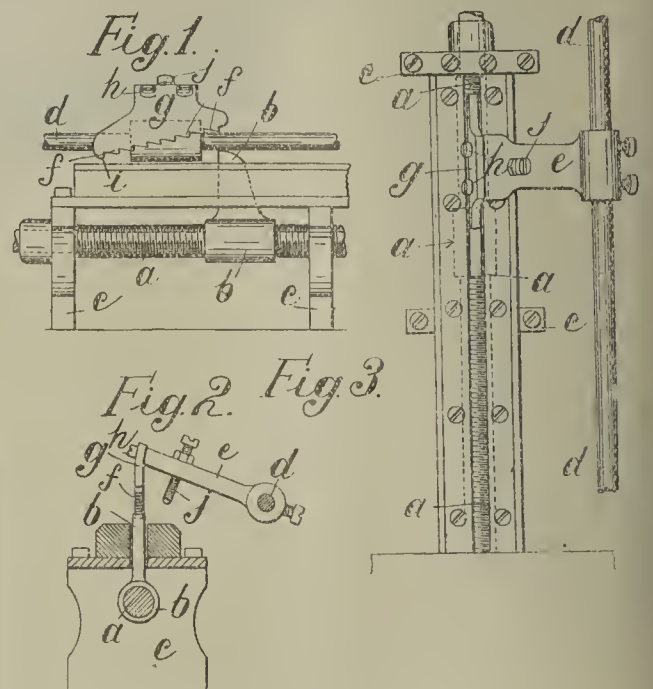
as is sometimes the case. The bottom hole of the shackle is made somewhat larger than the lower end of the pin and similar to it in shape, its major axis being coincident with the centre line of the shackle. When the shackle is closed



the pin rests with the lower corners of the splayed head in the notches CC as shown, and hence cannot turn. The burred lower end of the pin is under and across the bottom hole of

the shackle, consequently the pin cannot rise except a little distance. To open the shackle the pin is lifted a little distance by means of the ring E to disengage it from the notches CC, and then given a quarter turn, when it can be raised through the lower hole of the shackle and the coupling disconnected. (Two claims.)

26341 (1912). *A New or Improved Apparatus for Operating the Brake Mechanism of Colliery Winding Engines.* J. Shrigley, of 65, Grove-road, Northampton.—Relates to improvements in apparatus for operating the steam or other brake mechanism employed in connection with colliery winding engines, and has particular reference to improvements upon the invention described in prior Patent

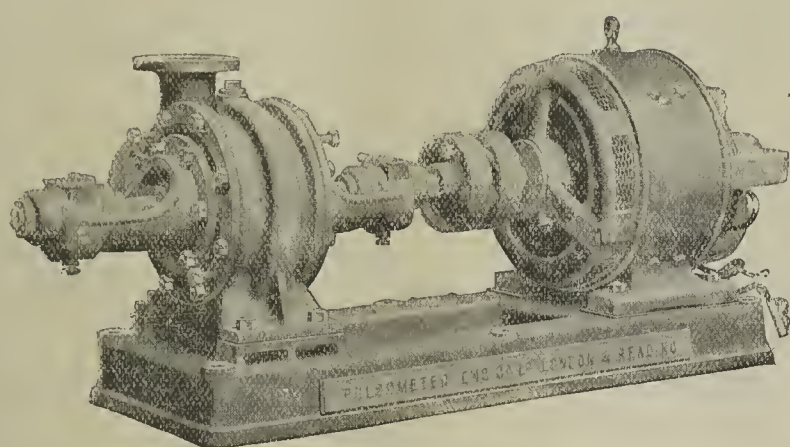


No. 12065 of 1911, in which is described, amongst other mechanism, the operation of traversing nuts adapted to engage, when required, with one or the other of two arms fixed on a shaft or rod which has imparted to it an oscillating motion through the agency of a governor device which brings the aforesaid arms into the path of the nuts. When one of the nuts engages an arm the oscillating rod is moved longitudinally in its bearings and operates the brake mechanism, the whole action occurring when the engine races. The present improvement relates mainly to the arrangement of the oscillating arms and to the construction of the traversing nuts, the object being to provide means



# PUMPS

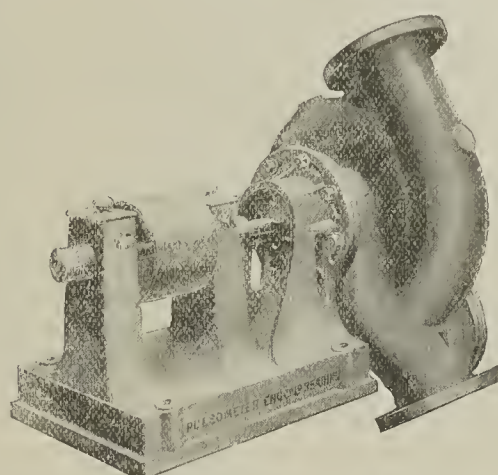
## FOR ALL PURPOSES.



HIGH LIFT CENTRIFUGAL PUMPS.  
TYPE C.

For Lifts up to 150 ft.

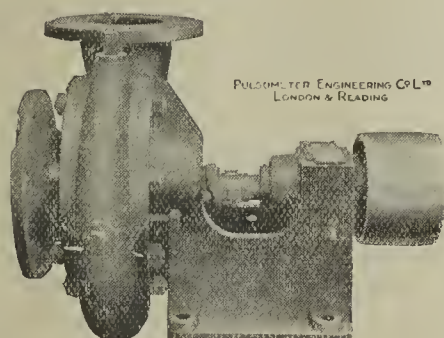
List No. 522.



CENTRIFUGAL PUMPS.  
TYPE V.

For Lifts up to 80 ft.

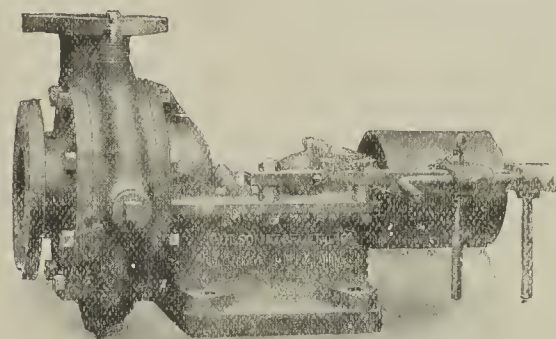
List No. 523.



TYPE A.  
CENTRIFUGAL PUMPS.

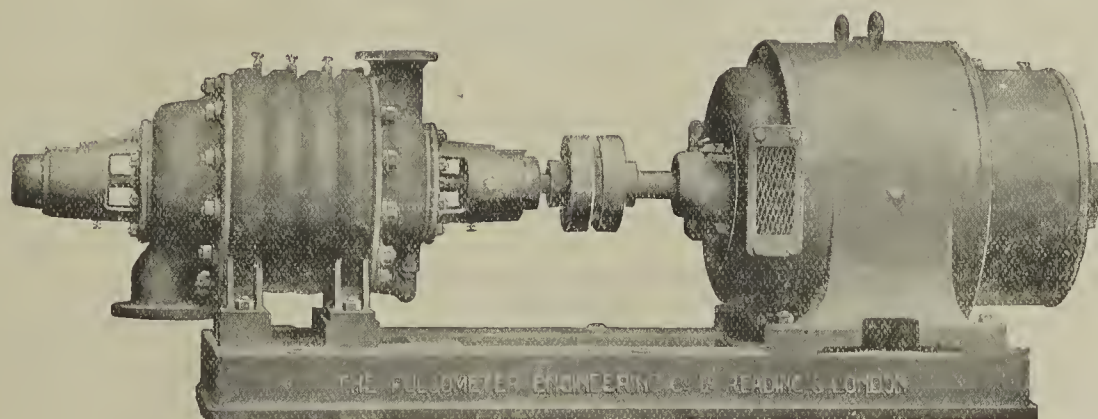
For Lifts up to 40 ft.

List No. 524.



TYPE A.  
CENTRIFUGAL PUMPS  
with Fast and Loose Pulleys.

List No. 524.



TURBINE PUMPS.  
Motor or Belt Driven.

For Lifts up to 1,200 ft.

List No. 527.

# Pulsometer Engineering Co., Ltd

Offices—11, Tothill Street,

LONDON, S.W.

Nine Elms Iron Works,

READING.



to enable the brake mechanism to be operated at varying speeds of the engine. With this end in view, the invention consists essentially in providing the arms with stepped ends and arranging the traversing nuts to suit this altered construction. Fig. 1 is a front elevation of so much of the apparatus described in the prior patent as is necessary to enable the present improvements to be understood; fig. 2, end elevation of same, partly in section; and fig. 3, plan. Each of the arms *e* is provided with a stepped end—that is to say, with a number of teeth *f* which may be made directly in the end of the arm in the form of steps or be arranged on a plate *g* secured thereto by screws *h*, bolts or the like. The plate may be adjustable on the arm, if required. The traversing nuts *b* are now each quite plain and square at the end, instead of being lipped so as to engage properly with the new arrangement of the oscillating arms. As a rule, the arms *e* are set on the shaft *d* so that when the engine is travelling at a normal speed the lowest tooth *i* would be engaged by the nut *b* when the pit cage was, say, just above the top of the pit shaft, and so cause shaft *d* to be traversed endwise to put on the brake automatically. This would be independent of any action of the engineman. On the other hand, if the engine for any reason raced, then the shaft *d* would be oscillated through a greater angle and bring one or other of the teeth *f* into position and cause the shaft *d* to be moved endwise to put on the brake previous to the top of the pit shaft being reached. The limit of the oscillation downward is controlled by setting the screw *j* in the arm *e* to allow the highest tooth to be put in the path of the traversing nut when the engine is at the extent of its speed at the greater part of the traverse of the cage in the pit shaft. (Two claims.)

### NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

#### Applications for Patents.

16653. Steel making and apparatus therefor. R. Hyde and J. R. Hyde.  
 16655. Fastener for sacks and the like. E. S. Weekes.  
 16662. Electrical cables. F. J. Brislee, J. L. Packer, and British Insulated and Helsby Cables Limited.  
 16664. Wire-drawing machines. R. D. Connor.  
 16671. Internal-combustion pumps. W. M. Wallace.  
 16673. Governors for variable-speed or reversible machines. L. Créplet.  
 16703. Motive power-driven jarring moulding machines. H. Rudman, H. T. Lancey, and J. E. H. Craven.  
 16716. Steam superheaters for locomotives and like fire-tube boilers. H. N. Gresley.  
 16745. Apparatus for compressing air or other gas. F. W. S. Stokes.  
 16760. Self-unloading tipping wagon. J. Horn.  
 16769. Machinery for preparing sand and coal for foundry and other purposes. G. E. Sherwin.  
 16787. Hook and slide for the prevention of accidents in mines through breakaway loads. J. W. Uttley and W. J. Deighton.  
 16790. Apparatus for the cooling of gas or superheating of air and the interchange of heat between fluids generally. E. L. Pease.  
 16800. Sewage disposal. N. Testrup, T. Rigby, G. W. Andrew, and Wetcarbonising Limited.  
 16805. Automatic fuel feeding and distributing apparatus. P. Dietz.  
 16806. Petrol air-compressor. S. C. Newton.  
 16807. Controlling gear for or connected with electrically-driven hydraulic pumps. J. A. Towler.  
 16821. Manufacture of steel. G. J. Boyle, Viscount Chetwynd.  
 16822. Apparatus for the resuscitation of asphyxiated persons. R. H. Davis and E. Allday.  
 16838. Briquettes of coal dust alone or mixed with wood waste. J. Alexander.  
 16854. Conveying-apparatus. Z. von Rodakowski.  
 16856. Steam exhaust nozzles for locomotives. P. T. Hayward and W. P. Sanderson.  
 16872. Machines for forging and sharpening the bits of rock drills, and the like. W. E. Kimber.  
 16903. Process for producing ammonia. P. A. Newton. (Farbenfabriken vorm. Friedrich Bayer and Co., Germany.)  
 16909. Rotary pumps, and the like. A. Collis and J. H. Collis.  
 16910. Process of burning solid fuel. A. G. Glasgow.  
 16911. Process of burning solid fuel. A. G. Glasgow.  
 16929. Furnaces. Karl Prinz zu Loewenstein.  
 16952. Corrugated roller for wire hauling ropes to run on. J. A. Yeadon.  
 16953. Push-rods for brakework on railway wagons. H. Green and J. H. Spruce.  
 16955. Tarpaulin support for railway wagons. J. Mabbett.  
 16978. Method of manufacturing safety dynamites. K. Ohno.
16980. Brakes for railway and the like wagons. J. Morris.  
 17010. Apparatus for washing coal and other materials. P. Habets and A. France.  
 17011. Apparatus for washing coal and other materials. P. Habets and A. France.  
 17012. Apparatus for washing coal and other materials. P. Habets and A. France.  
 17019. Steam or gas turbines. Vulcan-Werke Hamburg und Stettin Akt.-Ges.  
 17042. Production of sulphite of ammonia. W. Macnab and T. L. G. Bell.  
 17046. Welding powder for welding iron and steel. E. Eisengraber.  
 17049. Tool holder for boring, drilling, and like machines. E. Gregory.  
 17053. Haulage clips. M. Stubbs.  
 17060. Continuous regenerative gas-fired furnaces. H. Tomkins and A. V. Kemp.  
 17078. Buffers for railway wagons and other vehicles. J. Martin.  
 17079. Boilers. H. J. Yates.  
 17090. Spring or snap hooks. S. Eisner.  
 17105. Centrifugal pumps. British Thomson-Houston Company Limited. (General Electric Company, United States.)  
 17111. Classifier for crushed ores. W. F. Deister.  
 17121. Conversion of heavy hydrocarbons into lighter hydrocarbons. W. A. Hall.  
 17127. Method and means for obtaining tar from gas producers. A. C. A. Holzapfel.  
 17131. Recovery of nickel from its ores. H. L. Sulman, H. F. K. Picard, and A. E. Roberts.  
 17154. Automatic safety suspending apparatus for pit cages, hoists and the like. T. Paton and P. Williamson.  
 17158. Eye guards or protectors for pit ponies and horses. G. Dawes.  
 17163. Apparatus for the removal of earth from excavations. W. Fleischer and H. Simon.  
 17197. Balancing means for steam or gas turbines. Aktiebolaget Ljungstroms Angturbin.  
 17200. Rotary pumps. G. C. Arnesen.  
 17201. Labyrinth packing for gas or steam turbines. Aktiebolaget Ljungstroms Angturbin.  
 17205. Manufacture of gelatine explosives. A. E. Vergé.

#### Complete Specifications Accepted.

To be published on August 14.

1912.

14547. Lighting of miners' and like safety lamps. Paxton.  
 16826. Hydraulic briquetting machinery. Denison and Korte.  
 16855. Production of nitrogen from products of combustion. Harger.  
 17426. Drying and heating of wet-carbonised peat. Rigby and Wetcarbonising Limited.  
 17671. Compound railway and like rails. Weeber.  
 18209. Means for securing rail wedges in railway chairs and the like. Jones.  
 18687. Means for preventing accidents due to overwinding of mine cages and the like. Harris.  
 19701. Mine cages, lifts, and the like. Thomas and Jones.  
 20952. Manufacture of briquettes from ore or blastfurnace dust and organic binding substances in solution in water. Gewerkschaft Pionier.  
 21535. Mountings for percussive coal-cutters and the like. Mauss.  
 22352. Manufacture of ammonia. Johnson (Badische Anilin and Soda Fabrik).  
 23670. Grabs. Barnard.  
 24823. Automatic lubricating of the bearing surfaces of loose pulleys, sheaves, wheels, axles, and the like. Hindle.  
 24976. Grabs. Strachan, Sargent, and Strachan and Henshaw Limited.  
 26082. Electric furnaces and process of operating the same. British Thomson-Houston Company (General Electric Company).  
 28590. Method of compressing elastic fluids and apparatus therefor. Viscount Harberton and Spence.  
 29195. Rotary pumps. Foxlee.  
 1913.  
 139. Turbines. Graemiger.  
 1484. Lubricating devices for rail wheel axles and the like. Ladds and Perkins.  
 1593. Safety appliances for hoists and the like. Methven.  
 4249. Extraction of nickel from mixtures of nickel and other metals. Fierz and Cahen.  
 5045. Regenerators for furnaces and the like. Bruninghaus.  
 5279. Safety brakes for mine cages or the like. Wilson.  
 7704. Centrifugal pumps. Gentil.  
 7938. Coke ovens. Schuster.  
 9504. Device for closing the tapping openings of smelting furnaces. Meyer and Friedr. Feldhoff Sohn (firm of).

#### Complete Specifications open to Public Inspection before Acceptance.

1913.

14206. Process and apparatus for operating blow-off or return valves for centrifugal condensers or pumps. Guyer.

14426. Magnetic separators. Fr. Krupp Akt.-Ges. Grusonwerk.  
 14427. Magnetic separators. Fr. Krupp Akt.-Ges. Grusonwerk.  
 15143. Steam turbines. De la Saurais.  
 16031. Manufacture of nitro-products from petroleum and tar. Flexer.  
 16370. Process and apparatus for converting hydrocarbons into gas. Empis.

### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

Consular Reports: Japan Trade, 7½d.; Stettin, 3½d.; Costa Rica, 4d.; Caracas, 6d.; Italy Finances, 2½d.; Abyssinia, 4d.; Trebizond, 3d.; Aleppo, 4d.; Barra, 3d.; Katanga, 1½d.; Newchwang, 3d.; Yokohama, 5d.  
 Bills: Compensation for Mineral Damage (Scotland), 1d. Merchant Shipping Certificates, 2d.; Lanarkshire Middle Ward Water Order, 7d.; Trades Boards Provisional Order, 1½d.

Local Government Board: Second Report on Infant and Child Mortality, 2s. 5d.

National Insurance: Circular (A.S. 93) re Benefits for Persons over 65 Years of Age, 1d.; Report on Administration of Act in Wales, Part I., 8d.; Regulations for Proceedings of Committees (Welsh), 1½d.; Report for Scotland, Part I., 1s. 4d.

Report and Evidence on Commons Inclosure and Regulation, 1s. 9d.

Foreign Trade Accounts for June, 6d.

Registry of Ships, June, 3½d.

Board of Education Draft Regulations under which Grants will be made to Local Authorities in 1913-14, 1d.; Merchandise Marks Regulations, 1d.

Compulsory Taking of Land: Insanitary Property Report, with Evidence, 4½d.

COAL MINES ACT: GENERAL REGULATIONS, July 10, 3d.

### PUBLICATIONS RECEIVED.

THE STANDARD OF VALUE. By Wm. Leighton Jordan. London: Simpkin, Marshall, Hamilton, Kent and Co. Limited. Price 7s. 6d. net.

INDUSTRIAL POISONING. By Dr. J. Ramboisek (translated by T. M. Legge). London: Edward Arnold. Price 12s. 6d. net.

FAIRBROTHER ON PATENTS, BRITISH AND FOREIGN. By Henry Fairbrother. London and Birmingham: Bromhead and Co.

COALMINE ACCIDENTS IN THE UNITED STATES, 1896-1912 (U.S. Bureau of Mines, Technical Paper 48). By F. W. Horton. Washington: Government Printing Office.

NATURAL MINE RESCUE AND FIRST AID CONFERENCE, PITTSBURG, PA., SEPTEMBER 23-26, 1912 (U.S. Bureau of Mines, Bulletin 62). By H. M. Wilson. Washington: Government Printing Office.

THE COMMERCIAL TREND OF THE PRODUCER GAS POWER PLANT IN THE UNITED STATES (U.S. Bureau of Mines, Ditto Bulletin 55). By R. H. Fernald. Washington: Government Printing Office.

THE SELECTION OF EXPLOSIVES USED IN ENGINEERING AND MINING OPERATIONS (U.S. Bureau of Mines, Bulletin 48). By C. Hall and S. P. Howell. Washington: Government Printing Office.

WASTES IN THE PRODUCTION AND UTILISATION OF NATURAL GAS, AND MEANS FOR THEIR PREVENTION (U.S. Bureau of Mines, Technical Paper 38). By R. Arnold and F. G. Clapp. Washington: Government Printing Office.

"Zeitschrift für das Berg-, Hutten- u. Salinenwesen" (Band 61), 2 Heft, and 3 Statistische Lieferung; "Monthly Magazine of the Incorporated Chamber of Commerce of Liverpool" (Vol. 12, No. 7), July, price 3d.; "Transactions of the Institution of Mining Engineers" (Vol. 45, part 3); "Bulletin of the Imperial Institute" (Vol. 11, No. 2).

In a highly technical special report on the prospects of electricity extensions in the course of the development of the city of Bradford in the next decade, Mr. Thos. Roles, the city electrical engineer, foreshadows the use of coal-gas instead of coal for firing the boilers at the generating station.

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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY, AUGUST 8, 1913.

No. 2745.

## NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

### Annual Meeting.

The annual general meeting of the members of the North of England Institute of Mining and Mechanical Engineers was held in the Wood Memorial Hall, West-gate-road, Newcastle-on-Tyne, on Saturday afternoon last. Mr. JOHN SIMPSON occupied the chair in the absence of the president (Mr. W. C. Blackett).

The council reported that the prizes committee proposed that prizes should be awarded to Mr. Geo. Harold Greenwell, M.I.M.E., for his paper on "The Jherria Coalfield (India) and Its Future Development"; Mr. Thos. Arthur Saint, Stud I.M.E., for his paper on "The Lighting Efficiency of Safety Lamps"; and Prof. W. M. Thornton, hon. M.I.M.E., for his paper on "The Ignition of Coal Gas and Methane by Momentary Electric Arcs." It was proposed also that a G. C. Greenwell bronze medal should be awarded to Mr. W. Hutton Hepplewhite, H.M. inspector of mines, for his paper on "The Action and Control of Differently Constituted Coal Roofs."

### Annual Report.

The council's annual report stated that the institute had sustained great loss through the death of Mr. Thos. Bell, an honorary member since 1886, and Mr. Wm. Henry Ramsay, whose sudden death occurred whilst experimenting with rescue apparatus in an old drift at Benwell Colliery. The membership for the year just ended was 1,273, made up of 23 honorary members, 874 members, 100 associate members, 205 associates, 38 students and 33 subscribers. The membership in previous years was as follows:—1906, 1,349 members; 1907, 1,307; 1908, 1,358; 1909, 1,358; 1910, 1,361; 1911, 1,342; and 1912, 1,298. The second successive decrease in the membership was due to an exceptional number of deaths and resignations. The additions to the register numbered 66 and the losses by death, resignation, &c., 91. The deaths had numbered 18 and the resignations 40.

Mr. Thomas Douglas, as the only surviving original member of the institute, and Mr. J. B. Atkinson (late H.M. inspector of mines in charge of the Newcastle district), had been elected life honorary members. Mr. J. R. R. Wilson had been elected as an honorary member during his term of office as H.M. inspector of mines in charge of an inspection district. The additions to the library during the year included 532 bound volumes and 48 pamphlets, reports, &c. The library now contained about 14,131 volumes and 491 unbound pamphlets.

With reference to the course of lectures for colliery engineers, enginewrights and apprentice mechanics at Armstrong College, Newcastle, the Michaelmas term lectures on machine drawing were attended by 28 students and those on experimental mechanics by 29 students, 26 of whom sat for examination, 24 passing. During the Epiphany term, the lectures on the chemistry of fuel were attended by 26 students and those on the strength of materials by 28 students, 26 of whom sat for examination, 24 passing. Certificates had been awarded to Messrs. W. J. Leonard, E. S. Pearse, and J. T. Riley, who had completed the three years' course. The first and second prizes for the 1912-13 session had been awarded to Mr. J. Harrison and Mr. W. J. Leonard respectively. A guarantee fund had been established, and had received the financial support of the institute and also of a number of prominent gentlemen and companies connected with the coal trade of the north of England.

Messrs. Leo Dorey Ford and Henry N. J. Liddell were in January awarded Daglish Travelling Fellowships, under provisions made by the will of the late Mr. John Daglish; but Mr. Liddell afterwards relinquished his award, having obtained a position. Suitable arrangements have been made for Mr. Ford to gain knowledge and experience abroad.

The report mentioned the completion and publication of the report of the committee appointed to report

upon the carboniferous limestone of the north of England with special reference to its coal resources, and the progress that was being made towards replacing the collection of safety lamps destroyed by the fire at the Brussels Exhibition.

The report was adopted without discussion.

### Finances.

The finance committee reported that the total receipts for the year had been £2,934 1s. 3d. The expenditure was £2,706 8s. 6d., and there was a credit balance of £601 15s. 8d.

The report was adopted.

### Election of Officers, &c.

The retiring representatives of the institute on the council of the Institution of Mining Engineers were re-elected, excepting that Mr. A. M. Hedley and Mr. John Simpson took the places of Mr. J. B. Atkinson and Mr. A. D. Nicholson.

The scrutineers reported the election of officers for the ensuing year to have resulted as follows:—President, Mr. W. C. Blackett, re-elected; vice-presidents, Messrs. J. B. Atkinson, Frank Coulson, T. Y. Greener, Samuel Hare, T. E. Jobling and John Simpson; council, Messrs. R. S. Anderson, Henry Armstrong, R. W. Berkley, C. S. Carnes, W. C. Carr, Mark Ford, J. H. B. Forster, A. M. Hedley, A. C. Kayll, John Morison, W. C. Mountain, A. D. Nicholson, C. B. Palmer, R. L. Weeks, E. S. Wood and Benjamin Dodd and Prof. Henry Louis.

The following gentlemen were admitted into the institute:—Honorary members: Mr. J. B. Atkinson, mining engineer, 16, Belle Grove-terrace, Newcastle; and Mr. J. R. R. Wilson, H.M. inspector of mines, Westfield Drive, Gosforth, Newcastle. Members: Sir Ralph Percy Ashton, colliery agent, The Quarry, Oxted, Surrey; Mr. Wm. Calder, oilfield manager and engineer, Apsheronskaya, Maikop, South Russia; Mr. Lawrence Clive, H.M. inspector of mines, 2, Pimlico, Durham; Mr. Frank Hernaman Cothay, mining and mechanical engineer, 7, Valebrook, Sunderland; Mr. Morton Hedley, colliery manager, Medomsley, co. Durham; the Duke of Northumberland, Alnwick Castle, Northumberland; Mr. Herbert Wm. Taylor, mining engineer, El Bote mine, Zacatecas, Mexico; Mr. David Lewis Thomas, colliery manager, Ty-Cerrig, Slate-street, Morriston, Glam.; and Mr. John Emanuel Tyers, jun., mechanical engineer, Rewah State Colliery, Umaria, Central India. Associates: Mr. Wm. Calland, surveyor, Hedley Hope Colliery, Tow Law, co. Durham; and Mr. Francis Cecil Dwane, assistant colliery manager, Singareni Collieries, Deccan, India. Student: Mr. Ronald Edwin White, mining student, Cowpen Colliery Office, Blyth.

### Miners' Nystagmus.

The discussion on Mr. T. A. SAINT's paper on "The Lighting Efficiency of Safety Lamps" was resumed by

Dr. LEONARD HILL, who wrote stating that the only point he wished to make was that miners' nystagmus was produced by the feeble illumination of the safety lamp which prevented the use of the *fovea centralis* of the retina, and that fixation of the eye-balls which caused the object looked at to be focussed on the *fovea* of each eye. The peripheral parts of the retina were the more sensitive in the "dark-adapted eye," and, as fatigue was easily caused in these parts, continual movement of the eye-balls resulted and nystagmus became established, especially in those with some error of refraction in their eyes. It was obvious that the lamp with the highest power of illumination should be chosen, other things being equal, and, according to the data given by Mr. Saint, the Wolf lamp, with a  $\frac{1}{2}$  in. flat wick and benzine, seemed to be the most efficient, and also fairly economical. The absorption of the light by the dark coal was a great disadvantage, and he suggested consideration of the proposition whether it would not be feasible to increase the illumination of the safety lamp by the use of whitewashed canvas screens. Could not a roll of such canvas be carried with the lamp and suspended so as to help the illumination of the working surface?

### Gob Fires in Natal.

Mr. CHAS. F. FAIRBROTHER, assistant-manager of the Durban Navigation Collieries Limited, Dannhauser, Natal, wrote with reference to Mr. Blackett's recent address. He agreed with Mr. Blackett on the question of reversing the ventilating currents periodically. The whole question of dust explosion turned upon a mine having the necessary quantity of coaldust more or less evenly distributed in the roadways. Therefore, even supposing that the reversal of the currents should, at the moment, raise some dust, it would only be to relay it at some other convenient place, as one could hardly accept the idea of it being swept out of the mine altogether by a simple reversal of the current. Therefore the danger, at the best, would only be removed from one place to be deposited in another. Now, a great percentage of the dust was made at the working face by coal-cutting, pick work, filling and general handling of the coal. That was taken by air and deposited in the returns. Should a reversal of the fan disturb it, it would only be to re-deposit it in the working face where the currents were generally weak, or to put it into the very place where it would be most dangerous and least wanted. In the case of gas, there were obvious reasons for not tampering with the currents. There was, generally speaking, a right and a wrong way to ventilate every section of the pit, and, after going to considerable trouble to get the right way, what possible good could come from its being ventilated wrongly for so many hours per week? That particularly applied to broken sections where one used the ventilating current to force any gas far back into the waste on the side upon which one was working, and to draw it off upon the side next the return. Now, if one reversed the action, the current tended to draw the gas into the working side of the goaf, from which it might not be an easy matter to remove it.

The mines of Natal were situated some 4,200 ft. above sea-level. They would like to know what effect that fact would have in connection with such a reduction of oxygen in the mine workings as was proposed. Another important point in connection with the reduction was as to what provision had been made for those parts of a mine where the air was already diluted and, in many cases, by more than the quantity stipulated by Dr. Harger, by the natural gases given off by the strata—such as blackdamp and firedamp—and by exhalation and combustion in the lamps. It was obvious that if the workings contained 2 per cent. of the above-mentioned gases, the percentage of oxygen had been further reduced. What, then, was the limit of the reduction of the quantity of oxygen allowable so that a man might work in comfort? One would also like to know how it was proposed to regulate the supply of nitrogen so that the exact  $3\frac{1}{2}$  per cent. might be obtained. For his own part, he was of opinion that a thorough system of panelling met the gob-fire question best of all. In Natal, having only two seams to deal with and these close together, they were in the most favourable position for correct panelling, and, by studying these and laying the barriers at proper intervals following the broken close upon the whole of the workings, and building off directly the broken were finished—or earlier if necessary—requirements appeared to be best met and at least cost and trouble. Certainly, that system meant waste in barriers, pillars, &c., but what was that compared with the loss of a complete mine or districts? The trouble seemed to arise from the shale which lay immediately above each of the two seams, and the seams lying only 3 or 4 feet apart. Complete extraction was almost an impossibility in bord-and-pillar working, and, under the labour conditions, longwall was entirely beyond consideration. Panels, of course, did not in any way prevent the fire. They only provided a ready means of their being built off in case of occurrence, and, therefore, a system like that suggested by Dr. Harger, which was going to free them of all these troubles, interested them greatly, and they would like to hear that it might be applied under the conditions of Natal, and without harm to the underground workers.



### Electric Arcs and Firedamp.

Prof. W. M. THORNTON read a paper on "The Comparative Inflammability of Mixtures of Pit Gas and Air by Momentary Electric Arcs." He stated that, in the British coalfields, natural pit gas was chiefly composed of methane, with smaller quantities of the higher paraffins and some nitrogen. In preliminary experiments on firedamp—such, for example, as the determination of the lower limit of inflammability—it was usual to work with methane as nearly pure as possible, for natural pit gas was not always to be had in sufficient quantity for lengthy trials. The lower limit of explosive inflammability—i.e., the percentage of gas in air which was able to transmit an explosive wave indefinitely by "self-ignition"—had been worked out by M. J. Burgess and R. V. Wheeler for the paraffin series as far as pentane and found to vary inversely with the heat of combustion of the gas. The lower limit for hydrogen was higher than for any of the paraffins, and, if present, might raise rather than lower the lower limiting percentage.

The upper limit of inflammability, on account of its less urgent importance, had not been so fully examined, but it no doubt depended upon the quantity of air required for complete combustion. For example, hydrogen, which required only half its volume of oxygen for perfect combustion, was inflammable in mixtures up to 72 per cent. in air, whilst methane, which required four times its volume of oxygen, had an upper limit a little below 14 per cent. in air. That paper was an account of the examination of the inflammability of two samples of pit gas, obtained from a gassy seam at Eldon, co. Durham, by the kind co-operation of Mr. M.

proportionate retarding influence on the ease of ignition, for the presence of over 50 per cent. of hydrogen (in coal gas) only lowered the igniting current to the same extent as it was raised by an increase of 1.5 per cent. of nitrogen. That had some bearing on Dr. John Harger's proposal to lessen the risk of ignition by the admission of inert gas into the downcast air, and Dr. Harger himself had drawn attention, in his paper on "The Prevention of Explosions in Mines," to the sensitiveness of the ignition of methane to deficiency of oxygen.

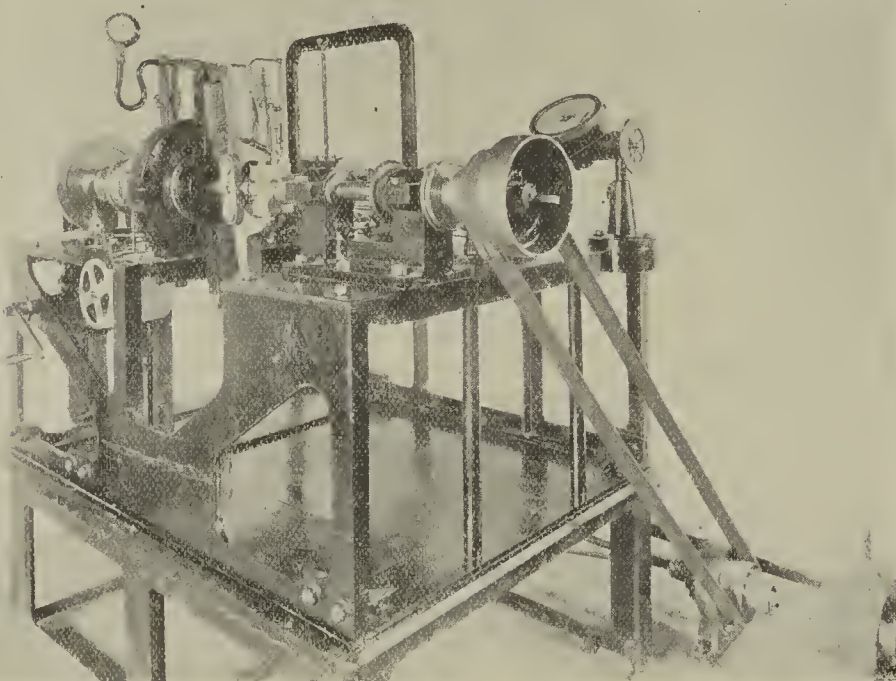
Coming to experiments with alternating currents, the writer said that, when the current was alternating, its limiting igniting values were much higher—e.g., 11.0 amperes at 200 volts and 36 periods per second, as compared with 1.6 amperes at 100 volts continuous current. The currents necessary to ignite the mixtures at the upper and lower limits were great compared with the continuous currents—at the most sensitive points they were 10 to 15 times greater than with continuous electrical pressures. There could be no doubt, therefore, that the use of alternating current tended to safety in coalmining, so far as there was risk of ignition by simple breaks of electric cables or in electrical signalling, except at vibrating contacts. It might be remarked in passing that, apart from its test of the influence of percentages of gas, the electrical method of examination of gases was more, and not less, sensitive than chemical analysis in showing differences of composition. The ratio of percentage of combustible gas in pit gases Nos. 1 and 2 was 1.06, whilst that of the least igniting currents for the same gases was 1.3.

In the absence of a constant and representative

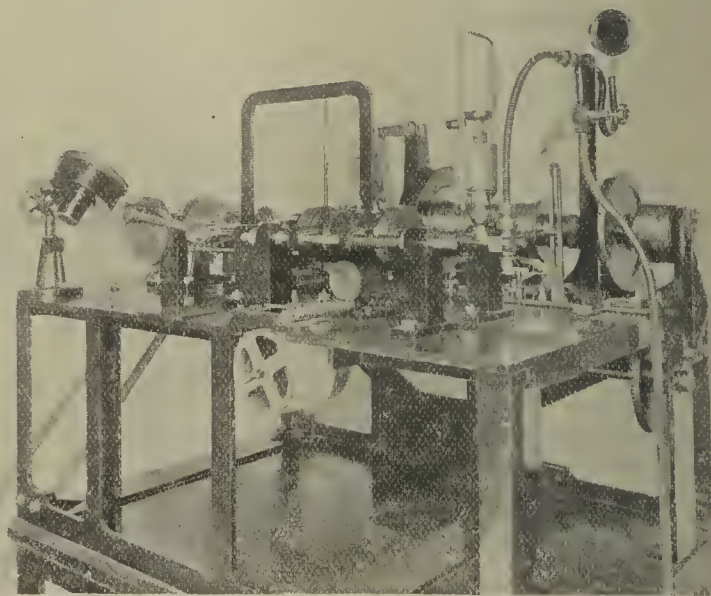
### HISLOP'S PATENT OIL-TESTING MACHINE.

We were recently afforded an opportunity of witnessing some interesting tests made in connection with the above machine at the works of the British Oil and Turpentine Corporation Limited, of the Excelsior Refinery and Wharf, Hayes, Middlesex, the inventor of the machine being Mr. R. C. Hislop, one of the directors of the Corporation. The object which the inventor has undoubtedly accomplished is a machine designed to give very sensitive results, enabling comparative tests to be made with lubricating oils, the qualities of which, obviously, could in no other way be detected. Further, the results obtained by the aid of this machine show the initial greasiness of an oil, its life under varying temperatures and loads, with an additional feature of enabling the user of the machine to ensure that the oils and greases he purposes using are perfectly suitable for the duty which they have to perform. The company therefore are able to obtain results by actual practical demonstration and by careful reproduction of the conditions under which an oil has to work, are able to put forward oils which considerably reduce fuel consumption and increase the life and efficiency of their client's plant. It is very well known that oils which are to all appearances giving satisfaction are very often using a considerable amount of excess fuel to overcome the friction generated by the oil itself, the exact amount of which is easily determined by this machine.

The first illustration shows the front view of the Hislop machine, and depicts in its centre a revolving spindle to which two bearings are adjusted, pressure



Front View.



Back View.

HISLOP'S OIL-TESTING MACHINE.

H. Kellett. The analyses, for which the writer was indebted to Dr. John Harger, were as follow:—

	Sample No. 1. Per cent.	Sample No. 2. Per cent.
Combustible gas .....	87.4 .....	93.3
Oxygen .....	0.2 .....	0.0
Nitrogen .....	12.2 .....	6.5
$n$ in $C_nH_{2n+2}$ , from explosion data .....	1.02 .....	1.11

From the explosion data, the combustible gas was seen to be nearly pure methane. The gases were examined under the same conditions and by the same method as in the author's paper on "The Ignition of Coal-gas and Methane by Momentary Electric Arcs," previously communicated to the institute. The chief points then established were the relation between the voltage and the least current required to ignite the gas, both when the current was continuous and when alternating, the influence of higher frequency in retarding ignition, and the comparative inflammability of different percentage mixtures. In the present experiments, attention had been confined to these points.

Prof. Thornton proceeded to describe experiments with the use of continuous currents, and stated that the practical conclusions to be drawn from them were as follow:—(1) That pit gas, if it contained nitrogen, might be relatively much less inflammable than methane, and since, in actual working, the nitrogen was swept into the air of the mine from the coal equally with the inflammable gas, the effect was the same as that which resulted from reduction of the oxygen percentage; (2) above about 9 per cent. of gas in air, differences in the rate of ignition appeared to be obliterated, although the magnitude of the igniting current; and (3) the percentage of inert gas had a more than

supply of natural pit gas for testing purposes in general, it was at least reassuring to know that experiments made with methane were, with very rare exceptions, likely to be on the safe side in regard to risk of ignition. The exceptions were those pit gases which contained large fractions of ethane, and these were rare in Great Britain. It was possible that our immunity from severe gas explosions was owing to the comparative inertness of firedamp, which was, in any case, the least inflammable of the natural gases associated with coal.

Prof. Thornton was accorded the thanks of the institute for his paper, discussion on which was deferred until the next meeting.

The following paper was also contributed: "Notes on Coalmining in the United States of America, with Special Reference to the Treatment of Coaldust and Haulage by Electric Locomotives," by Mr. SAMUEL DEAN. This will be summarised in the *Colliery Guardian* next week.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, July 29, 1913, is as follows:—Antwerp, 419 tons; Amsterdam, 1,141; Alexandria, 9,212; Bandholm, 1,210; Buenos Ayres, 2,046; Bordeaux, 1,857; Bremen, 1,491; Copenhagen, 299; Constantinople, 964; Cronstadt, 32,374; Drontheim, 73; Dahlsbruk, 1,403; Ghent, 575; Gothenburg, 711; Harlingen, 421; Hamburg, 3,056; Harburg, 5,204; Kallundborg, 2,135; Kiel, 1,502; Königsberg, 1,966; Libau, 394; Malmö, 1,223; Nordstrand, 112; Pernau, 3,318; Port Said, 3,959; Rouen, 190; Riga, 1,289; Rotterdam, 8,954; Stockholm, 533; St. Petersburg, 23,880; Stettin, 1,911; Solvesborg, 621; Trelleborg, 1,271; Wasa, 1,399; total, 117,113 tons; corresponding period last year, 124,493 tons.

being applied through bell crank levers and toggles, by a heavy spring within the casing, the spindle being free to rotate in the bearings at any required number of revolutions. The resulting friction between the revolving spindle and the bearings will tend to make the toggles and casing revolve, this movement being recorded upon a revolving drum upon which graduated paper is fixed, and the operator is therefore able to determine at once the suitability of the oil under test for the purpose required. In like manner he is able to calculate the horse-power and fuel required to overcome the initial friction.

For testing lubricants between thrust members, the spindle is removed and a flat, highly-polished plate is inserted in its stead, whilst in the place of the toggles a bridge is used which carries a similar round plate. In this case the pressure is directly put on these two surfaces by means of the spring within the casing acting through the arms on each end of the bridge. The machine is further adapted for determining the suitability of oils in cylinders in the presence of steam and burnt gases. We saw very successful tests accomplished, and it was interesting to learn that the firm's wide experience and the excellent facilities for research, as instanced by this machine, have been put to a severe test recently by a well-known colliery, and we understand the results obtained were mutually satisfactory.

The firm has, in our opinion, acted very wisely in establishing the refinery on the excellent site it enjoys. The works are less than a quarter of a mile distant from the Hayes and Harlington station on the Great Western main line, but a branch line has been laid running directly into the refinery yards, whilst the distant portion of the works runs for some distance alongside the banks



of the Grand Junction Canal; the latter, therefore, affords splendid facilities for discharging the products of the company, direct by pump, into the barges.

## APPROVED SAFETY LAMPS.

### The Patterson Lamps.

The Home Secretary has issued an Order [No. 713] dated June 27, 1913, under section 33 of the Coal Mines Act, 1911 (1 and 2 Geo. 5, c. 50), approving certain types of safety lamps for use in mines to which the Act applies. The conditions specified in the schedule are as follow:—

*Patterson and Co.'s Safety Lamps, Type "A. 1" and Type "A. 3."*

Each of these lamps, the general design of which is shown in Plate I., is a double gauze, flame, oil lamp, with an air feed through vertical holes in the bonnet ring. Each consists of the following essential parts:—

(1.) *Bonnet or Shield* of steel, with riveted seam and with a separate securely riveted crown, or of seamless steel, the bonnet and crown being in one piece.

Furnished with outlet holes immediately below the crown: Provided that the bottom of the holes shall not be less than  $\frac{3}{16}$  in. above the top of the outer gauze.

*Bonnet Ring* of brass, steel, or iron, riveted to the bonnet, screw-threaded to fit the pillar ring, and provided with 24 vertical air-inlet holes of total area not greater than 12 square inches.

(2.) *Pillar Ring* of brass, steel, or iron screw-threaded to take the bonnet ring, and locked thereto by means of a sliding pillar kept in position by the oil vessel.

*Pillars* of steel or iron, five or more (one sliding) so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass. Provided that lamps now in use, having three fixed pillars and one sliding pillar and not fulfilling this condition, may be used until 1st January, 1916.

*Bottom or Lock Ring* of brass, steel, or iron, provided with a fixed seating for the glass, and having, when fitted with a magnetic lock, two or more ratchet teeth to engage with the bolt of the lock; provided or not with the "patent electric ignition device" shown in Plate I., so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with secure flame-tight double lap seams, or butt seams with folded edge secured on the inside by a folded metal strip; each gauze formed to fit flanges of the outside and inside base rings, and so secured to the same by punch indentations or by riveting as to make strong and flame-tight joints; the gauzes being so constructed as to form the seating for the glass necessary to hold it firmly in position, thereby preventing the lamp from being put together without them.

Internal dimensions.	Outer gauze.	Inner gauze.
	In. In.	In. In.
Height from shoulder of base ring	$4\frac{1}{8} \pm \frac{1}{8}$ ... $3\frac{1}{8} \pm \frac{1}{8}$	$\pm \frac{1}{8}$
Diameter at top	$1\frac{1}{8} \pm \frac{1}{8}$ ... $1\frac{1}{8}$	$\pm \frac{1}{8}$
" " bottom	$1\frac{1}{8} \pm \frac{1}{8}$ ... $1\frac{1}{8}$	$\pm \frac{1}{8}$

Provided that the lamp may be fitted with a Mueseler tube and horizontal gauze in place of the inner gauze; the horizontal gauze forming a secure and flame-tight joint with the Mueseler tube.

Provided also that the lamp may be fitted with a single gauze, of the dimensions of the outer gauze given above (with or without a gauze cap), until 1st January, 1914, or in the case of lamps now in use, until January 1, 1916.

(4.) *Glass*, cylindrical:—

External diameter	56½ mm.	$\pm \frac{1}{2}$ mm.
Height	67 "	$\pm \frac{1}{2}$ "

Furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and lock-ring seating.

Provided that the lamp may also be made to take a glass of the following size, viz.:—

External diameter	57½ mm.	$\pm \frac{1}{2}$ mm.
Height	60 "	$\pm \frac{1}{2}$ "

(5.) *Oil Vessel* of brass, steel, or iron, of sufficient capacity to provide the required light for the required time as specified in paragraph 8 below; fitted with a flat  $\frac{1}{2}$  in. burner; provided or not with a winding wick adjuster, so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(6.) *Locking Devices*.

In the "A. 1" Lamp.—One or other of the following:—

(1.) A vertical iron bolt (held in position by a spiral spring) working within a closed or open-ended brass tube, as shown in Plate I., and so constructed that the bolt can be withdrawn only by means of a powerful electro-magnet.

(2.) An efficient lead-rivet lock, with a horizontal or vertical lug or hinge securely attached to the lock ring or to a pillar, and a horizontal or vertical lug or staple securely soldered to the oil vessel.

In the "A. 3" Lamp.—An efficient lead-rivet lock, with hinge attached to a sliding band on the lock ring, and with a vertical lug securely soldered to the oil vessel, as shown in Plate I.

(7.) *Reflector*.—The lamp may be fitted with a removable reflector

(8) Provided:—

(i.) That the strength of material and attachments throughout the lamp is not less than in the sample submitted for the official tests on the 15th April, 1913.

(ii.) That the oil and wick used in the lamp shall be such that the lamp shall be capable of maintaining a light of candle power not less than 0.30, as determined by a pentane standard, all round in a horizontal plane throughout a period of not less than 10 hours.

(iii.) That the lamp has been made at the works of Messrs. Patterson and Company, at Trafalgar Street, Newcastle-on-Tyne.

(iv.) That the glass shall be of an approved type, and that its dimensions shall not be outside the limits laid down in paragraph 4.

(v.) That the lamp shall have marked upon it its name and the name of the maker.

*Patterson and Company's Safety Lamp, Type "B. 1."*

This lamp, the general design of which is shown in Plate II., is a modification of Patterson and Company's

FIG. 2.—PATTERSON AND COMPANY'S SAFETY LAMP, TYPE A3.

Sliding Band Lead-lock Lamp; View of Oil Vessel and Lock Ring.

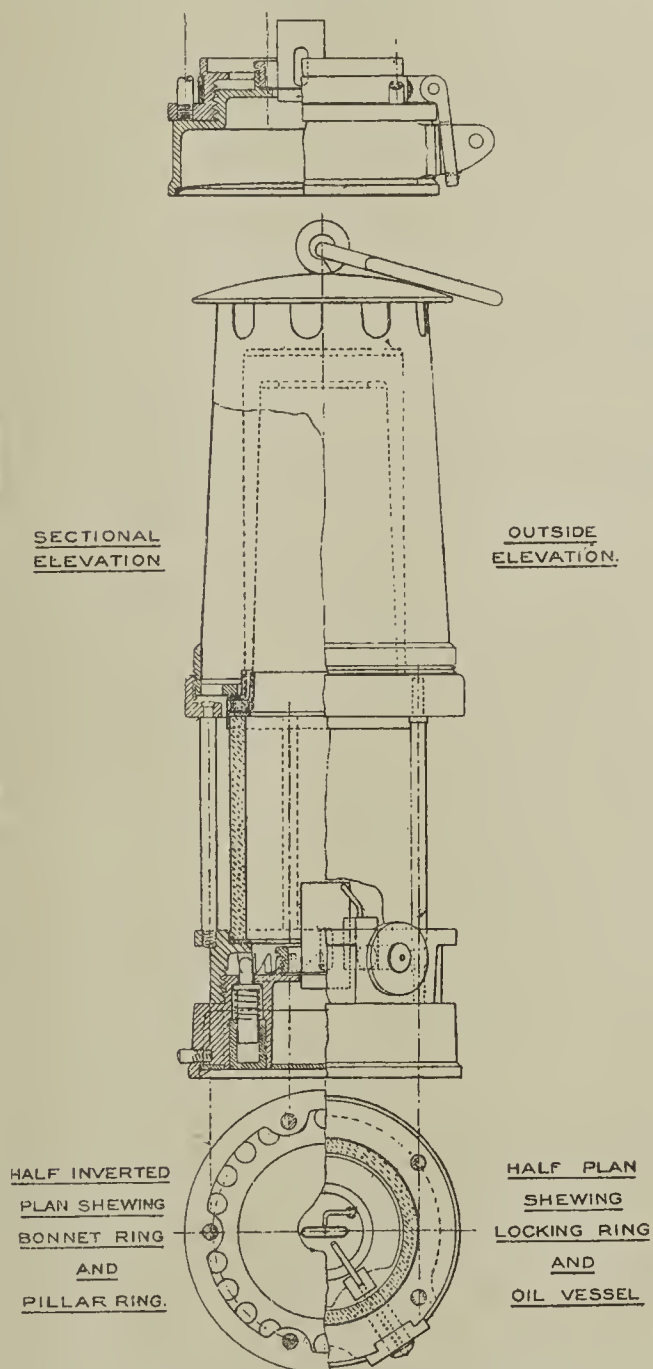


FIG. 1.—PATTERSON AND COMPANY'S SAFETY LAMP, TYPE A1.

Lamp, Type "A. 1," and consists of the following essential parts:—

(1.) *Bonnet or Shield* of steel with a separate securely fastened crown.

Furnished with outlet holes immediately below the crown; provided that the bottom of the holes shall not be less than  $\frac{3}{16}$  inch above the top of the outer gauze.

(2.) *Bonnet Ring* of brass, steel, or iron, riveted to the bonnet and provided with five vertical air-inlet holes of total area not greater than 1.6 square inches.

*Pillars* of steel or iron, five or more, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom or Lock Ring* of brass, steel, or iron.

(3.) *Glass Retaining Ring* of brass, steel, or iron, screw-threaded to engage with the lock ring; provided or not with an inner vertical flange for protection of the inside edge of the glass. Provided that the clearance between

the retaining ring and the oil vessel when the lamp is put together shall not be so great as to make it possible, under reasonable working conditions, to loosen the glass by forcing it round in its seating, to such an extent as to impair the safety of the lamp.

(4.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with secure flame-tight double-lap seams, or butt seams with folded edge secured on the inside by a folded metal strip; each gauze formed to fit flanges of the outside and inside base rings, and so secured to the same by such punch indentations or by riveting as to make strong and flame-tight joints; the gauzes being so constructed as to form the seating for the glass necessary to hold it firmly in position, thereby preventing the lamp from being put together without them.

Internal dimensions.	Outer gauze.	Inner gauze.
	In. In.	In. In.
Height from shoulder of base ring	$3\frac{1}{8} \pm \frac{1}{8}$ ... $3\frac{1}{8} \pm \frac{1}{8}$	$\pm \frac{1}{8}$
Diameter at top	$1\frac{1}{8} \pm \frac{1}{8}$ ... $1\frac{1}{8}$	$\pm \frac{1}{8}$
" " bottom	$1\frac{1}{8} \pm \frac{1}{8}$ ... $1\frac{1}{8}$	$\pm \frac{1}{8}$

Provided that the lamp may be fitted with a Mueseler tube and horizontal gauze in place of the inner gauze; the horizontal gauze forming a secure and flame-tight joint with the Mueseler tube.

Provided also that the lamp may be used with a single gauze, of the dimensions of the outer gauze given above (with or without a gauze cap), until 1st January, 1914, or, in the case of lamps now in use, until 1st January, 1916.

(5.) *Glass* cylindrical:—

Height	60 mm.	$\pm \frac{1}{2}$ mm.
External diameter	57½ "	$\pm \frac{1}{2}$ "

Furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring.

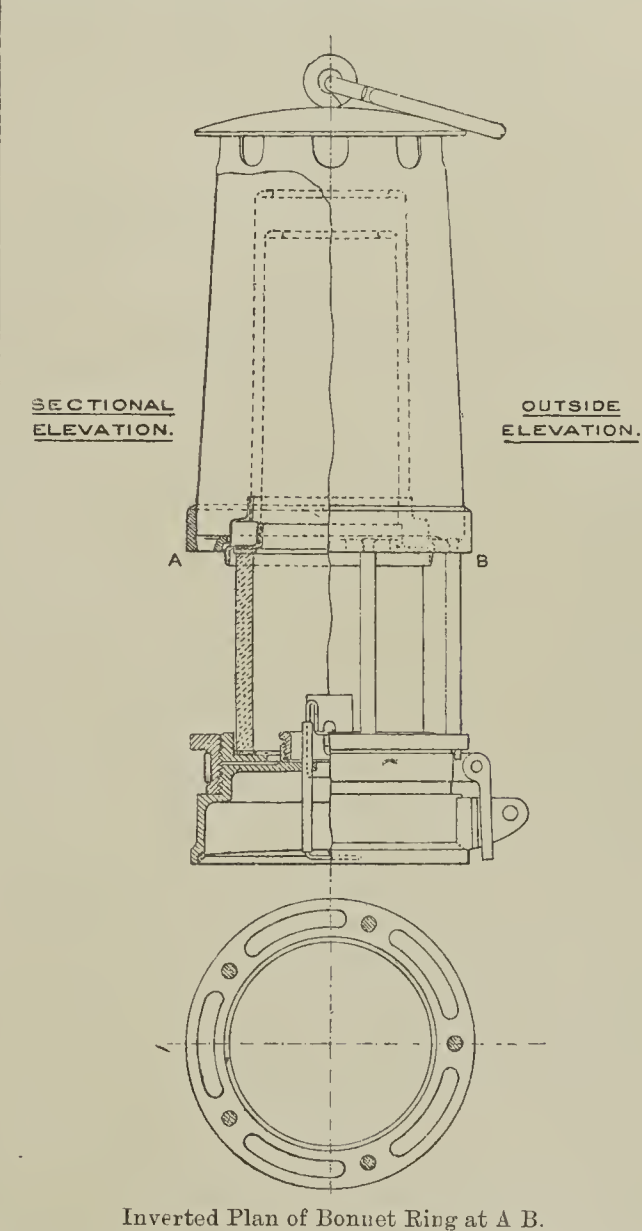


FIG. 3.—PATTERSON AND COMPANY'S SAFETY LAMP, TYPE B1.

(6.) *Oil Vessel* of brass, steel, or iron, of sufficient capacity to provide the required light for the required time, as specified in paragraph 9 below; fitted with a flat burner  $\frac{1}{2}$  in. to  $\frac{5}{8}$  in. wide (fitted or not with a porcelain body), provided or not with a winding wick adjuster, so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(7.) *Locking Devices*.—An efficient lead-rivet lock, with a horizontal or vertical lug or hinge securely attached to the lock ring by a sliding band or otherwise, or to a pillar, and a horizontal or vertical lug or staple securely soldered to the oil vessel.

Provided that lamps now in use, which are fitted with screw locks, may continue in use until 1st January, 1916.

(8.) *Reflector*.—The lamp may be fitted with a movable reflector.

(9) Provided:—

(i.) That the strength of material and attachments throughout the lamp is not less than in the sample of Patterson and Company's lamp "A. 1" submitted for the official tests on the 15th April, 1913.



- (i.) That the oil and wick used in the lamp shall be such that the lamp shall be capable of maintaining a light of candle power not less than 0.30, as determined by a pentane standard, all round in a horizontal plane throughout a period of not less than 10 hours.
- (iii.) That the lamp has been made at the works of Messrs. Patterson and Company, at Trafalgar-street, Newcastle-on-Tyne.
- (iv.) That the glass shall be of an approved type, and that its dimensions shall not be outside the limits laid down in paragraph (5).
- (v.) That the lamp shall have marked upon it its name and the name of the maker.
- Patterson and Company's Safety Lamps, Type "A. 2" and Type "A. 4." Patterson and Company's Safety Lamp, Type "B. 2." For use by Officials.*

These lamps are modifications of Patterson and Company's Lamps "A. 1," "A. 3" and "B. 1," respectively, and are similar to them in all but the following respects:—

- (1.) The bonnet, bonnet ring, pillar ring, lock ring, and oil vessel may be of aluminium.
- (2.) The pillars may be of brass.
- (3.) The gauzes may be of copper wire in the case of lamps used for surveying purposes.
- (4.) Provided:—
- (i.) That the strength of material and attachments throughout each lamp is not less than in the sample submitted for the official tests on the 15th April, 1913.
- (ii.) That the oil and wick used in each lamp shall be such that the lamp shall be capable of maintaining a light of candle power not less than 0.30, as determined by a pentane standard, all round in a horizontal plane throughout a period of not less than 10 hours.
- (iii.) That the lamps have been made at the works of Messrs. Patterson and Company, at Trafalgar-street, Newcastle-on-Tyne.
- (iv.) That the glasses shall be of an approved type, and that their dimensions shall not be outside the limits laid down for Patterson and Company's "A. 1" and "B. 1" lamps.
- (v.) That each lamp shall have marked upon it its name and the name of the maker.
- (vi.) That the lamps shall be used by Officials only.

**F.O.B. Contracts.**—The Court of Appeal has given judgment upon an appeal by the defendants against a decision of Mr. Justice Bailhache in the case of Charles Wimble, Sons and Co. v. J. Rosenberg and Sons, which raised for the first time the construction of an important section in the Sale of Goods Act, 1893. The plaintiffs (Mincing-lane brokers), by contract notes dated June 27, 1912, bought for the defendants 200 bags of rice at 12s. 10½d. per cwt. f.o.b. Antwerp, to be shipped as required by the buyers within three months, customary conditions, cash against bills of lading or receipt in London on the same day. The plaintiffs sent a sold note in similar terms to Mr. de Winter at Antwerp, who was the seller of the rice. The defendants gave to the plaintiffs written instructions, which they received on August 9, 1912, to ship the rice to Odessa and to pay freight on their account not exceeding 12s. 6d. per ton. The vessel was wrecked, and notice of the loss was posted at Lloyd's in the afternoon of August 26. The bills of lading dated August 25 and the invoice were not posted by Mr. de Winter to the plaintiffs till August 28. The bills of lading provided that the freight was payable goods lost or not lost. Plaintiffs at once paid the foreign seller the amount of the invoice with other accounts. On August 29 they tendered the documents to the defendants, who immediately tried to insure the goods, but found it was impossible. The defendants accordingly declined to take up the documents. The plaintiffs thereupon brought the present action, claiming £258 15s. 9d., the price of the rice, and £12 19s. 6d. freight thereon, alleging that by the contract and by the custom of the trade they were liable to pay, and they in fact had paid the foreign seller the price of the rice and had paid on the defendants' instructions the freight. Amongst other defences the defendants relied upon the terms of section 32 subsection 3 of the Sale of Goods Act, 1893, providing that "unless otherwise agreed where goods are sent by the seller to the buyer by a route involving sea transit under circumstances in which it is usual to insure the seller must give such notice to the buyer as may enable him to insure them during their sea transit, and if the seller fails to do so the goods shall be deemed to be at his risk during such sea transit." Mr. Justice Bailhache held that the contract in question was an ordinary f.o.b. contract of sale, and that subsection 3 did not apply to such a contract. He accordingly gave judgment for the plaintiffs. In their appeal the defendants contended that as the subsection obviously could not apply to c.i.f. contracts the intention of the Legislature must have been to make it apply to the other great class of contracts of sale—namely, f.o.b. contracts. The Court (Lord Justice Vaughan Williams dissenting) held that f.o.b. contracts were outside section 32, subsection 2, of the Sale of Goods Act, and accordingly the appeal by a majority was dismissed with costs. Lord Justice Vaughan Williams remarked that a buyer of goods under a contract could insure the goods by an open form of contract, but receiving notice of and without declaring the name of the ship by which the sea transit was to be effected.

## INDUSTRIAL AGREEMENTS.

### Report of the Industrial Council.

The Industrial Council have submitted to the President of the Board of Trade their report upon the enquiry which they made into certain matters connected with industrial agreements. The questions referred to the Council were the following:—

- (a) What is the best method of securing the due fulfilment of industrial agreements; and
- (b) How far, and in what manner, industrial agreements which are made between representative bodies of employers and of workmen should be enforced throughout a particular trade or district?

The report is divided under two heads, devoted respectively to the fulfilment and extension of agreements.

### The Fulfilment of Agreements.

Notwithstanding the difficulties inherent in dealing with large numbers of workpeople, the Council find from the evidence that agreements in most cases are well kept. The breaches that have been mentioned were, with a few exceptions, the result of the action of comparatively few men, or due to exceptional circumstances or to differences and misunderstandings in regard to points of interpretation, and are not, as a rule, countenanced by the respective organisations. It is recognised by both sides that they are under a strong moral obligation to observe agreements which have been entered into by them or by their representatives on their behalf. The principal exceptions appear to be in trades which are unorganised, or in which on one side or the other the organisation is incomplete or is of recent origin, but where agreements are the outcome of properly organised machinery for dealing with disputes they are, with very few exceptions, loyally observed by both sides. Where agreements have been broken it is frequently found that they were made at times when, owing to the abnormal conditions, great difficulty must have been experienced in arriving at a fair adjustment.

Where one side or the other are alleged to have committed a breach of an agreement, an examination of the facts of the case sometimes shows that the signatories to the agreement, though acting in good faith, signified their assent to the terms of the agreement, but were unable, subsequently, to carry their constituents with them. It sometimes happens that when the agreement comes to be put into practice different interpretations may be put upon some part of the document. The obviously reasonable and advantageous course for the parties to adopt in such circumstances is to submit the point of interpretation to some person not concerned in the question at issue.

An "interpretation clause" is an essential part of an industrial agreement and should form part of every such agreement. A model clause of this character would be one which provided that, in the event of a dispute arising as to the interpretation of an agreement, the point in dispute should be referred to an independent chairman, or to arbitrators, or a court of arbitration, agreed upon in each case by the parties. In the event of the parties failing to agree upon the person or persons to whom the matter is to be referred, it should be referred to a chairman or a court of arbitration appointed in accordance with the provisions of the Conciliation Act, 1896.

**Conciliation Boards, Joint Committees, &c.**—It was stated by a large proportion of witnesses that the existing conciliation procedure was found to work satisfactorily, and to assist in the settlement of the great majority of the points of difference that arise from time to time between the parties. A difference of opinion was manifested as to whether or not the awards and decisions of conciliation boards should be made binding, though a majority of the witnesses who expressed an opinion upon this point were in favour of the suggestion. So far as has been shown by the evidence, loyal acceptance of the decisions of the conciliation boards has been the rule in all the trades concerned; and it would appear inexpedient to attempt to substitute for these voluntary forms of machinery some alternative method based upon principles other than that of mutual consent.

The question arises, however, whether it is desirable or expedient to supplement in any way the existing voluntary agencies of conciliation. That there must be the power to appeal ultimately to the arbitration of the strike or lock-out is apparently the general opinion of those whom the Council have had an opportunity of examining, and the Council concur in this view. It is, however, also the general opinion that the chances of effecting an amicable settlement of industrial difficulties are increased if there is an established and recognised form of procedure which must be followed by the parties concerned before a cessation of work may take place.

Much support has been given to the view that some procedure should obtain in all trades to preclude a stoppage of work until the matter in dispute has been made the subject of some form of enquiry. The majority of opinions on the point favoured the principle that a definite period should elapse after the notification of a grievance before a stoppage of work. In most cases 30 days was suggested as a suitable length of time. Several witnesses favoured the suggestion that incitement to strike, during the period of enquiry, should be prohibited; and the opinion was

expressed that employers should not make use of that period for the organisation of non-union workers.

Where there exists in any trade a recognised form of conciliatory machinery for the adjustment of disputes agreed by both sides to come within the conciliation scheme, the Council consider that it is unnecessary that there should be any intervention on the part of the community (acting through a Government department or otherwise) until the existing procedure has been exhausted; but in order that the interests of the community may be adequately safeguarded, they couple with this opinion the view that it is desirable that before a cessation of work takes place there should be a period of time (after the existing procedure has been exhausted) sufficient to admit of (a) the further consideration of the position by the parties, and (b) the opportunity of the introduction into the discussion of some authority representing the interests of the community.

They also consider that it is an essential part of a conciliation board or joint committee that there should be attached to it some authority to which, in the event of a deadlock, the parties may appeal for a recommendation as to settlement.

Where there is (a) a difference in regard to the interpretation of an agreement, or (b) a difference as to whether there has been a breach of an agreement, there should be no stoppage of work (by strike or lock-out) pending the reference of the difference to some impartial tribunal, and pending the issue of a pronouncement by the tribunal.

**Organisation.**—The value of efficient organisation on the part of employers and workpeople as a means of securing the due fulfilment of industrial agreements is very clearly demonstrated by the experience of the different trades of the country.

**Moral Obligation.**—Different opinions were expressed in regard to the efficacy of the "moral obligation" as an aid to the due fulfilment of agreements. Some evidence was given to the effect that monetary guarantees or penalties would not interfere with, but possibly might strengthen, the moral obligation.

**Monetary Penalties and Prohibition of Assistance to Persons in Breach.**—Among the proposals which have come before the Council for consideration as possible methods of assisting the due fulfilment of agreements are two which, though dissimilar in some respects, seem to require, for the purposes of their proper examination and analysis, the application of very much the same principles. These suggestions are (a) the infliction and enforcement of monetary penalties upon those committing a breach of an agreement, and (b) the prohibition by law of financial or other assistance to persons in breach. The majority of the witnesses expressed the view that the penalties should be recoverable from the association rather than from the individual, the association to have the right of recovery from the individual. It was also suggested that claims for penalties should in all cases be made through the association to which the aggrieved party belonged. Various suggestions have been made as to the procedure by which monetary penalties should be recoverable. Apart from their assessment by a neutral and independent arbitrator, it has been suggested that they should be recoverable through the county court. As, presumably, the object of the penalty clause would be to secure the observance of the agreement, rather than the infliction of fines, it would appear to be desirable that the area of responsibility should be widened, and this suggests that the penalties should be claimable from the associations rather than from individuals, and that claims in respect of alleged breaches should be made only through the respective associations. Where the breach is committed by persons not members of an association a different procedure would, of course, be necessary.

The opinion was advanced that if unions were liable to the infliction of fines or penalties for breaches of agreements or strikes without due notice, the officials of the unions would find themselves in possession of a new means of insisting upon their members observing the agreements or of refraining from ceasing work without proper notice. The unions might be liable for breaches of agreements (1) when committed with the knowledge and sanction of the union officials or executive, (2) when committed by one or more individual members of the union without the sanction of the union officials. The rate of the penalty would require to be higher in the case of (1) than (2). In the case of (2) it was suggested that the ability of the union officials to maintain discipline among their members would be greatly strengthened by a provision giving them power to claim from the individual members the amount of the penalty incurred by the union on their behalf, or to expel the offending members from the union, the whole of any sums due to such members, or such part of those funds as may be necessary to cover the amount of the penalty, being retained by the union.

As regards the prohibition of assistance to persons in breach, the suggestion that no support should be given by either employers' associations or trade unions to their respective members acting in breach of an agreement has, as a principle, received general support from almost every witness who considered the matter in the course of the evidence. A majority of the witnesses who expressed a definite opinion on the subject held the view that some kind of legislative compulsion is desirable, but some



witnesses were opposed to legislative interference, and preferred that the matter should be regarded as part of the internal discipline of the organisations concerned. The Council think there can be little doubt that the fact that financial or other assistance could not be given to persons acting in breach of agreement would be an aid to discipline and would tend to assist in the maintenance of agreements, and are of opinion that where it has been decided by an impartial tribunal (or by mutual consent of the parties to an agreement) that a breach of an agreement has been committed by any person who is a member of an association represented by the signatories to the agreement, no assistance, financial or otherwise, should be given to that person by any of the other members of the associations who were parties to the agreement.

There is a danger that the introduction into the terms of agreements of provisions for the enforcement of money penalties or fines may in some instances deter workpeople from entering into agreements which might in other respects have been acceptable to them. Having regard to the special nature of industrial organisation on the workpeople's side, the ultimate result of the institution of a system of legal money penalties for breaches of agreement or the legal prohibition of assistance to members in breach might be that the trade union leaders would find themselves precluded from entering into agreements at all, or, if agreements were entered into, that they would be compelled to insist upon the insertion of a clause which enabled them to terminate the agreements upon exceedingly short notice. An alternative to this might be defiance of the law when there would at once arise all the difficulties inherent in any attempt to enforce the law against a large number of individual workmen—with no ultimate source of pressure short of imprisonment.

The Council's view is that voluntary organisation and collective bargaining cannot successfully proceed upon a basis of broken faith, and that breach of faith should be discouraged by all voluntary action that can be taken by associations on either side. In many associations rules for the punishment of persons committing a breach already exist, and it is recommended that other associations should follow the lead which has thus been taken, and consider whether it is not advisable that similar rules should be adopted in their organisations. While it is to the interests of both employers and workpeople that industrial agreements should be duly fulfilled, in the long run this object is more likely to be secured by an increased regard for the moral obligation and by reliance upon the principles of mutual consent, rather than by the establishment of a system of monetary penalties, or by the legal prohibition of assistance to persons in breach.

**Monetary Guarantees.**—A number of suggestions were received in favour of the principle of monetary guarantees in connection with agreements. A few witnesses, however, expressed doubts as to the efficacy of monetary guarantees. It was pointed out that the disciplinary value of a money payment for breach of agreement might be of little effect if the payment were made out of funds which had been set apart for the purpose, as in such a case the payment would not affect the general funds of the organisation, and the penalty would not be brought home to the members. One witness suggested that monetary guarantees implied a doubt as to the good faith of the parties to the agreement. It was also stated that in some cases the union funds could not bear the strain involved in maintaining a heavy guarantee fund, and also that the individual sum per man would be small; in the case of unions who are parties to a number of agreements it was suggested that it would be difficult for them to provide a monetary guarantee in each case.

The Council are of opinion, therefore, that the general adoption of the system of monetary guarantees, in the form of a deposit of money, cannot be regarded as constituting a practicable and efficient means of ensuring the fulfilment of agreements. At the same time, where monetary guarantees are voluntarily offered, they see no objection to their adoption.

**Duration of Agreements.**—The question of the period for which agreements should operate is one to which attention has been directed, and it is one of no little importance.

There may in some instances be difficulty in inducing employers or workpeople to bind themselves to observe particular terms of employment for a long period; but it appears to be to the advantage of the trade generally that agreements should continue in force for some fixed period.

Agreements providing for the establishment of machinery should contain a provision to the effect that the machinery shall remain in operation for an agreed period, to be mentioned in the document, and that it shall continue in force thereafter until such time as either party shall have given not less than three months' notice in writing to the other side to terminate it or to amend any of its provisions.

With regard to agreements on questions coming within the scope of the recognised machinery, they should be subject to revision on such written notice as may be agreed between the parties.

#### Extension of Agreements.

The evidence of a considerable number of witnesses was to the effect that the terms of agreements arrived at

between employers' associations and trade unions are often observed, particularly as regards rates of wages, by individual firms who are not members of the employers' association, and are not, therefore, parties to an agreement. A very large majority of the witnesses who expressed themselves definitely on the subject were in favour of the principle of the extension of agreements to the whole trade of a district, where such agreements have been arrived at voluntarily by associations representative of the trade in the district.

After considering various proposals regarding this matter (including one to the effect that the Industrial Council should be the authority appointed to hold the necessary enquiries and decide upon the various applications for extension of agreements that might be made), they have arrived at the conclusion that the proper body to appoint the authority is the Board of Trade.

It has not been proposed that the Board of Trade should entertain any application for the extension of an agreement unless such application is received from both the parties to the agreement.

The Council have drawn up the details of a draft scheme:—  
*Draft Scheme.*

Where an industrial agreement has been arrived at between representatives of one or more employers' associations and representatives of one or more trade unions in a particular trade or district, it shall be competent for the parties to the agreement to apply (at any time during the currency of the agreement) to the Board of Trade to cause an enquiry to be held, by such authority as the Board of Trade may direct, to determine whether or not the agreement shall be extended and its terms made obligatory upon persons not members of the associations represented by the signatories to the agreement.

Upon receipt of an application for the extension of an agreement the Board of Trade shall arrange for an enquiry to be held, and shall take steps to advertise the facts that an application is under consideration and that an enquiry is to be held. The name or names of the person or persons constituting the authority shall be made public.

The enquiry shall be held at such times and places as shall give reasonable opportunity for those affected to attend should they so desire.

The terms of any agreement in respect of which an application for extension has been received shall be duly advertised by the Board of Trade a reasonable time before the enquiry is commenced.

If the authority appointed by the Board of Trade are satisfied, after holding the enquiry, that the associations represented by the signatories to the agreement constitute a substantial body of the employers and workmen in the trade or district, and that the agreement is a proper agreement and one that might suitably be extended, the authority may declare that the terms of the agreement, with such modifications thereof as may be agreed upon by the parties at the enquiry, shall be extended to cover the whole of the trade or district. Where an agreement has been so declared to be extended, it shall be an implied term of any contract of service in the particular trade or district that the terms of the agreement shall be an essential part of such contract.

It shall be a condition precedent to such determination by the authority that the agreement provides:—

(a.) That at least . . . days' notice shall be given by either party of an intended change affecting conditions as to wages or hours, and

(b.) That there shall be no stoppage of work or alteration of the conditions of employment until the dispute has been investigated by some agreed tribunal, and a pronouncement made upon it.

In determining whether or not an agreement shall be extended, the authority shall take into consideration representations that may be made to them by persons claiming that they should be exempted from the operation of the agreement, either generally or as regards any part or parts of the agreement, and if the authority are satisfied that a claim for exemption has been established an intimation of such exemption shall be included in the determination respecting the agreement.

The authority shall forward its determination to the Board of Trade, and the Board of Trade shall cause it to be duly published, and copies of the determination shall be given to such persons as are known to be interested or affected or to any who may apply for copies.

The period during which an agreement which has been extended shall operate shall be such period as the authority may think fit.

The authority should take account of the suggestion that financial or other assistance should not be given to persons acting in breach of agreement, and whether or not the agreement, or the rules of the association that are parties to it, stipulate that no such assistance should be given.

#### Employers' Memoranda.

A memorandum is attached to the signatures of Sir Gilbert Claughton, Mr. J. H. C. Crockett, Mr. F. W. Gibbins, Sir Charles Macara, Sir Thos. R. Ratcliffe-Ellis and Mr. J. W. White, who desire to add that in their opinion an enquiry into the effects of the Trades Disputes Act, 1906, and the provision of protection would be desirable.

There is a further memorandum signed by several employers on the Council, who do not concur in those

portions of the report which, giving the go-by to the very strong opinions expressed against compulsion, impose agreements made between certain persons on others not parties to them.

The arrangement made between an employer, or a group of employers, and persons purporting to represent the trade union organisation of the men employed must be deemed to be a bargain made between each employer and the men in his employment, whether members of the trade union or not. It is binding only to a very modified extent, for it leaves employer and workman alike free to terminate the relation between them under the ordinary notice. This is a right which neither party is willing to surrender. The arrangement goes no further than to set out the conditions of wages, hours and other matters, on which those responsible for it consider employment ought to be offered and taken. It is clear that if such conditions are fair to A they must be fair to B, whether A and B be unionist or non-unionist. For this, among other reasons, compulsion is inadmissible as a means of obtaining the adherence of the parties to the arrangement.

A further consideration to which great weight attaches relates to the position of the general public. It is not difficult to conceive circumstances in which the interests of a majority of the employers and their workmen might be at variance with those of the general community. If the other employers and workmen were compelled by law to accept the decisions of such a majority and to regulate their practice accordingly, it might have the result that prices would be artificially forced up, in the interest of a particular trade, to the great detriment of the consumer.

A separate memorandum is signed by Sir Thomas Ratcliffe-Ellis, who thinks that it should be provided by statute that it should be an implied term of every collective industrial agreement that before there is a reversion to the method of strike or lock-out there should be an enquiry and a pronouncement upon the question at issue by some impartial tribunal, and that where that statutory term of the agreement is not observed it should constitute a contravention of the agreement.

Again, it should be declared to be illegal to make any payment, or to give any financial assistance in support of any person who (having been a member of an association represented by the signatories to the agreement) has been declared by the tribunal referred to in the report, or by the consent of the parties to the agreement, to have contravened any of its terms. Power might be given to the Board of Trade to issue a certificate that the statutory provision should not apply in any cases where, after enquiry, the Chief Industrial Commissioner is satisfied that the rules of the association and its disciplinary power of enforcing those rules are such as to secure the due fulfilment of all the terms, statutory and otherwise, of any agreement entered into. Such certificate should be revocable, but might be reissued. It might be provided in the Act that proceedings against persons alleged to have made illegal payments should not be instituted except on a certificate of the tribunal that it was a proper case for a prosecution. If that certificate were given, neither the Trades Disputes Act, nor any other Act, should be a bar to such proceedings.

Sir Thomas further considers that the draft scheme set out in the report should be amended by having a third condition added to the two conditions precedent to such determination by the authority, namely:—

(c) That it should be illegal for any financial assistance to be given by either the employers' association or the workmen's association in support of any person who, having been a member of an association represented by the signatories to an agreement, has been declared by an impartial tribunal or by mutual consent of the parties to the agreement to have contravened the terms of the agreement.

There is also a lengthy memorandum by Mr. Alex. Siemens, who dissents from many of the conclusions in the report.

An official notification issued on Saturday states that the Duke of Connaught, the Grand Prior, and the Chapter General of the Order of the Hospital of St. John of Jerusalem in England have made the following awards for acts of gallantry in saving or attempting to save life on land at imminent personal risk:—Bronze medal to Thomas Thomas, miner, who on April 27, 1913, rescued three men who were injured and in danger of losing their lives through the collapse of a portion of the pit side in the Llewellyn Pit of the Britannic Merthyr Coal Company Limited, at Giffach Gooch; silver medals to Edward Feeney (deputy), William R. Goodwin (deputy), Benjamin Mansbridge (machineman), Fred Adamson (deputy), Joseph Blenkiron (dattaller), Harry Rockliffe (dattaller), Albert Wall (dattaller), Dr. James Forster, Dr. Dhun Feroze, the Rev. S. F. Hawkes (vicar of Denaby Main), Basil H. Pickering (colliery manager), Walter Wilkinson (deputy), George Wilding (collier), Joseph Bucknall (deputy), George Milnes (under-manager), Arthur Sykes (deputy), Thomas A. Soar (surveyor)—members of rescue parties who displayed conspicuous heroism in rescue operations after the explosion at the Cadeby Main Pit, Denaby Main Colliery, on July 9, 1912.



## THE MINING ASSOCIATION OF GREAT BRITAIN.

A meeting of the executive council of this association was held at the Whitehall Rooms, London, on Thursday last, the 31st ult., when there were present Messrs. ARTHUR F. PEASE (president), in the chair; J. H. Merivale and Reginald Guthrie (North of England); J. T. Forgie, James Bain and Robert Baird (Scotland); F. J. Jones, Dr. W. E. Garforth, C. B. Crawshaw, R. Routledge, Joseph Warrington, W. H. Chambers, J. H. W. Laverick and E. B. Whalley (Yorkshire); W. H. Hewlett, Jesse Wallwork, R. B. Mawson, Henry Bouchier, G. H. Peace, Richard Branker, J. H. Walker and G. E. Lomax (Lancashire); G. J. Binns, Henry Stevenson, G. A. Longden, W. Hay, Ernest E. Bramall, J. W. Fryar, Mark Fryar, Alfred Hewlett (*terts.*), Dennis Bayley and P. Muschamp (Midland Counties); F. W. Llewelyn and J. Selby Gardner (North Staffordshire); Evan Williams, W. W. Hood, C. Kenshole and Finlay A. Gibson (South Wales); G. E. J. McMurtrie (Somerset); and Sir Thomas R. Ratcliffe-Ellis (law clerk and secretary).

### The Late Mr. M. H. Habershon.

A resolution of sympathy with the widow and family of the late Mr. Habershon was passed.

### New Knights.

On the motion of the PRESIDENT, a resolution in the following terms was unanimously passed:—

That this meeting of the executive council of the Mining Association of Great Britain desires to offer to Sir Francis W. T. Brain, Sir J. S. Harwood Bannier M.P., and Sir W. Scott Barrett, D.L. (honorary treasurer of the Association), the heartiest congratulations of the members on the well-merited honour which has been conferred upon them by H.M. the King, and to express the sincere hope that they may long be spared to enjoy the distinction.

### Coal Mines Act, 1911—Regulations.

The LAW CLERK reported the result of the hearing of objections to the draft proposed General Regulations under this Act, which had occupied the Right Honourable Lord Mersey nine days. Several important modifications suggested on behalf of the association had been embodied in the regulations which were to take the place of the former Special Rules, and were to come into operation after the expiration of two months from July 15, 1913; but it was hoped the time named would be extended by a fortnight.

Mr. EVAN WILLIAMS said he had been asked by the special committee of the association which had dealt with the regulations to bring before the council a special report in reference to the manner in which the case of the association had been prepared and conducted at the hearing before Lord Mersey, and he had pleasure in presenting such report, which he read as follows:—

On the conclusion of the protracted proceedings in connection with the General Regulations under the Coal Mines Act, the Special Committee desire to express to the association their very high appreciation of the services which have been rendered by Sir Thomas Ratcliffe-Ellis.

In the preliminary negotiations with the Home Office prior to the formal issue of the Regulations, in the subsequent consideration by the Committee of the Regulations when issued, during the period of negotiation with the workmen and the Home Office on the proposed amendments, and finally in preparing and submitting to Lord Mersey the case of the coalowners, the untiring devotion to the interests of the association displayed by Sir Thomas was most conspicuous.

His grasp of the various complicated details involved in the proposals which were under consideration and his tact in smoothing over difficulties, and finally the admirable manner in which he prepared and placed before the Referee the case of the coalowners, were mainly instrumental in bringing about what the Committee consider to be a highly satisfactory result.

The Committee propose that the heartiest thanks of the association be accorded to Sir Thomas, and that this report be recorded in the minutes of the Association.

Mr. WILLIAMS moved that the report be adopted by the council and be recorded in the minutes. This was seconded by Mr. J. T. FORGIE, and, on being put to the meeting by the PRESIDENT, was carried with applause.

The LAW CLERK, in thanking the members for the report and resolution, said it had been a great pleasure to him to have the opportunity of doing the work for the association. He thanked them warmly for their kind estimate of his services. He had simply put forward the best case he could, but he was greatly assisted in the preparation of the case and in presenting it before Lord Mersey by the valued services rendered by the committee which had worked with him. He had given in connection with the case, and he did not want to mention any particular might be invidious; but they had all

worked to the best of their power, and he was sure they deserved the heartiest approval of the association. (Hear.)

On the motion of the PRESIDENT, seconded by Mr. F. J. JONES, it was resolved unanimously:—

That this meeting of the executive council desires to place on record the high appreciation the members entertain of the eminent services rendered to the association by Messrs. W. C. Blackett, Evan Williams, W. H. Chambers, W. G. Phillips, J. T. Forgie and the other members of the committee during the nine days' enquiry before the Right Honourable Lord Mersey into the objections which had been lodged against the proposed general regulations under the Coal Mines Act, 1911, and to tender to them the cordial thanks of the association for the time they devoted to the preparation of evidence and for the very able manner in which that evidence was placed before his lordship, and which has resulted in a number of the modifications sought by the association being granted.

The council then proceeded with the consideration of a number of matters set out in the agenda, chief amongst them being the undernamed:—

National Insurance Act 1911 (Health Insurance), Income Tax on Wagons and on Contributions to Trade Associations, Railway Rates (Increases), Minimum Wage Act 1912, Coal Under Railways (Howley Park Case), Waterways, &c.

The proceedings terminated with a cordial vote of thanks to the President for his conduct of the meeting.

## INDUSTRIAL DISEASES.

### Clonic Spasm of the Eyelid and Nystagmus.

A Departmental Committee on Compensation for Industrial Diseases, comprising Mr. Ellis J. Griffith, K.C., M.P., Sir Thomas Clifford Allbtt, K.C.B., M.D., F.R.S., his Honour Judge Alfred Henry Ruegg, K.C., and Dr. Thomas Morison Legge, Esq., M.D., Medical Inspector of Factories, appointed in April 1912 to enquire and report whether the following diseases can properly be added to those enumerated in the Third Schedule of the Workmen's Compensation Act, 1906—viz., (1) cowpox; (2) Dupuytren's contraction; (3) clonic spasm of the eyelids, apart from nystagmus; and subsequently writers' cramp—have submitted their report [6956].

The report states that the necessity for some investigation concerning clonic spasm of the eyelids (*i.e.*, spasmodic contraction and relaxation of the muscles of the eyelids) was indicated by suggestions that miners suffering from such spasm had been refused certificates of compensation because they did not exhibit the *symptom* nystagmus (*i.e.*, oscillation of the eyeballs), though the *disease* nystagmus was already scheduled by the Secretary of State's Order of May 22, 1907. The enquiries subsequently made of ophthalmic specialists and others had revealed considerable divergencies of experience and opinion as to the existence and nature of such a spasm, particularly to a disabling extent, apart from nystagmus; some authorities suggested that it was a variety of nystagmus, others that it was at any rate a symptom of that disease, and others that it was merely a habit. The questions involved were therefore referred to the Committee.

Attention was also directed to the remarks made by the Lord President of the Scottish Court of Session in delivering judgment in the case *McGinn v. Udston*. These observations were to the effect that the condition at present scheduled being "nystagmus" and not "miners' nystagmus," a miner who exhibits as a sign, *e.g.* of disseminated sclerosis or other condition *not* due to the nature of his employment, the characteristic symptom of oscillation of the eyeballs is nevertheless given, by the use of the word "mining" in the second column of the schedule, the benefit of a presumption, which his employer must rebut if he wishes to escape liability for compensation, that the disease was due to the nature of his employment. The Lord President suggested that the term used in the schedule should have been "miners' nystagmus," but, in considering this suggestion, it is necessary to remember that this designation would not clearly cover cases of nystagmus as an occupational disease if they occurred among persons other than miners. Under the existing terms of the schedule, persons other than miners may claim compensation for disablement by nystagmus, but on them (as distinguished from miners) is the burden of proof that in their case the disease is due to the nature of their employment.

On these subjects the Committee heard four representatives of the Mining Association of Great Britain—*i.e.*, Drs. W. Brown-Moir, T. Lister Llewellyn, W. E. Hume, and Robert McGoie; a representative of the Miners' Federation of Great Britain and Ireland—*i.e.*, Dr. A. Rowley Moody; and two independent medical men specially qualified by their experience, *i.e.*, Dr. W. G. Laws and Dr. F. Shiffa-botham. After hearing the evidence of these seven gentlemen, the Committee circulated to certain ophthalmic specialists and others a schedule of questions designed to elicit definite expressions of opinion on those points on which there was still room for doubt.

The Committee's conclusion is that the word "nystagmus" is no more than the name of a symptom, and cannot conveniently be employed to name a disease. It denotes only oscillation of the eyeballs. "Miners' nystagmus," on the other hand, is a term well understood to name a disease or group of symptoms, practically confined to miners, of which oscillation of the eyeballs (*i.e.*, "nystagmus") is the commonest, but not invariably present, objective sign. This disease has many symptoms, some subjective and some objective. The Committee have no doubt that during its course, at some time or other, the symptom nystagmus appears in all cases. This is the conclusion come to on the evidence of those who have had the greatest experience, but it is impossible to deny that, among those heard, much diversity of opinion was expressed as to whether it is present at all times, or even susceptible of elicitation by repeated tests under conditions favourable to its perception. And, in some cases accompanying it, or in others even replacing it in the later stages, may be clonic spasm of the muscles of the eyelids. Consequently the symptom nystagmus, however easily found in a great majority of cases, ought not in all to be taken as a conclusive test either of the presence or of the absence of a disease of which, after all, it is but one symptom. The Committee find further, that the suggestion that it has been taken as such a test is not altogether unfounded. They are satisfied that cases of miners' nystagmus may have been wrongly diagnosed, and that certificates of disablement are likely to be refused, through too much insistence on this one test; and they are convinced that it is necessary to make it abundantly clear to all those concerned in the administration of the Act or in the diagnosis of cases, that the condition, the existence or non-existence of which to an incapacitating extent is to determine the question whether there can be a claim to compensation, is not the symptom nystagmus alone, but the whole disease known as "miners' nystagmus." The Committee also find that it is not sufficient, and for various reasons would not be proper, merely to call attention also to the additional symptom clonic spasm; all the symptoms, whether subjective (*e.g.*, movements of objects, headache, giddiness, night blindness, and dread of light) or objective (*e.g.*, movements of the eyeballs, tremor of the eyelids, eyebrows, head, and even of the neck and shoulders), must be taken into account. The question for decision is: "Do the symptoms present in this individual, the objective symptoms and the subjective symptoms taken together, with or without the history of the case and the other available evidence, show that he has miners' nystagmus to such an extent that he is wholly or partially incapacitated within the terms of the Act."

As regards the point raised in *McGinn v. Udston*, the Committee find that the word "nystagmus," being only the name of a symptom, either names no disease at all and so gives no title to compensation, or (and this is the interpretation on which the court acted) includes nystagmus even when it is a symptom of forms of disease (*e.g.*, Friedreich's ataxia, disseminated sclerosis, and tumour of the cerebellum) that are not industrial.

In view of the evidence given and the facts disclosed by recent researches as to the causation of miners' nystagmus by inadequate illumination at the coal face and elsewhere in the mine, the Committee entertain the gravest doubt whether true miners' nystagmus can ever occur in persons other than miners. The Committee of 1907, however, seem to have had such cases in mind (for though in the body of their report they referred to "miners' nystagmus," in their recommendation they spoke only of "nystagmus"). The Committee are, therefore, of opinion that any amendment of the existing schedule should be so framed as to observe the existing claim for compensation for cases of miners' nystagmus in persons other than miners, if such cases occur.

The conclusions are embodied in the following recommendations:—

"(1) To meet the point raised in *McGinn v. Udston*, we recommend that the word 'nystagmus' added to the first column of the schedule by the Order of May 22, 1907, should be replaced by the words 'miners' nystagmus.'"

"(2) To meet the case of workmen not engaged in mining possibly contracting the disease we recommend that the terms used should be 'miners' nystagmus in miners or others.'"

"(3) For the purpose of making it clear that the point for determination is the presence or absence, not merely of the symptom nystagmus, but of the disease miners' nystagmus, we doubt whether it will be enough to circulate this report to the courts concerned, and to issue instructions on the point to certifying surgeons and medical referees. We therefore recommend the addition in parentheses of the words ('a disease most common among miners, of which oscillation of the eyeballs is the commonest but not invariably present objective sign.')

"(4) We recommend the retention of the word 'mining' in the second column of the schedule. This will retain to a miner having miners' nystagmus the benefit of the presumption that it was due to the nature of his employment, but, in the case of any other workman, will leave on him the onus of proof that the disease was so due."



## LAW INTELLIGENCE.

## HOUSE OF LORDS.—August 1.

Before Lord LOREBURN (presiding), Lord SHAW, Lord MERSEY, and Lord PARKER.

## Workmen's Compensation: Contracting-out Schemes.

**Godwin (Pauper) v. Lords Commissioners of the Admiralty.**—This was an appeal by the workman from an order of the Court of Appeal in an arbitration under the Workmen's Compensation Act, 1906. The appellant, Frederick Godwin, was a bricklayer, and while working at the Portsmouth Dockyard on May 23, 1908, he met with an accident. In August 1909, when he became totally incapacitated, he was told that he had been returned as unfit for further employment under the Admiralty, and that the compensation—16s. 9d. a week—he had been paid would in future be only 3s. 5d. This he refused to accept. By way of defence the Lords Commissioners of the Admiralty relied on the fact that a scheme of compensation for their workmen had been duly certified by the Registrar of Friendly Societies, and was in force when the applicant received his injuries; and that the applicant had agreed on January 17, 1908, that the provisions of this scheme should be substituted for the provisions of the Workmen's Compensation Act, 1906. They contended therefore that there was no jurisdiction in the county court to hear the application, because by the terms of the scheme it lay with the Treasury to judge of the alleged incapacity, and the workman must make his claim for compensation under his contract, and was not entitled to apply for compensation under the Act. After the Act of 1906 came into force the scheme was re-certified, but no ballot of the workmen was taken before re-certifying. The applicant contended that the scheme as re-certified was not valid, as no ballot of the workmen affected by the scheme had been taken before the re-certifying, as provided by section 3 (1) of the Act of 1906 to be taken before the certifying of any scheme.

The County Court Judge decided that the scheme was a valid one, and dismissed the application for want of jurisdiction.

The Court of Appeal (Lord Moulton dissenting) held that a scheme under the Workmen's Compensation Act, 1897, might validly be re-certified by the Registrar of Friendly Societies under section 15 (3) of the Workmen's Compensation Act, 1906, notwithstanding that no ballot of the workmen affected by the scheme had been taken under section 3 (1) of the Act of 1906.

The workman appealed.

Lord Shaw said that after anxious deliberations he had come to the conclusion that the judgment of the majority of the Court of Appeal was right, and that this appeal must be dismissed.

Lord Mersey concurred.

Lord Parker said the third section of the Act of 1906 differed in some respects from the third section of the earlier Act. The Legislature had thought proper to make special provision with respect to schemes which, when the Act came into force, were existing schemes duly certified under the earlier Act. The question was what was meant by the words "re-certify" and "re-certified" in these subsections. In his opinion the object of re-certifying the scheme was to show that the Registrar had looked into the matter and was satisfied that the scheme conforms, or had been so modified as to conform, with the provisions of the Act of 1906. No form of re-certificate was provided by the Act, and any form of re-certificate which stated, either expressly or by necessary implication, that the Registrar was exercising his power to re-certify would seem to be sufficient. In his opinion the words "the provisions of this Act as to schemes" in subsection 3 meant those provisions of the Act which prescribed what a scheme was to contain or was not to contain—provisions with which a scheme or modified scheme could properly be said to conform or not to conform. It could not be properly said that a scheme or modified scheme conformed or did not conform with provisions which did not relate to its contents, but prescribed conditions precedent to its certification under the third section.

The appeal was dismissed.

## SUPREME COURT OF JUDICATURE.

## COURT OF APPEAL—July 21.

Before the MASTER OF THE ROLLS, Lord Justice KENNEDY, and Lord Justice SWINFEN EADY.

## Workmen's Compensation: When Does Employment End?

**Webber v. the Wansborough Paper Company Limited.**—This was an appeal from an award of the judge of the county court of Somerset sitting at Williton as an arbitrator under the Workmen's Compensation Act, 1906. The facts were not in dispute. Webber had been assisting in unloading a ketch, and when that was finished, to leave the vessel he crossed a plank belonging to the ketch, one end of which rested on a fixed ladder, and he got a few steps on this fixed ladder when he slipped and injured his foot. In these circumstances the learned county court judge held that the accident arose out of and in the course of the employment, and made an award in favour of the applicant. The employers appealed. The appeal was allowed.

The Master of the Rolls said the appeal raised a question which had often troubled the court: "When does employment begin and when does it end?" Two propositions are well established: (1) Employment is not to be confounded with work. For example, a collier's employment begins before he uses his pick on the face of the coal; (2) employment does not continue during the whole time occupied by going to or from the workman's home from or to the actual place of work. In this case he thought the difficulty had been solved by the House of Lords in *Lov v. the General Steam Fishing Company Limited* ([1909] A.C. 523). A sailor whose sphere of employment is the ship, and not the quay, was not within the protection of the Act when he was ascending the fixed ladder attached to the quay.

July 27.

## Workmen's Compensation: Accident and Appendicitis.

**Woods v. Thomas Wilson, Sons and Co. Limited.**—This was an appeal from an award of the judge of the County Court of Yorkshire sitting at Kingston-upon-Hull as an arbitrator under the Workmen's Compensation Act, 1906. The question was whether the death of a workman was due to an accident or to disease independently of the accident. The workman, Woods, was engaged in a lighter in coaling a ship, the "Calypso," bunkering her with baskets. He was in the act of fling a basket held between his body and a heap of coal. There came a rush of coal which either hit him in the stomach or knocked the basket against his stomach and he was unable to go on with his work. He was sent to the infirmary, where an operation was performed and a perforation of the bowel was discovered. At the same time it was ascertained by the operating surgeons that he had been suffering from chronic appendicitis. Three days afterwards he died from peritonitis, and during a post-mortem examination another perforation of the bowels was discovered. The county court judge found that the accident caused acute injury to the weakened bowel, which otherwise might have lasted for a considerable time and not interfered with his efficient work. He accordingly made an award in favour of the workman's widow. The employers appealed. The appeal was allowed. Lord Justice Kennedy dissenting.

The Master of the Rolls said the first perforation, which was not the cause of death, was apparently due to the appendicitis, and there was no reason for holding that the second perforation was not brought about by the same cause.

Lord Justice Kennedy thought that the Court could not reverse the decision without departing from the rule which had been stated both in the House of Lords and in that Court on several occasions, notably in "*Clover, Clayton and Co. Limited v. Hughes*" ([1907] A.C. 247). The workman's symptoms were not capable of being fully explained by the fact that he had chronic appendicitis, and it was a legitimate inference from the evidence, looking at it broadly, that the workman's death was accelerated by the accident which undoubtedly occurred to him.

Lord Justice Swinfen Eady delivered judgment in concurrence with that of the Master of the Rolls, observing that where the evidence was equally consistent with either view, that the death was, or was not, caused by the accident, then the onus lay upon the applicant to prove that it was so caused.

The appeal therefore was allowed, and the award entered in favour of the respondents.

## HIGH COURT OF JUSTICE.

## CHANCERY DIVISION.—July 16.

Before Mr. Justice JOYCE.

**Vipond and Co. Limited v. the Blaenavon Company Limited**—In this case Messrs. Viponds sued for the specific performance (or, in the alternative, for damages) of an alleged agreement contained in certain correspondence to renew a number of mineral leases of properties situate at Varteg Hill, Monmouthshire, held by Messrs. Viponds from the Blaenavon Company, and which will expire in the year 1918. The Blaenavon Company denied that there was any such complete or concluded agreement, and counter-claimed for certain arrears of royalties, and also for the payment of royalties upon coal worked from Messrs. Viponds' own contiguous freehold and leasehold mines. The Blaenavon company claimed payment of a wayleave upon large quantities of minerals which had been, as they alleged, worked from the adjoining properties of the Varteg Deep Black Vein Collieries Limited, and in breach of the covenant in the leases to Messrs. Viponds improperly conveyed through the roads or ways in the mines and premises leased to the plaintiffs. The Blaenavon Company also alleged that Messrs. Viponds had worked a large quantity of the minerals in the Blaenavon property, and wrongfully sent it to bank through the adjoining property of the Lower Varteg Company, instead of through the pits and openings on the Blaenavon property.

His lordship, in giving judgment, referred to the deed of 1883, under which the plaintiff company were, according to the defendant company, bound to pay royalties on all coal worked in the Blaenavon area, whether leased to them or contiguous to the leased mines. Plaintiffs, said his lordship, contended that the deed was not intended to be embodied

in the new lease, but if the case were one of *conclusio in rem*, only, his opinion was that the terms of the new lease must embody the provisions of that deed. It seemed to him that Mr. Laurence, the engineer for the defendant company, and Mr. Deakin, of the plaintiff company, had used the same ambiguous expression, "existing lease," though each meant something different. He was of opinion that the parties were never of one mind, and that there was no agreement. In all the circumstances he thought there was no completed agreement between the parties, and therefore the action must be dismissed; but as both parties were equally to blame there would be no costs on either side. His lordship decided that the counter-claim should stand over generally with liberty to apply.

## SCOTTISH COURT OF SESSION.

## FIRST DIVISION—July 16

Before the Lord PRESIDENT and Lords KINNEAR and MACKENZIE

## Workmen's Compensation—Fitness for Work.

**J. Paton v. Wm. Dixon Limited**—This was an appeal in an arbitration under the Workmen's Compensation Act by John Paton, miner, against Wm. Dixon Limited, Blantyre Collieries, Blantyre. On December 11, 1911, the appellant twisted his back and racked himself. He was paid compensation as for total incapacity until February 17, and for certain other periods he was paid as for partial incapacity. Subsequently the parties agreed to refer the matter to a medical referee. On May 1 the medical referee certified that the appellant was able for light work, and that if he could obtain that he would be able for his usual work in three weeks. At the end of the three weeks the respondents stopped payment, and five days later the appellant resumed his own work. On August 15 he became permanently incapacitated, and his trouble was diagnosed as cardiac dilatation due to an aneurism of the aorta. Sheriff-substitute Shennan, in the Sheriff Court at Hamilton, was of opinion that the aneurism strain was put upon the appellant's heart muscles while working between May 27 and August 15, 1912. He held that the incapacity the appellant suffered since August 15 was not proved to be due to the accident of December 7, 1911.

The Division refused the appeal with expenses, holding that it was a question of fact for the sheriff.

## Workmen's Compensation—Cleaning Machinery in Motion.

**Ogilvy Bros. v. R. McDiarmid.**—This was a stated case under the Workmen's Compensation Act between Ogilvy Bros., manufacturers, Gairie Works, Kilmuir, and Robert McDiarmid, factory worker. McDiarmid had been warned not to clean the machinery while it was in motion. On January 23 he attempted to clean part of a mangle with a piece of waste. He hand was drawn into the machine.

Sheriff-substitute Taylor in Forfar Sheriff Court found that the accident arose out of and in the course of the workman's employment, and awarded him compensation.

The Division sustained the appeal with expenses.

The Lord President said that the workman at the time of the accident was acting outside the scope of his employment. He was doing something which he must have known was not his duty, something he was not engaged nor entitled to perform.

**Doncaster's New Colliery.**—Some interesting particulars, in addition to those recently given by us in reference to the new colliery which Sir Arthur Markham, Bart., M.P., has decided to sink in the neighbourhood of Doncaster, have now come to hand. Up to the present there has been a good deal of doubt as to where this new colliery will be. The spot selected is not far from the village of Armthorpe, and just at the back of Sandall Beat Woods, one of the pleasure resorts of Doncaster. Through the centre of these woods runs the South Yorkshire Joint Railway Company's mineral line, from which a short lead of railway, 250 yards long, has just been constructed to the site of the colliery, so that the materials may be brought along and a start made. Before sinking takes place a borehole is to be put down some 600 yards from the spot where the original borehole was put in some years ago. This first bore, it will be remembered, entered coal measures at 941 ft. from the surface, and was continued to a depth of 2,163 ft. without reaching the Barnsley bed. It disclosed a serious fault of considerable downthrow south between Armthorpe and Bentley. If the borehole, with which a start is just being made, proves successful, the shafts will be sunk near at hand. Sir Arthur Markham paid a visit to the site of the colliery recently, being accompanied by Mr. J. B. Ball, chief engineer to the Great Central Railway. The actual site of the borehole is a field in the occupation of Mr. T. Frost, of Doncaster. It is understood about 7,000 acres of coal, leased to Sir Arthur Markham by Earl Fitzwilliam, who in turn had some of it leased to him by the Doncaster Corporation, will be worked, including the coal under the racecourse. The new colliery will deprive Bentley of the honour of being the nearest pit to Doncaster, and will effectually transform an old-fashioned hamlet, and another of the beauty spots of Doncaster, into a thriving and prosperous colliery centre.



## THE COAL AND IRON TRADES.

THURSDAY, AUGUST 7.

## Scotland.—Western District.

## COAL.

Business in the coal trade has not yet recovered from the effect of the holidays. Shipments from the Clyde show an increase over last week, being 103,217 tons compared with 72,736 tons, but were considerably below the returns for the corresponding week of last year, which amounted to 112,098 tons. The clearances were at Bowling 332 tons, Greenock 3,844 tons, Ardrossan 6,753, Troon 7,177, Irvine 1,394, and Ayr 17,214 tons.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	12/ to 14/6	11/9 to 14/
Eil .....	12/6 to 12/9	12/6 to 13/
Splint .....	12/9 to 15/	12/6 to 15/
Treble nuts .....	12/6 to 12/9	12/ to 12/6
Double do. ....	11/8 to 12/	11/6 to 11/9
Single do. ....	11/3 to 11/6	11/ to 11/3

## IRON.

The holiday feeling is still prevalent in the Glasgow iron market. Only a small business is recorded, amounting to only about 15,000 tons. Advances from the States and the Continent are more encouraging. The market has been considerably influenced by the action of the Middlesbrough ironmasters in postponing their decision with regard to a selling company. The effect of this has been to bring speculation practically to a standstill. Cleveland iron dropped on the week from 55s. 5d. to 54s. 9d., while Cumberland hematite, which was not in demand at all, was quoted at 70s. 3d., being 1s. 6d. less than at the beginning of the week. There are 87 furnaces in blast in Scotland, compared with 82 last week and 88 in the corresponding week of last year.

## Scotland.—Eastern District.

## COAL.

The trade from the Firth of Forth ports continues in a depressed condition owing to the dockers' strike, and although in one or two cases shipments have improved, the total quantity shipped shows a still further reduction, being 36,760 tons, against 49,810 last week and 118,882 in the corresponding week of last year. A number of the largest collieries are still closed, and business very unsettled. The shipments from Grangemouth during the week amounted to 19,480 tons, Granton 3,500 tons, Leith 2,050, and Bo'ness 12,730 tons.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal .....	12/9 to 13/	12/9 to 13/
Secondary qualities .....	11/9 to 12/	11/9 to 12/
Treble nuts .....	13/	13/
Double do. ....	12/ to 12/6	12/ to 12/6
Single do. ....	13/3 to 13/6	11/3 to 11/6

Business in the Fife coal trade was very active, and a considerable improvement over last week is reported. The shipments have increased from 46,360 last week to 74,064, a rise of 27,704 tons. Prices of the better qualities of coal are practically unchanged, but third-class steam coal is somewhat easier. Double nuts also show a slight decrease in price.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/9 to 17/	16/9 to 17/
Unscreened do. ....	14/6 to 15/	14/6 to 15/
First-class steam coal .....	14/3 to 15/	14/3 to 15/
Third-class do. ....	11/6 to 12/6	11/6 to 12/9
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/6 to 13/	12/9 to 13/3
Single do. ....	11/6 to 11/9	11/6 to 11/9

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 137,425 tons of coal and 1,405 tons of coke were despatched from Tyne Dock, a decrease of 9,887 tons of coal and an increase of 1,189 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 58,487 tons of coal and 2,604 tons of coke, an increase of 225 tons of coal and a decrease of 353 tons of coke. The Blyth shipments aggregated 91,245 tons of coal and coke, a decrease of 19,696 tons. The Naples Gasworks are stated to have contracted for about 30,000 tons of Holmside gas coal through local merchants. Shipment is to be over the first three months of next year at a c.i.f. price, which is estimated to work out at rather under 13s. per ton f.o.b. A quantity of good ordinary unscreened Durham bunkers is reported to have been sold for delivery over next year at 12s. per ton f.o.b. For delivery over next year, producers are stated to be offering gas bests at 13s. per ton and seconds at 11s. 6d. f.o.b. Buyers, however, regard these figures as too high. At Genoa, for new Pelton-Holmside gas coal for early delivery, from 23s. 6d. to 24s. per ton c.i.f. is being asked. For August delivery, sellers ask 23s. 9d., and for September-December 24s. For shipments over next year, there are sellers at 20s. 1½d. Buyers' ideas are rather less, however. For complete cargoes of gas seconds, 23s. 6d. is asked, whilst for parcels on passage from 22s. 9d. to 23s. 3d. is quoted. For next year, sales of seconds continue to be fixed up at 19s. 1½d. c.i.f. The local coal market has been very dull during the past week, the influence of Bank Holiday having predominated and being evidently hard to shake off. F.o.b. prompt shipment have varied as follow on:

Best gas, Blyths, are weaker; Tynes, 3d. down; seconds, 3d. lower; unscreened, similarly; Blyths, 3d. cheaper; Tynes, 3d. down;

gas specials, weaker; unscreened bunkers, Durhams, 3d. advanced; Northumbrians, 3d. decreased; and coking coal, stronger. Other descriptions of fuel are unaltered.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	15/3 to 15/6	15/6
Do. Tynes (Bowers, &c.) .....	15/	15/3
Secondary, Blyths .....	13/	13/
Do. Tynes (Hastings or West Hartleys) .....	13/3 to 13/6	13/3 to 13/6
Unscreened .....	11/9 to 12/3	11/9 to 12/6
Small, Blyths .....	9/3 to 9/6	9/6 to 9/9
Do. Tynes .....	7/9	7/9 to 8/
Do. specials .....	10/	10/
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) .....	15/	15/
Secondary gas coals (Pelaw Main or similar) .....	13/6 to 13/9	13/6 to 13/9
Special gas coals .....	15/3 to 15/6	15/6
Unscreened bunkers, Durhams .....	13/3 to 14/3	13/3 to 14/
Do. do. Northumbrians .....	12/ to 12/3	12/ to 12/6
Coking coals .....	13/6 to 13/9	13/3 to 13/9
Do. smalls .....	13/3	13/3
House coals .....	15/6	15/6
Coke, foundry .....	20/ to 21/6	20/ to 21/6
Do. blast-furnace .....	19/	19/
Do. gas .....	16/6 to 17/6	16/6 to 17/6

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 108,375 tons of coal, and 415 tons of coke, as compared with 101,760 tons of coal, and 1,105 tons of coke for the corresponding period of 1912, being an increase of 6,615 tons of coal, and a decrease of 690 tons of coke. Business on the coal market is still rather quiet owing to the influence of the holidays still being felt. Active operations will hardly be commenced in earnest before to-morrow. However, there is a decidedly better feeling, especially for prompt shipment, with enquiries for all qualities of coal. Prices all round have advanced, especially for gas coal and also for unscreened coals for bunkers. In view of the holidays, and tonnage being fairly plentiful, colliery turns are becoming very full. A contract for 30,000 tons of best gas coal has been accepted at slightly under 13s. per ton for January, February, and March shipment. There is nothing much doing in the forward market at the moment. Best Sunderland bunkers are selling at 14s. 9d. owing to the strong demand and collieries being very full. Quotations are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals .....	15/6	16/
Secondary do. ....	14/	13/9
House coals:—		
Best house coals .....	16/6	16/
Ordinary do. ....	16/	15/
Other sorts:—		
Lambton screened .....	15/9	15/6
South Hetton do. ....	15/3	15/3
Lambton unscreened .....	13/9	13/3
South Hetton do. ....	13/3	13/
Do. treble nuts .....	16/9	16/9
Coking coals unscreened .....	13/9	13/6
Do. smalls .....	13/6	13/3
Smithies .....	14/4	13/9
Peas and nuts .....	16/6	14/
Best bunkers .....	14/	14/
Ordinary bunkers .....	13/6	13/ to 13/3
Coke:—		
Foundry coke .....	22/	22/6
Blast-furnace coke (divrd. Teesside furnaces) .....	20/	19/ to 20/
Gas coke .....	16/6	17/6

The freight market is rather easier on the basis of 8s. 3d. Genoa-Savona for large tonnage. The Government manœuvres being now completed, this, of course, will release quite a large number of steamers which the Admiralty chartered for coaling purposes. Recent fixtures include the following:—Coast: London 3s. 9d., Havre 5s., Hamburg 3s. 9d. Bay: Lisbon 7s. 3d., Rochefort 6s. 6d. Baltic: Cronstadt 5s. 3d., Petersburg 5s. 3d., Lubeck 5s., Reval 5s., Riga 5s. Mediterranean: Genoa 8s. 6d. 3,500, 8s. 3d. 6,000, Oran 8s. 6d., Bari 9s. 9d., Malta 7s. 3d.

## Middlesbrough-on-Tees.

## COAL.

There has not been much doing since the holidays at the beginning of the week. Best Durham gas coal still rules about 15s. per ton, though there were odd sellers at slightly less. For second best qualities 13s. 6d. to 14s. f.o.b. Bunker coal meets with steady demand at 15s. 6d. for Durham specials and 13s. 6d. for ordinaries. Coke is slightly weaker; medium blastfurnace qualities, though generally quoted 18s. 6d. are in some cases obtainable at a slightly less figure. Best foundry coke is 22s. 6d. to 24s., and gas coke 16s. 6d. to 17s. per ton.

## IRON.

The iron market has been dull and transactions of a very limited nature. No. 3 Cleveland g.m.b. is at 56s. per ton and sellers of No. 1 quote 58s. 6d. for that brand. Foundry iron is steady at 55s. 6d., but No. 4 forge is from 55s. to 55s. 3d. per ton and the quotation for mottled and white iron 54s. 6d. to 55s. Hematite business is easy, 71s. per ton being quoted for east coast mixed numbers. Rubio ore realised 20s. per ton ex-ship Tees for 50 per cent. quality. The shipments of iron and steel from the Tees during the month of July were up to expectations. The total clearances of pig iron amounted to 105,935 tons, of which 97,309 tons were cleared from Middlesbrough and 8,626 tons from Skinningrove. In June the despatches reached 94,403 tons and the loadings for July a year ago were given at 123,494 tons. Of the pig iron sent from Skinningrove during the past month 7,022 tons went to Scotland and 1,604 tons to Holland. Of the quantity shipped at Middlesbrough during

July, 73,195 tons went abroad and 24,114 tons coastwise. Germany was the largest buyer, taking 11,879 tons, whilst Scotland received 10,600 tons, Italy 9,401 tons, Belgium 8,135 tons, France 7,521 tons, Japan 7,050 tons, Sweden 5,934 tons, Denmark 5,501 tons, Wales 5,490 tons, and United States 4,385 tons. The manufactured iron cleared amounted to 18,836 tons, 12,834 tons of which went foreign and 6,002 coastwise; and of the 46,645 tons of steel shipped, 42,620 tons went abroad and 4,025 coastwise. As usual, India was the largest customer for both manufactured iron and steel, receiving 5,612 tons of the former and 11,008 tons of the latter. Other large buyers of steel were:—New South Wales 3,621 tons, Victoria 3,359 tons, Russia 3,226 tons, Canada 2,415 tons, and Natal 2,060 tons.

## South-West Lancashire.

## COAL.

There will be a very small outturn of fuel in this district this week, as although the pits were down to commence work yesterday, many of them started with little more than half their full complement of men. In inland household coals ample provision had been made for the customer before the stoppage. With regard to shipping, fuel was fairly plentiful before the holidays, and the supplies then accumulated were sufficient to meet customers' requirements during the stoppage. The requirements in connection with the excursion steamers have surpassed those of any previous holiday owing to the greatly increased traffic. Quotations for screened Lancashire steam coals remain as reported last week. In the coastwise and cross Channel trade the demand keeps satisfactory. The holidays at the pits have had the effect of clearing, in most cases, whatever accumulation there was of slack. Another strike has now commenced on the non-union question, this involving the stoppage of a group of collieries in the Haydock and Golborne districts and affecting over 5,000 hands.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/3	16/3
Do. (f.o.b. Garston, net) .....	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/3 to 14/	13/3 to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

## South Lancashire and Cheshire.

## COAL.

The Manchester Coal Exchange on Tuesday presented a very holiday appearance, and business was nil. List prices generally are as last reported, but they are not quite so strong, as is only natural with the warmer weather and the holiday influences.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

## IRON.

There is nothing fresh to report in this district, as there is very little business doing at present owing to holidays. Prices remain as last reported.

## Yorkshire and Derbyshire.

## Leeds.

## COAL.

There was no market in Leeds on Tuesday, although a few colliery people were present at the Queen's Hotel during the afternoon. Business during the week has been more or less of a holiday character, and the west Yorkshire

	Current prices.	Last week's prices.
House coal:—		
Prices at pit (London):		
Haigh Moor selected .....	14/ to 14/6	14/ to 14/6
Wallsend & London best .....	13/ to 13/6	13/ to 13/6
Silkstone best .....	13/6 to 14/6	13/6 to 14/6
Do. house .....	12/ to 12/6	12/ to 12/6
House nuts .....	11/6 to 12/	11/ to 11/6
Prices f.o.b. Hull:		
Haigh Moor best .....	16/6 to 17/6	16/6 to 17/3
Silkstone best .....	15/6 to 16/6	15/6 to 16/6
Do. house .....	14/6 to 15/6	14/6 to 15/6
Other qualities .....	14/ to 14/9	14/ to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/3 to 12/9	12/3 to 12/9
Gas nuts .....	11/6 to 12/6	11/6 to 12/6
Unscreened gas coal .....	10/6 to 11/	10/6 to 11/
Other sorts:—		
Prices at pit:		
Washed nuts .....	11/6 to 12/3	11/6 to 12/3
Large double-screened engine nuts .....	11/ to 11/6	11/ to 11/6
Small nuts .....	10/ to 10/6	10/ to 10/6
Rough unscreened engine coal .....	10/ to 10/6	10/ to 10/6
Best rough slacks .....	8/ to 9/	8/ to 9/
Small do. ....	7/6 to 8/3	7/6 to 8/3
Coking smalls .....	7/6 to 8/	7/6 to 8/
Coke:—		
Price at ovens:		
Furnace coke .....	13/ to 13/6	13/ to 13/6



pits have worked only about three days. The house coal pits carry very limited stocks of coal, and it is expected that full time work will shortly be the rule, as August and September are usually busy months. Pit prices generally are unchanged. Works fuel is plentiful. Gas coal is in strong demand for current delivery, but new business is quieter. Washed furnace coke remains dull.

Barnsley.

COAL.

The effect of the Bank Holiday was varied throughout the district, but generally the collieries resumed work on Monday, and a fairly full week's output is available. The usual local market showed little animation, and there was every evidence that any dislocation in the supply which may have been anticipated had been well arranged for. In almost every respect the demand was of a quieter description, but the deliveries under contract are of such a substantial nature that the output of the collieries was fairly well cleared. On export account the demand for best large steams continues to be of a strong description, and buyers are able to maintain prices, although there are indications that on forward account the tone is hardly so satisfactory from the buyer's point of view. The position with regard to secondary qualities of large steam coal is again more fluctuating, and collieries with very heavy outputs continue to offer easier prices to ensure full work. The holidays have interfered with the tonnage which railway companies usually take under contract, and this is another cause for the weaker tone which is being felt. Though there is no change so far as values are concerned in respect to small coal required by the many industrial districts, the quantity taken has been considerably reduced, and for current business prices are a shade easier for slacks, which appear now to be plentiful. Gas coal collieries continue to work full time, and heavy shipments are being made. In regard to house coal the fairly satisfactory demand for the best qualities of coal from London and the eastern counties has continued, but in the nearer markets business is not of a strong character, and stocks are increasing at the collieries. Prices continue to lack firmness so far as secondary descriptions of fuel are concerned. The coke trade continues to be of a depressed character, and there has been nothing during the week to alter the dull tone in regard to forward business.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—	14/6	14/6
Best Silkstone .....	13/9 to 14/	13/9 to 14/
Best Barnsley sefts.....	11/ to 13/	11/ to 13/
Secondary do. ....	13/ to 13/3	13/ to 13/3
Best house nuts .....	11/ to 12/	11/ to 12/
Secondary do. ....		
Steam coals:—		
Best hard coals .....	13/	13/ to 13/3
Secondary do. ....	12/	12/ to 12/3
Best washed nuts .....	11/9 to 12/	12/
Secondary do. ....	10/9 to 11/	11/
Best slack.....	8/3 to 8/6	8/6
Rough do.....	7/6 to 8/	7/6 to 8/
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/ to 12/6
Unscreened do. ....	11/6 to 12/	—
Gas nuts .....	12/ to 12/9	11/ to 12/
Furnace coke .....	13/ to 13/6	13/ to 13/6

Hull.

COAL.

The Humber coal market has a very pronounced holiday tone, and no great amount of business is spoken of. Prices are unchanged from last week. Steam hards of South Yorkshire sorts retain their value for prompt shipment, but Derbyshire and Nottingham steams show no improvement, and are about 1s. per ton cheaper than South Yorkshires. The export demand continues fairly good, though forward business is practically non-existent. Secondary sorts show no improvement and smalls are in only poor request. Owing to the holidays, shipments have been on the light side, and it will be next week before things get fully into the stride again. The outlook for the second half of the shipping season is regarded as fairly satisfactory. The freight market is lifeless and on the reports of delays at Cronstadt very little tonnage is being taken up for that port. The nominal rate for Cronstadt, Rival or Riga is 5s., Pernau 5s. to 5s. 3d., Genoa 8s. 6d., Alexandria 8s. 6d. to 9s. A steamer has to-day been chartered Hull to Kiel at 5s. 9d. The following are the approximate prices for prompt shipment f.o.b. Hull, &c.

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards.....	16/3 to 16/6	16/3 to 16/6
Washed double-screened nuts .....	13/3 to 13/6	15/3 to 15/6
Unwashed double-screened nuts .....	13/	13/
Washed single-screened nuts .....	13/ to 13/3	13/ to 13/3
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls.....	10/6 to 10/9	10/6 to 10/9
Unwashed smalls.....	9/ to 9/6	9/ to 9/6
West Yorkshire:—		
Hartleys .....	13/3 to 13/6	13/3 to 13/6
Rough slack .....	10/9 to 11/	10/9 to 11/
Pea slack .....	9/9	9/9
Best Silkstone screened gas coal .....	13/3 to 13/6	13/3 to 13/6
Best Silkstone unscreened gas coal .....	13/	13/
Derbyshire and Notts:—		
Best steam hards .....	15/6	15/6
Do. (Grimsby) .....	15/ to 15/3	15/ to 15/3
Derbyshire nuts (doubles) .....	13/	13/
Derbyshire nuts (doubles) (Grimsby).....	12/9	12/9
Derbyshire large nuts ...	14/ to 14/3	14/ to 14/3
Do. do. (Grimsby) .....	13/9 to 14/	13/9 to 14/
Nottinghamshire hards ...	15/6	15/6
Do. do. (Grimsby) .....	15/ to 15/3	15/ to 15/3

Chesterfield.

COAL.

For the first time for several years past the pits of Derbyshire were idle on Monday (Bank Holiday), and a substantial reduction of the week's output of coal is the result. In previous years this particular day was set apart for the miners' annual demonstration, but in future it may possibly become a recognised colliers' holiday—at any rate so far as this district is concerned. The warm weather has had the effect of considerably weakening the demand for house coal, but prices have not been disturbed. These continue firm on what is practically the level of last winter's values. The condition of the market for fuel for manufacturing purposes is unchanged. There is a steady demand week by week, with the prospect that this satisfactory state of things will be maintained for, at any rate, the remainder of this year. Cobbles and nuts for gas producers are much wanted for the steelworks of Sheffield and district. Business in slack for steam-raising is steadily improving, and, with the resumption of full time at the Lancashire cotton mills, the demand is likely to be brisk during the next few months. Prices are unchanged, but continue firm with a tendency to move upwards. Stocks at the collieries are exceptionally light. One or two of the leading railways are inviting tenders for their requirements of steam coal for locomotive purposes over the ensuing 12 months. The prices to be quoted are not, of course, known at present, but it goes without saying that they will show a marked advance upon the figures at which the expiring contracts were entered into a year ago. Deliveries are now on a heavy scale, and will, in all probability, continue at this level for some months to come. In the export branch of the trade a considerable business is passing in steam coal, for which there is an excellent demand. Prices are very firm, and are now quoted at 15s. 9d. per ton, delivered free alongside steamer at Grimsby, for the best brands of Derbyshire Top Hards. There is a good enquiry for cobbles and nuts for near Continental ports, and shipments of these qualities are on a fairly extensive scale. Washed fuel moves freely, and enquiries coming to hand foretell a good autumn and winter business in this class of coal. The coke market is lifeless at the moment, and the number of ovens in actual work is less than it has been for many months past. No improvement can be looked for until there is a revival in the pig iron industry. The demand for coke for steel-melting purposes is of a satisfactory kind, but prices are slightly weaker. For coking fuel orders are fairly numerous.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

IRON.

No improvement can be reported in the demand for pig iron, which is of a poor kind. Unless there is an early change for the better, it is feared that some furnaces will have to be blown out. The finished iron branch of the trade is equally quiet, and new work is now much wanted.

Nottingham.

COAL.

There is little to report this week concerning the coal trade in Nottinghamshire, as most of the collieries were holidaying—some from Friday afternoon and others from Saturday at noon, until Wednesday. This cessation of work has helped to clear sidings of loaded wagons and complete contract requirements. With respect to household fuel, the demand got a little better just before the holiday. It is expected that a general improvement will shortly set in, as householders are certain to take advantage of present prices in order to stock for the autumn and winter months. The tone in the steam coal branch is only moderately active for the time of the year, but the output of late has been such as to keep most of the hard coal pits making about five days a week. There has been practically no change in prices since a week ago.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	12/ to 13/	12/ to 13/
Good house coals.....	11/ to 12/	11/ to 12/
Secondary do. ....	10/ to 11/	10/ to 11/
Best hard coals .....	11/6 to 12/6	11/6 to 12/6
Secondary do. ....	10/6 to 11/	10/6 to 11/
Slacks (best hards).....	8/3 to 8/9	8/3 to 8/9
Do. (seconds).....	7/3 to 7/9	7/3 to 7/9
Do. (soft).....	7/3 to 8/	7/3 to 8/

Leicestershire.

COAL.

This week only a holiday report can be made. Since Friday last there has been no coal-getting until Wednesday, and then work was only partially recommenced. There is, on the average, a moderate amount of business on hand on which operations will be resumed. But whilst some of the collieries are rather badly off for business, others have a very fair amount on hand. The bulk of the enquiry at present is for steam coals of all kinds. Household coal is not much in request except for the middle and lower qualities. Local merchants this week are generally very quiet. Their household business is but of very small dimensions, and the cessation of work in the factories and works is general this week, and this will curtail entirely the steam coal deliveries. But the aspect of business is not at all depressing, and a revival of the activity which has prevailed for a considerable time is quite confidently anticipated. There is not any likelihood of any marked easiness in quotations except for accumulations.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

There is not very much business being done this week in connection with the coal trade of the Cannock Chase district. Some of the collieries have been standing three days for the August holidays, and others made a start on Wednesday morning, but it will take most of the week to get properly settled down. Very little is being done in the house coal trade, but the demand for this class of coal will probably increase during the next few weeks. So far as the enquiry for fuel for manufacturing purposes is concerned the outlook is fairly satisfactory.

Birmingham.

COAL.

There was practically no market. The pits resumed in most cases on Thursday, but there has been no call for fuel during the week. Prices have not been tested, but current rates are likely to be maintained until the autumn.

Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep .....	16/6	16/6
Do. best shallow .....	14/6	14/6
Do. seconds do. ....	13/	13/
Best hard .....	14/	14/
Forge coal.....	11/	11/
Slack .....	8/6	8/6
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked .....		
cobs .....	13/9	13/9
Best hard spires .....	14/6	14/6
Forge (steam) .....	10/	10/
D.S. nuts (steam) .....	9/6	9/6
Small (do.) .....	8/6	8/6

IRON.

Holiday conditions still prevail in the South Staffordshire iron and steel industries. The galvanised sheet mills, which suddenly find themselves with a big volume of work, restarted on Wednesday, a few bar mills were in operation on Thursday, but work in the district will not be general till Monday. The curtailment of production is rather welcome, inasmuch as before the holidays business showed little disposition to expand; neither is any marked change expected during the present holiday month. The assurance of peace in the Balkans is, however, an encouraging sign, and taken in conjunction with good harvest prospects point to a steady autumn trade, though it is recognised that the boom of the earlier part of the year is over. The market did not furnish a strong test of prices. There have been practically no sales during the week of pig iron, and with stocks of Northamptonshire forge qualities accumulating, prices remain low, varying from 52s. 6d. to 55s. for the best qualities. For all brands—Staffordshire as well as those from the outside—smelters state that prices are now so near cost that they cannot make further reductions. Bar makers have to contend with reductions in other centres. Prices for merchant qualities remain at £7 12s. 6d. to £7 15s. delivered Birmingham. Small rounds, squares, and flats stand at £7 15s. to £8 three-eighths basis, gas-strip is in better demand at the reduced price of £7 10s. to £7 12s. 6d., and hoops are £7 15s. to £8. In all these departments fresh orders would be welcomed. The galvanised sheet branch is for the time being one of the busiest, under the influence of substantial lines from abroad, and £11 is the minimum, ranging up to £11 10s. according to nature of order. The figures are, of course, f.o.b. Liverpool. The black sheet trade has recently been on a slow scale, but will be helped by increased requirements of galvanisers. In steel rolling stock manufacturers are proving good customers. Prices in some cases are easier, though there is no official notification.

Forest of Dean

Lydney.

COAL.

The collieries worked up to Saturday last and recommenced again on Wednesday, so that two days only were lost in consequence of the holiday. The demand for the house coals of this district is still a good one and outputs are well taken up, stocks of all descriptions being comparatively light. It is very probable that a brisk trade will be done during the rest of the month. Steam coals are selling well, the pits are all on full time and there are no stocks. Large and small are maintaining their prices, but through is going at less. Rough slack from the house coal seams is reduced 2s. per ton this week.

Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	16/6	16/6
Forest .....	15/6	15/6
Rubble .....	15/9	15/9
Nuts .....	14/	14/
Rough slack .....	8/	10/
Steam coal:—		
Large .....	13/ to 13/6	13/6 to 14/
Small .....	10/ to 10/6	10/ to 10/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

The Distribution of Cleveland Pig Iron.—It is understood that the proposal to create a limited liability company among the ironmasters of Cleveland (Middlesbrough) for the purpose of distributing the make of pig iron, fix the prices and control the output, has fallen through. Several firms have disagreed with the proposal. No definite information is forthcoming as to whether the Cleveland warrant stores will be continued, for it is understood that no more Cleveland iron will be placed in the stores, and, if this is so, the existence of the stores will come to an end.



## THE WELSH COAL AND IRON TRADES.

THURSDAY, AUGUST 7.

## North Wales.

## Wrexham.

## COAL.

The labour disputes which have arisen in this locality of late have now been settled (at any rate for the time being), and the possibility of a strike averted. Generally speaking, the coal trade is not in a very encouraging state at present. This has been a broken week, of course, and it was very difficult to get the men to turn up to work on the day after Bank Holiday. As a result of this and the shortage of wagons, most of the pits played on the Tuesday as well as on the statutory holiday. House coal is very badly sold and things are pretty much the same as they were last week, and also as regards the gas coal business. The steam coal trade is better and the revival in the ironworks' trade at Ellesmere Port has helped matters. These works have been rather slack for some time past, but I understand that they have now sufficient orders at each works to last for several months at full time. As they take most of their fuel from this neighbourhood, this news is a source of gratification to the coalowners also. The shipping coal trade is moderately good and the demand for small coal is fair, though there are slight accumulations of slack to be seen in some of the sidings. The current ruling prices are as follow:—

Prices at pit f.o.r. —	Current prices.	Last week's prices.
Best house coal .....	15/ to 15/6	15/ to 16/
Secondary do. ....	14/ to 14/6	14/ to 15/
Steam coal .....	12/3 to 12/6	12/3 to 12/9
Gas coal .....	13/ to 13/6	13/ to 14/
Bunkers.....	12/ to 12/3	12/ to 12/6
Nuts .....	11/ to 11/3	11/ to 12/
Slack .....	6/ to 8/	6/ to 8/6
Gas coke (at works) .....	15/ to 16/8	15/ to 16/8
Prices landsale:—		
Best house coal .....	16/6 to 18/4	17/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	15/ to 16/8	10/ to 12/6

## Monmouthshire, South Wales, &amp;c.

## Newport.

## COAL.

The steam coal market has shown little animation so far since last Saturday, when work was suspended for the holidays. Stocks have been abundantly sufficient to load the tonnage now in port, so that the lack of production at the collieries has had little effect—more so, too, that there has been very little attempt made to open up business. Smalls have taken a slight turn for the better on a fair demand for bunkering purposes, but it may be taken as certain that settled conditions will not be fairly resumed before the commencement of next week. The freight market has been quiet, chartering slow, and rates steady in all directions. Pitwood, with rather scanty supplies to hand, is a little firmer at 22s. to 22s. 3d. ex-ship for good wood.

Prices f.o.b. cash 30 days, less 2½ per cent.

Steam coals:—	Current prices.	Last week's prices.
Best Black Vein large ...	17/ to 17/6	17/ to 17/6
Western-valleys, ordinary	16/6 to 16/9	16/6 to 16/9
Best Eastern-valleys .....	15/9 to 16/3	15/9 to 16/3
Secondary do. ....	15/6 to 15/9	15/6 to 15/9
Best small coals .....	8/ to 8/3	7/6 to 8/
Secondary do. ....	7/3 to 7/6	7/ to 7/3
Inferior do. ....	6/9 to 7/	6/6 to 7/
Screenings .....	8/3	8/
Through coals .....	13/ to 13/6	13/ to 13/6
Best washed nuts .....	13/9 to 14/3	13/9 to 14/3
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	20/ to 20/6	20/ to 20/6
Furnace coke .....	22/ to 23/	21/9 to 22/
Foundry coke .....	26/ to 27/	25/6 to 27/6

## IRON.

Owing to the interruption occasioned by the holidays, there is practically no alteration to report in the conditions of the local iron and steel trades. Only small transactions have taken place since last week and prices generally remain as they then were. Work is being slowly resumed at bar mills and business is moderately satisfactory at rail mills where specifications are still freely coming to hand and values remain as last quoted. The blastfurnace department remains as quoted last week, work continues good, but not a great deal of fresh business is being done. Values remain steady at 77s. 6d. for Welsh hematite delivered to works in the district. Only a moderate demand is reported from the tinplate works, with a small enquiry reported, but in some quarters an early improvement is predicted. Quotations remain substantially as last week.

## Cardiff.

## COAL.

Although there was considerable pressure for coal during the few days preceding the holidays, shipments only amounted to about 388,000 tons, which was slightly under the average. Of this quantity South America took over 100,000 tons. Including Newport, Swansea, and Port Talbot, the total was just over 600,000 tons, and this would have been greatly exceeded if it had not been for a day's idleness at Newport, consequent upon a strike of railwaymen at the docks. All the collieries were closed on Saturday for the usual holiday on Bank Holiday and the two following days, and this, of course, put almost an entire stoppage to business. Though it was officially decided that the strike should not extend over three days, the weather which prevailed had the effect of inducing large numbers of men to extend their holidays, and for the remaining three days of the week, from Sunday to Saturday, it was not expected that the

outputs would be more than one half the normal. Thus there was not sufficient coal sent down to supply the vessels in port, which at the opening of the week numbered 184. A few of the colliery offices opened on Tuesday, but there was very little business done either on that day or the rest of the week, as most of the shippers had already arranged for whatever supplies were available. Prices were maintained with considerable firmness, best steams being 20s. 6d. to 21s., superior second Admiralties 19s. 6d. to 20s., and ordinary seconds 18s. 3d. to 18s. 9d. One or two enquiries were made for shipment over the next two or three weeks, but so far from modifying their quotations coalowners seem inclined to ask for slightly higher prices. Particularly was this the case where sellers were well booked ahead. Some of them declared that they had sold a good proportion of their outputs for the next two months, and they were therefore in a somewhat independent position. Moreover, the fact that freights had shown a rather easier tendency, and that buyers abroad might be expected to take their deliveries more freely, was looked upon as favouring the sellers' point of view. The future course of the market will, of course, depend a good deal on the tonnage position. Last week chartering was slow, the amount of tonnage taken up being only 250,000 tons, or 78,000 tons less than during the preceding six days, but that was only to be expected. This week, too, chartering transactions will no doubt again be very light, but for the rest of the month a large increase may be looked forward to. There are one or two factors, however, which buyers must take into consideration if they are to arrive at something like an accurate forecast as to future prices. The first is the reduced outputs which invariably rule throughout the month of August, and the second the action which the executive council of the Miners' Federation have resolved upon in reference to the non-unionist question. It has been decided there should be another "show card" at all the collieries in the first week in September, and that where non-unionists are employed 14 days' notice should be given to terminate contracts. Although action such as this usually has the effect of inducing non-unionists to fall into line with the organised workmen, it is rarely done without first of all leading to stoppages more or less extensive. This naturally tends to keep up the prices of coal, and indeed, in many quarters, it is declared that the "show card" is resorted to mainly for that very purpose. The small coal market is very firm, and all business is of a hand-to-mouth character. Buyers are not oblivious to the fact that when the men once more resume work there will be a substantial increase in the supplies thrown on to the market, and that in a short time, when the fruit harvest commences on the Continent, there will be a diminution in the demand, and lower prices will be obtainable. At present, however, bunkerings remain steady at 10s. 9d. to 11s., whilst cargo qualities are 8s. 3d. to 8s. 6d. There is no material change in Monmouthshire coals. No business of any moment is expected to be done until next week, and quotations are nominally—Black Veins 17s. 3d. to 17s. 9d., western valleys 16s. 9d. to 17s., and best eastern valleys 16s. to 16s. 6d., in each case f.o.b. Cardiff. There is no alteration in fancy house coals, nor is there much change in bituminous qualities, No. 3 Rhondda large being still quoted at 17s. to 17s. 3d., and No. 2 at 12s. 6d. to 13s. The quantity of coal shipped coastwise during June was 344,274 tons, as compared with 354,625 tons in the corresponding month of last year, being a decrease of 10,351 tons. From Cardiff there were shipped 169,110 tons, of which Southampton took 41,860 tons, London 39,757 tons, Liverpool 30,220 tons, and Bristol 17,454 tons. From Newport the shipments were 69,411 tons, of which Dublin took 13,570 tons; from Swansea they amounted to 43,549 tons, no less than 20,300 tons going to London; whilst from Port Talbot and Briton Ferry the shipments were 26,619 tons. There is no change in patent fuel, best brands still realising 22s. 6d., and other qualities 21s. to 22s. per ton. The shipments for the week were over 39,000 tons, of which the Crown Company exported 22,513 tons, and other local makers 6,700 tons, and Swansea 19,802 tons. Coke is slightly easier. Pitwood is also 3d. weaker, best French fir being 22s. 3d. per ton.

Prices f.o.b. Cardiff (except where otherwise stated).

Steam coals:—	Current prices.	Last week's prices.
Best Admiralty steam coals .....	20/6 to 21/	20/ to 21/
Superior seconds .....	19/6 to 20/	19/9 to 20/
Ordinary do. ....	18/3 to 18/9	18/3 to 18/6
Best bunker smalls .....	10/9 to 11/	10/6 to 10/9
Best ordinaries .....	9/6 to 10/	10/ to 10/3
Cargo qualities .....	8/3 to 8/6	8/3 to 8/6
Inferior smalls .....	7/3 to 7/9	7/6
Best dry coals .....	18/ to 18/6	18/ to 18/6
Ordinary dries .....	15/9 to 16/3	15/9 to 16/3
Best washed nuts .....	16/ to 16/6	16/ to 16/6
Seconds .....	15/ to 15/6	15/ to 15/6
Best washed peas .....	14/ to 14/6	14/ to 14/6
Seconds .....	13/ to 13/6	13/3 to 13/6
Dock screenings .....	10/3 to 10/9	10/ to 10/6
Monmouthshire—		
Black Veins .....	17/3 to 17/9	17/3 to 17/6
Western-valleys .....	16/9 to 17/	17/ to 17/3
Eastern-valleys .....	16/ to 16/6	16/6
Inferior do. ....	15/6	15/3
Bituminous coals:—		
Best house coals (at pit)	20/	20/
Second qualities (at pit)	18/	18/
No. 3 Rhondda—		
Bituminous large .....	17/ to 17/3	17/
Through-and-through .....	15/ to 15/3	15/
Small .....	12/6 to 12/9	12/6
No. 2 Rhondda—		
Large .....	12/6 to 13/	12/6 to 12/9
Through-and-through .....	11/3 to 11/6	11/3 to 11/6
Small .....	8/6 to 8/9	8/6 to 8/9
Best patent fuel .....	22/ to 22/6	22/ to 22/6
Seconds .....	21/	20/
Special foundry coke .....	30/ to 31/	31/ to 32/
Ordinary do. ....	24/ to 27/	26/ to 28/
Furnace coke .....	20/ to 22/	20/ to 22/
Pitwood (ex-ship) .....	22/3	22/6

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

## IRON.

The whole of the tinplate works are this week on stop. This will mean a reduced output of about 400,000 boxes, but whether it will have any stiffening effect on prices is doubtful. It will, of course, result in a good clearance of stocks, which before the stoppage amounted to 389,826 boxes. What will also probably have a marked effect on the market is the closing down of a considerable number of American independent tinplate mills for repairs. Prompt sales of 14 × 20 cokes have been made at 13s. 1½d., but for forward delivery makers ask 1½d. above this figure. Oil sizes are 13s. 7½d. for 18½ × 14, and 19s. 6d. to 19s. 9d. for 10 × 20. Although the official price fixed by the South Wales Siemens Steel Bar Association was declared to be £4 16s. 3d., this was not actually the case. The official price was fixed at 95s., but it was understood that 1s. 3d. per ton more should be added, so as to allow a margin for bargaining. The price for Siemens tin bars is really £4 15s., and for Bessemer ditto, £4 12s. 6d. per ton. The galvanised sheet market keeps very strong, there being a steady demand for 24-gauge corrugateds at from £11 to £11 5s. per ton. Although the dispute at the Ebbw Vale Iron and Steel Works is still unsettled there is reason to believe that next week will see the men once more at work, as Mr. Fred Mills, the general manager, has consented to discuss the grievances of the roll turners with a deputation appointed by the Trades Council. Welsh pig iron remains steady at 60s. f.o.t.

## Swansea.

## COAL.

The returns of the trade of the port during the past week were very highly satisfactory. The coal and patent fuel trades were both active, the shipments amounting to 114,993 tons. There was a quiet tone in evidence on the anthracite coal market this morning and, owing to the collieries being on stop, there was very little new business transacted. The following were approximately the closing quotations:—

Prices f.o.b. Swansea (cash in 30 days).

Anthracite:—	Current prices.	Last week's prices.
Best malting large (hand picked) (net) .....	21/ to 23/	21/ to 23/
Secondary do. ....	18/6 to 20/	18/6 to 20/
Big Vein large (less 2½ per cent.) .....	16/ to 17/6	16/ to 17/6
Red Vein large do. ....	12/ to 13/	12/ to 13/
Machine-made cobbles (net) .....	21/ to 22/	21/ to 22/
Paris nuts (net) .....	22/6 to 24/	22/6 to 24/
French do. do. ....	22/6 to 24/	22/6 to 24/
German do. do. ....	22/6 to 24/	22/6 to 24/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	11/6 to 13/6	11/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	6/ to 6/6	6/ to 6/6
Duff (net) .....	5/9 to 6/3	5/9 to 6/3
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/ to 12/	11/ to 12/
Small do. ....	8/ to 9/6	8/ to 9/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) .....	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

## Llanelli.

## COAL.

The coal trade this week is very quiet owing to the holidays. Work was not resumed at the collieries until Thursday morning, but as a large number of the colliers did not go down at all, the outputs were very small for most kinds. There should be a slight improvement in the demand over the next few days, as stocks have been reduced and shipments have been fairly heavy. No change is expected in the steam and bituminous qualities for another month or two, unless, of course, the tin-plate trade improves, and that at the moment seems rather improbable. Anthracite is expected to improve shortly. Prices this week are:—

Prices f.o.b.

Anthracite:—	Current prices.	Last week's prices.
Best malting large .....	20/6 to 22/	20/ to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	17/ to 18/	17/ to 18/
Red Vein do. ....	12/6 to 13/6	12/6 to 13/6
Machine-made cobbles ...	19/6 to 20/	18/ to 20/
German nuts .....	20/ to 22/	20/ to 22/6
French do. ....	22/ to 24/	22/ to 24/
Paris do. ....	22/ to 24/	22/ to 24/
Machine-made beans .....	19/ to 22/	19/ to 21/
Do peas .....	12/ to 13/	12/ to 13/
Rubbly culm .....	6/6 to 7/	7/ to 7/3
Duff .....	5/ to 6/	5/ to 6/
Other sorts:—		
Large steam coal .....	16/ to 17/	16/ to 17/
Through-and-through ...	11/6 to 12/	11/6 to 12/
Small .....	9/ to 10/	9/6 to 10/6
Bituminous small coal ...	10/ to 11/	11/ to 12/

The Railway Committee of Newcastle Chamber of Commerce state that, in view of the indefiniteness of the notices of increase given by the principal English railway companies, and of the enquiries made of the Mansion House Association on Railway and Canal Traffic as to their meaning and effect, the question of the sufficiency of such notices has been submitted to counsel, who have expressed the opinion that they are bad, inasmuch as they do not comply with the requirements of section 33 (vi.) of the Railway and Canal Traffic Act, 1888, and the order made thereunder by the Board of Trade on January 25, 1889. The committee is informed that the increased rates have not yet been shown in the public rate books, and they are also advised that the references to the increases which some of those books contain do not satisfy the requirements of section 14 of the Regulation of Railways Act, 1873, respecting the publication of rates.



**LABOUR AND WAGES.****North of England.**

The quarterly meeting of the Durham Coal Trade Conciliation Board was held on Friday last, at the Coal Trade Offices, Newcastle, Sir Lindsay Wood, Bart., presiding. At the previous meeting, held in May, the Board granted an advance of  $6\frac{1}{4}$  per cent., which brought the total increase, over the 1879 basis, up to  $56\frac{1}{4}$  per cent. The past twelve months have shown a steady advance, and on Friday a further advance of  $3\frac{3}{4}$  per cent. was granted, the new scale to come into operation on Monday next. In the aggregate, the new scale means an advance of 60 per cent. above the basis of 1879.

The quarterly meeting of the Cumberland Miners' Association was held last week at Workington. It was agreed to bring before the Cumberland Coal Conciliation Board a demand that the standard rate of mechanics shall be 5s. per day, plus current percentage, and that all surface labourers and handlers of coal shall be paid 4s. per day, plus current percentage. The question of the surfacemen's representation was deferred.

The trimmers and teamers employed at Tyne Dock, who ceased work at 12 noon on Saturday, with a view to enforcing their demand for a half-day holiday on Saturday and overtime rates up to 4 o'clock for working vessels which can be finished by that time, resumed work on Tuesday evening. A settlement was arrived at on the following day, when it was agreed to stop work at 12 noon, but where employers and men mutually agree to work a cargo after 12 noon such work is to proceed at the enhanced overtime rates. The new system will come into operation at once.

**Federated Area.**

The agent, Mr. J. G. Hancock, M.P., presented the officials' report for the past half-year at the monthly council meeting of the Notts Miners' Association on Saturday afternoon. It showed that there was a membership of 33,784, an increase of nearly 700 on the preceding six months. There had been an increase of £1,400 in contributions from the branches; £12,250 had been placed in the bank, making the total worth of the association at the end of the half-year £140,000. The ordinary expenditure had shown a considerable decrease, owing very largely to fewer conferences having been held. Out-of-work pay had been about the same, but the amount paid out in pensions had shown a slight increase. A number of reports having been received from colliery owners agreeing to a general holiday on Saturday next, on the occasion of the Notts miners' annual demonstration, which is to be held at Sutton-in-Ashfield, it was decided that miners should have a holiday on that day. The grievances at Brierley Hill Colliery, which include the non-unionist question, were considered, and a deputation was appointed to meet the management. A half-scholarship at the Central Labour (Ruskin) College was granted to two members of the Association, viz., Mr. J. E. Ashmore, of Nottingham, and Mr. H. W. Booth, of Hucknall. The question of non-unionists at Gedling Colliery was referred to the secretary (Mr. C. Bunfield) and the local lodge officials to deal with. It was resolved that the coke oven men employed at Pinxton Collieries be allowed to become members of the association.

At meetings of surface workers employed at Lord Ellesmere's, Astley and Tyldesley Coal Company's, Messrs. A. Knowles and Sons', and the Hulton Colliery Company's pits in Manchester, Bolton and Tyldesley districts, last week-end, it was announced that as a result of continued agitation on the part of the surface workers, the executive council of the Lancashire and Cheshire Miners' Federation had arranged a joint conference with the coalowners' association to discuss the question of revising their scales of pay.

A meeting of the Derbyshire Joint District Board under the Minimum Wage Act took place at Chesterfield last week to make alterations to the rules rendered necessary by changed circumstances. Mr. W. B. M. Jackson (Sheepbridge Coal and Iron Company), who presided, said he was sure that on both sides of the table they sincerely felt the very great loss that had been sustained by the death of Mr. James Haslam, M.P. They on both sides had looked upon Mr. Haslam as a friend. He moved a resolution of condolence with the family and relatives. Mr. W. E. Harvey, M.P., in seconding, said he had had many wrenches in his life, but he did not know of any wrench he had sustained greater than that caused by the death of Mr. Haslam. The resolution was carried by the members rising in their places.

The monthly delegate meeting of the Lancashire and Cheshire Miners' Federation was held in the Caxton Hall, Salford, on Saturday. A fortnight previously the executive committee decided to give 14 days' notice that the men would leave work in order to bring into the union those men employed at Messrs. Evans' Haydock Collieries, who had not yet joined. Above and below ground the collieries employ between 6,000 and 7,000 men, of whom about 200 were not then members of the Federation. Since the notices were sent in, mass meetings of the men have been held and addressed by the miners' agents. These had considerable effect, and it was reported to the meeting on Saturday that only about 50 or 60 men still remain outside the organisation. The conference decided to let the notices expire. The conference also received reports on the proceedings at the National Conference last week on the question of surfacemen's wages. It was stated that Mr. Ashton, the general secretary of the National Federation, was in communication with Sir T. Rattleiff-Ellis, the secretary of the employers, with a view to arranging a joint conference, which will probably be held shortly.

The position of the rippers, timbermen, and stonemen at the Newstead and Teversal Collieries was

further gone into before the arbitrator, Mr. A. M. Williams, at the Victoria Station Hotel, Nottingham, on Wednesday. The evidence was completed, and the matter was left for the decision of the arbitrator. Another conference will be held next Wednesday, when the case of the Pinxton horse-keepers will come up for consideration.

The council of the Derbyshire Miners' Association met at Chesterfield on Saturday, when the question of automatic weighing machines on all pit banks in the county was discussed, and it was decided that strong measures should be taken by the union leaders with all companies refusing to instal these machines when it was the general wish of the men that this should be done. The question of a better type of lamp being adopted at the Grassmoor Collieries was discussed at length, and the agents were deputed to approach the company, and it was resolved that, failing a satisfactory agreement, the men be allowed to cease work.

There is some friction between the management of the Blackwell A Winning Colliery and the workmen, over the system of the sharpening of the miners' tools. The men have asked for the system to be placed in their hands, but the management, who have had control up to the present, cannot see their way to make any alterations. It has been decided to give the owners notice to cease further deductions for the payment of the sharpeners.

A further conference took place at the Great Northern Hotel, Leeds, on Friday, between the West Yorkshire Coalowners' Association and representatives of the various pit workers' organisations, which are concerned in the demands put forward by the surface workers in West Yorkshire in respect of wages and working conditions. After a two hours' discussion the conference was adjourned to some future date, it being announced that the negotiations were still in progress.

A general strike in the North Wales coalfield has been averted, notices which were to have expired on Saturday last having been withdrawn in consequence of an amicable settlement. The day wagemen and the surface hands at a number of collieries were dissatisfied with the basis upon which their earnings were calculated, having regard to the Conciliation Board's last award. Mr. Edward Hughes, the miners' agent, estimated that since the last award, which was made nine or 10 months ago, the men have been paid on an aggregate £1,600 less than their due. As the result of a conference which took place at Wrexham between representatives of the owners and the men, the differences were adjusted to the entire satisfaction of the men, who are to receive the arrears of pay on a new basis, or to repay any money which they may have received over and above their due. It is stated that the number who will be affected by the alternative is practically *nil*.

**Scotland.**

At a conference of Lothian miners held on Saturday, at Dalkeith, it was decided to submit a resolution at the annual conference of the Scottish Miners' Federation in Edinburgh to the effect that efforts be made to secure a minimum wage of not less than 7s. a day for miners.

The Lanarkshire Miners' Union have adopted as prospective candidate for South Lanark, Mr. Thomas Gibb, checkweighman, a member of their executive. Previously the South miners had decided to contest five seats, so that they will now enter upon six campaigns. In one case, West Fife, they are defending the seat held by Mr. William Adamson. Mr. Smillie, president of the Miners' Federation of Great Britain, will again fight Mid-Lanark.

The distribution of financial relief was begun on Tuesday among miners belonging to the Mid and East Lothian Association, who have in many instances suffered owing to the collieries being shut down through want of shipping facilities at Leith. Ten shillings is being allowed each member affected. The necessary funds to meet the expenditure have been got by a grant from the British Miners' Federation and a loan obtained by the Lothians officials, the balance being taken from the Lothians Federation. Six thousand workmen are participating.

A number of resolutions are to be submitted at the 20th annual conference of the Scottish Miners' Federation, which begins in the Free Gardeners' Institute, Edinburgh, on the 19th inst. The West Lothian miners seek the compulsory deduction of union dues through the employers' office; Lanarkshire ask for the abolition of contracting for ordinary coal-getting in mines; West Lothian desire amendments to Workmen's Compensation Act providing for the commutation of compensation. That medical men shall be confined to stating health conditions and fitness for work at the time of their examination, and that employers shall pay full compensation to parents in all cases of fatal accidents even when they are not partially or totally dependent on the deceased at the time of death. There are other resolutions on the subjects of evictions during trade disputes, the participation of officials at pithead meetings, &c., and the compulsory deduction of checkweighers' dues.

A conference was held at Dunfermline on Wednesday between representatives of the Fife and Clackmannan Coalowners' Association and the Fife and Kinross Miners' Association. The chief subject under discussion was regarding the request for payment of wage weekly, and on this point various difficulties were stated by the coalowners which they thought ought to be considered by the general body of the miners. No conclusion was arrived at. Another matter discussed was the firemen's rate of pay.

The executive of the Scottish Miners' Federation met in Glasgow on Wednesday and passed a resolution expressing deep regret that the Lanarkshire mineowners

had not yet seen their way to make provision for rescue stations and brigades which might be used in circumstances such as those which led to the death of 22 men at Cadder. They further decided to call the attention of the Home Secretary to the necessity for action being taken immediately.

**Iron, Steel, and Engineering Trades.**

The Board of Conciliation and Arbitration for the Manufactured Iron and Steel Trade of the North of England ascertainment for the months of May and June shows that ironworkers' wages during the months of August and September will be the same as those which prevailed during the preceding two months. The average net selling price per ton of manufactured iron for the two months ending June 30 last was £7 11s. 3-97d. as against £7 10s. 2d. for the preceding two months. The average net selling price for the months of May and June constitutes a record for the trade. The return issued this week beats all previous records as regards prices. The year 1907 has been pointed to as the boom year, the highest price recorded being £7 6s. 9d., but that has been beaten by each of the three returns issued so far this year.

At a conference lasting for six hours at Edinburgh, on the 31st ult., between the Shipyards' Federation and representatives of the men of the various shipyard trades, it was agreed that the wages advance 1s. a week, or  $\frac{1}{4}$ d. an hour, and the special advance of  $2\frac{1}{2}$  per cent. to rivetters on behalf of holders-on should take effect from the commencement of the first full pay day this August. No further general advance in piece or time rates is to take effect for a period of 12 months subsequently.

The labourers in the Elswick steelworks of Sir W. G. Armstrong, Whitworth and Co., Newcastle-on-Tyne, have come out on strike owing to a dispute over wages. Mr. J. T. Macpherson, organising secretary of the local branch of the Steel Smelters' Union, has written a letter deprecating the strike, but the National Amalgamated Union of Labour, to which the labourers belong, is supporting their action.

As a result of the report by Mr. John N. MacLeod, C.A., Glasgow, to Messrs. James C. Bishop and James Gavin, joint secretaries of the Board of Conciliation between owners of blastfurnaces in Scotland and the blastfurnacemen, as to the price of Scotch pig iron warrants in the Glasgow market for the months of May, June and July 1913, there is a fall of  $2\frac{1}{2}$  per cent. in the workmen's wages.

Messrs. Daniel Jones and William Ancott, secretaries to the Midland Iron and Steel Wages Board, have issued Messrs. B. Smith, Son, and Wilkie's report for the two months ended May and June 1913, and state that in accordance with the sliding-scale arrangements the wages for puddling during the months of August and September 1913 will be 10s. 9d. per ton, and all other mill and forge wages will remain unaltered from Monday, August 4, and continue until Saturday, October 4. In addition to the puddling rate of 10s. 9d. per ton under the sliding scale, there will be an increase of 6d. per ton given to the puddlers by resolution of the Wages Board, which met on July 15, 1913. This increase applies to puddlers only, and will make the total puddling rate 11s. 3d. per ton.

**New Colliery in the Barnsley District.**—An early commencement is to be made in connection with the sinking of the new colliery in the Barnsley district, and authoritative details are now available of the enterprise. The new colliery, which is to be sunk close by the Lancashire and Yorkshire railway at Darton, about 3 miles to the north-west of Barnsley, is to be carried out by Messrs. Harry Jaggar and Sons, who are the owners of several collieries in that district extending towards Clayton West. The minerals are the property of Lord Allandale, of Bretton Hall, and the area which is being leased contains 2,300 acres and includes the well-known Parkgate and lower seams which are mainly in request for steam and coke manufacturing purposes. The colliery, which will have two shafts 14 ft. diameter, will be equipped with steel headgears, with arrangements for simultaneous docking, and a modern screen and washing plant is also to be erected. Steam power will be used for winding the cages, but electricity is to be utilised for the driving of the fan and other machinery. The screens and other surface plant will be equipped with electric light. An extensive range of sidings are to be made, and the loaded wagons will gravitate from the screens and reach the railway by crossing the River Dearne by a girder bridge. The site of the screens will be about 80 yards from the shafts, the loaded tubs being elevated to the screen level by creepers, and the empty corves returned to the shafts by gravitation. It is expected that coal will be found at a depth of about 260 yards, with the Parkgate seam, about 4 ft. in thickness, and the Thorncliffe and Silkstone Four-foot seam will also be tapped. When fully developed the colliery is expected to find employment for about 1,500 hands. The contract for sinking has been let to Mr. S. Howard, who recently completed the sinking of the shafts at the Asken Colliery. Mr. Thomas Stubbs, M.E., of Sheffield, is the agent and consulting engineer, and Mr. William Harrison, Barwell, chief mechanical engineer, and the work will be carried out under supervision of Messrs. Stubbs and Brown, mining engineers, of High-street, Sheffield. This portion of the district appears likely to show considerable development, as the well-known firm of Messrs. Fountain and Burnley Limited recently sunk to the Silkstone seam at the Woolley Colliery, so that the exhaustion of the Barnsley bed in the locality will be compensated for by the developments which have taken place.



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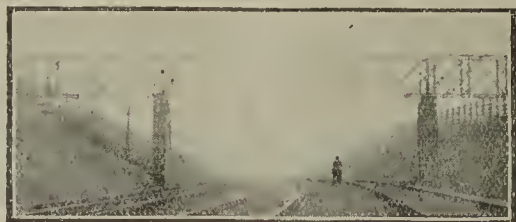
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Manchester Geological and Mining Society—

October 14, 1913

Institution of Mining Engineers—

Sept. 24, 25 & 26, 1913 (Manchester)

Midland Counties Institution of Engineers, Sept. 1913

South Staffordshire and Warwickshire Institute of

Mining Engineers ... .. October 20, 1913

## The Colliery Guardian.

LONDON, FRIDAY, AUGUST 8, 1913.

A serious fire occurred on Sunday night at the No. 15 pit of the Carron Company, situated at Cadder, near Bishopbriggs, Lanarkshire, 22 men losing their lives.

The proposal to create a limited liability company among the ironmasters of Cleveland for the purpose of distributing the make of Cleveland pig iron, fix the prices, and control the output, has, it is understood, fallen through.

A meeting of the executive council of the Mining Association of Great Britain was held at the Whitehall Rooms, on Thursday, July 31. A short report of the proceedings will be found in another column.

The important feature of the business for the Scottish miners' forthcoming annual conference will be a motion that steps be taken, both by the Scottish Miners' Federation and the Miners' Federation of Great Britain, for securing a minimum wage of not less than 7s. per day.

Between 6,000 and 7,000 miners engaged at the Haydock pits of Messrs. R. Evans and Co. Limited, came out on strike on Saturday on account of the employment of non-unionists at the pits.

For the purpose of widely extending the scope of the existing Truck Acts, a Bill has been introduced into the House of Commons. It makes all deductions from wages and all fines illegal, as well as all contracts whereby such deductions could be made or such fines imposed illegal.

At the annual meeting of the North of England Institute of Mining and Mechanical Engineers, at Newcastle on Saturday, a second successive decrease was reported, the membership now standing at 1,273. The decline, it was explained, was due to an exceptional number of deaths and resignations. Mr. W. C. Blackett was re-elected president. Papers by Mr. Samuel Dean and Prof. Thornton were read.

The ambitious Bill of the Labour Party to nationalise the coalmines and minerals of the United Kingdom, has been introduced by Mr. S.



Walsh and printed. The full text appeared in our issue of October 11, 1912.

At a quarterly meeting of the Durham Coal Trade Conciliation Board on Friday of last week, an advance in wages of  $3\frac{3}{4}$  per cent. was granted, making the wages 60 per cent. above the basis of 1879. The advance came into operation with pays commencing on Monday last.

To-morrow (Saturday) the joint excursion under the auspices of the Mining Institute of Scotland, and the Scottish branches of the National Association of Colliery Managers, and the Association of Mining Electrical Engineers, will be held. In connection with the outing it is interesting to note that Mr. James Barrowman, who for many years was secretary of the Mining Institute of Scotland, is to receive a handsome testimonial.

The Home Secretary has issued an Order [No. 713] approving certain lamps manufactured by Messrs. Patterson and Co., of Newcastle.

The report of the Departmental Committee appointed last year to consider the inclusion of certain industrial diseases in the Third Schedule of the Workmen's Compensation Act, has been issued. The Committee recommend that the word "nystagmus" added to the first column of the Schedule by the Order of May 22, 1907, should be replaced by the words "miners' nystagmus in miners or others (a disease most common among miners, of which oscillation of the eyeballs is the commonest but not invariably present objective sign)." The word "mining" is to be retained in the second column.

The opening of the Glamorgan Summer Mining School took place on Monday, an address being delivered by the Chief Inspector. Mr. Redmayne declared that in his opinion we are at the end of the period of great colliery accidents. Principal Griffiths suggested the foundation of a mining fellowship in South Wales.

RECENTLY we had the privilege of being present at a series of **Shot-firing in Coalmines.** experiments, made at the Government Explosives Testing Station at Rotherham, with a view to determining the relative safety of shots, in the stemming of which a new mechanical appliance is used and shots stemmed in the usual way. The chief object of the appliance referred to is to prevent accidents from miss-fires by enabling the faulty detonator to be withdrawn and a new one inserted in the same hole without unstemming. After inserting the detonator in the charge the appliance is withdrawn, leaving a cylindrical space in the length of the stemming about  $\frac{1}{2}$  in. diameter, beyond which the shot-hole is stemmed solid for a distance of about 3 in. towards its mouth. The purpose of the test was to show if this cylindrical space in the stemming would facilitate the passage of flame from the explosive in the case of a blown-out shot.

According to a memorandum of the Home Office, dated May 1912, the testing of explosives for inclusion in the Permitted List after March 31, 1913, was revised, requiring that the charge should be fired without any stemming directly into an explosive mixture of lighting gas and air, and also finely-divided coaldust suspended in air. Provision was made, however, for the temporary use in coalmines, until January 1, 1914, of explosives which were on the Permitted List on March 31, 1913. The influence of the cylindrical space in the stemming is therefore only of temporary importance, having in view the use of the safety shot-firing appliances with explosives which may not be able to comply with the new test, but which will

remain on the Permitted List until the end of this year.

The testing apparatus at Rotherham consists of a tubular explosion chamber, 5 ft. diameter and 50 ft. in length, with arrangements for inserting a paper diaphragm at a distance of 18 ft. from the firing end, so as to form a gas chamber. The explosive to be tested is fired through a hole in the centre of the permanently closed end of the gas chamber from a cannon having a bore 1,200 mm. by 55 mm. (3 ft. 11 in. by  $2\frac{1}{4}$  in.)

Rotherham town lighting gas was used in making the explosive gaseous mixture, which contained 13.5 per cent. of the gas (equivalent to 10.5 per cent. of combustible gases).

Before beginning the particular tests, a blank test was made with a powder fuse to show that the gaseous mixture was explosive. The cannon was then charged with  $2\frac{1}{2}$  lb. of a non-detonating explosive (used in each of the tests), and stemmed to a depth of 9 in. in the usual way with moist clay, as used at the Carr House Colliery, adjoining the testing station. The explosive occupied 2 ft. 11 in. of the bore, and the remaining 3 in. at the mouth was left unstemmed. The charge was fired into the explosive gaseous mixture contained in the first 18 ft. of the explosion chamber, retained there by the paper diaphragm referred to above, but no ignition of the mixture took place.

The second test was similar to the first, but in this case the safety shot-firing appliance was used. The 6 in. of stemming next to the explosive had a vacant cylindrical space, and the remaining 3 in. of the stemming was solid, the 3 in. between the top of the stemming and the mouth of the cannon being left unstemmed as before. On firing, the gaseous mixture failed to ignite.

In the third test the diaphragm was not inserted across the explosion chamber and no gaseous mixture was used. Instead, finely-divided coaldust, obtained by grinding coal from the Seven-feet Banbury seam, was spread at the rate of 4 oz. per linear foot on a 10 ft. bench placed in front of the mouth of the cannon, and at the rate of 2 oz. per linear foot along the rest of the chamber—making altogether 120 oz. along the 50 ft. of the complete chamber. The coaldust was ground and sieved so that 90 per cent. of it would pass 150 meshes to the linear inch (22,500 meshes per square inch). In this case the charge was stemmed in the usual way without the employment of the shot-firing appliance, and on firing no ignition of the coaldust took place. This last test was repeated with the difference that the shot-firing appliance was employed in stemming the charge, but no ignition of the coaldust took place. In the last experiment and in those that follow, only the coaldust on the bench was relaid, as the surface of the remainder of the gallery was well covered by the previous dressing.

In the next experiment double the quantity of coaldust (8 oz. per linear foot) was spread upon the 10 ft. bench, and dry stemming was used instead of moist, but the shot-firing appliance was not employed. In this case the coaldust was ignited, flame being emitted at the mouth of the chamber, and at the relief valves (sealed with paper) at the top.

As there were two elements of difference between the last experiment and the experiment immediately preceding it—namely, the quantity of coaldust was doubled, and dry stemming was used instead of moist—a further test was made with double the quantity of coaldust but with moist clay stemming, and no ignition of the coaldust took place. This last experiment was

repeated with the use of the shot-firing appliance again without an ignition.

From these experiments it would appear that the hollow longitudinal vacant space in the stemming, which is necessitated by the use of the safety shot-firing appliance, does not add in any way to the risk of an ignition of gas or coaldust, and that the appliance might be employed in coalmines with safety without waiting for the new Permitted List, which will contain only explosives which can be fired experimentally without any stemming at all.

The Rotherham Testing Station is situated immediately adjacent to a public road, so that the experiments were frequently interrupted by the traffic. In this respect the Government Testing Station at Eskmeals possesses a great advantage over that at Rotherham, and, in addition to the avoidance of delay, the former is free from those distractions which must necessarily interfere with such important work.

#### Trade Summary.

The London coal trade for the past week has been very slow at all the depots, but merchants report a fair number of orders in hand from the general public, and the outlook for the coming month's trading is brighter than the preceding month. Best house coals are in good demand and prices well maintained. Cheaper qualities, however, are moving very slowly. Bakers' nuts and kitcheners cobbles find very few buyers. Manufacturing qualities have felt the slackened demand owing to the lessened work during the holidays at all the large factories, but the market is already experiencing a more buoyant tone. Prices are firmly maintained for all large coals, but slacks and small nuts are weaker.

The market at Newcastle has been dull. Steam and gas coals are weaker, but bunkers and coking coal are stronger.

The Durham coal trade is quiet, but there is a decidedly better feeling, especially for prompt shipment. There is a strong demand for bunkers.

Business in Lancashire has been quiet, but stocks generally are light.

Business in West Yorkshire has been of "a holiday character. Stocks of house coal are inconsiderable.

The South Yorkshire steam coal trade is active, but the demand for manufacturing sorts is easier. House coal is dull, and coke is depressed.

Derbyshire house coal is in lessened request, but prices are steady. Fuel for manufacturing purposes continues in strong request.

In South Wales the week has been a very short one, and the output has been reduced by at least half. Little business has been done, but prices are firm.

The Scottish coal trade continues fairly active.

#### THE TIN-PLATE TRADE.

##### Liverpool.

The market has been exceedingly quiet the last few days. All works are closed down this week for annual holidays and it is expected that several will remain closed for a while until business improves. Only a hand to mouth trade is being done just now, and the figures given below are about what works are asking for shipment over rest of the year: for spot delivery probably a shade less would be accepted:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 13s. 3d. to 13s. 6d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 9d. to 27s. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 9d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 9d. per box; I C squares and odd sizes, 13s. 9d. basis for usual specifications. Charcoal tins run 15s. 6d. basis and upwards, according to tinning. Coke wasters are easy at the following rates:—C W 14 × 20, 12s. 3d. to 12s. 6d. per box; C W 28 × 20, 25s. 10½d. to 26s. per box; C W 20 × 10, 16s. 6d. per box; C W 14 × 18½, 11s. 9d. per box—all f.o.b. Wales, less 4 per cent.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—A. W. Taylor and A. Dyson, carrying on business as consulting, inspecting, and contracting engineers, agents and merchants, at New Brown-street, Manchester, under the style of Taylor and Dyson; J. McIntyre, T. C. McIntyre, and J. A. McIntyre, carrying on business as shipowners and ship and insurance brokers, at St. Helen's-place, London, and at Mercantile-chambers, Quayside, Newcastle-upon-Tyne, under the style of MacIntyre Brothers and Co., so far as J. McIntyre is concerned; G. Hudson, H. Jones, and R. Lawson, jun., carrying on business as coal merchants, at Chip Hill Farm, Hulton-lane, Bolton, under the style of James Golding and Company; J. Horrox and J. B. Horrox, carrying on business as iron drum makers, at School-street Works, Lower Broughton, Manchester, under the style of J. B. Horrox and Co.; A. Beever, C. Beever, and J. Beever, carrying on business as quarry workers and stone merchants, at Grenoside, near Sheffield, under the style of Beaver Brothers.



**WORKMEN'S COMPENSATION.**

(SPECIALLY CONTRIBUTED.)

**Workmen's Compensation and National Insurance.**

Rules have been issued, under date April 7, 1913, under the Workmen's Compensation Act, amending the existing rules. Rule 1 amends paragraph 1 of Rule 24 in accordance with the decision in *Nettleingham v. Powell*, 1913, 1 K.B. 113, that an employer who claims to be entitled to indemnity from a third person may, if he chooses to take the risk of so doing, dispense with the third party procedure, and sue the third party without serving any notice under that rule, subject to the obligation of having to satisfy the Court that the amount claimed was properly paid by him. Rules 2 to 7 have been framed in accordance with the opinion of the Insurance Commissioners that they are "parties interested" in agreements as to compensation payable to workmen who are insured persons, in those cases in which notice of such agreements is required to be given to the Commissioners; they have suggested that rules should be made under the Workmen's Compensation Act, providing that they shall have notice of memoranda of agreements sent to the registrars for registration, and shall themselves have power to send memoranda for registration. Rule 8 gives power to the judge to suspend a weekly payment, wholly or partially, pending the hearing of an application to review the payment. Paragraph 3 provides that the judge may refuse to record a memorandum of an agreement which is spent. Rule 9 enables the judge to refer questions as to the application of money paid into court to the registrar for enquiry and report. Rule 10 is in accordance with *Ibrahim Said v. Melsford*, where it was held that a party served with notice of an application for leave to issue execution is entitled to be heard and to show cause why it should not issue. The Court of Appeal doubted whether such applications should be made *ex parte*.

**Deafness Not the Result of an Accident.**

*McLuckie v. Watson*.—In this case (Court of Session, June 12) the applicant appealed from the award of a sheriff-substitute who had refused him compensation in the following circumstances:—He sought to recover compensation in respect of injuries received in September 1912 in the Gilbertfield Colliery, Cambuslang, belonging to the respondents. Water had accumulated in the pit bottom to a depth of about 18 in. at the cage, gradually shallowing back for about 30 ft. Only one cage carrying eight men was available for raising the men to the surface at the close of the shift, and there were about 200 men to be raised. As each was eager to get the first chance of ascending, all of them, including the appellant, waded into the water and stood in it, some from 30 to 45 minutes. There was no necessity for this. The traffic near the pit bottom had ceased at the time, and the men could have waited with safety on the dry ground till their turn came to ascend. They could then have crawled over hutches, and could have reached the cage comparatively dry. The appellant suffered from deafness caused by chill arising from exposure.

It was held that he had failed to prove that his incapacity was due to accident, and that if it could be held that standing voluntarily for 30 minutes in the pit bottom was an accident, it was one which did not arise out of the appellant's employment. Accordingly the sheriff-substitute refused the applicant's claim for compensation. The Division affirmed the sheriff-substitute's decision, the Lord President saying that there was not the slightest suggestion that there was the least danger to anybody owing to the amount of water at the bottom of the pit, and the men were going up to the surface in the ordinary way when their work was done. It seemed to his lordship out of the question to say that that was an accident to the miner which arose during the course of his employment.

**Miners' Nystagmus.**

*Elsby v. Messrs. Wm. Baird and Co.*—In the case before the Sheriff's Court (May 14), it appeared that pursuer claimed compensation for incapacity due to miners' nystagmus. Defenders did not deny that pursuer was afflicted, but they contended that the disease had not been contracted within the 12 months previous to the claim being lodged.

The sheriff, in finding for the pursuer and awarding compensation at the rate of 16s. a week, said the contention of the defenders really amounted to this—that granted the pursuer was suffering from miners' nystagmus, and that he was employed in the process of mining within the said 12 months, he must further prove that the disease was actually contracted within that period. He (the sheriff) had not been able to find any direct authority upon the point, and it was, indeed, to be directly raised for the first time in

this case. After the best consideration he had been able to give the matter, he thought that there was no foundation for the proposition maintained by the defenders. What one might call the time limit did not appear to him to apply to the contracting of the disease, but to the fact of the workman's employment in the process.

**Effect of Seaman "Signing Off" on a Claim under the Compensation Act.**

*Buls v. Oceanic Steam Navigation Company*.—There is nothing more irritating for the employer than to have a claim for compensation perpetually hanging over him. In the result it is not surprising that shipowners and others take any opportunity which presents itself of getting a release from the workman. In the above case (Liverpool, March 14) it appeared that on December 18 last, while applicant was at work on the "Teutonic" firing the ship, the furnace door swung back on his arm, causing a burn on the left forearm. Applicant did not consider the burn serious, and went on with his work, neither did he report it to the engineer. At the termination of the voyage, when he went to be paid off, he signed the usual statutory form at the company's office, which was a discharge under the Merchant Shipping Act releasing the owners of the ship from all claims in respect of the voyage. He went home, and subsequently the burn became painful, and as a result he was unable even to wash himself, and he went to hospital, where the wound, which had become septic, was reopened and treated. As a result of the injury applicant had been incapacitated for some weeks, and he therefore claimed compensation.

For the respondents, it was submitted that the release signed by the applicant when he was paid off was a bar to his claim under the Workmen's Compensation Act, and a long legal discussion on this point ensued.

His Honour, in giving an award in favour of the applicant, said it was impossible to entertain the contention put forward on the part of respondents with reference to the bar, and on that point alone, eliminating all other points, he gave his award as stated for the purpose, as he understood it, of the point being referred to the Court of Appeal.

**A Miner Working while Receiving Compensation.**

*Denaby and Cadeby Colliery Company v. Beardsley*.—In this case (Doncaster, January 9) the defendant was prosecuted for obtaining money by false pretences. He was the victim of an accident on November 11, 1912, receiving compensation at the rate of 11s. 10d. per week until December 10. It afterwards turned out that he had been at work for the Edlington Colliery prior to December 10.

The solicitor who prosecuted said that this was one of many instances of a colliery company being defrauded by such means, but great difficulty had been experienced in catching one.

The chairman of the Bench said the offence was a serious one, and a fine of £20 or three months could be inflicted. A fine of £3 or one month would now be imposed.

*\*\* We shall be pleased to answer in this column questions relating to Workmen's Compensation and Employers' Liability. All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.*

**INDIAN AND COLONIAL NOTES.****Africa.**

*South African Mineral Output*.—Our Johannesburg correspondent says: The total mineral output of the Union of South Africa during May (exclusive of diamonds) was, according to the returns issued by the Mines Department, valued at £3,621,490. This total was made up as follows:—Gold, £3,364,550; coal, £196,488; base metals, £50,845; and silver, £9,607. As far as coal was concerned it again constituted a record, reaching an output of 784,549 tons, as against 763,760 tons for April, the previous record output. This improvement in the demand for South African coal is principally in connection with the Transvaal coalfields, where, owing to the low pit top price, an increasing tonnage is being shipped to India and the Eastern markets. Natal, with 22 producing collieries, sold 267,533 tons for an average pit-top price of 5s. 11d. per ton, whilst the Transvaal Province, with 30 producing collieries, sold no less than 457,063 tons, at an average price at the pit mouth of 4s. 3s. 89d. per ton. All the different provinces, except the Cape, show a slight improvement in the tonnage sold; but although the Cape, Orange Free State and Natal all show a lower average pit top selling price as compared with April, a slight improvement in the Transvaal has brought the average selling price of coal throughout the Union up to the April level of 5s. per ton at the pit top. The Transvaal Province continues to produce more than

one-half of the total coal output of the Union of South Africa, and, judging from the general outlook—despite the low average selling price—the prospects of the Transvaal coal trade are much more encouraging than for a long time past. The Middleburg district has now working within its bounds quite one-half the number of producing collieries in the Transvaal, and in May produced more than three-fourths of the total coal output of the Transvaal. The 15 collieries sold 340,752 tons for an average pit-top price of 4s. 3d. per ton, and it is in the Middleburg district that the present Transvaal coal trade has to depend. Several of the collieries in the Middelburg district have, however, already passed their prime and been compelled to open new collieries in the immediate vicinity. The selection of other sites for coalmining operations is a matter of some difficulty. It has long been stated that there is too much coal in the Transvaal, the coal resources are, it is true, enormous, but to-day outside a radius of 6 miles, with Witbank as the centre, it seems almost impossible to establish a new colliery without having to work a coal of less value than that of Witbank.

**Australia.**

The Chief Commissioner for Railways for New South Wales (Mr. Johnson) has accepted the following tenders for the supply of large coal for the year ending June 1914:—South Clifton Coalmining Company (South Clifton), 90,000 tons; Southern Coalowners' Agency (Coalcliffe), 100,000 tons; Invincible Colliery Company (Invincible), 30,000 tons; J. B. North (Main Range), 10,000 tons; Lithgow Coal Association, Lithgow Mines, 55,000 tons; Caledonian Collieries Limited (Aberdare), 10,000 tons; Newcastle Coalmining Company (Whitburn), 6,000 tons; H. F. Madden (Ellesmere Vale), 30,000 tons; Abermain Colliery Company (Abermain), 50,000 tons; Central Greta Colliery Limited (Central Greta), 17,000 tons; Rothbury Estates (Rothbury Colliery), 22,000 tons; W. Longworth (Rosedale Colliery), 24,000 tons; Centenary Coal and Coke Manufacturing Company (Curlewis), 18,000 tons; Gunnedah Coal Company (Gunnedah), 19,000 tons; Stockton Borehole Colliery (Borehole), 12,000 tons; Sydney Harbour Collieries (Balmain), 990 tons.

**Canada.**

A. S. Porter, of Regina, Sask., an extensive owner of coal lands, is organising a company capitalised at 1,000,000 dols. for the purpose of developing power from the coal deposits on 15,500 acres. A branch of the Canadian Pacific runs through the property, which will afford the means of marketing briquettes and other by-products.

The British Columbia Court of Appeals has given a decision in the litigation between Hon. James Dunsmuir and Mackenzie and Mann over the purchase by the latter of the Wellington and other Vancouver Island collieries for 11,000,000 dols. The court declares Mr. Dunsmuir entitled to all the earnings up to the time the purchase money was paid over, subsequent to the date of the option. Mackenzie and Mann are awarded all the collateral properties, including sea-going craft employed in transporting coal, which, as Dunsmuir claimed, were not included in the deal. Both parties are dissatisfied with the decision, and an appeal will be taken to the British Privy Council.

The Acadia Coal Company report the fire in the Albion mine, Stellarton, Pictou Company, has been extinguished. This fire broke out on June 20, at a point near the bottom of the main slope, and is supposed to have originated from sparking of a heated brake-band. The fire was constantly fought for over a fortnight, and has at times threatened to involve the whole mine. Breathing apparatus and electric lamps were used and proved of great value as the fire was fought at close quarters with hose and nozzle by men wearing helmets. It was eventually found possible to contract the fire area sufficiently to permit it to be isolated by dams and flooded. The work has been extremely difficult and dangerous, as the Pictou seams are gassy and inflammable, but there were no serious accidents. General satisfaction is felt at the news that the fire is controlled, as the Albion mine is the main producer of the Acadia Coal Company, and quite recently a large capital expenditure has been made on the surface plant. This is the fourth occasion on which oxygen apparatus has been used in combatting serious mine fires in Nova Scotia and on each occasion it has proved of great assistance.

Our Toronto correspondent says:—An excursion in connection with the International Geological Congress left Montreal on the 13th ult., and is now engaged in exploring the coal regions of Nova Scotia. Its researches may perhaps be attended with important economic results, and add largely to the known coal resources of the Province. An examination was made on the 22nd of the Pictou coalbeds a prominent feature of which is a break in the coal formation caused by the upthrow of conglomerate. Fraser Mountain is the summit of the conglomerate intension, and such geologists as the late Sir William Dawson, Hugh Fletcher and Henry Poole agreed on placing the fault at a point considerably south of Fraser Mountain. The investigations of the visiting geologists lead to the supposition that the fault may be some distance farther north than this point, and the confirmation of this theory will lead to a considerable increase in the output from the beds now being worked. While some geologists hold the view that



after the conglomerate eruption the northern portion of the deposit was forced upwards and destroyed by erosion, the more general opinion is that there was a downthrow of this part of the bed, and that consequently a large undiscovered deposit exists to the north of the known coal strata.

Our Cape Breton correspondent says: The output of the Glace Bay mines of the Dominion Coal Company for the half-year ended June 30 reached 2,295,082 tons, compared with 2,124,158 tons in the corresponding period of last year. In June the production was restricted by a shortage of labour, but this condition has now been relieved. The Springhill Mines produced 193,797 tons, or 20,000 tons less than in the first half of 1912. The lessening of the output is due to a fire in the mine, which broke out at the end of 1912 and necessitated sealing off part of the mine. The output of the Glace Bay mines in the concluding week of June totalled 103,300 tons for six days, reaching a record output on one day of 18,130 tons.

A great development is taking place in the coal industry of Alberta. The Pacific Pass Coalfields Limited, of Fergie, will, in September, increase its output from 300 to 4,000 tons per day. The Mountain Park Coal Company Limited is planning an increase from 95 to 2,000 tons daily. The McLeod Collieries expect to take out 1,000 tons per day during the autumn. The Yellowhead Pass Coal and Coke Company has installed machinery with a capacity of 500 tons per day. The Jasper Park Collieries Limited has completed the installation of equipment to increase the daily production from 350 to 1,500 tons. The North Alberta Coal Syndicate is making preparations to develop 5,000 acres of coal lands West of Edmonton.

Our Toronto correspondent says:—The financial re-organisation of the Canadian Coal and Coke Company is being undertaken. The subsidiary companies affected are the Pacific Pass Coalfields Limited, Lethbridge Collieries Limited, Western Coal and Coke Company, and St. Albert Collieries Limited. These companies now require about 1,500,000 dols. to pay off existing liabilities and carry on the works now in progress. It has been found impossible under prevailing financial conditions to raise the funds required by the sale of bonds ranking *pari passu* with the existing issues. It is therefore proposed to exchange the outstanding bonds for 7 per cent. preference stock, cancelling that part of the issue remaining in the Treasury. The company is capitalised at 15,000,000 dols., with a bond issue of 6,500,000 dols. partially distributed. The company will issue 4,000,000 dols. participating preference stock to replace the outstanding bonds, and the common stock will be exchanged on a par basis. A majority of the bondholders have approved of the plan. Meetings to consider the proposal will be held July 18 and 19.

## COLLIERY ACCIDENTS.

### Cadder.

A disaster, which has resulted in the loss of 22 lives, occurred on Sunday night at the No. 15 Pit of the Carron Company, at Cadder, near Bishopbriggs, Lanarkshire. The pit is situated a short distance from the north bank of the Forth and Clyde Canal. The Carron Company here have two shafts situated about  $\frac{1}{2}$  mile apart, which are connected by a ventilating passage. The engine room and offices are situated at No. 17 Pit, and all communication with the place of the accident was necessarily carried on by means of No. 17 Pit, as the ventilating passage in the immediate vicinity of the bottom of No. 15 Pit was impassable. The mine, it may be stated, is worked with naked lights. The shaft is 170 fathoms deep, and is worked northwards towards the Kelvin. The equipment has been remodelled, and made to conform with modern demands. No. 17 Pit is highly up to date, and is furnished with the latest types of electrically-driven coal-cutting and ventilating appliances. No. 15 is 170 fathoms deep, and No. 17 is 120 fathoms. The length of the communication between the two shafts is approximately  $\frac{1}{2}$  mile. In No. 17 Pit there were employed 230 men during the day, and in No. 15 there were, in the ordinary course, 160 men. About 50 men worked in each pit during the night, most of them being repairers.

Fire broke out between 6 and 7 p.m., but some time elapsed before the alarm was raised on the surface. About 3 o'clock 26 men had descended to begin the day's work, which would have finished at 11 o'clock. Three men who were engaged as brushers were working at the time on the communicating roads leading from No. 17 Pit. They became aware of their danger when they noticed smoke rolling along in great volumes towards the bottom of No. 17 shaft. They endeavoured to keep in front of the smoke, and succeeded in reaching the cage and making good their escape.

The ventilation having been reversed, the first rescue party, which included Mr. M'Whinnie, manager at No. 17 pit, Wm. Johnstone, and Hugh Dickson, fireman, and Messrs. R. Dunbar, Speirs, Wm. Dick, Keenan, R. Davidson, and Quintin Davidson carried with them cages of canaries. Two birds died on being taken into the pit. The search party proceeded a considerable distance along the communication road, but on opening a door with a view to entering the workings, two or three of those in front were overcome by a rush of gas. They had to be assisted back to the shaft and were conveyed to the surface in an unconscious state.

A second search party descended the shaft about eleven o'clock, but they were not immediately successful in getting near the seat of the disaster. Shortly after one o'clock Mr. M'Laren, H.M. inspector of mines for the Western division, Mr. Spiers, the works manager, and others went down to give assistance. It was about an hour later that two of the returning volunteers brought the news that five dead bodies had been reached in the No. 15 tunnel, some distance beyond the junction of the communication road. Not long afterwards it was reported that two further bodies had been found near the same spot.

The Fife and Clackmannan Coalowners' trained corps, equipped with their special apparatus, later arrived from Cowdenbeath, and went down into the mine about five o'clock. About noon a rescue party succeeded in rescuing a brusher named Michael McDonald. He was found lying on his face in a semi-conscious state, and was the twentieth man to be brought from the mine. He had been in the mine for a period of about 16 hours. Quite near to the place where he was found were lying the bodies of a number of lifeless men.

When all the bodies had been brought to the surface the ventilation was again reversed, rendering a descent of No. 15 shaft possible, down which hose pipes and other fire-fighting appliances were taken.

In consequence of the disaster both pits of the company were laid idle on Monday. At a meeting of the workmen on Tuesday it was decided to appoint Messrs. Robert Smillie, John Robertson, and James Murdoch to make an inspection of the pit on behalf of the men, and that a mining expert should also be appointed.

Michael McDonald, the only survivor of the 23 who failed to make their escape, is in Glasgow Infirmary, and is making fair progress. Speaking of his experience, he said he could remember very little of what happened. He and three others were working together. They saw the smoke, but thought it would pass away. When they did realise that they were in danger they ran for a trapdoor, but they were too late. As a matter of fact, however, McDonald was found by his rescuers within a few yards of his working place. The three men, Robert Dunbar, Michael Keenan, and Felix O'Neill, who had escaped by means of the communication road with No. 17, stated that Charles Reilly, the fireman on duty, came and warned them that the pit had caught fire, and advised them to run for their lives. They last saw Reilly waving a lamp as a danger signal, and calling out to warn the other men in the pit. Reilly then ran back into the smoke. His body was afterwards found in the workings.

## OBITUARY.

The death on the 31st ult., as announced, of Mr. J. Stephen Jeans, for many years editor and one of the principal proprietors of *The Iron and Coal Trades Review*. Mr. Jeans' connection with the iron and steel industry dates back to 1877, when he was appointed secretary to the Iron and Steel Institute, an office which he held until he resigned it in 1893. Early in his connection therewith Mr. Jeans assumed also the secretaryship of the British Iron Trade Association, an appointment which he continued to fill until 1908. Notwithstanding the large demands upon his time which attention to the duties of these offices entailed, Mr. Jeans found opportunity to compile and publish a number of works dealing with the iron and steel and allied industries. Prominent among these is his well-known book on "Steel: Its History, Manufacture, and Uses," published in 1880; "England's Supremacy" (1884), "Railway Problems" (1885), "Waterways and Water Transport" (1888), "Rings, Trusts, and Corners" (1893), "Industrial Conciliation" (1894), and "Canada's Resources and Possibilities" (1904). At one time he was a frequent contributor of statistical articles to the *Colliery Guardian*. In addition Mr. Jeans organised meetings of the Iron and Steel Institute in various foreign countries, including the United States, Canada, France, Germany, Austria, and Hungary. He also initiated several commissions of enquiry in connection with the industry, notably one to enquire into Continental ironmaking conditions in 1895 and another to enquire into American industrial conditions in 1902, and the reports of both these were mainly compiled by him. He also prepared and conducted the case of the British iron trade before the Commission appointed in 1883 to enquire into the Railway and Canal Traffic Act, and before the Tariff Commission in 1904. He also gave evidence in the latter year before the Royal Commission on Coal Supplies. He filled the post of president of the Chartered Institute of Secretaries for two years, and read many papers on economic subjects before the Royal Statistical Society, the East India Association, the Royal Society of Arts, and other bodies.

Last week we briefly announced the death of the well-known miners' leader, Mr. James Haslam, member for the Chesterfield Division, and the founder and general secretary of the Derbyshire Miners' Association. Mr. Haslam passed away at his residence in Clarence-road, Chesterfield, on the 31st ult., at the age of 71 years. The hon. member had been seriously ill for over six months, but the actual breakdown in his health dated back some 18 months—to the period when he was strenuously engaged on behalf of the miners in the strike of 1912. A period of rest appeared

to restore to him some measure of his wonted vigour, but about the beginning of the present year he had a paralytic seizure, which deprived him of the use of his lower limbs. Although there was a partial recovery in his general health, he had not been able to leave the house, but for some months it had been possible for him to come downstairs each day and receive his fellow-officials of the Derbyshire Miners' Union and intimate friends in his sitting-room. A few weeks ago, however, dropsy supervened, and the patient's condition was aggravated by his refusal to consent to an operation. Mr. Haslam was born in 1842 at Clay Cross, and all his life he resided either in the village or at Chesterfield, some four or five miles away. His father was a shoemaker, and he was the youngest of a family of 10. He commenced life by working on the pit brow, and at the age of 16 went down the mine with the coal-getters, where he rose to the position of a stallman. He was thus employed a short time before the fearful explosion at one of the Clay Cross collieries in 1882, by which some 45 miners lost their lives. It was at the instance of the Clay Cross workmen that he decided to start the county union in 1881. He subsequently had the assistance of Mr. W. E. Harvey, the present member of Parliament for North-East Derbyshire, who lived at Morton, near Doe Hill. In the Derbyshire Miners' Association, Mr. Haslam has a notable monument to his memory. He saw it grow from the little nucleus at Clay Cross to the great organisation it is to-day, with a membership of some 30,000. The year 1893, when the memorable coal strike occurred, was a most trying time for the heads of the Association. Funds were exhausted by the long-continued strike pay, and the officials determined as a last resort to mortgage their offices and houses in Salter Gate, Chesterfield. The buildings proved a valuable asset, and the first care of the leaders after Lord Rosebery had effected a settlement of the prolonged dispute, was to free them from debt. He was to the front at the formation of the Miners' Federation of Great Britain, and was placed upon the executive. He was also on the Parliamentary Committee of the Trade Union Congress, and attended most, if not all, of the International Congresses. While living at Clay Cross he was elected on the Clay-lane School Board. He also represented the same district on the Chesterfield Board of Guardians. The offices and officials' residences (all in one block) at Chesterfield were formally opened in June 1893, and then Mr. Haslam removed with his large family to the borough. In Chesterfield he threw himself into the municipal life of the town, and for nine years sat on the Town Council as a representative of the North Ward. He was placed on the Commission of the Peace for the borough in 1893. Mr. Haslam entered Parliament in 1906, but in the House of Commons he did not cut a prominent figure. In the more important assemblies concerned with the conditions of labour, however, Mr. Haslam's activity and ability were conspicuous, and he enjoyed the respect of all the employers with whom he was brought in contact, as an earnest and straightforward man. He leaves a widow and a large family to mourn his loss.

The late Alderman David Hughes, Aberdare, whose death occurred last week, was in his 61st year. He was the eldest son of the late Mr. David Hughes, who was for years manager of the Abernant Collieries. The late Alderman, whose brother, Mr. William Hughes, is at present the manager of the Abernant Collieries, was a marine engineer, and took an active interest in public affairs, particularly in mining and technical education in the district and county generally.

We regret to record the death of Mrs. Godfrey Baker, the second daughter of Sir Thomas and Lady Ratcliffe-Ellis, of the Hollies, Wigan, which occurred on Saturday afternoon at Berkhamstead. Four years ago the deceased lady married Mr. Godfrey Mensell Baker, son of the Rev. Dr. Baker, of Berkhamstead. Mrs. Baker is better known to the outer world as Miss Beth Ellis, novelist.

Mr. James Kenworthy, principal of Messrs. James Kenworthy and Son, railway wagon builders, of Lockwood, Huddersfield, has died in his 86th year.

Mr. Charles Wilkins died from heart failure on Saturday at his residence at Merthyr. Mr. Wilkins wrote a large number of books. His first work was his "History of Merthyr Tydfil," which was published in 1867. Later works included "The History of the Coal Trade of South Wales," "History of the Iron, Steel, and Tin-plate Trades," and "The History of Newport." Mr. Wilkins acted for some years as local correspondent of the *Colliery Guardian*. He was a keen student of geology and archaeology, and was for some years Glamorganshire secretary of the Cambrian Archaeological Society. He was a fellow of the Geological Society.

The death has occurred of Mr. William Rowlandson, at Ainsdale, head of the firm of William Rowlandson and Co., of Liverpool.

Mr. John Pollock, who for some years was colliery manager with the Summerlee Iron Company, died suddenly at Crossgates, Bellshill, Lanarkshire, in the course of last week. Deceased, who was 57 years of age and is survived by a widow and family, was for over 40 years in the employment of the Summerlee Company.

The death is announced of Mr. W. Handyside, late under-manager of Felling Colliery. Mr. Handyside, who was 66 years of age, was for many years connected with the firm of John Bowes and Partners, and ultimately became under-manager, from which position he retired about 12 months ago.



## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### ACCIDENT AT THE CAR HOUSE COLLIERY.

SIR,—Under the above heading, in your last issue, you state that I said, "For 120 lb. pressure, 6 ft. of solid coal was ample." What I did say was, "For a pressure of 120 lb. per square inch, 6 yards of solid coal was ample."

E. B. WHALLEY

(John Brown and Co. Limited).

Rotherham Main Colliery,  
Rotherham, August 2, 1913.

### ANSWERS TO CORRESPONDENTS.

#### Wrongful Working: Measure of Damages.

J. R.—There are two rules for arriving at "just allowances" in the assessment of damages, viz.—(1) under which only cost of haulage or bringing to bank is allowed; (2) under which the expense of hewage and haulage is allowed to be deducted from the fair market value at the pit's mouth. The first has been applied where the misconduct has been of a substantial character (*e.g.*, where the wrongful working has been wilful and fraudulent, or the workings have been continued by a person in possession after it was known that a lease would not be granted, and that he had no title and had no right to expect a title).<sup>a</sup> So where the working has been unauthorised and *without mitigating circumstances*; wholly unauthorised and unlawful;<sup>b</sup> fraudulently concealed, or continued after negotiations for purchase had fallen through;<sup>c</sup> negligent, and notwithstanding that the employers relied on their certificated manager, and had no personal knowledge or notice of the wrongful working;<sup>d</sup> malicious, and with full knowledge that wrong is being done;<sup>e</sup> furtive and in bad faith.<sup>f</sup> The milder rule applies where the wrongful working has been done without fraud or negligence; inadvertently and under a *bona fide* belief of title; without express authority, though with the knowledge of the rightful owner; under a mere mistake and without any suggestion of fraud; neither tortious, nor larcenous, nor negligent, but in the assertion of a right. Where the remedy is sought in trover, and the plaintiff, before the action brought, has demanded delivery of the severed chattel, and the demand has not been complied with, he is apparently entitled to recover the value of the chattel, without allowing for the expense either of getting and severing, or of bringing to bank. For authorities consult *MacSwinnney on Mines, Quarries and Minerals* (fourth edition—Sweet and Maxwell), p. 437, and *The Law of Coal and Other Minerals* (Cockburn—Stevens and Sons), p. 478.—  
ED., C.G.

<sup>a</sup> *Martin v. Porter* (1839), 5 M. and W. 351; 2 H. and H. 70; *Morgan v. Powell* (1842), 11 L.J.Q.B. 263; 3 Q.B.D. 278, also Lord Macnaghten's remarks in *Peruvian Guano Company v. Dreyfus* (1892), A.C. 175.

<sup>b</sup> *Trotter v. Maclean* (1879), 13 C.D. 574; 49 L.J.Ch. 256.

<sup>c</sup> *Wild v. Holt* (1842), 9 M. and W. 672.

<sup>d</sup> *Llynvi Coal Company v. Brogden* (1870), 11 Eq. 188; 40 L.J.Ch. 46.

<sup>e</sup> *Phillips v. Homfray* (1871), 6 Ch. 770.

<sup>f</sup> *Joicey v. Dickinson* (1881), 45 L.T.N.S. 643.

<sup>g</sup> *Livingstone v. Rawyards Coal Company* (1880), 5 App. Cas. 25; 42 L.T. 334, 336, 337.

<sup>h</sup> See also *Wood v. Morewood* (1841), 3 Q.B. 440; *Hilton v. Woods* (1867), 4 Eq. 432; 36 L.J.Ch. 941; *Jegon v. Vivian* (1871), 6 Ch. App. 742; 40 L.J.Ch. 389; *Ashton v. Stock* (1877), 6 C.D. 719; *Re United Merthyr Colliery Company* (1872), 15 Eq. 46; *Job v. Potton* (1875), 20 Eq. 84; 44 L.J.Ch. 262; *Martin v. Porter*, 5 M. and W. 352; *Hunter v. Gibbon*, 1 H. and N. 466.

### THE IRISH COAL TRADE.

THURSDAY, AUGUST 7.

#### Dublin.

The house coal trade locally continues to be quiet, and demand for steam qualities is moderate, prices of all descriptions remaining unchanged—viz.:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best kitchen, 24s.; Orrell slack, 21s.—all less the usual 1s. per ton discount for cash; steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. Irish coals at Wolfhill (Queen's County) are:—Best large coal, 20s. per ton; best household, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth. It is stated that the movement to use Irish coal is spreading in the various inland unions. The coaling vessels arriving during the past week amounted to 62, as compared with 58 the week previously, chiefly from Garston, Swansea, Ayr, Preston, Troon, Whitehaven, Point of Ayr, Liverpool, Saundersfoot, Workington, Newport, and Cardiff. The total quantity of coal discharged upon the quay was 27,000 tons.

#### Belfast.

The city coal trade is about normal for the season, but there is a remarkably good demand from the inland districts, business in this connection having opened up earlier than usual this year. Prices are all unchanged, and it is not anticipated that they will be much, if anything, lower, although Welsh and Scotch coals have an easier tendency. The import trade is active, and stocks are increasing. City prices are as follow:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current prices ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Cargoes arriving during the week were chiefly from Ayr, Garston, Workington, Preston, Girvan, Partington, Ellesmere Port, Maryport, Cardiff, Glasgow, Neath Abbey and Newport. Recent returns of the Harbour Commissioners show that the quantity of coal imported into Belfast for the three months ending June 30, 1913, was 364,570 tons, as compared with 314,110 tons for the same period in 1912; the quantity exported was 3,222 tons, as compared with 9,510 tons in 1912; the imports of coke amounted to 3,514 tons, as against 2,529 tons, and there was none exported.

### THE LONDON COAL TRADE.

THURSDAY, AUGUST 7.

The London coal trade for the past week has scarcely recovered itself from the holiday season and very little has been done at the depots since the beginning of the week. The merchants decided on Friday last not to meet on Wednesday, so that the market has been closed practically until the Friday of the current week. Fortunately, the bulk of the orders on hand are for the best qualities of house coal, and the majority of collieries carry over a fair number of orders for the present month and, although many of the contracts are still in abeyance, yet the collieries are fairly supplied with orders for present working. The month of August is generally a very broken one, broken by holidays and village festivals, which seriously interfere with the ordinary output, and supplies are considerably curtailed. Colliery representatives are abstaining from booking any forward orders, and in some cases an advance has been notified in the ordinary selling price. The cheaper qualities of kitchen and stove coal find very little favour and stocks are gradually accumulating. Manufacturing qualities have also been quiet, arising doubtless from the fact that many of the large factories have been partially closed down on account of the holidays. Slacks and small nuts were bought rather freely during the week immediately preceding the current week, but all at somewhat lower prices. Bakers' nuts and kitchen cobbles are moving slowly, but prices are firmly maintained, and now that the worst summer months are over, the outlook assumes a brighter aspect, and no great pressure is shown towards any further contract negotiations. The attendance on market lately has proved a considerable falling off, but this is not at all surprising with the holiday season all around us. The South Metropolitan Gas Company, in their recent report, show an increase of 1.59 per cent. in the consumption of gas as compared with the corresponding half of last year. In many of the streets of the South London district, the entire absence of coal during the summer months has been recognised for many years past, and all the cooking and warming has been entirely confined to gas stoves. The lowest summer prices are still in force, although some little agitation has been shown, pointing to an early advance in public prices. The shipping trade continues very quiet.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal	13/6	13/6
Do. nuts	12/6	12/6
Birley cube Silkstone	12/	12/
Do. branch coal	15/	15/
Do. seconds	11/	11/
Barnsley Bed Silkstone	12/6	12/6
West Riding Silkstone	12/	12/
Kiveton Park Hazel	13/	13/
Do. cobbles	13/	13/
Do. nuts	12/	12/
Do. hard steam	11/	11/
New Sharlston Wallsend	14/	14/
Wharfedale Silkstone coal	14/	14/
Do. Flockton Main	13/6	13/6
Do. Athersley house coal	11/6	11/6
Newton Chambers best Silkstone	15/	15/
Do. Grange best Silkstone	14/	14/
Do. Hesley Silkstone	13/	13/
Do. Rockingham selected	13/6	13/6
Do. Rockingham Silkstone	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best	11/	11/
Do. large nuts	10/9	10/9
Do. small nuts	10/	10/
Do. kitchen coal	9/6	9/6
West Hallam Kilburn brights	11/	11/
Do. do. nuts	10/9	10/9
Do. London brights	10/	10/
Do. bright nuts	9/6	9/6
Do. small nuts	10/	10/
Manners Kilburn brights	11/	11/
Do. do. nuts	10/9	10/9
Shipley do. brights	11/	11/
Do. do. nuts	10/9	10/9
Mapperley brights	11/	11/
Do. hard steam	10/9	10/9
Cossall Kilburn brights	11/	11/
Do. do. nuts	10/9	10/9
Trowell Moor brights	11/	11/
Do. do. nuts	10/9	10/9
Grassmoor Main coal	12/6	12/6
Do. Tupton	11/	11/
Do. do. nuts	12/	12/

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal	12/6	12/6
Do. do. cubes	12/	12/
Do. special Derbys	11/9	11/9
Do. house coal	11/	11/
Pilsley best blackshale	12/6	12/6
Do. deep house coal	10/6	10/6
Do. hard screened cobbles	10/	10/
Hardwick best Silkstone	12/6	12/6
Do. Cavendish brights	11/6	11/6
Do. cubes	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards	12/	12/
Do. small hards	11/	11/
Do. deep large steam	12/	12/
Annesley best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Linby best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Digby London brights	12/	12/
Do. cobbles	12/	12/
Do. top hards	13/	13/
Do. High Hazel coal	14/	14/
Bestwood hard steam coal	12/	12/
Do. bright cobbles	11/3	11/3
Hucknall Torkard main hards	12/3	12/3
Do. do. cobbles	11/3	11/3
Do. do. nuts	11/	11/
Do. do. High Hazel H.P.	14/9	14/9
Do. do. London brights	12/3	12/3
Do. do. large nuts	12/3	12/3
Do. do. bright nuts	11/3	11/3
Sherwood H.P. hards	12/	12/
Do. hard steam	10/6	10/6
Do. brights	11/3	11/3
Do. cobbles	11/3	11/3
Do. large nuts	11/9	11/9
<b>Warwickshire.</b>		
Griff large steam coal	10/9	10/9
Do. screened cobbles	11/	11/
Do. bakers' nuts	11/	11/
Do. loco Two Yard hards	14/	14/
Do. Ryder nuts	11/6	11/6
Do. do. cobbles	12/6	12/6
Nuneaton steam coal	10/9	10/9
Do. screened cobbles	11/	11/
Do. nuts	11/	11/
Haunchwood steam	10/9	10/9
Do. screened cobbles	11/	11/
Do. nuts	11/	11/
Wyken steam coal	10/9	10/9
Do. screened cobbles	11/	11/
Do. nuts	11/	11/
Exhall Ell coal spires	12/6	12/6
Do. large steam coal	10/9	10/9
<b>Leicestershire.</b>		
Snibston steam	10/6	10/6
Do. cobbles	10/3	10/3
Do. nuts	10/6	10/6
South Leicester steam	10/	10/
Do. cobbles or small hards	10/6	10/6
Do. nuts	10/6	10/6
Whitwick steam	10/6	10/6
Do. roasters	10/6	10/6
Do. cobbles	10/6	10/6
Do. nuts	10/6	10/6
Netherseal hards	17/	17/
Do. Eureka	12/6	12/6
Do. kitchen	10/6	10/6
Ibstock kibbles	10/	10/
Do. large nuts	10/	10/
Do. bakers' nuts	9/6	9/6
Do. Main nuts	10/	10/
Do. hards	9/6	9/6
Granville New Pit cobbles	11/6	11/6
Do. Old Pit cobbles	10/6	10/6
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best	13/6	13/6
Sneyd best, selected	14/6	14/6
Do. deeps	14/	14/
Silverdale best	15/	15/
Do. cobbles	14/	14/
Apedale best	13/6	13/6
Do. seconds	13/	13/
Podmore Hall best	13/6	13/6
Do. seconds	13/	13/
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London		
Do. brights	13/	13/
Do. shallow one way	12/	12/
Do. deep nuts	11/6	11/6
Cannock steam	11/	11/
Coppice deep coal	13/	13/
Do. cobbles	12/	12/
Do. one way	12/	12/
Do. shallow coal	12/	12/
Cannock Chase deep main	17/	17/
Do. Deep kitchen cobbles	12/	12/
Do. best shallow main	14/	14/
Do. shallow kibbles	13/6	13/6
Do. best brights	13/	13/
Do. yard cobbles	13/6	13/6
Do. yard nuts	12/6	12/6
Do. bakers' nuts	10/3	10/3
Do. screened hards	11/	11/

#### From Messrs. Dinham, Fawcett and Co.'s Report.

Friday, August 1.—In view of the holidays, the seaboard house coal market was without alteration to-day. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 13.

There was no market on Monday or Wednesday.

His Highness Prince Youva, Rajah of Mysore, heir presumptive to the throne of Mysore, accompanied by Sir John Randles, M.P., whose guest he has been for several days at Bristow Hill, Keswick, has this week been visiting the iron and steel works of the Cumberland Iron and Steel Combine at Workington. The Rajah is visiting this country for the purpose of studying social and industrial conditions.



## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**The New School of Mines—Coalowners' Generous Scheme—Another "Show Cards" Campaign and Tendering of Notices Threatened—New Schedule of Rates Opposed—Another New Company by Mr. D. A. Thomas—The Great Burden of Rates and Wage Increases—Coal Trimmers and Saturday Stoppage—Extraordinary Circumstances of the Cardiff Company's Bill to Raise Charges on Coal: Special Action in Parliament.**

The new School of Mines, which the coalowners have established at Treforest at a cost of nearly £20,000, will be in working order early in October; and it is gratifying to report that a scheme of co-ordination ranging from the mining classes of the County Council through the School of Mines to the University College has been practically arranged—or, rather, that the School and the College are now in partnership in the duty of training students. An important meeting of colliery managers took place in Cardiff last week, the desire being to make arrangements whereby students of the School who are employed at the mines could spend one full day a week at the School; also, whereby full-time students might obtain practical instruction at the collieries. These latter will spend the whole of their time at the School during the winter, and will be at the collieries during the summer months. One chief feature in the organisation of the school is that it is open on equal terms to all classes of students, the scale of fees having been arranged on a very low basis. The understanding with the University College of South Wales at Cardiff results in the college authorities being responsible for the teaching of pure science, whilst the school takes the whole of the technical and practical work. The mining diploma, which has hitherto been given by the college, will in future be given by the two institutions jointly in respect of a joint course, and application has been made (with full hope of success) that the Home Office will recognise the joint diploma for the purposes of the Mines Acts, and also the joint certificates for colliery surveyors. The whole coalfield is embraced in the scheme, and the coalowners are said to be aiming at the setting up of an additional school in the west—probably in the Swansea district, and also in the east, some part of Monmouthshire being chosen. Lord Merthyr and Lord Plymouth are to be among the trustees of the school, the former being president. The South Wales College will create a post-diploma course for fourth-year students, as to which an extra certificate of efficiency will be issued; and for this extra year's course the school will provide five studentships of £50 a year each.

In furtherance of the general project, Mr. Ingledew and Prof. Knox waited upon the Swansea Education Authority, on Friday, desiring that they would link up their curriculum with those of other authorities in the coalfield, so that a student could pass direct from the technical school to the School of Mining. The chairman of the local committee promised careful consideration.

At a meeting of the executive council of the Miners' Federation, held in Cardiff on Saturday, it was resolved that during the first week of September there shall be a general "show cards" throughout the coalfield; and that where any non-unionists are found at work 14 days' notice be given terminating contracts unless the non-unionists join the Federation.

As to the new schedule of rates for new work, it was reported to the council that the proprietors of the Crumlin Navigation Collieries declined to consider it; and it was resolved that the general secretary should co-operate with the local agent and endeavour to settle the matter.

The Anthracite Miners' Association, at a meeting on Saturday, representing 15,000 men, decided to appoint a sub-agent because of the increasing work due to new legislation and from the enlarged membership of the association.

Mr. Hubert Jenkins, miners' agent in the Caerphilly district, has had to rebuke men for stopping collieries without first enlisting the services of the local committee and the agent, to negotiate upon a dispute.

The chief of the Cambrian combine—Mr. D. A. Thomas—although upon the boards of close upon a score of companies, and notwithstanding his investigations in America, which suggest developments westward, has registered a company to trade at Barcelona—the Anglo-Spanish Coaling Company. The new concern will have a capital of £100,000, and will develop an old-established Spanish business.

Sir George White, who presided at the meeting of shareholders in the Main Colliery Company, said that the result of the second half of the year's work was to wipe out the loss of the first half and to pay a full year's dividend at the rate of 6 per cent. Of the extra amount realised by the sales, as compared with the corresponding period, no less than 50 per cent. went in increased wages consequent upon recent legislation, whilst the net result for the proprietors was a £14,000 profit upon the balance of capital of nearly a quarter of a million sterling. During the past four years, £75,000 additional capital had been put into the concern, installing improvements which effected large savings;

but all their savings in various directions had been swept into the wages bill, or into increased local taxation.

The decisive action taken in the north of England lends special interest to the Saturday question in South Wales as raised by the coal trimmers. The joint board met at Cardiff last week, and had before it the demand of the men as set forth previously in this column, the men having given notice that they will cease work on Saturdays at one o'clock as from September 6, except in cases where a vessel can finish loading that evening. The board could arrive at no decision, and another meeting was agreed upon.

An umpire's award has been delivered in respect of the No. 3 Garn Goch pit of Messrs. Glasbrook. The men claimed that, apart from the recent decision of the High Court and notwithstanding the award of Lord St. Aldwyn, there existed an understanding at the colliery as to abnormal places; and the present award—given by Mr. Percy Player—has decided that the average wage must be calculated upon one week's wages, instead of a fortnight. Where men are engaged in cutting coal and also ripping top, the total earnings are to be reckoned, provided a man is in his own stall.

Each succeeding week brings the Cardiff Company's Bill into greater prominence; and even though it was on Tuesday reported to the House for third reading, there is a prospect of some singular development which may delay its passage. For one thing, it is said to involve a new principle, as to which the special attention of the House of Commons will be invited. Then the chairman dissented from the committee's decision, and is regarded as likely to take some independent action. Further, Mr. Tim Healey has been blocking private Bills, and has no consideration for this particular measure. Sundry other probabilities of hindrance are mentioned, one of a startling character; but apart from renewed contest in the committee room, last Tuesday, upon the allocation of the total 1½d. per ton, nothing positive is yet manifest. The discussion on Tuesday was as to what part of the 1½d. was to be imposed upon the tonnage dues.

Last week's experience was remarkable. The promoters could not give immediate acceptance to the decision of the Committee, who offered, upon conditions stated, to approve an increase of rates to the extent of a total of 1½d. per ton. This was to be spread over the different items of coal-shipping, wharfage and tonnage dues; and it contrasted with the original demands of the promoters that their coal-shipment rate should be increased from 2d. to 4d. per ton, wharfage increased by 50 per cent., and a material addition also to be made to tonnage dues. The chief condition attached by the Committee to the increase of 1½d. was that the company should provide "storage sidings."

Over these sidings their counsel, on Friday, raised a very important question, stating that it depended upon the exact requirements of the committee whether the company could possibly go on with the Bill. They were prepared to provide sidings which would facilitate coal-mixing, and would relieve any blocking of the running lines; but if the Committee required that the dock company should provide storage sidings upon which the railway companies might place the coal as brought down, that would block up the lines, and make the work of the docks impossible. Such an arrangement would be a reversion to the conditions prior to 1882, when the lines were flooded with traffic which could not be sorted out, and the work of the docks was stopped.

On behalf of the company, counsel submitted a clause carrying out the idea he had expressed; but the chairman said the committee had been very careful in their choice of words, and they certainly meant "storage sidings," apart from standing accommodation at the docks. Counsel replied that Cardiff had double the accommodation of Immingham; for whereas the latter had space for only 16,000 wagons, there was space for 30,000 to 35,000 at Cardiff. A plan was submitted showing what the company could do, and it was explained by the docks manager (Mr. Denniss); and on the other hand Mr. Prosser, manager of the Rhymney Railway Company, produced another plan showing what he thought the docks company ought to do.

The chairman made a remark as to coal being detained in sidings miles away from the dock, and that the Committee's requirement was for storage accommodation at the docks. Ultimately the room was cleared, and the Committee consulted in private; and upon the admission of parties again, the chairman read the committee's decision, which stated that their intention was that sidings should be provided sufficient for storage—not in the warehouse sense of the word, but to facilitate the loading of coal, by keeping the main line to the tips clear after the coal has been released from the railway companies' sidings. It was not the intention of the Committee to alter or vary the present system of storing coal at the railway companies' sidings in any way whatever.

Mr. Freeman (for the Rhymney Company) took objection that this would be only sidings to facilitate mixing of coal, and were not "storage" sidings.

For the company an offer was made to provide relief sidings; and after some discussion counsel for the promoters submitted a fresh draft of a clause whereby they would have to provide relief sidings "sufficient to avoid, as far as reasonably practicable, any obstruction of the running lines;" any questions

as to sufficiency to be referred to an arbitrator, and nothing in the Act to repeal or interfere with the provisions as to working of traffic contained in the Butte Docks Act of 1882. Any such interference, counsel said, would be absolutely fatal, not only to the docks company, but to all the freighters concerned, for the maintenance of conditions then arranged was absolutely essential.

For the Rhymney Company counsel contended that the phrase "for their own use," rendered the condition impracticable; and after argument, the words "under own control" were substituted.

It was also contended that the company should be prevented from making the increased charges until the sidings had been made and were in working order; and counsel for the company made no objection, provided the time was limited; and a time limit was agreed upon, the increased charges not to come into force until the sidings are made.

Counsel for the Cardiff Chamber of Commerce desired that the rates should not be increased until the company had completed and worked their railway; but this was not conceded.

The chairman interposed a remark that the clause now before the Committee got rid of the decision of the previous Wednesday to the effect that the company was to provide storage sidings; and counsel for the promoters answered, "If we are going back to these storage sidings, that is the end of the Bill"; but one member of the Committee remarked that the Committee had made it clear that this was not the intention. Proposals were submitted on behalf of the company, and ultimately the Committee decided that the charges should be apportioned:—

To shipment of coal, ¾d. per ton increase.

To wharfage, 7/16d. increase.

To tonnage dues, 5/16d. increase.

These three total to the 1½d. increase which had been sanctioned.

After clauses had been settled, and the parties were dispersing, a remarkable announcement was made by the chairman. He said that the proceedings had involved a principle of great importance, and he desired it to be put upon record that the decision of the Committee finding the preamble proved was not unanimous. He dissented from it, and must not be taken, therefore, as assenting to any subsequent proceedings.

This declaration by Mr. Soames, after 18 days' enquiry in the Commons and seven in the Lords, has given occasion for a great deal of comment and speculation—one idea being that the chairman might even go so far as to move rejection of the Bill on the third reading; but as to this personal action there is no confirmation, and it may be classed with the ordinary crop of rumours which are current when any exceptional incident arises.

As evidencing colliery developments in this area it may be noted that the imports of mining timber during the first six months of this year totalled 854,676 loads, as compared with 638,140 in the corresponding period. But the strike which prevailed during part of 1912 vitiates the comparison materially.

## THE BY-PRODUCTS TRADE.

**Tar Products.**—Though there is not much change in the position of most products, seeing that benzols and toluol hold firm, while pitch and naphthas are virtually unaltered, there has been a welcome revival in crude carbolic, which has advanced in both east and west substantially. Crystals, however, have not participated in the betterment. Nearest values are:—

Benzols, 90's .....	1/0½
Do. 50's .....	1/10½
Do. 90's North .....	1/
Do. 50's North .....	1/10
Toluol .....	1/11½
Carbolic acid, crude (60 per cent.) .....	1/5
Do. crystals (40 per cent.) .....	1/4½
Solvent naphtha (as in quality and package) ...	9½
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3
Pitch (f.o.b. east coast) .....	40/6 to 41/6
Do. (f.a.s. west coast) .....	40/ to 41/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—The tone of the market is distinctly one of steadiness, and in the North there has been an advance in price since the resumption of business on normal lines after the annual holidays. For forward also there is a rather better enquiry and prices are naturally correspondingly firm, albeit more or less nominal at the moment, £13 5s. being asked in the North for near at hand lots. The American market is quiet in the precincts of 3 dols. for 100lb. Closing prompt prices are:—

London (ordinary makes) .....	£13/2/6
Beckton (certain terms) .....	—
Liverpool .....	£12/17/6
Hull .....	£12/15/
Middlesbrough .....	£12/13/9 to £12/15/
Scotch ports .....	£13
Nitrate of soda (ordinary) per cwt. ...	10/7½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]



PROGRESS.

Hydraulic Stowing.

In a paper read by M. Victor Viannay, before the Société de l'Industrie Minérale, on the wear of conduits for hydraulic stowage (*Bull.* May 1913, p. 481) the following conclusions are given:—

The maximum wear is obtained when using non-argillaceous refuse in particles (colliery dirt, broken slag, &c.), and the minimum wear with very fine materials, such as clay, washery refuse, &c. An admixture of a certain proportion of the latter materials will diminish considerably the wearing effect of the former.

As an internal lining, hard steel or tempered iron is to be preferred. Large diameters and frequent bends should be avoided, as these increase the wear.

The dilution with water should not be excessive, that

The composition of the foregoing is as follows:—

"STRAIGHT" NITROGLYCERINE DYNAMITES.

Ingredients.	30 per cent.	40 per cent.	50 per cent.	60 per cent.
Nitroglycerine .....	30	40	50	60
Combustible material ...	17	15	14	16
Sodium nitrate .....	52	44	35	23
Calcium or magnesium nitrate.....	1	1	1	1

In the 60 per cent. low-freezing dynamite, for 15 per cent. of the nitroglycerine nitro-substitution compounds are used. Forty per cent. ammonia dynamite = nitroglycerine, 22; ammonium nitrate, 20; sodium nitrate, 42; combustible material, 15; calcium carbonate or zinc oxide, 1. Forty per cent. gelatine dynamite = nitroglycerine, 33; nitrocellulose, 1; sodium nitrate, 54; combustible material, 11; calcium carbonate, 1. Five per cent. granulated nitroglycerine powder = nitro-

Mines.	Horizontal conduits.		Flushing materials used.		Apparent speed.	Value of $\frac{1}{u}$ .
	Diameter.	Construction.	Composition.	Dimensions of holes in hopper screen.		
Cleophasgr. ....	Mm. 187	Rolled iron	Argillaceous sand .....	Mm. 100	M. —	11,300
Gothardsch. ....	187	Do.	Do. ....	100	—	11,300
Koenigin-Luiseagr. ....	187	Do.	Do. ....	100	4.50	28,200
Delbrücksch. ....	187	Do.	Sand .....	65	—	11,300
Myslowitzgr. ....	187	Do.	Do. ....	70	3.0	7,450
Czeladz ....	125	Do.	Argillaceous sand .....	70	1.0	5,900
Paulinesch. ....	187	Do.	25 per cent. clay, 20 per cent. loam, 25 per cent. slag, 30 per cent. coaldust. 35 per cent. sand and loam, 65 per cent. broken blastfurnace slag.	70	—	13,600
Friedensgr. ....	196	Do.	12 per cent. argillaceous sand, 88 per cent. broken stone from mine.	30	2.75	1,450
Maxgr. ....	182	Do.	12 per cent. argillaceous sand, 20 per cent. zinc slag. (See above.)	90	—	3,340
Cons. Giesche-Steink. ...	150	Cast iron	Argillaceous sand .....	80	—	1,960
Maxgr. ....	182	Do.	Do. ....	90	—	2,030
Concordiagr. ....	225	Do.	25 per cent. sand, 10 per cent. loam, 25 per cent. crushed rock, 30 per cent. granulated slag, 10 per cent. ashes.	—	1.50	7,300
Do. ....	150	Do.	Do. ....	30	3.0	14,400
Do. ....	150	Do.	88 per cent. argillaceous sand, 0.6 per cent. ashes, 11.4 per cent. crushed rock.	70	—	7,470
Czeladz ....	178	Rolled iron	Sand .....	70	1.0	7,470
Myslowitz ....	187	Steel	Do. ....	70	3.0	6,050
Do. ....	147	Reinforced with oak	Do. ....	70	4.50	3,600
Koenigin Luiseagr. ....	150	Porcelain	Argillaceous sand .....	100	—	2,125
Friedensgr. ....	165	Do.	51 per cent. crushed slag, 20 per cent. crushed rock from mine, 29 per cent. argillaceous sand.	30	4.50	1,780
Do. ....	165	Do.	61 per cent. crushed rock from mine, 39 per cent. crushed blastfurnace slag.	30	—	400
Do. ....	150	Reinforced with iron	19.5 per cent. crushed rock from mine, 31.5 per cent. sand and loam, 49 per cent. broken slag.	30	—	3,000

Generally, where sand is used for flushing, the dilution is in the proportion of 1 to 2½ parts of water to 1 of refuse. In the two installations at the Czeladz mine the dilution is respectively 4: and 2:1. In the Koenigin Louise installation the sand contains silica, and according to the experience of the Deutsche-Kaiser mine the coefficient *u* is practically *nil* when fine materials are employed.

giving the minimum wear being less than 1 part of water to 1 part of refuse.

In conclusion, a table is given showing the results obtained in a number of installations, the inverse of the coefficient of wear, which is denoted by  $\frac{1}{u}$ , representing the cubical volume of refuse necessary to cause 1 mm. of wear per decimetre of the perimeter of the conduit.

Energy of Explosives.

One of the *Bulletins* (No. 48) of the U. S. Bureau of Mines, on the "Selection of Explosives," by Clarence Hall and S. P. Howell, contains a table showing a comparison of various classes and grades of explosives as to potential energy and disruptive and propulsive effects. The percentage strength representing potential energy is the result obtained with tests with the calorimeter; that representing disruptive effect is the average of the rate of detonation, Trauzl lead block and small lead block percentages; and that representing propulsive effect is the average of the pressure gauge and ballistic pendulum percentages. In each case the 40 per cent. "straight" nitroglycerine dynamite is taken as the unit of comparison with a value of 100 per cent.:—

Class and grade.	Percentage strength representing potential energy.	Average percentage strength representing disruptive effect.	Average percentage strength representing propulsive effect.
30 per cent. "straight" nitroglycerine dynamite .....	93.1	84.1	96.8
40 per cent. ditto .....	100.0	100.0	100.0
50 per cent. ditto .....	111.0	109.2	107.4
60 per cent. ditto .....	104.0	119.8	114.9
60 per cent. strength low-freezing dynamite ...	60.2	93.5	91.2
40 per cent. strength ammonia dynamite ...	101.8	67.9	99.1
40 per cent. strength gelatine dynamite ...	105.7	78.4	95.8
5 per cent. granulated nitroglycerine powder ..	67.6	21.6	53.3
Black blasting powder ..	71.6	6.8	58.6

glycerine, 5; combustible material, 35; sodium nitrate, 60. Black blasting powder = charcoal, 16; sulphur 11; sodium nitrate, 73.

**Gob Fires and the Drawing of Timber.**—Four Brodsworth Main stallmen were charged at the Doncaster West Riding Police-court, last week, in that they, on or about June 4, did an act likely to endanger the safety of the mine, by leaving in props that should have been withdrawn. Mr. John Criddle, the manager, in his evidence, said there was a rule that every miner should look and inspect the place where he was working before he commenced. One of the greatest dangers to a mine such as Brodsworth was the leaving in the goaf of props. In every instance when gob fires had been caused at Brodsworth it was because timber had been left in the goaf. The magistrates imposed on each defendant a fine of 40s. and costs. After the decision, Mr. Gichard added that there had been a consultation between certain colliery owners, and if this class of offence, or any similar offence, should be committed in the future, the Bench would be asked to inflict still heavier fines. The Bench had now had power to impose a penalty up to £5.

**New Anglo-German Coaling Company.**—The Mersey and Clyde Coaling Company Limited has just been formed, and the first directors are the following:—Hugo Stinnes, mineowner, Mulheim Ruhr; John A. Moodie, colliery agent, 124, St. Vincent-street, Glasgow; William Wilson, colliery agent, 124, St. Vincent-street, Glasgow; J. Russell Ferguson, coal exporter, 3, Fenchurch-avenue, London; and Hy. B. Williams, coal exporter, 113, St. Vincent-street, Glasgow. In addition to carrying on business on its own account as coaling contractors, &c., the company will act as agents for Hugo Stinnes Limited, London, Glasgow, Newcastle, Hull, Cardiff and Swansea; also for Moodie and Wilson, of Glasgow and Hull, the Midgard Steamship Company Limited, Bremen, Bremerhaven, Nordenham, Geestemünde and Brake; the Kobenhavns Kul og Koks Kompagni Aktieselskab, Copenhagen; the Northern Union Mining Company Limited, London, &c.; and will also have wide connections in various Continental towns, including Mulheim Ruhr, Berlin, Hamburg, Stettin, Strassburg, Duisburg, Cologne, Wiesbaden, Mannheim, Stuttgart, Saarbrücken, St. Petersburg, Brussels, Paris, Rouen, Zurich, Genoa, Milan, Messina, Trieste, and Constantinople, &c.

BOOK NOTICES.

**An Investigation of the Coals of Canada.** By J. B. PORTER, R. J. DURLEY and others. Vol. iii. Detailed Results of the Coalwashing Trials, by J. B. PORTER. 168 pp., with numerous graphic records, 6½ in. by 10 in. Ottawa: Government Printing Bureau.

This is the third of the six volumes dealing with the results of investigations undertaken by the Canadian Government. The preceding volumes, which have already been noticed, record the general results, and this volume contains the first of the appendices, which gives details of the coalwashing trials, summarised in vol. i.

**Northern Coal, Iron and Steel Companies, 1913.** 127 pp. Cardiff and Newcastle, London and Hull: The Business Statistics Company. Price 1s. net.

This booklet does for the important coal and iron undertakings of the north of England in similar fashion what the above booklet does for South Wales. Between them they cover a major portion of England and Wales.

**Steam Engine Design.** By H. E. KING, Assoc. M. Inst. C.E.E. vi. + 356 pp.; 191 figs.; 7 in. by 4½ in. London: The Technical Publishing Company. Price 6s.

This book, which is based to a large extent upon articles that have appeared in the *Practical Engineer*, is intended primarily for the draughtsman, and deals prominently with the leading features of marine, slow-speed, stationary, and high-speed electric lighting engines. The first chapter briefly describes the general constructional features, and in successive chapters rules are given, while governing, balancing, lubrication, steam pipes and condensing plants are further subjects dealt with in detail. From a descriptive point of view, the scope of the book is limited, but this is probably intentional, the desire being to concentrate upon the standard principles of design rather than upon variations. The drawings are clear and intelligible, and altogether the purchaser will obtain excellent value for his money.

**Income-tax.** By F. B. LEEING. Third edition revised. 5 in. by 7 in., xvi. + 164 pp. Price 2s. 6d. net. London: Effingham Wilson.

This little manual, which has now reached the third edition, is intended to assist the taxpayer in making returns and preparing accounts in support of the same in recovering excess or obtaining reduction. There is a useful appendix of settled cases.

**Electricity in Mining.** By SIEMENS BROTHERS DYNAMO WORKS LIMITED. xviii. + 201 p.; 190 figs., 11 in. x 7 in. London: Charles Griffin and Co. Price 10s. 6d.

We have in this handsome volume something in the nature of a novelty—a text-book contributed unaffectedly by a large manufacturing company. It is notorious that a good proportion of the papers contributed on electrical and allied subjects are nowadays thin-disguised "puffs"; Messrs. Siemens at least have the frankness to avoid any subterfuge, and, further, this book has a real value, arising partly from the generous spirit in which it has been compiled and partly from the wide range of practice and experience to which the firm can justly lay claim. As an instance, it may be pointed out that the name of Siemens has admittedly bulked largely in the history of the development of the electric winding engine, and there are other branches of the subject in which the firm and its associates have played no less considerable a part.

The scheme of the work is a good one. In the second chapter some typical distribution systems are described, by means of excellent plans, with lists of the electrical equipment, the installations dealt with including those of the Cambrian collieries, the Powell-Duffryn Collieries, Gelsenkirchen, Rheinpreussen, and the Newcastle district scheme. Chapter III. deals shortly with the choice of transmission system and pressure; and Chapter IV. with electric power stations, driven respectively by steam, gas, oil, and water.

A lengthy chapter is devoted to electric winding engines, and there are some fine illustrations of plants in this country and abroad. Other chapters deal with switchgear, pumps, fans, compressors, haulages, auxiliary machinery, inbye, locomotives, washers, briquette presses, rock drills, flame proof installations, signalling systems, shot-firing apparatus, coal-cutters and underground cables receive scanty notice; and, generally speaking, the book is less an exhaustive manual on the subject than a readable and beautifully illustrated account of the various applications to which electricity is now applied in the production of minerals.



## CONTINENTAL MINING NOTES.

## Austria.

*Official Wholesale Coal Prices, Vienna Exchange.*—Pilsen coals: Large 33 20 kronen per ton, in 10-ton loads, ex Franz Josef Bahnhof. Ostrau-Dombrau-Karwin coals: Large 28 10-29 10 kr., cubes 27 60-28 60 kr., nuts 26 60-27 60 kr., small 23 20-24 kr., washed smithy coals 29 20-30 kr., coke 38 40 kr. per ton, ex shutes Nordbahnhof, net cash. Rossitz-Zbeschau-Oslawan coals: Best washed smithy coals, large or small, 30 50-31 50 kr., coke 30 32 kr. per ton, ex shutes Nordbahnhof or Staatsbahnhof. Upper Silesian coals: Best large or cubes 32 30-33 10 kr., medium large or cubes 31 50-32 30 kr., seconds large or cubes 26 70-27 80 kr., best nuts I. 32 70-33 50 kr., II. 29 60-30 10 kr., best small 23 50-24 kr., seconds 22 50-23 kr. per ton net cash, ex shutes Nordbahnhof. In 10-ton loads: Best large or cubes 30 70-31 50 kr., best nuts 31 10-31 70 kr. per ton, ex Nordbahnhof. Gas coke from Vienna Gasworks, 32 40-34 kr. per ton ex works. Lignite: Dux large 21 70-23 20 kr., Bräx or Dux cubes 21 70 23 20 kr., nuts 21 20 22 70 kr., Mariaschein cubes 23 70-25 20 kr., nuts 23 20-24 70 kr. per ton, ex shutes Franz-Josefs or Nordwest Bahnhof.

## France.

The Chamber of Deputies on July 25 adopted the recommendations of the Budget Commission imposing a tax of 25 centimes on all coal raised. The articles providing for the tax are as follow:—"Dating from October 1, 1913, mines of coal will be subject to the payment of an impost of 25 centimes per ton of coal, coke or briquettes despatched or sold. Mines will be exempt from this tax whose net profit is less than 1 fr. 25 c. per ton. In the case of mines whose net profit is between 1 fr. 25 c. and 1 fr. 50 c., the tax will be levied on the excess of profit above 1 fr. 25 c." The tax is estimated to produce 1,600,000 fr. during the present year.

## Germany.

*Coal Syndicate Report for June.*—The total coal raised 825,603 tons (7,540,158 tons June 1912), or 341,430 tons (322,574 tons) per working day; calculated distribution 7,031,398 tons (6,183,325 tons), being 281,256 tons (264,527 tons) per working day, or 106.47 per cent. (100.75 per cent.) of the participation. Total distribution of coal from Syndicate pits 8,589,103 tons (7,615,864 tons), or 343,564 tons (325,812 tons) per working day. Deliveries, including local sales, miners' house coal and supplies to pits' own iron-works: Coal 5,591,081 tons (5,006,754 tons), or 223,643 tons (214,193 tons) per working day. Coke 1,725,587 tons (1,527,164 tons), or 57,520 tons (50,905 tons) per working day; briquettes 396,438 tons (334,047 tons), or 15,858 tons (14,291 tons) per working day.

*Fuel Traffic in Ruhr Harbours, June.*—Total supplies by rail to: Ruhrort, 1,327,724 tons; Duisburg, 498,585 tons; Hochfeld, 18,964 tons; aggregate, 1,945,373 tons. Shipments outward:—To Coblenz and places higher up river, 974,452 tons; to places below Coblenz, 22,303 tons; to Holland, 558,444 tons; to Belgium, 322,792 tons; to France, 34,759 tons; to other destinations, 32,530 tons. Total shipments from: Ruhrort, 1,184,803 tons; Duisburg, 467,054 tons; Hochfeld, 25,221 tons; Rheinpreussen, 102,469 tons; Schwelgern, 84,734 tons; Walsum, 80,900 tons; aggregate, 1,945,281 tons.

*Coal Market in Upper Silesia.*—In contrast to the conditions prevailing in Western Germany, there is not the slightest indication of any decline in this market, and in fact the output needs to be higher to meet the demands of consumers fully and promptly. This, however, is impracticable, owing to the scarcity of skilled labour, especially now that harvesting operations are in progress. Some of the activity is, no doubt, due to the fact that consumers are covering winter requirements earlier than usual, fearing delays through a scarcity of railway wagons later on, and also the prospect of an advance in prices. It is characteristic of the situation that the pits have been on full time all the summer, and it is therefore not surprising to find from the traffic returns that the daily deliveries by rail average nearly 12,000 wagons. As regards the various classes of coal, gas and coking coals are very scarce, and the cokeries supplying the ironworks are complaining of short delivery. All other industrial coals keep in good request and enquiries for house coal are coming in freely. The great demand in the home market is causing the export trade to be neglected, and though the consignments to Austria-Hungary and Poland are very extensive, customers there would take still more of it if they could get it. The condition of the coke market is also good, consumers' demands being difficult to satisfy fully, as there are no appreciable stocks of blast-furnace or foundry coke.

*Hamburg Coal Trade.*—Mr. H. W. Heidmann, of Hamburg, writes: The imports of coal into Hamburg have been in July:—

From	1913. Tons.	1912. Tons.
Northumberland and Durham...	257,111	362,023
Yorkshire, Derbyshire, &c. ....	78,414	63,787
Scotland .....	93,800	125,825
Wales .....	9,833	9,067
Coke .....	—	109
Total .....	439,158	560,811

*The Half-year's Production of Fuel.*—The following table shows the output of coal, coke, &c., during June and the first half of the present year:—

	June.		January-June.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	13,888,848	15,929,858	84,706,380	93,577,987
Lignite .....	6,217,498	6,858,699	39,430,142	41,900,158
Coke .....	2,315,426	2,610,818	13,154,682	15,944,237
Coal briquettes .....	426,025	490,067	2,188,763	2,878,665
Lignite ditto .....	1,508,075	1,727,160	9,123,691	10,303,617

The next table shows the production of coal and coke in the half-year according to districts:—

	Coal.		Coke.	
District.	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Prussia—				
Breslau .....	22,785,638	22,810,370	1,431,306	1,474,881
Halle .....	4,117	4,486	59,384	79,167
Clausthal .....	418,562	472,740	41,754	42,691
Dortmund .....	47,633,634	55,111,473	10,329,449	12,328,049
Bonn .....	9,196,067	10,145,333	1,817,514	1,939,926

Total .....	80,438,018	88,544,402	13,679,407	15,864,714
Bavaria .....	394,540	399,076	—	—
Saxony .....	2,562,000	2,723,419	29,743	33,093
Alsace-Lorraine .....	1,711,822	1,911,090	45,532	46,430

Of the total output of lignite in the six months, 9,785,101 tons were produced in the Bonn districts, 22,358,414 tons in the Halle district, 3,014,759 tons in Saxony, 1,132,310 in the Breslau district, 913,052 tons in Bavaria, 555,342 tons in the Clausthal district, and 4,141,180 tons in districts other than those enumerated above.

In the Dortmund district, 2,471,830 tons of briquettes were produced, and in the Breslau district 243,690 tons.

The next table shows the net consumption of fuel in Germany in the six months:—

	Coal.		Lignite.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Output .....	84,706,380	93,577,987	39,430,142	41,900,158
Imports* .....	4,538,826	5,364,127	3,685,486	3,601,407
Exports* .....	19,176,907	21,836,212	584,553	98,034
Consumption .....	70,083,299	77,105,902	42,531,075	44,503,531

\* Including coal the equivalent of coke and briquettes.

*Exports and Imports of Fuel.*—The following table shows the exports and imports of fuel during the six months ended with June:—

	IMPORTS.			
From	1911. Tons.	1912. Tons.	1913. Tons.	
Coal—				
Belgium .....	196,460	189,193	139,101	
France .....	—	2,253	5,907	
Great Britain .....	4,531,117	3,497,244	4,379,817	
Netherlands .....	257,528	261,112	246,248	
Austria-Hungary .....	256,448	235,620	251,098	
Russia .....	156	—	—	
Other countries .....	4,063	541	3,291	
Total (coal) .....	5,245,772	4,188,943	5,028,462	
Lignite .....	3,580,413	3,583,304	3,502,911	
Coke .....	296,855	265,669	253,542	
Coal briquettes .....	55,664	26,392	11,535	
Lignite briquettes .....	55,079	61,927	59,694	

	EXPORTS.			
To	1911. Tons.	1912. Tons.	1913. Tons.	
Coal—				
Belgium .....	2,206,667	2,539,294	2,868,070	
British ports in the Mediterranean .....	—	14,260	21,752	
Denmark .....	60,533	132,724	101,875	
France .....	1,378,480	1,500,289	1,589,405	
Greece .....	35,645	23,667	34,156	
Gr. at Britain .....	—	56,073	5,680	
Italy .....	300,092	407,530	456,599	
Netherlands .....	2,714,015	3,100,786	3,521,303	
Norway .....	9,008	52,084	4,091	
Austria-Hungary .....	4,185,207	5,333,143	5,563,233	
Roumania .....	15,370	28,790	86,668	
Russia .....	556,051	712,286	821,413	
Finland .....	—	1,346	7,725	
Sweden .....	7,486	37,246	84,766	
Switzerland .....	671,951	751,712	778,168	
Spain .....	37,222	84,425	126,610	
Portugal .....	26,232	2,855	8,330	
Egypt .....	63,344	41,843	40,275	
Algeria .....	30,417	59,241	37,884	
Dutch Indies .....	—	12,942	—	
Argentine Republic .....	11,113	17,157	13,023	
Bunkers (foreign vessels) .....	82,599	167,764	152,601	
Various countries .....	23,470	22,089	45,060	
Total (coal) .....	12,614,952	15,099,546	16,368,690	
Lignite .....	27,752	25,807	30,464	
Coke—				
Belgium .....	241,507	279,617	533,173	
Denmark .....	13,728	22,609	28,131	
France .....	900,590	930,409	1,358,864	
Greece .....	13,730	10,335	12,550	
Italy .....	55,920	84,141	89,805	
Netherlands .....	102,257	131,019	146,575	
Great Britain .....	2,772	5,762	4,830	
Norway .....	18,215	22,428	20,912	
Austria-Hungary .....	361,743	453,592	543,176	
Roumania .....	2,022	6,475	8,577	
Russia .....	109,456	161,928	238,396	
Finland .....	—	1,747	4,961	
Sweden .....	39,203	82,380	82,313	
Switzerland .....	138,804	142,788	174,058	
Servia .....	10,088	3,990	8,857	
Spain .....	—	20,071	18,322	
Japan .....	6,742	5,709	4,295	
Chile .....	23,965	35,245	70,413	
Mexico .....	33,250	19,94	26,168	
Peru .....	—	2,661	—	
U.S.A. .....	6,345	14,553	10,815	
Australia .....	255	3,188	4,597	
French Oceania .....	—	7,264	5,655	
Other countries .....	19,166	8,461	9,729	
Total (coke) .....	2,102,758	2,457,666	3,405,202	
Coal briquettes .....	877,437	1,007,071	1,197,695	
Lignite briquettes .....	230,556	253,975	439,805	

Imports during June were as follows:—Coal, 957,279 tons, as against 1,191,186 tons in June 1912; Lignite, 591,745 tons (648,993 tons); coke, 18,392 tons (44,968 tons); coal briquettes, 2,502 tons (4,245 tons); lignite briquettes,

7,825 tons (8,694 tons). Imports of British coal in June amounted to 852,693 tons, as against 1,048,296 tons in the corresponding month of last year. Exports in June were as follow:—Coal, 2,681,039 tons (2,076,699 tons); lignite, 4,391 tons (2,684 tons); coke, 536,364 tons (248,865 tons); coal briquettes, 174,115 tons (138,005 tons); lignite briquettes, 65,145 tons (26,262 tons). The main increases in exports of coal were to Belgium, the Netherlands, Austria-Hungary, and Russia; there was also a large increase in the exports of coke to Belgium, France and Austria-Hungary.

*Ruhr Coal Market.*—There is again very little new to report. The falling-off in the coal trade is undeniable, being due to the incipient general industrial depression. In the coke market especially the output capacity of the cokeries has increased out of proportion to the demand, and as the result stocks are assuming large proportions. A change has also taken place in the export market, for though Holland and Northern France are still taking large quantities, these are less than usual. In Belgium the unsatisfactory condition of the local iron industry has greatly affected the demand for coal; but in other export markets the decline is less marked, and English competition is not doing much harm, the prices asked being too high. In South Germany, owing to the favourable state of the river, larger consignments have been received of late, and business has been rather more active, but not enough to absorb the oncoming supplies, so that stocks are again increasing.

## Russia.

The Ekaterinoslav Chamber of Commerce, in a report on the prevailing high price of fuel in Russia, attributes the rise mainly to the increased cost of production, estimated at from 2 to 2½ kopeks per pound. Thus the cost of labour, nominally 3 kopeks per pound of coal raised, has risen to 4½ kopeks, whilst every description of colliery stores has also increased in price. At the same time, the more rigid requirements in regard to inspection, safety, hygiene and housing have sensibly added to the cost; further, the efforts of the railways to beat down prices without regard to the cost of production have resulted in individual consumers having to pay considerably more for their fuel than they otherwise would. The Chamber do not consider that the abolition of the import duties on foreign coal will have much effect on the market, as the prices are regulated largely by the nature of the demand; nor can concessions in railway rates benefit more than a limited number of consumers. Efforts, it is thought, should be concentrated on the reduction of the cost of production, the improvement of credit, and the construction of mineral railways.

## IRON AND STEEL INSTITUTE.

## Brussels Meeting.

The autumn meeting of the Iron and Steel Institute will be held at the Palais des Académies, Brussels, on Monday, Tuesday, Wednesday and Thursday, September 1 to 4, 1913.

The following is the list of papers that are expected to be submitted:—

Armand Basr (Liège): "Reinforced Pile Foundations for Blastfurnaces."

Prof. E. D. Campbell and F. D. Haskins (University of Michigan): "Some Experiments on the Effect of Heat Treatment on the Colormetric Test for Carbon in a 0.32 Carbon Steel."

Prof. A. Campion and J. M. Ferguson (Glasgow): "A Method of Preparing Sections of Fractures of Steel for Microscopic Examination."

Baron E. Coppée (Brussels): "The Manufacture of Coke in Belgium."

General L. Cubillo (Madrid): "The Manufacture of Armour-piercing Projectiles."

Otto Frick (Beckenham, Kent): "The Electric Refining of Steel in an Induction furnace of special type."

Emil Gathmann (Baltimore): "Commercial Production of Sound Steel Ingots."

Gevers-Orban (Liège): "The Distillation of Tar in Metallurgical Practice."

E. Houbaer (Liège): "The Use of Coke-oven and Blast-furnace Gases in Metallurgy."

Prof. H. Hubert (University of Liège): "Present Methods of Testing, with Special Reference to the Work of the International Association for Testing Materials."

Baron E. de Lavoley (Brussels): "An Historical Survey of the Metallurgy of Iron in Belgium."

F. Rogers (Sheffield): "So-called 'Crystallisation through Fatigue.'"

Prof. A. Sauveur (Cambridge University, U.S.A.): "The Allotropic Transformations of Iron."

Dr. J. E. Stead (Middlesbrough): "A New Method for the Determination of the Critical Points  $A_1$  and  $A_2$ ."

Dr. J. E. Stead (Middlesbrough) and Prof. H. C. H. Carpenter (Manchester): "The Crystallising Properties of Electro-deposited Iron."

Benjamin Talbot (Middlesbrough): "Modern Open-hearth Steel Furnaces."

Gustave Trasenster (Ougrée, Belgium): "The Use of Oxygen in Blastfurnaces."

C. Vattier (Valparaiso): "Note on the Principal Deposits of Iron Ore in Chile."



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## MINING AND OTHER NOTES.

Young's Oil Company have introduced electric pumping plant into their coalmines at Westmains, West Calder. The oil company is now securing a large output of coal from the coalmines to supply their Addiewell works and shalemines. The new retorts at Addiewell, which will deal with 300 extra tons of shale per day, are almost completed, and will be in operation in a few weeks' time. This will greatly increase the oil output of the Addiewell works.

An explosion occurred on the 2nd inst. in the Brookside mine of the Reading Iron and Coal Company, at Tower City, Pennsylvania. Eighteen miners were killed, and over 40 have been seriously injured. Those rescued from the mine state that the disaster was caused by a premature explosion, and that this was immediately followed by an explosion of gas.

Interesting reports were submitted to the monthly meeting of the South Staffordshire Mines Drainage Commissioners, held at Dudley on Wednesday. Reporting on the works of the Tipton district, Mr. E. Howl stated that the rainfall during five weeks had been 1'34 in. The pumping had been 13,303,800 gallons per 24 hours, compared with 14,056,000 the previous month, and 10,468,600 in the corresponding period last year. This was a decrease of three-quarters of a-million gallons per day as compared with the previous month. The water pumped still exceeded all records for the last 25 years, with the exception of May and June last. The three engines in the Moat pound working at full speed had not yet been able to lower the water to any material extent. Tanking at Castle Mill had been continued during the month for eight hours per day to prevent water coming over from the limestone into the coal measures. The plunger valves of the Deepfields engine had been successfully changed by divers. In regard to the Old Hill district, Mr. W. B. Collis stated that the water in the Cabbage Hall pound was now lower than it had been since April 1912.

In the west of Scotland among the first town-planning schemes to be put on a practical footing are those of the District Committee of the Middle Ward of Lanarkshire. In two cases recently the committee have given public notice of their intention to make application to the Local Government Board for authority to prepare schemes. The two areas proposed to be dealt with are (1) the Hamilton Road district, near Motherwell, and (2) the Shotts and Dykehead district. On account of its speedy development the local authority have concentrated their attention more particularly on the scheme for the latter area, and they have taken several important steps in furtherance of their proposals during the last month. The total area embraced in the scheme is 996 acres. Generally speaking it is an industrial area, and there has been within recent years a rapid development in the mining industry. Several new pits have been opened within a short period, and other mineral fields are in course of being developed. In several parts of the area included in the scheme difficulty has been experienced by coalmasters and by owners of public works, including the large works of the Shotts Iron Company, in obtaining workmen in view of the insufficiency of the housing accommodation. The Shotts Iron Company are at present erecting some 50 houses near their works, and the Baton Colliery Company Limited, which is operating on several mineral fields in and outside the area proposed for the town planning scheme, are in course of erecting 50 houses, and are contemplating the erection of as many more. All these houses will be within the area of the proposed scheme. The District Committee of the Middle Ward of Lanarkshire have also been devoting a large amount of attention to the general question of housing in their district. The ward is the largest county district in Scotland. Its population is about 205,000 and its valuation about £1,280,000. The district extends to 281 square miles, and it has a total acreage of 186,623. The number of miners and other workmen connected with the coal industry and resident within its boundaries is estimated at about 48,000. Mr. W. E. Whyte, the district clerk, has prepared an interesting report dealing with the housing question in the ward. The report, which is an extensive document, embraces information and data as to population, valuation, and housing conditions, particularly the housing conditions of the miners.

According to the report of the gas committee of the Glasgow Corporation, the average price received for residuals last year per ton of coal carbonised was 5s. 5d., as compared with 5s. 2d. for the previous year. The total quantity of coke sold was 307,178 tons, the average price received being 10s. per ton, as compared with 8s. 7d. for the previous year. The quantity of coals carbonised was 741,338 tons, as compared with 687,542 tons for the preceding year. The average price paid for coals bought last year was 11s. 8d. Contracts have been made for the supply of coals during the current year at an average advanced price of 1s. 6d. per ton. The electricity committee report that the coal bill amounted to £61,095, an increase of £20,000 over the preceding year. The contracts entered into for the supply of coal this year, show an estimated increased expenditure of £5,500. The report adds that the effect of the cheap service of electrical energy has been to create a large demand for electrical energy for power purposes. When it is considered that the generation of steam in public works

may be averaged very moderately at 15lb. coal per horse-power per hour, with all the resulting products of more or less imperfect combustion thrown into the atmosphere, and that the Corporation undertaking can generate electrical energy with a combustion of coal of 2'4 lb. per horse power, it cannot fail to be seen that the increased use of electricity must have greatly improved the atmospheric conditions in the city. The number of different trades supplied by the Corporation amounts to over 120.

The Board of Trade, yielding to pressure brought to bear upon them by the North Staffordshire Chamber of Commerce, have decided to send an inspector immediately to examine and report upon the condition of the Harecastle Canal tunnel. The manufacturers and traders of North Staffordshire are gravely concerned about the condition of this tunnel, which is stated to have been so seriously affected by mining subsidences as to threaten the stoppage or the serious hindrance of water communication between the Potteries and the Mersey.

The Right Hon. Stuart, Baron Rendel, M.A., vice-chairman of Sir W. G. Armstrong, Whitworth and Co. Limited, left estate of the gross value of £652,328 11s. 8d., of which £480,169 19s. 6d. is net personalty.

On Saturday, the 23rd inst., the foundation stones will be laid of a group of 10 cottages at Gosforth, to be erected by the Northumberland Aged Mineworkers' Homes Association. When these cottages are completed, the association will have built 19 groups in different parts of the county, or 188 homes in all. There is a movement on foot whereby the good work of the association may be valuably supplemented. It has been suggested that the co-operative societies and the social clubs in the county might contribute separately towards providing a few additional cottages in districts selected by the subscribers. If, it is pointed out, the co-operative societies of Northumberland gave half a cottage each, or, in other words, the sum of £50, the number of homes for aged mineworkers would be appreciably increased. A meeting of representatives of the workmen's clubs in the county is shortly to be held, and a deputation will solicit support on behalf of the Aged Mineworkers' Homes Association.

The South Yorkshire Bar Iron Association has reduced the official minimum of bars 10s. per ton, making the price £8 10s. per ton. This is due mainly to the falling off in the orders for railway material.

Boring operations are said to be in progress on Lord Howe's estate, in the neighbourhood of Great Missenden, Bucks.

Prof. Archibald Barr, D.Sc., the occupant of the Regius Chair of Civil Engineering and Mechanics in the University of Glasgow, having completed 24 years of tenure of that office, has intimated his intention to retire. The appointment of a successor in the chair is in the gift of the Crown.

In the House of Commons, on Tuesday afternoon, Mr. Thomas Richardson asked the Secretary of State for the Home Department whether he was aware that agents in this country had been inducing Durham miners to leave their employment in this country for work in the mines at Vancouver, British Columbia, on the strength of a statement that there was no dispute there, and that conditions were normal; that when the men arrived at Vancouver they found that a dispute was in progress, and being unwilling to act as strikebreakers they found themselves stranded; whether he had any power to prevent such misrepresentation, and if not, whether he proposes to secure such power. Mr. McKenna said he had no information, but if the hon. gentleman would be good enough to furnish him with particulars he would cause enquiries to be made. To induce a person to emigrate under a false representation was, he added, an offence under the Merchant Shipping Act.

Suggestions for a composition scheme having come to nothing, the estate of Mr. F. W. Tannett-Walker, engineer, of Leeds, has gone into bankruptcy. Debtor was head of the engineering firm of Tannett-Walker and Co., of Hunslet, which is now in liquidation, and the original statement of his affairs showed liabilities of £85,295, and assets £1,602.

At the 203rd half-yearly ordinary general meeting of the Gas Light and Coke Company, Sir Corbet Woodall (the governor) again referred to the price of coal. He said they had sold 432 millions of cubic feet more than in the corresponding half of 1912, and after making the usual contribution to special funds, their income was just sufficient to provide dividends. Their coal bill was higher by £257,411, which even when credited with £30,113, the reduced cost incurred in the making of carburetted water gas, considerably exceeded the total of their gains. Contracts for the supply of coal extending over the next twelve months had been made at prices materially higher than those paid last year. Their estimate for the year was that these contracts would involve an additional expense of about £175,000, and, according to present indications, there was not likely to be any considerably increased credit on account of residuals. But he would be greatly surprised if the price of coal did not show a considerable reduction by the time the present contracts had expired.

Mr. J. U. Ridley, head engineer of the Sherburn and Sherburn House collieries, has been presented with handsome testimonials, consisting of a gold-mounted walking stick and a gold presentation ring, upon the occasion of his resignation of his work at Sherburn.

The Carnegie Hero Fund trustees have made the following awards:—Hon. certificate to Thomas Thompson, miner, of Ryeofoft, Rawmarsh, near Rotherham, who on April 3, 1913, succeeded in extricating a workman who had been buried under a fall of roof in the Swinton Common Colliery, Yorks: hon. certificates to Arthur Bernard Hewitt, manager; Albert Henry Cooper, under-manager; and George Thompson, stallman, all of Markham Colliery, Chesterfield, on January 8, 1913, who risked their lives to rescue three men who were buried beneath a large fall; assistance to the widow of Alfred Sykes, by-workman, Houses Hill, Kirkheaton, who lost his life in attempting to rescue a deputy at Lodge Mill Colliery, Lepton, Huddersfield, on January 28, 1913; and hon. certificates to Thomas Chatterton and Albert Schofield, who went to Sykes' assistance. All of the above have been awarded the Edward Medal of the second class.

Mr. William Beveridge, of Fife, a director of the Fife Coal Company Limited, and on the Edinburgh Board of the Commercial Union Assurance Company Limited, who died at Cannes on April 2 last, left, in addition to real estate, personal estate in the United Kingdom valued at £216,412, of which his interests in the Fife Coal Company Limited amounted to £80,680.

Members of the North of England branch Association of Mining Electrical Engineers recently paid a visit of inspection to Murton Colliery.

Mining developments are taking place at Hucknall, Notts. New headstocks are being erected at No. 2 Colliery there, in anticipation of tapping a new seam of coal, which, it is expected, will give a further lease of life for the mine.

As the result of a conference with representatives of the managers of collieries in East Kent, the Kent Education Committee have decided to establish classes in elementary coalmining and gas-testing at Dover, Eythorne and Nonington. It is understood that a sum of £40 will be contributed on behalf of the collieries towards the cost of the classes for the first year, and that a similar amount will be contributed in respect of a second year, should the classes be continued.

The Earl of Bradford is opening out the Plodder seam at his Manchester-road, Great Lever, Bolton, collieries, and other developments in the shape of tapping other seams are contemplated there.

The Chamber Hall Colliery Company are opening out new seams at their collieries in the Audenshaw district, near Ashton-under-Lyme.

An invention by Mr. C. Wood, solicitor, Kirkcaldy, having for its object the prevention of accidents by runaway hutches in mines, has just been tested in the Paunie Pit, Kirkcaldy. The appliance is not costly, and consists of a small beam of wood attached longitudinally to the roof at some distance down the incline, and connected with a wire to the top of the brae. In the event of a runaway, the man at the top of the incline has simply to pull the wire, when the timber drops and prevents the hutches from proceeding further. Tests were made on an incline of one in five, and 10 hutches were released at the top of the incline, 20 yards from the beam. These hutches were effectively stopped without doing any damage. It should be mentioned that tests made with single hutches were equally effective.

A meeting of the Hulton Colliery Explosion (1910) Relief Committee has been held at Bolton. The secretary reported that there was a further contribution to the fund of £15 1s. received from the Mayor of Chester. It was announced that the Mayor of Bolton had exercised the power vested in him by the deed of declaration of trust and nominated Mr. Arthur Tipping Crook, of Bolton, as member of the committee to fill the vacancy caused by the death of Mr. William Brimelow. The mayor also nominated Ald. Edward Challinor, Southport, as a member of the general committee to fill the vacancy caused by the resignation of Mr. F. Burrows, and the mayor was appointed a member of the sub-committee in place of Mr. Burrows. The statement of cases submitted showed that 32 widows had gone off the fund through death or re-marriage, and 69 children under 14 through commencing work, death, or attaining the stipulated age. Five children over 14 years of age placed on the fund for some special purpose had also gone off, as well as 13 fathers, mothers, &c., on account of death, re-marriage, or other causes. This now left 516 persons dependent upon the fund. Sir William B. Bowring, Bart., was elected on the special sub-committee that was appointed to consider the question of dealing with any surplus left over from the fund.

An interesting ceremony took place on the 31st ult., when the first sod was cut of the new shaft for the Lowmoor Colliery, Kirkby-in-Ashfield, belonging to the Butterley Company Limited. Among those present were Mr. A. Leslie Wright, managing director of the Butterley Company Limited, Miss Wright, Miss Joan Wright, Mr. H. Eustace Mitton (mining engineer for the company), Mrs. Mitton, Mr. Bircumshaw (mining agent), Rev. and Mrs. Hodges, and the colliery managers and leading officials of the company and their wives. In asking Miss Wright to perform the ceremony, Mr. Mitton presented her with a silver spade suitably inscribed, from the officials of the Lowmoor and Kirkby Collieries. Mr. A. Leslie Wright replied on behalf of his daughter, and hoped the undertaking would prove a success for the inhabitants of Kirkby



and the Butterley Company. Afterwards tea was served in the offices and the guests inspected the surface electric machinery, which includes a large power house with mixed pressure turbine, &c. The seam to be developed at the new shaft is the Deep Soft, which has recently been proved by deepening one of the existing shafts at Kirkby. Powerful winding engines, boilers, steel headgear and other plant have been ordered, and the colliery is to be equipped on modern lines. A telegram was received from the chairman of the Butterley Company Limited during the afternoon, wishing best success to the Lowmoor Colliery and all connected with it.

Notwithstanding that Bogfield Colliery, Carmyle, Lanarkshire, has been thrown idle in consequence of a somewhat alarming surface fire last week, the management have decided to proceed with the sinking operations which have been going on for some time past. The pit is being sunk to reach a seam of virgin coal, which, when opened, will provide employment for additional miners.

The underground and surface workers of Messrs. William Dixon's Limited High Blantyre Collieries, Lanarkshire, have presented Mr. John Fraser, one of the officials, who has retired after a period of active service extending over 40 years, with a handsome aneroid barometer and a purse of sovereigns.

At a meeting of the directors of the Lamplugh Iron and Steel Company Limited, at Whitehaven recently, Mr. Fergus Watson, of Fairfield Rigg, Eskdale, was appointed chairman of the company.

The Brampton branch railway between Brampton Town and Brampton Junction, on the Newcastle and Carlisle line, was opened at Brampton last week by Lady Cecilia Roberts, in the presence of a large gathering.

The Ayr District Committee of Ayr County Council have had before them an application by Messrs. William Baird and Co. for the approval of plans of 136 miners' houses proposed to be erected at Auchinleck. It is proposed to build 104 two-roomed houses and 32 three-roomed houses in four rows of 26 houses each, and two rows of 16 houses each. There will be small garden plots shown at the front and large clothes greens at the back of the houses. The Local Government Board inspector stated that though the houses were to be constructed according to the building by-laws, they perpetuated the old continuous row system. The colliery companies who had built houses in the last two years had seldom erected more than eight houses in a row, and had provided one w.c. for each house. It had been found, too, that the common washhouse for six families was objectionable for various reasons. The plans were passed.

According to statistics compiled by the *Investors' Guardian* the company registrations in England during the first half of the present year, connected with the coal and fuel trades, represented a total capital of £3,969,508, as compared with £2,718,220 in the first half of 1912, and £2,218,632 in the first half of 1911. One of these was the Consolidated Cambrian with a capital of two millions.

A new coasting coal charter is being prepared by the Documentary Committee of the Chamber of Shipping, for the Irish Channel trade, with particular application to the Clyde and the Mersey ports, both inclusive. The charter only differs from that now in force on the East Coast in that it has been framed to suit the local conditions applying in the West Coast trade, and it is hoped that at an early date a conference with the shippers will be held to come to an agreement, upon which the new form of charter will be formally adopted.

A local correspondent says the blastfurnaces in connection with the Partington Steel and Iron Works at Irlam on the ship canal are at present undergoing the "airing process," and it is expected that several of the furnaces will shortly be in full swing. A private company has just obtained the necessary land, and entered into arrangement with the Partington Steel and Iron Company for the purchase of the slag from the blast furnaces at their new works, which it is intended to prepare and use for filtering media at sewage disposal works and other purposes.

The "direct" process of recovery of by-products from coke ovens is being extensively adopted for old plants, in addition to the many new installations being erected. Simon-Carves Limited, of Manchester, are very busy in this direction, having at the present time several such plants in course of construction, the principal among which may be mentioned for the Shelton Iron and Steel Company Limited, Stoke-on-Trent, where an extension of 35 ovens is being erected with the Simon-Carves "direct" process to treat the gases from 100 ovens; Maltby Main Colliery, Rotherham, 60 ovens; Middleton Estate Colliery, Leeds, 32 ovens; Waleswood Collieries, Sheffield, 30 ovens; Wombwell Main Collieries, Barnsley, 50 ovens, in conjunction with all of which the new process is being adopted.

Mr. Alex. Hunter, Lochgelly, and Mr. Alex. Watson, Cowdenbeath, have each been awarded a Special Studentship for Teachers of Science and Technology. The studentship carries with it free attendance at classes at the Imperial College of Science and Technology, London, and £60 a year maintenance allowance and a free railway fare from London once a year. The studentship was awarded in the first instance for one year, but may be renewed for a second year.

An inrush of water occurred during the holidays at East Tanfield Colliery, the Brockwell seam being completely flooded out.

In presence of Mr. Augustus Carlow, Mr. Beveridge, and others, the huge fan recently erected at the Mary Colliery, Lochore, was recently set in motion.

### THE FREIGHT MARKET.

Bank Holiday has interrupted the normal course of the outward freight market this week, and such holidays appear increasingly difficult to be recovered from by business men. Hence, the amount of chartering done has been much less than should have been represented by a working week out of which one day only had been taken. On the north-east coast, coasting business is based on about 3s. 3d., Tyne to London, although 3s. 9d. has been paid for a small boat. Hamburg is listed at from 3s. 6d. to 3s. 9d., and Havre at from 4s. 6d. to 5s. The Baltic is based on from 5s. to 5s. 3d. to Cronstadt, and the Bay on 6s. to Bordeaux. The Mediterranean has been done at from 8s. 6d. to 8s. 9d. to Genoa. At South Wales, fixtures are very small in number and rates are easier. The Clyde and Humber are dull. Homewards, a fair volume of business has been done. The East Indies are firm. The Black Sea is steady, but rather slow. America is steady and active. The River Plate is firmly maintained at late rates. The Mediterranean and ore trades are quiet and unchanged, as is also the Baltic.

Tyne to Boulogne, 1,000, 5s.; Brest, 2,200, 5s.; Bari, 3,000, 9s. 9d., 400; Catania, 3,000, 10s. 6d., 500; Civita Vecchia, 3,000, 10s.; Cronstadt, 2,000, 5s. 3d.; 5,000, 5s.; 2,500, 5s. 3d.; E combrera, 3,000 11s. 6d. coal, 14s. 6d. coke; Genoa, 6,100, 8s. 6d.; 3,700, 8s. 6d.; 5,100, 8s. 9d.; Hamburg, 2,800, 3s. 6d.; 2,000, 3s. 9d., from Dunston; 1,750, 3s. 9d.; Helsingfors, 1,800, 5s. 6d.; Havre, 1,000, 5s.; 2,000, 4s. 6d.; Kotka, 1,100, 6s. 3d.; Kiel, 2,000, 5s.; Lubeck, 2,300, 5s., from Dunston; London, 1,200, 3s. 9d.; Marseilles, 2,600, 9s. 1½d., 500; 4,200, 8s. 3d., 600, from Dunston; Malta, 5,000, 7s. 3d.; Manager, 1,500, 5s. 3d.; Naples, 4,900, 8s. 3d., 800; Oran, 2,900, 8s. 6d.; Porto Vecchio, 5,800, 9s., 500; Rochefort, 2,700, 6s., 500; Rouen, 2,000, 5s.; Rotterdam, 1,700, 3s. 4½d.; Reval, 2,600, 5s.; Stockholm, 1,600, 5s. 3d.; Savona, 3,700, 8s. 6d.; Trieste, 4,700, 9s. 6d.; 5,700, 9s. 6d.; Wyburg, 800, 6s. 3d.; 1,100, 6s. 3d.

Cardiff to Algiers, 3,500, 9 fr.; 3,200, 9 fr., August 13; Barcelona, 2,600, 9s.; Brest, 320, 4s. 6d.; Caen, 720, 5s. 4½d.; 1,000, 5s.; Constantinople, 4,700, 10s. 6d., August 10; 5,000, 10s. 6d.; Copenhagen, 1,000, 6s., August 9; Campana, 19s. 9d.; Dover, 800, 3s. 6d., Admiralty; Genoa, 4,500, 8s. 3d.; 5,500, 7s. 9d.; 4,200, 8s.; Gaeta, 4,000, 9s. 6d., 400, August 18; Gibraltar, 3,300, 7s. 9d.; Helvoetsluis, 1,100, 5s. 3d.; Islands, 4,700, 8s. 9d., second half of August; Lisbon, 2,000, 7s. 3d., 500; 1,800, 7s., 350; 2,700, 7s., 500, 7s. 3d., 350, August 9; London, 850, 4s. 4½d.; Leghorn, 4,200, 8s.; Las Palmas, 4,700, 8s. 9d.; 4,200, 8s. 9d.; Malta, 3,600, 6s.; Monte Video, 18s. 6d., August 11; Port Said, 4,900, 8s. 6d., August 13; 4,400, 8s. 6d.; River Plate, 4,500, 19s. 3d.; 6,500, 19s. 3d., mid-August; 3,700, 19s. 3d., mid-August; 5,700, 19s.; 18s. 6d., August 13; Rosario, 4,800, 20s.; Rio de Janeiro, 16s. 3d., early August; Savona, 4,500, 8s. 3d.; 4,200, 8s.; St. Servan, 4s. 9d.; 1,000, 5s.; Stockholm, 1,400, 6s. 3d.; St. Nazaire, 2,300, 6½ fr.; Simonstown, 5,600, 16s. 6d., Admiralty; Shanghai, 2,500, 20s., August; Taranto, 5,000, 8s. 6d.; Teneriffe, 4,200, 8s. 9d.; Venice, 5,000, 9s. 7½d.; Villa Constitucion, 19s. 9d.

Swansea to Venice, 3,200, 10s. 6d.; 5,400, 10s. 9d.; 5,000, 10s. coal, 10s. 9d. fuel; Catania, 2,200, 10s. 6d.; Torre Annunziata, 2,800, 9s.; 9s. coal, 9s. 9d. fuel; Havre, 1,300, 4s. 9d.; Rouen, 2,200, 5s. 3d.; 650, 5s. 9d.; 1,200, 5s. 9d.; Fiume, 3,000, 10s. 3d., 400, 8d.; Melilla, 15s., coal and fuel; Naples, 9s. coal, 9s. 9d. fuel; Caen, 600, 5s. 6d.; Piræus, 1,100, 10s.; Genoa, 4,800, 8s. 6d., August 11; 3,800, 9s., August 11; Savona, 4,800, 8s. 6d., August 11; La Rochelle, 1,000, 7 fr.; St. Nazaire, 2,200, 6½ fr.; Rotterdam, 500, 5s.

Hartlepool to Hamburg, 2,200, 3s. 9d.

Amble to Stavanger, 1,500, 5s. 3d.

Antwerp to Delagoa Bay, sail, 72s. 6d.; Buenos Ayres, sail, 19s. 3d.

Hull to Port Said, 5,400, 8s. 9d.; Cronstadt, 3,000, 4s. 10½d.; 6,000, 4s. 9d.; Riga, 2,700, 4s. 10½d.; 3,000, 5s.; 1,600, 5s.; Bandholm, 1,300, 5s. 3d.; 1,800, 5s.; Nakskov, 1,050, 5s.

Immingham to Pernau, 1,600, 5s.

Port Talbot to Rouen, 2,200, 5s.

Rotterdam to Algiers, 6,000, 9½ fr., 600, 1s.; Port Said, 7s. 9d.; 8s. 9d., August 13; Barcelona, 5,000, 9s., August 9; Puerto de Mazaron, 2,600, 12s. 6d., coke, August 20; Havre, 1,400, 5s.; Huelva, 5,400, 8s., 300; Ergasteria, 1,500 tons steam coals 10s., 2,600 tons coke 12s. 3d.; Dieppe, 1,350, 4s. 10½d.; St. Nazaire, 3,400, 6s., Trignac terms; 3,600, 5s. 10½d., August 18; 3,300, 5s. 10½d., steam coals, 6s. 7½d. fuel; Marseilles, 5,200, 10 fr., 600, 9½ fr., 900, 500 tons coke same freight, August 18.

Emden to Malta, 5,400, 7s. 6d.; Bordeaux, 2,500, 6s.

Glasgow to Alexandria, 9s. 6d., coal, &c.; Buenos Ayres, 19s. 6d., 200, early August; Gaeta, 10s. 1½d.; Cronstadt, 2,000, 5s. 4½d.

Newport to Taranto, 2,100, 10s.; Cronstadt, 2,900, 6s.; River Plate, 5,500, 19s., mid-August.

Wear to Christiania, 850, 5s. 6d.; Wiborg, 850, 6s. 3d.; Kotka, 850, 6s. 3d.

Goole to Devonport, 600, 5s. 3d.

Bo'ness to Bandholm, 900, 6s.

Wales to Monte Video, sail, 16s. 3d.; 16s.

Fife port to Kiel, 2,000, 5s. 4½d.

Blyth to Catania, 2,200, 10s. 6d.

Sharpness to Rouen, 1,300, 5s. 6d.; 1,300, 5s. 3d.

Forth to Kiel, 5s. 4½d.

Port Talbot to Simonstown, 5,500, 16s. 6d.

Grangemouth to Cronstadt, 5,800, 4s. 10½d.

Homeward charters:—Azof, 5,900, basis Rotterdam 12s., with 3d. less barley, ppt.; 5,000, basis Rotterdam 12s., with options, August 8-20; 6,800, Rotterdam 12s. 3d., Emden or Weser 12s. 6d., Hamburg 12s. 9d., with 3d. less barley, completing outside 1s. 6d. less, August 10; 4,200, Rotterdam 12s. 6d., Emden or Weser 12s. 9d., Hamburg 13s., with 3d. less barley, August 15; 5,000, basis Rotterdam 13s., with 3d. less barley, days, August 10; 7,200, basis Rotterdam, 12s. 9d., with 3d. less barley, August 5; 3,800, West Italy basis 14½ fr., with options of Spanish, Mediterranean and

Adriatic at proportionate figures, September; Kherson, Nicolai-eff or Odessa, 6,200, London or Rotterdam 11s. 6d., Hamburg 12s., August 18; 4,100, Rotterdam 11s., Hamburg 11s. 6d., August 5; Nicolai-eff, 8,700, Marseilles or Genoa, 12½ fr., August; 6,800, basis Rotterdam 11s., August 8; Novorossisk, 3,900, Weser, 11s. 6d., with 3d. less barley, spot; M. j., 6,300, Bombay, 11s., September-October; Calcutta, 2,370 net, Singapore and/or Penang, Rs. 5 4 one port, Rs. 5 8 both ports, August; Gulf, 1,763 net, Pola and Venice, 150s., September; 25,000 qrs., 10 per cent., Antwerp or Rotterdam 3s. 6d., Hamburg 3s. 7½d., August-September; Sapelo, 1,100 stds., United Kingdom-Continent, 101s. 3d. one port, 103s. 9d. two ports, August-September; San Lorenzo, 6,400, 10 per cent., Rotterdam, 16s. 4½d., August; 5,700, 10 per cent., 18s. 4½d., no reduction direct, August; 4,600, 10 per cent., United Kingdom-Continent, 18s. 6d. o.c., less 6d., August-September; 5,000, 10 per cent., 20s. o.c., less 6d., August 16; 5,000, 10 per cent., 20s. o.c., no reduction direct, option Denmark, 2s. extra one port, 2s. 6d. two ports, 3s. three ports, ppt.; Huelva, 4,000, Trieste, 7s. 6d. f.o.b., early August; Seville, 1,500, Rotterdam, 7s. 6d., ppt.; Bilbao, 2,600, Middlesbrough, 5s. 3d., ppt.; 3,500, 5s. 3d., August 12; 3,600, Antwerp, 5s. 6d., ppt.; 1,800, Stock on, 5s. 7½d., ppt.; 3,500, Calais, 5s. 3d., ppt.; Santander, 2,500, Rotterdam, 5s. 10½d., ppt.; 1,850, 6s., ppt.; Gulf timber port, 1,500 stds., 165s., River Plate, September-October; Kohsichang, 7,200, 26s. 6d. o.c., ex London and France; Bombay, 8,500, United Kingdom-Continent, two ports, 24s. on d.w. on d.w., option Dunkirk same rate, mid-August; 2,440 net, 24s. on d.w., two p.p., August; 5,000, 24s. p.p., option Dunkirk same rate, on d.w., August; Kurrachee, 2,914 net, Antwerp, 18s. 3d., part light guaranteed, August; Pensacola, 700 stds., 10 per cent., Rotterdam, 105s., August; Baltimore, 30,000 qrs., 10 per cent., Rotterdam 2s. 9½d., Antwerp 2s. 11½d., August; Buenos Ayres or La Plata, 6,000, 10 per cent., United Kingdom-Continent, 16s. 6d., no reduction direct, August 10; San Nicolas, 6,300, 10 per cent., Belfast, 18s., August; Algiers, 3,400, Cardiff, 5s., ppt.; Barreiro, 1,800, Rotterdam, 7s., mid-August; San Francisco, sail, 39s., United Kingdom-Continent; Savannah, 50s., United Kingdom-Continent; Novorossisk or Theodosia, 5,800, Rotterdam 11s., Hamburg 11s. 6d., with 3d. less barley ppt.; 5,800, Rotterdam, 10s. 9d., no reduction, 6d. extra if both loading, August 8-20; Archangel, 1,000 stds., Bristol Channel, 53s., d.b. and b., August; 1,000-1,200 fathoms, Cardiff, 52s., props, August; Newcastle, N.S.W., sail, to West Coast South America and home to United Kingdom-Continent, 48s. in and out, 48s. 6d. always stiffened; 21s. 6d. direct nitrate ports, ex Junin; Fredrikstad, sail, 18s. 6d., Buenos Ayres, setts; time charter, States and West Indies, 6s. 6d. one trip, delivery Cuba, re-delivery north of Hatteras; 1,745, £700, seven months, delivery West Indies, re-delivery United States; time charter, States-Gulf round, delivery and re-delivery United Kingdom-Continent, 4s. 9d.; time charter, States and River Plate trade, 7,800, 6s. 6d., one trip, delivery New York, re-delivery River Plate; Miramichi, 1,200 stds., Plymouth, 58s. 3d.; New Orleans or Galveston, 25,000 qrs., Antwerp or Rotterdam 3s. 6d., Hamburg, 3s. 9d.; Eupatoria, 3,800, West Italy, 13 fr. one port, 13½ fr. two ports, mid-August; Rosario, 18s. 6d., Bristol Channel, no reduction direct; Meji, 3,149 net, Colombo 9s., August; Calcutta, 2,357 net, United Kingdom-Continent, p.p., about 12s. 6d., jute basis, end August; Port Arthur, 33 c., Australia, four ports, August-September; San Juan, 1800, Rotterdam, 7s. 7½d., end August; Villa Constitucion, 7,200, 10 per cent., United Kingdom-Continent, p.p., 19s., no reduction direct, option full cargo below bar 3s. less, ppt.; Rivasdella, 700, Rotterdam, 8s. 9d., ppt.; Puget South or Portland, Or., 2,786 net, United Kingdom-Continent, 38s. 9d.

**London County Council Coal Contracts.**—In the annual report of the London County Council for 1912, the Stores and Contracts Committee refers as follows to the contracts for coal and coke:—Under the reorganisation scheme of 1909, the arrangements for the supply of coal and coke are made by the Stores and Contracts Committee. The estimated requirements for the year 1912-13 were 258,490 tons of coal and 20,340 tons of coke. Of the coal required 150,000 tons were steam coal for the Greenwich electricity generating station of the Tramways Department. The remainder represented the general requirements (steam, house and kitchen coal and coke) for the pumping stations, sludge boats, schools, fire-stations, tramway depôts, parks, offices, &c. In 1911 the Council decided, as an experiment, to make arrangements for obtaining direct from a colliery or collieries a portion (about 7,000 tons) of the house coal required during the year 1911-12. Tenders were accordingly obtained and a contract entered into with a colliery for the supply of 7,000 tons of coal for the schools, offices, &c., in the central part of the county, including the central offices. A contract was also arranged for the necessary cartage. On March 19, 1912, the Council decided to continue the experiment for another year and to include the steam coal required for the schools, offices, &c., in the same area. The estimated quantity of this coal was 3,800 tons, making a total of 10,800 tons. Owing to the miners' strike in the early part of 1912 and the consequent interference with supplies under contract, it was necessary to make purchases out of contract. The amount so purchased for main drainage stations, schools, offices, &c., was about 14,072 tons of coal and 738 tons of coke, and the additional cost over the contract prices was about £5,941. The new contracts entered into in July 1912 showed an average increase in price of a little over 2s. a ton. In the case of the coal for the Greenwich generating station, the contracts for which expired on March 31, 1912, 19,274 tons were purchased out of contract up to that date at an additional cost of £10,753. The invitation of tenders was postponed, and purchases after March 31, 1912, were made, as and when required, on the most advantageous terms. Ultimately, a contract was entered into on October 22, 1912, for supplies for the eight months from November 1, 1912, to June 30, 1913.



**COAL, IRON AND ENGINEERING COMPANIES.**

**Allen (Edgar) and Co. Limited.**—The directors have declared a dividend at the rate of 10 per cent. for the past year, together with a bonus of 2½ per cent.

**Anglo-Spanish Coaling Company Limited.**—This company has been registered, with a capital of £100,000 (7,500 preference shares of £10 each and 20,000 shares of £1 each), to carry on the business of colliery proprietors, coal contractors, merchants, and brokers, &c. Minimum cash subscription, seven shares. First directors: D. A. Thomas, Romulo B. Alsina, K. Park, R. Miracle, J. P. Cadogan, and E. Plisson. Qualification, £500. Registered office, Cambrian-buildings, Mount Stuart-square, Cardiff.

**Basic Carbonising Syndicate Limited.**—This private company has been registered, with a capital of £5,000 (5,000 participating preference shares of £1 each and 20,000 ordinary shares of 1s. each), to purchase an invention for the treatment of coal before carbonising to improve the yield of volatile products; also to carry on the business of colliery proprietors and coal merchants, &c. Signatories: H. Bradshaw, 2, Nevile-grove, Nottingham; and C. N. Pike, Cropwell-road, Radcliffe-on-Trent, Notts.

**Bedwas Navigation Colliery Company Limited.**—The directors, under the authority given by the recent extraordinary meeting of the shareholders, have decided to issue 5,000 6 per cent. cumulative preference shares of £5 at par to the shareholders on the books on July 26, in the proportion of one preference share for each 10 ordinary shares held.

**Birmingham Railway Carriage and Wagon Company Limited.**—The directors announce an interim dividend at the rate of 7½ per cent. per annum on the ordinary shares for the half-year ended June 30.

**Briggs (Henry), Son and Co. Limited.**—The net profits were £109,938 for the year ended June 30, and £36,230 was brought forward. Final dividends of £2 5s. per share on the A shares and £1 10s. on the B shares are recommended, making £3 and £2 per share (20 per cent.) on the respective classes for the 12 months, adding £25,000 to the reserve, writing £10,000 off investments and £5,000 off leases, and carrying forward £40,593.

**Bristol and South Wales Railway Wagon Company Limited.**—Interim dividend of 3s. per share.

**British Wagon Company Limited.**—The directors announce an interim dividend of 4s. per share on the shares with £3 paid up, and 1s. 4d. per share on the shares with £1 paid up.

**Carnforth Hematite Iron Company Limited.**—After writing down investments to the present market value, the profit for the year ended June 30 amounts to £18,023, making, with £3,546 brought forward, an available total of £21,569. The directors recommend a final dividend of ½ per cent., making 12½ for the year, absorbing £18,000, and leaving £3,569 to be carried forward.

**Consett Iron Company Limited.**—The ordinary general meeting was held at Newcastle on Saturday. Mr. Charles V. C. Henderson (chairman of the company) presided, and his report was adopted. The chairman said that, in addition to the 20s. per share (£100,000) paid in February last, they now proposed to pay a further 70s. per share (£350,000). A dividend of a similar percentage had been paid on one occasion only in the history of the company, and that was in account of the year ended June 30, 1874. At that time, however, the capital of the company was smaller and the earning facilities were not so great as they are now. There was, he went on, no immediate necessity for setting any specially large sum aside for depreciation, &c. In regard to the future working prospects, they had decided to replace the beehive coke ovens at Langley Park Colliery—the old type of ovens that had been in existence since coke was made—by a by-product coke-oven plant. There would be 5 ovens, with tar sulphate of ammonia, and crude and refined benzol plants. Two extraordinary meetings were afterwards held in order to pass a series of formal resolutions, making the ordinary shares fully paid up, and dividing these and the preference shares into shares of £1 each. The resolutions were carried. Their effect was to raise the 7 10s. shares to 10 £10 shares by simply crediting each shareholder by way of bonus with 5s. per share. The reference shares were divided in order to preserve the necessary vesting power.

**Davis (D.) and Sons Limited.**—The directors have paid an interim dividend at the rate of 10 per cent. per annum on the ordinary shares, together with a bonus at the rate of 2½ per cent. per annum, in respect of the half-year ended June 30 last, both free of income tax.

**Fife Coal Company Limited.**—The directors have declared interim dividends for the half-year ending June 30 at the rate of 5 per cent. per annum on the preference shares and at the rate of 25 per cent. per annum on the ordinary shares.

**Fox (Samuel) and Co. Limited.**—In their report to the shareholders, the directors state that for the year ended June 30 a profit is shown of £55,528 9s. 5d., from which interest upon debenture stock, £5,000, must be deducted, leaving a balance of £50,528 9s. 5d., to which is added the balance from last year, £25,167 17s. 6d., giving a total of £75,696 6s. 11d. to be dealt with. It is proposed to declare a dividend of 10 per cent. for the year, less tax. This will absorb £30,000, towards which £7,500 as an interim dividend was paid in February, leaving £45,696 6s. 11d., of which it is proposed to transfer £30,000 to the reserve fund, and to carry the balance of £15,696 6s. 11d. to the next account. The report adds that the turnover of the company has been the largest on record, which has reflected itself in the year's profits. The directors have decided that, in view of the increase of the business, and further proposed developments, the time has arrived for increasing the capital of the company. Proposals to carry this into effect will shortly be submitted to the shareholders.

**Godfrey Manufacturing Company Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business of iron, steel, and metal founders, manufacturers of lifting machinery, cranes, rollers, joists, and other constructional iron and steel work, oilmakers, &c. First director, John T. Godfrey, Loughborough, Leicester.

**Hadfield's Steel Foundry Company Limited.**—The directors have decided that an interim dividend of 1s. per share, free of income tax, on the ordinary shares be paid on

August 22, 1913, out of the profits for the half-year ending June 30, 1913.

**Insoles Limited.**—The accounts for the year ended June 30 show a divisible balance of £81,958, after providing for debenture interest and the interim dividends. A final dividend of 15 per cent. and a bonus of 50 per cent. are recommended on the ordinary shares, making 70 per cent. for the 12 months, adding £1,500 to the redemption fund, and carrying forward £298. It is proposed to create 60,000 additional ordinary shares of £1 each, and to subdivide the present £10 preference and ordinary shares into £1 shares.

**International Coal Company Limited.**—On Saturday, at Cardiff, the annual meeting of the International Coal Company was held, Mr. E. Owen presiding, and a dividend of 10s. per share was declared for the past year. The chairman said the directors had been obliged to abandon the workings on one of the seams and direct all their efforts upon the lower steam coals, and the level seam. A shareholder alleged that no serious attempt had been made for the development of other seams correspondingly with what had been exhausted. He also contended that with foresight they ought to have made such a profit as would have enabled them to declare a dividend of 25 per cent. as in 1900. Another shareholder said that if Mr. Richards and Mr. Hirsch, of London, wanted to find out whether the colliery was being properly managed or not, they were never likely to succeed with Lord Merthyr by proceeding on the lines of hostility. Mr. Lewis Williams was re-elected a director. Mr. Hirsch proposed the election of Mr. J. T. Richards on the board. There being no seconder, Mr. Richards seconded his own nomination, and demanded a poll, which was fixed to take place this week.

**Kent Coal Concessions Limited.**—At an extraordinary meeting last week of the shareholders in the Kent Coal Concessions Limited, the Great Eastern Coalfield Extensions Limited, the Extended Extension Limited, and the Deal and Walmer Coalfield Limited, a resolution in regard to the amalgamation of the assets of the four companies was carried.

**Lanarkshire Steel Company Limited.**—At the rate of 5 per cent. per annum, less income tax, on both classes of preference shares for half-year ended June 30 last.

**Laycock (W. S.) Limited.**—An interim dividend at the rate of 5 per cent. per annum has been paid for the past half-year.

**Lofthouse Colliery Company Limited.**—The directors have declared an interim dividend of 4s. per share, free of income tax, for the past half-year.

**Marbella Iron Ore Company Limited.**—The directors have resolved to pay an interim dividend at the rate of 3½ per cent., less income tax.

**Mather and Platt Limited.**—The directors have declared an interim dividend on the ordinary shares of 5 per cent., free of income tax, for the half-year ended June 30, 1913, being at the rate of 10 per cent. per annum.

**National Gas Engine Company Limited.**—The directors announce an interim dividend at the rate of 7½ per cent. per annum, less income tax, on the ordinary shares for the six months ended June 30, 1913.

**Nimmo (James) and Co. Limited.**—An extraordinary general meeting of the shareholders is called for August 8, to consider a proposal for the subdivision of the preference and ordinary shares from £10 shares into £1 shares. A resolution will also be proposed making an alteration in the articles of association relating to the reserve fund. The article of association sanctioning a reserve fund in its present terms limits the amount to £25,000, unless with a sanction of the general meeting of the shareholders. The directors consider that this restriction should be removed—especially as the carrying out of the proposal will not interfere with the shareholders' right at each annual general meeting of the company to support or modify whatever recommendations the directors may think fit to make as to allocating any portion of profits to reserve fund.

**Normanby Ironworks Company Limited.**—The report for the year ended June 30 last, presented at the meeting on the 2nd inst., states that the interest received and other income for the year amount to £12,178, from which must be deducted debenture stock interest £2,652, and directors' fees and general administration expenses, &c., £778, leaving the sum of £8,746, to which must be added balance brought forward from last year of £349, making together £9,095. There has been appropriated to sinking fund account £800, and the directors now propose to carry to a provision account against loss on outstanding claims under late policy with the Law Car and General Insurance Corporation Limited, in liquidation, £250; to pay a final dividend on the ordinary shares at the rate of 4 per cent., making, with the interim dividend already paid, 7 per cent. for the year, leaving a balance to be carried forward of £245.

**North Central Wagon Company Limited.**—The net profit for the year ended June 30 amounted to £28,871, and £1,219 was brought forward. A final dividend at the rate of 13 per cent. per annum is proposed, making 12½ per cent., free of income tax, for the year, transferring to the reserve fund £12,000, and leaving to be carried forward £242. The reserve fund will now amount to £150,000.

**Pearson (W. H.) Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire and take over as a going concern the business of a coal merchant, now carried on by W. H. Pearson, at Folkestone, and to enter into an agreement with W. H. Pearson. Signatories: W. H. Pearson, 18, Radnor Park-road, Folkestone; F. G. MacGregor, Baldric House, Folkestone; and W. C. Harris, 41, Brondmead-road, Folkestone. Qualification of director, one share.

**Sheffield Forge and Rolling Mills Company Limited.**—The report for the year ended June 30 last states that the gross profit on the past 12 months, trading amounts to £30,567, and that after paying interest and all other charges there remains a net profit of £26,513. This, added to the sum of £5,956 brought forward from the previous year, makes a total of £32,470 standing to the credit of profit and loss account. Of this sum the directors have appropriated for depreciation of plant £3,000, to reserve fund £10,000, leaving a balance of £19,470, out of which they recommend a dividend at the rate of 12½ per cent. (free of income-tax), amounting to £12,500, and to carry forward to next year's account £6,970.

**Silurian Iron Ore Company Limited.**—This private company has been registered, with a capital of £100,000 in £1

shares (30,000 preference), to carry on the business of iron masters, iron smelters and founders, steelmakers and converters, colliery proprietors and manufacturers of steel and iron. Signatories: R. A. Pinsent and Roy Pinsent, both of 6, Bennett Hill, Birmingham. First directors, J. R. Wright, W. C. Wright, J. C. Davies and J. Spyker.

**South Wales Colliery Company Limited.**—The directors have declared an interim dividend on the A and deferred shares at the usual rate of 4 per cent. per annum, and on the B and new B shares at the usual rate of 14 per cent. per annum.

**Spencer (John) and Sons Limited.**—The directors recommend a dividend on the ordinary shares of 3½ per cent., making, with 2½ per cent. already paid, 6 per cent. for the year ended June 30 last.

**Stella Conduit Company Limited.**—This private company has been registered, with a capital of £6,000 in £1 shares, to acquire and take over as a going concern the business of conduit and tube makers now carried on by the Stella Conduit Company at Bilston, Staffs; also to carry on the business of brassfounders, ironfounders and makers of steel and iron conduits. Signatories: R. A. Eaton, Green-lanes, Erdington, and D. J. Jordan, 68, Walford-road, Sparkbrook, Birmingham.

**Strathcona Coal and Exploration Syndicate Limited.**—Interim dividend of 10 per cent. on the ordinary shares.

**Watson (John) Limited.**—Interim at the rate of 10 per cent. per annum.

**Western Wagon and Property Company Limited.**—The directors have declared an interim dividend at the usual rate of 10 per cent. per annum for the half-year ended June 30.

**Whidbourne and Lishman Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire and take over as a going concern the business of piston ring makers, now carried on at Cliff-road, Plymouth, under the style of Whidbourne and Lishman, to enter into an agreement with H. Whidbourne and J. J. Lishman, and to carry on the business of ironfounders, mechanical engineers, and manufacturers of metallic multiple packing rings for pistons, engines, &c.

**Yorkshire Railway Wagon Company Limited.**—The directors have declared an interim dividend at the rate of 12½ per cent. per annum. A year ago the interim was at the same rate.

**CONTRACTS OPEN FOR COAL AND COKE.**

*For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.*

**Abstracts of Contracts Open.**

**ALDERSHOT, AUGUST 12.**—Good hard coal, for the Education Committee. Also coke per ton. Tenders to Mr. Norman Clinton, clerk.

**BARNSELY, AUGUST 14.**—House coal, nuts and coke, for the Corporation Education Committee.

**BURY, AUGUST 15.**—About 40,000 tons of gas coal, 500 tons of boiler slack, 500 tons of burgy, 300 tons of house coal, 50 tons of Wallsend coal, for the Corporation. Forms from the engineer and general manager, Gasworks.

**BURY ST. EDMUND'S, AUGUST 11.**—Steam and house coal, for the Electricity Supply Committee. Forms from Mr. S. E. Day, borough electrical engineer, Corporation Electricity Works, Bury St. Edmunds.

**CORK, AUGUST 12.**—Twelve months' supply from August 13 of best double-screened steam coal, for the Harbour Commissioners. Forms at the engineer's department, Commissioners' Offices, Custom House-street.

**DARLINGTON, AUGUST 30.**—Best steam coal, for the Tees Valley Water Board, up to June 30, 1914, at the Merrybent Siding, Darlington, approximately 60 tons per week.

**DEVONPORT AND PLYMOUTH, AUGUST 15.**—Best Welsh steam coal, for the period from September 1, 1913, to June 30, 1914, at Devonport and Plymouth, for H.M. Government. Forms on application to the Officer Commanding, Army Service Corps, New Granby Barracks, Devonport.

**DEVONPORT, AUGUST 14.**—240 tons of good house coal, for the Guardians. Also for about 15 tons of coal of the same kind, and description as the above, at the Parochial Offices, Chapel-street, and the Parochial Offices, Camel's Head. Forms from the master of the workhouse.

**DOWNPATRICK (IRELAND), AUGUST 15.**—Good English and Scotch household coal, 200 tons, more or less; steam coal, about 1,200 tons; gas coal, about 300 tons, for the Committee of Management of Down District Lunatic Asylum. Forms from Mr. Samuel Rea, clerk.

**GLOUCESTER, AUGUST 25.**—Rough small slack coal for a period of either six or 12 months, commencing October 1, for the Corporation. Specifications from Mr. F. H. Corson, engineer, Electricity Works, Commercial-road, Gloucester.

**HASTINGS, AUGUST 13.**—For the Guardians, 650 tons of hard steam cobbles. Forms from Mr. A. R. Inskip, clerk, 11, Wellington-square, Hastings.

**HAVERFORDWEST, AUGUST 18.**—About 2,000 tons of double screened gas coal of the very best quality, for the Corporation. Forms from Mr. R. T. P. Williams, town clerk.

**LONDON, AUGUST 12.**—300 tons of house coal, for the Managers of the Poplar and Stepney Sick Asylum District. Forms from Mr. Sydney G. Wright, clerk to the Managers, Bow, London, E.

**LYMM, AUGUST 20.**—Cannel and best screened gas coal, for the Urban District Council, for a term of 12 months from September 1. Probable quantities required, about 500 tons of cannel and about 2,500 tons of gas coal, but the council reserve the right of increasing or decreasing the quantities named. Particulars from the gas manager, Mr. W. L. Donaldson.

**MAIDSTONE, AUGUST 12.**—Coal, coke, &c., for the Kent County Council. Forms at the office of the County Architect, 86, Week-street, Maidstone.

**NENAGH (IRELAND), AUGUST 14.**—50 tons of best double-screened Scotch coal, for the Guardians. Tenders to the clerk.



NEWPORT (I.W.), SEPTEMBER 11.—Fuel, for the Isle of Wight County Council. Particulars from Mr. J. Dufton, clerk, County Council Offices, Newport, I.W.

NORTHALLERTON, AUGUST 16.—Coal and coke, for the North Riding of Yorkshire County Council (Education Committee), to any or all of the elementary schools in the North Riding. Forms from the secretary, Education Offices, County Hall, Northallerton.

PLYMOUTH, AUGUST 16.—Steam coal to the workhouse and good large house coal (free from small) to the workhouse, scattered homes, and relief offices, for a period of 12 months, for the Guardians. The estimated quantity of the steam coal is 900 tons, and of the house coal 560 tons. Tenders to Mr. W. H. Perkins, deputy-clerk to the Guardians, Greenbank-road, Plymouth.

SANDRIDGE, AUGUST 14.—Good household cobbles to the Sandridge village school, for the Managers of the County School, during the year ending August 1914. Tenders to Mr. R. W. Brabant, solicitor, St. Albans, clerk to Managers.

TRALEE (IRELAND), AUGUST 31.—2,000 tons of best double-screened gas coal, for the Urban District Council, during 12 months ending August 31, 1914. Conditions from the engineer and manager, Mr. James E. Enright.

WEST BUCKLAND, AUGUST 12.—Coal and coke and oil to the West Buckland, Devon County School Foundation. Coal to be "Hawkesbury Hards," or equally good Midland hand-picked steam coal, delivered in not less than two truck loads at Filleigh Station (80-90 tons, about); best gas coke, delivered in not less than 4-ton lots (one truck) at Filleigh Station (20-25 tons, about). Oil to be "Royal Daylight," at per gallon, delivered at the school, in quantities of about 100 gallons (800-900 gallons, about). Tenders to the Governors.

YORK, AUGUST 25.—Coal to the electricity generating station, Foss Islands-road, York, during the 12 months ending September 30, 1914, for the Corporation. The quantity required will be approximately 10,000 tons, and tenders may be sent for either unscreened beans, pea slack, rough slack, or small peas quality. Tenders to Mr. J. W. Hame, engineer and manager, Electricity and Tramways Offices, Clifford-street, York.

The date given is the latest upon which tenders can be received.

### CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ALEXANDRIA (EGYPT), SEPTEMBER 30.—Oils, &c.—H.M. Consul-General at Alexandria (Mr. D. A. Cameron, C.M.G.) reports that tenders are invited by the Municipality of Alexandria for the supply of various articles required for the use of the Service du Nettoyement during 1913-14, including oils and colours, wood, steel and iron bars, angle iron, bolts and nuts, screws, rivets, brooms, buckles, wire, &c.\*

BURY, AUGUST 25.—Turbine Alternator, &c.—One 2,000/3,000 k.w. turbine alternator, with exciter and surface condenser, for the Corporation. Conditions from Mr. S. J. Watson, M.I.E.E., Electricity Works, Bury; deposit, two guineas.

CANBERRA (AUSTRALIA), SEPTEMBER 1.—Switchgear.—H.M. Trade Commissioner for Australia reports that tenders are invited by the Commonwealth Department of Home Affairs for the supply of switchgear for the power-house at Canberra, the new Federal Capital in New South Wales. The contract is divided into two sections: (1) Main power-house switchgear; (2) Diesel engine switchgear.\*

CHRISTIANIA (NORWAY), AUGUST 15.—Tongue Rails.—H.M. Consul at Christiania (Mr. E. F. Gray) reports that tenders are invited by the Norwegian State Railway Authorities for the supply and delivery of tongue rails.\*

CLECKHEATON, AUGUST 20.—Various.—The following plant in connection with the new gasworks, for the Urban District Council:—(2) Steam warping capstan and two bollards; (3) weighbridges; (10) purifiers and general plant; (11) Livesey washer and water-tube condensers; (12) rotary washer-scrubbers; (13) exhausters and engines; (14) station meter and governor; (16) boilers and seatings; (17) roofs, steel structures, and overhead tanks alterations, &c. Specifications from the engineer, Mr. Arthur L. Jennings, Town Hall. Deposit £2 2s. each contract, with the exception of No. 10 (£1 1s.)

CONWAY, AUGUST 18.—Dam and Tunnel.—For the construction of a concrete dam, the driving of a tunnel 7 ft. by 7 ft., with entrance cuttings, the total length being 1,440 yards, for the Aluminium Corporation Limited. Drawings, &c., at the offices of the engineers, Messrs. T. B. Farrington and Son, Trinity-square, Llandudno. Deposit £5 5s.

DUBLIN, AUGUST 25.—Rails.—The following, for the directors of the Great Northern Railway Company (Ireland):—Bull head rails, flat-bottom rails, fishplates, cast iron chairs, and permanent way fastenings. Specifications from the secretary, Amiens-street Terminus, Dublin.

DUBLIN, AUGUST 26.—Feed Pump, &c.—Feed pump, cast iron tanks, pipework, valves, steam separator, boilerhouse shutters, coal grab and steelwork, for the Corporation. Conditions from the city electrical engineer, Fleet-street, Dublin. Deposit 3 guineas.

EPSOM, AUGUST 25.—Cast Iron Water Main.—About 1,500 yards 6 in. cast iron water main in 12 ft. lengths and specials, for the Urban District Council. Particulars from Mr. W. Young, manager, Waterworks, East-street, Epsom.

FRASERBURGH, AUGUST 25.—Steel Booms.—Steel sliding booms or storm gates for the Fraserburgh Harbour Commissioners, Fraserburgh. Information from Mr. G. N. Abernethy, M.Inst.C.E., 82, Caxton-house, Westminster, London, S.W.

ITCHEN, SEPTEMBER 9.—Cast Iron Lamp Columns.—95 cast iron lamp columns, copper lanterns, burners, and fittings complete, for the Urban District Council. Particulars from Mr. T. A. Collingwood, surveyor to the Council.

NEWBURY, AUGUST 18.—Iron Fencing.—Iron fencing at St. Bartholomew's Grammar School, for the Governors. Specifications at the office of Mr. S. J. Lee Vincent, Municipal-buildings, Newbury.

NEWPORT (MON.), AUGUST 25.—Air Filter.—An air filter, with air ducts, dampers, &c., for the Corporation.

\* Specifications, particulars, &c., may be seen at the Municipal Intelligence Branch of the Board of Trade, 73, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 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1000.

The air filter is required for use in connection with the turbo-alternator plant at the East Power Station, and may be either of the dry air or wet air type. Particulars from Mr. A. Nichols Moore, M.I.E.E., borough electrical engineer, Town Hall, Newport, Mon.

NEWPORT (MON.).—Constructional Steelwork.—For erection of constructional steelwork. Particulars from Messrs. E. C. Jordan and Sons, contractors, Hanon-road, Newport, Mon.

PENDRE (FLINTS).—Tunnel.—For driving a tunnel, 8 ft. by 8 ft., nearly 1 mile long, in limestone formation (Flintshire). Particulars from the Tunnel Company Limited, Pendre, Holywell, Flintshire.

SHEFFIELD, AUGUST 26.—Firebricks.—350,000 firebricks and 54,000 arch-bricks, for the directors of the Sheffield United Gaslight Company (Grimesthorpe Works). Specifications from the engineer, Mr. J. W. Morrison, Commercial-street, Sheffield.

SOUTH NEWBALD (YORKS), AUGUST 12.—Well Sinking, &c.—For the sinking of a well and driving headings in the parish of South Newbald, in the East Riding of Yorkshire, and for testing the yield of water therefrom, for the Howden Rural District Council. Specification from the Council's engineer, Mr. Percy Griffith, M.Inst.C.E., F.G.S., 20, Victoria-street, Westminster, S.W.; deposit 2 guineas.

TALODI (EGYPT), AUGUST 26-SEPTEMBER 8.—Galvanised Sheets, &c.—The London Agent for the Egyptian War Office notifies that tenders are invited by that department for the supply of (1) galvanised corrugated sheets, and (2) steelwork for steel-framed buildings at Talodi. Specifications from the office of Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.\*

TRALEE (IRELAND), AUGUST 31.—Exhauster.—Supply and fixing complete at the Gasworks, of one exhauster, capable of passing 10,000 cubic feet of gas per hour, for the Corporation. Specification from the engineer and manager, Mr. James E. Enright.

WAKEFIELD, SEPTEMBER 1.—Boiler, &c.—Various plant for extensions to the works of the electricity department, for the Corporation: (1) Water-tube boiler, superheater, stoker, &c.; (2) steam turbo-alternator, condensing plant, &c.; (3) high and low tension switchgear. Particulars from city electrical engineer, Old Town Hall, Wakefield. Deposit £1.

### CATALOGUES AND PRICE LISTS RECEIVED.

Messrs. Alldays and Onions Pneumatic Engineering Company Limited, of the Great-Western Works, Birmingham, have sent us a new edition of their comprehensive catalogue of "Anchor" brand vices, vice benches, anvils, smiths' tools, boilermakers' tools, farriers' tools, &c.

Mr. Joseph Pugsley, of the Cattybrook Ironworks, Lawrence Hill, Bristol, sends us the latest issue of his stock list of new and second-hand machinery, for sale and hire, included in which is a large variety of boilers, winding and hauling engines, pumps, rock-drills, winches, pulleys, &c.

Messrs. Hans Renold Limited (Progress Works, Brook-street, Manchester) are responsible for an interesting little four-page pamphlet entitled "Driving Chains for Speeding-up," which shows that some very remarkable results have been obtained in lowering production costs as a direct result of using chains. The data were obtained from the comparative running of two automatic gear-cutting machines, adapted respectively to belt and chain drives. Tests were made with the aim (1) of obtaining the highest possible production; and (2) as nearly as possible the same production, measuring the power required. The results were (1) that 60 per cent. more output was obtained for 10 per cent. more power; and (2) that 14½ per cent. less power was required at equal output. By the alterations in this case a chain 2½ in. wide displaced a 7 in. wide leather belt, and the 2 in. wide belt driving the feed mechanism was dispensed with.

Messrs. Bruce Peebles and Co. Limited, of Edinburgh, have issued a pamphlet dealing with motor converters constructed under the Peebles la Cour patents. An illustration shows six of 19 475 kw. three-bearing sets supplied to the Calcutta Electric Supply Corporation; others show individual machines of the two-bearing and three-bearing types, and diagram of connections are also given. The characteristic curves show that not only are the efficiencies of these machines high at full load, but that very high efficiencies are maintained even at half and quarter loads. During the past 18 months orders have been received for over 60 sets, in sizes ranging from 1,500 kw. down to 100 kw. A special advantage of these machines, the construction of which is fully described in the pamphlet, is that the high-tension alternating current is switched directly on to the stator windings, without the intervention of transformers and their switchgear. Amongst the customers supplied we notice the Edinburgh Collieries Limited, the Durham Collieries Electric Power Company Limited, the Consett Iron Co. Limited, the Summerlee Iron Company Limited, the Powell Duffryn Steam Coal Company Limited, and the Shotts Iron Company Limited.

Grimsby Coal Exports.—The following is the official return of the quantities of coal exported from Grimsby during the week ended the 31st ult.:—Foreign: To Antwerp, 717 tons; Dieppe, 1,051; Drammen, 1,384; Esbjerg, 433; Gofe, 1,232; Gothenburg, 3,098; Graso, 803; Halmstad, 1,311; Hamburg, 1,321; Iggesund, 1,495; Kallundborg, 928; Libau, 1,413; Malmo, 670; Randers, 569; Riga, 4,286; Rotterdam, 235; Stugsund, 468; Stockholm, 1,893; and Trelleborg, 1,859; total, 25,166 tons. Coastwise: To London, 637 tons; and Penzance, 100; total, 737 tons. During the corresponding week last year the shipments were 30,325 tons foreign and 1,640 tons coastwise.

### ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

3903 (1912). Improvements in or relating to Miners' Safety or like Lamps. E. A. Hailwood, of 7, Gladstone-terrace, Morley, near Leeds, Yorkshire.—Relates to improvements in miners' safety lamps, and is an improvement in modification of the invention described in the specification of Patent No. 18415 of 1910, and has special reference to the construction of the insulated lighting pin in connection with such invention. Fig. 1 represents a sectional elevation of a portion of a miners' safety lamp showing the invention.

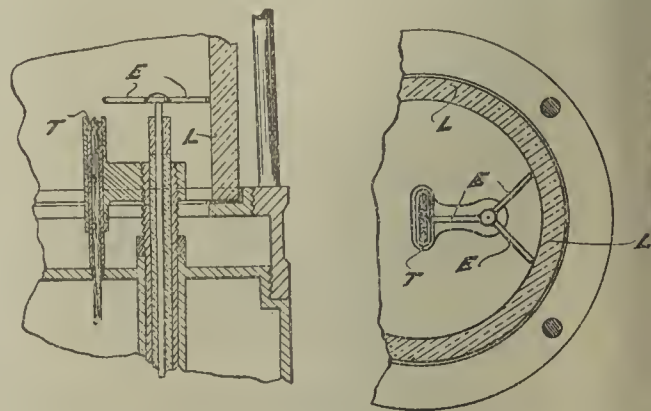
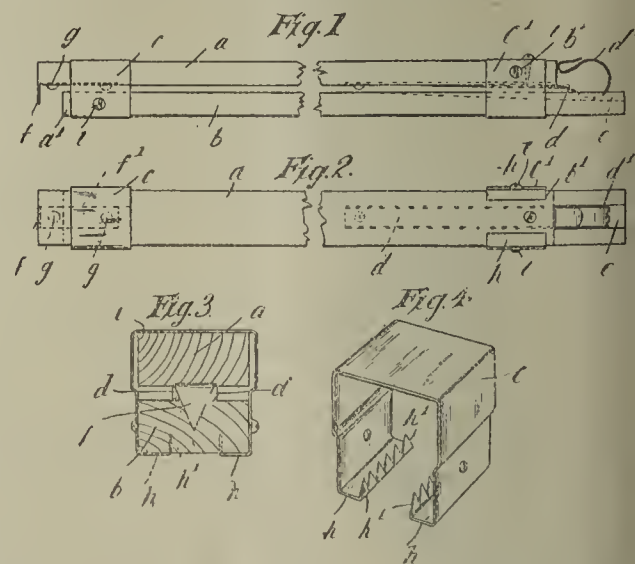


Fig. 1

Fig. 2

fig. 2 is a plan. The head of the lighting pin is constructed in the form of a star having several arms E so that one arm is always directed towards the wick tube T, the arms being of any convenient length. If three arms are employed, it is preferable to arrange the length of the two back arms so that they will come in contact with the glass L and compel the other arm to be always directed towards the wick. (Two claims.)

15601 (1912). Improvements in Measuring Rules for Use by Coalminers, Timbermen and the like. T. L. James, 80-81, Victoria-street, Dowlais, Glamorgan.—Relates particularly to such devices, in which a pair of graduated wood laths or battens held together by suitable means are arranged to slide in guides one upon the face of the other, as to be capable of being drawn out at the ends and when drawn out to be retained in the extended position, one of the battens carrying at the outer zero of its graduations marking or scribing point. A feature consists in the employment of self-adjusting means in the form of a spring for such retention to enable the desired lengths of timber to be accurately measured, and when so measured to be marked off by a steel point or scriber at the end of one of the battens. In the preferred construction, at one end of each of the said wood laths or battens a suitable metal guide or bridge piece is fixed, through which the other wood lath slides. Each guide or bridge piece which is fixed at the opposite end of each lath preferably consists of a strap of sheet metal shaped for the passage through the

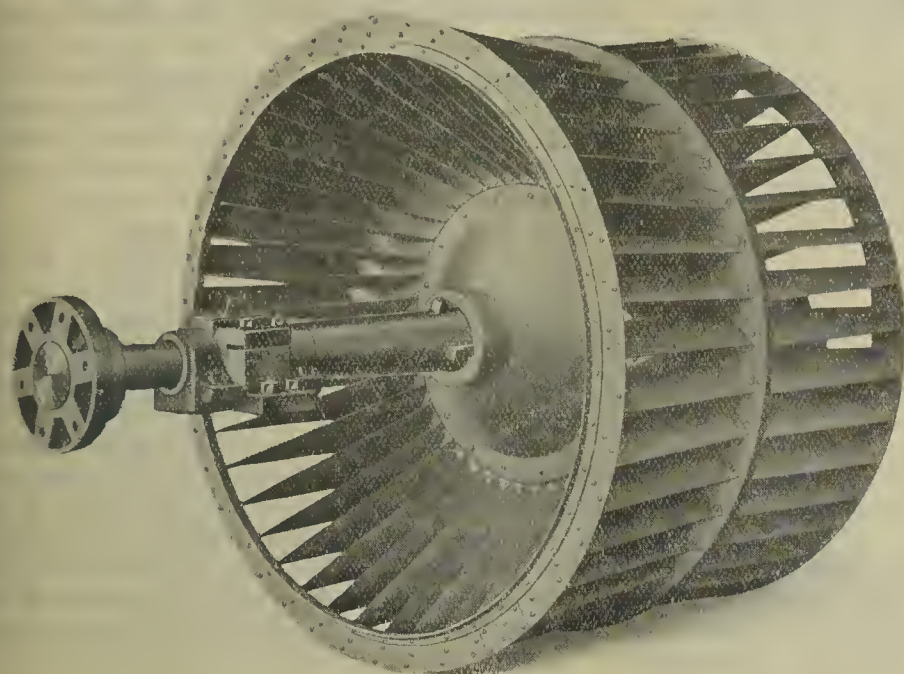


same of the other adjacent wood lath and furnished with intumed ends which are formed with teeth or serrations embed into the outer face of the wood lath or batton, the said guide or bridge piece being securely fixed in place by means of screws passed through holes in the sides of the lath. The spring is preferably a strip of tempered steel or other metal fixed by screws to the inner face of one of the said laths or battens, and formed with an end loop which applies pressure against the inner face of the opposite member of the device and slides in a groove therein formed longitudinally near one end thereof. The marker or scriber which is fixed at the other end of the device may consist of a strip of steel fixed by screws in a recess in the inner face of one of the laths, and having an angular bent V-shaped end which is suitably pointed for the purpose. Figs. 1 and 2 are side elevation and plan respectively of a measuring rule, fig. 3 is an end view thereof, and fig. 4 is a view of one of the guides or bridge pieces shown detached. (Three claims.)

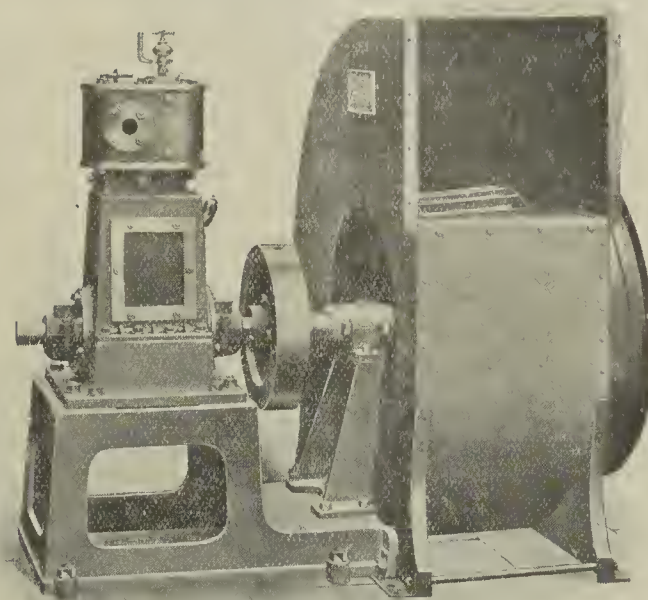
15706 (1912). Improvements in Electrical Distribution Junction Boxes or Apparatus. British Insulated and Hels



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KEITH INDUCED DRAUGHT FAN, ENGINE DRIVEN.

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Surface and In-by fans.

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Any boiler; all fuels.

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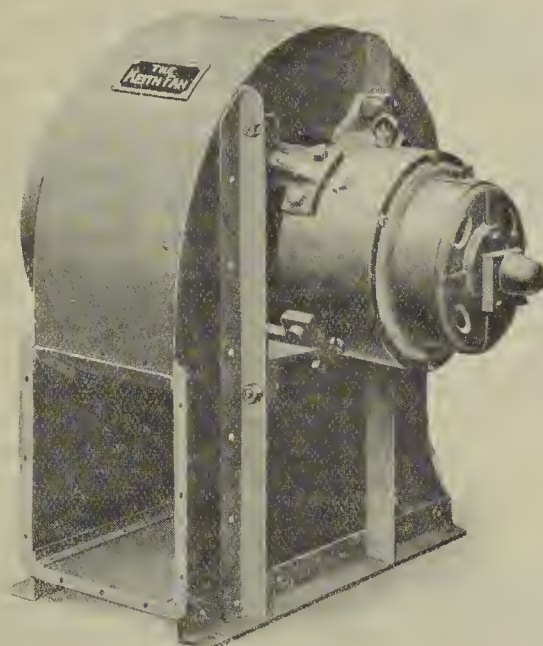
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Power Houses, Generators and large motors.



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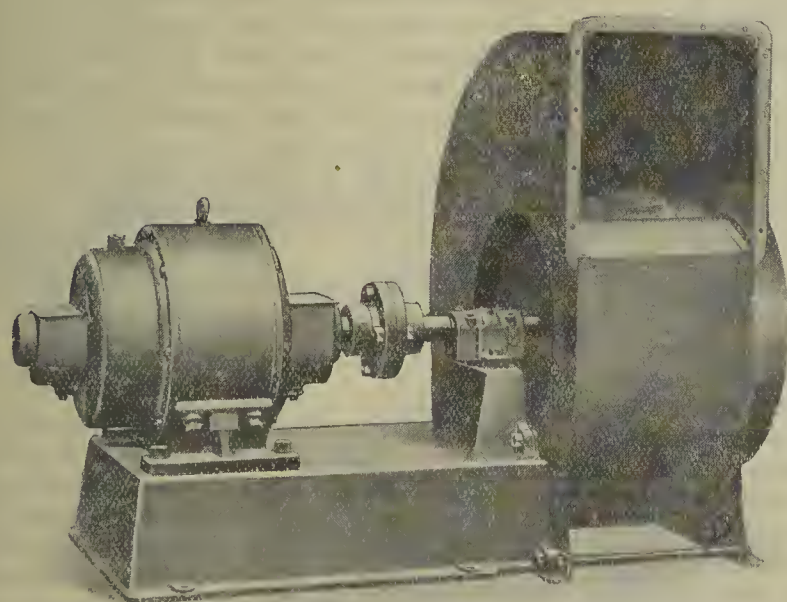
Exceptional Rigidity.  
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No Stay-rods required.

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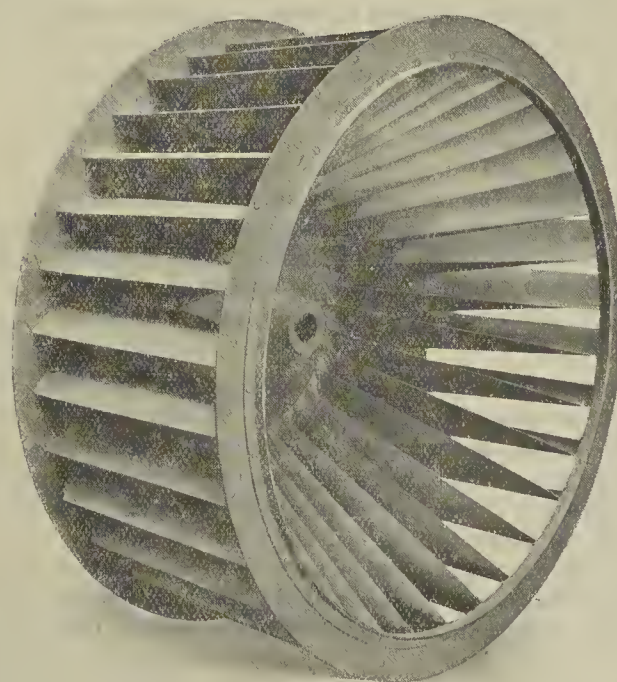
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Minimum driving power.

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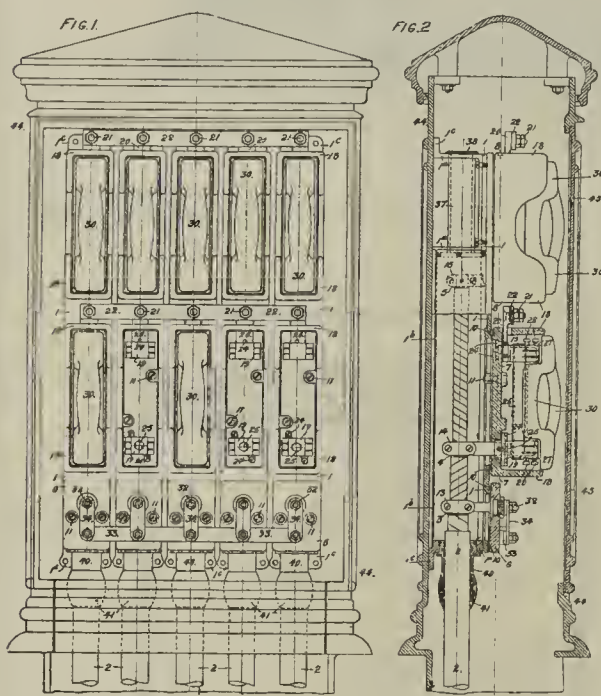
# James Keith & Blackman Co. Ltd.,

27, Farringdon Avenue, LONDON, E.C.

AND AT NEWCASTLE. MANCHESTER, LEEDS, CARDIFF, GLASGOW, &c.



ables Limited and H. Allwood, both of Prescott, Lancashire. Has reference to electrical distribution junction boxes or apparatus of the kind wherein the cables are passed into a case or holder—which is fitted with an insulation plate, and made watertight—and the terminal fittings are brought to the outside of it, and provided with spring clips, within which, and similar clips connected with bus-bars, the ends of the fuse is placed; the fuses being carried in porcelain or like handles, which are capable of being slid in and out between the clips. The case or holder into which the multicore cable end is introduced by entering it through one of its ends has a plurality of openings in line along one side or part; and at this open side or part it is closed, when the parts are assembled, with a plurality of separate covers or closing plates or "bases" of porcelain or other equivalent material; and these covers or parts are each provided with jointing grooves or means, which may be furnished with asbestos or other equivalent joint making material, and arranged to fit on joint edges or flanges surrounding the said openings in the box or case; so that when they are fastened down a good or close joint between the case or box and the covers will be effected; while the separate terminals

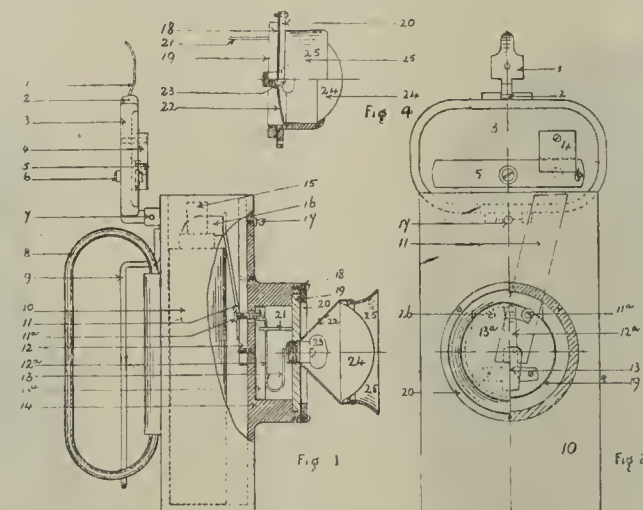


of the conductors of the multicore cable are led from the conductor through the said separate openings, and bases or plates, and connected up outside to clips adapted to receive a ready removable fuse carrier, which, when connected, makes contact with the clip. The cases or holders in which the cable ends fit are made of two parts; one of which is, say, of cast iron, comprising the ends of the case, and the upper parts of the sides mainly; whilst the other part is of sheet "fibre" or other suitable material, and is adapted to be fitted on to or into the ends and side portions of the former part, to which it will be fastened or secured in any suitable way. Generally, in cross section, the complete case will preferably be of U shape. The frame or case is adapted to be fastened and held in place by flanges, say one at each end; and may be so fastened and fitted in a box adapted to take and hold a plurality of these units or apparatus; and the box may advantageously be of a flat form. But it may, if desired, be in the form of a pillar or pedestal, or the like. Or each unit apparatus or set of assembled fittings, may be separately attached to a wall or other surface, without a pedestal or box of the character referred to. Fig. 1 is a front elevation of a complete apparatus, with the cover removed or open, and showing the internal parts; fig. 2 is a vertical section of same. (Four claims.)

15977 (1912). *A Process for Increasing the Yield of Ammonia from Gases of Dry Distillation.* K. Burkheiser, Fruchthof (Ecke Banksstrasse), Hamburg 1, Germany.—The object is to increase the yield of ammonia from the gases of distillation of coal, by such means that the cyanogen nitrogen of the gases is first converted by any suitable known process into sulpho-cyanide, then into ammonia, and the ammonia thus obtained then further worked up with, or led into the ammonia already contained in the gases. (One claim.)

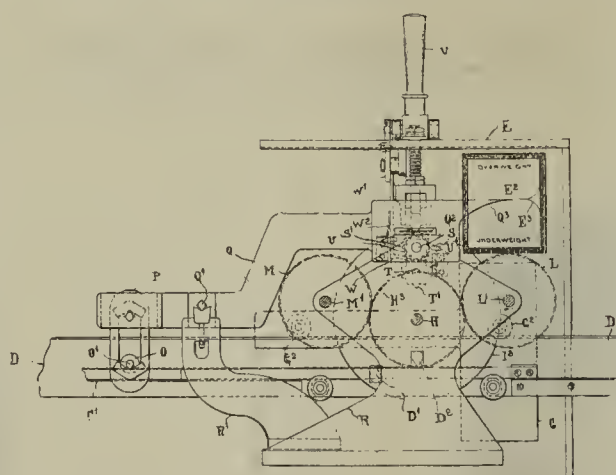
16126 (1912). *Improvements in Electric Battery Lamps.* H. Hunte, of 5, Park View, Perry Street-road, Northfleet, Kent.—Relates to improvements in particular to lamps in which a secondary battery is used to supply the current. Fig. 1 is a side elevation of one form of the lamp, such as may be used by policemen. The lamp is shown with the lid open, the front portion being in section illustrating the connection between accumulator, lamp bulb and press button for flashing signals. Fig. 2 is a front elevation with the bulb and reflector removed, and showing the connections for switching the light on and off; by giving the reflector a slight rotary movement to the right the lamp is lighted, while a slight movement in the reverse direction will extinguish the light. A slight rotary movement of the reflector turns the disc 19, carrying with it the pin 21. The pin turns the disc 13 and brings the finger 12 into contact with the screw 11, thus completing the circuit

and lighting up. A slight rotary movement in the reverse direction breaks the circuit. Fig. 4 shows a modified type of reflector, such as would be suitable for miners' use. The reflector 22 is of a different shape; so also the tubular extension 25 which carries the lens 24 is, in this case,



straight, whereas, in fig. 1, it is bell-mouthed. When the lamp is intended for use in mines, a swivel bent hook may be used in place of fittings shown at the back of the lamp. A locking device may also be used to prevent unauthorised persons tampering with the light. (Two claims.)

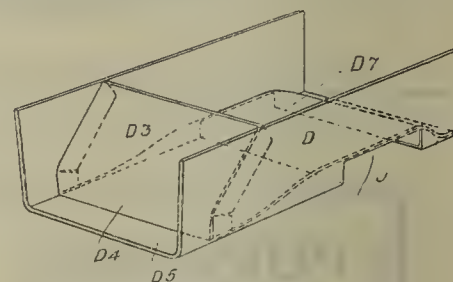
17885 (1912). *Improvements in Steelyard Weighing Apparatus or the like.* R. R. Gibbs and A. W. Brown, both of W. and T. Avery Limited, of Soho Foundry, Birmingham.—Refers more particularly to platform weighing machines or weighbridges and to that type the object of which is to prevent a record of the weight being obtained, unless the steelyard is in a position of equilibrium, and that such position can only be obtained when the weight upon the platform of the weighing apparatus corresponds to or balances the weight indicated by the poise weights on the steelyard, thereby preventing the weighman making or obtaining an accidental or fraudulent record. It has been previously proposed to employ a sliding shutter to cover the ticket slot, the invention residing in the mechanism and means of operation. An additional object of the invention is the provision of a consecutive numbering device, by means of which the individual weighments are automatically counted and a consecutive numerical record the same time as each weight is made. Broadly, the means obtained upon the ticket or other indication of the weight at of carrying the invention into effect comprise a steelyard having traversing poise weights thereon, said poise weights being connected by racks and pinions or the like in known manner to printing discs. Connected to the said steelyard by a link or other suitable connection is a lever fulcrumed on a knife-edge, which moves relatively and conjunctively



with the steelyard. Part of the said lever is arranged to pass behind the slot in the pillar or casing of the machine through which the ticket or the like has to be inserted upon which the record is obtained by impression from the printing discs in known manner; in this part of the lever is provided a slot similar to the slot in the casing, and the position of the lever is arranged so that only at such time as the lever is in equilibrium are the slots coincident and it is possible to insert a ticket through the two slots, and as the said lever moves relative to and conjunctively with the steelyard of the machine, it follows that only at such time as the steelyard is in a position of equilibrium are the slots coincident to allow of the insertion of a ticket upon which the record of the weight is obtained. In order to prevent the poise weights being wrongly set upon the steelyard, the whole apparatus is enclosed, and the poise weights are propelled exteriorly of the casing or enclosing means by connecting another series of racks to the said pinions, said further series of racks having connection to exterior knobs or slides by means of which they can be traversed to the required position; or the pinions may be revolved by knobs or the like, exterior to the casing connected to the spindles of the said pinions or geared therewith; but the means of propulsion employed forms in itself no feature of this invention. A window or like observation panel is provided in the casing through which the weighman can see when the

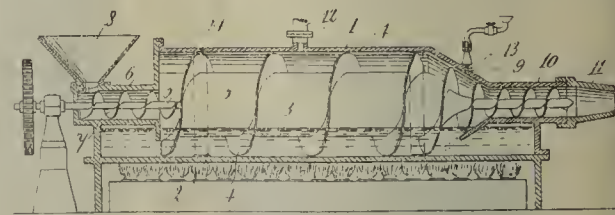
position of equilibrium or balance is attained. The additional object of consecutive numbering of the weighments is attained by means of a disc or series of discs arranged in train, having consecutive numerals thereon, said disc or discs being rotated to give a unit increase in the numerals for every operation of the printing handle or lever, said disc or discs being arranged approximate to and in peripheral printing alignment with the said weight-printing discs, whereby a record is obtained from both series of discs on the one ticket by the one printing operation. The accompanying figure is a part sectional elevation of the apparatus, the front plate of the pillar provided with the ticket slot being removed. (Four claims.)

23103 (1912). *Improvements in and relating to Appliances for Elevating and Conveying Stones, Ores, Coal, and other Minerals or Materials.* R. F. Pochin and H. S. Pochin, both of St. Margarets Ironworks, Watling-street, Leicester.—Has particular reference to an improvement or modification in the belt and bucket elevators, described and illustrated in the Specification of British Patent numbered 22155 and dated October 20, 1908. The present invention consists particularly in an improved or modified form of the buckets or trays, in which the cross plate or vane, instead of being flat and placed diagonally across the bucket or tray, is bent so that it extends upwards from the back of the bucket approximately at a right angle thereto, the upper part being diagonally disposed as heretofore. A further improved



feature consists in forming one or more of the said buckets or trays (i.e., those which come over the joint or joints in the belt) with the back part which normally lies flat on the belt or like, having part cut away, the opening thus found being covered up by a bent plate riveted or otherwise attached to the inside of the bucket or tray. This construction provides in the part of the buckets or trays which lies upon the belt, a recess to receive the projecting belt fastener and preserves the continuity and spacing of the line of buckets. The accompanying drawing is a perspective view of a bucket arranged to be fixed to a belt over the belt fasteners and showing the opening to receive a projecting belt fastener. (One claim.)

25698 (1912). *A New or Improved Method of and Apparatus for Making or Treating Fuel.* W. Smith, of Langley-on-Tyne, Northumberland.—Comprises a method of and apparatus for propelling coal through an externally heated cylinder so as to reduce same in a cleanly and efficient manner to a plastic state while setting free sufficient tarry constituents to cause the particles of coal to adhere when pressed together in their heated condition. With the object of increasing the calorific value during the operation certain chemical compounds or solutions thereof are mixed with the coal whilst it is heated and plastic; thus there is obtained a very intimate blending of the materials used. Bituminous small or powdered coal either alone or with other combustible materials is drawn along the surface of a relatively stationary bath of molten metal such as lead and the resultant tarry and plastic material is pressed into a



coherent mass, whilst still in its heated state and without cessation of the feeding movement of the coal under treatment. The apparatus employed conveniently comprises a cylinder adapted to contain a relatively stationary bath of metal, a screw conveyor revolving therein, a feed screw working in a cylinder of smaller diameter connected to the main cylinder, and a screw pressing arrangement arranged in series, the arrangement being such that at the point during transit approximately where the coal begins to sweat its tars a relatively stationary bath of molten metal, such as lead, suitably maintained at the required temperature is provided, the shaft and propelling blades being caused to dip in such molten metal and thus continuously to cleanse themselves, and the heated material having been propelled across the surface of the molten metal is then subjected to pressure so as to bind it into a coherent mass which can be cut, briquetted or otherwise formed into pieces of desired size. The accompanying drawing illustrates in central longitudinal section apparatus suitable for carrying out this invention. (Four claims.)

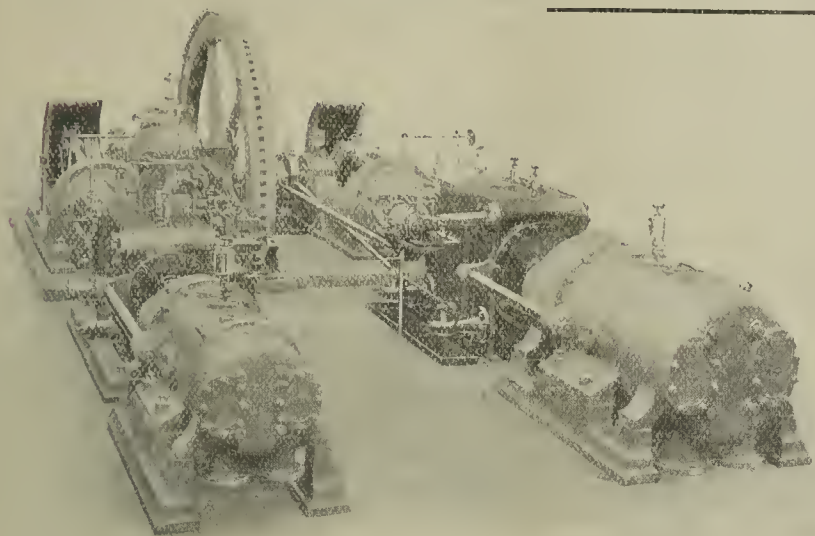
27843 (1912). *An Improvement in Blasting Powder.* R. Ponnay, of 6516, Denver Avenue, Los Angeles, California, U.S.A.—The ingredients utilised, and the relative propor-



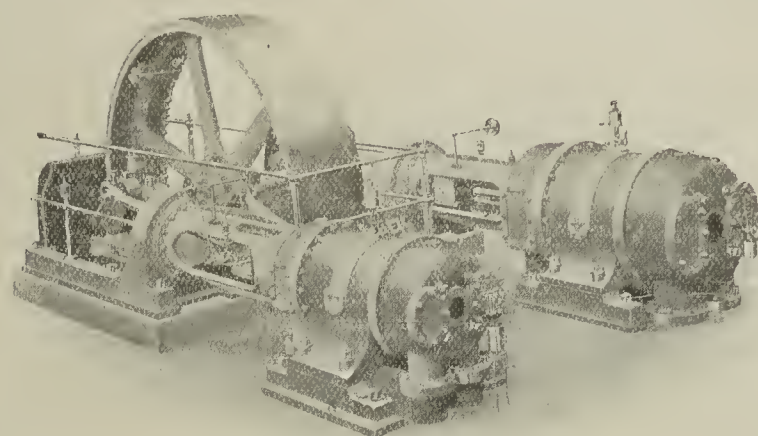
# WALKER BROS. (WIGAN) LTD

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New Broad Street House, LONDON.



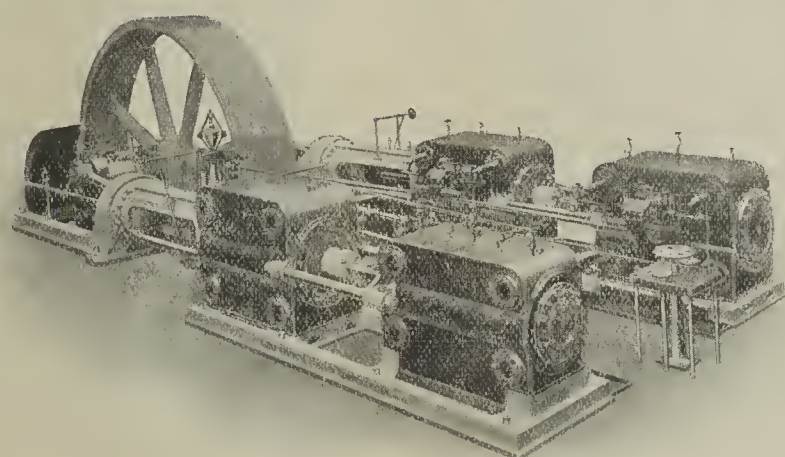
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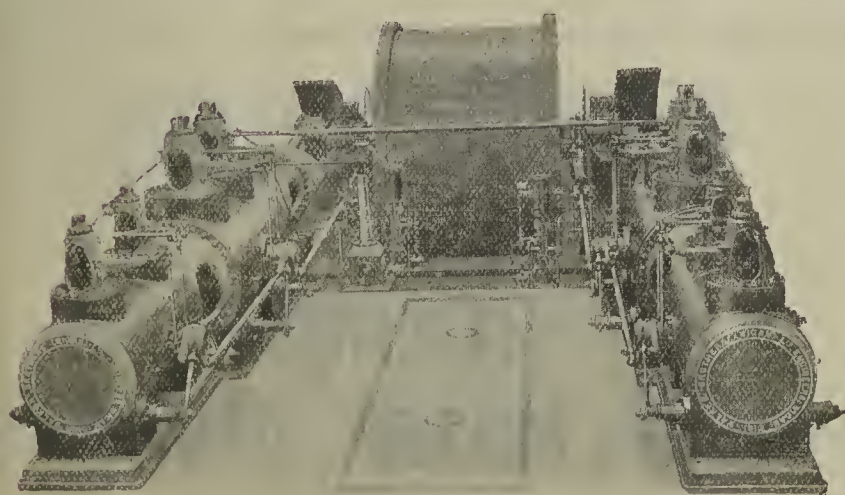
Applicable to existing Installations.



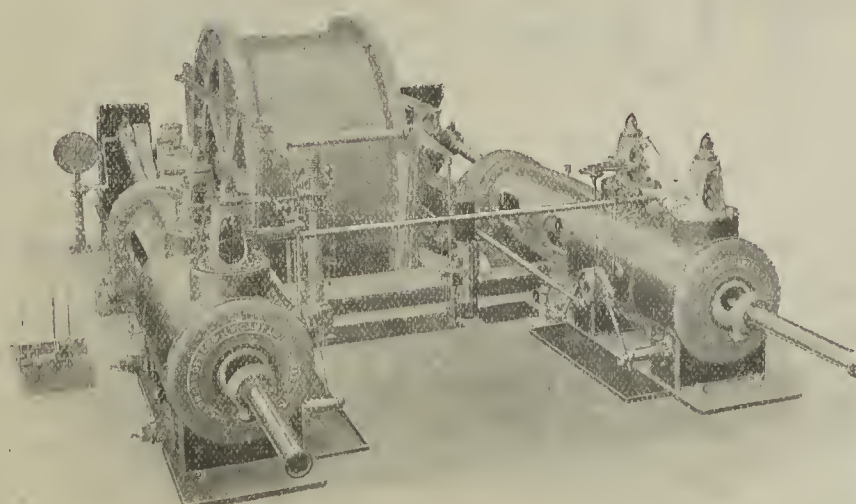
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tions of the same in a given quantity of the resultant composition or product, are as follow:—Chlorate of potash, 45 per cent.; sugar (beet or cane), 30 per cent.; manganese dioxide, 10 per cent.; charcoal, 7½ per cent.; and coaldust, ¼ per cent.; and all of the above ingredients are separately ground or comminuted and moistened. The coaldust is first mixed with the chlorate of potash, and the other ingredients are then added and the whole mixture ground to produce a homogeneous mass. The product is then dried and re-ground and sized as desired, as to granulation, and is ready for use. If charcoal alone is employed, the combustion is too violent and is dangerous. By using coaldust with the charcoal the combustion is modified and kept within limits of safety. The blasting powder constituted as above recited is found to be of an explosive strength equal to that of commercial Giant powder No. 2. It will not freeze, whereas Giant powder freezes at approximately 50 degs. Fahr. (Two claims.)

### NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

#### Applications for Patents.

17218. Furnaces of the laterally-fed type. W. Gartner.  
17235. Self-contained buffer. W. E. Cuniffe, J. Johnson, and G. W. Allen.  
17237. Apparatus for softening and purifying water, and for purifying other liquids. F. Lipscombe.  
17252. Process and apparatus for the distillation of carbonaceous material. S. R. Trevor.  
17255. Apparatus in ball and tube crushing and grinding machinery. G. Batchelor.  
17261. Electric conductor for explosive charges. H. J. von Klaeden.  
17266. Recording the movements or indications of measuring instruments and apparatus therefor. Siemens Bros. and Co. Limited. (Siemens und Halske Akt.-Ges., Germany.)  
17271. Pressure-reducing valves. A. Dinnis.  
17272. Process for obtaining benzol from petroleum or its distillates. J. Høegreber.  
17307. Manufacture of explosives of the Sprengel class. T. Hawkins.  
17327. Devices for use in actuating the controlling gear of power engines, turbines and the like. A. Gagg.  
17335. Steam or gas turbines or engines. Aktiebolaget Ljungströms Angturbin.  
17340. Apparatus for the distillation of mineral oils and the like. V. B. D. Cooper and A. W. Dsering.  
17355. Pneumatic tool for cleaning moulds in foundries. R. Hyde and J. R. Hyde.  
17370. Process for the production of a new source of heat and steam without the use of fuel. E. Montgomery.  
17394. Distillation of coal and other substances. J. Cadman.  
17406. Means for shoring-in excavations. G. G. Sinclair.  
17424. Purification, clarification and sterilisation of water. W. E. Evans. (H. Neel, France.)  
17431. Turbines. W. J. Mellersh-Jackson. (Ingersoll-Rand Company, United States.)  
17449. Apparatus for charging refuse-destroyer and other furnaces. H. N. Leask.  
17460. Means for testing the longitudinal axis of connecting rods of reciprocating engines or the like. W. and T. Avery Limited and A. W. Brown.  
17461. Recovery of tin from tinned plates. H. W. Gregory.  
17477. Explosives. B. J. Flürscheim.  
17496. Machine for completing sheet-metal folded seams. C. Bingham.  
17515. Furnaces for heating steam boilers by means of combustible gases or vapours. P. Cousin.  
17516. Process and apparatus for printing on tin-plate and other metals. S. Bakker.  
17519. Manufacture of briquettes. C. Fehr and E. Kleinschmidt.  
17524. Machine for the production of iron turnings. Soc. E. Cottard et Cie.  
17525. Automatic mechanical stoking device for steam boilers or the like. K. Petersen.  
17526. Bending machines for metal rods and bars. H. D. Lynes.  
17529. Apparatus for electrically igniting miners' safety lamps. V. E. Joyce and Spagnoletti Limited.  
17555. Foundry moulding boxes. Thompson Bros. (Bilston) Limited, W. B. Thompson, and H. K. Bather.  
17557. Testing machines. W. T. Avery Limited and H. W. Goulding.  
17571. Steam engines. T. Smethurst and J. N. Smethurst.  
17577. Combustion of combustible mixtures. Bonecourt Surface Combustion Limited and H. Edmunds.  
17590. Metallurgical and like furnaces. L. F. Tooth.  
17611. Feeding and distribution of charges in vertical distillation retorts. J. G. Aarts.

17612. Method of and apparatus for discharging carbonised products obtained in vertical retorts. J. G. Aarts.  
17613. Agglomerates of reduced metal and carbon, termed in particular ferrocarbonate and cuprocarbonite, and their process of manufacture. J. G. Aarts.  
17618. Superheaters especially applicable to locomotive boilers. J. H. Stirling and Schmidt's Superheating Company (1910) Limited.  
17620. Apparatus for lubricating the axles of colliery tubs and similar vehicles. Joseph Cook, Sons and Co. Limited and C. F. Cusson.  
17625. Generation of electrical power, and asynchronous-synchronous, transformer-motor, systems of electrical transmission of same, with means of speed regulation. W. P. Durnall.  
17627. Construction and arrangement of apparatus for the carbonisation of coal and the production of coal gas and coke therefrom. E. A. Franks.  
17633. Loco or similar type boilers. L. H. Sutton.  
17640. Crushing and cubing rolls. H. R. Marsden Limited and N. Taylor.  
17641. Stone-breakers, ore-crushers, and the like machines. H. R. Marsden Limited and N. Taylor.  
17644. Stays and bearings for use in conjunction with weighing apparatus. W. and T. Avery Limited and A. W. Brown.  
17653. Metal tubes, pipes, plates, and the like. A. J. Lewis.  
17661. Method of and apparatus for the distillation of bituminous matters. J. G. Aarts.  
17669. Holders for candles for use in mines, quarries and the like. W. T. Evans.  
17670. Automatic coupling for railway carriages and locomotives. E. Pepper.  
17672. Furnaces. J. Thomas.  
17676. Gas analysis apparatus. J. G. Taplay.  
17722. Retorts. H. Sykes.  
17727. Multitubular boilers. R. Eeles.  
17730. Process for the manufacture of colloidal coal and other substances in colloidal form. H. Plauson.  
17731. Manufacture of chemically pure molecular carbon. H. Plauson.  
17732. Process for converting coke into graphite. H. Plauson.  
17740. Adjustable double suction rotary pump. W. Parkes.  
17750. Automatic weighing apparatus. W. and T. Avery Limited and A. W. Brown.  
17773. Treatment of wet carbonised peat or the like. T. Rigby and Wetcarbonising Limited.  
17774. Locomotive and like boilers. F. H. Trevithick.  
17779. Apparatus for absorbing ammonia from producer gas. E. S. Mond.

#### Complete Specifications Accepted.

To be published on August 21.

1912.

9968. Steam superheating. De Ferranti.  
10203. Explosive compounds. Davies.  
14385. Miners' safety lamps of the electric type. Hudson.  
14871. Electric furnaces for fixing nitrogen from the air. Scott.  
17428. Utilisation of peat. Rigby, and Wetcarbonising Limited.  
17699. Locomotives. Lipetz and Magid.  
17733. Apparatus for making wire, hemp or other ropes, cables, and the like. Edwards, and Hanson and Edwards Limited.  
17855. Machines for charging and discharging gas-retorts. Lake. (Riter-Conley Manufacturing Co.)  
17972. Steam boilers. Alley and Woodvine.  
18542. Adjustable cable sling suspender. Smith.  
19002. Process for the manufacture of hydrogen from metals or low metal oxides and water. Bergius.  
19003. Manufacture of hydrogen from metals and water. Bergius.  
20140. Apparatus for cleaning tin plates and the like. Thomas.  
20190. Means for separating minerals from alluvial wash. Hughes.  
20900. Treatment of gases from coke ovens and of like gases, and the recovery of products therefrom. Coleman.  
21512. Protectors for the points of miners' pick blades. Watkins.  
23232. Mode of attaching teeth or sockets to continuous steel band saws used for cutting stone. Grice, Matthewson and George Anderson and Co. (1905).  
24237. Metallic armouring of insulated electric cables. Howard.  
25974. Making dephosphorised high grade pig iron. Héroult.  
27073. Doors for coke or other ovens or furnaces. Kickert.  
28508. Belt conveyors. White.  
29077. Centrifugal compressors. Mellersh-Jackson (Ingersoll Rand Company).  
29371. Apparatus for discharging vertical retorts. Koppers.  
29624. Apparatus for measuring and adding chemicals in purifying and softening water. Bethell.  
29683. Steam superheating. De Ferranti.  
29901. Explosives. Claessen.

1913.

4595. Magnetic separator. Fried. Krupp Akt.-Ges. Grusonwerk.  
4831. Crushing machines. Symons.  
6274. Apparatus for use in the production of gas. Boeckem.  
6504. Journal-boxes for railway and like vehicles. Berg.  
6598. Means for controlling the supply of steam to an engine. Harlé et Cie.  
7280. Sanitary convenience for mines. Morgan.  
8320. Valve apparatus for percussive rock-drills and the like. Rayner.  
9126. Fine coal and ore separator. Draper.  
10984. Adjustable guide wheels for centrifugal pumps, turbine pumps, and compressors or the like. Neufeldt and Zurovec.  
13906. Automatic couplings for railway vehicles. Schroeder.  
Complete Specifications open to Public Inspection before Acceptance.  
1913.  
16362. Pick-holders. Young.  
16805. Automatic fuel-feeding and distributing apparatus. Dietz.  
16935. Apparatus for purifying and filtering water for private and industrial purposes. Liot.

### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

- Explosion Report [No. 207] at Pitsea, March 28, 1913, 1½d.  
COAL MINES ORDER, dated June 27, 1913, APPROVING CERTAIN TYPES OF SAFETY LAMPS 3½d.  
Bills: National Insurance, as Amended, 3½d.; Truck, 1½d.; Mental Deficiency, 7d.; NATIONALISATION OF COAL MINES AND MINERALS, 2½d.; River Navigation Improvement (Ireland), 1½d.  
National Insurance: Scotland, Customs Order No. 1 (205) 2d.; Ditto, Subsidiary Employments, No. 1, 1d.; Ditto, Transfer of Deposit Contributors, 1d.; Ireland, Order Relating to Insurance Committees, 1d.; England, Special Employers' Customs Order No. 2, 1d.; Ditto, Special Customs Order No. 2, 1d.; Actuarial Report on the Bill, 1½d.  
Amendment Bill, note on Clause 8, Calculation of Arrears, 1½d.; Medical Benefit (Ireland) Report, 2½d.  
COAL MINES: MEMORANDUM ON TEST OF SAFETY LAMPS, 1½d. (Reprint of Memorandum, dated February 6, 1913.)  
Consular Reports: Galveston, 5½d.; German East Africa, 5½d.  
Boiler Explosion Report: Steam Pipe at the Carlisle Steelworks, Sheffield, No. 2233, 2½d.  
Report re Compensation for Industrial Diseases, 2d.  
Trade Unions: Membership and Expenditure Return, 1½d.

**Home Office Prosecution in Ayrshire.**—At Ayr Sheriff Court recently, John Barr, colliery proprietor, 21, Glasgow street, Hillhead, Glasgow, was charged with six contraventions of the Coal Mines Act in respect of the Maxwell coal pit, Daily. The charges were (1) that a fireman named Dunlop was not devoting his whole time to the duties, but also acting as under-manager; (2) that he failed to keep a separate plan showing the system of ventilation; (3) failed to have the bottom of the pit shaft being working as part of the mine securely fenced; (4) failed during part of an afternoon to have a signaller and winder on duty at the pithead; and (5) failed to keep a barometer above ground and two hygrometers below ground. The state of affairs existing at the pit was admitted, but evidence was led as to responsibility. Mr. Walker, H.M. Divisional Inspector of Mines for Scotland, in his evidence, said some of the seams of coal in this pit were on fire, and had been on fire for a considerable time. This pit had all along given them considerable anxiety, and he had been in correspondence with the proprietors with reference to it. Respondent stated that he was managing director of the Killochan Colliery Company, and that he consulted with the mine manager about affairs at the mine but never interfered directly with anything. He admitted he never read the Coal Mines Act nor the special rules. He considered the manager the responsible party and he thought it his (respondent's) duty to give the manager a free hand. The manager had been previously convicted and fined. The Sheriff held that respondent had failed to discharge the duties he was there to discharge. Fines amounting in all to £65 were imposed.

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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY, AUGUST 15, 1913.

No. 2746.

## BELGIAN SHOT-FIRING EXPERIMENTS.

### Further Tests with External Tamping.

IN September 1911, MM. Watteyne and Lemaire published a note\* on a special method of employing incombustible dust, devised at Frameries, with the object of safeguarding shot-firing operations and preventing the initial ignition of firedamp or coaldust by the flames of explosives. To this process the authors gave the name of *bouillage extérieur* or external tamping, and the preliminary experiments were so successful as to promise a sensible addition to the precautions applicable to shot-firing.

Further experiments have now been carried out, and the results are set forth in a second note by the same authors.† These, it may be said at starting, have fully confirmed the estimates already made as to the efficacy of the process.

extended to atmospheres containing firedamp. As before, explosives specially liable to ignite firedamp have been selected, those chosen comprising two of the nitroglycerine type, one with a cotton powder base, and one with a nitrate of ammonia base. For the first three an excessive charge of 600 grammes has been used.

The composition of the No. 1 dynamite used was as follows: Nitroglycerine, 42·5 per cent.; nitro cotton 1·5; sodium nitrate, 45·5, woodmeal, 3·0; barley meal, 5·0; trinitrotoluene, 2·0; sodium carbonate, 0·5. One cartridge charged with 100 grammes of this explosive when fired in a steel mortar easily fired a mixture containing 8 per cent. of firedamp. The incombustible dust was placed in a conical heap before the mouth of the cannon.‡ In no other of the 14 tests carried out with this explosive was there full ignition of the mixture; 3 kilogrammes of red shale proved ample in six tests

The experiments were made with charges containing 600 grammes of explosive, and the quantity of "external tamping" was successively reduced until an ignition was obtained. It was not until half a kilogramme was used that this occurred, tests with amounts varying from 1 to 3 kilogrammes having succeeded in preventing any ignition; in the case referred to, however, the propagation was slow and the flames were not of the usual colour, being yellower and brighter, thus bearing evidence of the presence of incandescent particles.

Using an ammonium nitrate explosive, in a charge of 100 grammes, fired in the steel mortar, the firedamp mixture was ignited; on the charge being raised to 900 grammes no ignition occurred, using quantities of incombustible material ranging from 1 to 4½ kilogrammes.

The following tables give particulars of some selected experiments:—



FIG. 1.—SIX CARTRIDGES OF DYNAMITE FIRED IN A STEEL MORTAR WITH 4 KILOGS. OF EXTERNAL TAMPING.

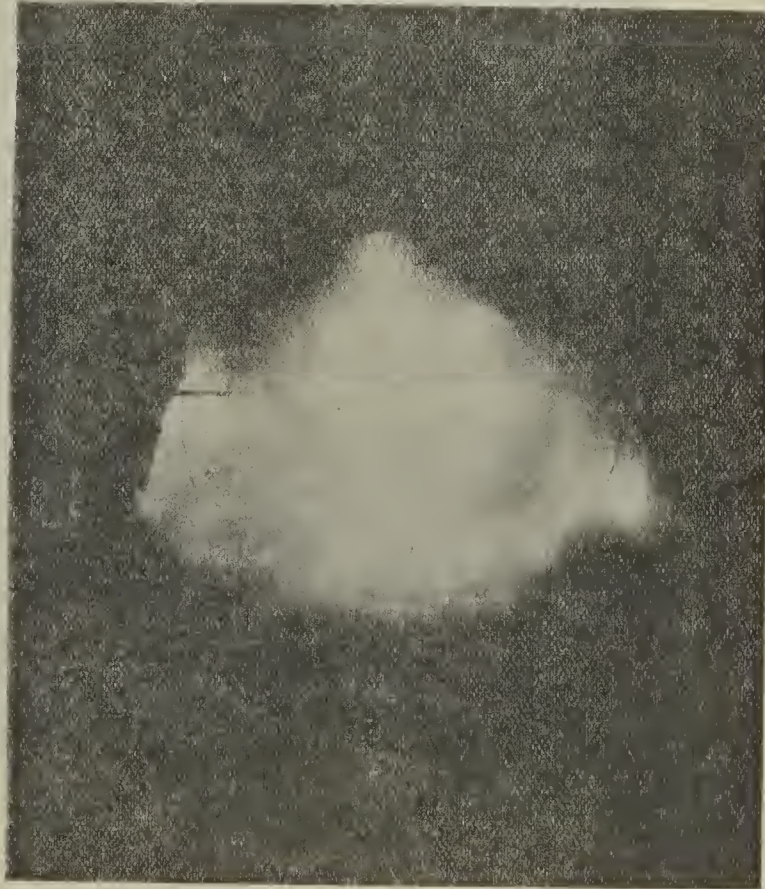


FIG. 2.—SIX CARTRIDGES OF DYNAMITE FIRED IN A STEEL MORTAR WITHOUT EXTERNAL TAMPING.

"External tamping," it may be recalled, consists in depositing a certain quantity of incombustible dust before the orifice of the shothole so as to completely mask it. The quantity of dust necessary to prevent the ignition of firedamp or coaldust, is insignificant, varying with the explosive charge. In the previous tests this quantity was determined by the formula  $P = \frac{Q}{120}$ , where P is the weight of incombustible dust expressed in kilogrammes, and Q the amount of heat in large calories, generated by the detonation of the explosive charge, deduction being made of the amount of heat necessary to raise the temperature of the products of combustion to 600 degs. To simplify calculations, this formula may be rendered  $P = 1 + 5p$ , where p represents the weight of the explosive charge expressed in kilogrammes. Experience has shown that the quantities given by this formula are quite ample. Briefly, the result of a blown-out shot is to throw the incombustible dust into suspension, thus creating a most unfavourable medium for the development of an explosion, whilst a quantity of heat is actually absorbed in the act of raising the dust cloud. Reference to figs. 1 and 2 will show the precise effect.

### Blown-out Shots.

The tests already described, which were carried out exclusively in atmospheres containing coaldust, have now been completed; the investigation has also been

to prevent ignition from charges of 600 grammes of explosive, and when the quantity of inert material was reduced to 1·8 kilogrammes light was seen at the first window in the gallery. With an explosive charge of 200 grammes 1 kilogramme of red shale proved to be sufficient. It is noted, however, that when 3 kilogrammes of coarse sand were employed, with a charge of 600 grammes, flame was seen at the first window of the gallery, although there was no propagation; reducing the respective quantities of stonedust and explosive to 2 kilogrammes and 200 grammes, complete immunity was the result. The conclusion arrived at is that a weight of incombustible material equal to five times the weight of the explosive charge is sufficient to prevent the ignition of the most critical firedamp mixtures, but that it is important that the inert material should be well pulverised.

Half a cartridge (containing 50 grammes) of gelatine dynamite (gelatinised nitroglycerine, 40 per cent.; sodium nitrate 43 per cent.; cellulose 16·5 per cent.; sodium carbonate 0·5) readily ignited a 7 per cent. mixture. As in the previous tests, in six cases 3 kilogrammes of red shale sufficed with charges of 600 grammes of gelatine dynamite.

The next tests were carried out with Belgian tonite (endecanitic cotton powder, 53 per cent.; barium nitrate, 37·6 per cent.; potassium nitrate, 9·4 per cent.). This explosive is a military rather than a blasting explosive, and was chosen on account of its disruptive capacity and the facility with which it ignites firedamp.

TABLE I.—EXPERIMENTS IN THE PRESENCE OF FIREDAMP (STEEL MORTAR)

	Weight of explosive charge.	Percentage of firedamp.	Nature of incombustible material.	Weight of incombustible material.	Result.
	gr.	Per cent.		Kilog.	
No. 1 Dynamite.	100 ... 8·0 ...	...	—	...	Ignition.
	600 ... 8·0 ...	...	Red shale.	3·0 ...	No ignition.
	600 ... 8·0 ...	...	do.	1·8 ...	Flame seen at first window.
	200 ... 8·0 ...	...	do.	1·0 ...	No ignition.
	600 ... 8·1 ...	...	Coarse sand...	3·0 ...	Flame seen at first window, but no propagation.
	200 ... 8·0 ...	...	do.	2·0 ...	No ignition.
Gelatine Dynamite.	50 ... 7·0 ...	...	—	...	Ignition.
	600 ... 8·0 ...	...	Red shale.	3·0 ...	No ignition.
	100 ... 8·0 ...	...	—	...	Ignition.
Tonite.	600 ... 8·0 ...	...	Red shale.	1·0 ...	No ignition.
	600 ... 7·9 ...	...	do.	0·5 ...	Ignition and slow propagation.
	100 ... 8·0 ...	...	—	...	Ignition.
Ammonium Nitrate Explosive.	50 ... 8·0 ...	...	—	...	No ignition.
	900 ... 8·0 ...	...	Red shale.	1·0 ...	No ignition.
	900 ... 8·0 ...	...	Fine sand.	1·8 ...	No ignition.
	100 ... 8·0 ...	...	—	...	Ignition.

### The Kruskopf Device.

Tests were also made with a variation that has been tried with success at Neunkirchen. This device

\* Ann. des Mines de Belgique, t. xvi., 1911, 4th part; Colliery Guardian, November 3, 1911, p. 873.

† Ann. des Mines de Belgique, t. xviii., 1913, 3rd part.



...nted by the firm of H. E. Kruskopf, of Dortmund, consists in the insertion in the shot hole of a cardboard cylinder containing incombustible dust, to which is fixed, outside the hole, a paper bag also filled with similar dust. Experiments showed that the results obtained with this method are much the same as those obtained when employing a simple cone of dust, as in the tests already described. MM. Watteyne and Lemaire, however, indicate a source of danger arising from the ignition of the cardboard and paper receptacles. In some of the tests, small fragments of cardboard and paper were subsequently found in the gallery, but these showed no signs of burning.

Experiments with Stemmed Shots.

The authors have also investigated the behaviour of incombustible dust in cases where shots have been allowed to do their work. For this purpose the steel mortar was replaced by granite cannons. In the first place cannons fashioned out of cement and concrete were used, but it was found that the destruction effected by the explosive charge in these cases was so complete as to create an effective *bourrage extérieur* from the shattered materials themselves.

Holes were bored of the diameter of the cartridges in the axes of the blocks, which measured 1 metre in length and 0.40 metre across. The blocks were placed on the ground inside the testing gallery, the walls of

records when a carefully prepared clay stemming, 30 centimetres in length, was employed, but the plates proved to be incapable of registering any visible effect.

Tables II., III., and IV. show some typical experiments:—

TABLE II.—EXPERIMENTS IN THE PRESENCE OF FIREDAMP (STONE CANNONS).

Weight of explosive charge (No. 1 dynamite).	Percentage of firedamp.	Weight of incombustible dust (red shale).	Result.
Gr.		Kilog.	
100 ... 7 ...	...	...	Cartridge placed at orifice of bore; no ignition.
200 ... 7 ...	...	...	Charge placed at orifice; detonator inserted in outside cartridge; no ignition.
400 ... 8 ...	...	...	Do.
400 ... 8.1 ...	...	...	Charge placed at orifice; detonator in innermost cartridge; ignition.
300 ... 8.1 ...	...	...	Same arrangement as above; flame at first window, but no propagation.
400 ... 8.1 ...	...	3	Same arrangement; no ignition.
500 ... 7.8 ...	...	...	Detonator in third cartridge of five; clay stemming 0.10 m. in length; no ignition.

100 grammes. It is difficult to say if these shots were properly stemmed, but it is certain, on the other hand, that several were not "blown-out" shots. It is, therefore, necessary to act cautiously in drawing the conclusion from these experiments that small charges are not dangerous; nevertheless the lack of stemming is a positive danger, and it is probable that a shot which simply heaves the strata without shattering it, is not without danger, and may be likened to some extent to an unstemmed shot.

The series of experiments last described was subject to the objection that, in order to preserve the testing gallery from damage, it was necessary to limit the charge of explosive to 400 grammes. This and other considerations led to the construction of a new gallery driven in the rock at Bois de Colfontaine, to the south

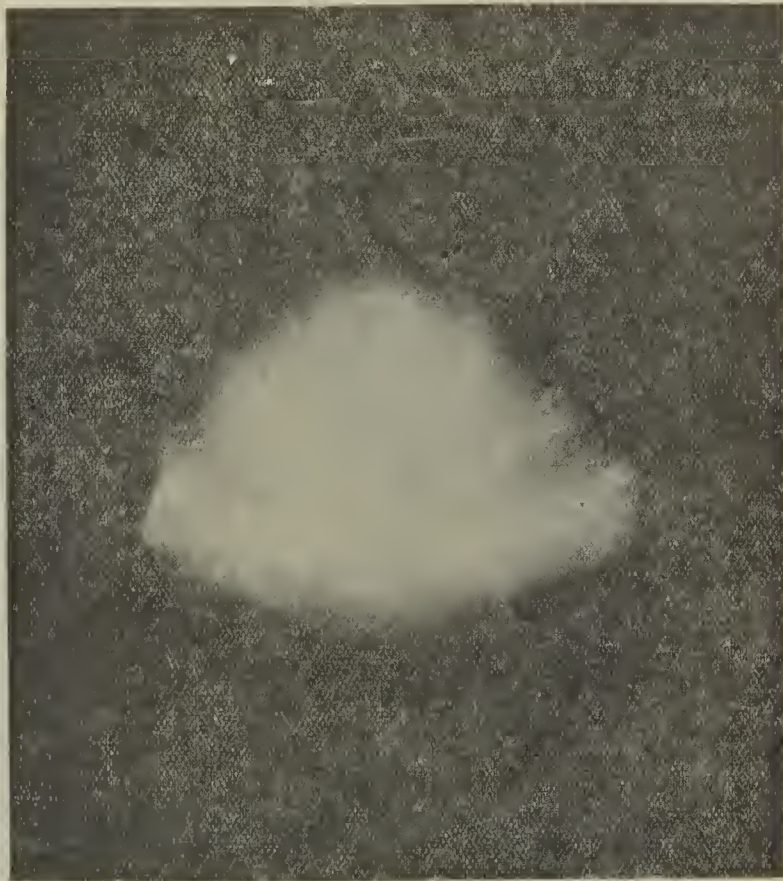


FIG. 3.—FIVE CARTRIDGES OF DYNAMITE FIRED IN A STEEL MORTAR.

which were protected by old mine cables. Experiments were then carried out with dynamite and gelatine dynamite, in atmospheres containing firedamp and coaldust respectively. It was found possible to fire charges of 100, 200 and 300 grammes of explosive, unprovided either with internal or external stemming, without any ignition. To ignite firedamp with a charge of 400 grammes of dynamite, it was necessary to place the detonator at the rear of the shot hole, for, when placed at the outer end, no ignition followed. However, when the detonator was thus reversed, stemming applied either internally or externally sufficed to prevent the ignition. When efforts were made to ignite coaldust under such conditions it was found that, in order to obtain an ignition, it was necessary partially to mask the shot hole with the combustible dust.

The accompanying photographs (figs. 2 and 3) show the relative size of the flames produced by the explosion of charges fired respectively in steel and stone cannons. The flame shown in fig. 2 occupies the whole breadth of the gallery, or about 2½ metres, whilst it rises about 1½ metres above the axis of the mortar, its total length being estimated at 4 metres. The photograph possesses a special interest on account of the secondary flames to be seen on the left between the timbers. Fig. 4 shows the results of firing a similar charge without stemming in a stone cannon, the detonator being placed in the last cartridge introduced into the shot hole. The considerable diminution in the dimensions of the flame will be noted; it is indeed comparable with the flame produced by using a "permitted" explosive in a steel cannon (fig. 5). Figs. 6 and 7 show the result obtained when the detonator was placed at the rear of the shothole. Efforts were made to obtain photographic

TABLE III.—EXPERIMENTS IN PRESENCE OF COALDUST (STONE CANNONS).

Weight of explosive charge (No. 1 dynamite).	Proportion of coaldust per cubic metre.	Result.
Gr.	Gr.	
400 ... 400 ...	...	Coaldust placed on floor with certain amount in suspension; no ignition.
400 ... 400 ...	...	Coaldust similarly disposed, but a quantity placed on a plank before the shot-hole, partially masking it; red flame seen at first two windows.

MM. Watteyne and Lemaire draw the conclusion that, although further tests will be necessary for full corroboration, shots that do their work are much less dangerous than those which "blow out," and that they are notably safer than shots fired in a steel mortar. At the same time, the experiments demonstrate the great importance to be attached to stemming; also that the danger of ignition arises mainly at the orifice of the shothole and that the gases which escape between the fragments of rock disintegrated by the explosion are only dangerous to a slight degree. These conclusions invest with importance the process of external tamping now advocated, since it prevents ignition of firedamp or coaldust in cases where a shot is "blown out" or the stemming is defective. It is especially necessary to see that the external tamping contains no combustible matter.

An examination of the reports on accidents that have occurred in Belgium due to the ignition of firedamp or coaldust, shows that certain of them have been caused by charges of rending (*brisant*) explosive not exceeding



FIG. 4.—FIVE CARTRIDGES OF DYNAMITE FIRED IN A STONE CANNON WITHOUT STEMMING: DETONATOR IN LAST CARTRIDGE INSERTED.

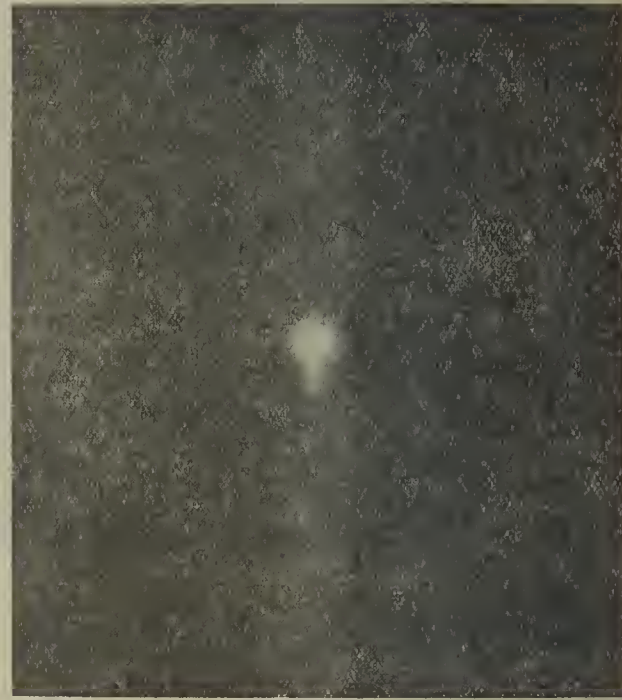


FIG. 5.—EIGHT CARTRIDGES OF "PERMONITE" FIRED IN A STEEL MORTAR.

of Frameries. The ground at this place offers conditions comparable with those encountered in a coalmine. The work of construction was commenced at the beginning of last year. When this new gallery is finished it is hoped that it will be possible to complete the investigations in regard to the *bourrage extérieur*, to verify, under practical conditions, the experiments already made, and to embark upon the study of new problems affecting the safety of shot-firing.

Internal Stonedusting.

It has already been observed that, in the tests carried out in cannons constructed of stone and cement, the crushing of the materials by the explosion provides an element of safety. MM. Watteyne and Lemaire have utilised this fact to suggest a new line of research. This consists in placing the explosive charge in a sheath of dust, friable cement, light pottery, dry clay, &c. In this connection it may be observed that tests have already been made with explosives encased in a sheath containing water, or in water in a gelatinised form: These methods gave favourable results, but were accompanied by practical difficulties resulting from the use of the water. To this new process the authors give the name of *schistification intérieure*. Only a few summary tests have so far been carried out. Dynamite cartridges were placed in a steel mortar, reposing on the floor of the bore, and were covered with incombustible dust;



the last cartridge introduced extended to within a centimetre of the mouth.

This method prevented the ignition of firedamp when 400 grammes of dynamite were used, or four times the quantity readily sufficient to ignite gas, when fired in a steel mortar, without the addition of diluents. Of the three tests, with charges of 500 grammes, only one resulted in an ignition. When the firedamp was replaced by coaldust, similar results were obtained. Owing to the fact that the bore of the mortar used was only 0.50 metre in length, it was necessary, when charges of over 400 grammes were inserted to dispose the cartridges in two rows, thus leaving insufficient room to surround the charge effectively with incombustible material. In the further tests which it is proposed to carry out, this difficulty will be obviated.

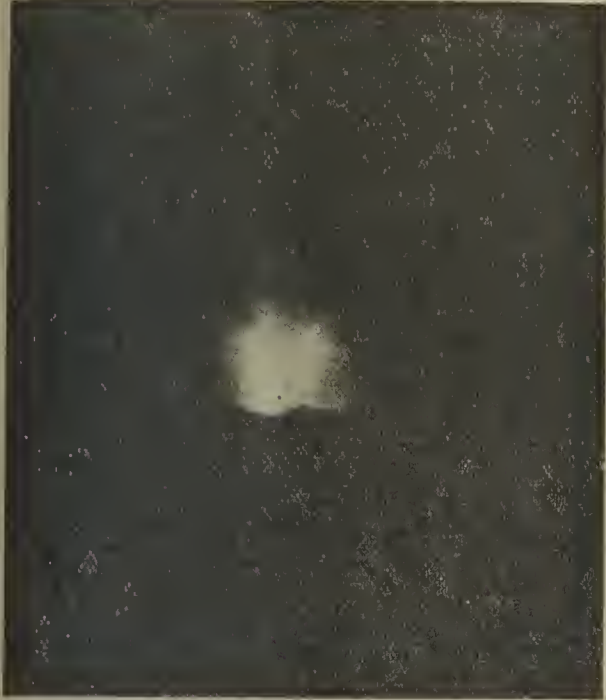


FIG. 6.—FIVE CARTRIDGES OF DYNAMITE FIRED IN A STONE CANNON WITHOUT STEMMING: DETONATOR INSERTED AT REAR OF SHOT- HOLE.

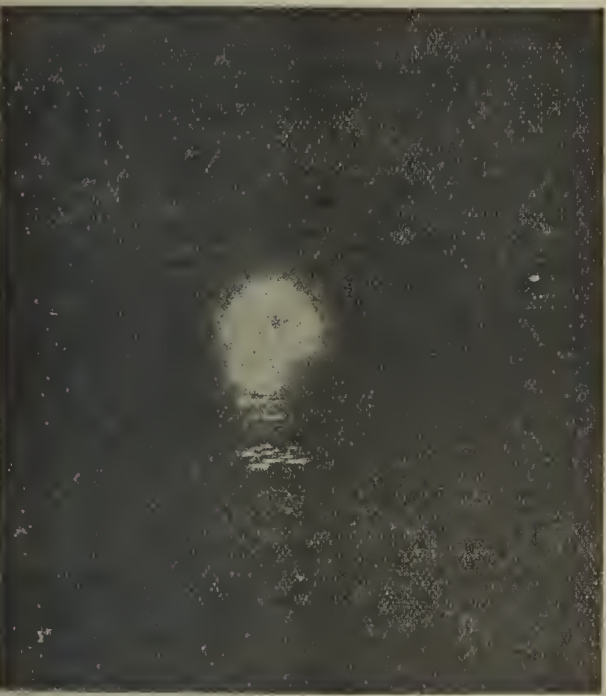


FIG. 7.—FIVE CARTRIDGES OF DYNAMITE FIRED IN A STONE CANNON WITHOUT STEMMING: DETONATOR INSERTED AT REAR OF SHOT- HOLE.

Some representative tests are shown in Tables IV. and V.:

TABLE IV.—EXPERIMENTS IN THE PRESENCE OF FIREDAMP (Schistification Intérieure).

Weight of explosive charge (No. 1 dynamite).	Percentage of firedamp.	Nature of in-combustible dust.	Weight of in-combustible dust.	Result.
Gr.			Kilog.	
400 ...	8.1...	Red shale ...	1,100 ...	Outer cartridge 1 cm. from mouth of shot-hole. No ignition.
400 ...	7.8...	Chalk ...	900 ...	Ditto.
500 ...	7.8...	Red shale ...	1,150 ...	Ignition.
500 ...	8.3...	Chalk ...	830 ...	No ignition.
600 ...	7.9...	Ditto ...	820 ...	Ignition.

TABLE V.—EXPERIMENTS IN THE PRESENCE OF COALDUST (Schistification Intérieure).

Weight of explosive charge (No. 1 dynamite).	Weight of coaldust * per cubic metre.	Nature of incombustible dust.	Weight of incombustible dust.	Result.
Gr.	Gr.		Kilog.	
500 ...	400 ...	Red shale ...	1,100 ...	Ignition.
400 ...	400 ...	Chalk ...	820 ...	No ignition.

\* Containing 35 per cent. of volatile matter.

MINING INSTITUTE OF SCOTLAND.

Presentation to Mr. Barrowman.

Under the joint auspices of the Mining Institute of Scotland, the Scottish branch of the National Association of Colliery Managers, and the Scottish branches of the Association of Mining Electrical Engineers, an excursion took place on Saturday. The company, which numbered upwards of 300 and included many ladies, left Queen-street Station, Glasgow, per special train direct for Craigendoran. Here the steamer "Waverley," which was specially chartered for the occasion, was in waiting to convey the trippers on a seven-hours cruise through the Kyles of Bute and round the Island of Arran.

The company was one thoroughly representative of Scottish mining interests, and amongst those present were:—Mr. James Hamilton, Glasgow, president of the Mining Institute of Scotland; Mr. Charles C. Reid, president of the National Association of Colliery Managers (Scottish branch); Mr. Matthew Brown, president of the West of Scotland branch Association of Mining Electrical Engineers; Mr. Alexander Anderson, Wishaw, president-elect of the Association of Mining Electrical Engineers; Dr. R. T. Moore, president of the Institution of Engineers and Ship-builders in Scotland; Mr. James T. Forgie, Bothwell (Messrs. Wm. Baird and Co.); Baillie James Moffat Hamilton (managing director of the Wemyss Coal Company); Mr. D. M. Mowat (Summerlee Coal Company); Mr. J. B. Thomson, Hamilton (John Watson Limited); Mr. George Gibb, Glasgow (Messrs. James Nimmo and Co.); Mr. Robert Baird, Cambuslang (secretary of the Lanarkshire Coalmasters' Association); Mr. Sam Mavor (Messrs. Mavor and Coulson, Glasgow); Messrs. Robert McLaren and J. Masterton, H.M. inspectors of mines; Messrs. Frank Anslow, A. B. Muirhead, H. G. McGuffie, Campbell King, D. Landale Frew, D. Martin, R. W. Peters and J. Smellie representing the councils of the A.M.E.E.; Mr. G. A. Mitchell, Glasgow (Messrs. Kerr and Mitchell, coalmasters), Mr. W. H. Telfer (Wilson's and Clyde Coal Company); Mr. James Nimmo, Edinburgh; Mr. Thos. Boyes (Messrs. Anderson and Boyes, Flemington Works, Motherwell); Messrs. Douglas Jackson, Newmains; Robert Wilson, Giffnock; J. Balfour Sneddon, Mid-Calder; Peter Milligan, Arniston; Wm. Smith, Dalmellington; D. Todd, Banknock; Frederick Duncan, Mount Vernon; D. Black, Bathgate; R. M. Howatt, Glasgow; Harry W. Lewin, Glasgow; George Murdoch, Coatbridge Technical School; William Williamson, Hamilton Technical School; Wm. Jarvie, Bothwell; James Blackwood, Hamilton; Neil A. Wilkie, Cardenden; James Nisbet, Summerlee Iron Company; Peter Thornton, coalmaster; Wm. McCreath, Glasgow; Mark Brand, Twechar; Henry Rowan (Fife Coal Company); J. M. Scally, Mount Vernon; Wm. Howat, Motherwell; Richard McPhee, Bothwell; K. M. Martin, Shettleston; Robert Crawford, Douglas; M. Howieson, Dunfermline; Wm. Stevenson, Omoa, Cleland; A. H. Russell, Armadale; James Allardice, Lesmahagow; A. R. Milligan, Cumnock; James Dalglish, Motherwell; John McLuckie, Larkhall; J. Kilpatrick, Larkhall; J. Paton, Earnock; John M. Martin, Carmyle; Alexander McLuckie, Muirkirk; Jas. Drylie, Glasgow; Wm. Riddell, Bothkennar; Wm. Ross, Chryston; James Kirkpatrick, Uddingston (secretary of the Scottish branch National Association Colliery Managers); and Mr. G. L. Kerr (secretary of the Mining Institute of Scotland).

General Meeting.

During an interval between dinner and tea, which was purveyed and served on board the "Waverley," a general meeting of the Mining Institute of Scotland was held in the upper-deck saloon. Mr. JAMES HAMILTON, president of the institute, occupied the chair, and he was supported by the guest of the afternoon, Mr. James Barrowman, Hamilton, who was accompanied by Mrs. Barrowman. At the outset the following were admitted to membership:—Messrs. T. Kasakabe, colliery manager, Mining Department, Tokio, Japan; C. F. Smith, civil and mining engineer, Penang; Robert Young, under-manager, Cardenden, Fife; and A. K. Smith, mining engineer, Cambuslang (associate member).

Magnesite Deposits in Eubœa, Greece.

The PRESIDENT announced that the paper by Mr. James Hogg, on the subject of "Magnesite Deposits in Eubœa, Greece," would be printed in due course so as to enable the discussion upon it to be taken at next meeting.

Presentation to Mr J. Barrowman.

The PRESIDENT said they had now come to what was the most interesting part of the day's proceedings, and perhaps it was the only justification for calling them all together. It had fallen to him to make the presenta-

tion to Mr. Barrowman on the occasion of his retirement from the secretaryship of the Mining Institute. He could have wished that some of the previous presidents of the institute had undertaken this duty, because in one respect he was at a disadvantage in that he had been under Mr. Barrowman from his (the speaker's) start in mining, and he still even yet retained some of the awe and reverence with which he regarded that gentleman at first. Very few members of the Mining Institute of Scotland had known Mr. Barrowman longer than he had done. He was introduced to him and a coalpit on the same day. The date—if he remembered rightly—was January 4, 1874, and the pit was the old gas pit at Auchenheth. Since then he had been very closely associated with Mr. Barrowman, and, if he might be allowed to say so, one of his characteristics was a passion for accuracy in his work and neatness in draughtsmanship. Indeed, those of them who had been trained under Mr. Barrowman owed him a good deal for their sense of accuracy and neatness. It was 30 years now since Mr. Barrowman undertook the secretaryship of the institute. To be secretary of an institute such as theirs was no easy matter. It involved the giving up practically of all one's spare time, and that meant a great deal. Mr. Barrowman, however, had undertaken the work, and he had carried it out along with his other multifarious duties with the utmost efficiency. As he had remarked, it was no easy matter to be secretary of the institute, because that official had to provide the necessary material for the meetings every two months, and he had also to see that the discussions were carried on. He had likewise to be constantly on the outlook for new ideas, so that interest in the institute might be sustained to the last. Then—and perhaps most important of all—he had to edit the *Transactions* of the institute. In such a task he had to consider the susceptibilities of the author, and to reconcile these, so far as possible, with the tastes of the readers. It was, he thought, a strong testimonial to the tact displayed by Mr. Barrowman as secretary, that there had been practically no friction during his régime as editor. In conclusion, the president, in the name of the members, presented Mr. Barrowman with a cheque for £150, together with a handsome Chippendale drawing-room clock, suitably inscribed, and a gold watch bracelet for Mrs. Barrowman.

Mr. JAMES T. FORGIE (Bothwell) said that nothing gave him greater pleasure than to be present that day, and to take some little part in doing honour to Mr. Barrowman who had been so long associated with the Mining Institute of Scotland. He had something to do with starting the institute, and he had to confess he looked back with pleasure on the small beginnings of the institute, and in comparing it with its present position to-day in the mining world. Much credit was, he felt, rightly due to Mr. Barrowman for the excellent way he had conducted the affairs of the institute. He had been most untiring and energetic throughout. No doubt it had often been said that the Mining Institute of Scotland did not hold the position in the kingdom that it should do; but nevertheless they had gone a long way. If their new secretary carried out the work with the same zeal and enthusiasm as Mr. Barrowman, then there was no saying what they might yet accomplish. Proceeding, Mr. Forgie went on to say that no one regretted more than he did the retirement of Mr. Barrowman, and he was glad to observe that the council had very wisely elected him an honorary life member. Of late their guest had unfortunately not been in good health, and they saw him with them that day a great deal better than he had been for the last two or three years. It was the wish of all, he (Mr. Forgie) was sure, that Mr. Barrowman would be restored to good health and that he would be long spared to look back on the interesting event of that day.

Mr. JAMES BARROWMAN, who was received with much cordiality in rising to reply, said that when the institute did him the honour at the last annual meeting of electing him to be an honorary life member, the president at the time did not afford him an opportunity of acknowledging the kindness. He now, therefore, took the opportunity of thanking the institute for the signal honour they had conferred upon him. Because he knew that in the past the institute had always been somewhat chary in bestowing that particular honour, he appreciated it all the more highly. On an occasion such as this, one was inclined to be reminiscent, and in the few remarks he wished to make he desired to refer to some outstanding features in the institute's history. Since the institute was founded, early in 1878, 1,736 persons had joined it as members. Of these, 1,072 had retired, through death or other causes, leaving as at April last 664 on the roll. Of the 10 original members of the institute seven were now gone, and three were alive. Mr. Jas. T. Forgie was



only one of the three who was present with them that day. The other two were Mr. Gilchrist and Mr. John Hogg. During the 35 years of the existence of the institute there had been 12 presidents, three secretaries, and six treasurers. Personally he had the pleasure of serving the institute during the last 30 years under 10 presidents. The work had been congenial to him, and his relations with the presidents and with the members of council had always been of the most harmonious character. What the President and Mr. Forgie had said with regard to his performance of the duties pertaining to the secretaryship was much too generous, because he was conscious of manifest defects in doing the work that fell to him. At the same time he thankfully testified to the kindness and indulgence which were extended to him by the members of council as well as the members of the institute. He was not able to give expression to all that he felt in acknowledgment of the kindness and generosity, of which those costly gifts were a tangible outcome. On behalf of his wife and for himself he had to thank them out of a full heart. They would prize them not only on account of their intrinsic value, but for what they signified. They would constantly remind him of a long period of pleasant work—work, which he hoped was also profitable—and of kindnesses received from members of the council and the institute generally beyond all time.

The PRESIDENT said that on behalf of the Mining Institute of Scotland he had to express pleasure in being associated in the excursion that day with the Scottish

### THE TESTING OF EXPLOSIVES.

The 37th annual report of H.M. inspectors of explosives includes a memorandum issued in regard to the test of explosives for inclusion in the Permitted List. It may be recalled that the explosives at present on the old Permitted List will be retained on the list until the end of the present year. An Order has been issued, dated March 31, 1913, scheduling a number of explosives that have passed the new test.

The memorandum is as follows:—

1. *Explosive*.—No explosive can be received at the testing station for the purpose of being officially tested or of being fired experimentally unless (1) it has been placed on the Authorised List of Explosives in force for the time being, or has passed the chemical test for being placed on that list; and (2) the Secretary of State is satisfied that both the explosive and the cartridge or combination in which it is proposed to issue it are of such a character as not to be liable to deteriorate or to be misused or to become dangerous under the conditions of storage or practical use.

2. *Application for Test*.—When it is desired to submit an explosive to the official test, an application form should be obtained from H.M. inspectors of explosives, and this, when filled in, should be forwarded, together with the prescribed fee, to the Under-Secretary of State, Home Office, Whitehall, S.W. The exact percentage of each ingredient should be stated.

3. *Second Trial*.—If an explosive fails to pass, no

7. *Removal from Permitted List*.—If any explosive fails on formal retest, the Secretary of State will, if he thinks fit, remove it from the Permitted List, or he may allow its retention on the Permitted List with a lower maximum charge, to be determined by a fresh test of the explosive. He also reserves the right, after such enquiry as he may think fit, to remove from the Permitted List any explosive which in practical use is found to cause ignitions or to be otherwise dangerous, or which on examination proves to be of defective composition or bad manufacture, or fails in any way to comply with the conditions on which its use is permitted.

8. *Experimental shots*.—Applications for firing experimental shots to enable manufacturers to form an idea as to the probability of a new explosive passing the official test or to assist them in working out an improved explosive should be addressed to his Majesty's Chief Inspector of Explosives, Home Office, Whitehall, S.W.

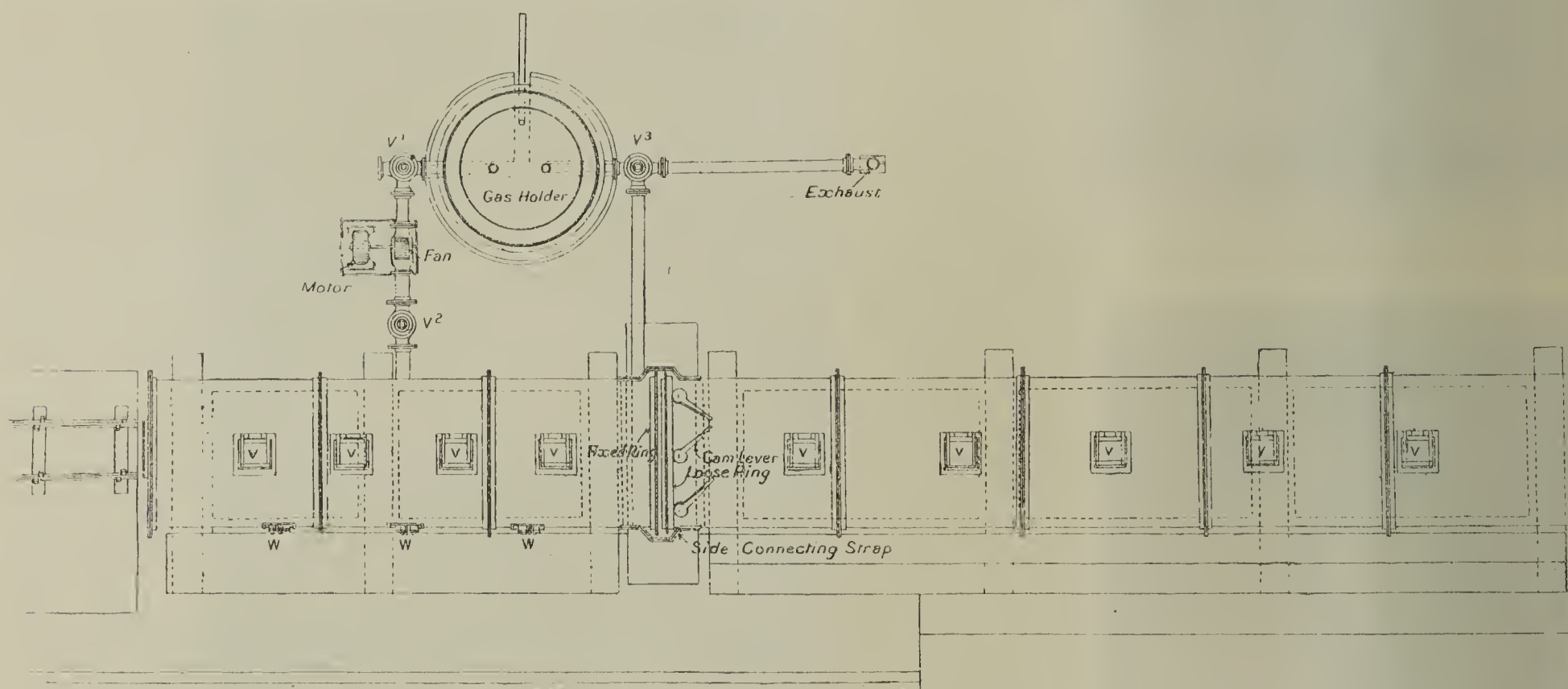
As a general rule it will not be possible to fire experimental shots on the same day as the official test.

The fee for such shots will be in accordance with the rate specified.

The exact composition of the explosive, together with the nature and material of the cartridge or wrapper in which it is proposed to issue it, should be stated.

9. *Consignment of Explosives*.—The amount of explosive required for the official test will be 50 lb., made up as follows:—

48 lb. in cartridges  $1\frac{1}{8}$  in.  $\pm$   $\frac{1}{16}$  in. diameter, of which—



PLAN  
FIG. 1.

branches of the National Association of Colliery Managers and the Association of Mining Electrical Engineers. He thought it was very desirable that they should cultivate fraternal relations as much as possible amongst the different bodies. Their aims were the same, and there was room for each in its own particular way. Personally, he trusted that this would not be the last occasion in which they would meet together in the same way.

Admirable arrangements in connection with the outing were made by the joint secretaries—Messrs. G. L. Kerr, Jas. Kirkpatrick, David Martin and R. W. Peters. It should be mentioned that the clock which was presented to Mr. Barrowman bears the following inscription:—“Presented to James Barrowman by the Mining Institute of Scotland on his retirement from the office of secretary after 30 years’ service—August 9, 1913.”

**New Colliery in Barnsley District.**—With reference to the paragraph which appeared under the above heading in the last issue of the *Colliery Guardian*, we understand that the statement that Messrs. Harry Jaggar and Sons are the owners of several collieries in the district extending towards Clayton West is liable to prove misleading, as indicating that the firm in question is associated with Messrs. Stringer and Jaggar Limited, owners of Park Mill and Emley Moor collieries. As a matter of fact, we understand that Mr. Harry Jaggar, who was formerly the owner of the Emley Moor collieries, some four years ago transferred his interest in them to Mr. Stringer and Jaggar Limited to Mr. Stringer. Mr. Jaggar is one of the present proprietors of the Round Green Colliery at Worsbrough Bridge, which, however, is hardly in the Barnsley district.

second trial will be allowed without the special sanction of the Secretary of State.

4. *Permitted List*.—Explosives which pass the test, the conditions of which are set out in Appendix A, will be placed on the Permitted List. This list will specify the composition of the explosive, allowing a small margin in the percentages of the ingredients to cover the variations which arise during manufacture, and will lay down the maximum charge which may be used, and other conditions as to the use of the explosive. The list will also specify in the case of each explosive by what manufacturer and at what factory or factories it is to be made, but alterations in the name of the manufacturer and in the factory or factories will be allowed on good cause being shown.

5. *Altered Explosive*.—In the event of the manufacturer desiring to make an alteration in an explosive already on the list, a test for an altered explosive will be allowed if the alteration, in the opinion of the Secretary of State, is not such as to constitute a new explosive. An explosive cannot be regarded as an “altered explosive” if the alteration is such as to make fresh chemical examination for the purpose of the Authorised List necessary. No alteration in the maximum charge will be allowed. Application for the testing of an altered explosive should be made on the same form as for a new explosive, and should be forwarded to the Under-Secretary of State, Home Office, Whitehall, S.W., together with the prescribed fee.

6. *Official Retest*.—The Secretary of State may, at any time, cause any explosive on the Permitted List to be formally retested. Notice of any formal retest will be sent to the manufacturer of the explosive.

33 lb. should be in cartridges each containing 8 oz. of explosive.

10 lb. should be in cartridges each containing 4 oz. of explosive.

5 lb. should be in cartridges each containing 2 oz. of explosive.

The remaining 2 lb. to be in cartridges of  $1\frac{1}{8}$  in. diameter and containing 4 oz. of explosive each.

Explosives should be forwarded, carriage paid, to—H.M. Inspectors of Explosives, Home Office Testing Station, Car House Colliery, Rotherham, Yorks.

The Secretary of State reserves to himself the right of storing all explosives submitted for the official test for at least 30 days prior to the test.

Explosives must not be despatched to the testing station until sanction has been obtained from H.M. inspectors of explosives.

10. *Manufacturers at Testing Station*.—Manufacturers and their representatives can attend at the testing station when their explosives are being officially tested or retested, or when experimental shots with their explosives are being fired.

#### Conditions of Test.

1. The test will be carried out by H.M. inspectors of explosives with the testing apparatus at the Home Office Testing Station at Rotherham.

2. The test will be carried out as follows:—

Shots will be fired into a mixture of gas and air until the largest charge which can be fired without igniting the mixture is found. Further shots will then be fired—beginning with this charge, and, in the event of an ignition, reducing the charge—until



five shots of the same weight have been fired without igniting the mixture.

Shots will then be fired with the charge so determined into coaldust, and the same procedure adopted, until five shots of the same weight have been fired without igniting the coaldust.

The lower of the charges thus determined will be known as the "maximum charge."

In making alterations to the weight of the charges, the increment or decrement of charge will not be less than 2 oz.

3. In loading the gun the charge will be pushed to the bottom of the bore (a clay plug having been previously inserted to protect the crown of the bore), and will have no tamping.

4. The coaldust will be ground to such a degree of fineness that not less than 90 per cent. will pass through a sieve of 150 meshes to the linear inch.

5. In addition to the foregoing shots, other shots will be fired at the ballistic pendulum, and the swings registered on the sliding scale provided for the purpose will be recorded. The mean swing thus obtained will be published in comparison with that given by a charge of gelignite containing 60 per cent. of nitro-glycerine.

6. Every shot will be fired electrically, and in the case of high explosives a detonator of the size recommended by the manufacturer or the person submitting the explosive will, subject to the approval of the Home Office, be used.

7. Each shot will be fired in the case, wrapper or covering in which the explosive is proposed to be employed in actual use.

8. An explosive will be considered to have passed the test if—

1. The "maximum charge" as above determined is not less than 8 oz. :
2. If, in the shots at the pendulum, no appreciable amount of the charge has been left unexploded :

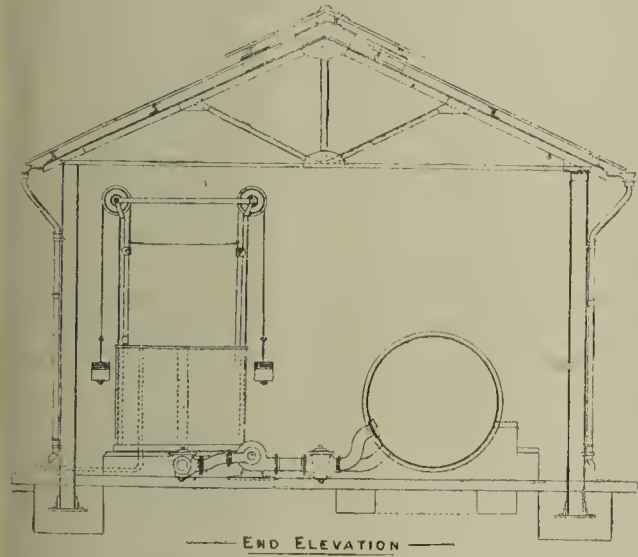


FIG. 2.

3. If, in the opinion of the officer in charge of the testing, the explosive has exploded in a satisfactory manner when fired untamped at the gallery.

9. A shot may be repeated at the discretion of the officer in charge of the testing, if, in his opinion, there is reasonable ground to believe that a failure was due to any cause unconnected with the explosive.

N.B.—The heaviest charge which may be fired from the gun is 2½ lb.

Fees.	£	s.	d.
For testing new explosive .....	50	0	0
For testing altered explosive.....	30	0	0
For second trial (if allowed) .....	30	0	0
For each experimental shot .....	1	0	0

Description of the Rotherham Station.

Particulars are also given of the new Home Office testing station at Rotherham.

Explosives for inclusion in the Permitted List are tested at the Rotherham testing station by firing charges from a cannon into a gallery:—

- (1) Containing an explosive mixture of gas and air.
- (2) Containing a quantity of finely ground coaldust, without gas.

The plant consists of the following:—

Gallery with gas holder, mixing fan and connecting pipes. Gun mounted on a carriage running on rails so that it may be run up against the end of the gallery.

The description of the gallery and its connections should be read in conjunction with the two drawings (figs. 1 and 2).

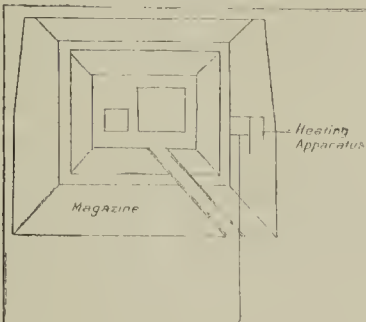
The Gallery.—Is cylindrical, 50 ft. long by 5 ft. diameter and is made of mild steel plates, ½ in. thick. A plate the girth of the gallery is butt-jointed and strapped on the outside with a ¾ in. mild steel strap 9 in. wide and riveted with four rows of ¾ in. rivets.

The several sections thus made are connected together (except the third and fourth) by angle steel rings of

3 in. by 3 in. by ¾ in. angle steel bars, the rings being riveted on to the sections with ¾ in. rivets spaced 3 in. centres. The edges of the rings against the shells, and the edges of the steel plates are caulked as for boiler work. The sections are then bolted together by ¾ in. bolts, spaced 4 in. centres and a gas-tight joint is formed by asbestos between the flanges.

Explosion Chamber of Gallery.—The first three sections form the explosion chamber, 18 ft. long. The outer end of this chamber is closed by a ¾ in. steel plate secured to a 3 in. by 3 in. by ¾ in. steel flange with ¾ in. steel bolts, spaced 4 in. centres, a gas-tight joint being made with asbestos. The end is further strengthened by four gusset stays of ¾ in. steel plate secured to 3 in. by 3 in. by ¾ in. angle steel brackets. The brackets on the shell plates are riveted (¾ in. rivets) and on the end plate bolted by ¾ in. bolts, an asbestos washer forming a gas-tight joint. In the centre of the end plate is a hole through which the gun fires, with a suitable means for making a gas-tight joint between the gun and end plate, which will be described later. The other end of the explosion chamber is closed by a large diaphragm of oiled brown paper as follows:—

There is a space of 1 in. between the explosion chamber and the rest of the gallery. This space allows of the insertion of the large paper diaphragm, approximately 5 ft. 8 in. by 6 ft. in size. The end section of the chamber has a 3 in. by 3 in. by ¾ in. angle steel ring riveted to it, and on the next section is a loose angle steel ring of similar section capable of sliding up against the fixed ring. The loose ring is fitted with an indiarubber strip covered with asbestos cloth, held on by steel plates, and the paper diaphragm is nipped between this and the fixed ring. The movable ring is fitted with a handle



SITE PLAN

Pressure Release Valves (V) are fitted along the top of the gallery. These valves are closed by means of pieces of paper.

Gas Connections.—A gas-holder of 58 cubic feet capacity is provided, scales of cubic feet being painted on the uprights and read by pointers on the holder. From the gas holder a 5 in. pipe, having the mixing fan in the centre, leads into the explosion chamber of the gallery at a point midway between the gun and the diaphragm. Inside the chamber is a distribution box or chamber bolted on, and having holes on its underside through which the gas passes.

From the explosion chamber at a point near the diaphragm is a return pipe leading back to the gas-holder, and also having an outlet to the open air controlled by a two-way valve.

There is also a two-way valve between the gas-holder and fan, with an outlet to the open air and a straight-through valve between the fan and explosion chamber. These valves are shown in the general drawing, and their action will be better understood from a description of the procedure of making a gas and air mixture in the explosion chamber. Referring to the fig. 1, the valves are marked V¹, V², V³.

The gas-holder having been filled with the desired quantity of gas (a mixture of 13·4 per cent. gas is used) and the electric motor of the fan having been started, the top relief valves are closed by pieces of paper and the large paper diaphragm is placed in position. The gun, loaded and ready, is run up against the end plate of the gallery, and thus the explosion chamber is completely closed. The three valves are now opened simultaneously, so that their positions are as follow:—V¹ open to admit gas from holder to fan, V² open through to gallery, V³

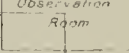
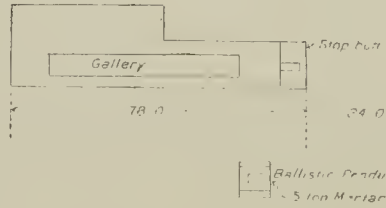


FIG. 3.

on each side, and there are six cam levers pivoted to bolts in the section just beyond the movable ring. By actuating these levers the movable ring is forced hard against the fixed ring. Above the gap at the end of the explosion chamber is a bracket carrying a removable roller round which the paper diaphragm is wound. A strip of wood about 5 ft. 8 in. long by 1 in. by ¾ in. is attached by clips to the end of the paper, and serves to hold the end while the diaphragm is lowered through the slot.

The two sections of the gallery are held rigidly in position to each other by three steel connecting straps, which are set out from the fixed and movable rings to give room for fixing the paper diaphragm. They are made of ¾ in. steel plate, 9 in. wide, and are bolted on to each section of the gallery by ¾ in. bolts, a sheet asbestos liner being used to make a tight joint.

The whole gallery is supported on concrete blocks, and prevented from longitudinal movement by wood baulks underneath it. It is also held down by two stout angle steel bars at the front end of the explosion chamber. These bars are bolted to the shell of the gallery, and their lower ends are turned in and embedded in the concrete.

The gas-tight joint for the gun end of the chamber is made as follows:—

In the centre of the closing disc is a hole 12½ in. in diameter. Surrounding this hole is bolted a steel plate carrying an indiarubber ring, against which the gun bears, thus making a tight joint.

The explosion chamber is fitted with three windows (W) fitted with ¾ in. plate glass, showing a clear light-space of 6 in. by 6 in. The glass rests on a thick asbestos washer inside, and has a ¾ in. rubber washer outside, the whole being secured by a hinged door or frame fastened by a pivoted screw. The castings to take the windows are bolted to the side of the chamber.

open to allow air and gas from gallery to pass back to the holder. Thus the gas and air in the holder and explosion chamber are circulated and mixed. After mixing for three minutes the valve V³ is turned, so as to open the pipe from the gallery to the open air through the exhaust pipe above the roof. The gas-holder immediately begins to fall, and the mixture of gas and air in it is discharged through the explosion chamber to the open air.

As soon as the gas-holder has fallen the valves V² and V³ are closed altogether, and V¹ is turned so as to close the passage to the gas-holder and open the passage to the air inlet. The holder is allowed to fill again with gas.

The gun is now fired, and after this the valve V² is opened, so as to allow the fan to blow fresh air from the air inlet of valve V¹ into the gallery. Before getting ready for the next shot V² is closed, and the apparatus is again ready for mixing.

The gun end of the gallery and gas holder are protected by a roof of corrugated iron as shown. It would be better if this roof extended the whole length of the gallery.

For use with coaldust.—The valves are closed and a plug is placed in the outlet pipe from the explosion chamber to prevent dust getting down it. A plank 10 ft. long by 10 in. wide, strengthened with iron bands and mounted on small wheels, is run up the gallery against the end plate. This plank is about 12 in. below the bore of the gun.

Coaldust at the rate of 4 oz. per foot run is placed on the plank, and at the rate of 2 oz. per foot run along the rest of the gallery to the extreme end. The gun is then run up and fired as before.

There is a large earth mound at the outer end of the gallery to act as a stop butt.



**Gun.**—The gun used at the gallery is of steel (wire construction), and was made at the Royal Arsenal. The length of the bore is 120 cm. and diameter of bore 55 mm. The diameter of the cartridges used is 1½ in. approximately = 35 mm. See Memorandum as to test.

The gun is mounted on a simple carriage, the wheels of which run on rails so that it can be readily run up to the gallery. The explosive charges are pushed to the bottom of the bore and no stemming is used.

In connection with the test, the swing of a ballistic pendulum given by a charge of 4 oz. of the explosive under test is recorded and is compared with the swing given by a similar quantity of gelignite containing 60 per cent. of nitro-glycerine.

The pendulum consists of an old 5-ton mortar suspended by rods from an overhead axle, having roller bearings. The axle is supported by two brick walls. A smaller gun is used (the old gun which was used for the Woolwich test). This gun has a bore of 30 in. long and diameter 1½ in.

The charge is made up to 1½ in. diameter so as to fit the bore, and 2 lb. of dry clay, well rammed in, is used for stemming. The gun is also mounted on a carriage running on rails, and it is run up to within 2 in. of the mortar before firing. The swing is recorded by a sliding boxwood scale at the back of the mortar.

Other apparatus required is for grinding the coaldust. Ball mills driven by electric motor are used, and are satisfactory.

The buildings required are:—(1) Observation room; (2) workshop; (3) room for grinding machinery; (4) stores for coal, &c.; (5) magazine for explosives. No description of these is required except to mention that the observation room is built parallel to the gallery at about 25 yards distance. It has a long observation slit, glazed with stout plate glass, through which the observer watches the explosion. It is also partitioned off inside so as to provide a room in which the gun charges are made up.

The disposition of these buildings is shown on fig. 3.

Detailed working drawings of the plant are available for inspection on application to H.M. inspectors of explosives.

**Dean Forest Coal Trade.**—The colliery proprietors and others interested in the coal trade of the Forest of Dean, after having paid the royalties due to the Crown on the coal, iron ore, &c., won in the Royal Forest during the past half-year, were entertained to a banquet at the Speech House Hotel, which was presided over by Mr. W. Forster Brown (the deputy gaveler), who was supported at the top table by Sir Francis Brain (Trafalgar Colliery), Mr. T. H. Deakin, J.P. (Parkend and New Fancy collieries), Mr. Joseph Hale (Lydney and Crump Meadow collieries), Mr. C. E. Machen, Mr. J. W. Guise, Mr. S. J. Elsom, and Mr. J. A. Carter (Severn and Wye Railway). The chairman, in proposing the toast of "Prosperity to the coal trade and kindred industries of the Forest of Dean," considered that the results attained during the past six months were alike satisfactory to employers and employed. So far as the local trade was concerned the house and steam coal collieries had been fairly well employed, the output for the half-year amounting to 568,223 tons, which was 30,865 tons less than the previous six months, due chiefly to the unfortunate stoppage at Cannop Colliery through the influx of water. Referring to the feared competition between oil and coal, the chairman said he still held to the opinion that oil would not be a serious competitor, and that there was still hope for the coal trade. There was ample room for oil and coal in the industries of this country and of the world.—Mr. T. H. Deakin, who first responded, dealing with the question of the use of oil as compared with coal, said he knew of no oilfields which were likely to supply one hundredth part of the purposes to which coal was put at the present time. Colliery owners would watch the Government trials, if not with concern, at any rate with interest, because it was perfectly clear the Government was going to make a fair trial with oil as compared with coal. Referring to the local trade, he said he feared the competition of other coal industries where coal was mined so cheaply now far more than he feared competition of oil; and though trade had been fairly good during the last six months, and what used to be considered as satisfactory prices had been obtained for their coal, he regretted very much to say that some of the collieries, at any rate, had made very little, if any, profit. It was perhaps forgotten, but it was nevertheless a fact, that there was no trade in Britain and no colliery district in the world, where so great a proportion of the money received by the coalowners from their customers went in payment of wages as in the Forest of Dean, where 75 to 80 per cent. of the money received for the coal went in wages to their workmen. There was only 20 to 25 per cent. to be divided over horse labour and stores, pitwood and compensation insurance, salaries, repayment of advances, and profit to the colliery owner.—Sir Francis Brain also replied, acknowledging the many complimentary remarks which had been made congratulating him on his recent knighthood.

## COALMINING IN THE UNITED STATES.

### Coaldust and Locomotive Haulage.

To the annual meeting of the members of the North of England Institute of Mining and Mechanical Engineers, held at Newcastle on Saturday, August 2,

Mr. SAMUEL DEAN contributed a paper entitled "Notes on Coalmining in the United States of America, with Special Reference to the Treatment of Coaldust and Haulage by Electric Locomotives." He stated that since 1899 the United States had been the chief coal-producing country of the world. Last year 28 States produced nearly 512,000,000 short tons (2,000 lb.). The quantity of coal mined in 1850 was 7,018,181 short tons; in 1900 it was 269,684,027 short tons. It was not uncommon to find an average production of six long tons (2,240 lb.) per hewer per shift of eight hours in mines where the seams were 5 ft. and 6 ft. thick. These figures were all the more remarkable when the fact that 90 per cent. of the men working in the mines in many parts of the country to-day were from eastern and southern Europe was taken into consideration, and that probably not more than 10 per cent. of them had had any mining experience before crossing the Atlantic.

The customary method of working, in seams of varying thickness all over the country, was that known as room-and-pillar. A main slope, generally used as a main-rope haulage way, was driven down on the dip of the seam parallel with a back slope, which was used as an intake or return airway. At intervals of about 1,200 ft. pairs of main entries or levels were turned off the main slope to both the right and left, and pairs of cross-entries or headings, each pair being about 600 ft. apart, were driven to the rise of these. To the right and left of the cross-entries rooms were turned at right-angles—generally at about 45 ft. centres, each room being driven narrow for a distance of 25 ft., and then widened out to a width of 20 ft., leaving pillars 25 ft. wide. The length of the rooms was 300 ft.—half the distance between the cross-entries—and, when the rooms had been driven that distance, the work of extracting the pillars was commenced. A large quantity of pillar coal had been lost in the past, but there had been a great improvement in that respect in recent years. An interesting fact was that it was customary to pay the same hewing rate or tonnage price in the pillars or broken as paid in the rooms and entries, or whole workings. The entries, 9 ft. wide, were subject to a yardage rate, in addition to the tonnage price.

In recent years, the electric locomotive had come into very general use for haulage along the main entries or levels, and doubtless that method was preferable to the endless rope in mines in which explosive gas was not found in very dangerous quantities. The total haulage labour cost was usually not more than 2½d. per long ton. In a mine in Pennsylvania, a 10-ton locomotive hauled about 150,000 tons of coal in a year at a cost of less than one-twentieth of a penny per ton for repairs. The usual train was made up of from 30 to 40 tubs, each loaded with about 3,700 lb. of coal, which was hauled up a gradient of 3 in 100. The cost was 1½d. per long ton. Mules were usually employed to haul the tubs from the working places to the electric locomotive terminals, but in a number of mines the "gathering" locomotive was now in use. In the cross entries, these locomotives took current from the trolley wire through the trolley pole, but, when entering the rooms, the trolley pole was fastened down and current obtained from a flexible cable, which enabled the locomotive to push the tubs into the rooms.

Generally, by the time the last empty tubs of the train had been distributed, the first tubs had been reloaded and the process of gathering was commenced. The train, when made up, was hauled to an electric locomotive terminal, where it formed part of a train to be hauled out to the slope by one of the main locomotives. Two men with a "gathering" locomotive could distribute and gather from 100 to 120 tubs per day of eight hours, each tub having a capacity of from two to four long tons. Without doubt, the day when electric storage-battery locomotives would become general was looked forward to, as the inconvenience and dangers of the trolley wire would, of course, be done away with then. Such locomotives were already in use, but as yet they suffered from too many well-known imperfections. Hand putters, drawers or trammers were very seldom employed, on account of the large capacity of the tubs. Where seams 4 ft. and more in thickness were worked, the capacity of the cars was from 2 to 4 long tons, the track gauge being from 36 to 48 in. A suggestion to introduce 10 cwt. tubs into the workings of a 6 ft. seam would receive no consideration whatever. When an empty tub was standing ready, a miner was tempted to load it and, figuratively speaking, it was considered almost a crime to keep a man at the face waiting for empties. Probably

the large capacity of the tub was one of the principal factors that contributed to the high output per man.

In the past the longwall method of mining had received but scant attention; only in comparatively thin seams in a few districts was it at all general. There appeared, however, to be at present a desire to give it a thorough trial, and it might become more general as time went on. A method with machines cutting across longwall-retreating faces might be found most adaptable to the conditions, but it would no doubt be difficult to compete with the deadwork cost in room and pillar working. At a colliery in one of the Middle West States, producing 2,000 tons per eight-hour day, the number of underground employees was 481, made up as follows: Hewers or diggers, 340; drivers, 38; shifters or datallers, 51; haulage hands, 32; and officials and others, 20. The seam was 5 ft. 9 in. thick, and was worked by room and pillar.

During the last three or four years, the coaldust question had received great attention, and in certain States watering or sprinkling was legally compulsory. At a great many mines it was done voluntarily. In Utah there was a law providing that "every owner, agent, manager, or lessee of mines shall provide and maintain a water system for the purpose of conducting water to the face of each and every working place, and throughout the entire open part of the mine in sufficient quantities for sprinkling purposes to wet down the dust that shall arise and accumulate in and around the mine, provided that, in mines or parts of mines where, by reason of the natural wet conditions, or the moisture derived from the introduction of steam into the air currents, or both, such sprinkling may not be necessary. In the State of Utah, about 2½ men per 100 tons of output were employed in sprinkling. The cost ran from ½d. to ¾d. per ton, including supplies, repairs, &c. The roof, floor and sides were sprinkled by means of hose and nozzle, and during the winter nights, which were very cold, steam was introduced into the intake air.

At the second Lick Branch explosion (West Virginia) in 1909, and at the Cokedale (Colorado) explosion in 1911, men in the mine felt a rush of cold air in-bye followed by a hot blast travelling out-bye. It was urged by Mr. John Verner, of Iowa, that there were always two movements of the air in an explosion, one away from the centre of disturbance and one towards it, the latter being termed the counter-current. It had been suggested that the power of the latter raised the dust and injected it into the flame for its propagation. It was claimed that, in the absence of draught, the presence of smoke would be as pronounced ahead of the flame as the presence of smoke behind it and, in that case, the flame would be rapidly extinguished. In Iowa, the practice of stopping the fan during shot-firing was first advocated about 10 years ago and had since become fairly general where the mines were not unusually gaseous. That was done to prevent, as far as possible, a strong draught of air, which was considered as great a menace as the presence of coaldust. In addition, the intake, in some instances had been closed to prevent natural ventilation.

One mine superintendent in Colorado had repeatedly stated that there were never any severe coaldust explosions in that State before laws made larger fans and greater volumes of fresh air compulsory. The popular demand arose of "fresh air for the miner," and that was still the cry in the open-light mines where gas was never found. In early days, miners fired their own shots, at any time of the day, and blasted off the solid black powder was used with coaldust tamping and blown-out shots were frequent. Whether the factor causing prevention of dust ignition or explosion propagation was lack of draught facilities or oxygen deficiency with the presence of carbon dioxide, could only be a matter of opinion, as the chemist had but recently played any part in connection with mine ventilation.

During recent years, disastrous coaldust explosions had been frequent in the coking-coal mines located in the eastern foothills of the Rocky Mountains, at an altitude of 6,000-7,000 ft. above sea-level, but dust explosions in the lignite and sub-bituminous mines were practically unknown. The so-called lignite coals of the west were not brown but black and glossy. They contained comparatively high percentages of volatile matter and were favourite house coals, being easy to light and making little, if any, soot. The lignite mines were subject to gob fires, but such fires seldom, if ever, occurred in the coking-coal mines.

Moistening of the intake air had been extensively adopted, but its advocates were split into two schools. One demanded that a blowing fan should be used and the ingoing air saturated with live or exhaust steam, and that the airway should not be used for travel or haulage except in the case of inspection or repair. That



made the haulage-way the main return and rendered it free from mist or fog, so objectionable in working places, mainways, or haulage roads. It was stated, on the other hand, that there was no objection to the intake airway being the main haulage and travelling way, and, so as to avoid the presence of fog, radiators of nine 1 inch diameter steam pipes, 100 feet long, were placed on both sides of the haulage way. Live steam was passed through these radiators, and any waste steam which was discharged was conducted through an inch gate-valve to perforated pipes carried along the roof, near the rib, on both sides. Attached to these perforated pipes were curtains of brattice cloth, the purpose of which was to condense the steam and allow the air current to pick up moisture from the wet cloth. As the air passed the radiators it was heated, and its capacity to absorb moisture was correspondingly increased. It then passed the saturated curtains which hung down on both sides for a distance of from 50 to 100 feet, and it was claimed that its humidity was raised to dew point. The air usually passed the in-bye end of the brattice cloths at a temperature of 70 degs. Fahr. in the winter time, and, as the air current passed through the mine, a deposit of moisture was said to be secured by the lowering of the temperature of the air to that of the mine. The wet curtain method was in use at a number of mines in Colorado where the climate was exceptionally dry.

The advocates of moistening in West Virginia contended that the object of saturating a mine atmosphere with water vapour was not for the purpose of furnishing the water for wetting the mine, as was sometimes supposed, but for preventing the evaporation of such water as was naturally there, or such as had artificially been supplied; also the danger to health on account of highly moist mine atmospheres was not apprehended on account of the generally low temperatures of the mines, which seldom exceeded 60 degs. Fahr. It was also stated that no dangerous mine roof conditions had been created by the introduction of steam into the air currents, and that subsequent to the time when it was first used, two severe explosions of gas had occurred, each of which was violent locally but not propagated beyond the gas area. The conditions for a disastrous coaldust explosion were considered favourable, but both mines had been furnished continuously with air saturated by exhaust steam for some time previously, and the fact that the propagation did not extend over a large area was attributed to that precaution. The original opinion that moistening might be valuable was probably fostered by the fact that dust explosions had occurred more frequently in winter than in summer. The outside air temperature in the summer was high and, during that season, sweating was noticeable in many of the mines. As the warm air came into contact with the cool walls of the mines, it deposited part of its moisture. The maximum mine temperature at which the humidifying method would be considered effectual and allowable had not been determined.

At a mine in Colorado, adobe dust had been applied over 10,000 linear feet of entries, but, up to the present, had not been used at the face of working places. Fire-damp seldom occurred and then only in small quantities. Efforts were made to keep the principal roads clean and free from accumulations of the small coal and coaldust which fell from the end-gate cars. Occasionally, water was sprinkled between the rails, where the roof and sides were covered with adobe dust. About three times a month all surfaces of the haulage ways received a coating of adobe dust applied by a machine which distributed 100 lb. in 12 minutes. Over 2 miles of entries or haulage ways could be covered in a night. After such treatment, entries driven through solid coal resembled rock tunnels.

In addition to dust distributed so, all ledges, holes and natural protections along the entries were cleared of coaldust and filled with adobe dust by hand. Hundreds of shelves were also strung along the haulage ways and loaded with adobe dust, and the upper sides of all roof timbers were also covered. All shelves recently erected were practically fireproof, being covered on the undersides with thin sheet iron. Adobe dust had a high ratio of solubility and contained two kinds of siliceous particles, one consisting of flakes of clay and the other of rounded grains of quartz with few cutting edges. The former were composed of silicate of alumina, which contained also traces of mica, limestone and oxides of iron. The dust was inert and contained no substance which could give off any injurious gases or fumes. It had been decided to erect a mill for the purpose of reducing roof shales to dust for use in the mines. These shales were quite suitable for the purpose.

The wooden end-gate mine tub was the chief cause of the presence of coaldust on nearly all the haulage roads in the country, the small coal which fell through the bottom, sides and ends of the tubs being quickly reduced to powder by the traffic. The removal of all

dust was impossible, but, with the introduction of dustproof tubs and rotary dumps or tipplers, the application of stonedust could be made more effectual, for the amount of dangerous dust to be diluted was trifling compared with the quantity always in evidence where the end-gate was in use.

TRADE UNIONS' MEMBERSHIP AND EXPENDITURE.

A return has been issued as a White Paper showing the membership at the end of 1911 and the amounts expended during the year on (1) unemployed benefit, (2) dispute benefit, and (3) other benefits and working expenses, by 100 of the principal trade unions in the various groups of trades. The statistics, so far as they relate to mining and quarrying, are as follow:—

	Member-ship at end of 1911.	Expenditure during 1911.			
		Unem- ployed benefit.	Dispute benefit.	Other benefits and working expenses.	Total.
		£	£	£	£
Northumberland Miners' Mutual Confident Association	39,547	4,047	1,936	18,432	24,415
Durham Miners' Association	132,014	34,922	1,618	148,655	185,195
Durham County Colliery Enginemmen and Boiler Minders' Mutual Aid Association	3,006	511	35	2,169	2,715
Durham Cokenmen and By-Product Workers' Association	3,812	1,891	37	1,981	3,909
Durham Colliery Mechanics' Association	5,121	1,135	84	1,252	2,471
Cumberland Miners' Association	7,326	891	765	3,078	4,734
Yorkshire Miners' Association	92,900	10,216	28,238	54,385	92,839
Derbyshire Miners' Association	38,928	16,331	723	18,991	36,045
Nottinghamshire Miners' Association	31,868	3,451	2,503	16,699	22,653
Warwickshire Miners' Association	11,000	1,550	602	4,763	6,915
Cannock Chase Miners, Enginemmen, and Surfacemen's Association	8,200	797	30	4,293	5,120
Leicestershire Miners' Association	5,887	9,528	740	2,699	12,967
Pife and Kinross Miners' Association	18,800	—	255	10,614	10,869
Mid and East Lothian Miners' Association	9,700	—	—	4,516	4,516
Cleveland Miners and Quarrymen's Association	10,200	3,557	—	5,862	9,419
North Wales Quarrymen's Union	3,927	—	3	1,040	1,043

REGULATIONS FOR GANISTER MINES.

The Home Secretary has proposed draft regulations under section 86 of the Coal Mines Act, 1911, for mines in which ganister is worked. The Regulations are in substance practically the same as the special rules at present in force in the ganister mines in Yorkshire, which are being repealed as from September 15 next, and the Home Secretary understands that they are accepted by the owners of all the mines affected.

Any objection with respect to the draft regulations by or on behalf of any person affected must be sent to the Secretary of State within 30 days from this date (August 9).

The draft regulations are as follow:—

- During the process of drilling holes in ganister, water\* or other efficient means shall be used to prevent the escape of dust into the air.
- After a shot has been fired in any place for the purpose of breaking ganister, no person shall return to that place until the air in such place has been cleared of the dust arising therefrom, or unless he uses an efficient respirator or other apparatus to prevent the inhalation of dust. Blasting of ganister shall as far as practicable be so arranged that men working in other places shall be exposed as little as possible to the dust.
- No person shall, in any part of the mine, remove or cause or allow to be removed the stone broken, if dry and dusty, unless it has been effectively damped so as to prevent the escape of dust into the air during removal.
- Except where the stone is so saturated that dust is not given off in the breaking, all stone-breaking machines used at the mine shall be provided and kept provided with an efficient watering or other arrangement to prevent the escape of dust into the air, and no person shall work, or cause or allow to be worked, any such machine unless such arrangement is provided and effectively used.
- It shall be the duty of the manager to see that all appliances or other things necessary to enable the above Regulations to be carried out, are provided and are maintained in working order.
- It shall be the duty of all persons employed in the mine to comply with the requirements of the Regulations, and with such instructions as shall be given to them by the officials with a view to such requirements being carried out, and it shall be the duty of all persons employed in the mine, whether workmen or officials of the mine, to report any breach of these Regulations to the manager.

\* When a drill worked by mechanical power is used, a water jet or spray or other means equally efficient must be used—see section 78 of the Coal Mines Act, 1911.

At the monthly meeting of the Cambuslang and District Mining Association an interesting paper was read by Mr. Lewis Johnson, Loanend, on "Discipline in Coalmines." Early next month Mr. Hurd, of Messrs. Mavor and Coulson, Glasgow, is to read a paper before the Association on "Electrical Coal-cutting."

ACCIDENTS FROM EXPLOSIVES IN 1912.

The thirty-seventh annual report of his Majesty's inspectors of explosives for the year 1912 has been issued [Cd. 6958].

The number of accidents by fire or explosion of which the Department has had cognisance during the year was 456, causing, as far as is known, 35 deaths and injuring 429 persons. The total number of accidents shows a decrease—viz., 456, against 515—and is above the average (410.9) for the past 10 years. This may be partly accounted for by the inclusion of the accidents due to projected *débris*. The number of deaths from accidents is less than in 1911—viz., 35, against 56—and is less than the decennial average (53). The number of persons injured last year was 429, as against 548 in 1911, and is above the decennial average (420.2).

Over 92 per cent. of the accidents causing death or

personal injury occurred in the use of explosives and under miscellaneous conditions to which the controlling provisions of the Act do not apply, and such accidents caused 30 out of the 35 deaths, and 393 out of the 429 cases of injury.

The following table shows the total number and nature of accidents occurring in the use of the different explosives, and under miscellaneous circumstances in 1912:—

Class of explosive.	Nature of explosive.	Accidents causing loss of life or bodily injury.		
		No. of acci- dents.	No. of persons Killed.	Injured.
1. Gunpowder	Gunpowder	169	9	186
2. Nitrate-mixture	Bobbinite	10	—	10
	Westfalite	2	—	2
3. Nitro-compound:—				
	Arkite	11	1	11
	Blasting gelatine	2	—	3
	Carbonite	3	1	2
	Cordite	—	—	—
	Cornish powder	1	—	1
Div. 1	Gelignite	61	6	77
	Menobel powder	3	—	3
	Rexite	4	—	4
	Rippite	7	2	6
	Samsonite	17	6	18
	Stowite	5	1	6
	Swalite	1	—	1
	Ammonal	2	—	3
	Ammonite	8	—	8
	Bellite	1	—	1
Div. 2	Faversham pwdr.	1	—	1
	Minite	1	—	1
	Oakley Quarry powder	1	—	2
	Roburite	1	—	1
	St. Helen's pwdr.	1	—	1
4. Chlorate-mixture:—				
Div. 1	Nobel polarite	2	—	2
	Permonite	4	—	4
Div. 2	Blastine	2	—	2
	Cheddite	3	—	4
5. Fulminate	Chlorate of potash and amorphous phosphorus composition	1	—	1
	Fuse composition	1	—	1
6. Ammunition:—				
Div. 1	Safety cartridge	1	1	—
Div. 2	Safety fuse	1	—	1
Div. 3	Detonators or electric detonators	14	1	19
7. Firework:—				
Div. 1	Firework Composition	1	—	1
	Alarm cork cartridges	1	—	1
Div. 2	Amorces	1	1	—
	Flash light pwdr.	1	—	1
	Socket distress signal	2	1	8
Totals		347	30	393

The number of accidents grouped under the heading "Use and Miscellaneous" is considerably less than in 1911, being 348 against 442. By far the larger number of these accidents are connected with blasting. The number of persons killed by these accidents is less than last year—viz., 30 as compared with 38, and the number of persons injured is also less, 393 against 503 in 1911.



accidents are classified under the headings of the cause, as follow:—

Cause.	No. of accidents.	No. of persons.	
		Killed.	Injured.
Shot-firing—			
Prematures and failing to get away from shot-hole (23)*	16	3	15
Firing by electricity when persons are at the shothole (9)	9	1	8
Not taking proper cover (55)	90	5	96
Projected debris	13	3	11
Hang-fires and returning too soon to the shothole (42)	55	3	58
Tampering with miss-fired shots (15)	13	2	15
Ramming or stemming the charge (37)	25	2	30
Sparks, flame, &c. (73)	68	2	80
Boring into unexploded charges (12)	10	2	12
Striking unexploded charges in removing debris (19)	10	2	16
Preparing charges (6)	2	—	2
Lighting fuse before inserting charge (1)	—	—	—
Fumes (1)	1	—	2
Hot or unexploded residue left in hole after "socketing" (11)	4	—	5
Various (6)	7	—	8
Miscellaneous:—			
Playing with detonators	5	—	6
Playing with other explosives	5	3	6
Socket distress signals	2	1	8
Illegal manufacture	2	—	2
Sparks, &c., unconnected with shot-firing	1	—	1
Explosive in coal	1	—	3
Fishing with explosive	1	—	1
Flash-light powder	1	—	1
Clearing chimney flue	1	—	1
Laboratory samples	2	—	1
Signal gun	1	—	1
Destroying explosives	2	1	2
Testing electric detonators	1	—	2
Totals	348	30	393

\* The figures in parentheses denote the average number of similar accidents during the previous five years.

**Prematures and Failing to Get Away from the Shot-hole.**—One accident occurred at the bottom of a sinking shaft in which four sinkers were lighting 14 shots. The men were preparing to ascend when the chargeman went back to light a shot which had been forgotten. He called for the signal to be given before getting into the bowk, and in going towards it stumbled and fell. The bowk was drawn up without him and he was killed. One premature is said to have been due to the fuse exploding. The attention of the manufacturer was drawn to this. Three accidents occurred when two or more shots were being lighted together, and four accidents were due to shots fired by means of squibs.

**Firing by Electricity when Persons are at the Shot-hole.**—Nine accidents occurred with electric firing, resulting in one death and injuries to eight persons. All but one of these accidents occurred in collieries where permitted explosives were used. One accident was caused by the shot-firer allowing another man to have charge of the battery while he himself was at the shot-hole. The remaining seven accidents were due to the shot-firer firing the shots before persons at the shot-hole had taken cover. Few, if any, of these casualties would have occurred had the precautions laid down in the Explosives in Coal Mines Order been observed. The one accident in a mine was caused by the fireman firing a shot while persons were in the vicinity.

**Not Taking Proper Cover.**—Ninety accidents were recorded in 1912. Four of these arose from "blow-throughs"—that is to say, the casualty occurred from material being projected from the back of the shothole into another working place or road.

**Projected Debris.**—Thirteen such accidents occurred, of which 12 were in quarries.

**Hang-fires and Returning too soon to Shotholes.**—Fifty-five accidents have been recorded under the heading of "hang-fires." Among these are many cases where two or more shots were prepared, and the miner returned, under the impression that all the shots had exploded, or that the fuses of some of them were not lighted. There were also five cases where men returned, having mistaken the explosion of an adjacent shot for their own. Eight cases of hang-fire occurred with squibs. Three accidents occurred when firing by electricity. In one case eight holes close to one another were charged. Three were fired electrically, and it is supposed others were fired by these, owing to the proximity of the shot-holes. One exploded after the return of the men. The other two shots hung fire.

**Tampering with Missfires.**—Thirteen accidents occurred from men attempting to recover miss-fired shots.

**Ramming or Stemming the Charge.**—There were 25 accidents in ramming or stemming the charge, causing two deaths and injury to 30 persons.

**Fumes, &c.**—There were 68 such accidents last year, and in every case but one gunpowder was the explosive involved. Two persons were killed and 11 persons injured by these accidents, which in 10 cases, due to nonconformity with the

usual regulation enjoining the removal of the candle or lamp from the cap before preparing a charge.

**Boring into Unexploded Charges.**—Ten accidents have been recorded.

**Striking Unexploded Charges in Removing Debris.**—Of the 10 accidents caused by striking charges or portions of charges which have not exploded, five were caused by explosives containing a considerable proportion of nitro-glycerine. These are caused by miss-fires and by partial ignitions (portions of the charge remaining in the mineral, their presence being unsuspected) or by an insufficient search being made in the case of shots which are known to have missed. A fertile source of such miss-fires and incomplete detonations is to be found in the use during cold weather of explosives which have not been softened. Of the five remaining accidents, none of which was fatal, two arose from detonators being struck and two from gunpowder.

During the past 12 years 377 accidents have occurred during the winter months December to May, whilst during the remaining six months the number was only 133.

**Preparing Charges.**—Only two accidents occurred in preparing charges. In one which occurred in January a quarryman was dividing a gelignite cartridge by means of a knife, and presumably the explosive was frozen. The other occurred while a man was threading the wires of an electric fuse through a bobbinit pellet, but details are wanting.

**Lighting Fuse Before Inserting the Charge.**—There has been no accident directly due to the senseless practice of lighting a fuse before inserting the charge.

**Fumes from Fired Shot.**—All known explosives evolve carbonic acid gas, and the majority also produce the far more poisonous carbon monoxide, particularly when fired in coal. Fortunately, accidents from the effects of these fumes are not very common, and only one occurred during the past year.

**Socketing.**—The practice of enlarging the end of a shothole with a small charge to enable the powder charge eventually to be concentrated at the back of the hole has been the cause of four accidents. In most cases this was due to allowing insufficient time to elapse between firing the first shot and recharging the hole. In three cases gunpowder was the explosive used, and in one gelignite.

Date.	Colliery.	Explosive.	Remarks.
July 6	Barnsley Main.	Monobel	Apparently two shots were fired without examination after the first one, and it is considered that the second shot had little work to do, and ignited gas liberated by the first shot. The hole was 3 ft. 6 in. deep, stemming clay, and the quantity of explosive 4 oz. Three men killed.
Oct. 1	Seven Sisters	Bobbinit	A partially blown-out shot consisting of 1 lb. fired in a hole in the floor 2 ft. 4 in. deep, stemmed with fireclay dust, ignited gas in a fissure in the roof 17 ft. away.
Oct. 2	Wharnccliffe	Fuseigniter	A gelignite shot was being fired in coal by safety fuse ignited by an igniter. A deputy fired the igniter by striking it between two pieces of ganister, and in so doing knocked it off the fuse, and a small accumulation of gas was ignited. The fuse was not ignited. The deputy had his face scorched.
Oct. 30	Auchincruive, Ayrshire	Bobbinit	A 10-oz. shot was fired in a 2 ft. 9 in. hole in hard coal, stemmed with damp fireclay for about 2 ft. After the shot the shot-firer found that gas had been ignited and was burning. The flame spread, but was ultimately extinguished. In a short time the whole section was fouled with firedamp. The section is much troubled with faults.
Nov. 16	Harrington	Samsonite	An 8 oz. shot was fired in a 2-ft. hole, in shale. Stemming 1 ft. 3 in. clay. A cavity of 3 in. above the shale had evidently contained gas, and the shot ignited it.
Nov. 12	Gwaunclawdd, Abercraue	Bobbinit	An 8-oz. shot was fired in a 3 ft. 6 in. hole, stemmed with clay. Gas was ignited, and also a pocket of gas in the roof 18 yards away. Four persons injured.
Dec. 14	Markham sinkings	Samsonite	14 shots, 1 lb. to 1½ lb. each, stemmed with water stemmings and clay caps, all under water, at the bottom of a sinking pit, were fired simultaneously by means of a high tension exploder on the surface. After the shots were fired gas was found burning above the water at the bottom of the shaft.

**Various.**—Seven accidents connected with shot-firing could not be classified under the above headings. Two cases were due to igniters in the same box as gunpowder firing and igniting the gunpowder. In two others nitro-glycerine explosives were being handled, but it was not possible to say what was actually being done to them. In the fifth a detonator was exploded by a fall of rock, while in the sixth the concussion of a neighbouring shot brought down a large rock, 30 yards distant, which broke a man's leg. The seventh was caused by a man firing an electric detonator by attaching the leads directly to his exploder.

**Miscellaneous.**—The number of accidents in playing with detonators was five. In four of these cases it seems probable that the injured person was not fully aware of the dangerous nature of the article. Five accidents, resulting in three deaths and injuries to six persons, were due to playing with explosives other than detonators. One was due to placing a blank safety cartridge in a fire when the explosion projected a piece of it, which killed one of the persons present. In another case an amorce set fire to a child's clothing, and she received burns from which she succumbed. It is satisfactory again to be able to report that no accidents occurred in thawing during the year. One accident was due to the presence of a detonator in coal. There were two accidents in connection with the destruction of waste explosive.

Two Orders have been issued during the year, viz.:—Order of May 21, 1912, and Order of October 15, 1912.

These Orders were made under section 61 of the Coal Mines Act, 1911. The first revokes all previous Orders in force and regulates the supply, use, and storage of explosives. It is divided into three parts. Part I., General Provisions; Part II., Special Provisions; and Part III., Supplemental. Many of the provisions are new. It contains three schedules, the first being the List of Permitted Explosives. This list contains the names of the permitted explosives which were in the schedules to the Orders in force previous to the issue of the Order of May 21. The Second Schedule gives the marking for the cartridges of permitted explosives, and does not differ from former provisions. The Third Schedule, however, is entirely new, prescribing for the first time conditions for safety fuse. The Order of October 15 amends the first-mentioned Order. In addition to these Orders, an explanatory memorandum, dated August 8, was issued.

Experiments have been commenced at the Testing Station at Rotherham with a view to formulating a new test for permitted explosives. These experiments were continued, the explosives used being several on the present Permitted List, some explosives on the Belgian List, and some experimental explosives made by British manufacturers. After experimental work, it was possible early in the year to formulate a new test, and a memorandum giving particulars of it was issued in May. Demonstrations at the testing station, to which representatives of manufacturing and importing firms were invited, were given on June 26 and 27. The station was opened for testing and experimental work on July 1. From that time onwards a great deal of work has been done, very many experimental shots having been fired for manufacturers to enable them to determine the relative merits of various samples submitted by them. Six explosives were actually tested, of which all but one passed.

In addition to these tests and experimental shots, some experiments were carried out with a view to determine whether a detonator would ignite the gas mixture in the Rotherham gallery, and also whether the coaldust used in the test could be ignited by the same medium. As a result of these experiments, it was found that a bundle of three No. 8 detonators (containing 2 grammes of the ordinary fulminate of mercury composition) did not ignite the gas mixture, but that a

bundle of five No. 8 detonators did ignite it. With coaldust, however, no ignition was obtained by firing a bundle of six No. 8 detonators. The modifications made to the gallery have proved quite satisfactory.

The above table shows the ignitions of firedamp which have been caused by permitted explosives.

**The Price of Gas Coal.**—At the half-yearly general meeting of the South Metropolitan Gas Company, Dr. Charles Carpenter, the chairman, said that despite the fact that they were producing 12,000 cubic feet per ton of coal, as compared with only 9,500 cubic feet in 1904, the fruits of their labours had been practically swallowed up by the voracious appetite of the coal industry. There were signs that that condition of affairs was slackening, and it was to be hoped that the owners of the coal deposits would soon be satisfied with a fair proportion of the profits instead of the lion's share, but the serious fact remained that they were giving a higher price for coal than it was commanding after the great strike, and that the increase in the coal bill was being largely met by gas consumers. It was doubtful whether the unrestricted export of coal was in the best interests of the nation. While coalfields with a large export trade were prosperous, the inland demand for fuel was not nearly so brisk, probably because of high prices which their own manufacturers could not afford to pay. Coal was going abroad to meet the requirements of foreign manufacturers of iron and steel, not in the form of foundry coke, which would increase the production in Great Britain of spirit for motor traction, and of heavy oils for the Navy's requirements, but as the raw material—coal—from which those valuable by-products were prepared by their competitors. He thought that an export tax on coal and the free export of metallurgical and other coke would help British manufacturers, and would increase the employment at home of British labour in the oil-producing industry.



## IMPORTANT COLLIERY PROSECUTION IN LEICESTERSHIRE

### Heavy Fines.

Before the Ashby-de-la-Zouch (Leicestershire) Petty Sessions, on Saturday, the Meacham Collieries Limited, Meacham, were summoned for failing to comply with certain special rules for the installation and use of electricity in mines, inasmuch as "certain electrical apparatus used in the mine was not earthed by connection to an earthing system at the surface of the mine, contrary to Rule 8 of the Special Rules of the Coal Mines Act, 1911," on May 6. Altogether, 18 offences were alleged. Nine summonses were connected with breach of the rules relative to switchboxes and cable junctions; five summonses alleged that the live parts of fuses were not protected against accidental contact; two for cables not being covered with insulating material, and two for not providing buffers to prevent abrasion of the cables.—A similar charge was preferred against Mr. Thomas Watson, at the time manager of the Meacham Mine, and now of Wigan. The cases were taken together.—Mr. C. S. Bigg, solicitor, Leicester, prosecuted for Mr. Hugh Johnstone, H.M. inspector of mines, Edgbaston; Mr. Thomas Jesson (Ashby-de-la-Zouch) appeared for the colliery company, and pleaded "Not guilty"; and Mr. Ratcliffe-Ellis (Wigan) was for Watson (the manager), who also pleaded "Not guilty."

Mr. Bigg, addressing the Court, said that, so far as the prosecution could see, both the company and the manager were liable, and it would be for the Bench to apportion the blame.

Mr. Robert Nelson, inspector of electrical plant in mines to the Home Office, spoke to visiting the colliery on March 27 and May 6. He was accompanied by Mr. Johnstone, H.M.I., Mr. Hepplewhite, H.M.I., and the manager, Mr. Watson. The state of the mine witness found in accordance with the offences set out in the summons. He noticed two fuses unprotected, several switchboxes unearthed, and in two places he found cables without any insulating material. Generally speaking, the electricity regulations had been ignored. He saw the managing director, Mr. Waddell, on March 27 and reported to him the defects, emphasising the lack of earthing, and the risk of a fatal accident. The manager, Mr. Watson, was present at that interview, and Mr. Waddell remarked, "You hear what Mr. Nelson says, and you have had authority to remedy these defects." Mr. Watson assented to the statement. In May no substantial effort was made to put matters right.

Mr. Hugh Johnstone, H.M. inspector of mines for the Midland and Southern Division, testified to receiving reports concerning the colliery in October 1910 and January last year. He acquiesced in the evidence given by the previous witness as to the condition of the mine. His impression was that Mr. Watson, the manager, was not allowed to order.

Mr. Wm. Hutton Hepplewhite, inspector of mines, Tamworth, spoke to visiting the mine on January 28 after a request from the manager, who said there had been an accident from electric shock. Witness examined the mine, and the electricity arrangements were very dangerous, and he informed both the managing director (Mr. Waddell) and the manager (Mr. Watson) that matters must be put in order. He gave the management three weeks to remedy matters, but when he called again the work had not been put in hand.

Mr. John Robinson Felton (assistant inspector of mines) corroborated previous witnesses as to the condition of the mine.

Mr. Thomas Watson, the manager of the mine in March, was called by the prosecution. He said he was manager from January 24 to June 21 this year. He found the mine in an extremely dangerous condition respecting the electrical installation, and told Mr. Waddell that the defects must be remedied. Mr. Waddell would not act, and on three occasions (February 15, April 19, and April 22) he wrote to Mr. Waddell, pointing out the danger of neglect and urging him to take immediate steps. Witness added that he could only order up to a small amount.

Mr. Robert Donald Waddell, managing director, of West Park, Eltham, near London, said Watson had an absolutely free hand in regard to spending money for the maintenance of the mine. He only restricted his manager respecting the ordering of new plant, or with regard to the development of the mine. With this exception Watson could do as he liked. He (witness) was unaware of the danger, and he denied that he had received any letters at all on the subject from Watson. He dismissed him because of incompetency. The condition of the plant was not due to previous managers, of whom there were six, failing to get his consent to spend money.

Mr. J. Richardson Campbell, chief electrician at the colliery, stated that after Watson left, his order-book was missing. He had had an order passed by Watson up to £60.

Mr. Robert Miller, a former manager, said he ordered what he required.

Mr. Ratcliffe-Ellis, addressing the court, said Mr. Watson, a young man, bore an admirable character and had obtained the managership of a mine at Wigan, his employers knowing the facts of the present case.

Mr. Watson then gave evidence in his own defence, of a

nature similar to his evidence when called for the prosecution. He repeated that he wrote letters to Waddell.

Wm. John Ferguson, ex-chief engineer at the colliery, and Thomas Strachan, ex-night overseer, were called as witnesses on behalf of Watson, and stated that Mr. Waddell stopped them doing electrical work at the mine.

Mr. Charles Dickinson, manager of the Netherseal Colliery, said it was not usual for managers of mines, even much larger than the mine of the defendant company, to be allowed to order above £50 without the consent of the directorate.

The Bench retired and, returning, the chairman said very careful attention had been paid to the case, which was an important one, and of a kind of which they hoped not to have a repetition. They had decided to find the company guilty, but the case against Watson would be dismissed. The company would have to pay £20 for the first offence, £5 for each of the others, making a sum of £105, and the costs £8 14s. Mr. Bigg applied for his costs, stating that it was not usual for the Home Office to meet such expenses. He desired that the ratepayers of the country should not have to meet the expenses. The Bench allowed 10 guineas, the chairman remarking that the case was a very exceptional one. The defendant company would have to pay the 10 guineas as well as the other costs, making a total of £124 4s.

### THE USE OF BENZOL.

Some useful notes on the methods of using benzol have been sent to us by the Petrol Substitutes Joint Committee.

As a motor fuel, it is essential that good quality spirit only should be used. If in appearance the spirit is of water-white colour, it is probably of good quality. A yellowish appearance argues caution, although under certain circumstances it may be quite suitable. The only safe way to prove whether a spirit be suitable or unsuitable is by means of a chemical test which indicates the extent of the presence of coumarine, a dark, sticky, oily-looking substance. The Petrol Substitutes Joint Committee is giving very close attention to the question of washing.

With the majority of carburetters, benzol may be used equally as well as petrol. When first using it, do not alter the carburetter. After about a 20-mile run, notice if there is any sign of extra heating about the engine generally, or if the exhaust gases are extra hot. If extra heat is observed, adjustment of the carburetter is needed. In carrying out any adjustment of this nature, although somewhat paradoxical, it is a practical truism that benzol gives better results on the less-benzol-to-the-same-air idea than it does on the same amount of spirit with more air. This is an argument, therefore, for reduction of jet orifice. After a run of about 50 miles, remove (say) a plug in one of the front cylinders and a valve cap in one of the rear ones. If there is anything in the nature of a sooty deposit, reduce the size of jet orifice. At the end of the next 100 miles do the same and so on until such time as the right proportion has been obtained, and the car runs without any deposit of soot at all. These successive jet reductions should be very slight.

Should the exhaust be malodorous, and the smell be sulphurous, it argues in the direction of too high a sulphur content in the spirit. The committee is at present conducting experiments to determine the maximum amount of sulphur that can be permitted without producing unsatisfactory results, and although the tests are not yet completed, it would seem that anything up to 250 or even 300 grains of sulphur per gallon of spirit may be allowed, without a malodorous exhaust being produced, or any chemical action being caused on the metals in the engine.

As benzol is a stronger solvent than petrol, temporary troubles may be caused by paint (from the inside of the tank) small pieces of rubber, &c., which were innocuous in petrol being carried into the jet by benzol. If such troubles should occur, fill the tank with benzol overnight, and empty it in the morning, through a strainer.

Another feature is that the use of benzol will stop knocking in practically all cases where engines are inclined to knock on petrol. The motorist, therefore, must bear this fact in mind and not "hang on" unduly to the top gear on hills just because he notices that the engine does not knock, otherwise excessive strain is being put upon the bearings, gudgeon pins, &c. The use of benzol permits of higher compression without causing pre-ignition or knocking.

The prevalent idea that an extra air valve is needed with benzol is not correct. With the older type of carburetter, an extra air inlet may prove advantageous; but it is preferable to go on the lines of jet reduction with the same air inlet than to try to use the same quantity of spirit with additional air. In addition to reducing the size of jet orifice, it is also desirable to raise the level of the spirit in the jet in order that it will flow more easily, thereby facilitating efficient carburation. With many carburetters heating of the induction type also adds to the efficiency of the carburation, and if desired this can be done easily by adding a small auxiliary pipe from the circulating system in such a manner that the induction pipe is encircled.

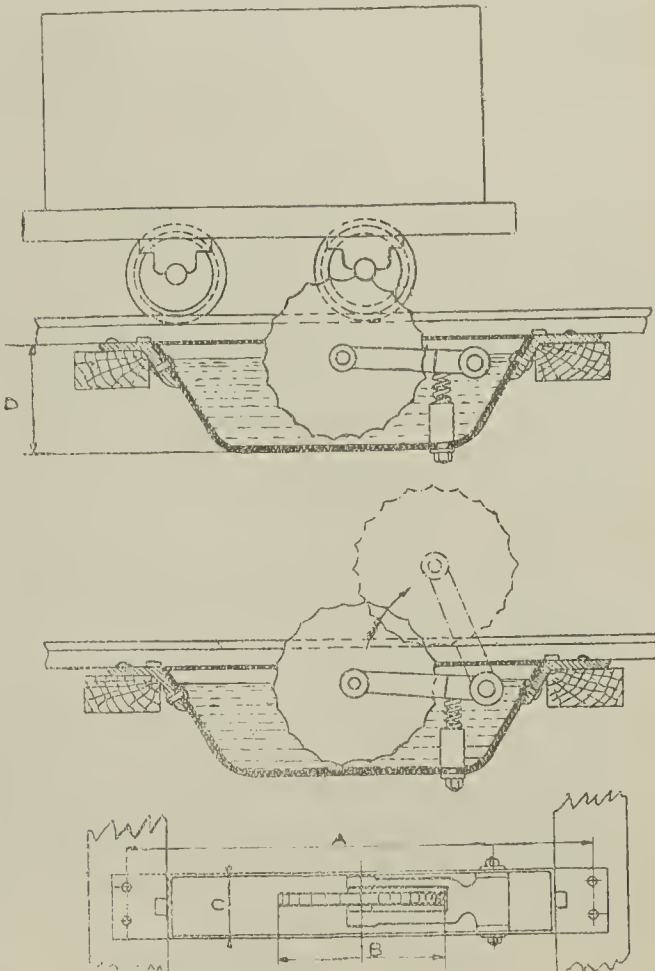
From 12 per cent. to 15 per cent. more power is obtainable when using benzol, and an increase of something in

the nature of 20 per cent. more mileage per gallon. The latter fact should be borne in mind in regard to the question of price. Really good benzol commands a fairly good price at present, and undoubtedly there are a large number of benzols obtainable at the moment on the open market which are superior to petrol.

### HAILWOOD'S PATENT TUB GREASER.

Messrs. Ackroyd and Best Limited, of Morley, near Leeds, have just put on the market the new type of tub axle greaser, shown in the accompanying cut.

The main features of the greaser are that the peculiar balancing of the crank which carries the greasing wheel prevents an undue amount of oscillation, and thus avoids squirting a vast amount of oil along the tram track. To adjust the height of the greasing wheel, it may be easily swung to one side, as shown in dotted lines in the drawing, and one or more washers placed underneath the spring or screw which holds the spring adjuster.



HAILWOOD'S PATENT TUB GREASER.

Whilst the greasing wheel is swung clear of the trough, the latter may be easily cleaned of accumulations of dirt. The trough, being made of sheet steel with welded joints, resists the shocks from runaway tubs, and if bent can easily be straightened. The greasing wheel is formed of box shape and is free from projections on the sides, which easily pick up and splash oil about. This box shape enables a very light wheel to be used and a balancing spring of reasonable elasticity. The lid which covers the trough in and surrounds the box prevents dust and dirt from dropping into the trough.

**Responsibility for Tools.**—A case of some importance has been decided by Sheriff Umpherston in the Dunfermline Small Debt Court. The case concerned the liability of coal-masters for the tools of workmen while being sharpened. It is practically the universal custom in Fife for the mine-owner to undertake the sharpening of the tools of the men in their employment. Prior to the passing of the recent Coal Mines Regulation Act, 1911, it was the custom for the men to take their tools to the smithy on the surface, leave them there and then call back for them after they were sharpened. Under the Act it is provided that workmen and tools or other materials shall not descend in the same cage. Accordingly, since the Act came into operation, the workmen have left their tools at the pit bottom and got them back there after they were sharpened, the mineowner having the custody of them in the interval. The pursuer in this action left his tools, consisting of five drills and a copper cleaner, in a hutch at the pit bottom provided for the purpose, but the tools were lost, and he sued the Wilsons and Clyde Coal Company for their value. Mr. D. Connel, for the defenders, stated that if the case was decided against the employers it would revolutionise the practice in Fife regarding the sharpening of tools, and that the employers would require to ask the men to make their own arrangements with regard to tool sharpening. In giving his decision, Sheriff Umpherston said it was his opinion that if a person took the property of another person and undertook to do work upon it, it was his duty to return the article which had been repaired, and if he failed to return it it was his duty to make recompense for his failure. He accordingly granted decree for the value of the tools—namely, 25s., with expenses.



THE COAL AND IRON TRADES.

THURSDAY, AUGUST 14.

Scotland.—Western District.

COAL.

There has been considerable activity in the coal trade of the western district this week. The demand has been rather better than last week, and in some cases prices are firmer. Good qualities of ell coal are in urgent demand, and are well booked in advance. There are practically no stocks on hand at the collieries, the output passing into consumption almost immediately on production. The shipping demand is brisk, and promises to continue thus for some time. Taken all over, the trade is in a fairly healthy condition. The shipments during the past week amounted to 104,505 tons compared with 103,217 in the previous week, and 126,756 tons in the corresponding week of last year. The clearances were at Glasgow 72,286 tons, Bowling 94, Greenock 1,146, Ardrossan 5,941, Troon 5,591, Irvine 1,491, and Ayr 17,956 tons.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	12/6 to 14/6	12/ to 14/6
Ell .....	12/3 to 12/9	12/6 to 12/9
Splint.....	12/9 to 15/	12/9 to 15/
Treble nuts .....	12/9 to 13/3	12/6 to 12/9
Double do. ....	12/ to 12/6	11/6 to 12/
Single do. ....	11/ to 11/3	11/3 to 11/6

IRON.

The position of the pig iron market in Glasgow shows no improvement on last week, and is, if anything, worse than ever. The tone of the market is extremely dull. Business was very quiet, there being practically nothing doing, the total turnover only reaching 5,000 tons. Although the proposal to form a selling combine in Middlesbrough has for the meantime been dropped, the market is still adversely affected by the uncertainty which prevails with regard to the continuance of warrant stores. After showing a slight improvement, prices closed just the same as last week, Cleveland iron being quoted 54s. 9d. per ton. Cumberland hematite was not in request, and, in fact, was not quoted at all. Prices of Scotch makers' iron are unaltered, and are as follow:—Govan and Monkland, f.a.s. at Glasgow, Nos. 1, 68s. 6d., Nos. 3, 67s.; Carnbroe, No. 1, 73s., No. 3, 69s.; Clyde, No. 1, 74s. 6d., No. 2, 69s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 75s., Nos. 3, 70s.; Glengarnock, at Ardrossan, No. 1, 75s., No. 3, 70s.; Eglinton, at Ardrossan or Troon, No. 1, 69s. 6d., No. 3, 68s. 6d.; Dalmellington, at Ayr, No. 1, 70s. 6d., No. 3, 68s. 6d.; Shotts, at Leith, No. 1, 75s., No. 3, 70s.; Carron, at Grangemouth, No. 1, 76s., No. 3, 71s. per ton. Scotch hematite is quoted 76s. per ton for delivery at west of Scotland steel-works. Since the settlement of the strike at Grangemouth there has been a good demand for iron. There are 86 furnaces in blast in Scotland compared with 87 the previous week, and 88 in the corresponding week of last year, and of the total, 50 are producing hematite, 32 ordinary, and five basic iron.

Scotland.—Eastern District.

COAL.

Although the dockers' strike at Grangemouth and district has been settled, trade at the Firth of Forth ports has not yet had time to resume a normal position, and on account of the resultant disorder will likely take a week or two to recover. Shipments show a marked improvement over last week, 69,679 tons being cleared compared with 36,760, but are still far below those of the corresponding period, which were 126,792 tons. Shipments were at Grangemouth 40,372 tons, Granton 2,780, Leith 3,028, and Bo'ness 23,499 tons. Prices are practically unchanged from last week.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	12/9 to 13/	12/9 to 13/
Secondary qualities .....	11/9 to 12/	11/9 to 12/
Treble nuts .....	13/	13/
Double do. ....	12/ to 12/6	12/ to 12/6
Single do. ....	11/3 to 11/6	11/3 to 11/6

The Fifeshire coal industry is in a fairly prosperous condition just now. The demand for all classes of coal is good, and enquiries are increasing. Treble nuts are particularly in request, and the prices all over are firm. There is a good supply of tonnage at the various ports awaiting cargoes, and no difficulty is experienced in getting rid of the output. The shipments during the week totalled 115,643 tons compared with 74,064 last week, and 118,574 tons in the corresponding week of last year. From Burntisland the shipments were 47,250 tons, Methil 64,198, Charleston 254, Tayport 672, Alloa 788, Dysart 1,193, and Wemyss 1,288 tons.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	16/6 to 17/	16/9 to 17/
Unscreened do. ....	14/6 to 15/	14/6 to 15/
First-class steam coal.....	14/3 to 14/6	14/3 to 15/
Third-class do. ....	11/6 to 12/6	11/6 to 12/6
Treble nuts .....	13/ to 13/6	13/9 to 14/
Double do. ....	12/ to 12/6	12/6 to 13/
Single do. ....	11/3 to 11/6	11/6 to 11/9

Forthumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During the week 93,932 tons of coal were despatched from the Tyne, a decrease of 35,496 tons when compared with the corresponding week of last year. The output of coke was 1,414 tons, a decrease of 3,764 tons. The Dunston colliery shipped 51,136 tons of coal and 2,906 tons of coke, an increase of 629 tons of coal and 669 tons of coke. The Blyth shipments aggregated 77,162 tons of coal and coke, a decrease of 5,414 tons. Great satisfaction is expressed at the amicable settlement of the north-east coast trimmers and teamers' agitation for a 12 o'clock Saturday. At one time the coal shipping of the district seemed likely to be seriously dislocated by the trouble. The agreement arrived at is likely to raise shipowners' trimming costs and to somewhat discourage week-end loading. The Magona Works, Porto Vecchio, have contracted for 11,000 tons of New Pelton-Holmside gas coals for shipment in two cargoes to Porto Vecchio over September-October at 24s. per ton, c.i.f. A number of small parcels of Durham unscreened bunkers, aggregating about 10,000 tons, have been arranged for for shipment over next year at from 11s. 1½d. to 11s. 3d. per ton f.o.b. for ordinaries, and from 12s. to 12s. 6d. for better qualities. The sale is also reported of 15,000 tons of good Durham bunkers for similar delivery at 12s. f.o.b. The contract to supply the Aalborg Cement Works with about 110,000 tons of Durham gas coal for shipment chiefly over next year has been distributed among local firms at c.i.f. prices, said to be based on 17s. per ton for Tyne primes and about 1s. less for seconds. A quantity of good Durham unscreened coal, suitable for gas, coking or bunkering purposes, is stated to have been sold by the colliery for shipment over next year at 13s. per ton f.o.b. The Russian State Railways have invited tenders of 250,000 tons of steam coal for shipment over Reval, Riga and Libau during October, November and December. The Finnish State Railways have invited offers of about 30,000 tons of steams for shipment, before the close of the Baltic season, to Helsingfors and other ports. There is an enquiry from Belgium in circulation—some 30,000 tons of Durham coking primes for shipment from now to the end of April next, with the option of shipment over the whole of next year, being wanted. Supplies of gas seconds for shipment to Genoa over next year have been sold at 19s. 3d. c.i.f. The Belgian State Railways, which at present take the great bulk of their supplies of steam coals from home collieries, are stated to be contemplating the revival of the system of inviting public tenders, in which event it is hoped, on this side, that larger quantities of coal would be ordered from Great Britain. As to forward business, it is reported that a colliery producing best Blyth steams has refused 14s. per ton f.o.b. for supplies for shipment from September to December, although, in another case, rather less than that price has been accepted. Over all next year, merchants have offered 12s. 6d. for Tyne gas primes and 11s. 6d. for seconds, without finding takers. For ordinary unscreened Durham bunkers, 11s. 6d. per ton is offered for 1914 shipment, but without business resulting, so far as is known. Durham gas bests are stated to be offering in Genoa for delivery over the first half of 1914 at 22s. c.i.f., as against 21s. 3d. tendered. The prompt market is very strong at present. Supplies are scarce and, on the other hand, tonnage is offering amply at low rates of freight. A considerable congestion of loading turns checks business. F.o.b. quotations for prompt shipment have undergone the following changes on the week:—Best steams, Tyne, are 6d. dearer; Tyne seconds, 3d. more; unscreened, ditto; smalls, Blyths, ditto; Tyne, ditto; specials, easier; smithies, stronger; gas seconds, 3d. up; unscreened bunkers, Durhams, ditto; Northumbrians, ditto; coking coal, ditto; smalls, ditto; coke foundry, 1s. more; blastfurnace, ditto; and gas coke, 6d. advanced. Other descriptions of fuel are steady.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	15/3 to 15/6	15/3 to 15/6
Do. Tyne (Bowers, &c.) .....	15/ to 15/6	15/
Secondary, Blyths .....	13/	13/
Do. Tyne (Hastings or West Hartleys) .....	13/3 to 13/6	13/3 to 13/6
Unscreened .....	11/6 to 12/6	11/9 to 12/3
Small, Blyths .....	9/6 to 9/9	9/3 to 9/6
Do. Tyne .....	8/	7/9
Do. specials .....	9/6 to 10/	10/
Other sorts:—		
Smithies .....	14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	15/	15/
Secondary gas coals (Pelaw Main or similar) .....	13/6 to 14/	13/6 to 13/9
Special gas coals .....	15/3 to 15/6	15/3 to 15/6
Unscreened bunkers, Durhams .....	13/6 to 14/6	13/3 to 14/3
Do. do. Northumbrians .....	12/ to 12/6	12/ to 12/3
Coking coals.....	13/6 to 14/	13/6 to 13/9
Do. smalls .....	13/6	13/3
House coals .....	15/6	15/6
Coke, foundry .....	20/ to 22/6	20/ to 21/6
Do. blast-furnace.....	19/ to 20/	19/
Do. gas .....	17/ to 18/	16/6 to 17/6

Sunderland.

COAL.

The exports from Sunderland last week amounted to 73,618 tons of coal and 537 tons of coke as compared with 83,730 tons of coal and 1,420 tons of coke for the corresponding period of 1912, being a decrease of 10,112 tons of coal, and a decrease of 883 tons of coke. There is plenty of enquiry for this and next month's shipment, but supplies are getting rather short, especially for August shipment, and in some cases collieries cannot take any further tonnage on stem, being fully stemmed. Gas coal is still rather scarce for all qualities, and prices are inclined to go still higher owing to the scarcity and strong demand. There is an enquiry on the market for 30,000 tons from Belgium for Best Durham coking coals for shipment from now to about the end of April of next year. The Russian State railways are, it is reported, again in the market for about 200,000 tons of best steam coals. The Finnish State Railways are also in the market for about 30,000 tons of steam coal to be shipped before the end of this year. With regard to the Danish Cement Works' contract it is reported buyers have submitted counter offers which up to the present have not yet been definitely accepted, but are now being considered. These enquiries, coming on top of the recent heavy purchases, will no doubt stimulate the steam coal market considerably, and prices for the remaining part of this year promise to be firmer. Unscreened coals for

bunkers are a strong feature in the market, and best Sunderland bunkers are selling at 14s. 9d. to 15s., and ordinary bunkers at 13s. 7½d. to 14s. according to quality. Quotations are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6 to 16/	15/6
Secondary do. ....	14/ to 14/3	14/
House coals:—		
Best house coals .....	16/6	16/6
Ordinary do. ....	16/	16/
Other sorts:—		
Lambton screened .....	16/	15/9
South Hetton do. ....	15/6	15/3
Lambton unscreened .....	14/	13/9
South Hetton do. ....	13/9	13/3
Do. treble nuts .....	17/	16/9
Coking coals unscreened ..	14/	13/9
Do. smalls .....	13/7½	13/6
Smithies .....	14/9	14/4
Peas and nuts .....	16/6	16/6
Best bunkers .....	14/9	14/
Ordinary bunkers ..	13/9 to 14/	13/6
Coke:—		
Foundry coke .....	20/ to 21/	22/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	18/6	20/
Gas coke .....	16/6 to 17/	16/6

The freight market is steady, but inclined to ease somewhat owing to the difficulty of arranging loading turns. The prospects of the Milan labour troubles spreading to the near Italian ports, Genoa, Savona, Spezia, Leghorn, etc., is preventing tonnage from being offered so readily for that direction. Recent fixtures include the following:—Mediterranean: San Remo 10s. 6d., Genoa 8s. 9d., Civita Vecchia 9s. 6d., 600, 9s. 10½d., 500, 10s. 400, Malta 7s., Marseilles 8s. 3d. Bay: Lisbon 8s., Bordeaux 6d. Baltic: Stockholm 4s. 9d., St. Petersburg 5s. 3d., Cronstadt 5s. 3d., Memel 4s. 6d., Riga 5s. 3d. Coast: Zeebrugge 3s. 1½d., Rotterdam 3s. 9d., Antwerp 4s., Havre 4s. 6d., Rouen 4s. 9d., London 3s. 4½d.

Middlesbrough-on-Teas.

COAL.

The fuel trade is steady and firm, and a good business passing. There is a heavy demand for this month's shipment, and producers are taking up a firm stand. Up to 15s. is quoted for best Durham kinds, and second-class gas coal ranges from 14s. to 14s. 3d. Unscreened Durhams of the usual classes run from 13s. 9d. to 14s. 6d., whilst for special kinds up to as much as 15s. 6d. is named. Household coal is 15s. 3d. to 16s. There is a fairly good demand for coking coal. Coking unscreened runs from 13s. 9d. to 14s. 6d., and smalls range from 14s. 3d. to 14s. 6d. There is very little passing in coke, and the price is easy. Average blast-furnace kinds are quoted at 18s. to 18s. 6d. delivered at Teesside works. Foundry coke for shipment is 22s. 6d. to 25s., and gas coke is 16s. 6d. to 17s. 6d.

IRON.

Quietness still characterises all the branches of the iron and steel trades. Holiday-making is general on Teesside, and as a result very little business is passing, but it is expected that after the usual vacation there will be a renewal of activity. The settlement of the trouble in the Balkans has had very little influence on the market. General satisfaction has been caused among merchants and ironfounders by the report that the proposal to form a liability company to distribute the production of pig iron made in Cleveland, fix prices, and control the output, has fallen through. It is understood that no more Cleveland pig iron will be sent into the public warrant stores, and if this be so then the Glasgow warrant ring must come to an end. The market is somewhat disturbed as the result of the uncertainty which prevails. The price of No. 3 g.m.b. Cleveland pig iron is 55s. 9d. f.o.b., whilst No. 1 is quoted at 58s. 3d., No. 4 foundry 55s. 3d., No. 4 forge 55s., and mottled and white iron each 54s. 9d. All the foregoing quotations are for early delivery. The anticipated downward movement in east coast hematite pig iron has set in. Business is quiet, and mixed numbers are being offered freely at 70s. for both early and forward delivery. There is nothing passing in foreign ore, but sellers take a firm stand, and market rates remain on the basis of 20s. ex-ship Tees for rubio of 50 per cent. quality. A large number of the manufactured iron and steel works are preparing to close next week for the usual race week. Quotations are easy, and reductions were recorded this week. Iron and steel bars have dropped 15s., and iron and steel ship angles, steel ship plates, and steel boiler plates each 10s. Principal market quotations stand:—Common iron bars, £8; best bars, £8 7s. 6d.; best best bars, £8 15s.; iron ship plates, £8; iron ship angles, £8 5s.; iron boiler plates, £8 17s. 6d.; steel bars (basic), £7 5s.; steel bars (Siemens), £7 5s.; steel ship plates, £7 15s.; steel ship angles, £7 7s. 6d.; steel strip, £8; steel hoops, £8; steel joists, £6 17s. 6d.; cast iron railway chairs, £4 15s.; light iron rails, £7; heavy steel rails, £6 12s. 6d.; steel railway sleepers, £7 10s.; and galvanised corrugated sheets, £11—sheets less 4 per cent., railway material net, and all other descriptions less the usual 2½ per cent. discount.

South-West Lancashire.

COAL.

There is nothing new to report in regard to the inland house coal trade, which proceeds upon summer lines. It is exceptional, however, where broken time is being worked, although complaints are many in regard to the large percentage of absentees in the mines and the consequent small output. Screened coal for forges and manufactories moves off in fair tonnage, without being quite up to the maximum. With regard to shipping, the strike at Messrs. R. Evans and Co.'s collieries on the non-union question is, of course, affecting supplies, and at the moment coal is not over plentiful. Prices, if anything, are inclined to stiffen, and for screened Lancashire steam coals range from 13s. 6d. f.o.b. for ordinary grades to 14s. or 14s. 3d. f.o.b. for the best qualities. Slack is difficult to sell, there being comparatively few enquiries and some very low prices are being taken. The coastwise and cross-channel house coal trade



continues much above the average for the time of the year, and in the best qualities there is quite as much enquiry as can be promptly met. The holiday stoppages at the various towns which are now at their height are temporarily decreasing largely the consumption of slack, but as the end of these is well in sight, collieries are quite content to put down some of the surplus, confident that in the winter it will all be wanted. At the moment, in consequence of the strike named above, there is an unlooked for outlet for what would otherwise be a surplus quantity.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	16/3	16/3
Do. (f.o.b. Garston, net) .....	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/6 to 14/3	13/3 to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

### South Lancashire and Cheshire.

#### COAL.

There was a good attendance on the Manchester Coal Exchange on Tuesday. The demand for house coal continues poor. Furnace coal is steady and finds a ready sale, but shipping coal is not moving away quite so rapidly as it did. Prices remain firm. Slack is fairly plentiful and concessions are made exceptionally for spot lots, but generally prices remain steady. Present prices are as below.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

#### IRON.

There is not much tone in the market, and there is very little confidence to be found yet among would-be buyers; any buying that one can hear of being of from hand to mouth character. Good foundry iron continues to be offered in the neighbourhood of 63s. Forges are not much busier since the reduction took place; prices are, Crown bars £8, second quality £7 10s., hoops £8 7s. 6d. Steelworks are not too busy and could do with more specifications. Prices remain at £7 10s. to £7 12s. 6d. for bars, less 2½ per cent, and £5 5s. to £5 10s. net for billets. Foundries are slack. Engineers moderately employed. Wagon works could do with more enquiry.

### Yorkshire and Derbyshire.

Leeds.

#### COAL.

The first market after the holidays was only moderately attended on Tuesday, many of the members being away on holiday. The market, however, was fairly satisfactory, as more orders were given out for house coal, and there was also a fair number of enquiries for prompt parcels of steam coal. It was reported that the pits had worked nearly full time, and that stocks of the better qualities of house coal were practically nil, whilst stocks of other sorts are below the average for the period of the year. Empty wagons are very plentiful just now, and traffic is being moved expeditiously.

**House Coal.**—It is doubtful if stocks of best house coal have ever been less at this time of the year than they are at the present time. The demand from London and the eastern and southern counties is exceptionally good, and many of the pits producing the best Haigh Moor coal are 10 days to a fortnight behind with their deliveries. The same applies to a lesser extent to Silkstone best, and the market for these qualities is very firm. Of course, the bulk of the business done with the distant markets is for stocking purposes, but all the same prices are very firm, and there is every prospect of a very busy autumn. The coastwise trade has shown considerable improvement since the holidays, and a very large business is at present being done in the medium qualities of Silkstone house coal ex Goole and Hull. Freights are practically unchanged. There is not quite the same briskness in the demand from the local markets, but merchants in Leeds, Bradford, Halifax, Huddersfield, and the heavy woollen districts report a fairly steady demand for the secondary qualities, and also for washed house nuts. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

**Gas Coal.**—The bulk of the contracts are now placed, and new business is much less plentiful. The collieries are able to work full time, as the demand under current contracts is a very heavy one. Three or four acceptances are reported and in each case the shilling advance has been obtained. A fairly heavy tonnage of gas coal is being shipped from Hull to the nearer Continental ports, and it is reported that a sale of a considerable quantity of screened gas coal has been effected this week for delivery to the end of the year at 14s. 5½ per ton f.o.b. Hull.

**Manufacturing Fuel.**—There is no special feature to report in this branch of the trade, except that the prices of slack continue further in buyers' favour. The quietness in the demand for coke has had the effect of throwing an extra tonnage of small slacks on to the market, and it is said that some descriptions have been sold this week at 6s. 6d. per ton at the pit. Washed fuel maintains relatively the best position, and small washed nuts are somewhat scarce.

**Washed Furnace Coke.**—Stocks generally are considerable, and there is no life at all in the demand. Those most closely associated with the trade, however, say that the bottom has been reached. Some little buying is reported at about 13s. per ton at the ovens, but spot lots have been met with during the past few days at 12s. 6d. Deliveries to the Midlands have been resumed, but are still much below normal.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected .....	14/ to 14/6	14/ to 14/6
Wallsend & London best .....	13/6 to 14/	13/ to 13/6
Silkstone best .....	13/6 to 14/6	13/6 to 14/6
Do. house .....	12/ to 12/6	12/ to 12/6
House nuts .....	11/6 to 12/	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best .....	16/6 to 17/6	16/6 to 17/6
Silkstone best .....	15/6 to 16/6	15/6 to 16/6
Do. house .....	14/6 to 15/6	14/6 to 15/6
Other qualities .....	14/ to 14/9	14/ to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/3 to 12/9	12/3 to 12/9
Gas nuts .....	11/ to 12/	11/6 to 12/6
Unscreened gas coal .....	10/6 to 11/	10/6 to 11/
Other sorts:—		
Prices at pit:		
Washed nuts .....	11/6 to 12/	11/6 to 12/3
Large double-screened engine nuts .....	10/9 to 11/3	11/ to 11/6
Small nuts .....	10/ to 10/6	10/ to 10/6
Rough unscreened engine coal .....	10/ to 10/6	10/ to 10/6
Best rough slacks .....	8/ to 8/9	8/ to 9/
Small do. ....	7/6 to 8/	7/6 to 8/3
Coking smalls .....	7/3 to 7/9	7/6 to 8/
Coke:—		
Price at ovens:		
Furnace coke .....	13/	13/ to 13/6

### Barnsley.

#### COAL.

Although the demand for steam coal on export account has become somewhat easier during the week, there is a stronger tone prevailing with regard to forward business. The lack of tonnage at Hull has reduced the amount of traffic considerably, although the volume of trade continues to be very large. There are good enquiries to cover to the end of the shipping season, but on current account prices are hardly so strong, excepting the best hards. Collieries producing the latter class of coal are able to get along without accumulating stocks, and at the same time maintain prices fairly well, exporters requiring a fair amount of best coal to complete their arrangements. The output of secondary Barnsley steams continues to be in excess of the demand, and the requirements for the home trade are also of a quieter description, with the consequence that prices are again more fluctuating, and generally weaker both for current and forward business. The holiday season in the manufacturing districts continues to throw a considerable bulk of small coal on the market, and values do not recover—slacks in particular being decidedly easier, and a reduced tonnage is now being utilised on coke-making account. In regard to gas coal, there are complaints that the output is not being maintained owing to the absence of miners, and contract supplies are hardly met, whilst in some respects the same complaint is made in house coal districts. The demand generally continues to be of a remarkable character considering the season of the year, and full contract deliveries are now being taken by merchants in London and the eastern counties. District merchants complain of difficulty in obtaining ready supplies, and winter prices are being maintained in regard to most classes of coal. There continues, however, to be a fair quantity of secondary sorts on offer at reduced prices. The depression in the coke industry continues to be felt, and despite the reduced output producers find it impossible to get better values.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	14/6	14/6
Best Barnsley softs .....	13/9 to 14/	13/9 to 14/
Secondary do. ....	11/ to 13/	11/ to 13/
Best house nuts .....	13/ to 13/3	13/ to 13/3
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	13/	13/
Secondary do. ....	12/	12/
Best washed nuts .....	11/9 to 12/	11/9 to 12/
Secondary do. ....	10/9 to 11/	10/9 to 11/
Best slack .....	8/ to 8/6	8/3 to 8/6
Rough do. ....	7/3 to 8/	7/6 to 8/
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/6 to 12/	11/6 to 12/
Gas nuts .....	12/ to 12/9	12/ to 12/9
Furnace coke .....	13/	13/ to 13/6

### Hull.

#### COAL.

There is much more activity in the Humber coal market, and exporters are now busy booking up their contracts for the remainder of the season. With colliery owners holding prices firmly and showing an indisposition to commit themselves very far ahead, forward buying is confined very largely to deliveries over a month or so. Little free coal for August shipment is to be had. Prices for prompt lots of steam hards therefore maintain a steady level. At the same time it is not possible to report any improvement in secondary sorts and smalls, which are in plentiful supply and weak in tone. House coal is steady, gas coals in fair request. Derbyshire steam hards, in view of the demand of the Finnish State Railways for 30,000 tons over the remainder of the year, are stronger than they were a week ago, being now quoted at 15s. 6d. f.o.b. Grimsby or Immingham. Shipments at the docks are again on a heavy scale, and earlier in the week several vessels had to wait for turns at the Hull hoists. The pressure, however, has been removed, though all reports speak of a continued busy time ahead. Owing to the difficulty in arranging terms, the freight market has been only moderately active. What tonnage has been fixed up has been mostly for Baltic and near Continental ports, rates

being on the basis of Cronstadt 5s. for large vessels and 5s. 3d. for handy-sized carriers. Little has been doing for Mediterranean destinations. Genoa, having been done at 9s., is now quoted at something under that figure. The following are the approximate prices for prompt shipment f.o.b. Hull:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	16/3 to 16/6	16/3 to 16/6
Washed double-screened nuts .....	13/6	13/3 to 13/6
Unwashed double-screened nuts .....	13/	13/
Washed single-screened nuts .....	13/	3/ to 13/3
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls .....	10/6	10/6 to 10/9
Unwashed smalls .....	9/3 to 9/6	9/ to 9/6
West Yorkshire:—		
Hartleys .....	13/6	13/3 to 13/6
Rough slack .....	10/9 to 11/	10/9 to 11/
Pea slack .....	9/	9/9
Best Silkstone screened gas coal .....	13/3 to 13/6	13/3 to 13/6
Best Silkstone unscreened gas coal .....	12/9 to 13/	13/
Derbyshire:—		
Best steam hards (Hull) .....	15/9	15/6
Do. (Grimsby) .....	15/6	15/ to 15/3
Derbyshire nuts (doubles) .....	13/	13/
Derbyshire nuts (doubles) (Grimsby) .....	12/9	12/9
Derbyshire large nuts .....	14/ to 14/3	14/ to 14/3
Do. do. (Grimsby) .....	14/	13/9 to 14/
Nottinghamshire hards .....	15/9	15/6
Do. do. (Grimsby) .....	15/6	15/ to 15/3

The summary of exports of coal (exclusive of bunkers) from the Humber ports to foreign countries during July, and to date, in comparison with the corresponding periods of last year, is as under:—

	July.		January-July.	
	1913.	1912.	1913.	1912.
	Tons.	Tons.	Tons.	Tons.
Hull .....	417,478	427,636	2,550,368	1,732,583
Grimsby .....	108,359	132,471	648,155	648,177
Goole .....	122,496	138,928	744,467	539,123
Immingham .....	145,135	95,889	808,215	237,372

The great advance at Immingham will be noted.

### Chesterfield.

#### COAL.

The amount of business being done in the house coal section of the trade is, just now, on a small scale. Prices, however, are well maintained, and with the earliest appearance of cold weather they will almost certainly be advanced. Indications are clear as to a very firm and active condition of things in the coming autumn and winter. Owing to the intervention of the holiday season, there is a slight weakening of the demand for fuel for manufacturing purposes. After the close of this month, it is confidently expected that there will be renewed activity in this branch of the coal trade. For the reason already stated, slack for boiler firing is not so much called for, but with the return to normal conditions in the various industrial centres this fuel will again come into active request. Prices remain firm. Steam coal for locomotive use continues in steady demand. Tenders for a renewal of contracts for the ensuing 12 months have, within the last few days, been submitted to one or two railway companies. The offers are now being considered, and it is expected that the result will be made known at an early date. In the export department business is brisk, and the demand for steam coal is of an active kind. Prices remain firm at 15s. 6d. per ton delivered free alongside steamer at Grimsby. There is a satisfactory call for cobbles for near Continental ports. Washed fuel moves freely at prices that are firm, but unchanged. No improvement can be reported in respect of the coke market, which remains sluggish. The demand has fallen off substantially, and prices are weaker. The number of ovens at work is considerably less than it was at the end of June. Coking fuel is in steady request, and the supply is now much less difficult to find.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

#### IRON.

While the iron trade of the district cannot be said to be any worse, it certainly shows no improvement. There is a little enquiry for pig iron for forward delivery. The finished iron branch of the trade is depressed, and the reduction in prices recently announced has not had much success in the way of inducing buyers to place fresh business of any magnitude. A better state of things is not looked for until the holiday season is over.

### Nottingham.

#### COAL.

With the collieries at work again following the holiday, the coal trade in Nottinghamshire has this week commenced to assume a normal aspect. Saturday was a general holiday at practically all the pits in this county on account of the miners' demonstration at Sutton-in-Ashfield. The stoppage had given the railways an opportunity of clearing the sidings of stocks, and with an ample supply of wagons the collieries have made a good start towards the autumn season. As yet orders for domestic fuel are not coming to hand freely, but the demand is manifesting a slight improvement, despite the fact that the weather is not of a character to give much assistance to sales. Better-class



stocking purposes is in better request, but common re selling quietly. A firmer tone is characterising for steam coal, a noteworthy factor being the demand for best qualities, while another helpful factor is the increasing orders on export account. Second-rate fuel is keeping in fair request. With regard to slacks, the market is improving, and few cheap lots are obtainable, prices showing a firmer tendency.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	12/6 to 13/	12/ to 13/
Good house coals.....	11/ to 12/	11/ to 12/
Secondary do. ....	10/ to 11/	10/ to 11/
Best hard coals .....	11/6 to 12/6	11/6 to 12/6
Secondary do. ....	10/6 to 11/	10/6 to 11/
Slacks (best hards).....	8/3 to 8/9	8/3 to 8/9
Do. (seconds).....	7/3 to 7/9	7/3 to 7/9
Do. (soft).....	7/3 to 8/	7/3 to 8/

Leicestershire.

COAL.

Since the holidays there has been an amount of activity which is quite good for the middle of August. There is a general demand for nearly all descriptions of coal, which argues for a speedy revival of business. As it is, there is, for the time of year, a good output being made. The business being done is not equally distributed—whilst some collieries are quiet, others are well supplied with orders—but as a whole the present conditions are not discouraging. A good deal of coal is being sent away. As a rule, stocks are not inordinately heavy, though some collieries have rather a heavy amount. There is a fairly good demand for household sorts, small coals being most in request. Steam coal of all kinds are in demand. Local merchants are generally much busier, consumers being more inclined to take season supplies. Quotations are generally maintained, and it is only where there is any considerable accumulation that concessions are made. The question of miners' wages has been settled, the council of the Miners' Association having accepted the owners' offer made at the conference last week.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

There is very little of importance to report this week concerning the coal trade of the Cannock Chase district. The amount of business being done is well up to the average for the time of the year, and is likely to improve. Any material giving way in prices is unexpected. The collieries are working fairly well, some of them doing from three to four days a week, and others nearly full time. There has not been much improvement as yet in the house coal trade. The demand for fuel for manufacturing purposes is fairly well maintained, and slack is in good request. Business continues quiet at the landsale depots.

Birmingham.

COAL.

The coal market is still weak, but signs of a coming revival are beginning to show themselves. Works fuel is in steady consumption, and there is an abundance of slacks. Prices remain as under:—

Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep .....	16/6	16/6
Do. best shallow .....	14/6	14/6
Do. seconds do. ....	13/	13/
Best hard .....	14/	14/
Forge coal.....	11/	11/
Slack .....	8/6	8/6
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked cobs .....	13/9	13/9
Best hard spires .....	14/6	14/6
Forge (steam) .....	10/	10/
D.S. nuts (steam) .....	9/6	9/6
Small (do.) .....	8/6	8/6

IRON.

The market has recovered from the interruptions necessitated by the holidays, and though the tone is still somewhat quiet and the demand on a restricted scale, there are indications that, with the turn of the month, a steady autumn trade will develop. During the last few days pig iron sales have materially improved. There is as yet no forward buying, but when consumers once realise that the limit of concession has been reached, they will purchase in larger quantities. The quotations for the time being are:—Northamptonshire forge 53s. to 54s., Derbyshire 55s., South Staffordshire 53s. to 54s., with the usual extra for part-mine. Makers hold that they cannot go below these figures except at a loss. In the bar iron trade a fair number of orders have been booked since the holiday stoppage, and most of the works are in full operation. Prices have undergone no change, being £9 10s. for marked bars, £7 12s. 6d. to £7 15s. for merchant qualities, and £7 5s. to £7 7s. 6d. for nut and bolt iron used in the Darlaston and Wednesbury district. These prices are very firm, an encouraging influence being the fact that Continental prices have advanced about 4s. during the month. The strip works, which were entirely disorganised by the recent prolonged strike are now running normally, but the demand is on the slow side. The quotations range from £7 10s. to £7 12s. 6d., according to size of order. Makers of galvanised sheets continue to do well, and substantial orders are being received from the East and West Indies and South America. The business is on a smaller scale. The minimum price for galvanized sheet is £11 10s. Liverpool. Makers of sheet piling have enquiries, but in this branch there is no forward buying for improvement. Prices remain at

£8 5s. for doubles. The drop of 10s. in steel sections—angles, tees, and channels—has had the effect of stimulating buying to some extent. Joists are not included in the reduction, these having been altered previously. A fair amount of enquiry is afoot for semi-finished steel. Bessemer qualities are £5 to £5 2s. 6d. and Siemens £5 5s. Continental prices are £4 15s. to £4 17s. 6d., and the difference is too slight to affect the home products. Copper sheets were advanced £1 to £85 a ton.

Forest of Dean.

Lydney.

COAL.

The house coal market has gained further strength this week, and the demand, for the season of the year, is exceedingly keen. A good many merchants and householders are evidently taking advantage of present prices to lay in stocks for the colder season. The collieries are engaged five and six days in the week, and stocks are comparatively light. All qualities of steam coal continue in good request, and the pits are making full time. Stocks are nil.

Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	16/6	16/6
Forest .....	15/6	15/6
Rubble .....	15/9	15/9
Nuts .....	14/	14/
Rough slack.....	8/	8/
Steam coal:—		
Large .....	13/ to 13/6	13/ to 13/6
Small .....	10/ to 10/6	10/ to 10/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

Devon, Cornwall, and South Coast.

Plymouth.

COAL.

Messrs. W. Wade and Son state that the usual summer dulness of trade is unrelieved by speculative purchases for future shipment. Purchasing continues to be on a rather restricted basis, and the numerous forward contract offers meet with but few acceptances. Freighters are quoted rather lower from the various coal ports. Although on the east coast the new "Coastcon" charter is generally supported by shipowners and brokers, various necessary revisions are being made, involving a concession now here and now there, cancelling one or other of the unfair clauses embodied in the 140 lines of this grotesque business instrument. From Wales, Liverpool, and the west coast generally the "Coastcon" charter is unthought of, and from the east coast its objectionable clauses will eventually be dropped by such owners as are willing to give and take in a fair and reasonable business spirit. The "Coastcon" charter has already originated local strikes, and caused heavy losses to importers, and in some cases to shipowners, so that even from the east coast the old customary charter has been, and is being, accepted. Commercial men feel that strikes and litigation cannot be lightly incurred by entering into a charter party that is full of unaccustomed clauses and one-sided proposals.

CONTINENTAL MINING NOTES.

Belgium.

An interesting review of the Belgian coal trade, by M. Emile Discry, managing director of the Gosson Lagasse Colliery, appears in *Action Economique*. He points out that the cost of production has risen considerably during the past seven years. Thus, according to the official estimates the labour cost has increased from 6'23 fr. to 9'17 fr. per ton, whereas the average profit per ton (1'41 fr. in 1912) is sensibly inferior to that earned in the preceding fifteen years (1'99 fr.) During the first half of 1913 the financial results have not been superior to those of the first half of 1912, owing mainly to the constant rise in wages and the political strike in April.

The announcement is made from Brussels that the Belgian Railway Administration is considering the advisability of once more adopting a system of public tendering for the supply of coal to the Belgian State Railways. Over 2,500,000 tons of fuel are usually arranged for at one time by the State authorities. The present system of reserving contracts of this nature to home producers has not been in force for very long, and previously the supply of fuel was put up to open tender. Since this principle was dropped, not only have prices advanced very materially, but there is some ground for supposing that the Belgian contractors have had to go outside the country to fulfil the terms of their bargain.

France.

In the *Revue Noire* M. Didier publishes some interesting statistics relating to the profits earned by some of the principal concerns in 1912. From these we take the following:—

Company.	Value of shares.		Dividends per ton.	
	June 29, 1912.	June 30, 1913.	1912.	1913.
Aniche .....	Fr. 2,849	Fr. 3,125	1'65	1'73
Anzin.....	8,545	8,435	2'63	2'61
Carvin .....	937	926	2'38	2'66
Courrières .....	4,675	5,090	2'10	2'32
Douchy.....	980	932	1'55	1'44
Dourges .....	455	498	1'79	1'86
Ligny .....	484	668	—	1'18
Marles A .....	3,171	3,575	3'92	4'17
" B .....	4,929	5,345	—	—
Thivencelles ..	1,700	2,080	0'83	0'88

According to the journal *Information*, the taxation of the French mining industry has risen from 1,425,778 francs in 1871 to 2,508,645 francs in 1895 and 8,749,871 francs in 1911.

Germany.

The following table shows the entries of British coal at various ports in Germany during the six months ended June:—

	Jan.-June 1913.	Increase (+) or decrease (—) as compared with Jan.-June 1912.
Baltic ports—	Tons.	Tons.
Memel .....	71,717	+ 20,953
Königsberg-Pillau.....	101,401	— 34,808
Danzig-Neufahrwasser .....	78,451	+ 17,589
Stettin-Swinemünde .....	322,274	+ 69,464
Stolzenhagen-Kratzwick .....	202,908	+ 137,600
Rostock-Warnemünde .....	43,236	+ 4,213
Wismar .....	57,709	+ 2,024
Lübeck-Travemünde .....	59,836	+ 15,035
Kiel-Neumühlen u. Dietrichsdorf .....	119,263	— 2,428
Flensburg.....	85,713	— 10,554
Other Baltic ports.....	99,302	+ 20,953
Total (Baltic ports).....	1,241,810	+ 240,041
North Sea ports—		
Tönning.....	18,399	+ 3,596
Rendsburg-Audorf .....	61,187	+ 12,215
Brunsbüttelkoog .....	34,231	+ 7,894
Hamburg-Altona .....	2,247,219	+ 429,160
Harburg .....	380,756	+ 129,926
Bremen-Bremerhaven.....	130,534	+ 37,112
Other North Sea ports .....	56,114	+ 10,421
Total (North Sea ports) .....	2,928,440	+ 630,324
Inland harbours.....	207,005	+ 12,578
Grand total.....	4,377,255	+ 882,943

*Ruhr Coal Market.*—Although the volume of traffic has undoubtedly diminished, the situation is not altogether unfavourable when considered as a whole, the chief feature being that the deliveries are not commensurate with the output capacity of the pits. The iron industry continues to be a very important consumer, and though its position is not particularly favourable, there seems a prospect of the depression being removed. In gas coal the traffic has become much quieter and stocks keep growing, and coking coals are also very quiet, whilst the coke trade is less active and the difficulty in disposing of the enormous output is causing stocks to accumulate. In South Germany, things have been brisker again of late, and the desire to lay in good supplies of house coal has led to an immediate absorption of a large proportion of the extensive consignments to that district, less activity, however, being manifested with regard to industrial coals. The export conditions show no signs of change, France and Holland continuing to be large consumers, whilst the Belgian demand leaves much to be desired. There is, however, no serious competition on the part of English coals.

*Coal Market in South Germany.*—The great activity in the demand for house coal is being maintained, and notwithstanding that the specifications for delivery are frequently much in excess of the contracted quantities, it has been possible, in general, to meet customers' requirements promptly. The introduction of the winter price list for coke and anthracite at the beginning of the month has naturally checked the demand, and at the same time agricultural buyers are now requiring their vehicles for harvesting purposes, so that for the time being they will not be available for hauling domestic fuel. In the demand for industrial coals there is little alteration to be recorded, buyers in general taking their contracted quota, though users of water power are getting behindhand, being frequently overstocked. Large consignments are coming forward from the Ruhr, the river being in very good condition for traffic and the supplies ample, so that stocks on the Upper Rhine are being made up to the desired level, especially in small nuts and through-and-through coals, though there is still a shortage of large nuts, especially open-burning kinds.

*Coal Market in Upper Silesia.*—There are no indications of any unfavourable change in the situation; and the actual state of affairs may be gathered from the fact that the State collieries have announced that, being overburdened with orders for house coal, they cannot accept any fresh commissions for next month. This is due to the administration having declined to follow the policy of the Convention and raise the price of house coals for the home market, though it has done so in the case of Austria-Hungary. Apart from the general desire to be independent of the shortage of railway wagons in the autumn, most consumers are in actual need of fuel, not many of them having any large stock in hand. This is evident from the fact that they are willing to pay the extra carriage by rail as compared with the slower method of delivery by water. In the export trade, the Austrian railways and private consumers are increasing their requirements; and it is found difficult to satisfy these in view of the demands of the home market. For the same reason, Russian Poland has to go short. The activity extends to all grades of fuel, gas coal being once more in improved request, and coking coals difficult to raise fast enough. So far as the coke market is concerned, the conditions are very similar, the entire output of blast-furnace and foundry coals being absorbed at once, and complaints about delay being very frequent.



## THE WELSH COAL AND IRON TRADES.

THURSDAY, AUGUST 14.

## North Wales.

## Wrexham.

## COAL.

The average amount of summer trade has been done during the past week, and though most of the collieries have suffered through a shortage of wagons, some of them have managed to work the five days. Houso coal business continues to be somewhat dull; but as August month advances merchants are beginning to appreciate the fact that it will be necessary for them to settle their winter contracts at an early date, and a number of these have been fixed up at, generally, good prices. Gas coal is in normal demand, and works are commencing to lay in their stocks, and the work of settling these contracts is now practically completed. The demand for various classes of steam coal is fairly satisfactory, and a good tonnage has been disposed of for locomotive, manufacturing, and shipping contracts. Nuts and slack are fairly well sold, and prices are little different from last week. With reference to prices generally it may be said that, on the whole, the same figures apply this week as ruled in last week's markets for all grades of fuel.

Prices at pit f.o.r. :—	Current prices.	Last week's prices.
Best house coal .....	15/ to 15/6	15/ to 15/6
Secondary do. ....	14/ to 14/6	14/ to 14/6
Steam coal .....	12/3 to 12/6	12/3 to 12/6
Gas coal .....	13/ to 13/6	13/ to 13/6
Bunkers.....	12/ to 12/3	12/ to 12/3
Nuts .....	11/ to 11/3	11/ to 11/3
Slack .....	6/ to 8/	6/ to 8/
Gas coke (at works) .....	15/ to 16/8	15/ to 16/8
Prices landsale :—		
Best house coal .....	16/6 to 18/4	16/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	15/ to 16/8	15/ to 16/8

## Monmouthshire, South Wales, &amp;c.

## Newport.

## COAL.

Favoured by the pleasant weather of the past fortnight, the Welsh collier has expanded his Bank Holiday to a much greater extent than usual, and the reduction of output occasioned has checked any further tendency to reduce prices. Thus, in spite of a very moderate enquiry for forward business, to-day's prices compare favourably with those last quoted. Buying is not extensive, and those looking for coal seem very chary of paying higher rates. Sellers on the other hand are in most instances fairly well booked, and will not make further concessions at present. The freight market shows no very favourable signs just now, being quiet and featureless, with rates generally on the easy side. Pitwood has shown practically no fluctuation during the past week, good wood now as then being obtainable at 22s. ex ship.

Prices f.o.b. cash 30 days, less 2½ per cent.

Steam coals :—	Current prices.	Last week's prices.
Best Black Vein large ...	17/3 to 17/6	17/ to 17/6
Western-valleys, ordinary	16/6 to 17/	16/6 to 16/9
Best Eastern-valleys .....	16/ to 16/3	15/9 to 16/3
Secondary do. ....	15/9 to 16/	15/6 to 15/9
Best small coals .....	8/ to 8/6	8/ to 8/3
Secondary do. ....	7/6 to 7/9	7/3 to 7/6
Inferior do. ....	6/9 to 7/	6/9 to 7/
Screenings .....	8/3 to 8/6	8/3
Through coals .....	13/3 to 13/6	13/ to 13/6
Best washed nuts .....	14/ to 14/6	13/9 to 14/3
Other sorts :—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/6 to 20/6	20/ to 20/6
Furnace coke .....	22/ to 23/	22/ to 23/
Foundry coke .....	26/ to 27/	26/ to 27/

## IRON.

There are few fresh features to report in the local conditions of the iron and steel trades, but if anything the tone of the market is somewhat firmer. Work is again in full swing, and outputs have regained their usual average. A fair enquiry is coming along for bars, mills being well engaged—quotations showing an increase on the week of 1s. 3d. per ton and an upward tendency. Rathmore business is passing in the rail department, where several good lines have been booked, but quotations remain unaltered. Only a small business is being transacted in pig iron, blastfurnaces being hardly so busy as recently, and small concessions have been made to secure orders. Practically no business of an important nature is being done in the tinplate trade, where enquiry has dropped away to a minimum. Steel rails: Heavy sections £6 10s. to £6 15s., light £6 15s. to £7; tinplate bars: Bessemer steel £4 16s. 3d., Siemens £4 16s. 3d. to £4 17s. 6d.; tinplates: Bessemer primes, 20 x 14, 13s. 3d., Siemens primes, 20 x 14, 13s. 3d. Finished blackplate £10 per ton, Welsh hematite 75s. to 76s., delivered in the district.

## Cardiff.

## COAL.

The coal market this week has been in a most lifeless condition. Colliers have lately been earning such good money that they extended their holidays much beyond the three days officially allowed by the Coalowners' Association. Indeed, during the latter half of last week it is probable that not one-third of the number of men turned up at their employment. This interfered materially with the arrangements for loading, and in many cases work had to be suspended because there was not sufficient coal sent down from the pits to supply the requirements of shippers. The exports for the week only amounted to about 235,000 tons, being more than 150,000 tons less than in the preceding six days. Even when the present week opened, the return of miners to work was reported to be very meagre, and though there was a daily increase in the numbers, it is estimated that at no period during the week were there more than

from 70 to 80 per cent. of the men following their occupation. The effect on the market was not very marked. Though the amount of tonnage taken up last week was only about 183,000 tons, there were such a number of vessels in port—namely in Cardiff 138, Barry 88 and Penarth 19, or a total of 245—that business was resumed on Monday last, and shipowners were glad to make very substantial concessions to persons who were prepared to charter. Particularly was this the case as regards the Mediterranean ports, as low as 7s. 6d. being accepted for Genoa, which was the lowest figure recorded for over 18 months, but buyers generally seemed to prefer to wait for a few days before entering into any fresh engagements. There are one or two factors which render the position very uncertain. In addition to the forthcoming showcard day, which has been decided upon by the officers of the Miners' Federation in order to test how far the men are paying their subscriptions, application has been made to the coalowners for an advance of 15 per cent. in the wages of colliery surfacemen. Both these circumstances may cause considerable interruption to work—to use the mildest term—and therefore colliery salesmen are not disposed to make any modifications in their quotations for at any rate the rest of this month. In some cases they state that they are so well sold ahead that they are unable at present to quote for any new business. Best steam coals command from 20s. 6d. to 21s., superior second Admiralties 19s. 6d. to 20s., and ordinary qualities 18s. to 18s. 6d. Up to the time of writing no reply had been received to the tenders sent in for the requirements of the White Star Line Steamship Company, and the feeling is gaining ground that they will for the present only arrange for a portion of their supplies, deferring the purchase of the bulk of what they require until the market is in a more assured position. The small coal market keeps very firm. Following upon the fall in freights there has been more enquiries than usual the last few days. Evidently buyers are anxious to fill their depots before the commencement of the fruit harvest, when very few wagons are obtainable for the carriage of coal, but whether they will prefer to pay present values, or elect to adopt a waiting policy, remains to be seen. Whilst the output continues low, sellers do not seem disposed to lower their price, which for bunkerings are 10s. 9d. to 11s., and for cargo qualities 8s. 6d. to 9s. per ton. Monmouthshire coals keep very steady, Black Veins being 17s. 6d. to 17s. 9d., and western-valleys 16s. 9d. to 17s. 3d. f.o.b. Cardiff. The market for bituminous coals is rather weaker, owing to the strike of clay men in Cornwall, whither a large portion of these coals go. No. 3 Rhondda large, although still quoted at 17s. to 17s. 3d., barely commands even the lower figure. No. 2 Rhondda is 13s. to 13s. 3d. Shipments of patent fuel for the week were very light, the total being under 18,000 tons, of which the greater part—namely 7,900 tons—were despatched from Swansea, Newport exporting 5,100 tons, and Cardiff makers only loading 4,125 tons. Prices remain steady at from 21s. to 22s. 6d. The coke market is very irregular. There is very little enquiry and prices have fallen about 2s., special foundry being 28s. to 30s. per ton. Pitwood is weak at 22s. per ton. There was naturally a good deal of discussion on 'Change over the rejection of the Cardiff Railway Company's Bill by the House of Commons on Tuesday evening. So great a majority against the Bill came as a surprise, but the feeling seemed to be pretty general that the last had not been heard of the controversy.

Prices f.o.b. Cardiff (except where otherwise stated).

Steam coals :—	Current prices.	Last week's prices.
Best Admiralty steam coals .....	20/6 to 21/	20/6 to 21/
Superior seconds .....	19/6 to 20/	19/6 to 20/
Ordinary do. ....	18/ to 18/6	18/3 to 18/9
Best bunker smalls.....	10/9 to 11/	10/9 to 11/
Best ordinaries.....	10/3 to 10/6	9/6 to 10/
Cargo qualities .....	8/6 to 9/	8/3 to 8/6
Inferior smalls.....	7/6 to 8/	7/3 to 7/9
Best dry coals .....	18/ to 18/6	18/ to 18/6
Ordinary dries .....	16/ to 16/6	15/9 to 16/3
Best washed nuts .....	16/ to 16/6	16/ to 16/6
Seconds .....	15/ to 15/6	15/ to 15/6
Best washed peas .....	14/6	14/ to 14/6
Seconds .....	13/6	13/ to 13/6
Dock screenings .....	11/	10/3 to 10/9
Monmouthshire—		
Black Veins .....	17/6 to 17/9	17/3 to 17/9
Western-valleys .....	16/9 to 17/3	16/9 to 17/
Eastern-valleys .....	16/ to 16/3	16/ to 16/6
Inferior do. ....	15/9	15/6
Bituminous coals :—		
Best house coals (at pit)	20/	20/
Second qualities (at pit)	18/	18/
No. 3 Rhondda—		
Bituminous large .....	17/	17/ to 17/3
Through-and-through...	15/	15/ to 15/3
Small .....	12/6	12/6 to 12/9
No. 2 Rhondda—		
Large .....	13/ to 13/3	12/6 to 13/
Through-and-through...	11/6	11/3 to 11/6
Small .....	8/6	8/6 to 8/9
Best patent fuel .....	22/6	22/ to 22/6
Seconds .....	21/	21/
Special foundry coke .....	28/ to 30/	30/ to 31/
Ordinary do. ....	25/ to 27/	24/ to 27/
Furnace coke .....	20/ to 22/	20/ to 22/
Pitwood (ex-ship) .....	22/	22/3

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

## IRON.

All the tin-plate works resumed operations on Monday, but as prior to the stoppage some good orders had been received, a busier time than usual is anticipated. Stocks in the warehouses and in vans have been substantially reduced, being now only 334,227 boxes, as compared with 389,826 boxes in the previous week, and 272,300 boxes in the corresponding week of last year. According to the Board of Trade returns, the total exports of tin-plates for July amounted to 41,166 tons, being a decrease of 7,000 tons as compared with the corresponding month of last year. The decline to Roumania alone was 6,800 tons, but this was counterbalanced to some extent by the increased shipments

to the United States, which totalled 3,800 tons. There is but little change in quotations, 14 x 20 cokes being 13s. 3d., and oil sizes 13s. 7½d. and 19s. 6d. Imports of foreign steel plates and bars for the week were over 5,000 tons. Foreign makers have slightly reduced their prices, and this has had some effect on the Welsh market—£4 16s. 3d. being now obtainable for Siemens and £4 15s. 9d. for Bessemer tin bars. The holidays have had a disturbing effect on the galvanised sheet trade, and the business coming forward has been sparse; 24-gauge corrugateds, however, are still quoted at £11 to £11 5s. The exports for July, according to the Board of Trade returns, were 61,844 tons, or an increase of nearly 4,700 tons as compared with July of last year. The roll turners employed at the Ebbw Vale works went back to work on Monday, pending a settlement by the general manager. Work continues to go on uninterruptedly at all the spelter factories; in fact, trade is so brisk that one-third of all the workers are compelled to work seven days in every week. Welsh pig iron continues steady at 73s. 6d. f.o.t. There is no material change in scrap metals.

## Swansea.

## COAL.

During the past week trade was considerably disorganised by the holidays, both the coal and patent fuel trades were quiet, and shipments only amounted to 72,175 tons. There was a good attendance on 'Change this morning, and the undertone of the anthracite coal market was somewhat improved. There was a better demand for Swansea Valley large, and values moved in an upward direction. Rod Vein large, however, was still slow. Machine-made nuts maintained their steady position, but cobbles were weak. Rubbly culm was without any improvement, but duff was very firm at last prices. In the steam coal market there was no outstanding feature, and this department closed easy.

Prices f.o.b. Swansea (cash in 30 days).

Anthracite :—	Current prices.	Last week's prices.
Best malting large (hand picked) (net) .....	21/ to 23/	21/ to 23/
Secondary do. ....	18/6 to 20/	18/6 to 20/
Big Vein large (less 2½ per cent.) .....	16/6 to 18/	16/ to 17/6
Red Vein large do. ....	12/6 to 13/	12/ to 13/
Machine-made cobbles (net) .....	21/ to 22/	21/ to 22/
Paris nuts (net) .....	22/6 to 24/	22/6 to 24/
French do. do. ....	22/6 to 24/	22/6 to 24/
German do. do. ....	22/6 to 24/	22/6 to 24/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	11/6 to 13/6	11/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.)	6/ to 6/6	6/ to 6/6
Duff (net) .....	5/9 to 6/3	5/9 to 6/3
Steam coals :—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/ to 12/	11/ to 12/
Small do. ....	8/ to 9/6	8/ to 9/6
Bituminous coals :—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.)	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

## IRON.

There is little to state about the condition of the tin-plate trade during the last week, the various works having closed down for the annual stop-week. They restarted on Monday morning, and a brisk week is anticipated, as splendid orders had been received. The shipments of tin-plates last week were 107,160 boxes, receipts from works 51,561 boxes, and stocks in the dock warehouses and vans 334,227 boxes. The weldless tube trade continued brisk, and the engineering shops had a lot of orders on hand. The foundries in the district were not so busy, there being little employment for moulders.

## Llanelli.

## COAL.

The holidays of last week did some good to the coal market, and the stop days have had the result of taking a good quantity of stock coal away. Several of the collieries closed down for the whole week. There is still far too much coal lying about in the "await order" sidings, and occasional idle days would go a long way towards putting up prices. These during the past few weeks have been cut considerably, and some of the collieries must have been losing money. It is fully expected that from September on there will be an improvement for most kinds, and values should be far better. The bituminous and steam coals are still in a bad condition, and unfortunately there is but little prospect of any improvement for the next few weeks. There is little alteration yet in the inland trade, but possibly this is due to many of the buyers being away on holiday. Things are getting better slowly in the anthracite trade, but there is ample room for improvement. This week's prices are :—

Prices f.o.b.

Anthracite :—	Current prices.	Last week's prices.
Best malting large .....	20/6 to 22/6	20/6 to 22/
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large.....	17/ to 18/	17/ to 18/
Red Vein do. ....	12/6 to 13/6	12/6 to 13/6
Machine-made cobbles ...	19/6 to 20/	19/6 to 20/
German nuts .....	20/ to 22/	20/ to 22/
French do. ....	22/ to 24/	22/ to 24/
Paris do. ....	22/ to 24/	22/ to 24/
Machine-made beans .....	19/ to 22/	19/ to 22/
Do peas.....	12/ to 13/	12/ to 13/
Rubbly culm .....	6/ to 6/6	6/6 to 7/
Duff .....	5/ to 5/6	5/ to 6/
Other sorts :—		
Large steam coal.....	16/ to 17/	16/ to 17/
Through-and-through ...	11/6 to 12/	11/6 to 12/
Small .....	9/ to 10/	9/ to 10/
Bituminous small coal ...	10/ to 11/	10/ to 11/



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(A Classified List appears on page 348.)

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Mechanical Engineering of Collieries. By T. C. Futers. Vol. 1 21s. net; Vol. 2 10s. 6d. net; Supplementary Vol., 10s. 6d. net (postage extra).	
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— See Page 339. —

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## Forthcoming Annual Meetings.

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August 21, 1913 (Toronto)  
Manchester Geological and Mining Society—  
October 14, 1913  
Institution of Mining Engineers—  
Sept. 24, 25 & 26, 1913 (Manchester)  
Midland Counties Institution of Engineers, Sept. 1913  
South Staffordshire and Warwickshire Institute of  
Mining Engineers ... October 20, 1913

## The Colliery Guardian.

LONDON, FRIDAY, AUGUST 15, 1913.

Last month the exports of coal, coke and manufactured fuel from the United Kingdom totalled 7,275,630 tons, the value being £5,119,833. This compares with 7,319,789 tons, valued at £4,558,336, in July 1912, and 5,091,436 tons, valued at £2,859,103, in July 1911.

The total of exports for the first completed seven months of the year amounted to 44,323,767 tons, valued at £30,959,085, as compared with 34,516,503 tons, valued at £21,685,450, and 37,899,821 tons, valued at £21,583,785, in the corresponding periods of 1912 and 1911 respectively.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during July was 14s. 0.8d. per ton, as compared with 12s. 5.4d. in July 1912 and 11s. 2.7d. in July 1911.

The value during the first seven completed months of the present year is 13s. 11.6d. per ton, as compared with 12s. 6.7d. and 11s. 10.3d. respectively in the corresponding periods of 1912 and 1911.

Of the total exports of coal during July, the mean value of the large coal exported was 15s. 4.5d.; through-and-through (unscreened) coal, 12s. 5.1d.; and small coal, 11s. 0.6d. The average value of all kinds of coal exported was 13s. 10.7d., a decrease of 2d. as compared with the preceding month. Otherwise divided,



atched the following values:—Steam coal, 25d.; gas coal, 12s. 5·9d.; anthracite, 9·8d.; household coal, 13s. 4·4d.; and sorts of coal, 12s. 4·07d. The value of the exported was 19s. 7·7d. per ton, and of the manufactured fuel 17s. 6·1d. per ton.

the Clay Main Collieries Company Limited been formed, with a capital of £250,000. The tors are Messrs. R. Armitage, M.P., G. C. H. y, C. E. Rhodes, W. Wilde, and A. L. Rea.

1 Tuesday, H.M. the King presented ard Medals to a number of miners for acts allantry at Cadeby, Lodge Mill Colliery, ham No. 2 Colliery, and the Townhead Ore Mine.

i important report has been issued by the d of Trade on rents and prices in 1912, and ost of living of the working classes.

Ashby - de - la - Zouch Police Court, on rday, the Measham Collieries Limited, of ham, were summoned for failing to comply certain special rules for the installation use of electricity in mines. Similar charges preferred against Thomas Watson, manager e mine, whose defence was that he was pered by not being allowed to order what necessary to remedy the defects, which he brought to the notice of the director, Mr. dell, who, on his part, denied this. Watson acquitted and the company was fined £105, £19 4s. costs.

ie council of the International Geological press, which opened in Toronto last week, decided to hold its next international con- in Brussels in 1917.

ogress has been made with fighting the fire he Cadder pit. Considerable difficulties been encountered, but it will probably be d unnecessary to flood the workings. The accident enquiry will be held in the ciary Buildings, Glasgow, on August 26.

Home Secretary in the House of Commons week stated that he had appointed Sir ry Cunynghame to conduct a special enquiry the circumstances attending the accident. also reiterated the determination of the e Office not to recognise the provision of appliances as fulfilling the requirements of regulations and to insist upon the provision lf-contained apparatus. The Carron Com- have intimated their intention of making provision for the 63 dependants of the ers who lost their lives.

ver 1,000 workmen stopped work at the ngton Colliery, in South-east Durham, this owing to their objection to ride 60 men cage.

iners are on strike at Messrs. Richard Evans Co.'s collieries at Haydock, Golborne, and elens, Lancashire, owing to 31 non-unionists sing to join the Federation.

a Saturday, 23rd inst., the Wages Board of Northumberland Miners' Association will the coalowners of the county to seek a er advance in wages. To-morrow a con- ce will be held regarding the three-shift tion in the county.

a joint excursion meeting of the Mining tute of Scotland, the Scottish branches of National Association of Colliery Managers, the Association of Mining Electrical Engineers Saturday, Mr. James Barrowman, J.P., ilton, on the occasion of his retirement, 30 years' service, from the secretaryship e Mining Institute, was presented with timonial.

the House of Commons on Tuesday the iff Railway Bill, which proposed increases harfrage and dock dues at the Port of Cardiff, rejected by a majority of 83.

The report of H.M. Inspectors of Explosives for 1912 has been issued. Details are given of the new test for mining explosives.

A syndicate of capitalists have just registered at Somerset House a new company, "Iron and Steel Corporation Limited," the capital of which is £2,000,000. The first signatories are Messrs. Biggart, Lumsden and Co., Glasgow, and the Shipbuilding Employers' Federation. The company will carry on the manufacture of iron and steel besides shipbuilding and railway plate.

Serious floods have occurred in Bengal, and work at the collieries in some cases has been dislocated. We understand, however, that there is no real cause for alarm.

A MONOGRAPH consisting of Germany's three quarto volumes, accom- Coal Reserves. panied by an atlas, giving the results of an exhaustive enquiry into the coal resources of the world, was presented at the opening meeting to the members attending the International Geological Congress, now being held in Canada. The section of this work relating to the coal resources of the German Empire was undertaken by the Royal Prussian Geological Survey, and the estimates have been compiled under the auspices of the German geological societies and other bodies. Two articles have recently appeared in our esteemed contemporary, *Glückauf*, written by Herr Bergassessor H. P. BÖKER, of the Royal Prussian Geological Survey, containing the collected details.\*

The total coal resources of the German Empire calculated upon all seams regarded as workable under present conditions to a depth of not exceeding 2,000 m. (6,561 ft.) are estimated at 290 milliards of tons (metric = 2,204 lb.), or, including the partially worked seams, up to 12 in. in thickness in Westphalia and Upper Silesia only, the total amounts to 410 milliards of tons. [A milliard is 1,000 millions, or, according to the French and American method of numeration, a billion. According to the English method, a billion is equal to a million millions.]

Calculated according to depth, the estimates are stated as follow :—

	Coal regarded as workable under present conditions.	Total coal.
Metres.	Milliards of tons.	Milliards of tons.
0 to 1,000 .....	100 .....	141
1,000 to 1,200 .....	41 .....	54
1,200 to 1,500 .....	53 .....	77
1,500 to 2,000 .....	96 .....	138
	290 .....	410

It is not considered that coal is likely to be worked at a greater depth than 1,500 m. during the next decade.

The reserves are divided into three groups—"actual," "probable," and "possible," and the first of these, "actual," have been estimated with the greatest care at 75 milliards of tons, 57 milliards of which, or 76 per cent., occurring at depths less than 1,200 m.

The principal coalfields of carboniferous age (that is excluding the tertiary coals which are variously known as Lignite, Erdige Kohle, Gemeine Braunkohle, Blatterkohle, Peckkohle, Gaskohle, and Glanzkohle, according to their physical character) are the Ruhr or Westphalian coalfield (about 1,080 square miles), the Upper Silesian coalfield (about 2,500 square miles), and the Saar district coalfield (about 1,080 square miles) with which are included the coalfields of Bavaria Pfalz and Alsace-Lorraine. The following table

Glückauf, July 5 and 12, 1913.

gives a summary of the resources of the several areas :—

COALFIELDS OF THE GERMAN EMPIRE.

Coalfield.	Coal regarded as workable under present conditions. Milliards of tons.	Total cost. Milliards of tons.
Westphalian .....	146 .....	214
Upper Silesian .....	114 .....	166
Saar district, including Bavaria Pfalz and Alsace-Lorraine .....	16½ .....	16½
Left bank of Rhine .....	10 .....	10
Lower Silesian .....	3 .....	3
Kingdom of Saxony .....	0½ .....	0½
Small districts .....	0½ .....	0½
	290	410

The reserves of tertiary coal (lignite, &c.) are very considerable, and probably exceed 13 milliards of tons.

The coal production of Germany has increased with great rapidity from about 40 million tons in 1876 to 158 million tons—both quantities exclusive of lignite—in 1911. The quantity of lignite produced in 1886 was about 16 million tons, increasing to nearly 73 million tons in 1911.

The author carefully abstains from committing himself to any forecast as to the probable life of the coalfields of Germany, and the phenomenal increase in production during recent years fully justifies such reticence. All that can be said is that, judging from the present rate of output, Westphalia has sufficient coal reserves to last for 2,000 years, Upper Silesia for over 4,000, the Saar district for about 1,200 years, and Lower Silesia 500 years. These are long periods, and we imagine that Germany need not suffer from over-anxiety as to the future. We hope to give a short abstract of Herr Bergassessor BÖKER's excellent articles in our next week's issue.

At the beginning of this article we referred to the ambiguity of the term "billion." There is a still greater uncertainty in the use of the term "ton," which has three values : the British, or long ton of 2,240 lb.; the American, or short ton of 2,000 lb.; and the metric ton of 2,204 lb. The official statistical unit adopted by different producing countries are as follow :—The British Empire with the exception of Canada, and the Pennsylvania anthracite field of the United States, use the long ton of 2,240 lb.; Canada and the United States, with the exception of the Pennsylvania anthracite field, use the short ton of 2,000 lb.; elsewhere the use of the metric ton of 2,204 lb. is practically universal.

There is an instance of the want of uniformity in the "Mines and Quarries: General Reports with Statistics" issued annually in four parts by the Home Office. Parts I, II. and III. give the quantities of coal in long tons, while Part IV. uses metric tons.

The Royal Commission on Coal Supplies, in their Final Report, drew attention to the fact that our mining statistics were inadequate and sometimes misleading, and there is still room for improvement.

Trade Summary.

The London coal trade shows very little change during the current week, but the tone of the market is distinctly improving. The conditions are somewhat uncertain, and the attendance more or less of a holiday character, but buying is more freely indulged in, and orders, especially for best house coal, are more plentiful. Manufacturing qualities also, now that the large works are assuming their normal conditions, are selling freely. Prices for all large coals are well maintained, but nuts and smalls of all kinds are difficult to sell. Stocks at the depots are accumulating, but the delivery trade is slowly increasing.

The prompt market at Newcastle is very strong, supplies being short and tonnage cheap and plentiful. Prices generally have risen.

There is a strong feeling in the Durham coal trade. Enquiries are numerous and prices well held.



The Lancashire house coal trade continues quiet, but there is little broken time. Shipping supplies are rather scarce and values have stiffened. The consumption of slack has eased off.

In West Yorkshire there is a satisfactory call for house coal, and steam coal has been well bought.

South Yorkshire steam coal is rather easier, but the demand on forward account continues strong. Gas coal is scarce and there is no great surplus of house coal. The coke market continues depressed.

Derbyshire house coal is slow of sale, but prices are steady. Rather less coal is being taken also for manufacturing purposes.

The market at Cardiff is lifeless, the output being much below par, and buyers have held off, although latterly enquiries have been more numerous following the drop in freights.

The Scottish coal trade is more active, especially in the west. Trade in the east is still feeling the effect of the Leith dockers' strike.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### THE ILLUMINATING POWER OF SAFETY LAMPS.

SIR,—We should be glad if you would give us the opportunity of rectifying a slightly false impression given by Dr. Leonard Hill in his letter to the North of England Institute of Mining and Mechanical Engineers, as reported in your last issue.

We have ourselves been in communication with Mr. Saint, and have his confirmation that the lamp used in these tests was not a Wolf lamp, but our Cremer type of this lamp which has our special burner adaptation fitted, and has been proved in the past, by special tests made at the Leeds University and other mining centres, to give a considerably increased lighting power over the ordinary Wolf lamp.

We quote below the actual figures obtained at the Leeds University:—

"Mining Department, The University,  
"Leeds, May 4, 1911.

"I have carried out preliminary comparative tests as to the illuminating power of various lamps. The Davy lamp is taken as a standard comparison:—

1. Davy lamp, round wick .....	1'00
2. Wolf double gauzes, flat wick ...	4'40
3. Cremer, lower air inlet open .....	5'58

"The photometer used was of the Bunsen type, of a modern pattern. The flames were standardised as to height in each case. (Signed) DAVID BOWEN,

"F.G.S., M.Inst.Min.E. (London and America),  
"Acting Professor of Mining at Leeds University."

As you will see, No. 3 gives practically a-quarter time as much light as No. 2 lamp, which would make all the difference in the world to the subject Dr. Hill deals with in the letter.

R. LAMBERT WOOSNAM, Manager,

The Cremer Lamp and Engineering Co. Ltd.

32, York-place, Leeds,  
August 12, 1913.

### FUSES AND AUTHORISED SHOT-FIRERS.

SIR,—I should be glad if you would give me your opinion, through the medium of your columns, on the following point in connection with the use of detonators with fuse in naked-light pits. I take it from the Explosives in Coal Mines Order, May 21, 1912, that detonators are only to be issued to shotfirers or officials authorised in writing by the manager whose wages do not depend on the amount of mineral gotten.

From the Act I take it that this applies to *all* coal-mines, although I know of certain cases where *contractors* in candle pits use detonators with fuse if authorised in writing by the manager.

Awaiting the favour of your consideration.

August 12, 1913.

ENQUIRER.

[According to section 5 of the Explosives in Coal Mines Order dated May 21, 1912, the provisions as to the appointment as shotfirers of persons whose wages do not depend on the amount of mineral to be gotten only apply to cases in which permitted explosives are required to be used. In an Order dated October 15, 1912, an addition was made to the Third Schedule enabling fuses to be ignited by means of a naked light in mines in which the use of safety lamps is not required, providing certain conditions are observed.—Ed. C.]

### LABOUR AND WAGES.

#### North of England.

In connection with the Durham miners' forward movement, a conference and meeting were held at Houghton-le-Spring on Saturday. A resolution was passed reaffirming the claim for improvement in the rates and rules laid down by Sir R. Romer, and protesting against the method of the employers pooling the wages of several men. The resolution also urged the workers to vote in favour of using trade union funds for political purposes.

A dispute has occurred at Easington Colliery, East Durham, by which over 1,000 men and boys are idle. The stoppage began on Monday. The cause of the dispute, according to the men's case, is that the management want 60 men to ride in the cage at once while the men contend that under present conditions it is not safe for 60 men, but they are willing to allow 30 men to ride at once.

The result of the proxy voting among Northumberland miners on the three-shift and other questions have been issued from the Burt Hall, Newcastle. The proposal against modification, but to "go for abolition pure and simple" was rejected by 230 votes to 208. The suggestion to open further negotiations with the employers with a view to modification, so as to avoid evening work as far as possible, was carried by 280 votes to 96, and a further resolution instructing the executive to bring a scheme before the coalowners was carried by 359 to 14. There is a reservation that no scheme is to be adopted unless confirmed by another vote. Resolutions were also carried by large majorities in favour of seeking an early interview with the coalowners in order to get a better agreement for payment of surface workers; that the question of an eight hours day and a minimum wage for these be left to the Miners' Federation as a national question; that the owners be asked to turn over laid out fines to the aged miners' homes; and that where men are working at the county rate of wages the management be requested to find explosives. The offer of the coalowners to pay men working by piece at the coal-cutting machines the following rates was accepted:—Man in charge, 5s. 6d. basis wage per shift; second man assisting with longwall machine, 4s. 10d. basis wage per shift. The lodges endorsed by 354 proxy votes to 149 the council's proposal to take a ballot on the question of making Saturday a holiday. At present the miners of Northumberland work on alternate Saturdays only, so that if the forthcoming ballot is favourable, a five days working week will follow.

#### Federated Area.

The Notts miners held their annual demonstration at Sutton-in-Ashfield on Saturday. Amongst the speakers were Mr. Lloyd George, M.P., Sir Arthur Markham, M.P., and Mr. Robert Smillie.

About 160 pony drivers employed at Bentley Colliery last week succeeded in setting down the pit, and throwing over 3,000 men and boys out of work for the time being. At the Doncaster West Riding Police Court on Saturday, Mr. Frank Allen, on behalf of Messrs. Barber, Walker, and Co., applied for summonses against the pony drivers for leaving the pit without notice. The pony drivers demand 15 minutes at the end of their shifts for taking their ponies to the stables and getting out of the pit. The boys resumed work on Wednesday. A deputation of the Miners' Association are to meet the employers. Summonses granted by the magistrates on Saturday against 150 of the boys have been withdrawn.

The agreement arrived at in North Wales is in the following terms:—

That in future day wages for underground workmen and men on surface manipulating coal shall be made up as follows:—

1. Basis rates shall be arrived at by taking two-thirds of the rates paid when wages stood at 50 per cent. above the standard.
2. The number of days worked by each man shall be multiplied by his basis rate and an addition made thereto equal to the ruling percentage given by the Conciliation Board, the present percentage being 65 per cent.
3. In the event of any man's wages, made up as above, being more or less than the wages actually paid to him since April 30, 1913, the difference shall be paid to the man or deducted from his wages, as the case may be. This procedure, however, not to form a precedent.
4. Wages to be paid in accordance with this arrangement on Friday, August 22, or Saturday, August 23, 1913, as the case may be.

A dispute as to the wages of Leicestershire miners has been brought to an end by the acceptance of a new offer by the owners. At a special meeting of the council of the Leicestershire Miners' Association at Coalville, the agent reported on the meeting of the owners and men's representatives at Leicester as to the method of applying the three 5 per cent. advances in addition to the minimum wage. Mr. Lovett said the owners made an offer to pay on a 4s. 8d. basis for stallmen, and a 3s. 8d. basis for wagemen, equal to 3d. a day for stallmen on a 5 per cent. advance, 6d. a day on a 10 per cent. advance,

and 8-40d. on a 15 per cent. advance. The council decided to accept this offer.

It was announced at the beginning of the week that there was a possibility of an early settlement of the strike of 6,000 men and youths at Messrs. R. Evans and Co.'s collieries in the Golborne and Haydock districts of southern Lancashire, a number of the non-unionists who have brought about the stoppage owing to their refusal to join the union, having now announced their willingness to become members of the Federation.

#### Scotland.

The half-yearly report and balance-sheet just issued by the executive of the Scottish Shale Miners' Association records the remarkable growth that has taken place in the association since the beginning of the year. For the six months ending June, 1,500 new members were admitted, bringing the total up to 4,000, while the increase for one year was 2,900 members. The half-year's income amounted to £989, and the association's reserve funds amount to £2,970. In the course of his report to the men, the agent, Mr. Robert Small, refers to the fact that wages had risen on two occasions during the six months, and now stood at 7s. 6d. per day nominally. Indications were not lacking, however, says the report, that the trade expansion had reached its limit, and though for a time wages would remain stationary, the depression would undoubtedly come. In 10 years the four leading Scottish oil companies had paid fully £1,500,000 in profits on an approximate capital of £1,500,000, while the Scottish coal trade had paid £7,750,000 of profits on a capital of £7,250,000 in a similar period. Royalties for shale last year amounted to £79,502, and for coal they reached £901,265—sums that should never have been allowed to go to private individuals. Both from profits and royalties the miners should derive a larger share in higher wages.

The monthly meeting of the executive board of the Fife and Kinross Miners' Association was held at Dunfermline on the 7th inst. The general secretary submitted a report on the conference held with the Fife coalowners. After hearing the report the executive expressed dissatisfaction with the attitude of the employers in regard to the day for paying wages weekly. It was agreed to remit the whole matter to the branches for consideration, with a view to some action being taken at an early date to have set aside a day convenient to the men for the payment of their wages.

Owing to a dispute at Cambuslang Colliery, work at four Lancashire collieries has been stopped by the men's union. Four thousand miners are idle.

#### The Iron, Steel and Engineering Trades.

The working agreement between employers and workers in the engineering industry throughout the United Kingdom—which has done so much in the six years it has operated to maintain peace in this industry—is threatened as the result of a decision by the executive council of the Amalgamated Society of Engineers. A circular has been issued to the branches asking the men to vote for or against ending the agreement, and also for or against continuing the premium bonus system.

### THE IRISH COAL TRADE.

THURSDAY, AUGUST 14.

#### Dublin.

The fine weather is against the house coal trade; otherwise business is fairly good, more particularly with the inland districts, and prices of all qualities are unaltered at late rates. Quotations in the city are as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best kitchen, 24s.; Orrell slack, 21s., steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. Irish coals at Wolfhill (Queen's County) are:—Best large coal, 20s. per ton; best household, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth. The import trade has been moderate, on account of recent holidays, and the unloading of some of the coal vessels has been hampered, owing to a strike amongst the coal labourers employed by one of the large city firms. During the past week 40 colliers arrived in the port as compared with 62 the week previously, chiefly from Ayr, Newcastle-on-Tyne, West Bank, Garston, Newport, Troon, Burryport, Manchester and Swansea. The total quantity of coal discharged upon the quays was 17,000 tons.

#### Belfast.

There is no change to report, business both locally and in the country being fairly good considering that this is usually the quietest season of the year in the coal trade, and the supply continues to be good of all qualities. Prices remain the same as last quoted, viz.:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current prices ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Cargoes arriving during the week were chiefly from Girvan, Glasgow, Troon, Irvine, Ayr, Maryport, Garston, Point of Aire, Preston, West Bank, Ardrossan, Campbeltown and Workington. From July 13 to August 2 the total number of coal vessels entering the harbour was 150. It is stated that the sinking of the shaft has been commenced in the coalfields between Cookstown and Stewartstown, County Tyrone.

**Shipment of Bunker Coals.**—During the month of July the quantity of coal, &c., shipped for the use of steamers engaged in the foreign trade amounted to 1,883,676 tons, as against 1,632,501 tons in July 1912 and 1,531,395 tons in July 1911. The aggregate quantity so shipped in the first completed seven months of the present year is 11,970,713 tons, as compared with 9,758,398 tons and 11,090,042 tons respectively in the corresponding periods of 1912 and 1911.



## THE TALBOT CARS.

One of the results of the disturbing legislation of the last few years has been to introduce the colliery manager the space-bridging qualities of the motor-car. On the one hand, the exacting daily round has necessitated great economies of time; on the other, the improved mechanical construction of the latter-day automobile has rendered it suitable for rough country roads, to which it was formerly a stranger.

For the colliery manager's needs, strength and reliability to say nothing of speed—are prime essentials, and in this section we may refer to the well-proved qualities of the "Invincible" Talbot cars, made by Messrs. Clement Talbot Limited, of Barlby-road, Ladbroke Grove, W. There are four models of these cars, differing only in the number and dimensions of engine cylinders and the various chassis measurements. The 12-horse power 4-cylinder Talbot has an R.A.C. rating of 15.8-horse power and a brake horsepower of 28-horse power. The four cylinders are cast in pairs, water-cooled, bore 80 mm., stroke 120 mm. The inlet and exhaust valves, which are on the same side of the engine, are mechanically operated, interchangeable and closed. The water pump and magneto are driven on a common shaft by skew gearing from the cam shaft, which is operated by silent helical gears. The car is equipped with a four-valve carburettor, forced lubrication, and Bosch high-tension dual ignition. The clutch is of the self-acting leather-faced aluminium reversible cone type, with spring engagement. Four speeds and a reverse are provided, all shafts running on ball bearings, whilst the gears are automatically locked when in operation. The transmission is a gear-box to road wheels is by live axle and Cardan joint, the latter of which is provided with a universal joint at its forward end. A tubular sleeve, surrounding the drive shaft, serves as a torque rod.

In the 15-horse power car the cylinders, which are also in number, have a 90 mm. bore and 140 mm. stroke. Its R.A.C. rating is 20.1-horse power and the brake horsepower 43. The 20-horse power car is provided with six cylinders (8 mm. x 120 mm.) and has R.A.C. rating of 25-horse power and brake horsepower 45. The 25-horse power Talbot is a four-cylinder car (101.5 mm. x 140 mm.), with an R.A.C. rating 25.6-horse power and brake horsepower 55. The last-mentioned model was the first to run 100 miles in one hour, and all the models have accomplished some extraordinary feats, testifying to their speed and reliability. Amongst the present year's performances may be mentioned the successes accomplished in Aston, Shelsley Walsh, Staffs and Caerphilly hill climbs, and the speed trials at Northcawl and Saltburn.

## PARLIAMENTARY INTELLIGENCE.

## HOUSE OF COMMONS.—August 7.

## Workmen's Inspectors.

Mr. KEIR HARDIE asked the Home Secretary whether attention had been drawn to the appointment, by the Board of Mines, of the Bwlfa Colliery, Aberdare, of Edwin Melake as workmen's inspector under the terms of section 16 of the Coal Mines Act, 1911, and of the refusal of the Board of Mines to recognise the appointment on the ground, *inter alia*, that it was not competent for the persons employed in a mine to make such an appointment a permanent one, but that a fresh appointment must be made on the occasion of each inspection, whether the monthly inspection was held for in the clause or the inspection following an accident; and what action he proposed to take to secure enforcement of the Act.

Mr. McKENNA said the case had been brought to his attention, and, acting on his instructions, the inspector of mines had informed the owners of the mine that in the opinion of the Home Office the Act did not require a fresh appointment to be made on the occasion of each inspection. The Act required two persons to be appointed to make an inspection under section 16, and did not give power to appoint a single person only.

## Rescue Appliances.

Mr. DUNCAN MILLAR asked the Home Secretary what provision in the way of rescue and ambulance appliances had been made at the Carron Company's No. 15 pit, at Carron, Lanarkshire, at the time of the recent disaster, in pursuance of the terms of section 85 of the Coal Mines Act, 1911, and of the regulations issued as relative thereto; whether any rescue appliances, provided by the company, were available for immediate use by the local rescue parties; whether the requisitioning of the Cowdenbeath rescue apparatus was rendered necessary by the absence of a rescue apparatus at the pithead?

Mr. McKENNA said the General Regulations under section 85 were not yet in force, but he regretted to say that nothing had been done at this mine to provide portable rescue apparatus, as required by the Order made under the Mining Accidents (Rescue and Aid) Act. As he had previously stated, it was contended by a large section of the coal mineowners that smoke helmets supplied with air by means of a tube and bellows were a compliance with the Order—a view which the Home Office were unable to accept; and the steps for bringing the matter to a final issue were now in hand.

August 11.

## Mining Accidents in Staffordshire.

Mr. OUTHWAITE asked the Home Secretary whether he could state, for the last year for which statistics were available, the number of men and of boys killed and the number injured by accidents in the coalmines of Great Britain and in those of the county of Staffordshire.

Mr. McKENNA said the following were the figures for mines under the Coal Mines Act for the year 1912:—

	Killed.		Injured (accidents disabling for more than seven days).	
	Men.	Boys (under 16).	Men.	Boys (under 16).
United Kingdom ...	1,204	71	140,185	10,285
Staffordshire.....	77	5	6,924	362

August 12.

## The Cadder Disaster.

In debate on the Consolidated Fund (Appropriation) Bill,

Mr. ADAMSON asked the Home Secretary if he intended to institute a special enquiry into the circumstances connected with the recent mining disaster at Cadder, in Lanarkshire, and, particularly, as to the neglect of the owner of that colliery to give effect to the general regulation made to supply and maintain appliances for use in rescue work and the training of rescue brigades. He said there was a considerable number of mining men who held the opinion that if the colliery had been provided with safety appliances and with trained men, some at least of the lives that were lost would have been saved. He understood that at the present time there are no less than 20 central rescue stations in the British coalfields. In Wales there were 13, and thousands of men had been trained to handle themselves in circumstances such as prevailed in this particular disaster. In Fifeshire the coalminers were so convinced of the value of this life-saving apparatus that, prior to the passing of the Rescue and Aid Act of 1910, they had built a central station, and at the present time there were auxiliary stations being built by some of the companies, and at least 60 teams of men had been trained for use in similar circumstances to those which applied in this particular colliery where the disaster occurred. But in Lanarkshire, the county in which the colliery was situated, and in the adjacent counties where something like 70,000 or 80,000 men were employed the Order was a dead letter, and no provision had been made. The fact that no attempt had been made to carry out these rescue and aid provisions could not be laid to the charge of the miners. During the course of last year a series of meetings were held in the mining districts of Lanarkshire. Large demonstrations were given showing the usefulness of the life-saving appliances, and the cost of them was borne by the men themselves. At every one of those meetings resolutions were passed calling upon the coalowners to provide the necessary appliances and to arrange for the training of rescue brigades. Notwithstanding specific statements on the part of the Chief Inspector, eight months had passed without anything apparently having been done by way of compelling owners to carry out the law, except that the coalowners had been contending with the Home Office that a smoke helmet supplied with fresh air by means of tube and valve was compliance with the Order. One of the points which required to be carefully looked into was that, after the men had been sent down, no one was left in charge at the bottom. If someone had been left there, he was convinced the fire would have been discovered much earlier, and possibly all the men would have been saved. It was the duty of the Government, and the duty of the Home Office in particular, to make the most searching enquiry into the circumstances connected with the disaster.

Mr. PRINGLE thought the House should demand an enquiry by a judicial authority with an expert as assessor, so that they should have an authoritative finding, not only as to the cause of the disaster, but as to the further and equally, or even more important, question as to whether the provisions of the law were being adequately carried out.

Mr. McKENNA, in reply, said a Government enquiry would be held at once, and Sir Henry Cunynghame had been appointed to hold an enquiry into all the circumstances. Meanwhile, the divisional inspectors were inspecting the conditions at the mine. As a matter of fact, the Scottish owners had not provided the apparatus which the Home Office thought necessary, nor the smoke helmets which, according to their view, they thought were sufficient. Neither were provided. That undoubtedly was a breach of the Act of 1910, but they were in course of taking action on that point, and, although the matter had been brought to a head in consequence of this accident, it must not be supposed for a moment that the Home Office were not using every effort in their power in order to induce and, if necessary, ultimately to compel owners to comply with the Order.

Sir A. MARKHAM asked the right hon. gentleman if he was aware that Dr. Haldane had condemned all these appliances as dangerous to the people wearing them. He had adopted these appliances himself, and they had had to be scrapped.

Mr. McKENNA said he was going to appoint a Committee on that very point. Dr. Haldane's statement was not quite

so sweeping. He distinguished between different kinds of appliances. He quite agreed that if the Home Office were in every case, the moment an Order is passed, to bring an action against all the employers for not carrying it out, no doubt Orders would be more rapidly enforced, but they would be enforced at the expense of trade. Inasmuch as a very full enquiry into all the circumstances of the case was to be held, and inasmuch as there could be no dispute as to the fact that the owners were at fault, and not the Home Office, he hoped that his hon. friend would be satisfied.

August 13.

## Miners' Wages.

Mr. DUNCAN MILLAR asked the President of the Board of Trade if he could state the increase which has taken place in the wages earned by the miners in the United Kingdom during the past 20 years; and what the purchasing power of the shilling was 20 years ago as compared with to-day?

Mr. BUXTON replied: I regret that at the last Census of Wages the Board of Trade were not successful in obtaining a sufficient number of returns showing the actual earnings of coalminers to enable me to make the desired comparison. The net percentage advance on the standard piece prices of coal-hewers between 1892 and 1912 was about 19 per cent., but it is doubtful if the average earnings have risen in the same proportion. As regards the latter part of my hon. friend's question, he is probably now aware that a Report on Cost of Living in the United Kingdom was issued last night, from which he will be able to obtain information throwing light on recent changes in the cost of articles of workmen's consumption. A comparison of the retail prices of 23 articles of food shows a rise of 9 per cent. as between 1892 and 1912.

## OBITUARY.

The death of Mr. James Hogg, Hamilton-drive, Cambuslang, occurred on Wednesday of last week. Deceased was 62 years of age, and for a considerable time occupied the position of manager at Kirkhill Colliery, commonly known as the "Toll Pit." In later years Mr. Hogg carried on business as a coal agent and contractor.

Mr. J. G. Crofton, for 40 years colliery manager at Esh Winning, died on Tuesday, at the age of 72, at Harrogate. Early in July Mr. Crofton had a paralytic seizure, which left him very infirm. Mr. Crofton was born near Durham, and commenced his mining studies in the Peases West offices at Crook. At the completion of his term he obtained a post at Castle Eden and afterwards migrated to Wales, from whence he came to Waterhouses Colliery, under Messrs Pease and Partners, as manager. Later, he superintended the sinking of the Esh Winning Colliery, and afterwards took it under his charge. On the firm acquiring Sir William Chaytor's Ushaw Moor Colliery, he was entrusted with its management. He leaves a widow and four daughters.

The death occurred on Wednesday at his residence, Dutton Manor, near Blackburn, of Mr. William Thom, head of the firm of Messrs. Yates and Thom, ironfounders, of Blackburn. Mr. Thom, who was 72 years of age, worked his way up from apprentice to manager of the firm, which position he held for forty years. He retired from the management in favour of his son several years ago, but still retained an interest in the business. His death was indirectly due to the personal attention he gave to the rebuilding of the foundry, which was recently burned down.

Mr. Richard Lewis, consulting mechanical engineer of the Ocean Coal Company, died at Ton Pentre on Wednesday, from injuries received through being knocked down by a passenger train on the Rhondda and Swansea Railway the previous night.

## THE BY-PRODUCTS TRADE.

*Tar Products.*—Quiet but steady is about the position of affairs. Pitch keeps much about the same. Benzols and toluol firm. Carbolic acid, crude, also holds well to the recent improvements. Naphthas, while steady, are slightly under a cloud. Other products are unchanged. Nearest values are:—

Benzols, 90's .....	1/0½ to 1/1
Do. 50's .....	1/10½
Do. 90's North .....	1/
Do. 50's North .....	1/10
Toluol .....	1/11½
Carbolic acid, crude (60 per cent.) .....	1/5
Do. crystals (40 per cent.) .....	4½
Solvent naphtha (as in quality and package) ...	9½
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3
Pitch (f.o.b. east coast) .....	40/6 to 41/6
Do. (f.a.s. west coast) .....	40/ to 41/
Do. (f.o.b. gas companies) .....	—

*Sulphate of Ammonia.*—The market is firm, and in the north is hardening obviously. In some quarters quotations are rather erratic, and call for the exercise of some discretion and discernment in appraising their worth as an index to the actual state of the market. It must be continually borne in mind that there are very strong inducements in one section of the market to make the most of an occasional low quotation or speculative offer, regardless of quality or conditions. Closing prompt prices are:—

London (ordinary makes) .....	£12/5/
Beckton (certain terms) .....	—
Liverpool .....	£12/18/9
Hull .....	£12/16/3
Middlesbrough .....	£12/15/ to £12/16/3
Scotch ports .....	£13 to £13/1/3
Nitrate of soda (ordinary) per cwt. ...	10/7½



## INDIAN AND COLONIAL NOTES.

## India.

The Government of Bengal have decided to ask the Government of Behar and Orissa to form a joint committee of the two provinces to discuss the subject of a proposed mining school in the coalfields. Already Asansol and Dhanbaid are being advocated as alternative sites.

Sir F. Zulbhoy Currimbhoy, a member of the Supreme Legislature, has suggested, through the medium of the *Times of India*, the holding of a triennial Congress of Commerce and Industry, to be attended by representatives of all interests affecting the economic prosperity of the country.

## Africa.

**Natal Coal Industry.**—The British Trade Commissioner for South Africa furnishes in the *Board of Trade Journal* particulars of the progress of the coal industry in Natal during the past year. He states that the output of coal from Natal collieries in 1912 was 2,472,100 tons (of 2,240 lb.), as compared with 2,394,200 tons in 1911 and 2,296,700 tons in 1910. The total for 1912, although in advance of the previous figures, is not considered satisfactory in view of the number of collieries producing and the markets which may be considered as within the sphere of Natal's trade. The increase of exports to Cape ports is more than sustained, states the report, and whereas in 1911 the amount sent to Union ports was 270,300 tons, that of 1912 totalled no less than 403,000 tons. The following analysis is given of the distribution of the Natal output during the year under review:—

	Tons of 2,240 lb.
Coal bunkered by steamers at Durban...	1,118,350
Coal exported from Durban by sea .....	585,747
Coal used inland by railways, harbours and other consumers .....	768,014
	2,472,111

During the year, according to the report, two collieries passed into the control of the largest shipowners trading in South Africa, and at the end of the year 10 of the other collieries formed themselves into an association for the purpose of developing the export trade and of facilitating the interchange of coal and the more expeditious release of railway trucks. Improved prices will also be a resulting advantage, in the opinion of the writer, and it is likely that in 1913 the collieries will receive additional revenue to the extent of about £150,000 as compared with the revenue on the same tonnage in 1912. The collieries, however, have to meet increased expenditure on native labour and for working the private sidings connecting the collieries with the main line, but it is anticipated that the improved results will enable some of the collieries to reduce floating debts and others to get nearer the dividend stage. Taking the industry as a whole, the opinion is expressed that the financial results of the year 1912 were distinctly unsatisfactory, and fully justified the steps taken to improve the prices and conditions. No doubt is entertained in authoritative quarters that the rates for the carriage of coal both inland and for export will be further reduced when the next adjustment of rates to reduce the difference between railway revenue and expenditure is made, and it is anticipated that lower rates will be given for coal overland from collieries in the Union to Cape ports.

## Australia.

**Newcastle Coal Trade.**—During the half-year ending June 30, 1913, the coal exports totalled 2,307,998 tons, value £1,206,557, against 2,218,602 tons, value £1,151,512, during the first half of the preceding year, an increase of 89,396 tons and £55,045 in value. The exports during the two periods were as follow:—

	1912.	1913.
	Tons.	Tons.
Victoria.....	486,620	635,654
South Australia .....	349,083	352,711
West Australia .....	112,475	138,590
Tasmania .....	73,845	86,508
Queensland .....	60,540	51,290
New Zealand .....	234,711	271,592

In the over-sea trade, excluding New Zealand, the exports amounted to 871,644 tons, a decrease of 29,684 on the corresponding period of the preceding year. The decreases are shown below:—

	1912.	1913.
	Tons.	Tons.
Chili .....	347,412	307,243
Java .....	148,276	137,139
United States .....	46,474	42,299
India .....	61,191	41,808
Fiji .....	27,019	23,816
Peru .....	25,469	22,543
Philippines .....	43,189	18,692
Canada .....	17,520	15,256
Argentina .....	27,541	Nil
New Caledonia .....	8,340	7,052
Ecuador .....	8,183	2,967

The increases were:—

	1912.	1913.
	Tons.	Tons.
Straits Settlements...	52,766	93,492
Sandwich Islands .....	28,588	41,175
Germany .....	18,333	28,275
MOSTLY FOR GERMANY IN THE PACIFIC.		
Mexico .....	6,052	26,484
United Kingdom.....	6,546	11,729
Ocean Island .....	10,589	10,602

## THE LONDON COAL TRADE.

THURSDAY, AUGUST 14.

The London coal trade is gradually recovering from the holiday season, and already signs of an improvement in the demand has commenced to show itself. House coals are selling more freely and the enquiries for forward delivery are more plentiful. The negotiations with regard to the winter's contracts are still held in abeyance and merchants and colliery representatives alike are studiously avoiding the question, but overtures for prices extending into September and October are frequently in evidence. The depot trade during the Bank Holiday week was exceedingly slow and householders generally avoided having any coals delivered during the holidays, but the market is beginning now to assume the normal character and the delivery trade is slowly improving. Fortunately, many of the collieries adopted the position of having extended holidays, so that the output was considerably diminished or the stock would have become unbearable. As it is, the principal marshalling stations on the various railways are greatly congested and stocks at the depots are unusually heavy. On the other hand, orders from the general public are more plentiful and signs of an increasing activity are visible. All special offers of "spot lots" have been withdrawn and prices generally are firmer. The attendance on market continues very thin, but this is accounted for by so many of the London merchants being away on holidays. Sellers often outnumber the buyers. Whilst the present weather lasts the actual consumption of household fuel is exceedingly limited and merchants who have contracts already fixed find the daily invoice somewhat embarrassing, with the heavy stocks already on the ground. Many of these contracts also are in arrears and very little opportunity has been given of overtaking them during the past three or four weeks. Now, however, the delivery trade is becoming fairly brisk and with the near approach of the autumn trade the house coal orders are showing more activity and a greater expansion in the volume of trade. The two worst months in the year, viz. June and July, are past and a more hopeful outlook is growingly apparent. Factors are the principal ones now who are offering cheap lots on the market, and as these were the only ones who would buy during the summer months, they are able, in many cases, to undersell the colliery prices. So far, no contract renewals have been made at less than 1s. advance on last year's prices, and as the contracts already booked are at present much less than the average usual contract tonnage, there is every prospect of having more "free" coal to offer than ordinarily during the winter months. Whether this may turn out advantageously to the merchant or to the colliery owner will depend very largely on whether the weather is severe or otherwise. Last winter was a phenomenal one in this respect, as no change whatever took place in the publicly-advertised prices between September 11, 1912, and May 19, 1913, and as this course of events proved so disastrous to many of the smaller merchants, there is every prospect that a more determined attitude in the advancement of the retail prices will be forthcoming during the ensuing winter. Many of the collieries are still working short time and the shipping trade is also slow, whilst harvesting operations hinder many of the country merchants from buying freely, so that there are still many difficulties to overcome, but the outlook is brighter. The seaborne market is merely nominal, as there are no Durhams or Yorkshires offering. Prices are on the basis of 21s. 6d. per ton for best and 20s. 6d. per ton for seconds. Thirty-three vessels are reported as arriving in the River Thames for Monday's market and nine for Wednesday. Coke continues very weak and prices are uncertain. The cheaper qualities of kitchen coals are also very slow.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/6	13/6
Do. nuts .....	12/6	12/6
Birley cube Silkstone.....	12/	12/
Do. branch coal .....	15/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone.....	12/6	12/6
West Riding Silkstone .....	12/	12/
Kiveton Park Hazel .....	13/	13/
Do. cobbles.....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	11/	11/
New Sharlston Wallsend .....	14/	14/
Wharfedale Silkstone coal.....	14/	14/
Do. Flockton Main .....	13/6	13/6
Do. Athersley house coal.....	11/6	11/6
Newton Chambers best Silkstone.....	15/	15/
Do. Grange best Silkstone .....	14/	14/
Do. Hesley Silkstone .....	13/	13/
Do. Rockingham selected .....	13/6	13/6
Do. Rockingham Silkstone .....	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best.....	11/	11/
Do. large nuts .....	10/9	10/9
Do. small nuts .....	10/	10/
Do. kitchen coal .....	9/6	9/6
West Hallam Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Do. London brights .....	10/	10/
Do. bright nuts .....	9/6	9/6
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Shipley do. brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Mapperley brights .....	11/	11/
Do. hard steam .....	10/9	10/9
Cossall Kilburn brights.....	11/	11/
Do. do. nuts .....	10/9	10/9
Trowell Moor brights.....	11/	11/
Do. do. nuts .....	10/9	10/9
Grassmoor Main coal .....	12/6	12/6
Do. Tupton .....	11/	11/
Do. do. nuts.....	12/	12/

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.).</b>		
Clay Cross Main coal .....	12/6	12/6
Do. do. cubes .....	12/	12/
Do. special Derbys .....	11/9	11/9
Do. house coal .....	11/	11/
Pilsley best blackshale .....	12/6	12/6
Do. deep house coal .....	10/6	10/6
Do. hard screened cobbles .....	10/	10/
Hardwick best Silkstone .....	12/6	12/6
Do. Cavendish brights.....	11/6	11/6
Do. cubes .....	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/	12/
Do. small hards.....	11/	11/
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards.....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	12/	12/
Do. cobbles .....	12/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/	14/
Bestwood hard steam coal.....	12/	12/
Do. bright cobbles .....	11/3	11/3
Hucknall Torkard main hards.....	12/3	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts.....	11/	11/
Do. do. High Hazel H.P. ....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts.....	11/3	11/3
Sherwood H.P. hards .....	12/	12/
Do. hard steam.....	10/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/9	11/9
<b>Warwickshire.</b>		
Griff large steam coal.....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	11/	11/
Do. loco Two Yard hards .....	14/	14/
Do. Ryder nuts.....	11/6	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts.....	11/	11/
Haunchwood steam .....	10/9	10/9
Do. screened cobbles.....	11/	11/
Do. nuts .....	11/	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts.....	11/	11/
Exhall Ell coal spires.....	12/6	12/6
Do. large steam coal.....	10/9	10/9
<b>Leicestershire.</b>		
Snibston steam.....	10/6	10/6
Do. cobbles .....	10/3	10/3
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/6	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts.....	10/6	10/6
Netherseal hards .....	17/	17/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	10/	10/
Do. large nuts .....	10/	10/
Do. bakers' nuts .....	9/6	9/6
Do. Main nuts .....	10/	10/
Do. hards .....	9/6	9/6
Granville New Pit cobbles.....	11/6	11/6
Do. Old Pit cobbles .....	10/6	10/6
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/6	13/6
Sneyd best, selected .....	14/6	14/6
Do. deeps.....	14/	14/
Silverdale best.....	15/	15/
Do. cobbles .....	14/	14/
Apedale best .....	13/6	13/6
Do. seconds.....	13/	13/
Podmore Hall best .....	13/6	13/6
Do. seconds.....	13/	13/
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London .....		
Do. brights.....	13/	13/
Do. shallow one way.....	12/	12/
Do. deep nuts.....	11/6	11/6
Cannock steam.....	11/	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/	12/
Do. one way .....	12/	12/
Do. shallow coal .....	12/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles .....	12/	12/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles.....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards.....	11/	11/
<b>From Messrs. Dinham, Fawcett and Co.'s Report.</b>		
<b>Friday, August 8.</b> —There were no Durham or York seaborne house coal cargoes on offer at to-day's market which remained exceedingly quiet. Best (Durham) 21s. 6d. Cargoes 19.		
<b>Monday, August 11.</b> —There was no alteration in seaborne house coal market to-day, no business reported and nothing on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 33.		
<b>Wednesday, August 13.</b> —The seaborne house coal market remained very quiet to-day, with no cargoes of Durham or Yorkshire on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 9.		



## MINING AND OTHER NOTES.

Mineral subsidences are still of frequent occurrence in Motherwell, and acting on the advice of their mining engineers the local Town Council have decided to defer for a year a proposal to repair the pavements and thoroughfares in certain parts of the burgh.

It is expected that the enquiry by the Home Office in regard to the No. 15 Cadder pit disaster will be held in Glasgow Sheriff Court.

A correspondent learns that the Wirrall Colliery Company Limited are about to open out new seams and carry out other improvements both below and on the surface at their pits at Neston, Cheshire, which should be the means of providing employment for a few more workers. The coal obtained is of good quality, and is meeting with an increased demand in Neston and surrounding localities.

The Earl of Ellesmere has now commenced the erection of new depots and wharves at Clifton, near Manchester, which will be in direct communication by private railway with his collieries in Walkden.

A local correspondent says the blast furnaces at the Partington Steel and Iron Company's extensive new works on the Ship Canal at Irlam, are being started this week. Already a considerable number of men are employed here, and their ranks will become augmented as different departments are started. A splendid view of these works' chimneys is obtained from Swinton and Walkden, nine or ten miles away.

The "Ceag" Electric Safety Lamp Company Limited, of 19, St. Dunstan's-hill, London, E.C., inform us that their "Ceag" miner's electric safety lamp has just obtained the highest award, first prize and gold medal, at the World's Exhibition, 1913, at Ghent.

The principal of the Cambrian Mining School, Porth (Mr. William Thomas), secured the first prize at the National Eisteddfod for the best collection of fossils from either the ordovician rocks, the carboniferous limestone, or the coal measures of Wales, labelled with locality, geological horizon and modern scientific names. It is interesting to note that while the above collection was being compiled, a specimen hitherto unknown was found in the Pengam pits of the Rhymney Iron Company Limited. This has been temporarily named "samoropsis" by Dr. Robert Kidston, the Government geological expert in fossil flora botany. Mr. Thomas Thomas, of Gilmour-street, Tonypandy, head assistant at the Cambrian Mining School, was awarded first prize for the best geological map on the scale of 6 in. to the mile of a district in Wales of marked geological interest, and at least 10 square miles in area, with a description and illustrative collection of rocks and fossils, each specimen being labelled with scientific name and geological horizon, and indicating by a letter or number on the map the place where it was found. Mr. Thomas proved an easy winner over the many competitors, having secured the maximum marks and led the second by 180 marks. His plan, section and collection from a commercial standpoint is of great interest, as in the collection of the 214 specimens there are specimens of iron in an almost pure state. This was found to the south of Penttyrch in a considerable quantity in the lower shales of the carboniferous limestone. This specimen yielded 90 per cent. of iron, and its presence in such a state of purity hitherto unsuspected, may not improbably prove of considerable value to the district. The plan and section extended from Llantwit Vardre, through Penttyrch, Wenvee, Barry, on to Barry Isle. Mr. Gwilym Thomas, of Tonypandy, secured the first prize and Mr. James McGinn (of Cymmer) second prize in the same competition for the best collection of the rocks of any district in Wales, accompanied by maps and sections illustrating the geological structure of the district. The above successes are proofs of the ability of the staff of tutors at the Cambrian Correspondence School. Mr. Thomas Thomas and Mr. McGinn have obtained first-class certificates in surveying at the last City and Guilds, London Institute examination.

The committee of management of the International Engineering Congress, 1915, announce that Col. Geo. W. Goethals, chairman of the Isthmian Canal Commission and chief engineer of the Panama Canal, has consented to accept the honorary presidency of the congress, and will reside in person over the general sessions, to be held in San Francisco September 20-25, 1915.

A Bill has been introduced by Mr. Ellis Davies, supported by Messrs. W. Jones, Haydn Jones, and John Hinds, to provide for the establishment of a minimum wage and regulation of the hours of labour in the case of workmen employed in slate quarries and slate mines. The Bill, which contains six clauses, is modelled on the Coal Mines (Minimum Wage) Act, 1912, but goes rather further. The rates and rules are to be settled by county boards, consisting of seven persons, recognised by the Board of Trade. In settling the rate of wages the county board is to "have regard to the cost of living in the district, and the sum which in the opinion of the county board is necessary to maintain in health and efficiency a quarryman or slate miner, and his wife and a family of three children." The county board is also to determine the maximum number of hours of employment, and wages are to be paid weekly. A statement showing the number of days and half-days for which a workman has been employed is to be delivered with his wages.

Mr. George Andrew Barkley, of 51, Drayton-gardens, South Kensington, S.W., a director of the Ross and Monmouth Railway Company, of the Tredegar Iron and Coal Company Limited, and of the Oakdale Navigation Collieries Limited, who died on June 26 last, aged 86 years, left estate of the gross value of £7,937 14s. 11d., of which the net personalty has been sworn at £2,442 11s. 6d.

In the debate on the Finance Bill on Monday Mr. Pollock moved a new clause providing that deductions should be allowed under the Income Tax Acts in respect of inherently wasting assets existing outside the United Kingdom. He said that as a result of the present system companies were ceasing to register themselves in this country. The Chancellor of the Exchequer admitted that the case was one for which it was extremely difficult to find a justification, but once the Treasury accepted the distinction it would be difficult to refuse it in the case of companies inside the United Kingdom. It was not so much a question of justice or injustice as of the utter impossibility—impracticability, at any rate—of establishing a rule which would enable them to draw a distinction between what was and what was not a wasting asset. The balance was redressed and adjusted in the death duties.

In the House of Commons on Monday Mr. O'Grady asked the Home Secretary whether there was any intention to increase the medical staff of the factory department to deal with industrial diseases; and whether he would consider the necessity of appointing medical referees to diagnose and report upon injuries in cases where the victims of accidents were too poor to pay legal and medical costs. Mr. McKenna said one medical inspector was being added to the staff, making three medical inspectors in all. Medical men were also appointed under the Act throughout the country for the purpose of examining children and young persons, enquiring into accidents and poisoning cases, and examining workmen in certain dangerous industries. The number of these medical men was 2,118. A worker injured by accident was not required by the Act to obtain any medical certificate for the purpose of making a claim for compensation. A worker suffering from an industrial disease had to obtain a certificate from the certifying surgeon, but the fee was only 1s. in cases where the certifying surgeon gave the certificate on the result of the examination made by him in pursuance of his duties under the Factory Act, and 5s. in other cases; and if the worker was refused a certificate and appealed to the medical referee, the referee's fee was paid by the State.

Mr. Charles Hunt, presiding at the half-yearly meeting of the South Suburban Gas Company, suggested that a combined endeavour should be made by the gas industry before it was too late to secure something like uniformity of legislative provisions both in form and substance, so as to avoid, if possible, the confusion which existed at the present time as to illuminating power owing to the multiplicity of standards.

A circular has been issued by the board to the shareholders of the Kent Collieries Limited, stating that the difficulties in sinking through the sand and water have been surmounted. The water-bearing strata at the junction of the newer rocks with the coal measures have now been passed through, and the large feeders of water encountered in that formation have been shut off. The depth of the No. 3 shaft being now 1,200 ft., the first seam of coal will be reached by sinking 80 ft. further. At this point the headings driven over from No. 2 shaft will be cut, ventilation effected, and the working of coal commenced.

The Carron Company has officially intimated its intention of becoming responsible for the entire monetary relief of the dependants of the 22 men who lost their lives in the Cadder pit disaster. Mr. George Pate, the company's manager, conferred with the magistrates at Glasgow on Friday, and explained that at present there are 63 dependants, including 12 widows and 41 children. The Carron Company will, in addition to the amounts legally due to the deceased, provide such additional monetary assistance for at least 10 or 15 years as will at any rate suffice for the children until they are able to provide for themselves. The widows will be equally provided for during the same period, or probably as long as they require the company's assistance. In addition, the company will pay the whole cost of the funerals. It is proposed to form a trust fund, into which the compensation allowance and company's contributions will be placed. The magistrates decided, in view of the company's generous offer, that a public appeal for funds was not necessary.

A Local Government Board enquiry was held recently at Trimdon Grange, south-east Durham, into an application by the Sedgfield Rural Council for sanction to borrow £5,500 for the building of 25 houses at Trimdon, where there is a great scarcity of houses. It is proposed to charge weekly rents of 5s. 6d. and 6s. for the houses. Evidence was given that owing to the closing of insanitary houses many families were being driven from pillar to post.

An interesting event took place on Monday afternoon in the workshops at Messrs. T. and H. T. Scowercrofts' Tonge and Breightmet Collieries, Bolton, when a presentation was made to Mr. C. I. Scowercroft, only son of Mr. T. Scowercroft, to commemorate his coming of age. The presents consisted of a handsome gold Albert and seal, a polished oak smoking cabinet and a meerschaum pipe and case.

The contract to supply 5,200 tons of engine fuel to Eccles Corporation Electricity Works has been placed for the fifth consecutive year with Messrs. H. Hooley and Sons, Patricroft, with a calorific value of over 13,000 British thermal units per pound of dry fuel and percentage of incombustibles not to exceed 12 per cent.; also best selected house coal to their various departments, with a calorific value of over 14,500 British thermal units per pound of dry fuel, and not to exceed 5 per cent. of incombustibles.

Almost a million sterling in profits has been made by four Cardiff firms on the shipment of coal during the year ended June 30 last. The Cardiff Hall line claimed £112,742, the Tatum Navigation Fleet made £352,347, the Hain Steamship Company £340,812, and the W. and R. T. Jones Steamship Company made £105,268.

At about three o'clock on Monday afternoon fire was discovered to have broken out in the engine house of Bogside Pit, the property of Messrs. William Baird and Co. This shaft has for some time been used only as an air and escape shaft for the Bartonholm Pit. In Bartonholm Pit there were only about a dozen men at work at the time, and on account of the interruption of the air supply caused by the fire they were at once brought to the surface by their usual shaft at Bartonholm. The buildings at the Bogside pithead were completely destroyed, and the ventilating machinery was damaged. Later in the day the pit ponies were brought to the surface.

There is a possibility of the Leeds Corporation supplying Doncaster with a great deal of the additional water required in the development of the coalfield and the mining villages that are springing up. The matter was referred to at last week's meeting of the Doncaster Corporation, when it was reported the Water Committee had paid a visit to Leeds to discuss the question. Councillor Wightman stated he did not think the time was yet ripe for discussing it in public, but if the arrangements were made they would have a sufficient supply of water for 150,000 inhabitants.

A meeting of the shareholders of the Mansfield Railway Company was held at Nottingham on Monday, August 11. Mr. J. P. Houfton, chairman of directors, in moving the adoption of the half-yearly report, mentioned that since the last meeting nearly four miles of the line between Mansfield Colliery and Clipstone, had been opened for goods and mineral traffic, and the volume of traffic—77,000 tons between the opening on June 16 and the end of July—had been quite equal to the directors' expectations, and well up to the estimate made by the company's traffic advisers. Good progress was being made with the remaining portion of the line, and every effort was being made to get at least one through line between Clipstone and Kirkby, so that traffic could pass both east and west. They hoped during the next six months to be able to deal with goods and mineral traffic to and from Mansfield. Up to the end of the year the company had expended on the line £221,627, and a great deal of work had been carried to formation level on the line between Kirkby and Mansfield.

More houses are to be built at Bentley to meet the great demand for the same in this flourishing district. Since the Bentley Colliery opened out no district has flourished so rapidly or developed more quickly in the immediate neighbourhood of Doncaster than has Bentley. So great is the demand at present that two, and even three, families are residing in one room.

With reference to the latest projected colliery in the Doncaster district, that at Harworth, near Bawtry, our Doncaster correspondent writes that although at present details with regard to the development seem to be rather indefinite, yet it is evident that preparations for sinking will not be long delayed. A few years ago Mr. Arnold Lupton obtained the mineral rights of a large district around Harworth, with a view to sinking a coalpit near that village. From enquiries recently made it would appear the shaft will be sunk just outside Harworth, on a site upon Viscount Galway's Ssrlby estate, near to the old ruin, and a short distance from the right of the hill road which runs from Harworth to Scrooby. This will make it a very easy matter to connect the pit up with the Great Northern Railway line between Doncaster and Retford, and it is said the first work taken in hand will be the making of a branch line from the Great Northern Railway line to the site of the pit. It is also stated that the coal to be here found will prove to be of the best quality of the Barnsley bed, and that it will, in all probability, be found at a similar depth to that at Maltby, which pit will only be six miles distant from the Harworth Colliery. The new pit will be in a line with the operations at Rossington, and exactly nine miles from the town of Doncaster.

Edward Patterson, onsetter at Wallsend Pit, was charged before the Wallsend magistrates on Tuesday with a breach of special rule 131, which makes it an offence negligently to do anything likely to endanger life. The prosecution, advised by the Government Inspector, was a sequel to an accident which occurred in the mine on July 10. While the cage was descending, a youth in it got his head jammed between the wall of the shaft and the door of the cage, and was killed. It was Patterson's duty to rap the cage away, and he did so without seeing that the gates were closed. In ordering Patterson to pay £1 9s. costs, the Mayor said the Bench did not think there had been wilful negligence.



## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Demand for 15 per Cent. Rise in Banksmen's Wages—Coal Trimmers' Intended Stoppage on Saturdays—Extraordinary Proceedings in Parliament on Cardiff Company's Bill—What Will Happen in the Future?—Continental Tour of Mining Students—"Another Sixpence a Day for Every Grade"—Important Case as to Mine Safety—The Sunday Night Shift Question.**

It was decided at the meeting of the South Wales Federation council, held in Cardiff on Saturday, that an application should be made to the coalowners for an immediate advance of 15 per cent. in the wages of colliery surfacemen.

The question of applying the new schedule rates came before the council, arising out of an application by a deputation of workmen from North Celyn Colliery. The matter was discussed at length; but a decision was postponed until the next meeting of the council.

The Coal Trimming Board, a joint organisation representing both employers and employed, sat at Cardiff on Tuesday, the subject for consideration being the demand of the men that work should cease at one o'clock on Saturdays. In this, they were carrying out the policy framed at the Birmingham conference, the intention being that the new arrangement should come into operation on September 6, and should apply to all the ports in the kingdom. But, since that conference, a modification has been agreed upon in the north; and when, on Tuesday, the employers' side at Cardiff presented their objections to a change, they were to some extent fortified by what had happened elsewhere. They pointed out that, to stop work at one o'clock on Saturday, would restrict trade by the detention of vessels and by preventing return of empties to the collieries; and that South Wales would also be at a disadvantage as compared with the north.

The question was fully gone into, but no decision was arrived at, the men's representatives desiring to lay the views of the freighters and shipowners before a mass meeting of their constituents called for Sunday. Afterwards, another general conference, representing all the ports, is to be held in Birmingham.

Remarkable as have been the prolonged incidents of the Cardiff Company's Bill, they have been exceeded in interest by the closing scene, which took place in the House of Commons on Tuesday, a full-dress debate at a most congested period of the session being accorded to what must be regarded as one of the gravest proposals affecting industry ever submitted to Parliament. Its real significance has been obscured by detail. Put briefly, one question at the root of the whole controversy was whether investors who find their public undertaking unprofitable are entitled by that fact to secure from Parliament such powers as will enable them to secure a fair return upon their capital. On the other hand, opponents of the measure put in two powerful pleas—first, that the property was not being worked to the full extent of existing provision, as, for example, in the unused railway; and secondly, that the new dock, &c., were not yet in full work, and therefore not yet yielding due return.

A most unusual course has been pursued. Much has been said about the proceedings upon the Bill being "unprecedented"; and certainly the spectacle witnessed on Tuesday evening—of the Chairman of the Committee which has passed the Bill standing up in his place to oppose the decision of his own committee—merits that description. With him co-operated the chairman of last year's Committee which had to deal with the Bill then rejected. Strenuous efforts had been made by both sides to whip up supporters. Lobbying of the most assiduous type has been in operation for days—even the members of the Irish and Labour parties being sedulously instructed as to the merits and demerits, whilst shipowners and others, whose interests were affected, were approached in order to influence the voting.

In the end, the Bill—which had passed the Lords in a form giving power to raise additional revenue to the extent of £186,000 per annum, and had passed the Commons' Committee in a form reducing this to about £60,000, and imposing conditions as to provision of facilities—was rejected in the House of Commons itself by 159 to 76, an adverse majority of 83.

It is already stated that the matter cannot end here, but that circumstances dictate the need of a further application to Parliament next session. This may be the case; but speculation is rife as to whether the more probable event is not a revival of some scheme for fusion of the dock property with local railways, and it is no secret that part of the stimulus of opposition arose from anticipation that the desired powers to raise revenue would, if accorded, have largely affected the price of transfer in the event of any such amalgamation taking place. At any rate, such is the nature of Exchange gossip upon the decision.

The continuance of the excellent system whereby mining students in South Wales are given opportunities of gaining mining practice abroad, a party of between 30 and 40, who left Cardiff on Saturday for Saxony. Amongst other places, they will visit the safety lamp works of

Freeman and Wolff, and the machinery section of the Ghent Exhibition; the mining school at Freiberg will be visited, and also the lignite mine. The tour will extend over nearly a fortnight.

In the course of a speech at Abertridwr, Mr. Hartshorn said on Friday that at present the membership of the Federation was 150,000; but he would not be satisfied until it was 200,000. As to the increased contribution that had been suggested, he pointed out that the workmen paid 4d. under the Insurance Act without a grumble; but a good deal was said if the Federation asked for a little increase. He thought the Federation would be justified in asking for a shilling increase, it being practically impossible to carry on the present work without increased funds. The Federation were going to demand another sixpence a day for every grade throughout the coalfield, and he was pleased to say Wales would no longer be left to push this matter to the front as they had in the past.

A case of great importance came on Thursday and Friday before the judge at Newport County Court. A number of miners claimed for loss of employment at Llanhilleth Colliery, due (as they alleged) to the unsafe condition of the mine. The proprietors (Messrs. Part-ridge Jones and Co.), who contended that the mine was not unsafe, had entered a counterclaim against each man for £2 10s. damages for the days during which the men declined to work. It was alleged on behalf of the men that on June 4 the air was charged with gas to the extent of from  $\frac{1}{2}$  to 1 inch cap on the lamp. Mr. Jenkins, inspector of mines, gave evidence that he had taken samples of the air in the worst places at a time the colliery was not working (and when, therefore, the air would be worse), and the analysis showed there was less than 2 per cent. of gas. The subsection of the Act showed that  $2\frac{1}{2}$  per cent. or upwards of gas in the general body of the air would be deemed a dangerous condition. Counsel for the miners, however, said that  $2\frac{1}{2}$  per cent. was the amount at which it was compulsory to withdraw the men, and that a prudent colliery manager might think it right to withdraw the men if there were only 1 per cent. of gas.

Mr. Theophilus Jones, manager, stated that the mine had been open for 25 years, and there had never been a gas explosion. On June 3 he tried to induce the men to work, because the pit was perfectly safe as a whole, and he had offered that if they alleged No. 3 district ought not to be worked, he would stop that district from the feeders to the return airway until the feeders had spent themselves, and he had offered to find work in another part of the colliery on the same shift for the men affected.

Mr. Thomas Griffiths, of Insoles, who was called, stated that he had had 40 years' experience in colliery matters. He had examined No. 3 district, and in his view the district was properly ventilated. He knew feeders in a district which had given trouble for seven years; and in the Rhondda they had a feeder which had been blowing for 48 years. The fan at the colliery was one of the best. Mr. David Hannah, M.E., of Ferndale (who also had had over 40 years' experience), said that he had examined the mine, and thought the ventilation adequate.

In giving judgment, his Honour said that the system of ventilation appeared to be a good one, and he did not think it could be said that there was not an adequate current of air. Although the utmost vigilance were exercised, there must be times when the air in a district became charged with gas, and the men had to be withdrawn; but that was not the fault of the colliery company through any failure on their part to discharge their duty to use all reasonable means for keeping the ventilation good. He found for the colliery owners, both on the claim and on their counterclaim.

Rhondda miners are taking measures to ensure uniformity of hours on the Sunday night shift, the intention being to secure abstention from work "till the latest possible hour."

Mr. T. Evans, for some time undermanager at the Bedwellty Pits, has been the recipient of a gold watch and chain from the officials and workmen.

Mr. Tom Simmonds, upon his transfer from the Milfraen to the Blaenavon Company's Big Pit, has been presented with a service of silver, marble clock, &c., by the officials and workmen of the first-named colliery.

## THE TIN-PLATE TRADE

## Liverpool

There is practically no change to report on the week. Most works have restarted after the holidays, but many are still closed down. Some moderate buying for early delivery is reported, but the difference between buyers' and sellers' views prevents transactions going through in plates required ahead. Current quotations may be called:—Coke tins: 1 C 14 x 20 (112 sh. 108 lb.), 13s. 3d. to 13s. 6d. per box; 1 C 28 x 20 (112 sh. 216 lb.), 26s. 7½d. to 27s. per box; 1 C 28 x 20 (56 sh. 108 lb.), 13s. 9d. to 13s. 10½d. per box; 1 C 14 x 18½ (124 sh. 110 lb.), 13s. 9d. (nominal); 1 C 14 x 19½ (120 sh. 110 lb.), 13s. 9d. (nominal); 1 C 20 x 10 (225 sh. 156 lb.), 19s. 9d. (nominal); 1 C squares and odd sizes, 13s. 9d. to 13s. 10½d. basis for usual specifications. Charcoal tins are in quiet request; quotations run 15s. 6d. and upwards (for 1 C 14 x 20), according to tinning. Coke wasters are in fair demand, and are quoted:—C W 14 x 20, 12s. 3d. per box; C W 28 x 20, 25s. 9d. per box; C W 14 x 18½, 11s. 6d. per box; C W 20 x 10, 15s. 10½d. per box—all f.o.b. Wales, less 4 per cent.

## THE FREIGHT MARKET.

Outward chartering has been active on the north-east coast during the past week, but, tonnage being in ample supply, rates have been upheld with difficulty. For London 3s. from the Tyne is quoted, whilst 3s. 6d. to Hamburg and 4s. 4½d. to Havre are representative rates for other coasting ports. The Mediterranean is based on from 8s. to 8s. 6d. to Genoa. The Baltic is represented by from 4s. 9d. to 5s. to Cronstadt, whilst from 6s. to 6s. 3d. to Bordeaux is a typical quotation for the Bay. The Humber market is similarly influenced, and is moderately busy at low figures. At South Wales the market is unchanged for the Mediterranean, and rather firmer for the River Plate and Brazils. The Bay of coasting trades are dull and easy. The Clyde is quiet at unaltered figures. Homewards, a fair amount of chartering has been done. At the Black Sea there is a steadily increasing demand for tonnage, and rates are on the up-grade for the latter half of this month and early September. Tonnage is offering somewhat sparingly. The Azof and Danube are very firm. The Eastern demand is fairly active at firm figures. The Mediterranean and ore trades are steady, as is also the Baltic. America is quiet and easy. There is an improved enquiry and a steadier tone for River Plate tonnage.

Tyne to Abo, 900, 5s. 4½d.; Antwerp, 900, 4s. 6d.; 1,100, 4s.; 1,400, 4s., from Dunston; Bordeaux, 3,500, 6s.; 2,200, 6s. 3d.; 3,000, 6s.; Chantenay, 3,300, 5s. 9d.; 600; Civita Vecchia, 2,800, 10s., 400; 3,200, 9s. 6d., 400; Cronstadt, 1,700, coke, 8s. 6d.; Genoa, 4,400, 8s. 6d.; 6,500, 8s. 3d., from Dunston; 6,700, 8s. 1½d.; 4,200, 8s. 3d.; 6,000, 8s. 1½d., river loading; 4,800, 8s. 4½d., river loading; 4,300, 8s. 9d., river loading; 4,000, 8s. 9d., from Pelaw; Girgenti, 2,500, 10s.; 3,400, 10s., 400; Gibraltar, 2,500, 8s. 1½d.; Harburg, 1,400, 3s. 9d.; Helsingfors, 2,000, 5s. 4½d.; Harstadt, 2,000, 5s. 6d.; Havre, 1,650, 4s. 4½d., from Dunston; Kiel, 2,100, 5s.; Las Palmas, 4,600, 9s.; Lisbon, 1,500, 8s. coal, 10s., coke; Lubeck, 2,200, 5s. 3d.; 2,700, 5s. 3d.; Messina, 2,600, 10s., 400; Marseilles, 3,000, 8s. 3d., from Dunston; Memel, 1,600, 4s. 6d.; 2,500, 4s. 6d.; Malta, 4,400, 7s.; Palermo, 3,100, 10s., 400; 3,700, 10s.; 3,100, 10s. 6d., 500; Port Said, 2,500, 8s. 3d.; 5,000, 8s. 6d., August; Pozzuoli, 2,900, 10s.; Piraeus, 5,500, 8s. 3d.; Perna, 1,000, 5s. 3d.; Riga, 2,200, 5s. 3d., 450; 1,000, 5s. 6d., part cargo; 1,900, 5s. 3d., 500; Rouen, 1,000, 5s. 3d.; Rotterdam, 1,000, 3s. 9d.; Savona, 5,100, 8s. 6d.; 4,800, 8s. 4½d., river loading; 4,900, 8s. 3d., 750, 8s. 6d., 500; St. Petersburg, 1,800-2,200, 5s. 6d., part cargo; 3,500, 5s. 3d.; 3,500, 5s. 1½d.; Syra, 5,550, 8s. 3d.; Stockholm, 2,900, 4s. 9d.; Teneriffe, 4,600, 9s.; Veile, 650, 5s. 9d.; Wifsterwarf, 1,500, 5s. 3d.; Zea, 5,500, 8s. 3d.; Zeebrugge, 1,700, 3s. 1½d., August.

Cardiff to Alexandria, 5,700, 8s. 9d.; 5,400, 9s., 500 Algiers, 5,200, 8½ fr.; 3,900, 9 fr.; 3,200, 9 fr.; 4,000, 8½ fr. Bizerta, 2,800, 10 fr.; 1,500, 10½ fr.; Bjorkoe, 2,300, 6s. Brest, 1,200, 4s.; Beyrout, 3,500, 10s.; 4,000, 10s. and 10s. 9d.; Barcelona, 3,200, 8s. 9d.; Brindisi, 4,000, 8s. 3d., 5,800, 8s. 3d.; 500, August 18; Caen, 2,200, 4s. 9d.; Colombo, 5,000, 14s., August; Calais, 1,400, 4s. 6d.; Cronstadt, 3,200, 6s.; 3,600, 5s. 10½d., August 20; Danube, 3,300, 10s. 3d., Dieppe, 2,800, 4s. 3d.; 1,900, 4s. 6d.; Genoa, 4,000-4,200, 8s.; 5,000, 8s.; 3,400, 8s. 3d.; 4,800, 7s. 6d.; Gibraltar, 1,500, 8s. 4½d.; Honfleur, 2,200, 4s. 9d.; Islands, 4,200, 8s. 9d., August; La Rochelle, 2,800, 6 fr.; Las Palmas, 4,000, 8s. 6d., August 20; Lisbon, 2,600, 7s., 400, August 18; 2,600, 7s., 300, August 18; Leghorn, 8s.; La Pallice, 3,400, 5½ fr., August 20; Monte Video, 5,100, 18s. 3d.; Malaga, 2,200, 8s. 6d.; Marseilles, 4,000, 9½ fr.; 3,400, 9½ fr.; 5,500, 9½ fr., Messina, 5,000, 6s. 10½d., net terms; Malta, 4,500, 6s. 9d., August 18; 6s., Admiralty, 3,800, 7s., end August; Naples, 3,500, 8s. 6d.; 4,000, 8s. 3d.; 6,000, 7s. 3d., 1,020, 7s. 4½d., 800; 4,000, 8s., 700; 4,200, 7s. 6d.; Niendiep, 1,600, 5s. 3d., Nantes, 1,500, 7 fr.; Port Said, 6,600, 8s. 6d.; 5,000, 8s. 6d., 6,300, 8s. 6d., August 18; 4,600, 8s. 6d., August 21; 5,000, 6,000, 8s. 6d.; Palermo, 3,000, 9s. 6d.; Piraeus, 3,500, 8s., Rosario, 4,000-4,500, 18s. 3d., August; River Plate, 18s. 9d., with 1s.; 5,000, 19s., reported, August; 5,000, 18s. 6d., 6,000, 18s. 6d., August 25; 6,600, 18s. 9d.; St. Helena, sail 18s. 3d.; Savona, 3,400, 8s. 3d.; St. Nazaire, 3,000, 6½ fr., 3,800, 5½ fr.; Santa Fe, 5,000, 23s., August 20; St. Malo, 1,400, 4s. 9d.; 1,800, 4s. 6d.; Syra, 3,500, 8s.; Singaporean, Nagasaki, 7,000, 19s., Admiralty; St. Petersburg, 2,200, 6s., 600; Trieste, 5,300, 9s. 6d.; Toulon, 6,000, 9½ fr., 400, f.d., Teneriffe, 4,800, 8s. 6d., August; Torre Annunziata, 4,000, 8s. 3d.; 5,800, 8s. 3d., 500, August 18; Venice, 4,000, 9s. 3d., 400; Valencia, 3,100, 8s., free tax; Zea, 3,500, 8s.

Mersey to Santos, sail, p.t., 22s. Newport to Algiers, 4,200, 9½ fr., fuel; 3,200, 9 fr., August; Alexandria, 5,600, 8s. 9d.; Torre Annunziata, 3,600, 9s., August; Civita Vecchia, 3,600, 9s., August; Naples, 4,700, 8s., 800; Caen, 2,200, 4s. 9d.; Oporto, 1,900, 7s. 9d., Nantes, 1,450, 6½ fr.; Bilbao, 1,350, 6s. 9d.; Buenos Ayre or La Plata, 5,000, 18s. 6d., 1s.; Marseilles, 4,800, 9½ fr., 3,800, 9½ fr.; Gibraltar, 1,500, 8s. 4½d.; Cronstadt, 3,600, 5s. 10½d., August 20.

Glasgow to Naples, 3,500, 8s. 9d.; North Norway, 1,200, 5s. 6d.; Cronstadt, 4,800, 5s.

Bo'ness to St. Petersburg, 2,000, 5s. 3d.; Randers, 800, 5s. 9d.

Fife port to Malmo, 1,200, 5s. 6d. Forth to Helsingfors, 1,450, 5s. 9d.; Libau, 1,450, 5s. 4½d. Methil to Genoa, 9s.; Savona, 9s.; Leghorn, 9s.

Wales to Iquique, sail, 18s., coal; direct nitrate port and home to United Kingdom-Continent, sail, 42s. 9d. on the round; Rio de Janeiro, 16s. 6d., August-September; Santos, 19s. 6d., August-September; Luderitz Bay, sail, 22s. 6d.

Antwerp to Buenos Ayres, sail, 12½ dols.

Newport River to Algiers, 4,000, 9½ fr.

Wear to Konigsburg, 2,450, 5s., 850, 10d.; Bordeaux, 3,000, 6s.; Chantenay, 3,300, 5s. 9d.; Lisbon, 3,500, 7s. 3d., 350.

Swansea to Valencia, 2,200, 10s. 9d.; 2,650, 10s. 3d. and 11s.; Cherbourg, 1,000, 5s. 4½d.; 700, 5s. 4½d.; Tunis, 1,800, 14 fr. coal, 15 fr. fuel; Oran, 2,800, 11 fr. coal, 12½ fr. fuel; Sundswall, 6s. 9d.; La Rochelle, 90, 6½ fr.; St. Malo, 700, 4s. 10½d.; Caen, 1,200, 5s. 3d.; Constantinople, 3,100, 11s.; Rouen, 1,500, 5s.; 650, 5s. 3d., Bordeaux, 2,100, 8 fr.; Alexandria, 3,600, 9s. 3d.; Honfleur, 900, 5s. 3d.; Torre Annunziata, 3,200, 8s. 6d.

Hartlepool to Bordeaux, 2,200, 6s. 3d.; Genoa, 4,200, 8s. 6d.; St. Nazaire, 3,200, 6s., Trignac terms.

Hamburg to Atlantic States ports, several boats, 10s. kaint; Charleston, 10s. 3d.

Blyth to Calais, 2,300, 3s. 9d.; Riga, 1,900, 5s. 3d., 500 Akureyri, 750, 12s. 6d.; Rouen, 2,000, 4s. 9d.



Thames to Pernambuco, about 4,000, 18s. 6d., cement, August.

Llanelli to Guernsey, 280, 5s.

Hull to Cronstadt, 2,200, 5s. 3d., 500; 4,000, 5s. 1½d.; 2,000, 5s. 3d.; 2,500, 5s. 3d.; Kiel, 1,200, 5s. 9d.; Alexandria, 4,000, 8s. 9d., August 18; Reval, 2,000, 5s.; Genoa, 2,000, 5s.; 3,000, 9s.; Libau, 2,850, 5s. 3d., 500.

Immingham to Cronstadt, 2,000, 5s. 3d.; 2,500, 5s. 3d.; Naxo, 1,100, 5s. 6d.; Pernau, 2,200, 4s. 9d.

Goole to Boulogne, 800, 5s.

Port Talbot to Nantes, 3,200, 6½ fr.

Rotterdam to Algiers, 9 fr., part cargo.

Seaham Harbour to London, 1,500, 3s. 4½d.

Clyde and Mersey to Bombay, p.t., August.

Homeward charters:—Kherson, Nicolaieff or Odessa,

4,400, Emden or Weser, 12s., with 3d. less barley, ppt.;

3,000, Rotterdam 11s. 9d., Weser 12s., Hamburg, 12s. 3d.,

with 3d. less barley, ppt.; 6,100, basis London or Rotterdam

11s. 9d., with 3d. less barley, ppt.; 4,000, Rotterdam 12s.,

Hamburg 12s. 6d., with 3d. less barley, 2,500 tons

guaranteed, ppt.; 4,200, London or Rotterdam 11s. 9d.,

Weser 12s., Hamburg 12s. 3d., with 3d. less barley, days,

August 15; 5,100, London or Rotterdam 11s. 6d., Hamburg

or Weser 12s., ppt.; 5,100, Rotterdam 11s. 6d., Hamburg or

Weser 12s., ppt.; Kherson, Nicolaieff, Odessa, Novorossisk

or Theodosia, 7,400, Rotterdam 12s. 1½d., London, Hull or

Antwerp 12s. 4½d., Weser 12s. 6d., Hamburg 12s. 9d., option

Kherson and Nicolaieff or Odessa, two ports, 3d. extra,

August 18; Nicolaieff, 5,800, London or Rotterdam 11s. 9d.,

Weser 12s., Hamburg 12s. 3d., ppt.; Kurrachee, 2,467

net, United Kingdom-Continent, p.p. 18s. 9d., August-

September; 2,665 net, East Coast United Kingdom, two ports,

about 10s. 6d., less 2 per cent., August 25-September 15;

Christmas Island, 2,491 net, Hamburg and Rendsburg, about

30s., August; Calcutta, 2,593 net, United Kingdom, Antwerp,

Holland, 25s. one port, 25s. 9d. two ports, d.w. basis, net

terms, September; 2,513 net, Dundee, Bremen or Hamburg,

about 29s., jute basis, ppt.; St. Petersburg, 700 tathoms,

Bo'ness, Granton or Grangemouth, 35s. 6d. per intaken

tathom, short props, ppt.; San Lorenzo, 5,000, 10 per cent.,

United Kingdom-Continent, 18s. 6d. o.c., less 6d., September-

October; 5,500, 10 per cent., 19s. 6d. o.c., less 6d., August;

4,500, 10 per cent., 21s. o.c., less 6d., option Villa Constitu-

tion 6d. less, August; 4,500, 10 per cent., 18s. 9d. o.c., less

3d., France excluded, seed 1s. extra, option completing

below bar 2s. 6d. less, September 15-30; 21s. o.c.; 19s. 4½d.

o.c.; 5,200, 10 per cent., Rotterdam, 18s. 6d., no reduction

direct, cancelling September 30; 5,000, 10 per cent., U.K.-

Cont., 20s. 6d., no reduction, option Denmark, 2s. extra, Aug.;

Bilbao, 4,700, Rotterdam, 4s. 7½d., ppt.; 4,000, 5s., ppt.; 2,900,

Middlesbrough, 5s. 3d., ppt.; Santander, 2,400, Rotterdam,

3s., ppt.; 1,800, 6s., ppt.; Gulf, sail, 18½ dols., Sante Fe;

time charter, Transpacific trade, 4s. 6d., one trip, delivery

North Pacific, re-delivery Australia, September; 5s., one

trip, delivery North Pacific, re-delivery Australia; Mira-

nichi, 57s. 6d., Manchester; Grindstone Island, 57s. 6d.,

West Britain or East Ireland, August-September; Novo-

rossisk, 4,200, Rotterdam 11s. 6d., Antwerp 11s. 9d., days,

August 18; Azof, 6,100, Rotterdam 12s. 9d., Emden or

Weser 12s., Hamburg 13s. 3d., with 3d. less barley, days,

August 18; 4,800, Norway, basis 12s., grain, days, August 25,

1,800, basis Rotterdam 13s., with 3d. less barley, option

South Russia 1s. less, August 18; 6,300, Rotterdam, 12s. 3d.,

with 3d. less barley, ppt.; 4,600, 12s. 6d., ppt.; 4,200,

Marseilles, 12½ fr., option St. Louis du Rhone, 14 fr.,

August 15-31; Vladivostok, 2,505 net, United Kingdom-

Continent, 25s., end August; Bombay, 2,846 net, United

Kingdom-Continent, 24s. 6d. one p.p., 25s. two p.p., on d.w.,

August; Nicolaieff, Odessa, Novorossisk or Theodosia,

7,000, Rotterdam, 11s. 6d., ppt.; Baltimore, 2,776 net,

Rotterdam 2s. 7½d., Antwerp 2s. 9d., ppt.; Seville, 1,650,

Swansea, 9s., ppt.; time charter, Transatlantic trade, 8s. 6d.,

5s. 6d., one round trip, delivery United Kingdom-Continent,

re-delivery United Kingdom-Continent, via United States;

time charter, White Sea trade, about 3,000 d.w., £1,075, one

round trip, delivery East Coast, option further Baltic round

trip; Jacobstad or Gamle Karleby, 1,100 stds., Cardiff Barry,

43s., Seafin charter; Omega, 600 stds., Cardiff, 52s. 6d.,

Nicolaieff, Odessa or Novorossisk, 5,800, London or Rotter-

dam, 11s. 6d., Hamburg 12s., ppt.; Sulina, 5,000, Antwerp

or Rotterdam, 10s. 3d., spot; 4,500, Antwerp, 11s., spot;

Nicolaieff or Odessa, 5,800, Rotterdam, 11s., with 3d. less

barley, ppt.; Poti, 4,800, Boulogne, 15s., 500-500, August;

3atoun, 2,500, Philadelphia, 12s. 6d., ore, September;

St. Petersburg or Cronstadt, 1,600 stds., Grangemouth, 31s.,

Hull, 17s. 6d., United Kingdom-Continent, net form, Sep-

tember; North Pacific, 18s. 9d., Japan, one or two ports,

option United Kingdom-Continent, 35s. 9d., September;

Kherson or Nicolaieff, 4,700, Leith or Glasgow, 12s. 6d., end

August; Nicolaieff or Odessa, 5,800, Rotterdam, 11s. 6d.,

opt.; Rangoon, 7,000, East Coast United Kingdom, two

ports, 32s. 6d., ricemeal, September; La Palaise, 4,400,

Barrow, 8s., early September; Carthage, 1,700, Rotterdam,

5s., ppt.; Nantes, 1,400, Swansea, 3s. 7½d., ppt.; time charter,

Eastern trade, £1,500, one trip, delivery Moji, redelivery

Belong, August; time charter, Labrador trade, 1,000, £650,

one round trip, delivery Wales; San Francisco, Puget Sound

or Portland, Or., 39s. 6d., United Kingdom-Continent,

September; Burmah, 26s. 3d., one port Holland, September;

Savannah, 53s. 9d., United Kingdom-Continent; Villa

Constitution, 20s., United Kingdom-Continent, o.c.

**Hull Coal Exports.**—The official return of the exports of

coal from Hull for the week ending Tuesday, August 5,

1913, is as follows:—Alexandria, 8,629 tons; Arendal,

2,05; Amsterdam, 996; Antwerp, 592; Bandholm, 1,466;

Buenos Ayres, 5,343; Bornholm, 175; Bremen, 1,710;

Copenhagen, 549; Cronstadt, 34,720; Christiania, 1,273;

Drontheim, 198; Degerhamn, 863; Delfzyl, 1,369; Ghent,

867; Gothenburg, 961; Harburg, 2,149; Hamburg, 16,163;

Larlingen, 911; Königsberg, 4,693; Leghorn, 1,672; Libau,

96; Marseilles, 471; Newfairwater, 559; Naples, 1,005;

Reval, 1,419; Naksokoy, 1,523; Oporto, 1,357; Oxelosund,

396; Paris, 1,068; Pernau, 1,637; Rotterdam, 4911; Riga,

404; Rouen, 1,924; St. Vincent, 4,827; Stockholm, 1,474;

Tettin, 255; St. Petersburg, 10,174; Trelleborg, 1,742;

Vieste, 308; Venice, 610; Ystad, 1,324; total, 128,348

tons; corresponding period August 1912, total 95,544 tons;

ditto 1911, total 39,677 tons; ditto 1910, total 59,904 tons.

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

**BIRMINGHAM, AUGUST 27.**—Tenders are invited for the supply of 205,000 tons of coal to the generating stations of the Corporation Electric Supply Department for delivery between November 1, 1913, and October 31, 1914. Particulars as to delivery and requirements can be obtained from the undersigned. Tenders must be sent in by noon of Wednesday, August 27, 1913. R. A. Chattock, M.I.E.E., city electrical engineer and manager, 14, Dale End, Birmingham.

**CARN BREA (CORNWALL), AUGUST 23.**—The directors of the East Pool and Agar Limited invite tenders for the supply of about 13,000 tons of coal as required by these mines for 12 months, in about equal monthly deliveries, from September 1, 1913, to August 31, 1914, at per ton f.o.b. Lydney or South Wales ports, or delivered into East Pool and Agar coal yards, and at the different yards and sheds at Tolvaddon. The monthly quantity required at the mines is about 700 tons, and for Tolvaddon about 400 tons, more or less; the same to be weighed on the East Pool and Agar weighbridges, and the weighbridge at Tolvaddon; the quality to be good steam coal, and to contain at least 40 per cent. of large, and to be subject to the approval of the managers. Payment by cash, less 2½ per cent. discount, within the month following delivery. The directors reserve the right, should the supply be deficient or the quality inferior, to obtain coal from other parties and charge the contractor, or contractors, with the loss (if any) on such transactions. If any differences should arise regarding the construction of any of the terms and conditions of the contract, such differences shall be the subject of an arbitration under the Arbitration Act of 1889, or any statutory modification of it for the time being in force. The tenders to be sent to East Pool and Agar Limited on or before one o'clock on Saturday, August 23, 1913, marked "Coal tender." The directors do not bind themselves to accept the lowest or any tender. J. F. Maynard, secretary, Carn Brea, S.O., Cornwall.

## Abstracts of Contracts Open.

**BANDON (IRELAND), AUGUST 21.**—About 400 tons of best double-screened gas coals, for the Town Commissioners. Further information from Mr. J. Coghlan, secretary, gas-works, Bandon.

**BELFAST, AUGUST 21.**—Steam and house coal, for the Fire Brigade stations, for the Corporation. Forms from the Chief Fire Station.

**BEVERLEY, SEPTEMBER 1.**—Coal to various almshouses in the borough, for the Beverley Consolidated Charities, according to particulars obtainable from the clerk. Mr. J. Willis Mills, clerk, 81, Laigate, Beverley.

**BRIDLINGTON, AUGUST 18.**—About 500 tons of best South Yorkshire screened hard steam coal, having an evaporative capacity of not less than 9 lb. of water per pound of coal from and at 212 degs. Fahr., for the Corporation. Mr. A. E. Matthewman, town clerk, Town Hall, Bridlington.

**BURY ST. EDMUND'S, SEPTEMBER 1.**—Coal and coke to the Shire Hall and police station at Bury St. Edmund's, for the West Suffolk County Council. Tenders to Mr. A. Townshend Cobbold, clerk to the West Suffolk County Council, Shire Hall, Bury St. Edmund's.

**DARLINGTON, AUGUST 30.**—Best steam coal, for the Tees Valley Water Board, up to June 30, 1914, at the Merrybent Siding, Darlington, approximately 60 tons per week.

**DUMFARTON, AUGUST 25.**—About 110 tons of house coal and 210 tons of washed nuts or tripping to the Joint Hospital. Tenders to Mr. Alex. Roberts, clerk to the Board, Town Clerk's Office, Dumfarton.

**GLOUCESTER, AUGUST 25.**—Rough small slack coal for a period of either six or 12 months, commencing October 1, for the Corporation. Specifications from Mr. F. H. Corson, engineer, Electricity Works, Commercial-road, Gloucester.

**HAMPTON (MIDDLESEX), SEPTEMBER 1.**—Best Welsh double-screened steam coal, for the Urban District Council. Forms from Mr. Sidney H. Chambers, surveyor to the Council, Public Offices, Hampton, Middlesex.

**HAVERFORDWEST, AUGUST 18.**—About 2,000 tons of double screened gas coal of the very best quality, for the Corporation. Forms from Mr. E. T. P. Williams, town clerk.

**IPSWICH, AUGUST 28.**—Best hand-picked hards, Bestwood, Newstead, Portland, Hucknall, New Hucknall, Linby, Watnall, Amblecote or Shirebrook steam coal; best Durham, Wallsend (well screened), best Silktone (well screened) house coal; best anthracite beans from the Emlyn Colliery; also coke (well broken), to the workhouse, &c., for the Guardians. Forms from Mr. L. W. Greenhalgh, Guardians' Offices, 19, Tower-street, Ipswich.

**LONDON, SEPTEMBER 9.**—Gas coal, for the Holborn Guardians. Forms from Mr. J. Allan Battersby, clerk to the Guardians, Holborn Union Offices, 53, Clerkenwell-road, E.C.

**LYMINGTON, AUGUST 19.**—About 40 tons of best Silktone coal, for the Guardians. Tenders to Mr. J. Davis Rawlins, clerk, Lymington.

**LYMM, AUGUST 20.**—Cannel and best screened gas coal, for the Urban District Council, for a term of 12 months from September 1. Probable quantities required, about 500 tons of cannel and about 2,500 tons of gas coal, but the council reserve the right of increasing or decreasing the quantities named. Particulars from the gas manager, Mr. W. L. Donaldson.

**NEWPORT (I.W.), SEPTEMBER 11.**—Fuel, for the Isle of Wight County Council. Particulars from Mr. J. Dufton, clerk, County Council Offices, Newport, I.W.

**MOLD (FLINTS), AUGUST 23.**—Coal and coke, for the Flintshire Education Committee. Forms from Mr. J. Bevan Evans, director of education and secretary, County Education Offices, Mold.

**ROCHDALE, AUGUST 27.**—Steam coal, for the Electricity Committee of the Corporation. Forms from Mr. C. C. Atchison, M.I.E.E., engineer and manager, Dane-street, Rochdale.

**ST. AUSTELL, AUGUST 20.**—About 200 tons of steam coals (all large), for the Rural District Council; also for the supply of 100 tons of coal for the use of the Council's steam

rollers. Tenders to Mr. John Stephens, clerk to the Council, St. Austell.

**STRATFORD-ON-AVON, AUGUST 21.**—About 400 tons of Griff large hand-stacked steam coal, for the Guardians. Forms from Mr. Stanley C. Warden, clerk, Union Offices, Stratford-on-Avon.

**SUNBURY, AUGUST 30.**—About 150 tons of best Derby bright coals, for the Trustees. Tenders to Mr. Charles E. Goddard, vestry clerk, Sunbury.

**TRALEE (IRELAND), AUGUST 31.**—2,000 tons of best double-screened gas coal, for the Urban District Council, during 12 months ending August 31, 1914. Conditions from the engineer and manager, Mr. James E. Enright.

**WEYMOUTH, AUGUST 22.**—Coal, coke and firewood to the Elementary Schools, for the Borough of Weymouth and Melcombe Regis Education Committee. Tenders to Mr. G. P. Symes, clerk to the Education Committee.

**WORKING, AUGUST 26.**—About 300 tons of good hard hand-picked steam coal, from the Linby or Shipley colliery, for the Urban District Council. Forms can be obtained at the offices of the Council.

**YORK, AUGUST 25.**—Coal to the electricity generating station, Foss Islands-road, York, during the 12 months ending September 30, 1914, for the Corporation. The quantity required will be approximately 10,000 tons, and tenders may be sent for either unscreened beans, pea slack, rough slack, or small peas quality. Tenders to Mr. J. W. Hame, engineer and manager, Electricity and Tramways Offices, Clifford-street, York.

*The date given is the latest upon which tenders can be received.*

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

**ALEXANDRIA (EGYPT), SEPTEMBER 30.**—Oils, &c.—H.M. Consul-General at Alexandria (Mr. D. A. Cameron, C.M.G.) reports that tenders are invited by the Municipality of Alexandria for the supply of various articles required for the use of the Service du Nettoyement during 1913-14, including oils and colours, wood, steel and iron bars, angle iron, bolts and nuts, screws, rivets, brooms, buckles, wire, &c.\*

**BURY, AUGUST 25.**—Turbine Alternator, &c.—One 2,000/3,000 kv. turbine alternator, with exciter and surface condenser, for the Corporation. Conditions from Mr. S. J. Watson, M.I.E.E., Electricity Works, Bury; deposit, two guineas.

**CANBERRA (AUSTRALIA), SEPTEMBER 1.**—Switchgear.—H.M. Trade Commissioner for Australia reports that tenders are invited by the Commonwealth Department of Home Affairs for the supply of switchgear for the power-house at Canberra, the new Federal Capital in New South Wales. The contract is divided into two sections: (1) Main power-house switchgear; (2) Diesel engine switchgear.\*

**CLECKHEATON, AUGUST 20.**—Various.—The following plant in connection with the new gasworks, for the Urban District Council:—(2) Steam warping capstan and two bollards; (3) weighbridges; (10) purifiers and general plant; (11) Livesey washer and water-tube condensers; (12) rotary washer-scrubbers; (13) exhausters and engines; (14) station meter and governor; (16) boilers and seatings; (17) roofs, steel structures, and overhead tanks alterations, &c. Specifications from the engineer, Mr. Arthur L. Jennings, Town Hall. Deposit £2 2s. each contract, with the exception of No. 10 (£1 1s.)

**CONWAY, AUGUST 18.**—Dam and Tunnel.—For the construction of a concrete dam, the driving of a tunnel 7 ft. by 7 ft., with entrance cuttings, the total length being 1,440 yards, for the Aluminium Corporation Limited. Drawings, &c., at the offices of the engineers, Messrs. T. B. Farrington and Son, Trinity-square, Llandudno. Deposit £5 5s.

**CORK, AUGUST 21.**—Wells and Pumps.—For sinking wells, supplying and erecting pumps, for the Rural District Council, according to plan and specification, which can be inspected at the Board Room, Cork Workhouse.

**DUBLIN, AUGUST 25.**—Rails.—The following, for the directors of the Great Northern Railway Company (Ireland):—Bull head rails, flat-bottom rails, fishplates, cast iron chairs, and permanent way fastenings. Specifications from the secretary, Amiens-street Terminus, Dublin.

**DUBLIN, AUGUST 26.**—Feed Pump, &c.—Feed pump, cast iron tanks, pipework, valves, steam separator, boilerhouse shutters, coal grab and steelwork, for the Corporation. Conditions from the city electrical engineer, Fleet-street, Dublin. Deposit 3 guineas.

**DUBLIN, AUGUST 26.**—Meters.—Single-phase and three-phase alternating-current meters, for the Electricity Supply Committee. Specification may be inspected at the office of the City Electrical Engineer, Fleet-street, Dublin.

**EPSOM, AUGUST 25.**—Cast Iron Water Main.—About 1,500 yards 6 in. cast iron water main in 12 ft. lengths and specials, for the Urban District Council. Particulars from Mr. W. Young, manager, Waterworks, East-street, Epsom.

**FRASERBURGH, AUGUST 25.**—Steel Booms.—Steel sliding booms or storm gates for the Fraserburgh Harbour Commissioners, Fraserburgh. Information from Mr. G. N. Abernethy, M.Inst.C.E., 82, Caxton-house, Westminster, London, S.W.

**ITCHEN, SEPTEMBER 9.**—Cast Iron Lamp Columns.—95 cast iron lamp columns, copper lanterns, burners, and fittings complete, for the Urban District Council. Particulars from Mr. T. A. Collingwood, surveyor to the Council.

**LONDON, AUGUST 19.**—Steel Material.—Steel material and pig iron, for the directors of the Bombay, Baroda and Central India Railway. Tenders to Mr. C. Crommelin, secretary, Gloucester House, 110, Bishopsgate, London, E.C.

**NEATH, SEPTEMBER 7.**—Mains.—Laying and jointing 6 in., 5 in., 4 in. and 3 in. cast iron and steel mains, special castings, the erection and fixing of valves, &c., bridge and steam crossings, valve chambers, excavations, pipe trenches, concreting, &c., for the distribution mains in the parishes of Resolven, Clyne and Neath Lower parishes, for the Rural District Council. Specification from Mr. D. M. Davies,

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade 73, Basinghall-street, E.C.



EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During July and the first seven months of 1911, 1912 and 1913.

To	July, 1913.						July.					
	Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
	Tons.	£	Tons.	£	Tons.	£	1911.	1912.	1913.	1911.	1912.	1913.
Russia .....	132,919	86,420	46,361	31,876	701,686	524,889	458,810	648,018	880,066	244,499	424,850	643,185
Sweden .....	71,604	44,748	41,805	26,102	289,304	203,273	277,423	472,276	402,743	140,551	281,071	274,123
Norway .....	53,036	27,145	9,802	5,727	118,060	81,985	120,265	224,229	180,898	58,380	123,379	114,857
Denmark .....	59,580	29,708	66,259	46,264	110,406	77,240	183,034	287,886	227,245	90,448	169,330	153,212
Germany .....	327,357	188,857	351,737	205,352	187,942	127,763	696,803	1,000,068	867,036	322,154	518,447	521,972
Netherlands .....	91,805	55,842	55,196	34,899	47,046	32,506	134,970	209,714	194,047	66,173	114,848	123,247
Belgium .....	70,925	36,819	40,981	26,146	59,586	34,078	105,971	179,548	162,492	45,805	84,810	97,043
France .....	510,947	258,580	292,838	178,075	357,688	282,613	661,543	1,047,511	1,161,473	354,623	594,182	719,268
Portugal, Azores, and Madeira .....	18,560	9,997	15,319	10,234	81,073	67,654	85,428	124,539	114,952	50,339	79,764	87,885
Spain and Canaries .....	33,909	20,849	115,716	71,740	154,880	124,865	223,747	337,096	304,505	137,337	220,573	217,454
Italy .....	145,949	66,334	215,407	137,855	603,869	499,784	793,658	967,491	965,225	451,575	629,552	704,173
Austria-Hungary .....	31,634	16,366	19,280	11,943	53,062	37,737	79,644	87,677	103,976	41,427	53,158	66,046
Greece .....	7,039	4,133	28,803	18,121	36,180	28,429	74,599	60,821	72,022	43,169	35,029	50,663
Turkey .....	2,699	2,118	3,585	2,510	30,585	24,468	49,637	55,766	36,869	33,469	39,444	29,096
Egypt .....	16,514	9,106	35,555	22,499	238,822	187,633	256,064	348,765	290,891	158,347	225,647	219,238
Algeria .....	27,123	15,523	27,185	16,671	43,268	34,825	83,392	99,233	97,581	44,652	56,267	67,019
United States of America .....	—	—	—	—	97	113	102	50	97	120	58	113
Chile .....	1,587	2,093	—	—	43,039	33,890	48,550	52,131	44,626	29,780	43,365	35,983
Brazil .....	1,003	1,345	7,068	4,946	145,499	133,978	100,958	110,667	153,575	75,695	89,310	140,269
Uruguay .....	2,998	1,720	—	—	67,817	60,548	31,035	64,590	70,815	24,554	52,222	62,268
Argentine Republic .....	9,067	8,103	—	—	351,052	294,781	193,431	322,833	360,119	145,861	253,855	302,884
Gibraltar .....	4,113	2,113	5,748	3,588	13,062	10,338	19,218	26,843	22,923	11,303	16,601	16,039
Malta .....	14,174	7,247	9,795	7,357	30,350	25,346	25,009	39,721	54,319	15,282	24,617	39,950
British South Africa .....	744	704	—	—	6,926	5,461	7,728	3,261	7,760	4,244	2,068	6,165
„ India .....	11	14	—	—	1,368	981	3,966	10,251	1,379	2,823	7,909	995
Straits Settlements .....	503	706	—	—	—	—	70	4,762	503	109	4,627	706
Ceylon .....	663	796	—	—	13,369	11,132	11,876	31,759	14,032	8,939	25,395	11,928
Other countries .....	35,924	21,453	18,877	12,753	123,361	106,162	148,527	224,360	183,162	104,365	160,808	140,373
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Total { Anthracite .....	132,766	92,511	—	—	163,227	141,643	197,072	304,022	295,993	151,311	238,141	234,154
Steam .....	1,234,393	648,774	304,587	189,001	3,517,328	2,755,582	3,442,615	4,961,888	5,056,308	1,953,877	3,157,667	3,593,357
Gas .....	95,533	53,506	923,923	575,513	95,116	67,440	884,559	1,260,008	1,114,572	429,593	657,611	696,459
Household .....	43,116	27,859	580	406	124,365	84,071	115,898	161,813	168,061	58,539	94,695	112,336
Other sorts .....	156,689	96,374	178,227	109,738	5,361	3,736	239,414	354,135	340,277	112,708	183,072	209,848
Total .....	1,662,497	919,024	1,407,317	874,658	3,905,397	3,052,472	4,879,558	7,041,866	6,975,211	2,706,028	4,331,186	4,846,154
Total (July 1912) .....	1,568,621	767,191	1,592,618	828,669	3,880,627	2,785,326	—	—	—	—	—	—
Total (July 1911) .....	1,106,650	496,691	1,094,265	524,303	2,678,643	1,685,034	—	—	—	—	—	—
Coke .....	—	—	—	—	—	—	82,651	85,978	99,605	63,768	75,280	97,848
Manufactured fuel .....	—	—	—	—	—	—	129,227	191,945	200,814	89,307	152,470	175,831
Total of coal, coke & manufactured fuel .....	—	—	—	—	—	—	5,091,436	7,319,789	7,275,630	2,859,103	4,553,936	5,119,833
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First seven months of 1913.						First seven months.						
Total { Anthracite .....	782,238	539,898	339	339	920,513	812,893	1,366,747	1,278,215	1,703,090	1,021,655	1,012,608	1,353,130
Steam .....	7,479,453	4,117,390	2,144,749	1,336,459	21,466,351	16,564,782	26,427,909	23,682,055	31,090,553	15,278,038	15,262,028	22,018,631
Gas .....	564,571	311,001	5,370,507	3,221,647	689,902	484,988	5,958,632	5,747,845	6,624,980	2,901,736	3,011,161	4,017,636
Household .....	294,901	179,884	1,919	1,352	726,616	485,392	829,466	802,268	1,023,436	434,037	474,236	666,028
Other sorts .....	915,200	569,182	1,079,566	661,046	64,621	45,311	1,790,763	1,704,806	2,059,387	854,498	906,795	1,275,539
Total .....	10,036,363	5,717,355	8,597,080	5,220,843	23,868,003	18,393,366	36,373,517	33,215,189	42,501,446	20,490,014	20,666,888	29,331,564
Total for seven months of 1912 .....	7,467,912	3,628,373	7,229,073	3,794,211	18,518,204	13,244,304	—	—	—	—	—	—
Total for seven months of 1911 .....	8,169,567	3,608,031	7,491,643	3,599,755	20,712,307	13,282,228	—	—	—	—	—	—
Coke .....	—	—	—	—	—	—	545,210	474,086	599,275	415,315	376,981	584,375
Manufactured fuel .....	—	—	—	—	—	—	981,094	827,228	1,223,046	678,456	641,581	1,043,146
Total of coal, coke & manufactured fuel .....	—	—	—	—	—	—	37,899,821	34,516,503	44,323,767	21,583,785	21,685,450	30,959,085

M.I.M.E., Council Offices, Neath, upon receipt of £3 3s. (£2 2s. only returnable).

NEWBURY, AUGUST 18.—*Iron Fencing*.—Iron fencing at St. Bartholomew's Grammar School, for the Governors. Specifications at the office of Mr. S. J. Lee Vincent, Municipal-buildings, Newbury.

NEWPORT (MON.), AUGUST 25.—*Air Filter*.—An air filter, together with air ducts, dampers, &c., for the Corporation. The air filter is required for use in connection with the turbo-alternator plant at the East Power Station, and may be either of the dry air or wet air type. Particulars from Mr. A. Nichols Moore, M.I.E.E., borough electrical engineer, Town Hall, Newport, Mon.

ROCHDALE, AUGUST 27.—*Filter*.—Erection at their electric power station, Dane-street, Rochdale, of a wet air filter, for the Electricity Committee. Specifications from Mr. C. C. Atchison, M.I.E.E., engineer and manager, Dane-street, Rochdale, on receipt of a deposit of £1 1s., returnable.

SHEFFIELD, AUGUST 26.—*Firebricks*.—350,000 firebricks and 54,000 arch-bricks, for the directors of the Sheffield United Gaslight Company (Grimesthorpe Works). Specifications from the engineer, Mr. J. W. Morrison, Commercial-street, Sheffield.

TALODI (EGYPT), AUGUST 26-SEPTEMBER 8.—*Galvanised Sheets, &c.*—The London Agent for the Egyptian War Office notifies that tenders are invited by that department for the supply of (1) galvanised corrugated sheets, and (2) steelwork for steel-framed buildings at Talodi. Specifications from the office of Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.\*

TRALEE (IRELAND), AUGUST 31.—*Exhauster*.—Supply and fixing complete at the Gasworks, of one exhauster, capable of passing 10,000 cubic feet of gas per hour, for the Corporation. Specification from the engineer and manager, Mr. James E. Enright.

WAKEFIELD, SEPTEMBER 1.—*Boiler, &c.*—Various plant for extensions to the works of the electricity department, for the Corporation: (1) Water-tube boiler, superheater, &c.; (2) steam turbo-alternator, condensing plant, &c.; (3) low tension switchgear. Particulars from the engineer, Old Town Hall, Wakefield.

WIMBLEDON, SEPTEMBER 1.—*Turbine-alternator*.—For the Corporation: (a) A 1,500 kw. turbine-alternator, with condensing plant and auxiliaries; (b) a 20-ton overhead travelling crane. Specifications from Mr. H. Tomlinson-Lee, borough electrical engineer, Electricity Works, Durnsford-road, Wimbledon. Deposit of £2 2s. (returnable).

COAL, IRON AND ENGINEERING COMPANIES.

Antrim Iron Ore Company Limited.—The directors have declared an *ad interim* dividend of 1s. per share, being at the rate of 5 per cent. per annum, for the six months ended June 30 last.

Demon Manufacturing Company Limited.—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of ironfounders, mechanical engineers, manufacturers of implements and machinery, tool makers, brass founders, metal workers, iron and steel converters, and electrical engineers, &c. First directors, Alfred Morris Cohen and Laurence Seth-Wallis. Qualification, 100 shares. Remuneration, 50 guineas per annum. Registered office, 21 and 22, Windsor-street, Brighton, Sussex.

Dunderland Iron Ore Company Limited.—At a meeting to be held at Winchester House, London, on Friday, August 22, the shareholders will be asked to adopt a new scheme of arrangement. The property and assets of the company are in the hands of Sir William Barclay-Peat as receiver and manager on behalf of the prior lien bondholders, and, to avoid offering the property for sale, negotiations have been conducted to secure the financial co-operation either of ironmasters or others in a scheme which would provide the capital necessary to equip the Dunderland works for wet magnetic separation. After considerable negotiations, £125,000 will be guaranteed under a proposed new company who are to be entitled to all its properties and profits, subject only to the modified rights of the prior lien bondholders.

Edison Accumulators Limited.—This company has been registered, with a capital of £150,000 (135,000 participating preference cumulative £7 per cent. shares of £1 each, and

300,000 ordinary shares of 1s. each) to carry on the business of electrical and mechanical engineers, &c. Minimum cash subscription, £25,000. Registered office, 49, Old Bond-street, W.

Fairbairn, Lawson, Coombe, Barbour Limited.—Interim dividend on the ordinary shares at the rate of 5 per cent. per annum for the six months to June 30, 1913.

Guest, Keen and Nettlefolds Limited.—The directors recommend the payment of final dividends as follows:—On the preference shares at the rate of 5 per cent. per annum for the half-year ended June 20, and on the ordinary shares at the rate of 10 per cent. per annum for the half-year ended June 30, together with a bonus of 1s. per share on the ordinary shares, all free of income-tax.

Hadfield's Steel Foundry Company Limited.—The directors announce an interim dividend of 5 per cent. (1s. per share), free of income-tax, on the ordinary shares for the past half-year.

Harrisons (London) Limited.—This private company has been registered, with a capital of £100,000 in £1 shares, to carry on the business of importers and exporters of coal, foreign coaling and fueling agents, coalminers, colliery owners, smelters, engineers, ironmasters, ironworkers and ironfounders, &c. First directors: John Harrison, Charles Harrison, Francis Joseph Harrison, and Alfred Harrison, all of 66, Mark-lane, E.C. Qualification, 200 ordinary shares. Registered office, 66, Mark-lane, E.C.

International Coal Company Limited.—The poll for the election of a new director for the International Coal Company Limited, which was demanded at the annual meeting, took place at the Angel Hotel, Cardiff, on the 6th inst. The votes for Mr. Robert T. Rees, mining engineer, Glandare, Aberdare, the directors' nominee, were stated to be greatly in the majority, and he was declared duly elected.

Lanarkshire Steel Company Limited.—The directors have declared dividends at the rate of 5 per cent. per annum, less income-tax, on both the first issue of preference shares and on the 1899 issue of preference shares.

Llay Main Collieries Limited.—This private company has been registered, with a capital of £250,000 in £10 shares, to purchase or otherwise acquire any collieries, mines, quarries, coal, iron, ores or other minerals of every



COLLIERY REPORT BOOKS AND FORMS.  
New Forms, &c., recently issued under the Coal Mines Acts.

This List will appear weekly in the "Colliery Guardian," and will give new prescribed forms, &c.

Registered No. Please quote when ordering.

NEW FORMS, &c., RECENTLY ISSUED.

STATUTORY RULES AND ORDERS, &c.

H.O., 511	Explosives in Coal Mines Order of 21st May, 1912 (revoking all previous Orders). Pamphlet Form ... ..	4d. each.	By post 5d.
C.G., 69	The same (without Schedules). Pamphlet Form ... ..	4d. each.	By post 5d.
H.O., 31	The same (without Schedules). In Sheet Form for posting ... ..	1d. each.	By post 1½d.
H.O., 1540	Explosives in Coal Mines Order dated October 15, 1912 ... ..	1d. each.	By post 1½d.
	List of Authorized Explosives, Jan. 1, 1913 ... ..	2d. each.	By post 2½d.
H.O., 359	Explosives in Coal Mines Order of 31st March, 1913. (Amending Order of 21st May, 1912) ... ..	1½d. each.	By post 2d.
H.O., 1861	Order relating to the keeping of Mixed Explosives in Registered Premises ... ..	1d. each.	By post 1½d.
H.O., 341	General Regulations dated April 1, 1913, as to Hours of Employment of Winding Enginem ... ..	1d. each.	By post 1½d.
H.O., 10	Coal Mines (Reference) Rules, 1913 ... ..	1d. each.	By post 1½d.
H.O., 69	Coal Mines: Safety Lamp Order, dated January 14, 1913, under Section 33. (Hailwood Lamp No. 1 and the Oldham Lamp) ... ..	2d. each.	By post 2½d.
H.O., 296	Coal Mines: Safety Lamp Order, dated March 13, 1913. (Oldham Miner's Electric Safety Lamp, Hewer's Types) ... ..	1d. each.	By post 1½d.
H.O., 434	Coal Mines: Safety Lamp Order, dated April 18, 1913. (Gray-Sussmann Electric Safety Lamp, Nos. 3 and 4) ... ..	2d. each.	By post 2½d.
H.O., 519	Coal Mines: Safety Lamp Order, dated May 3, 1913. (Ceag Miner's Safety Lamp) ... ..	2d. each.	By post 2½d.
H.O., 713	Coal Mines: Safety Lamp Order, dated June 27, 1913 (Patterson & Co.'s Safety Lamps, Type A3 and B1) ... ..	3d. each.	By post 3½d.
H.O., 748	General Regulations dated July 10, 1913, under Section 86 ... ..	2½d. each.	By post 3d.

C.G., E (Coal)	Special Rules for the Installation and Use of Electricity in Mines. Sheet Form (H.O., 12)	3d. each.	By post 3½d.
C.G., K.	Pamphlet Form (H.O., 11)	2d. each.	By post 3d.
C.G., E. (Metal.)	Special Rules for the Installation and Use of Electricity in Mines. Sheet Form (H.O., 15a)	3d. each.	By post 3½d.
H.O., 12A.	Special Rules for Sidings. Pamphlet Form	3d. each.	By post 3½d.
H.O., 12B.	Sheet Form	3d. each.	By post 3½d.
C.G., L.	Coal Mines Act, 1911. Pamphlet Form	9d. each.	By post 1½d.
C.G., L. (Abs.)	Coal Mines Act, 1911, Abstract. Sheet (26 in. by 34 in.) (H.O., 2)	3d. each.	By post 4d.
C.G., M.	Coal Mines (Minimum Wage) Act, 1912. Pamphlet Form	1½d. each.	By post 2d.
Cd. 6460	Mines and Quarries: General Reports, &c., for 1910. Part 4. Foreign and Colonial Statistics	1s. 6d. each.	By post 1s. 10d.
Cd. 6340	Mines and Quarries: General Reports, &c., for 1911. Part 1. District Statistics	6½d. each.	By post 8d.
	List of Mines in the United Kingdom for 1911	4s. each.	By post 4s. 4d.
	List of Quarries in the United Kingdom for 1911	5s. each.	By post 5s. 6d.
H.O., 403	Coal Tables of Production, Consumption, Imports and Exports of Coal, 1911	6d. each.	By post 7d.
	Directions for Restoration of Persons suffering from Electric Shock. (20 in. by 30 in., and 10 in. by 15 in.)	4d. each.	3s. per doz.
C.G., F.	Mounted on Cardboard, 6d. each, carriage extra; Mounted and Varnished	1s. each,	carriage extra
	On Enamelled Iron Plates (10 in. by 15 in.)	3s. 2d. each	do. { Reduction on a quantity.

PRESCRIBED FORMS.			
H.O., 11A.	Electricity Rules: Daily Log Sheet	1s. 6d. per 100	
H.O., 11B.	Electricity Rules: Daily Log Book	4s. each.	By post 4s. 8d.
H.O., 15b (Metal.)	Electricity Rules: Daily Log Book	2s. each.	By post 2s. 6d.
H.O., 11c.	Electricity Rules: Notice to Inspector of the District under Rule 2 (ii.)	1d. each.	By post 1½d.
H.O., 11d.	Electricity Rules: Notice to Inspector of the District under Rule 2 (iii.)	1d. each.	By post 1½d.
H.O., 15c (Metal.)	Electricity Rules: Notice to Inspector of the District under Rule 2 (ii.)	1d. each.	By post 1½d.
H.O., 20	Form of Register of Boys, Girls and Women Employed—Section 94	4d. each,	postage extra
H.O., 20A (Metal.)	Form of Register of Boys, Girls and Women Employed—Section 6	½d. each,	post free
H.O., 23	Form of Annual Return to Inspector of Division	1d. each.	By post 1½d.
H.O., 21	Notice of Accident or Dangerous Occurrence	1d. each,	post free
H.O., 22	Notice of Accident, Books containing 100 Forms with Duplicates	2s. each,	postage extra
H.O., 33	Conviction Returns*	1d. each,	post free
H.O., 35	Register of Extension of Time	4s. each,	postage extra
H.O., 36	Form of Report Book for Inspection on behalf of Workmen—Section 16	9d. each	do.
H.O., 37	Form of Book for Record of Measurements of Air Currents—Section 29 (2)	7d. each	do.
H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii.)	1s. 6d. each	do.
H.O., 39	Form of Report of Thorough Examination of Steam Boiler—Section 56	1d. each	do.
H.O., 40	Form of Book for Report on Quarterly Internal Examination of Steam Boilers—Section 56 (1) (c) and (3)	6d. each	do.
H.O., 41	Form of Book for Daily Report on Condition of Roads as to Coal Dust—Section 62 (5)	1s. 3d. each	do.
H.O., 42	Form of Report Book for Firemen, Examiners or Deputies—Sections 64 and 65	1s. each	do.
H.O., 42A.	Similar to H.O. 42. Suitable for use in large collieries, 2 Forms on a page, about 400 pages	4s. 6d. each	do.
H.O., 42B.	Similar to H.O. 42. Suitable for use in large collieries, 1 Form on a page, about 400 pages	2s. 6d. each	do.
H.O., 43	Form of Book for Daily Report of Examination of External Parts of Winding Machinery, Guides, &c.—Section 66 (a)	1s. 6d. each	do.
H.O., 44	Form of Book for Weekly Report of Machinery, Gear and other Appliances (other than Winding Machinery, Gear, &c.)—Section 66 (b)	1s. 3d. each	do.
H.O., 45	Form of Book for Weekly Report on State of Shafts in which Persons are Lowered or Raised—Section 66 (c)	1s. 3d. each	do.
H.O., 46	Form of Book for Weekly Report on State of Airways—Section 66 (d)	1s. 3d. each	do.
H.O., 47	Form of Book for Reports on Places from which Workmen have been Withdrawn—Section 67	9d. each	do.
H.O., 48	Form of Notice of Accident Causing Loss of Life or Serious Personal Injury, to be sent to Representative of Persons Employed—Section 80 (1)	1d. each	do.
H.O., 49	Form of Notice Specifying the Period of Employment and Times Allowed for Meals of Boys, Girls and Women—Section 93	1d. each	do.
H.O., 50	Form of Book for Horsekeeper's Record and Daily Report of Horses under his care—Schedule III. (13)	2s. 6d. each	do.
H.O., 51	Register of Hours of Winding Enginem	8d. each.	By post 1s.
H.O., 52	Form of Book for Daily Record of Shots Fired—Explosives in Coal Mines Order	9d. each,	postage extra

\* Conviction Returns can also be supplied in books of 20 Forms and 20 Duplicates 3s. each, postage extra.

“COLLIERY GUARDIAN” SERIES.

UNOFFICIAL FORMS.			
C.G., 10A.	Fan Record and Readings of Meteorological Instruments. Books of 60 pages	3s. each.	By post 3s. 4d.
C.G., 13c.	Daily Report of Examination of External Parts of Machinery. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 14	Daily Record of Earth or Fault Detectors. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 14A.	Earth or Fault Detectors. Daily Record. Books containing 400 Reports	4s. each.	By post 4s. 5d.
C.G., 14B.	Earth or Fault Detectors. Daily Record. Books of 100 Reports, with Duplicates	6s. each.	By post 6s. 5d.
C.G., 15	Report on Electric Power Plant. Books containing 100 Forms of Report, with duplicates perforated	6s. each.	By post 6s. 5d.
C.G., 15A.	Report on Electric Power Plant. Books containing 100 Forms of Report, with duplicates perforated	6s. each.	By post 6s. 5d.
C.G., 15B.	Report on Electric Power Plant (Three-phase). Books of 100 Forms of Report, with duplicates perforated	6s. each.	By post 6s. 5d.
C.G., 20	Overman's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 24	Report of Inspection of Ventilation, &c. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 27	Foreman Engineer's Daily Report to Manager. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 28	Foreman Smith's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 30	Wagon Weighman's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 31	Authority to Fire Shots and Carry and Use Detonators. Books of 100 Forms, with rules on back	8s. each.	By post 8s. 6d.
C.G., 31*	The same as C.G. 31, but without rules on back	4s. each.	By post 4s. 5d.
C.G., 31A.	Authority to Carry a Lamp Key. Books of 100 Forms	4s. each.	By post 4s. 5d.
C.G., 32	Authority to have Charge of Detonators. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 4d.
C.G., 34	Appointment of Deputy, Fireman, &c. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 4d.
C.G., 35	Workmen's Contracts and Workmen's Deductions. Books of 200 pages, Forms 35A and 35B combined	4s. each.	By post 4s. 5d.
C.G., 35A.	Workmen's Contracts. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 35B.	Workmen's Deductions. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 42	Certificated Manager's Daily Report. Books containing 200 pages	4s. each.	By post 4s. 5d.
C.G., 43	Certificated Under-Manager's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 47	Veterinary Surgeon's Weekly Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 48	Daily Return of Early Riders and Damaged Lamps. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 49	Accident Report to Manager. Books of 50 Reports and duplicates	4s. each.	By post 4s. 5d.
C.G., 50	Daily Record of Male Persons above 16 Employed Above and Below Ground. Books of 48 pages, covering 12 years	2s. each.	By post 2s. 3d.
C.G., 50A.	Abstract of all Persons Employed, to facilitate the making of the Annual and other Returns. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50B.	Register of Officials, with Particulars of Engagement. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50c.	Register of Persons Employed, with Particulars of Engagement. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50c.*	Register of Persons Employed, 24 Hours' Notice. Books of 96 pages	3s. each.	By post 3s. 4d.
C.G., 50d.	Book made up of 48 pages 50A; 24 pages each 50B and 50c; indexed for easy reference	3s. each.	By post 3s. 4d.
C.G., 51	Coal-cutter's Daily Report. Books of 200 pages	4s. each.	By post 4s. 5d.
C.G., 70	Appointment of Winding Enginem. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 4d.
C.G., 71	Authority to give Signals. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 5d.
C.G., 72	Appointment of Horsekeeper. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 5d.
C.G., 73	Appointment of Electrician. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 5d.
C.G., 74	Authority to Operate Switchgear. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 5d.
C.G., 75	Appointment of Safety Lamp Examiners. Books of 100 Certificates, with counterfoils	4s. each.	By post 4s. 5d.

Forms under the Quarries Act, 1894.

C.G., 20q.	Daily Report by Foreman. Books containing 400 Forms of Report	4s. each.	By post 4s. 5d.
C.G., 25q.	Reports of Examination of Machinery, &c. Books of 200 pages	4s. each.	By post 4s. 5d.



## COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of July 1913, compared with the corresponding month of 1912.\*

Port.	July 1913.		July 1912.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle .....	962,818	19,481	1,118,634	10,884	—	155,816	8,597	—
North Shields .....	121,514	995	99,618	2,682	21,896	—	—	1,687
South Shields .....	131,933	2,145	220,220	9,074	—	88,287	—	6,929
Sunderland .....	258,975	1,375	286,461	302	—	27,486	1,073	—
West Hartlepool .....	108,624	1,142	149,404	678	—	40,780	464	—
Goole .....	122,496	1,290	138,928	1,989	—	16,432	—	699
Blyth .....	343,688	292	372,826	962	—	29,138	—	670
Newport .....	399,901	716	429,707	1,311	—	29,806	—	595
Liverpool .....	32,150	303	29,835	325	2,315	—	—	22
Methil .....	198,815	66	168,107	—	30,708	—	66	—
Glasgow .....	161,268	4,412	150,790	4,506	10,478	—	—	94
Kirkcaldy .....	6,973	—	8,205	—	—	1,232	—	—
Burntisland .....	155,770	183	136,647	179	19,123	—	4	—
Cardiff .....	1,846,425	10,468	1,768,702	6,618	77,723	—	3,850	—
Borrowstoness .....	39,654	340	55,022	—	—	15,368	340	—
Llanelli .....	26,873	—	11,449	—	12,424	—	—	—
Middlesbrough .....	2,331	4,141	3,621	5,602	—	1,290	—	1,461
Seaham .....	99,513	49	100,339	—	—	826	49	—
Swansea .....	263,801	118	369,689	553	—	105,888	—	435
Granton .....	5,818	105	5,419	497	399	—	—	392
Port Talbot .....	160,698	1,405	179,952	18	—	19,254	1,387	—
Alloa .....	12,518	—	14,602	—	—	2,084	—	—
Grangemouth .....	122,321	7,238	126,898	12,101	—	4,577	—	4,863
Neath .....	18,041	—	12,895	—	5,146	—	—	—
Hull .....	458,123	4,576	462,917	2,647	—	4,794	1,929	—
Amble .....	43,598	—	48,838	—	—	5,240	—	—
Troon .....	6,014	—	14,005	155	—	7,991	—	155
Grimsby .....	108,359	916	132,471	172	—	24,112	744	—
Ayr .....	7,288	—	4,618	—	2,670	—	—	—
Greenock .....	697	—	4,048	30	—	3,351	—	30
Leith .....	7,183	—	167,311	—	—	160,128	—	—
Ardrossan .....	4,494	—	5,714	—	—	1,220	—	—
Stockton .....	—	—	—	—	—	—	—	—

## COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.\*

Port.	July 1912.		July 1913.		Port.	July 1912.		July 1913.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle .....	296,163	660	322,548	484	Ayr .....	76,423	77	68,126	—
North Shields .....	—	—	—	—	Irvine .....	5,979	—	9,521	—
South Shields .....	5,770	—	470	—	Alloa .....	2,830	—	3,394	—
Blyth .....	11,254	—	12,605	—	Whitehaven .....	25,453	—	19,160	—
Amble .....	3,370	—	4,561	—	Liverpool .....	167,988	—	172,900	—
Sunderland .....	106,742	—	118,719	—	Grimsby .....	7,294	—	1,982	—
Seaham .....	76,355	—	83,825	—	Granton .....	13,189	—	159	—
Hartlepool .....	32,290	—	64,098	—	Borrowstoness ..	12,267	—	17,041	7
Stockton .....	20	—	—	—	Burntisland .....	38,352	—	22,055	—
Middlesbro' .....	—	40	—	105	Kirkcaldy .....	1,356	—	5,534	—
Hull .....	77,315	—	65,884	500	Methil .....	18,490	—	31,843	—
Goole .....	112,702	—	122,959	—	Port Talbot .....	16,181	336 c. 400 p.	25,539	105 c. 475 p.
Swansea .....	31,366	750	35,067	—	Glasgow .....	39,250	767	34,889	797
Cardiff .....	315,100	60	384,076	148	Grangemouth .....	24,286	—	8,795	1,240
Llanelli .....	7,100	—	7,310	—	Greenock .....	1,387	4	1,787	—
Newport .....	65,839	150 p.f.	65,377	—	Neath .....	12,671	—	14,099	—
Troon .....	24,373	20	23,837	—	Leith .....	8,774	6	2,979	—
Ardrossan .....	5,788	—	4,723	—					

\* From Browne's Export List.

description; and to construct, carry on, and improve any coal, iron, steel and electric construction works; also to search for and make merchantable coal, metals, and iron and other ores. First directors: Robert Armitage, M.P., Farnley Hall, Leeds; George Charles Hague Davy, Smeaton Manor, Northallerton; Charles Edward Rhodes, Lane End, Rotherham; William Wilde, Thurnscoe Hall, Rotherham; and Alec Lionel Rea, 48, Ullet-road, Sefton Park, Liverpool. Qualification, 1 share. Remuneration (other than managing director), £300 per annum.

**Mather and Platt Limited.**—The directors announce an interim dividend upon the ordinary shares of 5 per cent.

**Midland Railway Carriage and Wagon Company Limited.**—The report of the directors states that the accounts of the company for the year ended June 30 last show a gross profit of £14,039 1s.; adding to this sum the amount brought forward from last year—namely, £10,835 6s. 10d., the sum to be dealt with is £24,874 7s. 10d. From this must be deducted the sum of £2,000 set apart for depreciation of plant and machinery, £781 11s. 8d. part cost of issue of debentures, the debenture interest amounting to £11,634 13s. 4d., and loss on realisation of securities, £901 17s. 6d. The interim dividend on the preference shares absorbed £1,635 10s. 8d., so the available balance thus becomes £7,920 14s. 8d., which the directors propose to apply as follows:—Dividend on the preference shares at the rate of 6 per cent. (free of income tax), £4,232 1s. 10d., less interim dividend paid February 26 last £1,635 10s. 8d.—£2,596 11s. 2d.; balance to be carried forward £5,324 3s. 6d., making a total of £7,920 14s. 8d. The Shrewsbury works are now closed, and the business hitherto carried on at the Landor-street works will be finally transferred to Washwood Heath during the next three months. The directors continue confident that as the new works get into full working order they may expect a considerable improvement in the company's position. A slight alteration in the articles of association has been suggested, to permit of a salaried officer of the company being appointed a director, should this be found desirable, and a resolution to this effect will be proposed at a special meeting of the company, to be held immediately after the annual meeting.

**Mossay and Co. Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of railway, mechanical, electrical and general consulting engineers and manufacturers, tool makers and metal workers, &c. First managing director, Paul Alphonse Mossay, 4, Abbots-road, Hampstead, N.W. Capital, £2,000 in 250 shares. Registered office, 45, Horseferry-road, Westminster, S.W.

**New Stockton Collieries Limited.**—Dividend of 6 per cent. (free of income tax), making 10 per cent. for the year, £30,000 to

a reserve fund for sinking a new shaft, and £22,654 carried forward.

**Newport Abercarn Black Vein Steam Coal Company Limited.**—An important circular has been issued by the directors to the shareholders. Some time ago the directors submitted a scheme for the rearrangement of their capital, and special resolutions were passed amending the articles of association to empower the company to carry their proposals into effect, but in their annual report, sent out in June last, the directors intimated that they had decided not to proceed for the time being with the proposed capital revision. The scheme now outlined goes much further than the previous one submitted. The principal features of the scheme are as follows:—To convert the present 10,000 participating non-cumulative 6 per cent. preference shares of £10 each, of which 7,500 have been issued, into 100,000 7½ per cent. cumulative preference shares of £1 each. To subdivide the present 15,000 ordinary shares of £10 each into 75,000 7 per cent. cumulative preference shares of £1 each and 75,000 ordinary shares of £1 each. To place restrictions on the right of pre-preference and preference shareholders to vote; to renounce the converted shares throughout, and to approve of an arrangement for reconstituting the board of directors, and for the compensation of the retiring members of the board. Further, it is proposed to confer upon the holders of the pre-preference and preference shares the right on a distribution of assets to participate with the ordinary shares to the extent of 4s. per £1 pre-preference share and 2s. per £1 preference share respectively in any surplus assets of the company remaining after repayment of the paid-up capital of the company, including any arrears of the pre-preference and preference dividend. After giving their reasons for recommending the scheme the directors state that Messrs. T. Beynon and Co. Limited, who represent, in both classes of existing shares, more than one-third of the entire capital of the company, have entered into an agreement with the secretary of the company on behalf of all the holders of new ordinary shares to purchase at 24s. per £1 share any new ordinary shares which the holders may offer to sell to them within 10 days from the confirmation as special resolutions of the resolutions to be proposed at the general meeting. Such of the holders as desire to sell will, in addition to five £1 7 per cent. preference shares, receive £6 in cash for each old ordinary £10 share against the transfer to Messrs. Beynon of their new ordinary shares. Messrs. T. Beynon and Co. Limited have also undertaken, if required, to underwrite the forthcoming issue of debentures to the extent of £75,000 on terms to be arranged. The directors have agreed, with the approval of the shareholders, to retire from the board on the ratification of the proposed scheme in consideration of which Messrs. Beynon will transfer to each director £2,000 nominal value

of the preference shares they now hold as compensation for his loss of office. The names of the new directors will in due course be communicated to the shareholders. The present directors are Messrs. T. E. Watson (chairman), J. W. Beynon, W. W. Jones, G. E. Markham, and H. St. John Raikes.

**North Central Wagon Company Limited.**—The accounts for the year to June 30 show a profit of £28,871, which, with the amount brought forward, makes an available total of £30,990. The directors recommend a further dividend for the half-year at the rate of 13 per cent. per annum, tax free, making 12½ per cent. for the year, transfer £12,000 to reserve, making it £150,000, and carry forward £221.

**Parsons (W.) and Co. Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire and take over as a going concern the business of electrical, mechanical and general engineers, now carried on by William Parsons at Regent-street, Leamington, Warwick, under the style of "W. Parsons and Co.," and to enter into an agreement with William Parsons; also to carry on the business of ironfounders and manufacturers of agricultural implements and other machinery, toolmakers, brassfounders, metal workers and iron and steel converters, &c. First director, William Parsons. Registered office, Regent-street, Leamington, Warwick.

**Pickering (J. T.) Hoist and Engineering Company Limited.**—Registered as a private company, with a capital of £1,000 in £1 shares, to enter into an agreement with Joseph Thompson Pickering and to carry on business as general and mechanical engineers, manufacturers of hoists and all parts connected therewith, electrical appliances, and dealers in machinery of all kinds. First directors, Joseph Thompson Pickering, 41, Evington-road, Leicester, and John Bardell Smith, 308, Ayleston-road, Leicester. Qualification, £1.

**Powell Duffryn Steam Coal Company Limited.**—An extraordinary general meeting was held on the 17th ult. at the offices of the company, 101, Leadenhall-street, E.C., for the purpose of confirming resolutions passed on July 21. These provided for the alteration of the articles of association in order that part of the undivided profits of the company may be capitalised for the purpose of a bonus on the ordinary shares of the company. The resolutions submitted included two new clauses in the articles giving effect to the new scheme, and also authorising the directors to increase the capital of the company from £1,294,375 to £1,835,782 by the creation of 541,407 new ordinary shares of £1 each, and also providing for the capitalisation of £541,407, being part of the undivided profits of the company standing to the credit of the company's reserve fund, and declaring accordingly a bonus of 10s. per share on the fully-paid £1 shares, and of 5s. per share on the 5s. paid ordinary shares, making the latter 10s. paid. The resolutions were unanimously agreed to. Letters of allotment will be posted on September 9 next.

**Richmond Iron and Steel Company Limited.**—A meeting of the creditors was held at Middlesbrough on the 12th inst. Mr. H. Meredith Hardy, the official receiver, who presided, said that this was the largest failure in the iron and steel industry on Teesside for some considerable time. The business was started by Mr. James Richey, and on his death, in June 1910, his sons, James and Archibald, carried on the business until recently under the name of the Richmond Iron and Steel Company. The financial position showed the gross liabilities to be £45,134 11s. 4d., of which £34,224 7s. 6d. was expected to rank. The assets were £5,218 14s. 6d., leaving a deficiency of £29,005 13s. 1d. An examination of the books showed that the firm had been losing consistently since 1909, when a small profit of £197 was made. A loss of £2,005 was recorded in 1910, £738 in 1911, and £4,749 in 1912. On the first few months of this year there had been a loss of over £1,000. Regarding the firm's output, Mr. Hardy said that from July 1910 to June 1913 the total sales amounted to £215,528, the average price per ton being £6 11s. During that period the average, according to the Conciliation Board's figures, was £6 12s. 9d. per ton, and they seemed to have been selling below the average net selling price. The principal creditors were the North-Eastern Banking Company, £8,716; Mr. W. Hicks, £4,580; Mr. T. H. Hutchinson, £3,300; Messrs. J. Jackson and Co., £2,573; Mr. E. Tomkins, £2,027; and Messrs. T. W. Ward Limited (Sheffield), £1,684. Sir Frank Brown, of Stockton, was appointed trustee, with a committee of inspection.

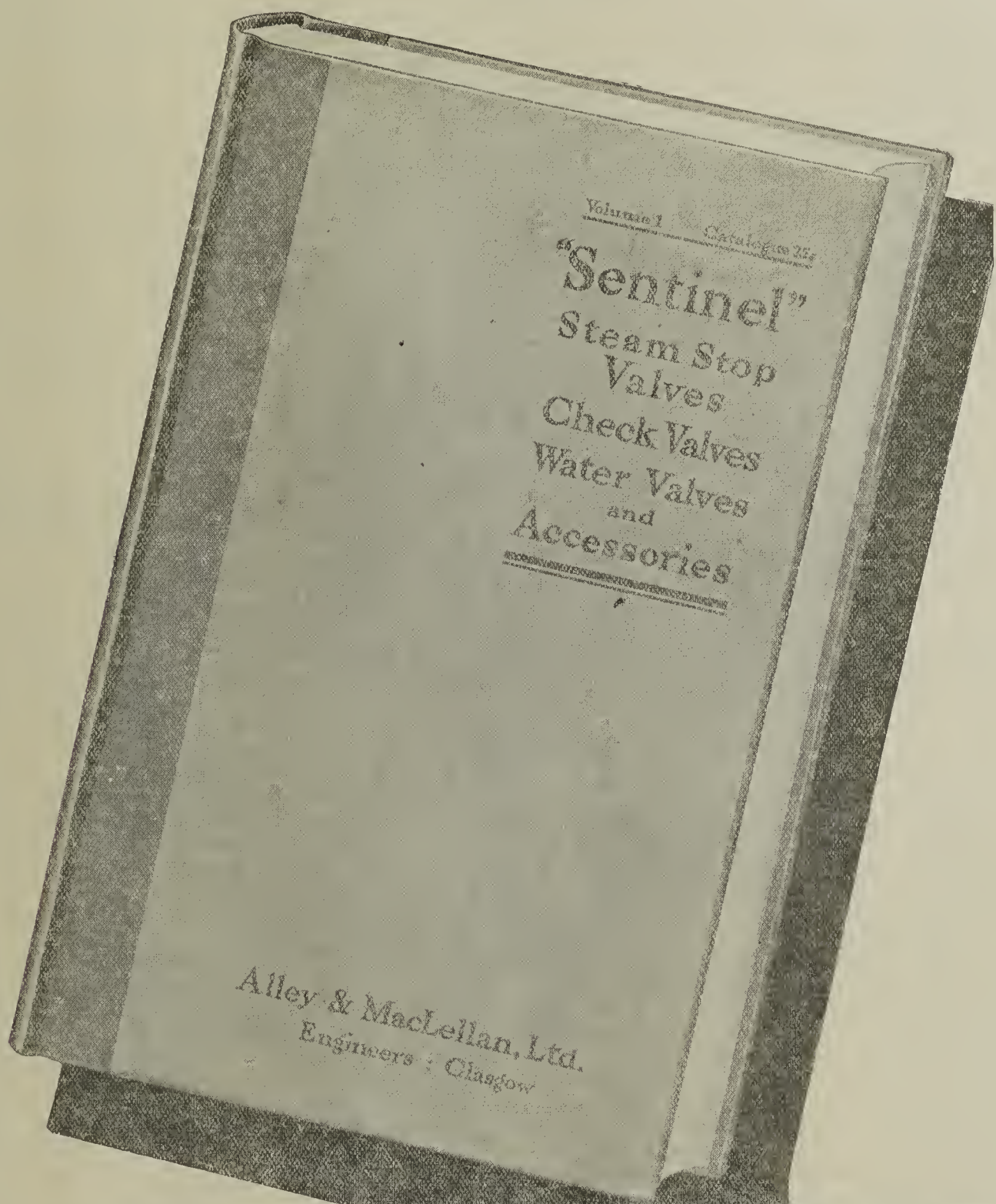
**S. and O. British Iron and Steel Corporation Limited.**—This company has been registered, with a capital of £2,000,000 (100,000 preference shares of £5 and 1,500,000 ordinary shares of £1 each), to purchase mines, mineral rights, and machinery, and to search for ores and minerals; to carry on the business of miners, smelters and refiners; of manufacturers of machinery and railway wagon builders; and also any business relating to iron and steel manufacturers and founders, toolmakers, brassfounders, metal workers, iron and steel converters, and mechanical, electrical and general engineers. Minimum cash subscription, 10 per cent. of the shares offered for subscription to the public. Signatories: Thomas Biggart, H. Lumsden, D. Higgins, W. G. Davidson, all of 105, West George-street, Glasgow; Andrew R. Duncan, 43, Wilton-street, Glasgow; W. G. Livingstone, 99, Queensborough-gardens, Hyndland, Glasgow; and R. A. Shepherd, 34, Norham-street, Crossing-loof, Glasgow. Qualification of directors, £500. Remuneration of directors, £500 per annum.

**Scott (Walter) Limited.**—The report of the directors for the year ended June 30, 1913, states that the profits of the steelworks, collieries, &c., for the twelve months amount to £91,393 4s. 10d., to which must be added the balance of profit brought forward from last account, £855 2s. 1d., giving a total of £92,048 6s. 11d. Out of this the following amounts have been provided:—Directors' fees for year to June 30, 1913, £1,500; interest on 4 per cent. debenture stock for year to June 30, 1913, £12,000; dividend on 6 per cent. preference shares for half-year to December 31, 1912, £9,000; interim dividend on ordinary shares at 5 per cent. per annum for half-year to December 31, 1912, £6,875; amount carried to special reserve account under section 104 of articles of association, £7,531; additional amount carried to general reserve account for depreciation, £17,144 12s. 1d.; depreciation of investments, £6,750; leaving to be dealt with, £31,247 14s. 10d. The directors recommend the following appropriation of this balance: In payment of dividend on the 6 per cent. preference shares for the



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year to June 30, 1913, £9,000; in payment of a dividend per cent. on the ordinary shares for the half-year to June 30, 1913, making, with the interim dividend above stated, 10 per cent. for the year. £20,625; carrying forward to next year's account the balance of £1,622 14s. 10d. The result of the trading for the year has been satisfactory, the output at the steelworks and collieries having considerably improved upon the previous year, but the brickworks and cement works have remained in a languid condition owing to the stagnation in the building trade. Electric generating plant, consisting of two mixed flow turbine generators with necessary machinery complete for pumping and haulage, has been installed at East Hetton Colliery; and at Trimdon Grange a battery of 55 patent coke ovens, with coal washery and by-product plant, has been erected, from both of which great benefit is expected to be derived.

**Vickers Limited.**—The directors announce an interim dividend for the half-year ended June 30 last year of 1s. a share on the ordinary shares, payable August 26, the same as a year ago.

**Vryheid (Natal) Railway Coal and Iron Company Limited.**—The report for the year ended January 31, 1913, states that after allowing for depreciation and providing for interest on debenture issue and loan, the result of the year's trading shows a profit of £1,338. Considerable increase in traffic is expected to result from the Government extension from Piet Retief in the Transvaal, now under construction, and joining the company's line at Tendega. As mentioned in the general manager's report, the output for last year showed a decrease of 6,027 tons owing to scarcity of native labour; but results for the current year are decidedly better. Coal remains an entirely satisfactory feature, its high quality being now thoroughly established and advanced contract prices having been obtained for the current year.

**Walker (C. and W.) Limited.**—The directors have declared an interim dividend of 5 per cent.

**Waste Heat and Gas Electrical Generating Stations Limited.**—Interim dividend at the rate of 5 per cent. per annum, less tax, on the issued share capital in respect of the half-year ended July 31, payable on August 31.

**Western Engineering Company Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire and take over as a going concern and carry on the business of electrical and general engineers, now carried on by Charles William Isaac at 24, Frogmore-street, Bristol, under the style of "The Central Engineering Company," and to enter into an agreement with Chas. William Isaac; also to carry on the business of iron-founders, mechanical engineers, and manufacturers of agricultural implements and other machinery, toolmakers, brassfounders, metal workers, iron and steel converters and electrical engineers, &c., and to carry on any business relating to the winning of minerals. First director (permanent), Charles William Isaac, 24, Frogmore-street, Bristol. Qualification, £50. Registered office, 24, Frogmore-street, Bristol.

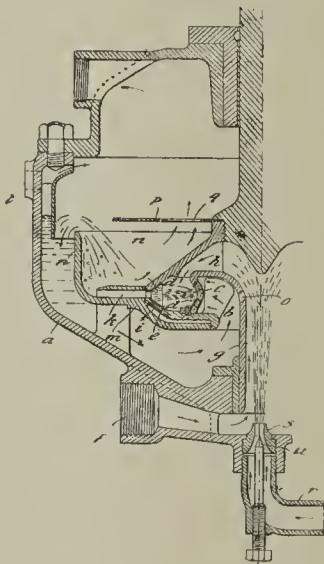
**Workington Iron and Steel Company Limited.**—The directors have declared a final dividend of 3½ per cent., making 6 per cent. for the year ended June 30, on the ordinary shares, and the usual dividend at the rate of 6 per cent. upon the preference shares.

**The Cowdenbeath Station.**—The miners' rescue station at Cowdenbeath, which has been brought into the public notice by the recent disaster at Cadder Colliery, was the outcome of a movement on the part of the Fife coalowners, and Mr. Charles Carlow, the managing director of the Fife Coal Company, was principally responsible for its inception. The building was opened in November 1910 by Mr. R. W. Wallace, chairman of the Fife and Clackmannan Coalowners' Association, at a cost of £2,000. Teams are drawn from all the collieries in the counties, and at present there are 60 teams, with five men in each fully trained, and five more are in course of receiving the able tuition of Mr. David Stevenson, who, along with his son, have charge of the station. Before a man is allowed to join a team he is required to undergo a searching medical examination, and a further scrutiny by a doctor is made every six months. Before the members are permitted to do much manual work the team are instructed how to handle their apparatus, which is of the Weg type, the invention of Dr. W. E. Garforth. They have to put in 13 practices before being regarded as efficient, and afterwards they make a periodical practice every three months. Twenty sets of apparatus are kept within the building, and one set always is hung in readiness on a special stand, so that in the event of a sudden call it can be slipped on in much the same way as the harness is dropped on to a fire brigade horse. Two pumps are kept for filling the cylinders. One of these is driven by electricity, and the other is for hand use when a call is made. In addition to the breathing apparatus, there are accommodated within the station half-a-dozen Draeger pulmoters. Recognising that the value of the station would be enhanced by the provision of speedy transit in cases of accident, the Coalowners' Association, who defray the whole cost of upkeep, purchased a motor wagon. This vehicle is of 32-horse power, and it can accommodate comfortably 10 men inside and two outside, besides affording space for the appurtenances which the men carry with them. In order to test the efficacy of the breathing appliance in the event of a wearer being trapped by a fall or other cause while at work, one man remained in the gallery for 6 hours and 10 minutes in the most highly-charged atmosphere. At the close of the test it was found that only one-third of his oxygen supply had been exhausted, although at the same time it was seen that the chemical for absorbing the carbonic acid gas from the air could not have stood out quite as long. The station is the only one in Scotland. Its services have only been called on three occasions, the last occasion being the rescue of a man which it has been asked to assist outside of the county, which it is primarily intended to be of use.

## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

16484 (1912). *Improved Composition for use with Explosives, for Neutralising Noxious Fumes therefrom after Explosion.* W. H. Mawdsley, of Lower Quarters, Mount Morgan, Queensland.—Consists in using a composition consisting of a mixture of alkaline hydroxide or hydroxides with one or more hydroxides of the alkaline earths. This material is inserted in the boreholes either as "tamping" in front of the primer and detonator, or between the cartridges, or at the bottom of the borehole. One convenient method of preparing a suitable mixture is to slake lime with a solution of an alkaline hydroxide, and to mix the product so obtained with a quantity of kieselguhr or diatomous earth or other inorganic absorbent material as ordinarily used. The composition may then be formed into cartridges. An oxidising agent such as permanganate or chlorate of potash, or of soda, may be incorporated in the composition for the purpose of oxidising the carbon monoxide to carbon dioxide. Common salt may also be added, preferably above the charge, for the purpose of absorbing excessive moisture, and also for the purpose of keeping down the dust. (Three claims.)

19025 (1912). *Improvements in Centrifugal Air Pumps, Compressors and the like.* E. S. G. Rees, the Rees Roturbo Manufacturing Company Limited, Wolverhampton, Staffordshire.—Relates to centrifugal air pumps or compressors in which the pump impeller is carried by a vertical shaft and is enclosed within a casing containing the entraining liquid, which is thus used over and over again for the purpose of producing the requisite vacuum and providing the extended liquid surface or spray, whereby air or other gas may be entrained in the liquid and delivered to a collector. The object is to dispense with auxiliary tanks for the purpose of separating the gas from the entraining fluid. The accompanying drawing is a half-vertical section of an apparatus embodying the invention. The tank *a*, within which the apparatus is enclosed, is in free communication with the eye *b* of a pump impeller *c*, the periphery of which is pierced with outlets or nozzles *d* arranged in converging pairs so that the streams of water issuing from each pair of nozzles will impinge and form a sheet of sprayed water which is directed across a space *e* which is in communication with the air or gas *f* through a hollow part of the pump shaft. Blades or vanes *h* may be fitted within the hollow shaft or duct *g* at the end thereof contiguous to the chamber *e* for the purpose of promoting the flow of gas into the said chamber. The pump impeller is surmounted by a hood *i* fitted with rim blades *j* in the known manner, which act as extractors of the mixed gas and liquid and deliver it to a



series of expanding ducts or an annular duct *k* formed within the fixed casing *m* surrounding the impeller. The outlet end of such duct or ducts has in front of it a vertical wall or baffle *n* of suitable height encircling the outlets of the expanding ducts *k*. With such an arrangement it is found that the entraining liquid clings to the inner surface of the baffle, flowing over the top of the same into the still water part of the tank *a*, the air being separated out by centrifugal force owing to the difference in density between it and the entraining liquid and being collected in an air chamber situated above the level of water in the tank and connecting with a delivery pipe. When the pump impeller has, as shown in the drawing, a pressure chamber of the character described in Specification of Letters Patent No. 4810 of 1906, it is found that any air in the water entering the impeller is liable to be separated within the impeller and to obstruct the free flow of the liquid through the eye of the same. To obviate this, passages *o* are formed connecting the eye of the impeller and the passage or passages *g* through which the air or gas to be entrained is drawn. In addition to the vertical fixed baffle *n* there may be provided a rotating baffle plate *p* which more or less encloses the discharge opening of the cup-shaped space formed by the vertical baffle, the object of this rotating baffle being to promote the vortex motion within this space and to deflect any spray or the like so that it will follow the path of the bulk of the entraining liquid up the face of the baffle and over the edge of the same into the still water space of the casing *a*. This rotating baffle plate is preferably provided with openings *q* towards its axis of rotation for

the passage of air into the collector or air space above. Should an air pump be used, as the air pump for a surface condenser, in which case the entraining water would soon get very hot with constant circulation, the vacuum space *g, e* may be connected by means of a pipe *r* and suitable nozzles with a supply of cold water or with the suction pipe of the main circulating pump so as to allow a small quantity of cold water to be continuously or intermittently introduced into the impeller, an over-flow *t* being provided in the tank casing so that a constant quantity of water may be maintained. This auxiliary water jet or nozzle can also be used for increasing the capacity of the air pump, and its action can be regulated by means of a suitable regulable stop cock or throttle device such as *u*, according as the air pump is required to suck more or less air depending on the load on the condenser. (Six claims.)

19381 (1912). *Improvements in Explosives.* O. Silberrad, Silberrad Research Laboratories, Buckhurst Hill, Essex.—Consists in the production of explosives from the nitro compounds of the methyl derivatives of naphthalene, as, for example, the nitro or dinitro derivatives of the methyl or dimethyl derivatives of naphthalene, or artificially produced mixtures of these with other nitro compounds. The following examples illustrate modifications of the invention:—

	Parts.
Nitro methyl naphthalene or the like either alone or admixed with other nitro compounds	20—25
Oxygen bearing salts	50—60
Soluble nitro-cellulose or collodion cotton	0—5
Wood meal	0—5

Relatively highly nitrated derivatives of methylated naphthalene or the like either alone or admixed with other nitrohydrocarbons	20—30
Oxygen bearing salts	50—60
Guncotton and or wood meal	0—10

### (a) IMPROVED GELIGNITE.

Nitro methyl naphthalene either alone or admixed with other nitro compounds	20—25
Potassium perchlorate	50—60
Nitroglycerine	15—25
Soluble cotton	0·5—4
Wood meal	0—10

### (b) IMPROVED BLASTING JELLY.

Nitro and or dinitro methyl and or dimethyl naphthalene either alone or admixed with other nitro compounds	5—10
Nitroglycerine	75—90
Soluble nitro-cellulose	8—12

### (c) IMPROVED CORDITE.

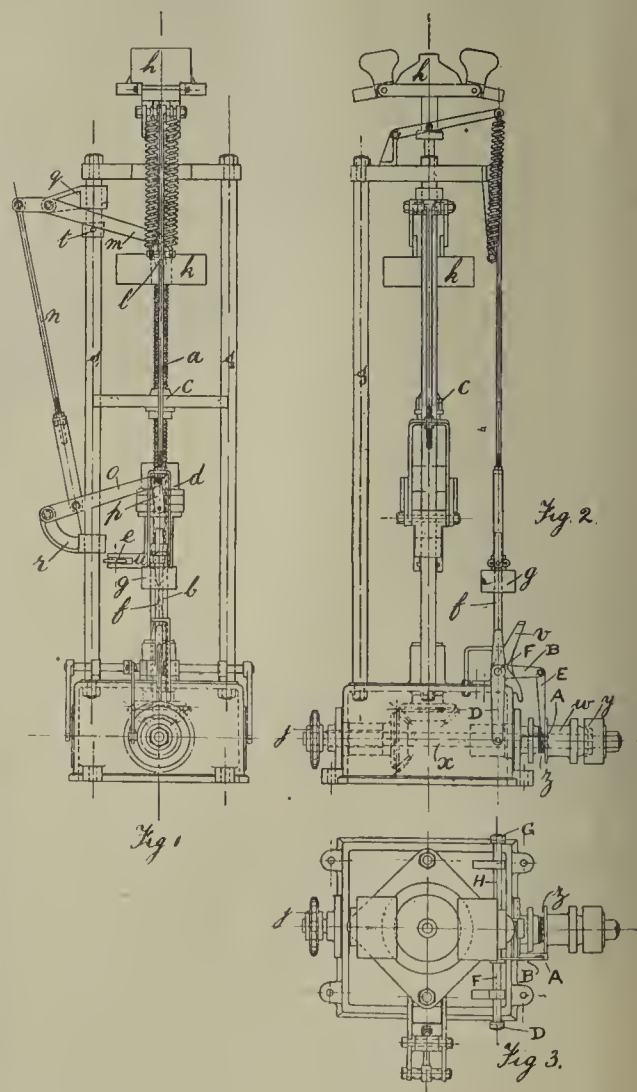
Cordite MK 1	50—95
Nitro and or dinitro methyl and or dimethyl naphthalene either alone or admixed with other nitro compounds	50—5

### IMPROVED DETONATING COMPOUND.

Tri nitro methyl naphthalene	5—10
Fulminate of mercury	95—90

(Six claims.)

22679 (1912). *Improvements in or relating to Apparatus for Preventing Overspeeding and Overwinding in Colliery Winding Engines and the like.* H. J. Moysey, of Guildford,

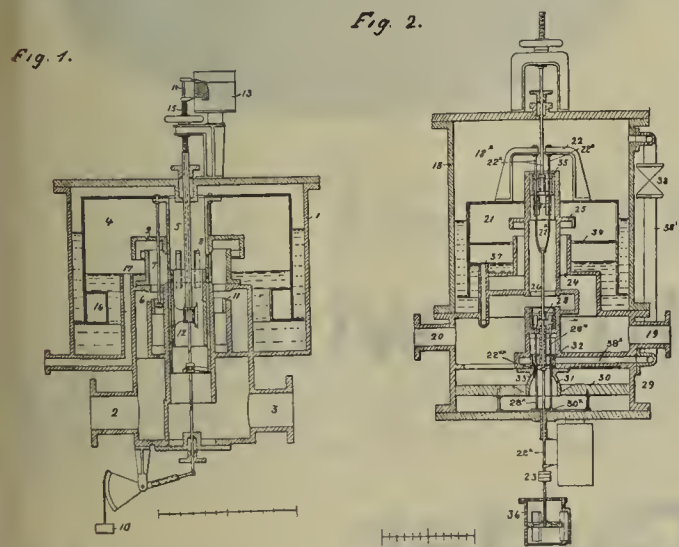


Kellfield-avenue, Low Fell, Gateshead, Durham.—The object is to provide a depth indicator of the ordinary vertical screw type with a reliable and sensitive attachment for preventing overspeeding and overwinding. In the accompanying drawings, fig. 1 is a front elevation of the apparatus; fig. 2 is a side elevation of the apparatus shown in fig. 1; and



fig. 3 is a plan of the apparatus shown in figs. 1 and 2. The sleeve *d* rotates with the screw shaft *a*, and the tripping roller *e* carried on an arm *u* on sleeve *d* has a high velocity relatively to that of the nut *c* on the screw, so that when once the tripping roller *e* engages with the roller *g* on the tripping lever *f* a quick trip is obtained with a small movement of the cage in the pit shaft. When the winding engine is at rest with the cages at the landing levels the relative positions of the tripping roller *e* on the sleeve *d* and the roller *g* on the tripping lever *f* are such that a small angular movement of the screw shaft *a* in the direction to overwind will engage them, while if the screw shaft *a* rotates in the reverse direction the tripping roller *e* on the sleeve *d* will pass over the roller *g* on the tripping lever *f* as a result of the sleeve *d* having followed the nut *c* up the screw *a*. During normal starting the speeding up of the winding drum and centrifugal governor *h* raises the roller *g* on the tripping lever *f* at such a rate as to follow the rising of the sleeve *d* with the tripping roller *e*, but not overtake it; and at full speed the governor *h* will hold the roller *g* just below the level at which the tripping roller *e* is revolving. If, therefore, the full speed is exceeded, the roller *g* will be further raised and engage with *e*, so that tripping will take place. If on starting a wind the speed rises too rapidly, the roller *g* on tripping lever *f* will be raised by the governor *h* faster than the sleeve *d* rises on screw *a*, and the rollers *g* and *e* will engage and tripping take place. Further, when the nut *c* approaches the landing level position and pushes down the sleeve, the two rollers *g* and *e* will engage and trip unless the speed has been reduced. Levers *f*, *B* and *D* are all fixed to shaft *F*, so that the operation of the tripping lever *f* moves *B* and *E* down so as to release drum *w* from catch *A*, so that the drum rotates with the driving shaft *x*. The rotation of this drum by winding up a rope or chain gradually applies the brakes to the winding engine, and when desirable can be made to operate the reversing lever. At the same time lever *D* trips the stop valve or main switch so as to cut off the supply of power to the engine. Tripping lever *v* is connected to lever *G* through shaft *H*, and is only operated when roller *g* is tripped in its lowest position on lever *f*—that is to say, when the engine is running slowly and the cage has passed the landing level. Lever *G* is arranged to trip the stop valve or main switch and apply the brakes at full emergency force as soon as operated. (Two claims.)

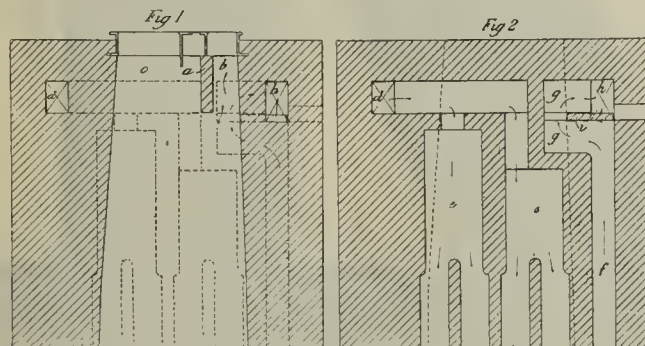
23656 (1912). *Improvements in Apparatus for Measuring Gases, Vapours and Liquids.* Firm H. Liese, Peutestrasse, Hamburg 28, Germany.—Relates to improvements in apparatus for which a patent was granted numbered 27467 of 1911. The object of one part is to provide means whereby the inlet or outlet valve of a meter adjusted to deliver up to a certain maximum quantity is throttled when the expansion chamber moves beyond a certain point; and the object of another part is to provide means whereby sure or certain measurement is secured in cases where, under definite circumstances, higher demands are made on the measuring apparatus than the maximum it is adapted to measure. Fig. 1 shows a measuring apparatus adjusted to pass not more than a certain maximum quantity; fig. 2 shows a measuring apparatus consisting of an upper and a lower meter, so constructed and adapted that each meter can put itself out of action and the other into action under certain circumstances to be hereinafter explained. In the figure the upper meter is supposed to be in action and the lower meter out of action. In fig. 1, when the quantity



passing reaches the maximum permissible, the bell 4 will have been raised by the increased pressure to such a point that the valve 11, which is raised with it, will throttle the passage 6 so as to prevent more than the said maximum to pass through the meter. The recording is effected on the drum 13, and the rod 14 indicates the position of the bell 4 and slide-valve port 8, and the tube 15 the position of the sleeve-valve 12. The record shows an abstraction of steam from a receiver between the high- and low-pressure cylinders of a steam engine, wherein the shaded part between the highest position and the level of the valve 12 indicates the quantity of steam. With saturated steam the condensation water serves as a seal for the bell, and the surplus overflows by pipe 17. In the arrangement shown in fig. 2, the increase of pressure in the bell due to the excess of

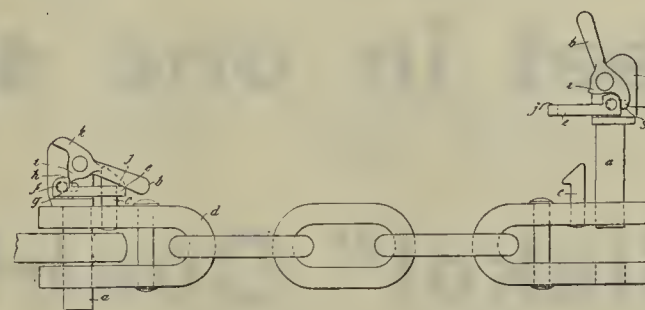
quantity causes the bell to rise, raising with it the valve 32, allowing the substance to pass from space 18\* through valve 38, by-pass pipe 38\* and pipe or passage 33 into space below the piston 30, raising the latter and assisting to raise the valve 28, thereby shutting off the upper meter and bringing the lower one into action, opening communication through the space between the piston 30 and the measuring cone 31 to the outlet 20. When the quantity passing through the lower meter has fallen to or below the maximum quantity for which the upper meter is adjusted, the lower meter is automatically put out of action and the upper meter brought again into action. If the substance being measured exceeds the quantity fixed by the measuring ports 27 and the sleeve-valve 35, it is throttled by the flange 34 and the baffle-plate 25, the annular space between 34 and 25 being of suitably limited area. The flange 34 allows the bell 21 to move up, taking with it the sleeve-valve 32, which in its turn takes with it the sleeve-valve 28, whereby the outlet from the bell 21 is put out of action, and the lower measuring apparatus put into action. When it is desired to use a measuring apparatus of the kind above described for regulating the speed of a steam engine, the throttling flange 34 is employed in connection with the baffle-plate 25, so that when the normal condition of working prevails the passage between 34 and 25 is free, and when the number of revolutions exceeds the normal, the throttling flange 34 is raised by the bell and throttles more or less the passage between itself and the baffle-plate 25. The inlet to the lower meter can be regulated by the valve 38, and if desired the two meters may be entirely separated from one another by the same means. (Three claims.)

25342 (1912). *Improvements in Vertical Retorts for the Continuous Carbonisation of Coal.* A. M. Duckham, of Waseda, Highfield, Ashted, Surrey.—Has reference to improvements in vertical retorts for the continuous carbonisation of coal. In such retorts there has been provided a division in the upper portion where the coal enters, so that the gas evolved as it leaves the retort is separated from the incoming coal. This division in the retort forms a free space which is usually heated so that the liquid hydrocarbons are to a certain extent cracked into gases.



According to the invention, means are provided by which the temperature of the walls enclosing this free space can be regulated so as to have the requisite heat action on the gases as they leave the retort, and this regulation it is desirable to accomplish without affecting the heating of the incoming coal or the remaining portions of the retorts—that is to say, without disturbing the heating of the rest of the retort. Fig. 1 is a vertical section through the upper part of the retort and fig. 2 is a like section through the heating flues. (Two claims.)

23363 (1912). *Improvements in and relating to Couplings for Colliery Trams and for other purposes.* D. Hughes, Mill Forge, Nantgarw, Taffs Well, Glamorganshire.—Relates more especially to shackles of the kind commonly referred to as being of the D type in which a pin is adapted to be inserted through eyes in the open-spaced ends of the shackle and through an eye-piece on the end of the drawbar plate, and in which means are provided for locking the coupling device. The accompanying drawing shows a side elevation of a two-part coupling, on the right-hand side of



which the pin is unlocked and partly drawn out. The usual ring which is passed through the upper end or head of the pin *a* is replaced by a pivotally mounted handle *b* which is so weighted or arranged that it will normally fall down on to one side to automatically control the locking means. These locking means comprise a hook or latch pin *c* on the top side of the shackle *d*, which is adapted to be engaged by a sliding catch-piece *e* on the shackle-pin *a*. The aforesaid catch-piece *e* is of U-shaped form, and it is guided so as to move transversely of the shackle pin by means of a bolt *f*, which engages the ends of the catch and works in a slot *g* formed in the top end of the said pin *a*. Upstanding projections or teeth *h* are formed one on each free end of the U-shaped catch *e*, and these teeth *h* are

engaged by a pair of projections *i* on each side of the handle *b* so that normally when the handle is turned down the catch-piece *e* is held or drawn along the slot *g* in the shackle-pin *a*, with its end *j* engaged under the fixed hook or latch-pin *c* on the shackle *d*. Thus when it is desired to disengage the coupling by withdrawing the pin *a*, the handle is lifted up and a nose *k* on the said handle serves to push out the catch-piece *e* free of the latch-pin *c*, and thereby leaves the shackle-pin *a* free to be lifted out. The engagement of coupling is effected by simply holding the shackle-pin by the handle, dropping it in place and releasing the handle, when the pin will be automatically and securely locked in place. (Four claims.)

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

- 17816. Mine signalling apparatus. R. Nicholas.
- 17819. Method and apparatus for quenching, screening and loading coke which has been discharged from coke ovens or retorts. C. J. Sadler.
- 17831. Appliances to vehicles and machinery wheels and the like for the prevention of accidents. F. P. Whitehead.
- 17838. Methods for converting higher boiling petroleum hydrocarbons into lower boiling petroleum hydrocarbons. G. W. Gray.
- 17839. Method for converting higher boiling petroleum hydrocarbons into lower boiling petroleum hydrocarbons. G. W. Gray.
- 17856. Pneumatic depth indicators. H. S. Parks.
- 17869. Method of treating steel and iron in the manufacture thereof. C. R. Gostling.
- 17877. Treating illuminating and heating gases for purifying them and obtaining useful products therefrom. Athion G. m. b. H.
- 17885. Adjustable mine props. C. Treinnee.
- 17887. Coke furnaces. J. Lütz.
- 17900. Hose for hydraulic or pneumatic machines or the like. J. Muskett.
- 17915. Furnace. T. H. Storer.
- 17927. Optical pyrometers. Siemens Brothers and Co. Limited. (Siemens und Halske Akt.-Ges., Germany).
- 17936. Car trucks. H. H. Hewitt.
- 17939. Automatically controlling the speed of rolling mills and other metal-working devices. W. R. Clark.
- 17940. Car trucks. H. H. Hewitt.
- 17944. Utilisation of peat. T. Rigny and Wetcarbonising Limited.
- 17955. Furnaces of the kind known as pushing furnaces or continuous ingot-heating furnaces. F. K. Siemens.
- 17956. Regenerative gas furnaces. F. K. Siemens.
- 17959. Interlocking sheet piling. G. G. Sinclair.
- 17961. Superheating. M. Churchill-Shann.
- 17970. Rotary engines, pumps, blowers and the like. J. V. Coonan.
- 18006. Turbines. Hermann Föttinger.
- 18014. Construction of furnaces and cupolas. J. Moeller.
- 18022. Centrifugal pump provided with a ring of guide buckets. Allgemeine Elektrizitäts Ges.
- 18025. Valves for controlling and regulating gas furnaces. W. J. Brown, W. Davies, W. W. Richards, and W. H. Tucker.
- 18031. Feed apparatus for bucket conveyors or transporters. See. Burton fils.
- 18046. Method of and means for weaving wire cloth. A. Boyd.
- 18072. Electric furnaces. W. N. Grafts.
- 18073. Electric shaft furnaces. W. N. Grafts.
- 18099. Apparatus for measuring the inclination of boreholes and making a photographic record thereof. H. M. Switt.
- 18114. Means for supplying actuating fluid to the cylinders of haulage machines and the like. H. Wood and C. C. Wood.
- 18116. Making or refining steel. E. Humbert.
- 18166. Means for detecting inflammable gases, especially adapted for use in mines. J. W. Manley and W. J. L. Sandy.
- 18167. Casting moulds. E. Hock and Patent Austellungs- und Verwertung G. m. b. H.
- 18177. Safety catches for mine skips and cages, hoists, and the like. J. D. Wilson and M. S. Aaron.
- 18182. Means for fastening boring bits or drills to their heads. A. Klein.

### Complete Specifications Accepted.

To be published on August 28, 1913.

1912.

- 10564. Furnaces for roasting, smelting, or otherwise treating ores. Buchholtz.
- 15778. Mechanical furnaces for roasting or roasting and drying ores and the like materials. Spinzig and Hommel.
- 17712. Machines for conveying steel and iron plates. Jones.
- 17856. Method of obtaining hewn stones in quarries. Barthold.
- 17935. Reduction of ores. Sutcliffe.
- 17946. Apparatus for washing or purifying and cooling air and gases. Cole.
- 17970. Apparatus for supplying a mixture of gas and air or the like. Guy.
- 18006. Tubulous hoilers. Taboulewitsch.
- 18179. Apparatus for promoting circulation in steam boilers. Circulators Limited, Ross, and Schofield.
- 18314. Pumps. Watson and Billetp.
- 18395. Means for burning hydrocarbons. Foni.
- 18443. Percussive rock-drilling tools. Chalkley.
- 18611. Disintegrating machines. Caldognetto.
- 18614. "Riders" for steadying "bowks" or "kibbles" in pit-shafts. Davies and Barker.
- 19606. Furnaces of the channel or tunnel type. Cowles.
- 19783. Pneumatic elevators and conveyors for granulated or pulverised materials. Van Berendonck.

(Continued on page 346.)



# **THE RECORD**

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**square feet in one shift with  
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**INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.**



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Is any further proof needed as to which is the best Coal Cutter?

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INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.



19832. Manufacture of driving belts, conveyor belts, and the like. Rigby.  
 20279. Power-operated shears, forging presses, and the like. Davy Brothers Limited and Holmes.  
 20560. Apparatus for winding conducting wires for electric blasting fuses into skeins. Lake (Fabrik Elek-trischer Zunder Ges.).  
 21668. Weight-recording devices for weighing-machines. Denison.  
 22484. Machines for coiling or twisting wire for the produc-tion of rope strands and such like. Harding and Harding.  
 22830. Reciprocating pumps. Martin.  
 23128. Elevators or conveyors for coal and other materials. Fine Cotton Spinners' and Doublers' Association Limited and Baron.  
 23379. Valves particularly adapted for use with tanks for compressed gases or air. Oie.  
 23581. Slitting-machines for use in the manufacture of expanded metal. White.  
 25259. Manufacture of pure ammonia. Johnson (Badische Anilin and Soda Fabrik).  
 25627. Processes and apparatus for the production of mixtures of heated gas or vapour and products of combustion. McCourt and Ellis.  
 25721. Engine valves and reversing mechanisms. Allan.  
 26014. Trip-gear for operating the admission valves of steam engines. Newton, Bean and Mitchell (firm of), Becker, and Eastwood.  
 26520. Method of promoting combustion. Morgan.  
 27388. Fluid-compressing devices. Turner.  
 27499. Furnace grates. Hill.  
 27851. Method or process for producing non-conducting coverings for boilers, steam pipes, and other surfaces. Cuthbertson.  
 28075. Method of and means for manufacturing weldless couplings. Gross and Gross.  
 28413. Rotary pumps. Mathys (Del Mar).  
 28847. Air-heater for heating the blast air for blast-furnaces and other purposes. Pregardien.  
 29235. Mechanical roasting furnaces. Helsingborgs Koppar-verks Aktiebolag.

1913.

894. Cleaning of furnace gases. R. Bocking et Cie., E. Stumm-Halberg, and R. Bocking Ges.  
 3391. Derricks or portable hoists. McLendon.  
 3376. Apparatus for purifying gases. Forder.  
 5024. Surveying instruments such as those known as clinometers, levels, and the like. Bentley and Foote.  
 5034. Regenerators for heating air or gases. Gobbe.  
 5365. Pyrophorous ignition apparatus. Schlick.  
 6167. Feeding devices for roasting furnaces. Stout.  
 6816. Air and like fluid-compressors and exhausters. Reader.  
 7231. Steam ejectors. Soc. Anon. pour l'Exploitation des Procédés Westinghouse Leblanc.  
 7890. Conveyors. Flottmann.  
 9324. Grabs. J. Pohlig Akt.-Ges. and Volkenborn.  
 11927. Centrifugal separators. Robertson.  
 13334. Hoisting and transporting apparatus. Welinder.  
 14470. Device for simultaneously cutting and closing hollow bricks. Johannesmann.  
 15019. Pyrometers, gas analysis apparatus, and the like. Arndt.

#### Complete Specifications open to Public Inspection before Acceptance.

1913.

3465. Apparatus for the purification and distillation of benzol. Gasser.  
 16746. Means for converting automobile vehicles into ambulance wagons. Lemaistre.  
 16846. Generation of heat. Dresser.  
 17197. Balancing means for steam or gas turbines. Aktiebolaget Ljungströms Angturbin.  
 17201. Labyrinth packing for gas or steam turbines. Aktiebolaget Ljungströms Angturbin.  
 17335. Steam or gas turbines or engines. Aktiebolaget Ljungströms Angturbin.  
 17519. Manufacture of briquettes. Fohr and another.  
 17611. Feeding and distribution of charges in vertical distillation retorts. Aarts.  
 17612. Method of and apparatus for discharging carbonised products obtained in vertical retorts. Aarts.  
 17661. Method of and apparatus for the distillation of bituminous matters. Aarts.

**Grimsby Coal Exports.**—The official returns of the exports of coal from Grimsby during the week ended August 7 show a total shipment of 28,700 tons foreign and 1,196 coastal, as compared with 29,676 tons foreign and 3,286 coastal during the corresponding week last year. The ship-ments were:—Foreign: To Aarhus, 875 tons; Antwerp, 543; Bermuda, 183; Cronstadt, 4,720; Esbjerg, 494; Fredrikshald, 1,217; Dieppe, 1,393; Gothenburg, 1,198; Hamburg, 963; Kiel, 1,364; Malmo, 4,162; Norrköping, 1,780; Nykjöbing, 2,063; Port Kunda, 1,719; Riga, 1,516; Rotterdam, 399; Videy, 468; and Ystad, 3,573. Coastal: To London, 96; and Yarmouth, 1,100 tons.

#### CATALOGUES AND PRICE LISTS RECEIVED.

The Chicago Pneumatic Tool Company have issued a new bulletin dealing with pneumatic drills, reamers, wood borers, flue rolling and tapping machines and grinders.

The Draeger Bulletin for June illustrates a new fire-men's helmet for use with a one-hour breathing apparatus. Features are an extra long neck-leather, a new ear-protector, as well as the substitution of leather for rubber in certain vulnerable parts. There is also a photograph of a mine rescue trolley. (See C.G., August 1, 1913, p. 219.)

Messrs. W. T. Glover and Co. Limited, of Trafford Park, Manchester, have favoured us with one of their useful almanacs. The almanac, which dates from July 1, 1913, contains on each day of the calendar some notable extract from the technical publications, a photograph of an installation or, it may be, an example of that humour for which the electrical industry are renowned. It is the enterprising production of an enterprising firm.

Messrs. Edward Bennis, of Little Hulton, near Bolton, have issued a pamphlet entitled "Cheap Steam and Machine-firing." Shaded drawings show some of the leading types of boilers to which the Bennis stokers and furnaces are applicable, including Lancashire, Cornish and Yarrow water tube, Nesdrum water tube, Babcock and Wilcox boilers, &c. An illustration shows a long range of stokers fed by a U-link chain conveyor, in operation at a South Wales Colliery. Particulars of two interesting tests at a Lancashire cotton mill and a railway power-house testify to the practical benefits to be derived from mechanical stoking. In one case the fuel cost showed a reduction of 15·8 per cent.

The Cumberland Syndicate, of 44, Charing Cross, London, S.W., send us particulars of the Cumberland electrical process for treating boilers and condenser tubes, with a view to the prevention of corrosion, pitting and scale, which has been extensively used in Australia. In carrying out the process, iron anodes are immersed in the water contained in the vessel to be protected, and a measured amount of electricity supplied to each. Each anode is controlled by a separate resistance coil, and is connected by wire to the positive pole of the source of electric supply, its affinity for acid and oxygen being increased or diminished according to the amount of current supplied. The vessel is connected to the negative pole, and its affinity for hydrogen is controlled in accordance with the amount of current supplied. The action of the current is to attract the destructive oxygen and acids contained in the water to the anodes, and the protective hydrogen to the vessel.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—J. Sauer and H. Waterhouse, carrying on business as engineers, under the style of the British Flexible Shaft Company, at The Saltisford, Warwick (and formerly at Loveday-street, Birmingham); W. R. Ormanby and J. W. Spensley, carrying on business as consulting chemists and engineers, at Barton-arcade, Manchester, under the style of Ormandy, Spensley and Co.; C. Bransom, T. Williams, W. J. Lawton, T. Bunnagar, J. Branson, and J. Branson, carrying on business as colliery proprietors, at Odd Rode, in the county of Chester, under the style of The Bank Colliery Company.

**Wigan and District Mining and Technical College.**—The fifty-seventh session of this useful institution opens on September 8, and the calendar which has been issued shows that there will be no curtailment of the facilities afforded for a thorough education in mining and allied subjects. The new head of the department of mining and geology is Mr. George Hunter, who is assisted by Messrs. John Roberts and R. M. Evans (lecturers), and W. Molyneux, J. G. Garrett, G. S. James and J. Laithwaite (demonstrators), Messrs. J. E. Christopher and Francis Percy are lecturers on coke, iron and steel manufacture. In the day mining department there is a three years' diploma course on the "sandwich" system, the students spending about four months in the summer below ground. About three weeks in every summer will be devoted to visiting and making a thorough inspection of the mines in some British or foreign mineral district. A scheme for giving part-time day instruction in mining and surveying makes provision for a five years' training, based upon an attendance at the college for one day and one evening per week during each session. There is also a complete system of evening classes for apprentices and others engaged in the neighbouring collieries and works, some of which are within a few minutes' walk of the college. There are besides special Saturday mining classes, and firemen's examinations are held from time to time.

#### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

Reports re Compensation for Industrial Diseases, 2d.  
 Compensation for Industrial Diseases Evidence, 1s. 9d.  
 Bills, 1913: Bankruptcy, 4d.; Bankruptcy (Scotland) Consolidation, 1s. 0½d.; Bankruptcy Bill Amendments, 1s. 0½d.; Misdescription of Fabrics, 1½d.; Labour Minimum Con-tions, 2½d.; Quarries and Slate Mines, 1d.; Industrial a Provident Societies, 2d.; Ditto, Amendment, 1d.; Nation Insurance Act Amendment, 4d.; Companies' Annu Returns, 1d.; Public Health: Prevention and Treatment Disease Amendment.

Trade Unions: Membership and Expenditure Return, Chamber of London Account, 1912-13, 2d.  
 Misdescription of Fabrics Bill, Report, 1d.  
 Factory Form 667, Register of Overtime, 8d.  
 Trade and Navigation Returns for July, 1s. 10d.  
 United Kingdom: Trade, Commerce and Condition People, Return, 1d.

EXPLOSIVES: REPORT FOR 1912, 2d.  
 Unemployment Insurance: First Report, 11½d.  
 Gas Authorities Residual Products: Index, 4d.  
 East India: Statement Exhibiting the Moral and Mater Progress and Condition of India, 1911-12, and the Preceding Years, 5s.

Consular Trade Reports, &c.: Russia, Trade of Mosco 1912, 6d.; France, Trade of Marseilles for 1912, 3½d.; Brazil, Trade of Pernambuco, 1912, 5d.; Portugal, Trade Chinde, 1912, 3½d.

Imports: Australia and New Zealand Return, 1d.

#### PUBLICATIONS RECEIVED.

ACTION OF THE SALTS IN ALKALI WATER ON CEMENT (U.S. Department of Commerce, U.S.A. Technolo Papers of the Bureau of Standards, No. 12). By P. Bates, A. J. Phillips and R. J. Wig. 1913. Washingto Government Printing Office.

REPORT OF THE MINE INSPECTOR FOR THE TERRITORY ALASKA TO THE SECRETARY OF THE INTERIOR FOR Y ENDED JUNE 30, 1912. 1913. Washington: Governm Printing Office.

APPARATUS FOR GAS-ANALYSIS LABORATORIES AT COALMI (U.S. Bureau of Mines, Technical Paper 14). By Geo Burrell and F. M. Seibert. Washington: Governm Printing Office.

"Mathieson's Half-yearly Highest and Lowest Prices, J 1913 Issue," price 2s. 6d.; "Province of Quebec, Cana Department of Colonisation, Mines and Fisheries, Mi Branch, 'Extract from Reports on the District of Ungu recently added to the Province of Quebec under the na of the Territory of New Quebec'; "Annales des Min (Tome 4, No. 7); "Bulletin Mensuel de la Soc Industrielle du Nord de la France" (No. 194), Ju "Bulletin of the American Institute of Mining Engine (No. 79), July; "Cassier's Magazine" (Vol. 44, No. August, price 1s.; "Le Mois Scientifique et Industri (No. 167), July, price 2 fr.; "The Journal of the Chemi Metallurgical and Mining Society of South Africa (Vol. No. 12), June, price 3s.; "Bulletin et Comptes Ren Mensuels de la Société de l'Industrie Minérale (Tome No. 7), July; "Bulletin de la Société Belge de Géolo de Paléontologie et d'Hydrologie, Procès-Verbal (Tome Nos. 1-10); "Ministère de l'Industrie et du Trav Administration des Mines, Service des Accidents Min et du Grisou 'Le Bourrage Extérieur en Poussi Incombustibles,' par Victor Watteyne et\*Emmar Lemaire; "The Engineering Magazine" (Vol. 45, No. August, price 25 cents; "Records of the Geolog Survey of India" (Vol. 43, Part 1).

A pony driver, Willie Kitchen, of Bolton-on-Dea was at Doncaster on Saturday prosecuted for obtain money from the Hickleton Main Colliery Company by me of a false birth certificate. Mr. J. Baddiley, for the coll company, said the boy had been employed at the coll since February, and, in the first instance, he gave his ag 15. Mr. Mannikin, the manager, who signed the certifi under the Factory and Workshops Act, subsequently fo that instead of having been born on May 22, 1897, represented, he was born on May 22, 1898, and that he 15 and not 16 years of age. Defendant was bound ove 40s. for six months.



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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY, AUGUST 22, 1913.

No. 2747.

## APPARATUS FOR GAS-ANALYSIS LABORATORIES AT COALMINES \*

By GEORGE A. BURRELL and FRANK M. SEIBERT.

In the course of its investigations relating to mine fires and explosions, the Bureau of Mines has been carefully studying the composition of mine atmospheres and the most efficient methods of detecting those mine gases that are dangerous. Some results of that study are presented in this paper, which is published as one of a series of reports dealing with problems of mine ventilation.

In a Bureau of Mines bulletin now in course of publication are described in detail different methods and types of apparatus used by the Bureau for the chemical examination of gases. In the present paper are descriptions of those types of apparatus that are believed to be most suitable for the determination of the more common gases in coalmines, where the work usually must be performed rapidly, because as a rule there is not time for the longer methods of analysis.

### Collection of Samples.

When samples are to be examined for their carbon dioxide content they should be collected by the method of air displacement. This can be conveniently performed by attaching a small rubber pump to the sample container, and forcing mine air into the container until the air that was previously in it is entirely displaced. In another method of sampling one end of a rubber tube is attached to the glass pipette, and the other end is held in the mouth of the operator. Eight or 10 deep inhalations through the tube will completely displace the air from the pipette. Care must be exercised that the breath is exhaled away from the container, because exhaled air contains about 4 per cent. of carbon dioxide. Instead of the glass pipettes with pinchcock attachments, copper or brass pipettes may be used as containers. They have one disadvantage—namely, that oxygen combines with the metal to a small extent. Bottles with rubber stoppers secured by catches, such as are used by druggists for magnesium citrate solution, also make good gas containers. The top of a bottle should be covered with paraffin wax immediately after a sample is taken.

The maximum volume of sample required for the analysis, using any of the apparatus shown in this report, is 50 cubic centimetres. The use of larger containers for collecting the samples is advised so that enough of the gas will be available for several analyses. The use of small containers is advantageous when samples are to be carried from place to place.

When samples are to be examined for methane only, they can be collected by filling the pipettes with clean water and emptying each in turn at the particular place where a sample is to be collected.

When an air current is sampled, it is the practice of the Bureau of Mines to take velocity, temperature, and hygrometer readings at the same place immediately before or after the collection of the sample. The collector records also other pertinent data.

### Sampling Gases to Verify Safety Lamp Indications.

In using gas analysis apparatus to verify safety lamp indications, the manner of collecting the sample is of much importance. Immediately after or before the "cap" on the safety lamp is recorded, the sample container should be held close to where the air intake of the lamp was and the sample collected. The best method is for one person to take the sample while another judges the flame. The best method of collecting a sample of a pocket of methane and air is to use sample tubes from which air has been exhausted. Such a pipette can be exhausted at the laboratory by sealing one end of it with a blast flame and attaching the other end to a vacuum pump. A mercury gauge should be connected between the pump and pipette so as to show the degree of exhaustion of the pipette. After the air has been entirely removed from the pipette, the glass tube leading to the pump can be

melted off with a blast flame, thereby sealing the pipette tight. A scratch should be made on one of the tubes with a file. At the place where the sample is to be collected the scratched tube is easily broken at the file mark. It should then be sealed with a little soft wax. The Bureau of Mines uses a wax made by mixing two parts of beeswax and one part of Venice turpentine.

The next best method of collecting a sample for checking safety lamp indications is simply to fill a bottle or tube with water and then to empty it at the place where the sample is to be collected. It should be emptied at the point where the air intake of the lamp was when the flame was observed.

### Apparatus for Exact Determination of Methane and Carbon Dioxide.

The apparatus shown in fig. 1 is a modified form of the apparatus devised by Haldane, but simplified for the determination of carbon dioxide and methane only. The burette has a capacity of 21 cubic centimetres, and consists of the ungraduated bulb at the top, which has a capacity of 15 cubic centimetres, and the stem, which has a capacity of 6 cubic centimetres. The stem is graduated in hundredths of a cubic centimetre. To the bottom of the stem the levelling bulb *i* is attached by rubber tubing. Mercury is used as the levelling fluid.

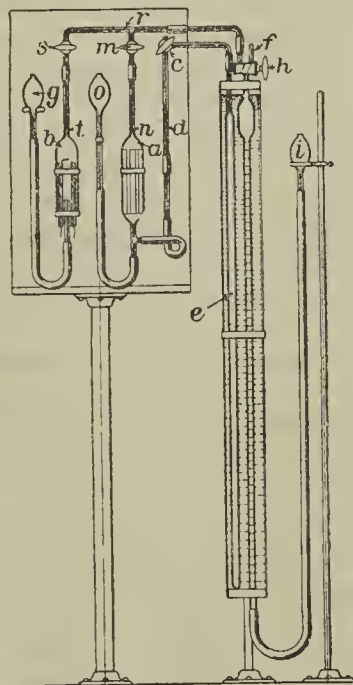


FIG. 1.—LABORATORY FORM OF APPARATUS FOR THE EXACT DETERMINATION OF CARBON DIOXIDE AND METHANE.

The burette can be read to 0.002 cubic centimetre, and duplicate analyses of the same sample should agree within 0.01 per cent. At *a* is the potassium hydroxide pipette for absorbing carbon dioxide, and at *b* the slow-combustion pipette for burning the methane. The potassium hydroxide solution in *a* and the mercury in *b* are of such amount that the liquids in reservoir bulbs *o* and *g* are on a line with the liquids in the corresponding pipettes. The stopcock *c* is first turned so that communication is made between the compensating tube *e* and the outside air at *c*, thereby equalising the pressure in the tube *e* with that of the atmosphere. Stopcock *c* is then turned so that communication is made between *e* and the column of potassium hydroxide solution in *d*. The levelling bulb *i* is raised enough to run the mercury up the burette to the stopcock *h*, thereby expelling all air from the burette. The sample container is connected to *f* by means of glass and rubber tubing. The unconnected end of the container, if a pipette, is placed in a vessel of mercury. If the container is a flask or bottle, it is inverted in the vessel of mercury. In the case of a pipette, the pinchcocks on the tubing are opened, making a clear passage from the pipette to the burette. Then, by lowering the levelling bulb *i* the mercury in the burette is brought to the 20 or the 21 cubic centimetres mark, thereby drawing some of the sample into the burette. The stopcock *h* is closed and the mercury reservoir *i* raised a little to bring the

gas in the burette under slight pressure. The sample tube is then detached from the burette at *f*, and the stopcock *h* is opened to the air for a second to bring the gas in the burette to atmospheric pressure. The stopcocks *h* and *m* are then opened so that, through *r*, communication is made between the burette and the column of potassium hydroxide solution in *n*. By slightly raising or lowering the levelling bulb *o* the potassium-hydroxide solution is brought exactly to the mark *d*. The levelling bulb *i* is then raised or lowered until the other column of potassium hydroxide solution is brought exactly to the mark *n*. The burette is then read carefully. In this way burette readings are made against the pressure of the air in the compensating tube *e*, so that slight changes in the temperature and pressure of the outside air during the course of an analysis can be disregarded. Before a burette reading is made, the water in the water jacket should be stirred by forcing air into it through a long glass tube. A small syringe bulb can be used for this purpose. This precaution is necessary in order to keep the temperature of the water uniform throughout the jacket. A good method is to pass a gentle stream of compressed air continuously through the water.

The carbon dioxide is entirely removed from the sample by passing the sample back and forth several times between the burette and the potassium-hydroxide pipette *a*. The volume of gas after absorption of the carbon dioxide is determined in the same manner as was the volume of the sample, and the gas is then passed into the slow-combustion pipette *b* to burn the methane. The platinum wire is heated to a white heat and the sample is passed back and forth between the burette and the combustion pipette several times to burn completely the small amount of methane in the capillary tube *r*. In no case should the burette mercury be raised above the stopcock *h* or the mercury in the slow-combustion pipette raised to the platinum wire in burning the sample. The wire should be raised to the necessary heat slowly to avoid the danger of melting it by too strong a current. At the expiration of about two minutes the methane in the sample is completely burned.

After the pipette has cooled—cooling can be hastened by playing a stream of compressed air on the pipette—the sample is drawn back into the burette, and the contraction in volume due to combustion is measured. In returning the gas to the burette from the combustion pipette the mercury in the latter should be brought exactly to the mark *t*. This reading is taken in the same manner that the original volume of the sample was measured. Finally, the sample is passed into the potassium hydroxide pipette *a* to absorb the carbon dioxide produced by the combustion of the methane. After the carbon dioxide has been absorbed, the reduction in volume of the gas is measured and the volume of carbon dioxide is recorded.

In case methane alone is to be determined, the sample, after the first measurement in the burette, is passed directly into the slow combustion pipette and the platinum wire is heated to incandescence. After the methane has been burned the pipette is allowed to cool and the sample is withdrawn into the burette for remeasurement. The contraction in volume due to the burning of the methane is divided by 2 and calculated to a percentage basis.

In using an apparatus of this type care should be taken to use heavy wall rubber tubing for the connections and to keep the stop-cocks well lubricated. A lubricant prepared by mixing pure gum rubber, vaseline and paraffin wax is satisfactory. In making an analysis the potassium hydroxide solution must be kept out of the capillary tubing *r*; otherwise the combustion analysis for methane will be inaccurate because of carbon dioxide being absorbed by the potassium hydroxide. It is also essential that the inner walls of the burette and the compensating tube be kept slightly moistened with water. As these tubes become dry from time to time a drop or two of water should be added. Mercury can be purified by first filtering it through chamois skin or

\* From Technical Paper 14 of the United States Bureau of Mines.



muslin and then dropping it in a fine stream through dilute nitric acid, 1 part concentrated acid (1.42 sp. gr.) to 8 parts water. Detached bubbles of potassium hydroxide solution must be kept out of the capillary tubing above *d*. In fact, all of the capillary spaces above the solutions and between the pipettes and the burette must be kept clear of liquid.

A storage battery can be used for heating the platinum wire to incandescence.

#### Apparatus for Exact Determination of Methane.

The apparatus shown in fig. 2 has a 21 cubic centimetre burette similar to that used on Haldane's apparatus and the apparatus just described. The bulb has a capacity of 15 cubic centimetres and the stem a capacity of 6 cubic centimetres. The stem is graduated in hundredths of a cubic centimetre. To the burette is attached a compensating tube that renders negligible small changes in room temperature during the course

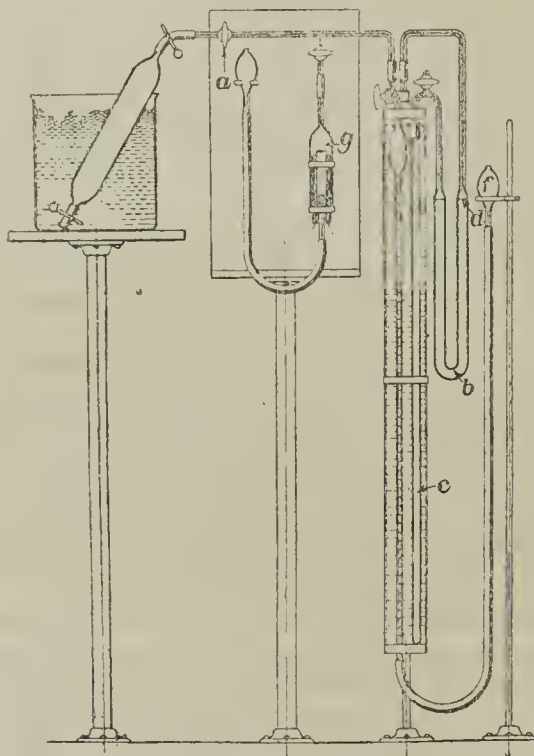


FIG. 2.—LABORATORY FORM OF APPARATUS FOR THE EXACT DETERMINATION OF METHANE.

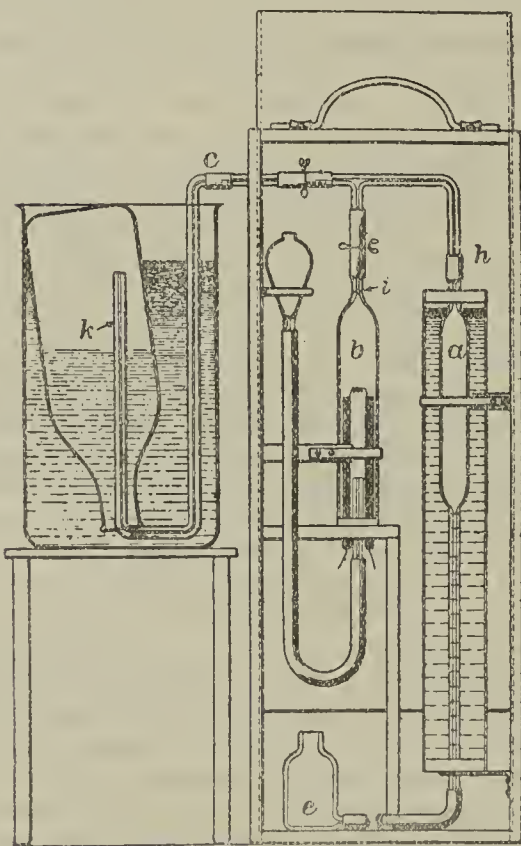


FIG. 3.—PORTABLE APPARATUS FOR THE DETERMINATION OF METHANE.

of an analysis, and thus facilitates the taking of accurate readings. The compensating device, although similar in principle to that attached to the burette of the apparatus shown in fig. 3, is operated differently. The slow combustion pipette, *g*, is similar in construction to that shown in fig. 1.

At the laboratory the sample container is set up as shown in fig. 2. About 10 cubic centimetres of the sample is drawn into the burette and discharged through the three-way stopcock *a* to sweep out the air in the capillary tubing. About 21 cubic centimetres of the sample is then drawn into the burette and measured against the air in the compensating tube *c* by means of the manometer *b*. The water in the manometer *b* is of such amount that at atmospheric pressure the surface of the liquid in both limbs of the U-tube is approximately on a line with the scratch at *d*. After the sample has been drawn into the burette, the burette stopcock *e*

is turned so that communication is made between the burette and the manometer *b*. By slightly raising or lowering the levelling bulb *f* the movement of the mercury brings the water in the U-tube exactly to the mark *d*. The burette reading is then taken.

After measurement in the burette, the gas is passed into the slow-combustion pipette and the platinum wire is heated. After combustion the pipette is allowed to cool and the gas is returned to the burette in order to measure the contraction in volume from the burning of the methane. This contraction divided by 2 and calculated to a percentage basis gives the proportion of methane in the sample. Duplicate determinations should agree within 0.02 per cent.

#### Portable Apparatus for Determination of Methane.

Fig. 3 shows a portable apparatus for the determination of methane in mine air. The burette has a capacity of 50 cubic centimetres, the capacity of the bulb being 45 cubic centimetres and that of the stem 5 cubic centimetres. The stem is graduated in five-hundredths of a cubic centimetre. In order to simplify the apparatus, water is used instead of mercury in the burette and the combustion pipette.

With this apparatus the methane content of a sample of mine air can be determined within about 0.10 per cent. This accuracy is all that is desired in many cases. The apparatus, although not as accurate as those shown in figs. 1 and 2, with which the methane can be determined with an accuracy of 0.01 per cent., possesses the advantage that it is easy to manipulate by persons who have had little or no experience in gas analysis.

To perform an analysis, the water in the combustion pipette *b* is first drawn to the mark *i* by suitable manipulation of the levelling bottle *e*. By raising this bottle water is forced out of the burette and through the tubes *k* and *h*, thereby filling all of the capillary spaces with water. The sample container is then inverted in water in the vessel, opened under water, and the tube *k* inserted in it. By opening the pinchcock on tube *c* and lowering the level bottle *e* a portion of the mine air is drawn from the sample-container into the burette *a*. The surface of the water in *a* is lowered until about 48 or 50 cubic centimetres of gas has been trapped. The pinchcock on *c* is then closed. The quantity of the sample taken is measured at atmospheric pressure by holding the level bottle *e* so that the surface of the water in it is on a line with the surface of the water in the burette. After the sample had been measured it is forced into the slow-combustion pipette by raising *e* and opening the pinchcock above *i*. The platinum wire in the combustion pipette is then heated to a white heat, and allowed to remain so for two minutes. At the expiration of this time the methane in the sample will have been completely burned. The electric current is then broken and the pipette is allowed to cool. Cooling may be hastened by blowing air against the pipette. After the pipette has cooled, the pinchcock above *i* is opened and the sample is returned to the burette and again measured. The water in *b* is brought exactly to the mark *i*. The difference between the two readings shows the contraction in volume produced by the burning of the methane. The apparatus is contained in a carrying case which is 12 in. high, 6 in. deep, and 6 in. wide.

The results of a determination of methane in mine air, with the calculations, are given below:—

#### RESULTS OF A DETERMINATION OF METHANE, WITH CALCULATIONS.

	Cubic centimetres.
Volume of sample taken .....	49.8
Volume after burning .....	47.2
Contraction due to burning.....	2.6
Volume of methane = $\frac{2.6}{2}$ =	1.3 cubic centimetres

$$\text{Percentage of methane} = \frac{1.3}{49.8} \times 100 = 2.6$$

For all ordinary purposes the direct reading of the contraction in cubic centimetres can be taken as the percentage of methane.

This apparatus, as well as those shown in figs. 1, 2 and 4, is intended for mixtures of methane and air that are non-explosive—that is, contain less than 5.5 per cent. methane. For mixtures richer in methane, the apparatus shown in fig. 5 can be used.

#### Portable Apparatus for Determination of Carbon Dioxide and Methane.

In fig. 4 is shown a portable apparatus similar to the one just described, except that a caustic potash pipette *b* has been included for the determination of carbon dioxide. Water is used in the burette *a* and the combustion pipette *c*. The apparatus is operated in the same manner as is the one shown in fig. 3, except that the sample, after measurement in the burette and before burning, is passed into the caustic potash pipette for removal of the carbon dioxide. The two determinations are accurate to about 0.10 per cent. In fig. 4, *d* is the

levelling bottle for the burette and *e* the levelling bottle for the slow-combustion pipette. Connection with the sample container is made at *f*. The percentages of carbon dioxide in a given sample (actual carbon-dioxide content 0.73 per cent.), as determined by a series of analyses with the apparatus, were as follow:—0.82, 0.71, 0.90, 0.90, 0.91; the percentages determined in analyses of another sample actually containing 0.28 per cent. carbon dioxide were 0.40 and 0.30.

#### Modified Orsat Apparatus for Complete Approximate Analysis of Mine Air.

The portable apparatus shown in fig. 5 consists essentially of the burette *e* and the four pipettes *a*, *b*, *c*, and *d*. The burette has a capacity of 50 cubic centimetres, and is graduated to two-tenths of 1 cubic centimetre. The case is 12 in. high, 6½ in. wide, and 6 in. deep. Pipette *a* contains potassium hydroxide solution for the removal of carbon dioxide, pipette *b* contains alkaline pyrogallate solution for the removal of oxygen, pipette *c* contains ammoniacal cuprous chloride

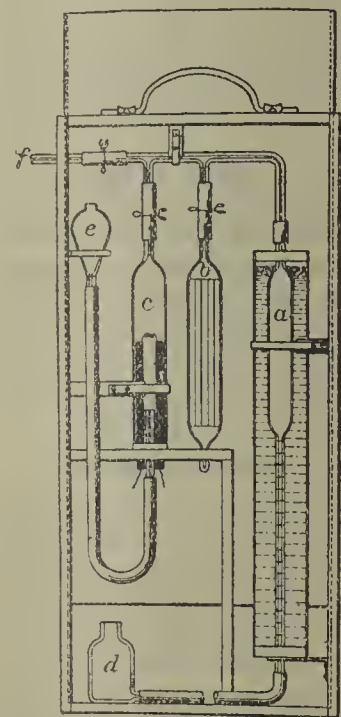


FIG. 4.—PORTABLE APPARATUS FOR THE DETERMINATION OF CARBON DIOXIDE AND METHANE.

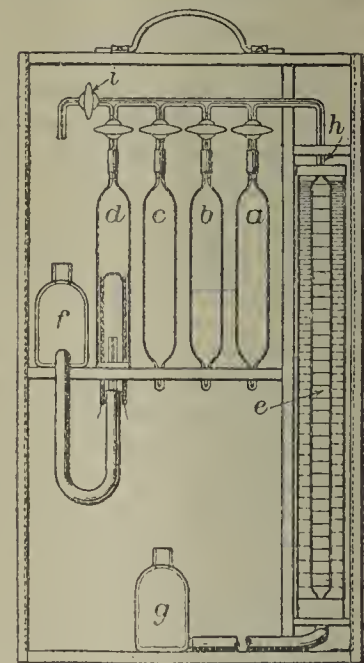


FIG. 5.—MODIFIED ORSAT APPARATUS FOR THE COMPLETE ANALYSIS OF MINE AIR.

solution for the removal of carbon monoxide, and pipette *d* is the slow-combustion pipette for burning the methane in the sample of mine air. Pipettes *a*, *b*, and *c* contain glass rods (not shown) to increase the absorbent surface of the reagents. The platinum wire inside the combustion pipette is No. 30 (B. and S. gauge), and is supported by two hollow glass rods. It is sealed by copper wires that pass down through the rods. The lower ends of the copper wires may be connected to a storage battery, or other source of electric current. The combustion pipette is filled with distilled water slightly acidified with sulphuric acid. At *f* and *g* are levelling bottles.

After the constituents absorbable by the reagents are removed, the sample, if it contains less than an explosive proportion of methane, is diluted with air or oxygen by lowering the level bottle *g* (fig. 5), opening the stopcock to the outside air, and drawing some of the air into the burette, so that the combined volume of air and residual gas amounts to 48 or 50 cubic centimetres. After measurement the sample is passed into the slow-combustion pipette *d*. The platinum wire therein is



heated to a white heat for two minutes. After the pipette *d* has become cool to the hand, the residual gas is drawn into the burette and the contraction in volume due to the burning of the methane is determined. The gas is then passed into the pipette *a*, and the carbon dioxide produced by the burning of the methane is absorbed by the caustic potash solution. The residue is then returned to the burette, and the contraction in volume due to the absorption of carbon dioxide is recorded. The carbon dioxide produced by the burning of the methane should be equal to one-half of the contraction. If this relation does not hold good within  $\pm 2$  cubic centimetre, some other combustible gas than methane is present, or an error has been made in the manipulation.

If the proportion of methane in the sample is too large to be determined by the method of dilution, as described above, the gas left after the absorbable constituents have been removed may be passed directly into the slow-combustion pipette. The platinum wire is then heated and oxygen is slowly passed into the pipette. The methane burns as fast as the oxygen enters and an explosion cannot follow. The rest of the analysis is performed in the manner already described. A final

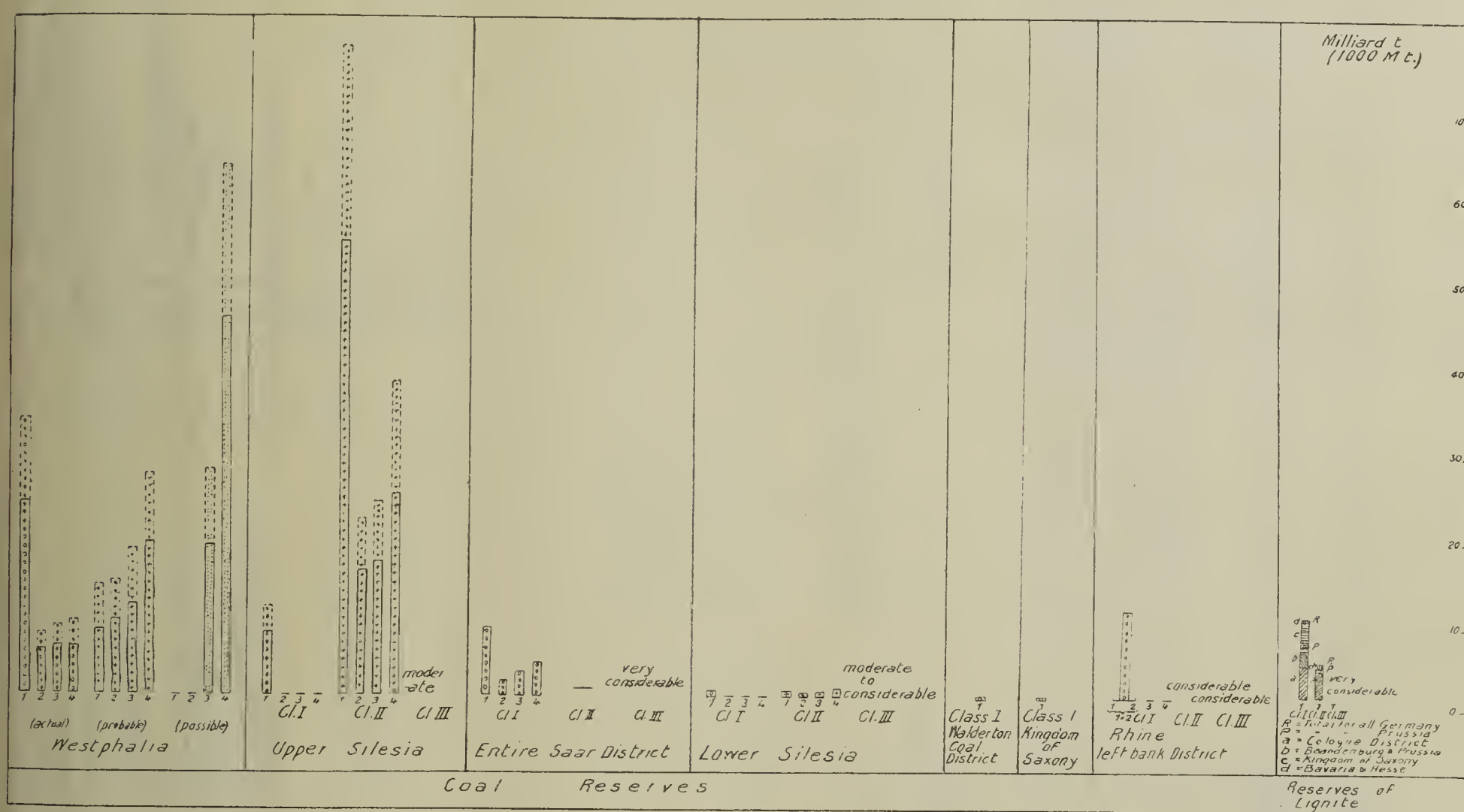
### GERMANY'S COAL RESERVES.\*




The estimates set forth by the author have been compiled under the auspices of the German geological societies and other bodies, for presentation to the International Geological Congress at Toronto this month, of which Congress the world's coal reserves forms one of the principal subjects on the agenda.

So far as Germany is concerned, the coal reserves are divided into two groups, and these again subdivided into several classes. Group A comprises the coal contained in all the seams regarded as workable under present conditions, to a depth of 2,000 m. from the surface, this being the limit of depth taken into account in making the individual estimates. The reserves in this group amount, in round numbers, to 290 milliard tons,† or, by including the partially workable seams up to 12 in. in thickness—which, however, has been done only in the case of Westphalia and Upper Silesia, where the continuity of the seams is greatest—to 410 milliard tons (Group B). Of the four stages into which the total depth has been divided—viz., 0 to 1,000, 1,000 to 1,200, 1,200 to 1,500, and 1,500 to 2,000 metres, the first is the most important, containing about 34 per cent., or 100 milliard tons, whilst the second stage contains about

As is naturally to be expected, the ratio between the "actual" and the "probable" reserves undergoes a modification in favour of the latter class in proportion as the depth increases, because the coal measures now being worked form only a small proportion of the whole, and, for the sake of precaution, these coals in the less developed fields have been allocated solely to the second and third classes. Conversely—in view of the present limitation of mining operations to the upper stage of depth—the reserves belonging to Class I. in the uppermost and most important stage from the economic point of view are, both absolutely and relatively, much greater than in the lower stages. Thus the "actual" reserves between 0 and 1,200 metres amount to 57 milliard tons—that is to say, to two-thirds of those in the "probable" Class II. (85 milliard tons); whilst the ratio of Class I. to Class II. in the stage from 1,200 to 1,500 metres is only one-fifth, and in the stage 1,500 to 2,000 metres, as low as one-ninth. It is a point of great importance that, out of the total reserves of 75 milliard tons in the chief class, I., 76 per cent., or 57 milliard tons, should be contained in the already practical limits of depth between 0 and 1,200 metres.

Without going into the details of the numerous



 Total Output of the various Districts in 1911  
 Total reserves of all Classes (Group B) for all Germany  
 " " " ( " A) " " "  
 " " " ( " A) for the several Districts

Class I (Group A) Mt = Million tons 1000 Mt. = Milliard tons  
 " " " B) Bez = Reserves in the separate districts DR-Reserves for all Germany  
 " II ( " A) 1,2,3,4 = 1,2,3,4 Stage of depth (0-1000, 1000-1200, 1200-1500, 1500-2000 metres)  
 " " ( " B)  
 " III ( " A)  
 " " ( " B)

*Coal Reserves in the various Districts at the several depths, arranged according to classes and Groups.*

FIG. 1.

termination of oxygen should be made to determine what sufficient oxygen was present to burn the methane completely.

All of the apparatus shown in this report are only modifications of existing types long used by gas analysts, the modifications being made to suit the conditions existing at coalmines. The compensating device of the apparatus shown in fig. 1 is similar to that used by Haldane. That attached to the apparatus shown in fig. 2 is similar to the type used by Hempel, although both depend upon the principle of Pettersson, who was the first to show that, by means of a tube enclosing a volume of gas, errors resulting from variations in the pressure and temperature of the atmosphere at the time of an analysis can be compensated for. The construction of the slow-combustion pipettes follows Winkler's design as modified for use with mercury by that of Dennis, although the use of a platinum wire for burning combustible gases originated with Lequillon.

The ordinary Orsat apparatus widely used for flue-gas analysis is well known. A slow-combustion pipette was included for burning combustible gases, and the burette was made of the same diameter from top to bottom, so it could be read at any point.

10 per cent. of the total. The fact that the thickest stage (0 to 1,000 metres) contains only three to four times, instead of five times, the amount of coal in the second stage is, of course, due to the presence of the non-carboniferous upper strata. Down to 1,500 m., a depth which the German mines are not considered likely to exceed during the next decade, the reserves of workable coal are estimated at 194 milliard tons, or 272 milliard tons if the thinner seams are taken into consideration. The reserves in the two groups, A and B, are further divided into "actual," "probable" and "possible" classes; but while estimates have been prepared for the first two classes, the prospects of the "possible" class are merely given in vague terms, such as "considerable," "moderate," &c. This uncertain class comprises districts which, though producing coal, are not yet known with sufficient accuracy to allow any numerical calculation to be made; and, therefore, the actual coal reserves are sure to be greater than the figures given would imply. The "actual" reserves, which have been estimated with the greatest care, comprise 26 per cent. (75 milliard tons) of the total reserves in Group A.

\* H. E. Böker. *Glückauf*.  
† 1 milliard = 1,000,000,000 tons.

statistical tables furnished for the various coal districts, it may be mentioned that the relative importance of the Westphalian coalfield increases from stage to stage when compared with the total reserves of all classes. Whereas in the uppermost stage, 0 to 1,000 metres, Westphalia contains only about one-third—namely, 30 milliard tons in Group A and 45 milliard tons in Group B—of the total reserves of 100 and 141 milliard tons in these stages throughout the country, the proportion rises to nearly two-thirds (70 per cent.) in the stage 1,500 to 2,000 metres; or, if the whole of the stages from 0 to 2,000 metres be considered—containing 148 milliard tons in Group A and 214 milliard tons in Group B—rather more than one-half the aggregate reserves in the country. On the other hand, the relative importance of Upper Silesia becomes smaller and smaller as the depth increases. Thus, whereas in the stage 0 to 1,000 metres, it contains over 60 per cent. of the total reserves—that is to say, nearly twice as much as Westphalia in that stage—and is therefore by far the richest coalfield in Germany, so far as the stage now being worked is concerned, its share falls to only about one-fourth in the lowest stage. Consequently, when all the stages between 0 and 2,000 metres are grouped together, the proportion of Upper Silesia is







### SHAFT SIGNALLING DEVICES OPERATED FROM THE MOVING CAGE.\*

For some years past a number of collieries in the Ostrau-Karwin district have been equipped with shaft signalling devices operated from the moving cage. These devices are of three broad classes—electrical, mechanical, or combined.

The purely electrical types are based on the following principle:—Each winding compartment is fitted with a bare wire, mounted on insulators and forming one branch of an electric circuit, the other branch of which is constituted by the steel winding rope. The signalling apparatus at bank is connected to the winding engine shaft or pulleys on the one hand, and to the bare wire on the other. Two bells are generally provided, one near the engineman and the other near the banksman. The current is furnished by an electric pile, or by a magneto in the cage. In the former case the occupant of the cage completes the circuit by applying to the bare wire a metal contact connected to the wire rope by an insulated wire. In the other a trolley on the cage

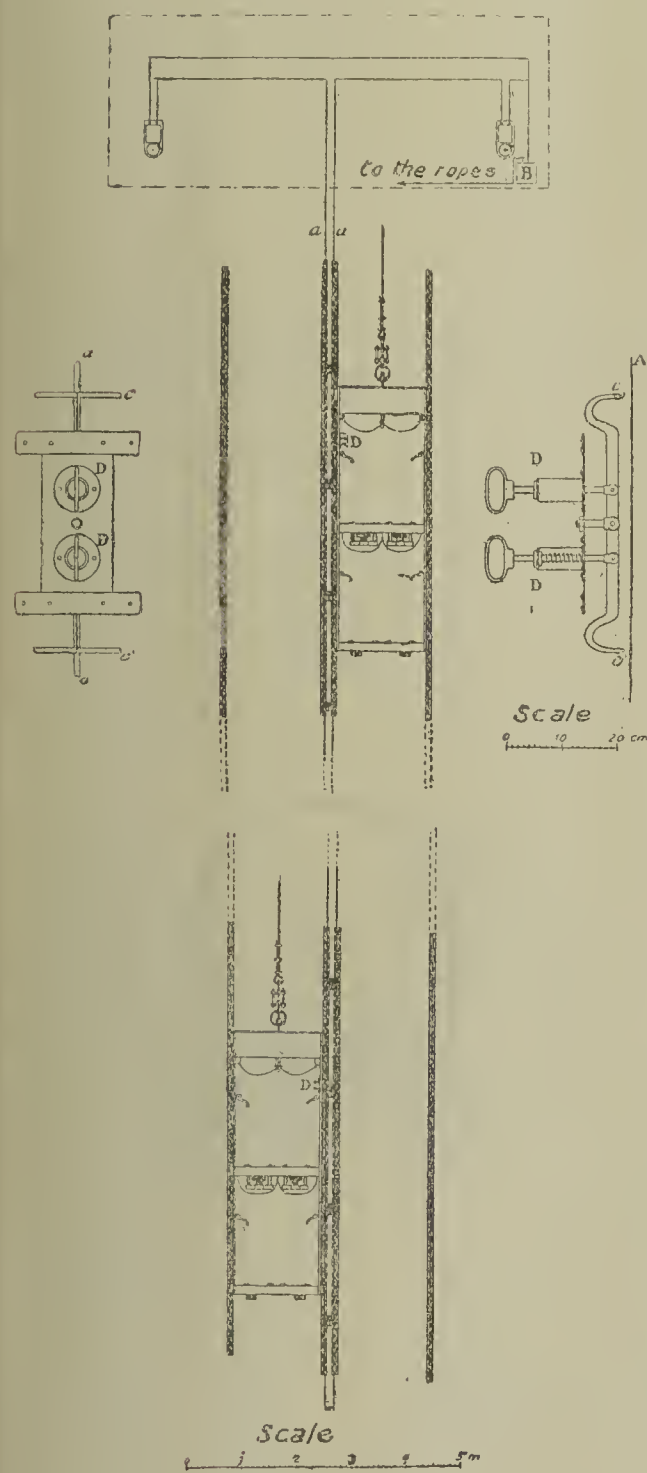


FIG. 1.

makes frictional contact with the bare wire, whilst the magneto is connected to the rope and trolley, the signals being given by turning the handle of the magneto.

An installation of the first-named type, at the Gabriel pit, Karwin, is illustrated in fig. 1. The cage guides are of wood, and the bare wires *aa* are mounted on the partition. The frictional contacts *cc'* are caused to bear against the wire by means of one of the members *D*, which are drawn back by coiled springs when released. At bank a bell for each compartment of the shaft is placed close to the engineman, and is operated by the current from a Leclanché cell *B*, one pole of which is connected up with the wires *aa'*, and the other to the winding ropes.

Fig. 2 represents an electric signal of the second kind, in use in the Therese pit, Ostrau. A steel wire *A*, 4 mm. in diameter, extends right down each compartment, and is mounted on insulators at the pit bottom and at bank. This wire passes through two cylinders *B* of insulating material, one at the top of the cage and the other at the bottom. A copper pulley *C* presses against the wire, and is connected, through its axis, with one pole of the magneto *D*, the other pole of which is connected with the winding rope. This signal is installed to a depth

of 605 m. in the shaft. The magneto gives a tension of 70 volts, and the total electrical resistance is 180 ohms.

In the purely mechanical type of signal, an endless wire, of bell-wire gauge, is carried down each compartment of the shaft and round a pulley at bank and pit bottom, the bottom pulley being arranged to slide under the influence of a counterweight, so as to keep the wire taut. The bell signal is operated by the shaft of the pulley at bank. Each limb of the endless wire passes through one of the cages, these being provided with

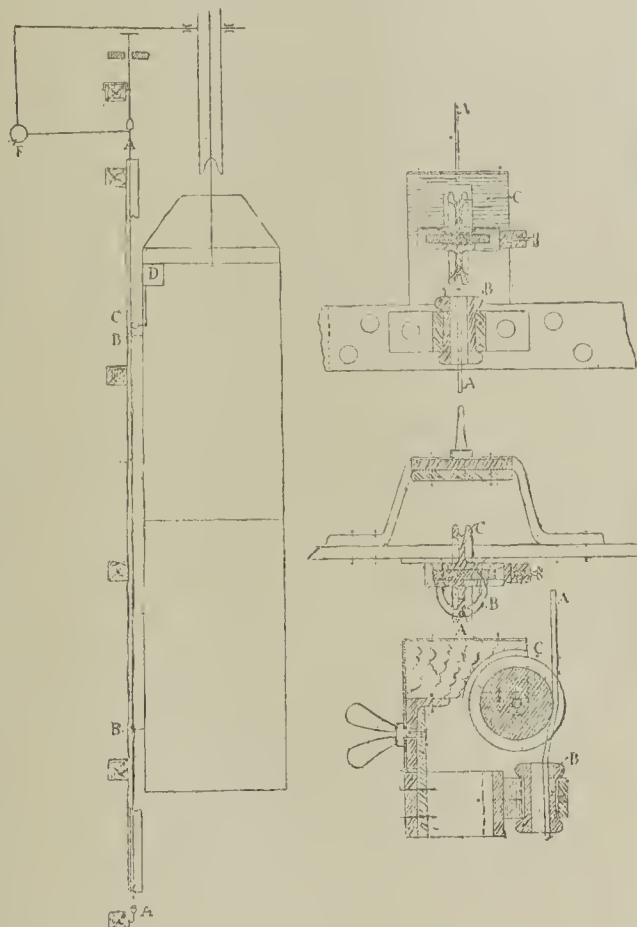


FIG. 2.

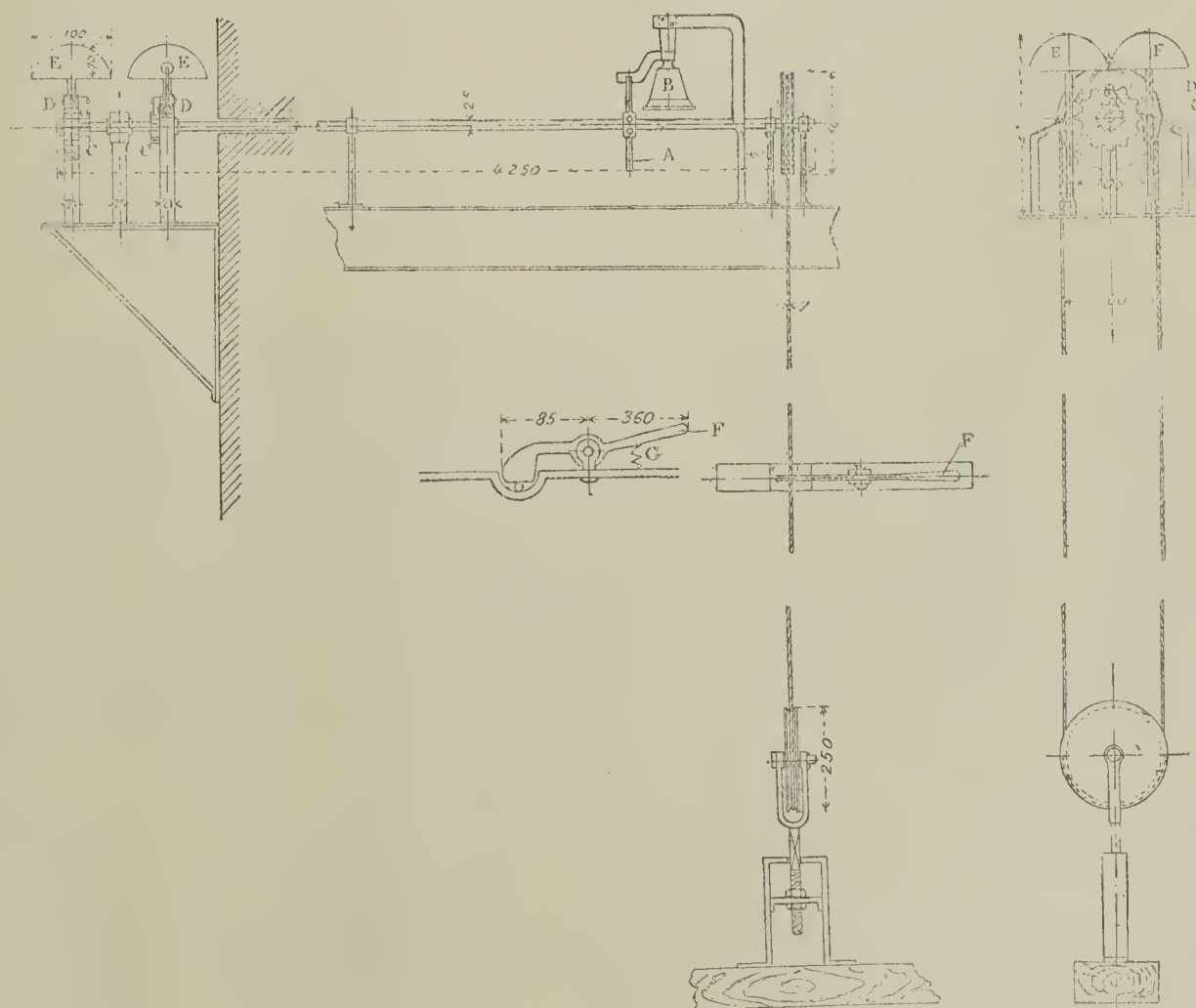


FIG. 3.

devices for gripping the wire, thus pulling it in the direction the cage is travelling and ringing the bell.

Fig. 3 shows the signalling apparatus in use at the Lucie pit, Ostrau. A wire, 7 mm. in diameter, is passed over two pulleys, the one at the pit bottom being adjustable by a threaded rod and two nuts, to keep the wire on the stretch, whilst the bank pulley operates a cam shaft *A*, which strikes a bell *B* when the wire is pulled, thus giving the signal to the banksman. This shaft is continued into the engine room, where it is provided with two ratchet wheels *C*, each of which operates (in opposite directions) a pinion *D*, which causes one of the bells *E* to sound, according to the direction in which the cage is travelling. In the cages are grips *F*, adapted to clamp the wire against one of the uprights of the cage. The grips, on being released, are drawn out of action by a spring *G*. A variant of this pattern is used at the Michel pit, Ostrau.

A typical form of grip is illustrated in fig. 4, the wire being gripped between a fixed jaw *K* and a movable jaw *K'*, operated by a lever *H*. The jaw *K'* ends in a swallow-tail recess containing a pivot which slides in a segmental groove *N* forming part of the lever *H*, and arranged eccentrically to the axis of rotation of the lever, so that when the latter is raised the jaw *K'* is moved towards *K* and grips the wire, whereupon the lug *H'* engages with a bolt which holds the device in the locked position. In another type of grip (fig. 5) used

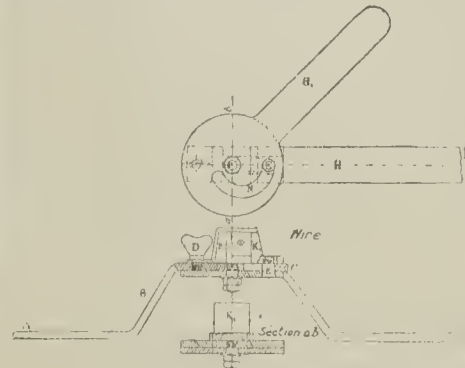


FIG. 4.

in the Karwin district, the wire is gripped by a pair of jaws *A* and *B*, the latter being operated by a rod *C* and cranked lever *D*, which is held by a flat spring. The whole device is bolted to a plate *E F*, connected to the frame of the cage at *G H* by two guide rods *I*, one of which is fitted with a coiled spring, to ease the strain in the event of the wire being gripped too suddenly.

The combined mechanical and electrical type of signal comprises two variants. In the one the wire is arranged in the pit in the same manner as for mechanical signalling, whilst the shaft of the bank pulley operates an electrical signal. In the other each compartment of the shaft is fitted with a wire which, on being shortened, completes an electrical circuit at bank. An example of the first kind is that (fig. 6) used at the Ignace Pit, Marienburg. Here the endless wire, 8 mm. in diameter, is passed over two pulleys, the one at the

\* J. Kersten. *Annales des Mines de Belgique*.



Another arrangement is shown in fig. 7, in which the pulley acts on a shaft A, which is caused to rotate on a vertical axis by means of cone pinions B. This axis carries two arms, carrying two closed tubes enclosing a hollow cylinder of copper, terminating at one end in an insulating ring, and closed by a copper cap. A drop of mercury is placed in, which is connected by an insulated copper wire, with a ring fixed on the vertical shaft B, and making contact with a brush, whilst the cap is similarly connected with

into two classes, according as the two wires are used to operate one signalling device or two separate ones. An example of the former class is illustrated in fig. 8, and is used at the Hubert pit, Ostrau. The two wires  $D_1 D_2$  are secured at the bank and pit bottom respectively, to two swing beams  $H_1 H_2$ , the upper one of which is held in equilibrium by two powerful coiled springs F F. When one of the wires is shortened, to give a signal while the cage is in motion, the beams tilt and complete an electric bell circuit at bank through one or other of the contacts, K,  $K_1$ . The figure shows the device for

circuit is connected to a metal frame A A, and the other to two copper strips,  $e_1 e_2$ , attached to said frame by means of two insulating plates. A rod  $c$  supports the wire, which is stretched at the pit bottom by a weight, the whole being balanced by a spring  $b$ . This rod carries two copper discs  $d_1 d_2$ , which make contact with a strip  $e_1$  or  $e_2$  on the wire being pulled up or down by

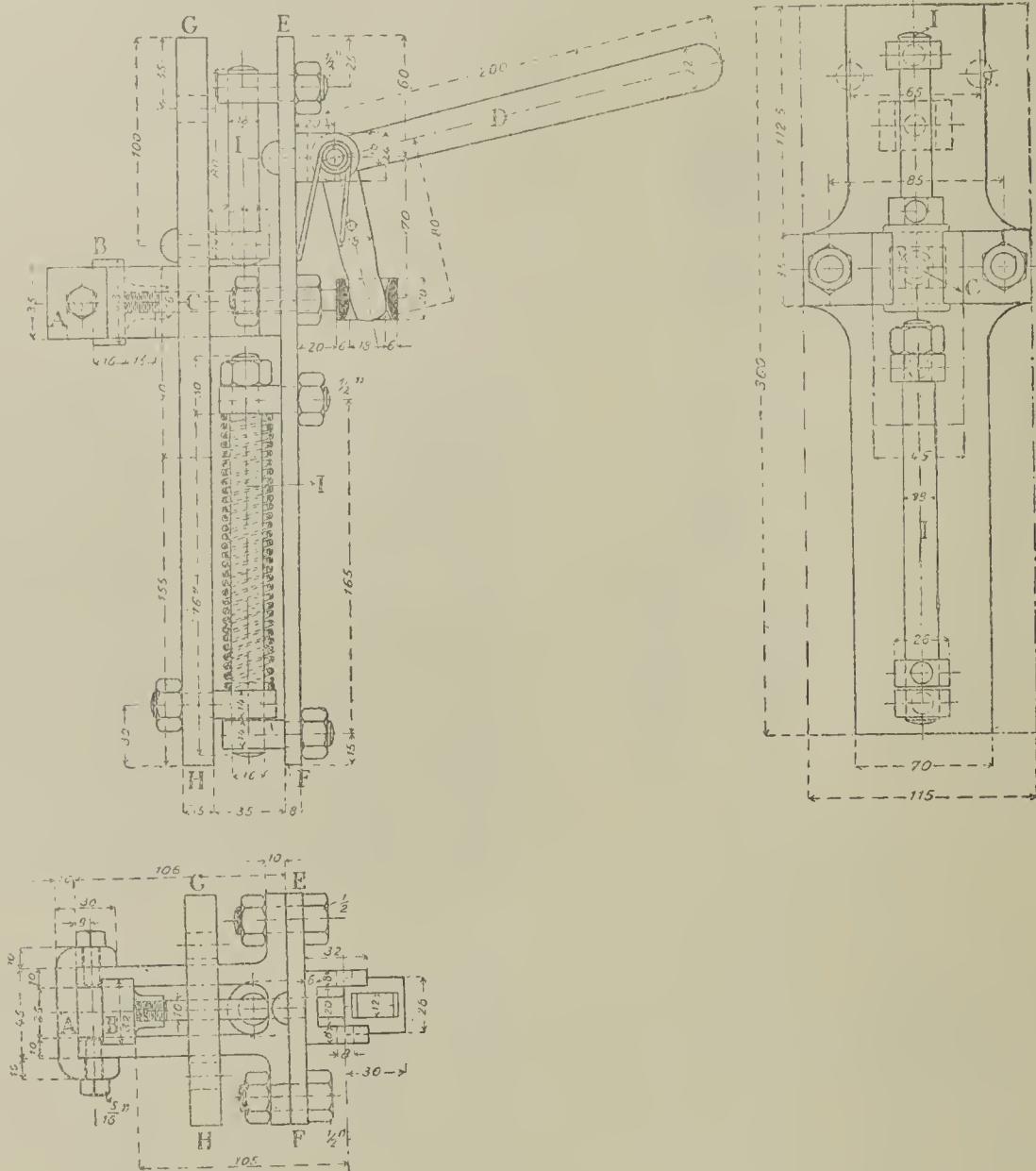


FIG. 5.

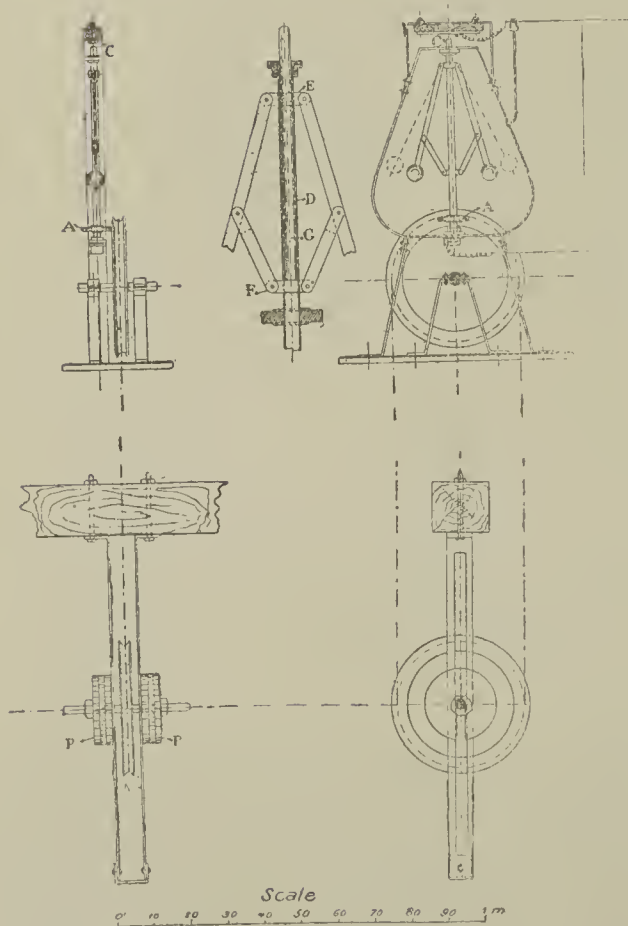


FIG. 6.

another brush and ring, the two brushes communicating with the poles of the bell battery. While the device is at rest the drops of mercury remain at the lower end of the respective cylinders; but when the shaft is rotated the mercury is flung outward by centrifugal force against the caps, thus completing the circuit and ringing the bell. About 40 sets of this apparatus—made by Vaca and Rospyal, Mährisch-Ostrau—are in use at the Ostrau-Karwin district.

The combined variant of the combined system is divided

gripping and shortening the wire in the cage, by means of a simple lever  $h$  bearing against a rod, which presses two rollers  $r$  against the wire traversing the eye  $e$ . An alternative method of making the electrical contact is shown in fig. 9, where a copper strip A on the pivot of the beam bears against a contact B to the right or left, according to the tilt of the beam, one end of the bell circuit being connected to the strip A, and the other bifurcated to connect with the contacts B. To ease the grip on the wire when the shortening device is set in operation, the wire in one system is passed between two pairs of rollers, so that when these are tilted by the operating lever the wire is deflected into a sinuous course and is subjected only to rolling friction.

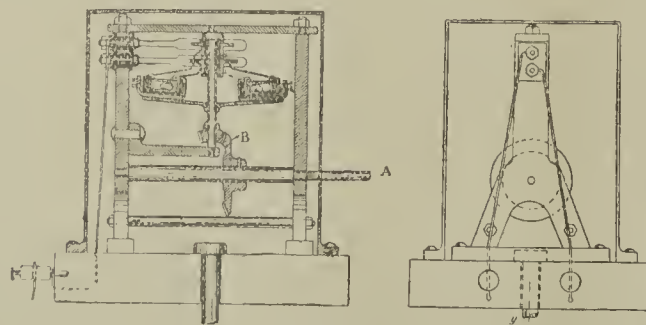


FIG. 7.

An example of the combined system in which each wire operates an independent bell signal is given in fig. 10, showing the apparatus at the Emma pit, Polnisch-Ostrau. The wires are fixed at the pit bottom to a channel iron by means of a clamp and two bolts, whilst at bank each is kept taut by two springs acting on a tee-piece, the head of which acts on a lever which engages between two strips of copper when the wire is shortened. The lever is connected to one end of a circuit, and the copper strips to the other. The grip can be operated from either deck of the cage.

In some collieries the wire itself completes the signalling circuit. Thus, at the Tiefbau pit, Mährisch-Ostrau (fig. 11), one of the terminals of the electric

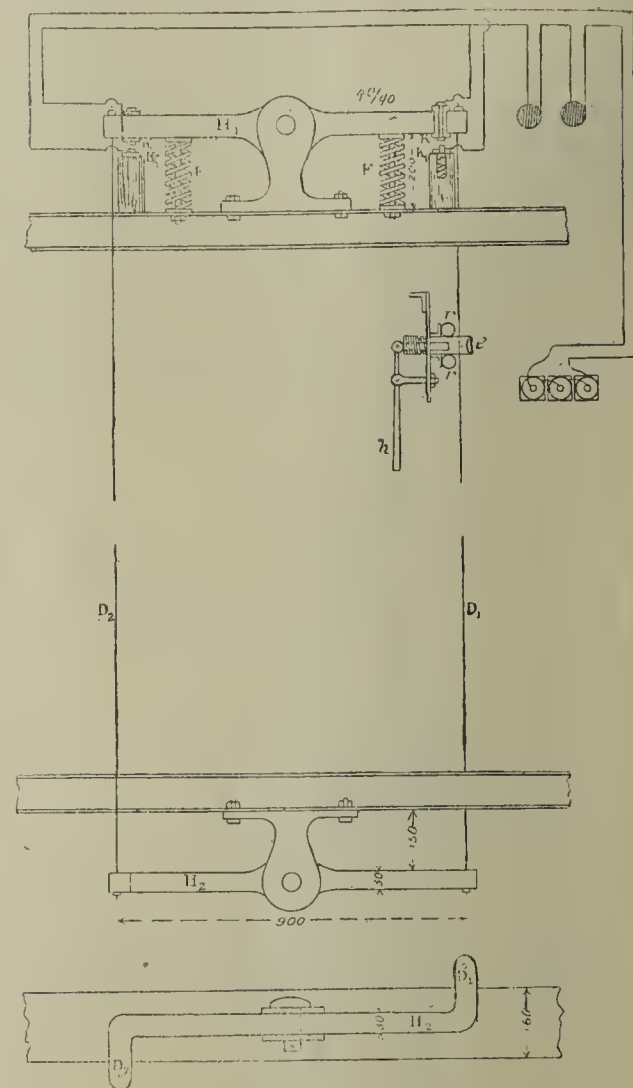


FIG. 8.

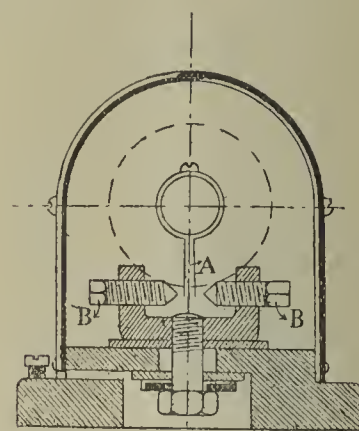


FIG. 9.

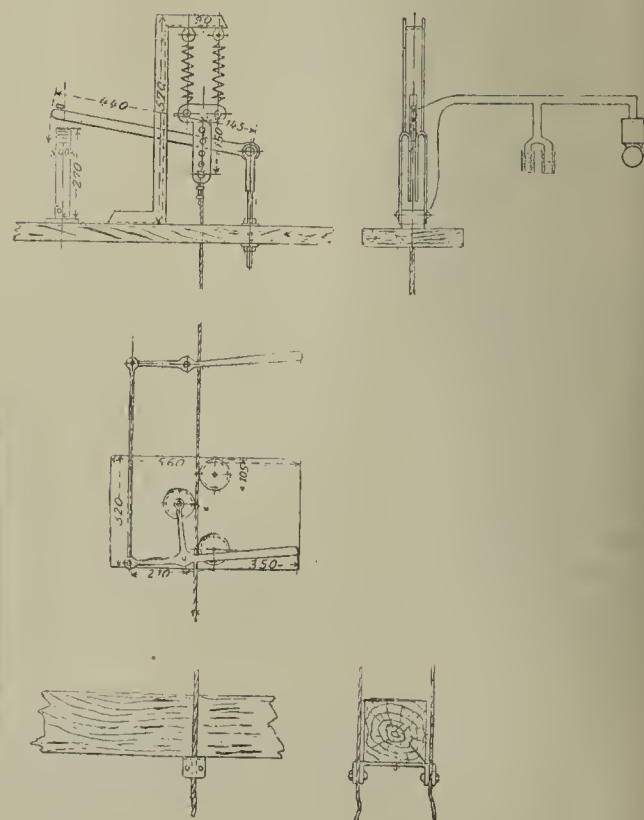


FIG. 10.

the grip in the cage. In some cases a mercury contact is used with a similar device, the supporting rod carrying a metal bell which dips into a cup of mercury when the wire is shortened. This method, however, has the drawback that the mercury evaporates, and its



surface becomes contaminated with coaldust, which has to be removed. In another method of stretching the wires (fig. 12), use is made of a spiral spring, the supporting rod carrying a copper strip, which completes the circuit by making contact with the terminals BB or B'B', each of which is connected to an end of the electric circuit. This latter is completed by BB when the cage is ascending, and by B'B' during the down trip.

The experience gained by the use of these various systems of signalling in the Ostrau-Karwin district has resulted in a decided preference for the combined mechanical and electrical devices, especially those in which the wire is endless and run over two pulleys. For the purely electrical types induced current is preferred. One advantage of electrical signals is that the conducting wire can be attached to the guides; but

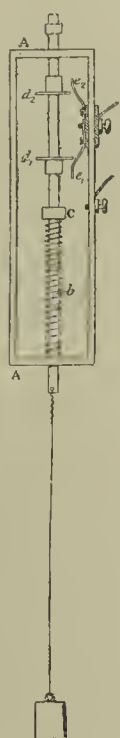


FIG. 11.

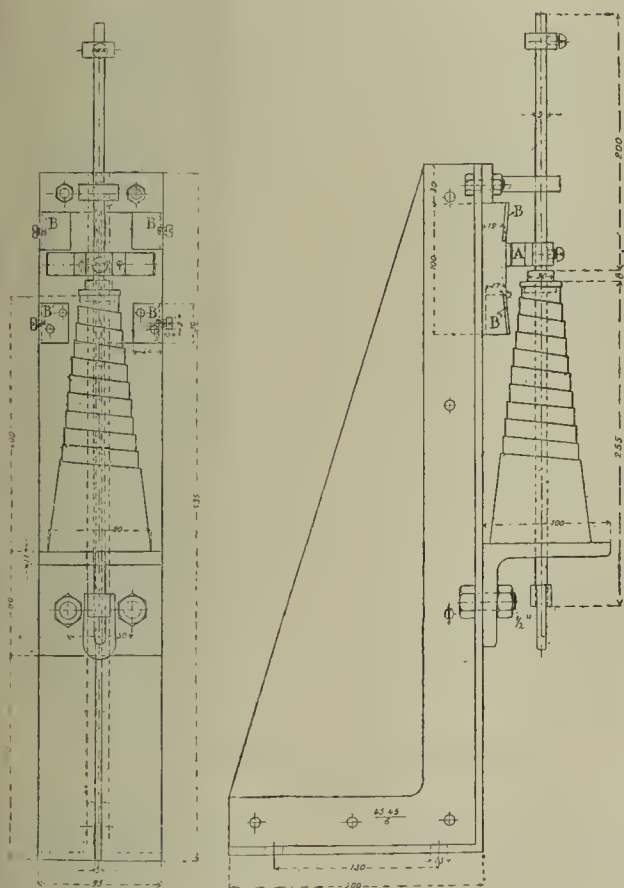


FIG. 12.

in wet shafts the difficulties of insulation are considerable. Where the winding rope forms the second conductor, the delicate point is the connection of the rope with the copper wire, this connection being sometimes broken by the cage chains in starting, so that the apparatus is put out of order. Finally, the system is expensive, owing to the heavy frictional wear on the copper and its deterioration under atmospheric influences, repairs being also more difficult than with mechanical systems. Moreover, the risk of sparking prevents the use of this type of apparatus in return-air shafts or fiery pits.

Purely mechanical devices give satisfaction, provided bell signals be provided at the pit mouth and in the engine room (fig. 3), but this cannot be done when the engine room is some distance away. The devices in which a movable wire operates an electric bell present many advantages: thus, the two limbs of the wire balance each other, and the only resistance to be overcome in moving them is that due to the friction in the pulley and shaft bearings, and to the rigidity of the wire; so they can be used in very deep pits. The

operation of the signals by shortening the wire produces shocks, and the dangers of the system are greater. When the wires are new, they stretch by their own weight and require frequent adjustment. It is also necessary to see that the strength of the spring is in proportion to the weight of the wire to be balanced, since otherwise the signal may act out of due time.

## PROGRESS.

### The Resources of the Rhenish-Westphalian Coalfield.

Over the area of 1,532 quadratkilometres which has been opened up in the Rhenish-Westphalian coalfield it is estimated that down to a depth of 1,500 metres there is a supply of 32 thousand million tons, after the subtraction of the 2 thousand million tons that have been already obtained. At a still greater depth there are deposits of about 10 thousand million tons. Further, through exhaustive borings, an area of 1,728 quadratkilometres has been investigated, in which it is estimated lie some 27 thousand million tons to a depth of 1,500 metres, and below that some 45 thousand million tons. A third area, not yet fully proved, is estimated to contain 77 thousand million tons down to 1,500 metres, and at a still lower level 151 thousand million tons. That is to say, over the whole area it is estimated that there exists 77 thousand million tons of coal down to a level of 1,500 metres, and below this another 206 thousand million tons, altogether 283 thousand million tons. The length of life for the field naturally depends on the yearly output. In the year 1800 not more than a few hundred thousand tons were produced, in 1900 60 million tons, a year ago 102 million tons. How production will develop in the future cannot be foretold. At the present rate of progress we may expect about 150 million tons in 1920 and 10 years later a production of some 250 million tons. At the present rate of about 100 million tons the existing coalfields, down to a level of 1,500 m., have supplies for 320 years. The further fully tested area has supplies for 270 years, and the less completely investigated districts a life of about 180 years. Up to the present it has not been found possible to work with profit seams at a lower level than 1,500 m. Could that be done, there are supplies at this lower level which, at the rate of 100 million tons a year, would last for some 2,000 years. In these estimates have been included only coal that at present repays the hewing. Of inferior qualities, it is estimated that the field contains some 159 thousand million tons.

### Coal v. Oil for Steam Raising.

In the course of his Cantor lectures, delivered recently before the Royal Society of Arts, on "Liquid Fuel," Prof. Vivian Lewes gives an interesting table showing the actual evaporation given by various oils in practice in the same boiler. From this the following is extracted:—

	Calorific value by bomb.		Actual evaporative power in practice from and at 212° Fahr.
	Calories.	B.Th.U.	
American residuum	10,904	19,627	15.0
Russian ostatki.....	10,800	19,440	14.8
Texas .....	10,700	19,242	14.79
Burma .....	10,480	18,864	14.5
Barbadoes .....	9,899	17,718	14.2
Borneo .....	10,461	18,831	14.0
Shale oil.....	10,120	18,217	13.8
Blastfurnace oil ...	8,933	16,080	12.0
Heavy tar oil.....	8,916	16,050	12.0

The same type of boiler when fired with coal would have given an evaporative duty of between 9 and 10 pounds of water from and at 212 degs. Fahr., the best Welsh steam coal being employed.

### Fossil Plants of the South Staffordshire Coalfield.

Dr. Newell Arber has contributed to the *Geological Magazine* a short article upon a recent discovery of fossil plants in the Old Hill marls of the South Staffordshire coalfield. With the exception of Dr. Kidston's paper, published in 1888 in the *Transactions* of the Royal Society of Edinburgh, on the Hamstead fossil plants, and a short reference in the *Summary of Progress*, 1906, to fossils from the Langley Green boring, there has been little done in this area since Hooker's time. The plants now described by Dr. Arber were collected by Mr. Henry Kay, of Birmingham. They were found in the Granville Clay Pit, in the "red coal measure clays" of Jukes, which lie between the Halesowen sandstone and the productive grey measures. The specimens include Equisetalean remains, Sphenophyllales, Pecopterids, and Lycopods. The most interesting is a cone of *Sigillariostrobus nobilis*, Zeller.

and the first record of this species from the British area, although the author has discovered the same plant quite lately in the Wyre Forest coalfield. As to the horizon of the Old Hill flora, Dr. Arber thinks that they probably represent a low position in the transition coal measures.

### Ankylostomiasis in the Lorraine Iron Ore Mines.

The *Annales des Mines* (tome 3, 6, p. 425) contains a long report, by Dr. G. Thiry, on ankylostomiasis in the iron ore mines of Lorraine, as the result of an investigation undertaken at the instance of the Minister of Public Works. The report, although long, discloses results mostly of a negative description, for only 1.209 per cent. of the men examined were found to be infected. These numbered 745, or 20 per cent. of the miners employed at 13 mines in Nancy, Briey, and Longwy basins. Of the nine persons infected, five came from the Pienne Mine (Briey), and two each from the Fond de la Norre Mine (Briey) and the Hussigny Mine (Longwy), and only one urgently required treatment. All of them came from other districts; two Frenchmen came from collieries in France, one German from a Westphalian pit, and the remainder, all Italians, had been employed in coffee plantations in San Paulo (two), in ricefields in Novaro (one), and in sulphur mines (three), one of the latter having also been engaged during the driving of the Simplon Tunnel. It is observed that, after the completion of the St. Gothard Tunnel, a number of infected Italian workmen found employment in the Micheville Mine, but do not appear to have contaminated any of the other workmen. Dr. Thiry nevertheless considers that the refuse in the mines is such as to favour the development of the parasites, but temperatures of 16 degs. Cent. are rare.

### A Large Canadian Winding Engine.

An order has been recently placed with the Nordberg Manufacturing Company, Milwaukee, Wis., by the Inverness Railway and Coal Company for a Nordberg-Corliss duplex winding engine. The cylinders are 34 and 34 by 72 inches, and the hoist is provided with two drums, each of which is equipped with a Nordberg axial clutch and post brake, enabling independent operation of either. The hoist is designed for the following service:—A train of 12 cars, each weighing 1,150 lb., and containing one long ton of coal, must be hauled up a 10,000 ft. incline, which is 16 degs. at the surface and 35 degs. at the bottom. The brakes, clutches, reverse and throttle are not operated directly by hand, but by auxiliary engines.

**Colliery Development at Askern.**—Determined opposition by landowners was shown at a Local Government Board enquiry last week (near Doncaster), relative to an application by the Doncaster Rural District Council to borrow £23,500 for the purposes of sewerage and sewage disposal at Sutton, which district is largely developing through the Askern Main Colliery. It was stated the colliery company were willing to supply electricity to work the pumps. Mr. G. B. C. Yarborough, a well-known local landowner, and chairman of the West Riding Bench, stated his opposition was that the scheme would entail an exceedingly heavy rate on a quantity of agricultural land which could not derive any benefit from it. The colliery in this case was not in Sutton, it was in Askern; but it seemed to have got into everybody's head about there, that there was going to be a very large increase of population wherever there was a site upon which it was possible to build. The colliery proprietors had purchased 52 acres of land upon which to build a colliery village, and as between them and the vendors the number of houses which could be built was limited to 20 upon each acre. The company intended as soon as possible to erect 1,000 houses, which meant accommodation for a population of 5,000. Beyond that the colliery company had an agreement by which they had a right of pre-emption at the same price, £100 per acre, upon more land immediately adjoining the land which they had already acquired. There was thus room altogether for a population of from 7,000 to 10,000 people. If the sewage scheme was carried out and the houses were never built, there would be an intolerable burden on the present small rateable value and the small number of inhabitants.—On the following day the same inspector (Mr. R. O. Hetherington, M.Inst.C.E.), held an enquiry into the application of the Doncaster Rural District Council to borrow £6,300 for sewerage and sewage disposal at Norton, which is a village not far from Sutton. The colliery developments at Askern were again referred to, and also the town-planning scheme proposed by the Doncaster Rural Council. Mr. Marshall, clerk to the Council, said they had evidence in that parish that some of the mining population had already arrived there, and at the top of Norton Village an estate was in course of development which showed the need of a sewage scheme. Mr. Yarborough told the inspector a meeting of ratepayers had been called and had unanimously decided this large expenditure was premature.



## THE COAL AND IRON TRADES.

THURSDAY, AUGUST 21.

## Scotland.—Western District.

## COAL.

The position of the coal trade in this district is much stronger than last week, and better prices are being obtained. The recent brisk demand still continues, all coal being well booked up to the end of the month, while the best shipping qualities of splint coal are not obtainable for this month's loading. A considerable demand has also been experienced for treble and double nuts. The continued activity is mainly owing to heavy shipments to the Baltic. The recent improvement promises to be permanent, and prospects for the future are bright. The shipments for the week amounted to 111,055 tons, compared with 104,505 in the previous week and 130,718 tons in the corresponding week of last year. The clearances were at Glasgow 75,617 tons, Bowling 279, Greenock 3,427, Ardrossan 7,442, Troon 5,730, Irvine 1,874, and Ayr 16,686 tons. The coastwise shipments were 58,968 tons, while foreign exports totalled 52,087 tons.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	11/9 to 13/	12/6 to 14/6
Ell .....	13/	12/3 to 12/9
Splint.....	12/9 to 15/	12/9 to 15/
Treble nuts .....	13/6	12/9 to 13/3
Double do. ....	12/9	12/ to 12/6
Single do. ....	11/3	11/ to 11/3

## IRON.

The Scotch iron trade is still comparatively quiet, the recent reductions in prices having not yet occasioned any great rush of business. Makers of malleable bars are not yet working to mill capacity—cheap Continental prices, coupled with low American prices, being largely responsible. A good business is being done in the black sheet trade, although in this line also makers could easily overtake a larger amount of work. The Glasgow pig iron warrant market continues very idle, only about 7,500 tons being the total turnover for the week. The tone of the market has, however, been slightly better, and prices closed 2d. higher than the previous week. Business has been done in Cleveland iron at 56s. 1½d. cash, and 55s. 3d. to 55s. 3½d. 14 days. Transactions have also taken place at 55s. 4d. one month, and 50s. three months. The prices of Scotch makers' iron are practically unchanged, with the exception of Scotch hematite, which is quoted 75s. per ton, a reduction of 1s. since last week. Govan and Monkland are quoted f.a.s. at Glasgow, Nos. 1, 63s. 6d., Nos. 3, 67s.; Cambroo, No. 1, 73s., No. 3, 69s.; Clyde, No. 1, 74s. 6d., No. 3, 69s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 75s., Nos. 3, 70s.; Glengarnock, at Ardrossan, No. 1, 75s., No. 3, 70s.; Eglinton, at Ardrossan or Troon, No. 1, 69s. 6d., No. 3, 68s. 6d.; Dalnellington, at Ayr, No. 1, 70s. 6d., No. 3, 68s. 6d.; Shotts, at Leith, No. 1, 75s., No. 3, 70s.; Carron, at Grange-mouth, No. 1, 76s., No. 3, 71s. per ton. There are 89 furnaces in blast in Scotland, compared with 86 in the previous week and 88 in the corresponding week of last year. Of the total, 34 are making ordinary, 48 hematite, and 5 basic iron.

## Scotland.—Eastern District.

## COAL.

The coal trade in the Lothians is gradually returning to the position occupied previous to the dockers' strike. Work is still interfered with on account of a lack of labour, numbers of the miners having removed to other districts during the stoppage, and it will likely be a few weeks yet before the output is normal. At the moment there is a fair demand for the different qualities of coal. The shipments from the Firth of Forth ports were 82,474 tons, compared with 69,679 in the previous week and 116,723 in the corresponding week of last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	12/9 to 13/	12/9 to 13/
Secondary qualities .....	11/9 to 12/	11/9 to 12/
Treble nuts .....	13/6 to 14/	13/
Double do. ....	12/3 to 12/6	12/ to 12/6
Single do. ....	11/6 to 12/	11/3 to 11/6

In the Fifeshire district there has been an increased demand experienced for all sorts of coal. Collieries are well booked ahead, and prices have a firmer tendency. There is an ample supply of tonnage at both Methil and Burntisland, and the demand on the collieries for export is very heavy. Shipments during the week have been 86,013 tons coastwise and 44,807 foreign, the total of 130,820 tons comparing with 115,643 tons in the previous week and 133,447 tons in the corresponding week of last year.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	16/9 to 17/	16/6 to 17/
Unscreened do. ....	14/9 to 15/	14/6 to 15/
First-class steam coal.....	14/ to 14/3	14/3 to 14/6
Third-class do. ....	11/6	11/6 to 12/6
Treble nuts .....	13/ to 13/9	13/ to 13/6
Double do. ....	12/3 to 12/9	12/ to 12/6
Single do. ....	11/3 to 11/6	11/3 to 11/6

The shipments from Scottish ports during the past week were 24,349 tons, compared with 239,827 in the previous week and 380,888 tons in the corresponding week of last year. The total shipments to date are 10,112,203 tons, compared with 9,205,300 tons, an increase of 906,903 tons.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 124,819 tons of coal and 2,156 tons of coke were despatched from Tyne Dock, a decrease of 24,017 tons of coal and an increase of 127 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 58,933 tons of coal and 1,658 tons of coke, a decrease of 2,318 tons of coal and an increase of 64 tons of coke. The coal and coke shipments at Blyth aggregated 100,129 tons, an increase of 3,044 tons. The most interesting item of possible business in the coal market this week is with reference to the Russian Southern State Railways' requirements of steam coals. The latest information is that the department has been Ministerially authorised to purchase 800,000 tons of foreign coal, to be imported through the port of Odessa. It is assumed that the whole of this huge order will come to British collieries—probably, as to the bulk of it, to South Wales, of course. A Ministerial edict is daily expected, abolishing (for 12 months) the import duty—six copecks per poed, or about 8s. 9d. per ton—on foreign coal, this course having been unanimously decided upon at a recent session of the Duma. It is not improbable that, in view of the lateness of the season, much of the coal—all of which, apparently, is wanted within the next few months—may be sent to Riga and transported by rail to the south of Russia. The Finnish State Railways are stated to have contracted for 30,000 tons of West Hartley Main steams for delivery this autumn, at about 13s. per ton, f.o.b.; the order has been placed with Russian merchants. A very large quantity of Durham gas bests (in the neighbourhood of 400,000 tons, it is said) has been sold by the colliery to merchants for delivery in monthly quantities over next year at 12s. 6d. per ton f.o.b. Another lot—from 50,000 to 60,000 tons—of similar coal for like delivery has been sold at the same price. Other producers of gas bests are stated to be refusing over 13s. per ton for next year's delivery. Some 100,000 tons of Durham gas seconds for delivery over 12 months from next January, have been sold at 11s. 9d. f.o.b. Second-hand holders of best steams are stated to have sold pretty heavily for next year's delivery at 12s. 6d. f.o.b. Near Continental railways are reported to be enquiring for 50,000 tons of North-country steams for October-January shipment. Some 6,000 tons of best Newcastle gas coke for October-March delivery have been sold at 17s. 6d. f.o.b. The Bergen Gasworks are enquiring for 10,000 tons of Wear gas specials, the Stavanger Gasworks for 10,000 tons and the Randers Gasworks for 6,000 tons, all for delivery over next year. Several "parcels" of best unscreened Durham bunkers for 1914 delivery have been sold at 12s. f.o.b. The prompt coal market is inactive, but the inactivity is due to no falling-off in possible business. Loading turns are very much congested, however, and stems for gas and steam coals are stated to be not available until the end of the present month. Supplies of fuel are exceedingly scarce, a state of affairs somewhat contributed to by a rather short output of coal and to the slowness with which shipments are being made. F.o.b. quotations for prompt shipment have varied little on the week. The following are the only changes recorded:—Best steams, Blyths, are 3d. cheaper; Tynes, stronger; Tyne seconds, firmer; unscreened, inclined to advance; gas seconds, in seller's favour; specials, a shade dearer; unscreened bunkers (Durhams), stronger.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	15/3	15/3 to 15/6
Do. Tynes (Bowers, &c.) .....	15/3 to 15/6	15/ to 15/6
Secondary, Blyths .....	13/	13/
Do. Tynes (Hastings or West Hartleys) .....	13/6	13/3 to 13/6
Unscreened .....	11/9 to 12/6	11/6 to 12/6
Small, Blyths .....	9/6 to 9/9	9/6 to 9/9
Do. Tynes .....	8/	8/
Do. specials .....	9/6 to 10/	9/6 to 10/
Other sorts:—		
Smithies .....	14/	14/
Best gas coals (New Pelton or Holmside) ...	15/	15/
Secondary gas coals (Pelaw Main or similar) .....	13/9 to 14/	13/6 to 14/
Special gas coals .....	15/6	15/3 to 15/6
Unscreened bunkers, Durhams .....	13/9 to 14/6	13/6 to 14/6
Do. do. Northumbrians .....	12/ to 12/6	12/ to 12/6
Coking coals.....	13/6 to 14/	13/6 to 14/
Do. smalls .....	13/6	13/6
House coals .....	15/6	15/6
Coke, foundry .....	20/ to 22/6	20/ to 22/6
Do. blast-furnace.....	19/ to 20/	19/ to 20/
Do. gas .....	16/6 to 17/6	17/ to 18/

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 84,800 tons of coal and 1,170 tons of coke as compared with 93,295 tons of coal and 875 tons of coke for the corresponding period of 1912, being a decrease of 8,495 tons of coal, and an increase of 295 tons of coke. Loading turns still continue to dominate the coal market, and business now resolves itself largely into the question of arranging stems, which after the recent heavy chartering are more congested than ever. Transactions in consequence tend to be quiet, but nevertheless the market still continues very strong for all qualities of coals. Recent prices are still being very firmly held, and for some qualities higher prices are freely being realised. There is a great scarcity of all qualities of coals for prompt shipment, and the demand for prompt stems is exceedingly strong. The Bergen gasworks have invited tenders for a supplementary quantity of 5,000 to 10,000 tons of Durham gas coals for this year's shipment, and the Finnish railways have just booked up 30,000 tons of steam coals. There has been an extraordinary demand for forward shipment, and some large quantities have recently been contracted for. Best Durham gas coals have recently been sold for next year to the extent of 300,000 to 400,000 tons at 12s. 6d. per ton, and a large amount of business has also been done in bunker qualities, 11s. 6d. to 11s. 9d. having been paid for ordinary Durham unscreened, and 12s. to 12s. 3d. for better qualities. Quotations are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/6 to 16/
Secondary do. ....	14/	14/ to 14/3
House coals:—		
Best house coals .....	16/6 to 17/	16/6
Ordinary do. ....	16/	16/
Other sorts:—		
Lambton screened .....	15/9	16/
South Hetton do. ....	15/3	15/6
Lambton unscreened .....	13/9 to 14/	14/
South Hetton do. ....	13/9	13/9
Do. treble nuts .....	17/	17/
Coking coals unscreened ..	13/6	14/
Do. smalls .....	13/3	13/7½
Smithies .....	13/9	14/9
Peas and nuts .....	16/3	16/6
Best bunkers .....	14/6	14/9
Ordinary bunkers ..	14/	13/9 to 14/
Coke:—		
Foundry coke .....	21/	20/ to 21/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	20/	18/6
Gas coke .....	18/	16/6 to 17/

The freight market still continues very steady, rates being firmly maintained, and would probably be somewhat firmer were it not for the difficulty in arranging and securing stems from the collieries. Recent fixtures include the following:—Mediterranean: Palermo 10s. 3d., Licata 10s. 9d., Marseilles 8s., Genoa or Savona 8s. 4½d., Las Palmas 8s. 9d., Gibraltar 8s. 3d., Naples 8s. 9d. Bay: Lisbon 7s. 3d., Bordeaux 6s. Baltic: Riga 5s. 3d., Aarhus 5s., Helsingfors 5s. 3d., Cronstadt 5s. Coast: London 3s. 6d., Havre 4s. 4½d.

## Middlesbrough-on-Teas.

## COAL.

The fuel market shows little change. Coal is generally firm. Best gas kinds are 15s., seconds 14s., and specials 16s. The Stavanger Gas Company are in the market for 10,000 tons of best gas coal. Deliveries of gas coal for home consumption are increasing. There is a good demand for bunker coal, and it is met by an ample supply. Ordinary Durhams range from 13s. 9d. to 14s. f.o.b., superiors 14s. 6d., and specials 15s. 6d. Household coal is steady at 15s. 6d. to 16s. Fairly good enquiries for coking coal continue, and the price ranges from 13s. 9d. to 14s. 6d. Coke is in rather good request. Local consumption is on a heavy scale, but buyers report that they experience no difficulty in purchasing average blastfurnace kinds at 18s. delivered at Teesside works, though some sellers are inclined to fix the quotation at above that figure. Best foundry coke is in the neighbourhood of 22s. 6d. f.o.b., and gashouse coke is about 16s. 6d.

## IRON.

Shipments of pig iron are on a fairly good scale. To date this month the loadings at Tees ports total 57,649 tons, as compared with 55,180 tons to the same date last month, and 58,104 tons for the corresponding part of August last year. Cleveland pig iron is being steadily taken from the public warrant stores here, the withdrawals so far this month being at the rate of 420 tons per working day, and if this reduction is maintained the stock will disappear altogether by October next. The stock in the warrant stores now stands at 186,059 tons or 6,752 tons less than at the beginning of the month. There is little business passing in pig iron just now, but next month should see a demand spring up to meet autumn needs. Values of pig are easy. No. 3 g.m.b. Cleveland pig is 55s. 6d. to 55s. 7½d. f.o.b., No. 1 is 58s., No. 4 foundry 55s., No. 4 forge 54s. 9d., and mottled and white iron each 54s. 6d.—all for early delivery. There is practically nothing doing in east coast hematite pig. Second hands are pressing sales at 70s. for early or forward delivery of mixed numbers, but they meet with little success, and possibly contracts could be made at below the price named. Dealers in foreign ore are not disposed to lower rates, but consumers will not pay the prices asked. Nominally market quotations are based on 20s. ex-ship Tees for rubio of 50 per cent. quality. Most manufactured iron and steel works are closed this week, as is usual during the annual local races, when firms take the opportunity of executing repairs and generally overhauling machinery. Prices of finished iron and steel are unaltered.

## South-West Lancashire.

## COAL.

About a normal quantity for the time of the year is going into household consumption for the inland trade. There is no change with regard to prices. Steam coal for shipping is about in the same position as last week, though perhaps on the whole there is a little more of this class of fuel on offer. Prices, generally speaking, do not yet appear to be affected by the continued strike at Haydock Collieries, present rates for screened Lancashire steam coals being quoted at 13s. 6d. f.o.b. for ordinary qualities to 14s. or 14s. 3d. for the better qualities, although for commenor sorts in some instances 3d. less is being taken to clear wagons. The coastwise and cross-Channel trade for household fuel keeps consistently good, and is distinctly above the summer average. In some cases there is actual pressure for special grades. The wakes holidays in the manufacturing towns are one by one running their course and work is being resumed, and there are signs that slack will soon occupy a stronger position than it has had for the last few weeks.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/3	16/3
Do. (f.o.b. Garston, net) .....	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal.....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/6 to 14/3	13/6 to 14/3
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/



**South Lancashire and Cheshire.****COAL.**

The attendance on the Manchester Coal Exchange on Tuesday was good, but there was not much business to transact. The demand for house coal shows no improvement, and it is just a question of marking time at present. Furnace coal meets with good enquiry, but shipping coal has fallen away somewhat. Slack is in good demand, with plentiful supplies offering. Prices generally are firm, with the exception of shipping coal. Below are list prices:—

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

**IRON.**

Very little business to record. Good foundry iron can now be purchased at 62s. net delivered, but even this price does not tempt buyers to purchase more than sufficient to cover immediate requirements. The forges are mostly on short time and their products are without alteration, and not much weight of new work coming to them. The steel-works are short of work both in billet and bar mills. Bars were reduced yesterday to £7 5s. for good specifications. Billets remain at £5 5s. to £5 7s. 6d., with foreign at much less. Engineers and ironfounders of all classes would like to see more work coming in. Wagon works are busy for the moment.

**Yorkshire and Derbyshire.****Leeds.****COAL.**

The local coal market is still to some extent under holiday influences, but the position at the collieries is quite satisfactory for the time of the year. Apart from broken time caused by local feasts, the pits in West Yorkshire have been able to work fully five days this week, and the output has been cleared for the various markets daily. There is a plentiful supply of empty wagons, and loaded traffic is being moved expeditiously. Stocks at the pits comprise chiefly manufacturing fuel, but these are not heavy, while ground stocks of house coal are much less as compared with 12 months ago.

**House Coal.**—The demand from London and the eastern and southern counties for best house coal is fully maintained, but this scarcely applies to the medium and lower qualities. Sellers are very firm in their quotations, some of the special qualities of best house coal realising 15s. per ton at the pits. Stocking at the London depots is considerable, and with the closing of the holiday season the retail trade is expected to show a great improvement. The coastwise trade is fairly brisk, with the demand running mainly on medium Silkestone or similar firm house coals. In the West Riding merchants are but indifferently employed, although many of the larger residences are putting in stocks for the winter. The retail bagging trade is quiet. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkestone best, 16s. to 17s.; Silkestone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

**Gas Coal.**—The pits are able to work full time, and to keep the sidings clear of stocks. There is a fairly good demand for cheap parcels of unscreened gas coal for shipment at the Humber ports. New inland business is quiet, as the contracting season is practically over.

**Manufacturing Fuel.**—Supplies are still in excess of market needs, with the inevitable result that special prices are met with in numerous cases. This applies more particularly to slacks and unwashed nuts, there being a ready outlet for washed fuel and rough steam coal.

**Washed Furnace Coke.**—This branch of the trade shows no improvement. Spot lots are met with at 12s. 6d., others with short-term contracts at 13s. Stocks are considerable.

	Current prices.	Last week's prices.
House coal:—		
Prices at pit (London):		
Haigh Moor selected ..	14/ to 14/6	14/ to 14/6
Wallsend & London best	13/6 to 14/	13/6 to 14/
Silkestone best .....	13/6 to 14/6	13/6 to 14/6
Do. house .....	12/ to 12/6	12/ to 12/6
House nuts .....	11/6 to 12/	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best .....	16/6 to 17/6	16/6 to 17/6
Silkestone best .....	15/6 to 16/6	15/6 to 16/6
Do. house .....	14/6 to 15/6	14/6 to 15/6
Other qualities .....	14/ to 14/9	14/ to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/3 to 12/9	12/3 to 12/9
Gas nuts .....	11/ to 12/	11/ to 12/
Unscreened gas coal ..	10/6 to 11/	10/6 to 11/
Other sorts:—		
Prices at pit:		
Washed nuts .....	11/6 to 12/	11/6 to 12/
Large double-screened engine nuts .....	10/9 to 11/3	11/ to 11/3
Small nuts .....	10/ to 10/6	10/ to 10/6
Rough unscreened engine coal .....	10/ to 10/6	10/ to 10/6
Best rough slacks .....	8/ to 8/6	8/ to 8/9
Small do. ....	7/6 to 8/	7/6 to 8/
Coking smalls .....	7/3 to 7/9	7/3 to 7/9
Coke:—		
Price at ovens:		
Furnace coke .....	12/6 to 13/	13/

**Barnsley.****COAL.**

Although the demand generally may not be so vigorous as it was a month ago, the volume of trade is still very large. Continued complaints are made that the output cannot be maintained, owing to the frequent absence of large numbers of miners. In regard to some classes of fuel, the supply is not sufficient to meet the enquiry, and considerable delay is being experienced in consequence.

This condition of affairs, however, serves to give prices a more firm position than perhaps they would otherwise occupy. On export account there is a fairly strong enquiry to cover to the end of next month, but coal-owners have still very firm ideas as to what prices should be. These demands are not being complied with at the present, so that much of the business is of a hand-to-mouth character. Best quality steams are strong as about last quoted, and though there is rather a stronger tone apparent in respect of secondary descriptions of Barnsley bad steams, the position of consumers is not so strong as formerly. Frequent holidays are occurring, and this, in addition to the reason already stated, is keeping down the output in a material degree, or, with the pits working full time, there is no doubt the production would be still exceeding the enquiry. There continues to be a considerable bulk of small manufacturing fuel on offer. This is thought to be due to the fact that the mills in the cotton districts are frequently set down, owing to holidays, and the tonnage available is of a substantial character. A fairly satisfactory trade, however, continues to be experienced in regard to best washed nuts, which again make about the values prevailing a week ago, but slacks, especially those of a rougher description, have been offered more cheaply. The large tonnage of gas coal placed under contract, both for home and export, keeps the colliery fully employed; in fact, there are complaints that deliveries are in arrears. It is surprising to find the demand for house coal continues so good at this period of the year. The tonnage of best qualities which is going to London and the eastern counties for stocking purposes is unusually large, and local merchants still find it not easy to obtain ready supplies. The same state of things applies, though in a lesser degree, to secondary descriptions, although stocks at the collieries, even of this class of coal, are not large. Prices continue very firm and the stipulated advance is being readily obtained. There is no change to report in regard to coke, and business continues to be of a desultory character.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkestone .....	14/6	14/6
Best Barnsley softs .....	13/9 to 14/	13/9 to 14/
Secondary do. ....	11/ to 13/	11/ to 13/
Best house nuts .....	13/ to 13/3	13/ to 13/3
Secondary do. ....	11/ to 13/	11/ to 12/
Steam coals:—		
Best hard coals .....	13/ to 13/3	13/
Secondary do. ....	11/9 to 12/	12/
Best washed nuts .....	11/6 to 12/	11/9 to 12/
Secondary do. ....	10/9 to 11/	10/9 to 11/
Best slack .....	8/ to 8/6	8/ to 8/6
Rough do. ....	6/6 to 7/6	7/3 to 8/
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/6 to 12/	11/6 to 12/
Gas nuts .....	12/ to 12/9	12/ to 12/9
Furnace coke .....	13/	13/

**Hull.****COAL.**

There is not much change to report in the condition of the Humber coal market. Best South Yorkshire steam coal continues to be in good demand for export, and prices are maintained, a tendency to weakness for prompt delivery at the beginning of the week having been arrested. Small coal, however, is generally weak, the supply being plentiful and the demand only moderate. Forward business is still difficult to negotiate, and colliery owners continue to maintain their firm attitude. The announcement that the Russian State Railways are likely to come into the market for a considerable supply for Black Sea ports has had the effect of confirming them in their determination to keep prices at about their present level. Definite enquiries do not yet seem to have been put on foot, so far as one can gather locally, but there is the expectation that the Humber will not be left out altogether when the buying does actually begin. Shipments of coal from the Hull Docks are on a large scale, though the pressure is not so great as it was a week ago, when lost time caused by the holiday had to be made up. Thanks to the excellent facilities loading conditions are good, and practically prompt turn available. As examples of good despatch at the Hull and Barnsley Railway Company's riverside quay the following steamers are given as having loaded in good time:—"Edmund Hugo Stinnes," 3,780 tons in 14½ hours (average 262 tons per hour); "Zeland," 1,737 tons in 6 hours (average 289 tons per hour); "Marlwood," 2,902 tons in 8½ hours (average 351 tons per hour); and

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	16/3 to 16/6	16/3 to 16/6
Washed double-screened nuts .....	13/6	13/6
Unwashed double-screened nuts .....	13/	13/
Washed single-screened nuts .....	12/9	13/
Unwashed single-screened nuts .....	12/3 to 12/6	12/6
Washed smalls .....	10/3 to 10/9	10/6
Unwashed smalls .....	9/3 to 9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys .....	13/6	13/6
Rough slack .....	10/9	10/9 to 11/
Pea slack .....	9/ to 9/3	9/
Best Silkestone screened gas coal .....	13/6 to 13/9	13/3 to 13/6
Best Silkestone unscreened gas coal .....	12/9 to 13/	12/9 to 13/
Derbyshire:—		
Best steam hards (Hull) ..	15/9	15/9
Do. (Grimsby) ..	15/6	15/6
Derbyshire nuts (doubles) ..	13/	13/
Derbyshire nuts (doubles) (Grimsby) ..	12/9	12/9
Derbyshire large nuts ..	14/ to 14/6	14/ to 14/3
Do. do. (Grimsby) ..	14/	14/
Nottinghamshire hards ..	15/9	15/9
Do. do. (Grimsby) ..	15/6	15/6

"West Quarter," 2,071 tons in 5½ hours (355 tons per hour). The freight market has been quiet, few fixtures having been reported. The rates for Baltic ports are now on the basis of 5s. Cronstadt, and for Mediterranean ports 8s. to 8s. 6d. Genoa. The following are the approximate prices for prompt shipment f.o.b. Hull, &c.:—

**Chesterfield.****COAL.**

Steadiness characterises the coal trade of this district, and prospects for the autumn and winter months are hopeful. The present demand for house coal is satisfactory, and the pits are working practically full time. Prices are unchanged but firm, and the next movement will certainly be in an upward direction. Taking into account the fact that we are now at the height of the holiday season, business in fuel for manufacturing purposes is good, with every indication of an expansion with the advent of September. For gas producers, cobbles and nuts continue in brisk demand. Slack for boiler firing is now gradually coming into greater request, and it is expected that the demand during the winter months will be very heavy. Prices remain on the recent high level of values. Stocks are extremely low. Steam coal for locomotive use is much wanted, and substantial deliveries are going forward daily. The export trade is brisk, steam coal being in strong demand. Prices are very firm. Washed fuel finds a ready sale without any change in values. The coke market is weak both in respect of demand and prices. No improvement is to be expected until there is a recovery in the pig iron trade. Coking fuel is in fairly good demand.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

**IRON.**

The condition of the iron market is unsatisfactory. There is only a poor enquiry coming to hand for pig iron, and orders for finished iron are badly wanted.

**Nottingham.****COAL.**

Whilst the coal trade in Nottinghamshire has not been brisk during the past week, still a fair tone has been in evidence, and, taking into consideration the state of the weather and the time of the year, the position is on the whole satisfactory. In the domestic fuel section the demand is improving, this perhaps being more conspicuous in better-class qualities, the sale of which is good, as some householders are beginning to stock for the winter before prices advance. Second-grade and common sorts are going out of hand somewhat steadily. A feature of this branch is that prices are keeping firm, and very little material can be obtained at cheap rates. The outlook in the steam coal section is a little more favourable, as a larger amount of fuel is being sent away to the east coast ports for shipment. Best steams are in good request, with secondary qualities moderate, but small steams are in fairly brisk demand, prices of which show a tendency to increase. The recent holiday in manufacturing centres has somewhat curtailed the demand for slacks, but it is expected that this branch will quickly revive, and values are being maintained. Coke is having a slow sale, with prices on the down grade.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	12/6 to 13/	12/6 to 13/
Good house coals .....	11/ to 12/	11/ to 12/
Secondary do. ....	10/ to 11/	10/ to 11/
Best hard coals .....	11/9 to 12/6	11/6 to 12/6
Secondary do. ....	10/6 to 11/6	10/6 to 11/
Slacks (best hards) .....	8/3 to 8/9	8/3 to 8/9
Do. (seconds) .....	7/3 to 7/9	7/3 to 7/9
Do. (soft) .....	7/3 to 8/	7/3 to 8/

**Leicestershire.****COAL.**

The activity noted last week has been well maintained. It is true there is not a great pressure in business, but there is on the whole a satisfactory demand considering the time of the year. There has been a full amount of season business booked, and there is now a decided movement on the part of buyers. Some of the collieries here are not yet fully supplied with orders, but others are carrying a large amount of business. There is a better demand for household coal, and also for steam coals; nuts are in considerable request. Engine slacks are also wanted of all kinds. The output is being gradually increased, and though in some instances stocks are rather heavy they are generally clearing. Local merchants are occupied much as the last week or two, but they are anticipating an early improvement. The prospects of business are not at all discouraging, rather the other way. Quotations have not varied to any extent; any alteration is in an upward direction.

**South Staffordshire, North Worcestershire and Warwickshire.****Hednesford.****COAL.**

The coal trade of the Cannock Chase district is steadily reviving, and in a few weeks' time a keen demand will probably be experienced. Prices remain about the same as when last reported. The collieries are working well for the time of the year, in some cases nearly full time being worked. The house coal trade is not yet very brisk, but is gaining strength. There is a fairly satisfactory demand for coal for manufacturing purposes.

**Birmingham.****COAL.**

There is very little doing. Merchants and consumers are beginning to lay in stocks in anticipation of the autumn



and also of enhanced prices. A fair call for works experienced. Slacks are abundant. Prices are changed as follow:—

## Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep.....	16/6	16/6
Do. best shallow.....	14/6	14/6
Do. seconds do.....	13/	13/
Best hard.....	14/	14/
Forge coal.....	11/	11/
Slack.....	8/6	8/6
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked.....		
cohs.....	13/9	13/9
Best hard spires.....	14/6	14/6
Forge (steam).....	10/	10/
D.S. nuts (steam).....	9/6	9/6
Small (do.).....	8/6	8/6

## IRON.

There was a fair attendance at Thursday's market. Better enquiries are being received since prices were adjusted on a lower scale, and there is reason to suppose that the downward tendency has been checked. There is, of course, still plenty of room for improvement, for most of the mills of the district are operating part time only. The prospect of the harvest has quickened the demand for galvanised sheets, and both on home and foreign account this industry is in a state of activity, in striking contrast to that which existed a few months ago. The Liverpool prices are firmly upheld at £11 to £11 10s., which represents an advance of 10s. on recent quotations. In bar iron the market produced very little movement, and makers could do with more business. For second-class bars the better houses uphold the £7 10s. minimum, ranging to £7 15s., but smaller firms are glad to accept business below these figures. Common bar iron for bolts and nuts is in the neighbourhood of £7, which represents a fall of 10s. on the month. The demand is slightly better, though Belgian competition, despite uncertainty of delivery, is keen, this foreign iron being obtainable at £6 a ton. The Gas Strip Association met during the afternoon, and decided to retain prices at £7 10s. to £7 12s. 6d., according to size of order. The recent deductions in mild steel hoops and strips have not so far stimulated demand; current quotations for fine steel strip, used largely in the bedstead trade, are £8, and for stronger gauges £7 12s. 6d. to £7 15s. per ton delivered in the district. Pig iron retains its weakness. In Northampton district big stocks are accumulating, and one of the principal firms has blown out a furnace in order to check output. Prices vary from 52s. 6d. to 54s., for Derbyshire 54s. to 55s., and the leading brands of South Staffordshire 54s. to 55s. Consumers are bare, and as prices represent little more than actual cost, a reaction is anticipated soon. Makers of boilers, tanks, roofs, bridges, &c., are actively employed, but there is keen rivalry for new contracts.

## Forest of Dean.

## Lydney.

## COAL.

The steam coal pits continue to work full time, but the demand is much easier and prices less firm than during the past few months. There is very little stock, however, to be noticed, and all the collieries are disposing of full outputs. House coals continue in good demand and the pits are engaged five and six days in the week, which, considering the extremely warm and dry weather, is very satisfactory. Prices are very firm and should show an advance shortly.

## Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block.....	16/6	16/6
Forest.....	15/6	15/6
Rubble.....	15/9	15/9
Nuts.....	14/	14/
Rough slack.....	8/	8/
Steam coal:—		
Large.....	13/ to 13/6	13/ to 13/6
Small.....	10/	10/ to 10/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

## THE IRISH COAL TRADE.

THURSDAY, AUGUST 21.

## Dublin.

There is no change in the condition of the local coal trade, which is about normal, and there are no contracts owing to the high prices ruling. The country trade continues to be fairly good for this time of year. City prices remain unaltered, as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best kitchen, 24s.; Orrell slack, 21s., steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. Irish coals at Wolfhill (Queen's County) are:—Best large coal, 20s. per ton; best household, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth; steam coals for contracts, 17s. 6d. per ton. The coaling vessels arriving during the past week amounted to 44 as compared with 40 the week previously, chiefly from Swansea, Troon, Garston, Ellesmere Port, Newcastle-on-Tyne, Newport, Partington, Ayr, Point of Aire, Maryport, Cardiff, Preston, Workington, Glasgow, Whitehaven, Ardrossan, West Bank, Saundersfoot and Neath Abbey. The total quantity of coal discharged upon the quays was 20,000 tons.

## Aberdeen.

The city household trade is lifeless, but business in other classes is fairly good, both locally and inland. There is rather a scarcity of coal for the past week or

two from some of the Scottish districts, and prices of house coals have advanced, although there is no change in this port in any class of fuel so far, most qualities being firm at late rates. Trade with Scotch ports is now improving and there is, upon the whole, a good supply. City prices are as follows:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch bouse, 23s. 6d.; Orrell slack, 23s. 6d. Current quotations ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Cargoes arriving during the week were chiefly from Garston, Ayr, Ardrossan, Maryport, Preston, Partington, Glasgow, Port Talbot, Sharpness, Ellesmere Port, Whitehaven, Troon, Campbeltown, Girvan, Newport and Manchester. Stocks continue to accumulate.

## THE WELSH COAL AND IRON TRADES.

THURSDAY, AUGUST 21.

## Monmouthshire, South Wales, &amp;c.

## Newport.

## COAL.

For the past few days the steam coal market has manifested a steady tone throughout, very little change being shown in quotations, which to-day are rather closer than last week, although in the main no higher. The most movement is shown in smalls, where a good bunkering enquiry has enhanced values 3d. to 6d. a ton. In the way of prompt business there is now very little being done, buyers being unwilling to press their enquiries, while colliery salesmen as a rule have very little free coal to offer, and naturally wish to make the best of their position. Outputs have not yet regained their normal level, but next week will probably see this attained, as the holiday spirit amongst the colliers evaporates with the spending of their cash. Pitwood has remained a steady trade with reduced imports, best French fir realising 22s. ex-ship. In the freight market there has been little alteration in freights, tonnage offering more freely.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	17/3 to 17/9	17/3 to 17/6
Western-valleys, ordinary	16/9 to 17/	16/6 to 17/
Best Eastern-valleys .....	16/ to 16/6	16/ to 16/3
Secondary do. ....	15/9 to 16/	15/9 to 16/
Best small coals .....	8/3 to 8/9	8/ to 8/6
Secondary do. ....	7/6 to 7/9	7/6 to 7/9
Inferior do. ....	7/ to 7/3	6/9 to 7/
Screenings .....	8/6 to 8/9	8/3 to 8/6
Through coals .....	13/3 to 13/6	13/3 to 13/6
Best washed nuts .....	14/3 to 14/6	14/ to 14/6
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/6 to 20/6	19/6 to 20/6
Furnace coke .....	22/ to 23/	22/ to 23/
Foundry coke .....	26/ to 27/6	26/ to 27/

## IRON.

Local conditions of the iron and steel trades remain practically the same as a week ago. Work at the bar mills continues satisfactory, and output normal. A fair enquiry is coming to hand, but quotations remain as last reported. Imports of foreign bars for the week total about 4,000 tons, and values here are firm. The rail department continues to be well employed, and prices are quotably unaltered. The general outlook in the pig iron market is regarded as more favourable, but there is very little business being transacted just now, and quotations are slightly easier on the week. The tinplate trade remains practically as last reported, but the future is looked forward to with a more hopeful feeling. Quotations are nominally unaltered.

## Cardiff.

## COAL.

Although the shipments last week amounted to 372,877 tons, as compared with 232,093 tons in the corresponding week of last year, or an increase of 90,784 tons, the total is generally looked upon as unsatisfactory, and the aggregate exports would probably have been much greater if the colliers had returned to work as was anticipated. The renewed burst of fine weather has undoubtedly induced many of the colliers to prolong their holidays, and with the high wages now ruling, numbers of the men, instead of taking the usual fortnight, have been persuaded to prolong their vacation to three weeks or a month. The result has been that outputs are far below their normal for the time of the year, and the shortage has been reflected in the prices which have obtained during the past week. Generally speaking the market has been firmer, especially for best Admiralty qualities, and the difficulty has been to arrange stems. Many collieries which are fully booked refuse to look at any new business before September 1, and the hopes of buyers that prices would be easier in the near future are not likely to be realised—at any rate for some weeks to come. There is very little free coal on the market, and the only business that is being done is practically by middlemen, who are making the most of their opportunities. The amount of tonnage in the docks has been quite satisfactory, no less than 262 vessels being reported in Cardiff, Penarth, and Barry on Monday last. Charterings, too, have been on an increased scale, although considerably below the normal, the tonnage taken up last week being 263,150 tons as compared with 183,050 tons last week, or a decrease of 85,100 tons. For best Admiralty coals prices have been well maintained, and in several instances enhanced figures have been secured. Where prompt shipment was necessary, buyers have been biding out in the hope that the market would exhibit an easier tendency, but up to the present there is very little sign of these hopes being realised, and whilst the output remains on the present basis there is a probability that, instead of becoming weaker, an increased amount will have to be paid for prompt shipment. The Egyptian State Railways are now in the market for about

380,000 tons of steam coals for delivery over next year, and this contract is always looked forward to with some amount of interest, because it is one of the first to be arranged, and it forms a general forecast of prices for the ensuing 12 months. As a rule, the coal taken has been that produced by the Welsh and Monmouthshire pits, but last year there was a break in the ordinary methods, owing to the unrest in the Welsh coalfield, and a quantity of coal was taken from America. It was thought in some quarters at the time that this was in the nature of an experiment, but it is satisfactory to know that the great bulk, if not all, of the requirements of the Egyptian State Railways are now being asked for from the Welsh coalfield, so that American competition has not been successful in ousting Welsh coal from this important market. Tenders have to be in by September 10, and it is expected after this that forward contracts will be pretty well on a settled basis. The White Star contract, to which reference has been made in these columns on a previous occasion, is reported to have been arranged, and the orders are stated to have been distributed between the Lewis Merthyr, the Great Western, Cymmer, Powell Duffryn and the Mann George companies. The price has not transpired, but it is stated to range between 17s. and 18s. net. The Cunard Steamship Company are also in the market for 350,000 tons of large coal, but as in former years, it is probable that the orders will go to Yorkshire. Local prices generally have been well maintained, and in some instances a marked advance has taken place. Best Admiralties are firmly held for 21s., and superior seconds have commanded 20s. 6d., whilst for ordinary kinds the price has been 18s. to 19s., or an advance of 6d. a ton on last week. There is no change in best Monmouthshire coals, Black Veins being still quoted at 17s. 6d. to 17s. 9d., western-valleys at 17s. 3d. to 17s. 6d., and the best of the easterns at 16s. 9d., all f.o.b. Cardiff, the latter also showing an advance of 6d. per ton. In the small coal market there has been a considerable improvement. During the holiday week a large quantity of small coal was reserved by the collieries for home requirements, and the supply available for market purposes was restricted. Although the outputs are now increasing, the quantity produced has not been equal to the demand, and a smart spurt in price has taken place, best qualities having jumped from 10s. 9d. to 11s. 6d., and even 12s. has been paid during the past week for small quantities. Quotations at the time of writing, however, range from 11s. 6d. to 11s. 9d., with best ordinaries at 11s. 3d. to 11s. 6d. and cargo sorts at 8s. 9d. to 9s. Bituminous coals of the best quality are also a trifle firmer, but for the lower grades prices remain stationary. Local merchants had been expecting a reduction in the price of house coals as from August 15, but their anticipations have not been realised and the quotation is maintained at 20s. for best and 18s. for second qualities. There is therefore no hope of any reduction during the present summer, and the tendency is for higher prices in the early autumn. In the coke market there is very little business doing, special foundry being quoted at 28s., ordinary ditto at 25s. to 26s., and furnace coke at 20s. to 22s. Very little business, however, is being transacted at the latter figure, and in fact there is not much enquiry at all. Shipments of patent fuel last week amounted to 31,606 tons, of which the Crown company shipped 6,725 tons, other local makers 3,200 tons, and Swansea 21,681 tons. The quotation for best qualities is 22s. 6d. per ton net, and enquiries are numerous, although buyers seem to be waiting for a break in the coal market. Pitwood is a shade better than last week, current quotations ranging from 22s. to 22s. 3d. According to the Board of Trade returns which are now to hand, the shipments of coal from the Bristol Channel ports to the chief countries of the world during the month of July amounted to 2,873,830 tons, as compared with 2,801,866 tons in the corresponding month of last year, or an increase of 71,964 tons. From Cardiff alone the shipments were 1,837,233 tons, against 1,770,649 tons; Newport 477,549 tons, against 426,212 tons; Swansea 328,669 tons, against 370,475 tons, and Port Talbot 192,725 tons, against 216,820 tons. For bunker coals the returns are:—Cardiff 287,856 tons, against 246,539 tons; Newport 62,504 tons, against 64,044 tons; Swansea 43,622 tons, against 44,751 tons, and Port Talbot 12,588 tons, against 20,459 tons. The following table shows the quantity exported to the principal countries during July as compared with July 1912:—

	July 1913. Tons.	July 1912. Tons.
Russia .....	118,517	107,393
Sweden .....	12,482	30,693
Norway .....	15,445	15,723
Denmark .....	6,032	5,468
Germany .....	42,331	31,768
Netherlands .....	12,665	18,955
Java .....	5,351	4,947
Belgium .....	27,899	53,521
France .....	707,342	589,295
Algeria .....	62,325	51,056
French West Africa .....	17,691	12,575
Madagascar .....	—	5,754
Portugal .....	76,331	60,300
Madeira .....	4,372	9,091
Portuguese West Africa ...	8,572	48,286
Spain .....	112,319	112,067
Canary Islands .....	58,846	80,519
Italy .....	599,490	601,434
Austria-Hungary .....	18,631	24,012
Greece .....	33,178	14,623
Roumania .....	20,335	32,826
Turkey (European) .....	18,142	16,481
" (Asiatic) .....	14,247	22,455
Egypt .....	185,755	193,676
Tunis .....	25,227	16,525
Peru .....	—	6,827
Chili .....	18,470	45,311
Brazil .....	142,850	100,851
Uruguay .....	67,239	51,150
Argentine Republic .....	306,655	293,173
Channel Islands .....	7,802	8,565
Gibraltar .....	15,677	12,120
Malta and Gozo .....	45,551	32,304
Cape of Good Hope .....	5,664	235
Aden and Dependencies ...	14,229	12,169
British India .....	—	5,985
Ceylon and Dependencies ...	14,032	31,759
Hong Kong .....	10,318	—
Canada .....	2,887	5,529
Falkland Islands .....	5,023	3



Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	21/	20/6 to 21/
Superior seconds .....	20/ to 20/6	19/6 to 20/
Ordinary do. ....	18/6 to 19/	18/ to 18/6
Best bunker smalls .....	11/6 to 11/9	10/9 to 11/
Best ordinaries .....	11/3 to 11/6	10/3 to 10/6
Cargo qualities .....	8/9 to 9/	8/6 to 9/
Inferior smalls .....	8/ to 8/6	7/6 to 8/
Best dry coals .....	18/ to 19/	18/ to 18/6
Ordinary dries .....	15/9 to 16/6	16/ to 16/6
Best washed nuts .....	16/	16/ to 16/6
Seconds .....	15/	15/ to 15/6
Best washed peas .....	14/3 to 14/6	14/6
Seconds .....	13/ to 13/6	13/6
Dock screenings .....	11/3	11/
Monmouthshire—		
Black Veins .....	17/6 to 17/9	17/6 to 17/9
Western-valleys .....	17/ to 17/6	16/9 to 17/3
Eastern-valleys .....	16/6 to 16/9	16/ to 16/3
Inferior do. ....	15/ to 15/3	15/9
Bituminous coals:—		
Best house coals (at pit)	20/	20/
Second qualities (at pit)	18/	18/
No. 3 Rhondda—		
Bituminous large .....	17/6	17/
Through-and-through .....	15/	15/
Small .....	12/6	12/6
No. 2 Rhondda—		
Large .....	13/6	13/ to 13/3
Through-and-through .....	11/6	11/6
Small .....	8/6 to 8/9	8/6
Best patent fuel .....	22/6	22/6
Seconds .....	21/	21/
Special foundry coke .....	28/	28/ to 30/
Ordinary do. ....	25/ to 26/	25/ to 27/
Furnace coke .....	20/ to 22/	20/ to 22/
Pitwood (ex-ship) .....	22/ to 22/3	22/

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

## IRON.

For the first time in many weeks it is satisfactory to note that the enquiry for tinplates has been better and prices have become somewhat steadier. Shipments last week amounted to 99,501 boxes and receipts from works were 51,565 boxes, leaving stocks in vans and warehouses at 286,291 boxes, as compared with 192,832 boxes in the corresponding week of last year. The unsettled state of the Balkans still has a detrimental effect in some quarters and very little business is doing, whilst in other districts the mills and the trade are affected by American competition in the Canadian markets, which is described down here as unfair. In fact, an influential deputation has been organised to visit the Canadian Ministers, which will consist not only of employers, but workmen's officials, and, failing redress, it is contemplated that a combination will be formed of Welsh tinplate manufacturers and others with the object of starting new works in Canada on a large scale. This plan, it is expected, will put an end to the American dumping and will also beneficially affect the makers at this side of the Atlantic. Prices generally show a slightly firmer tendency and are:—Bessemer cokes 20 x 14 13s. 1d. to 13s. 3d., 14 x 18½ 13s. 6d. to 13s. 9d., 28 x 20 26s. 4½d. to 26s. 6d. Oil sizes are 13s. 7½d. for 18½ x 20 and 19s. 1½d. for 20 x 14. In the galvanised sheet trade the recent improvement in prices has been maintained and good orders are being received from India, 24-gauge corrugateds being firmly quoted at £11 to £11 5s. Imports of foreign steel during the week have been heavier than usual, being over 11,000 tons, but there is little new business doing, owing to the advance in prices by the Belgian makers. Local works are fairly well employed, Bessemer bars being £4 15s., and Siemens £4 16s. 3d. Welsh pig iron is 73s. 6d. f.o.b. In iron ore the market is stagnant and Spanish producers are holding out for prices, which are difficult to realise. Best rubio is offered at 18s. 6d., seconds at 17s. to 17s. 6d., and Almeria at 18s. to 18s. 3d. In scrap metals there is a slight improvement, heavy wrought being at 51s., cast and heavy steel 55s., light wrought 35s., double-headed rails 60s. to 62s., and mixed sections 55s. per ton.

## Swansea.

## COAL.

Following the holidays, the trade of the port showed considerable activity. Both the coal and patent fuel trades

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 23/6	21/ to 23/
Secondary do. ....	18/9 to 20/	18/6 to 20/
Big Vein large (less 2½ per cent.) .....	17/6 to 18/9	16/6 to 18/
Red Vein large do. ....	12/9 to 14/6	12/6 to 13/
Machine-made cobbles (net) .....	21/ to 22/	21/ to 22/
Paris nuts (net) .....	22/6 to 25/	22/6 to 24/
French do. do. ....	22/6 to 25/	22/6 to 24/
German do. do. ....	22/6 to 25/	22/6 to 24/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	12/ to 13/6	11/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	7/ to 7/6	6/ to 6/6
Duff (net) .....	5/9 to 6/3	5/9 to 6/3
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/6 to 12/6	11/ to 12/
Small do. ....	8/6 to 9/6	8/ to 9/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ p.c.) .....	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

were exceptionally brisk, the shipments amounting to 123,122 tons. A very good attendance assembled on 'Change this morning, and there was a steady improvement in the general condition of the anthracite coal market, the undertone being brighter. Swansea valley large continued a very strong market, and the improvement noted in Red Vein large was well maintained. Machine-made nuts were firm at last figures, and cobbles were slightly harder. Rubbly culm was in good demand, and prices were advanced. Duff was unaltered. There was a steady feeling in evidence in the steam coal market, and values all round were a shade harder.

## IRON.

There is every prospect of the tin-plate trade for next month being fully employed. At some of the works in the district the demand has been greater than the supply, with the result that prices have risen, and makers have secured better profits. Ten mills were in operation at the Duffryn Works, Morriston, last week, and an additional four were re-started on Monday. Trade in the various steelworks, in common with the industries all over the district, is most satisfactory, and prices are still being maintained. In the pig iron industry there is plenty on hand in the way of orders to keep one busy for some time to come. The shipments of tin-plates last week were 99,501 boxes, receipts from works 51,565 boxes, and stocks in the dock warehouses and vans 286,291 boxes.

## Llanelli.

## COAL.

There is very little doing in the coal market here, though collieries for the most part are able to put in full time. No great improvement can be expected until September and buyers prepare for the winter months. Stocks are still rather heavy, and wagons are none too plentiful to keep pits going. There is every prospect that anthracite will be in good demand over the coming months, and collieries have already commenced raising their prices for the machine-made kinds. These for the past months have done badly, and the change is a welcome one. The manufacturing kinds are moving very slowly, and prices are down considerably. Unfortunately there is very little promise of an improvement for weeks to come. Prices are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	20/6 to 22/	20/6 to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	17/ to 18/	17/ to 18/
Red Vein do. ....	12/6 to 13/6	12/6 to 13/6
Machine-made cobbles ...	19/6 to 20/6	19/6 to 20/
German nuts .....	20/ to 22/	20/ to 22/
French do. ....	22/ to 24/	22/ to 24/
Paris do. ....	22/ to 24/	22/ to 24/
Machine-made beans .....	20/ to 21/	19/ to 22/
Do peas .....	12/ to 13/	12/ to 13/
Rubbly culm .....	6/6 to 7/	6/ to 6/6
Duff .....	4/6 to 5/6	5/ to 5/6
Other sorts:—		
Large steam coal .....	17/ to 18/	16/ to 17/
Through-and-through ...	11/6 to 12/	11/6 to 12/
Small .....	9/ to 10/	9/ to 10/
Bituminous small coal ...	10/ to 11/	10/ to 11/

## THE BY-PRODUCTS TRADE.

**Tar Products.**—Things are steady, and prices for the most part well maintained. Benzols are firm, while even carbolic seem to show a little more movement. Pitch keeps very steady, and seems in satisfactory request. Creosote quiet and naphthas also. Nearest values are:—

Benzols, 90's .....	1/1
Do. 50's .....	11½
Do. 90's North .....	1/
Do. 50's North .....	11
Toluol .....	11½
Carbolic acid, crude (60 per cent.) .....	1/3½ to 1/5
Do. crystals (40 per cent.) .....	4½
Solvent naphtha (as in quality and package) ...	9¾ to 10d.
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3
Pitch (f.o.b. east coast) .....	42/ to 43/
Do. (f.a.s. west coast) .....	41/6 to 43/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—Anticipations are being realised, and prices generally are firmer, and in some quarters show a distinct advance. The forward market also is much improved, and after the business transacted in some localities £13 10s. would not be sufficient to secure supplies. Closing prompt prices are:—

London (ordinary makes) .....	£12/16/3
Beckton (certain terms) .....	—
Liverpool .....	£13
Hull .....	£12/17/6
Middlesbrough .....	£12/16/3 to £12/17/6
Scotch ports .....	£13/2/6 to £13/5/
Nitrate of soda (ordinary) per cwt. ...	10/7½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

At Market Bosworth, Leicestershire, on Wednesday, a colliery shot-firer, Samuel Moore, of Hugglescote, was summoned for unlawfully failing, when coupling cables to firing apparatus, to see that all persons in the vicinity had taken proper shelter, contrary to the Explosives in Coal Mines Order, 1912. Defendant pleaded guilty. At Ibstock, on July 3, there were two men in a particular stall, one named Pendleton, and the defendant allowed him to connect the cable, and failed to see that the men were clear when he fired the shot, with the result that Pendleton was killed. It was further stated that the defendant, who was an efficient and faithful workman, mistook a shout by another man when he fired. He was fined £2, including costs, or 14 days.

## BOOK NOTICES.

**Reports of Lectures, 1912-13: Secretaries' Association Limited.** 104 pp. 7¼ in. x 5 in. London: Bassishaw House, 70A, Basinghall-street, E.C. Price 1s. net.

Contains verbatim reports of the following six lectures, some of them of much interest:—"Commercial Education with Relation to the Training of the Secretary," by H. J. Eldridge; "The National Insurance Act, 1911," by P. Rockliff; "The Secretary in Health and Disease," by H. Cooper Rose, M.B.; "Westminster Abbey: Its Architecture, its History, its Tombs," by H. W. Fincham; "The Promotion and Flotation of Limited Companies," by H. W. Jordan; "The Story of a Bar of Iron," by L. P. Sidney (assistant-secretary of the Iron and Steel Institute).

**The Fitting and Erecting of Engines.** By C. LESLIE BROWNE. xii. + 153 pp.; 114 figs., 8½ in. x 5½ in. Manchester and London: Emmott and Co. Price 3s. 6d. net.

The contents of this book, which appeared originally as a series of articles in the *Mechanical World*, have been written with the object of assisting young engineers in their practical work. Much has been written on the design and construction of engines and on their use and maintenance; the province that lies between them, however, is a *terra incognita* so far as text-book literature is concerned, but one that can be exploited with profit. The author deals amply with all the small, but vastly important, problems that beset the fitter—the choice of tools, the adjustment of bearings and other essential parts, &c. It is a book that is conspicuously valuable to the apprentice.

**The Newport Year Book, 1913.** Newport Chamber of Commerce. Price 5s. net.

Most of our leading ports now employ this means of bringing their facilities to the notice of traders. We believe, however, that the "Newport Year Book," which now attains its sixteenth year of issue, was the first illustrated official publication of its kind in the kingdom. It is also one of the best. Since 1902 the exports of coal from Newport have more than doubled, and there has been a similar advance in almost every branch of the export and import trade, which is almost exclusively associated with the coal and iron trades. The Year Book contains a full analysis of the statistics of export and production, and there is a list of collieries situated in the rich hinterland of the port, a list of members of the Chamber of Commerce, and many other features of interest. We must not forget a history of Newport, written by Mr. Samuel B. Williams, secretary of the Chamber.

**Reid's Handy Guide for Northumberland, Durham and Yorkshire.** 266 pp.; 6½ in. by 4 in. Newcastle-on-Tyne: Andrew Reid and Co. Price 2s. 6d.

This little annual is so well known that few words of commendation are needed here. The excellent colliery map given in former issues has been revised, and the text of the Coal Mines Act and Rules and Orders issued since the Act came into force is given in full. The main portion of the book, as heretofore, is occupied with lists of colliery owners, collieries, agents, managers, engineers and fitters. There is also a brief but useful collection of data, compiled by T. R. Blackett.

**Law and Practice of the Railway and Canal Commissioners' Court.** By E. E. G. WILLIAMS. xxi. + 292 + [14] pp.; 5 in. by 8½ in. London, Winnipeg, Sydney and Calcutta: Butterworth and Co.

The procedure of the Railway and Canal Commission has not always given satisfaction, and the efforts to amend it made within recent years have not been singularly successful; the fact, however, that it varies considerably from the practice in other courts is in itself the justification of a book such as that under review. In it the law has been arranged under its appropriate subjects, such as traffic facilities, undue preference, increases in rates, special services, terminals and demurrage, analysis of rates, workmen's trains, working agreements, canals, labour legislation, and the Post Office. The second part is devoted to the practice of the courts, and there are in addition appendices containing precedents, rules, and statutes, with an index and table of cases. In fine, there must be many to whom such a work at the present time is little short of a boon.

**The A B C Guide to Patents for Inventions.** By ROBERT E. PHILLIPS, M.I.Mech.E., Assoc.M.Inst.C.E., and A. MILLWARD FLACK, Fel. Chart. Inst. P.A. 66 p. London: Butterworth and Co.

The only excuse for another book on patents must lie in the treatment. In this case the adoption of the "A B C" method, with its economy in time and labour, is, we think, sufficient justification. We are not aware that the authors make any further claims.



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Part I. of the annual report of the Chief Inspector of Mines for 1912 has now been issued. The total output of coal in the United Kingdom was 260,398,578 tons, a falling off of 9,207,772 tons as compared with 1911. This decrease is accounted for by the national strike which occurred in the earlier part of the year. The total number of persons employed in and about all mines was 1,117,148, of whom 1,089,090 worked at the 3,265 mines under the Coal Mines Act, and 28,058 at the 645 metal-liferous mines. This shows an increase of 21,877 persons employed in coalmines. The number of fatal accidents occurring in coalmines was 1,151, causing the death of 1,276 persons. The non-fatal accidents totalled 150,217.



At a meeting of the North Staffordshire Institute of Mining and Mechanical Engineers to be held on Monday next, Mr. John Gregory will read a paper on the "Practical Examples of the Use of Concrete in Collieries."

On Friday last, two miners were electrocuted while working at an electric coal-cutter at the Moor Green Colliery, near Nottingham. The inquest was opened on Monday, and adjourned until Tuesday next.

The application of the South Wales Miners' Federation seeking an advance of 15 per cent. in the wages of surface workmen has been refused by the owners.

The members of the Institute of Journalists will to-day inspect the Hemsworth Collieries.

The executive of the committee of the North of England Miners' Association have issued a circular drawing the attention of the miners to the extremely low financial position of the association. In condemning the strike-for-everything policy, the circular points out that at present there is an overdraft at the bank of £10,000. The miners are urged to consider this when balloting for a county strike to enforce modification of the three-shift system.

The annual conference of the Scottish Miners' Federation opened on Tuesday. Mr. John Robertson, vice-president, referred to the lack of rescue appliances on the occasion of the Cadder pit disaster, and declared that, except in Fife and Ayrshire, the Scottish coalowners had done nothing to provide the appliances which two years ago the law laid upon them the onus of providing. At mines where more than 60,000 men were employed no such provision had been made. On Thursday, it was resolved to submit to a ballot of the men a proposal to substitute, for the Federation, a national union of Scottish miners.

DEEPLY deplorable was the ven-  
**"Trade"** erous attack upon the Home Office  
**and** and the Scottish coalowners made  
**"Profits."** at the annual conference of the  
 Scottish Miners' Federation on  
 Tuesday by the vice-president, Mr. JOHN  
 ROBERTSON (who occupied the chair in the  
 absence of the president, Mr. ROBERT SMILLIE),  
 while moving a resolution of sympathy with the  
 relatives of the men who lost their lives in the  
 Cadder pit disaster. Referring to Mr. McKENNA'S  
 reply to Mr. ADAMSON, in the House of Commons  
 on August 12, the chairman of the annual  
 conference of the Scottish Miners' Federation is  
 reported to have said that the Home Office (and,  
 implicitly, the coalowners) were apparently more  
 concerned about the coalowners' profits than  
 about the miners' lives. This was a most  
 serious charge, and absolutely unjustifiable.  
 What Mr. ROBERTSON probably had in his  
 mind was Mr. McKENNA'S statement that  
 "he quite agreed that if the Home Office were in  
 every case, the moment an Order was passed, to  
 bring an action against all the employers for not  
 carrying it out, no doubt Orders would be more  
 rapidly enforced, but they would be enforced at  
 the expense of trade." "Trade" does not mean,  
 simply, profits to coalowners, but, on the  
 contrary, has a wide significance. Trade means  
 wages first and profits (sometimes microscopical)  
 afterwards. It has been calculated by competent  
 authorities, from figures of results obtained at  
 collieries throughout the kingdom, that the cost  
 of labour is about three-fourths of the cost of  
 production, apart from capital charges. This  
 being so, a sacrifice of trade must necessarily  
 mean a dominant sacrifice of employment and  
 wages, and wages mean the well-being and even  
 lives of the miners.

In 1910 an Act was passed, called the Mines  
 Accidents (Rescue and Aid) Act, empowering  
 the SECRETARY OF STATE to make an Order  
 requiring such provision as he might consider to  
 be necessary to be made in regard to (a) supply  
 and maintenance of appliances for use in rescue  
 work, and formation and training of rescue  
 brigades; (b) supply and maintenance of  
 ambulance appliances and the training of men  
 in ambulance work. This Act was the ultimate  
 outcome of recommendations made by the Royal  
 Commission on Mines, in their Second Report,  
 dated July 1909. Subsequent to the passage  
 of the Act, the HOME SECRETARY appointed a  
 Committee, which included representatives of  
 mineowners and miners, to frame proposals for  
 an Order, who reported unanimously. A Draft  
 Order, giving effect to the recommendations of  
 the Committee, was issued in 1911.

After discussion, the terms of the Order were  
 agreed to, and it was issued in its final form in  
 May 1912. It would appear that the installation  
 of rescue apparatus in collieries in Lanarkshire  
 and adjoining counties has been delayed in  
 consequence of a dispute as to whether smoke  
 helmets supplied with fresh air by means of a  
 tube and valve comply with the requirements  
 of the Act; and Mr. McKENNA has stated that  
 he is going to appoint a committee to examine  
 into the merits, or otherwise, of appliances of  
 this description. The results of the use of  
 rescue appliances have, so far, not been altogether  
 satisfactory, and it certainly seems that unneces-  
 sary haste should be deprecated.

Colliery owners are far too deeply interested  
 in securing the safety of their men as well as of  
 their mines for us to entertain the possibility of  
 the truth of such a charge as has been made by  
 the Scottish Miners' Federation.

Coalmining is admittedly a dangerous industry,  
 and the risk of accidents cannot be altogether  
 eliminated. Striking results in the diminution  
 of the number of accidents have, however, been  
 achieved through the combined efforts of the  
 masters and the men, assisted by the Home  
 Office, and it is only by such combined action  
 that the conditions of mining can be further  
 improved. On the other hand, distrust will  
 tend to undo much of that which has already  
 been done. A full Government enquiry is  
 to be held at once, by Sir HENRY CUNYNG-  
 HAME, into all the circumstances attendant upon  
 the Cadder disaster, and it is only fair that  
 judgment should be withheld until the result  
 has been made public. The Government has a  
 difficult part to play in the just administration  
 of mining legislation, for it has to consider  
 matters from many points of view—the general  
 good of the community being the ultimate  
 consideration. In addition to this, the Govern-  
 ment must frequently be in possession of infor-  
 mation which is not available to the public, and  
 which may rightly influence their action in any  
 particular case.

In his report for the year 1912 dealing with  
 Scotland—which has just been issued—Mr. W.  
 WALKER, H.M. inspector of mines, refers to the  
 use of smoke helmets, as follows:—

"In the Lothians the owners have, after  
 considering the matter, come to the conclusion  
 that smoke helmets installed at the collieries  
 comply with the Order, and have informed me  
 that this is their opinion and that such  
 apparatus has been installed at the Elphinstone  
 Collieries, near Tranent. A committee repre-  
 senting the owners in Dumbartonshire, Lanark-  
 shire, part of Linlithgowshire and Stirlingshire,  
 after considering the question and making  
 experiments with smoke helmets, which were  
 witnessed by myself and some of the other

inspectors, have also decided that they comply  
 with the requirements of the Order. I met this  
 committee at their request, and they then informed  
 me of this decision, and enquired what my  
 opinion was. I informed the Committee that  
 I would report their decision to you (his  
 Majesty's SECRETARY OF STATE FOR THE HOME  
 DEPARTMENT), but I was of opinion that  
 you would not be able to agree that  
 smoke helmets were 'portable breathing  
 apparatus' within the meaning of the Order,  
 and, personally, although I thought they  
 were excellent within certain limits, I was  
 unable to agree that they would meet all the  
 cases which might arise after an explosion or  
 underground fire, and that, therefore, portable  
 breathing apparatus of one or other of the well-  
 known types, which were installed in other  
 parts of the United Kingdom, should be  
 installed."

It would therefore appear that the coal-  
 owners have not been altogether passive in the  
 matter. Unfortunately, neither the apparatus  
 which the Home Office thought necessary, nor  
 the smoke helmets which, according to the view  
 of the Scottish coalowners, they thought were  
 sufficient, had been provided at the colliery in  
 question.

#### Trade Summary.

The London coal trade for the past week has been very  
 slow. Steam coals, kitcheners cobbles, and bakers' nuts are  
 moving better, but all household coals are in very moderate  
 demand. Contractors are gradually falling into line, and  
 agreeing to the 1s. advance. The near approach of the  
 winter months has made it expedient to close, especially  
 with bakers' nuts. Stocks, however, at the various wharves  
 and depots are accumulating, and prices are still difficult  
 to maintain. Small nuts and slacks have shown a distinct  
 depreciation, but it is thought to be only temporary.

At Newcastle the prompt market is inactive. Supplies  
 are very scarce. Prices in a few cases inclined to advance.

The market at Durham continues strong. Prices are  
 firm, and in some qualities are slightly higher. Good  
 business in bunkers.

The house coal trade of Lancashire remains quiet, with  
 prices unchanged. Shipping supplies very little improved.  
 Furnace coals and slack in good demand. Prices generally  
 firm.

The demand for house coal at West Yorkshire is main-  
 tained in best qualities. Unscreened gas coals in fair  
 demand.

Steam coal market in South Yorkshire remains unchanged.  
 Slacks rather cheaper, whilst gas coal continues scarce.  
 Good demand for house coal. Depressed condition of coke  
 unaltered.

Derbyshire house coal in satisfactory demand, and prices  
 remain firm. Business in fuel for manufacturing purposes  
 is fair. Export trade brisk.

At Cardiff, the output is still below normal, market  
 slightly firmer. Considerable improvement in small coals.  
 Good enquiry in patent fuel.

Position of coal trade in West Scotland is much stronger,  
 and prices are higher, whilst the forward demand is good.  
 Market in the east not fully recovered from Leith dockers'  
 strike, but gradual improvement is shown.

#### THE TIN-PLATE TRADE.

##### Liverpool.

There has been very little doing the last few days.  
 Buyers prefer only to cover their requirements over two  
 to three months. The tone of the market is quietly  
 steady, and current quotations may be called:—Coke tins:  
 I C 14 × 20 (112 sh. 108 lb.), 13s. 3d. per box; I C 28 × 20  
 (112 sh. 216 lb.), 26s. 6d. to 26s. 9d. per box; I C 28 × 20  
 (56 sh. 108 lb.), 13s. 9d. per box; I C 14 × 18½ (124 sh.  
 110 lb.), 13s. 9d. per box; I C 14 × 19½ (120 sh. 110 lb.),  
 13s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 9d.  
 per box; I C squares and odd sizes, 13s. 7½d. to 13s. 9d.  
 basis for approved specifications. Charcoal tins are selling  
 slowly. Quotations for I C 14 × 20 run 15s. 6d. per box  
 and upwards according to finish. Ternes rule easy at  
 23s. 3d. for I C 28 × 20. Coke wasters are in moderate  
 request, and are quoted:—C W 14 × 20, 12s. 1½d. per box;  
 C W 28 × 20, 25s. 4½d. per box, C W 14 × 18½, 11s. 6d.  
 per box; C W 20 × 10, 15s. 9d. to 16s. per box—all f.o.b.  
 Wales, less 4 per cent.

The Maltby Main Colliery is rapidly developing under  
 the present management. The output of coal reached 1,000  
 tons for one day recently, while the record of 900 tons of  
 coal for the afternoon shift was reached.



## WORKMEN'S COMPENSATION. (SPECIALLY CONTRIBUTED.)

### Not a Volunteer.

*Painter v. Caeduke Colliery Company.*—In this case (Llanelly, May 5), in reviewing the evidence Judge Lloyd Morgan observed that a request had been made by Mr. Matthews, the manager of the colliery, for the use of some extra apparatus in order to enable men to fill up a gap through which gas from some old working was leaking. The manager and Painter made an arrangement to do the work required, and along with two other men they descended the pit on October 27. On that day Painter was poisoned with gas. For the respondents, it had been submitted that Painter was a volunteer, or, at any rate, was a contractor and not a servant.

His Honour was of opinion that deceased was not a volunteer and was a workman within the meaning of the Workmen's Compensation Act, and he would give his award in favour of the applicant. In the event of the parties being unable to arrive at a mutual agreement regarding the amount, the question would be deferred pending the calling of witnesses.

### Liability of Third Party.

*Kear v. Streamhead Colliery Company.*—In this case (Tunstall, May 9) it appeared that the applicant was driving a crut in the respondents' colliery on October 5, 1912, when the accident occurred. He was not employed by the respondents, but by Messrs. Hosey and Son, who contracted for the work. He was being drawn up from his working place in a tub belonging to the contractors, when his foot went through a hole in the side of the tub and was crushed against a pillar. Respondent said he worked under the direction of the manager, who supervised the work. Henry Brown, commercial manager and agent for the respondents, said it was usual for collieries in that district to let out their crutting. The manager only saw that the crutting was being kept straight.

His Honour held that the applicant was not the servant of the respondents, but of the contractors. Respondents did not employ skilled men for this particular work.

### Boarding Train whilst in Motion.

*Walton v. Tredegar Iron and Steel Company.*—In this case (Tredegar, March 18) it appeared that deceased was a collier lodging at Pontllanfraith, and travelled to and from his work at Pochin Colliery by the colliers' train. On October 1, when leaving work, he tried to board the train before it had stopped, and fell between footboard and the platform and was killed. It was stated that the train was run under an agreement between the Tredegar Iron and Coal Company and the London and North-Western Railway Company, and that the workmen had to sign an indemnity relating to both companies as a condition on which they were allowed to travel by that train.

On behalf of the applicant, it was argued that the workmen had a right to the use of the train as one of the terms of their employment.

After hearing argument, his Honour said the first point was largely a question of fact, but most stress was laid on the indemnity agreement. He did not regard the words of the indemnity as implying a licence or privilege. By the award of 1890 it was arranged that the train should be run and the fares paid by the company, and it was regarded as part of the terms of the employment. The award must be in favour of the applicant.

### When is a Woman Dependent on her Husband?

*Young v. Niddrie and Benhar Coal Company.*—In this case (House of Lords, July 2) the question was whether a deserted wife and children could be said to be dependent upon the husband. The wife and children were deserted in March 1907. From then the husband gave his wife small sums amounting to £2. She managed to keep herself by charring and with help from grown-up sons. Eventually she got a maintenance decree against her husband for £15 12s. a year, but she only recovered 17s. under the decree. The husband died as the result of an accident in 1911. The Sheriff-Substitute, as arbitrator, found that the two younger children were wholly dependent upon the earnings of their father at the time of his death. The Court of Session reversed this finding, but the House of Lords restored it on the ground that all such questions were questions of fact. In March 1907 Young deserted his family, and from that time down to the time of his death, in April 1911, paid nothing towards the support of his wife or children. His wife and family continued after he deserted to live together at High Bonnybridge. The family consisted of two older sons, then aged 17

and 14 respectively, who were working, and two younger children, Richard and Gretta, then aged seven and four years respectively. The father gave them small sums from time to time when he met them casually but paid nothing regularly, and did not pay alimony which had been decreed against him. In April 1911 the eldest son received a post-card which had been sent at the father's request stating that he had met with an accident while employed by the respondents as a miner in their Woolmet pit, Bonnyrigg, Mid-Lothian, and that he had been removed to the Edinburgh Royal Infirmary. The son on arriving at the infirmary found that his father was dead. The respondents paid the widow £2 18s. that was due to the deceased for wages, but denied liability to make further payment as compensation under the Act. In these circumstances it was held by the House of Lords that the wife and children were dependants, and were entitled to £216 as compensation.

### Miscellaneous Cases.

*In Weth v. Wansboro' Paper Company* (House of Lords, July 21) it was held that a man who had been unloading a ketch, and safely crossed the plank from the ship to the quay, but slipped on a guide ladder on the dock premises, was not the victim of an accident arising out of and in the course of his employment.

*In Parker v. Usk Board of Conservators* (Usk, July 27) it was held that a water bailiff, who was found drowned in the river with his uniform on, there being marks to show how he had tried to grab his way out, was the victim of an accident.

*\*\* We shall be pleased to answer in this column questions relating to Workmen's Compensation and Employers' Liability. All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.*

## LABOUR AND WAGES.

### North of England.

A circular, drafted by the executive committee of the Northumberland Miners' Association on the "Cost and Means of Striking" has been issued to the branches, which states:—The sense of responsibility which the office we occupy as your executive committee compels us to draw your attention to the resources of our association and the demands which are being made on these resources. Desire must always be the forerunner of realisation; but desire should be governed by reason, and attempts to achieve that which we desire should be measured by the means at our disposal; otherwise action will defeat itself. These truths are largely lost sight of to-day by the strike-for-everything advocate, and we regret to say that this sort of advocacy has recently become too popular in our ranks. We therefore desire to point out the foolishness of such a policy at the present time. In disputes between capital and labour workmen should never resort to a strike until everything else has failed, and not even then unless they have the means to strike hard enough and long enough to make success probable. According to resolutions carried by our association, under the advocacy we are condemning, we have to take ballot votes of our membership on the following questions, all involving the probability of a county strike if two-thirds of the votes recorded in favour of the down-tools policy to enforce our demands:—

1. Are you in favour of striking until our demands regarding the grievances of night workers are conceded by the colliery owners?
2. Are you in favour of taking every "baff" Saturday as a general holiday without getting the consent of the colliery owners?
3. In case of failure to get such a modification of the three-shift system, are you in favour of handing in notices to enforce the abolition of the three-shift system?

In addition to these proposed county strikes it has also been decided that the workmen at any colliery where the owner refuses to give all stonemen and shifters the same rent and coal allowance as is given to coal hewers, the workmen shall have power to hand in notices to demand the same. There is a similar decision regarding the workmen of any colliery where the "butty" system is in operation and the owner refuses to abolish the system.

With all these ballot votes and possible strikes in front of us, is it not time we were considering the means we have of supporting our members and their families during such strikes? Just previous to the national strike of last year our assets stood at £81,887 7s. 2d. Most of this was invested in Newcastle Corporation and Northumberland County Council stocks, the rest was in property. All this was either realised or mortgaged in order to pay as much strike benefit as possible to our members. Two strikes since have cost £3,200, and these have left us at the present time with no money in our funds, and an overdraft at the bank of £10,000. In addition, it has now been decided to pay rent allowance to financial members who were living in rented houses during the last three weeks of the national strike, during which no benefit was paid. This will cost about £6,000, and the trustees have been instructed to seek a further overdraft at the bank to that amount. This, if secured, will leave us with a bank overdraft of £16,000, covered by the value of our property and £8,000 Newcastle Corporation Stock, the bonds and deeds for which

are now in the hands of the bank. This overdraft at 3½ per cent. interest will be a further charge upon our funds of £560 per annum. Previous to the strikes we have referred to, instead of having to meet an expenditure of this kind, we had an income from interest on our investments equal to nearly the whole of our ordinary working expenses. The cost of taking each of these ballot votes will be between £120 and £130. The cost of a county strike is between £23,000 and £24,000 a week. Notwithstanding this enormous cost, with nothing in our funds and a huge overdraft to pay off, we are contemplating entering into a county strike on three separate questions, and, in addition, we have decided to give leave to two-thirds of our branches to come out on strike on two other separate grievances. The wisdom or otherwise of this we will leave to our members when they have to mark their voting papers in the coming ballots. If we are as an association still to occupy the forefront in the ranks of trade unionists, or if we are to secure the reforms in the conditions of our workmen in our own district which we are now seeking, we will have to increase our contributions to our association. Otherwise, we will have to be content to go on in the crippled and weak condition which we have herein pointed out.

We may be pointed to the fact that we are members of the Miners' Federation, and therefore should look to it for support. The question presents itself to us as honourable men, "Would we, because of a lack of funds, be justified in asking financial assistance from the funds of other districts where the members pay as high a contribution per week as we do per fortnight?"

A mass meeting of the Durham Miners' Association at West Stanley, co. Durham, on Saturday, registered its protest against the rates and rules under the Minimum Wage Act, as operating in Durham at the present time. It also called upon the workers to seriously consider their position with regard to the coming ballot under the Trade Union Act, and trusted that they would vote in favour of using their votes for the purpose of making trade unionism effective on the floor of the House of Commons.

At Newcastle, on Saturday, a conference took place between the Northumberland Coalowners' Association and representatives of the Miners' Association respecting proposed modifications to the three-shift system so as to avoid evening work as far as possible, and the grievances of surface workers at the mines in the county, Mr. T. Taylor presiding. The results of the conference are to be communicated to the branches in due course.

At Easington Colliery, where 1,500 men and boys are idle over the cage trouble, there are still no signs of a settlement. There have been no overtures from the owners to ride 30 in a cage, and the men on their part decline to ride 60, and there the matter stands. A meeting of the executive of the Durham Miners' Association is expected to be held at Durham shortly, when the question will be considered. The management have drawn all the ponies out of the mine.

### Federated Area.

A strike ballot of the surfacemen employed at the Cossall Colliery is to be taken in consequence of a grievance that they are working longer hours than men similarly employed in other parts of the district, permission having been granted by the Derbyshire Miners' Association, the Enginemens and Firemen's Association, and the Amalgamated Union of Labour.

At a council meeting of the South Derbyshire Miners' Association last week, the agent reported that on the question of rescue work, which was purely voluntary, owners could not accede to the request of the Miners' Association to pay a higher rate per day than at present. The agent remarked that it would be the duty of the association to advise any man who was not satisfied to withdraw from the training. He understood the deputies were making an effort to obtain better terms, so the matter might remain in abeyance for a short time. It being the opinion of the council that at the earliest opportunity the minimum rates, as fixed by the district board, should be revised, as some of them were too low the agent was instructed to write the owners in reference thereto.

A two day's sitting of the council of the Yorkshire Miners' Association was concluded at Barnsley on Tuesday. Mr. H. Smith (president) was in the chair. The question of a county strike to enforce a settlement of the non-union question and also that of wages and conditions of surfacemen in West Yorkshire was again discussed. It was reported that the discussion, which was prolonged, showed a desire to give in notices. Eventually an adjournment was made pending the result of the next meeting between representatives of the coalowners and the Miners' Association. It was agreed that the men at Messrs. Brooks' colliery connected with the Netherton branch should be allowed to take a ballot on the question of tendering notices, seeing that no settlement of the price list dispute could be arrived at. In regard to matters at the Brierley Colliery, it was reported the dispute for the time being had been settled. The men are to restart work pending the decision of the four arbitrators on the question of a price list, and failing their agreement the matter is to go before an independent chairman. It was decided that no demonstration should be held this year.

At a meeting on Saturday of the executive of the Lancashire and Cheshire Miners' Federation, the whole position of the strike at Haydock Park Collieries was reviewed. It was explained that there were now not more than 25 non-unionists engaged at the pits. It was decided that the secretary, Mr. Ashton, should ask for a meeting with the employers, with a view to obtaining a promise that non-unionists should not be allowed to start work at the pits. Statements were made that colliery wagons of Messrs. R. Evans and Company Limited were being filled at other



collieries; and the executive decided that should it come to the knowledge of any agent that this practice was carried on, he should at once inform the colliery management that in the event of the wagons not being withdrawn, the whole of the men engaged at the pits would cease work.

#### Scotland.

A calculation officially made shows that somewhere about £35,000 has been lost in wages by the miners and other colliery workmen throughout Mid-Lothian and Haddingtonshire during the last six weeks owing to the partial stoppage of colliery work in 15 local districts. These is still no prospect of work being generally resumed at the collieries.

In the absence of Mr. Robert Smillie, the president, the chair at the annual conference of the Scottish Miners' Federation, on Tuesday, was occupied by Mr. John Robertson, vice-president. The chairman moved a resolution of sympathy with the relatives of the men who lost their lives in the Cadder pit disaster. He wanted to be as charitable as possible in affixing the blame. It might be cruel to do so meantime, for there was to be a Government enquiry, and that would give an opportunity for getting to the bottom of the cause of the disaster; but there was one aspect of the calamity that they were bound to condemn in the very strongest terms possible. Nearly two years ago an Act of Parliament placed on the coalowners the onus of providing rescue and aid appliances at the collieries. Except in Fife and Ayrshire nothing had been done in Scotland in the way of carrying out that Act of Parliament, and so far as 60,000 or 70,000 of the Scottish miners were concerned no provision of rescue appliances had been made. He wondered whether the same clemency would be shown to a miner if he violated the Coal Mines Act. If Prof. Redmayne, the Chief Inspector of Mines, was aware that the Act was not being carried out, did he report that fact to the Home Office in order to compel the Home Office to take steps against the coalowners? If he did not report that fact to the Home Office, then it was the duty of the miners, not only of Scotland, but of Great Britain, to know why the Chief Inspector of Mines for two years allowed the coalowners to flout the authority of Parliament. If he did report to the Home Office, then the miners had a right to know why the Home Office took no action to compel the coalowners to carry out the Act. Evidently the Home Office denied responsibility, and Mr. McKenna, replying to Mr. Adamson, M.P., made reference to the expenditure incurred in carrying out the regulations, being apparently more concerned about the coalowners' profits than about the miners' lives. The position of the matter was not satisfactory to the Scottish miners. The conference afterwards sat in private and adopted a resolution asking that steps be taken to secure a minimum wage of not less than 7s. a day.

Mr. Robert Smillie took the chair at the second day's sitting. He emphasised the criticism of the Scottish coalowners, made by the vice-president on the previous day. In his presidential address he put forward a plea for the nationalisation of mines. Referring to the surface workers, he said there were few classes of labour so badly treated, and it was the duty of miners to do something to improve their position substantially. It was proposed to make a general demand for a 16 per cent. increase, and they had requested the Conciliation Board areas to meet and discuss the demand. Regarding the nationalisation of mines, Mr. Smillie urged an active propaganda on its behalf. Nationalisation, he said, would secure greater safety for underground workers. He asserted that in many mines the question of profits came first and safety second. Nationalisation would also eliminate the argument that wages should be ruled by the ability to pay of the worst situated mine. The State would pool the whole bulk and sell the coal at a price all over which would enable the best to make up for the worst. Private ownership left the consumer out of consideration, and manufacturers were hampered by prices varying at short intervals. The resolution, which expressed satisfaction at the introduction of the Nationalisation of Mines Bill, and which urged the carrying on of a vigorous agitation, was carried unanimously. A resolution was adopted unanimously that double payment be made for Sunday work, such payment to be enforced, even though it entailed a stoppage. The secretary was instructed to advise the coalowners accordingly.

The conference sat privately on Thursday, and considered a proposal to substitute for the federation a national union of the Scottish miners, which would have greater control over disputes and strikes and their settlement and the distribution of strike pay. Draft rules having been submitted and amended, it was decided that a ballot of the miners should be taken on the whole question.

In regard to the recent dockers' strike at Leith, it is stated that the Lothian miners have lost over £40,000 in wages during the stoppage of the collieries owing to the strike.

**The South Wales Institute of Engineers.**—A special general meeting of the above institute will be held at Ghent (in the Palais des Fêtes, in the Exhibition grounds, by kind permission of the directors of the Exhibition) on Monday, September 1, 1913. The chair will be taken at 9.30 o'clock a.m. by the president, W. N. Atkinson, LL.D., I.S.O. The following papers are down for discussion:—"Underground Conveying," by Sam Mavor, M.I.E.E.; "Machine Mining in the South Wales Coalfield," by G. D. Budge and W. E. Jayne; "The Sinking and Equipping of the Bedwas Colliery," by E. L. Hann; "Latest Developments in Connection with Mechanical Puddling," by David E. Roberts, M.Inst.C.E. There will be a reception of the members and their ladies at the restaurant "Vieille Flandre," in the Exhibition, on Sunday, August 31, at 9 o'clock p.m., by the president and council of the Association des Ingénieurs sortis des Ecoles Spéciales de Gand.

## PARLIAMENTARY INTELLIGENCE.

### HOUSE OF COMMONS.—August 13.

#### Royalties in Belgium, France and Germany.

Mr. DUNCAN MILLAR asked the President of the Board of Trade the amount paid in name of annual royalties and wayleaves in Belgium, France and Germany during the past 10 years, giving the figures for each year, or as far as they may be available, and distinguishing, if possible, the amount of royalties paid on coal from that paid on other minerals.

Mr. BUXTON said the information in his possession did not enable him to answer the question, but he would see how far further particulars could be obtained.

August 15.

#### The Cadder Disaster.

Mr. PRINGLE asked the Home Secretary to state the terms of reference in the enquiry into the Cadder Colliery disaster.

Mr. McKENNA answered that the enquiry would be a statutory enquiry under section 83 of the Coal Mines Act, and, according to the terms of that section, would be an investigation of the accident and of its causes and circumstances.

Mr. PRINGLE further asked if the Home Secretary would publish the correspondence between the Home Office and the Scottish coalowners regarding the provision of safety and rescue appliances in mines.

Mr. McKENNA said that as this would be one of the questions to be gone into at the enquiry which is to be held into the accident at the Cadder Colliery, he thought it would be better to leave the matter to be dealt with by the Commissioner, who would make a full report which would be presented to Parliament.

## OBITUARY.

Mr. Richard Lewis, consulting mechanical engineer to the Ocean Coal Company Limited, died at his residence, Augusta-street, Ton Pentre, on the 17th inst. under tragic circumstances, he being knocked down by a passenger train. The deceased gentleman was held in high repute as engineer throughout the Valleys. He was at one time manager of Messrs. Shepherd's Foundry at Bridgend, and later, prior to taking up his post under the Ocean Company, he was manager of Cubitt's Foundry, Pentre.

The death of Mr. Alexander M. Melvin, late managing director of the St. Rollox Iron Works, Glasgow, took place at Skye on the 14th inst.

## CONTINENTAL MINING NOTES.

### Austria.

*Official Wholesale Coal Prices, Vienna Exchange.*—Pilsen coals: Large 33-20 kronen per ton, in 10-ton loads, ex Franz-Josefs Bahnhof. Ostrau-Dombrau-Karwin coals: Large 30-31 kr., cubes 29-60-30-60 kr., nuts 29-30 kr., small 23-23-20 kr., washed smithy coals 30-30-50 kr., coke 38-40 kr. per ton net cash, ex shutes Nordbahnhof. Rossitz-Zbeschau-Oslawan coals: Best washed smithy coals, coarse or fine, 30-50-31-50 kr., coke 30-32 kr. per ton, ex shutes Nordbahnhof or Staatsbahnhof. Upper Silesian coals: Best large or cubes 32-30-33-10 kr., medium large or cubes 31-50-32-30 kr., seconds large or cubes 26-70-27-80 kr., best nuts I. 32-70-33-50 kr., II. 29-60-30-10 kr., best small 23-50-24 kr., seconds 22-50-23 kr. per ton net cash, ex shutes Nordbahnhof. In 10-ton loads: Best large or cubes 30-70-31-50 kr., best nuts 31-10-31-70 kr., ex Nordbahnhof. Gas coke from the Vienna Gasworks, 32-40-34 kr. per ton ex works. Lignite: Dux large 21-70-23-20 kr., Brux or Dux cubes 21-70-23-20 kr., nuts 21-20-22-70 kr., Mariaschein cubes 23-70-25-20 kr., nuts 23-20-24-70 kr. per ton, ex shutes Franz-Josefs or Nordwest Bahnhof.

### France.

A circular has been issued by the Minister of Public Works to the electric supply companies, proposing that the price of electric current should be based automatically on the price of the coal purchased by the State Railways. Such prices will be communicated at the end of each year. During the past four years the prices were as under:—1909, 16 fr. 62 c.; 1910, 15 fr. 97 c.; 1911, 16 fr. 86 c.; 1912, 20 fr. 47 c.

*Coke for the Lorraine Ironworks.*—M. Didier, in *La Revue Noire*, discusses the question of coke supplies for the Meurthe-et-Moselle ironworks. The principal points to consider, he says, are (1) the situation of the works near the ore supplies, near the coal supplies, or on the coast; (2) the advisability of the works erecting coke-oven batteries themselves; and (3) the situation of the coking plants and the choice of coal. At present there are 160 blast furnaces in France—90 in the Eastern district, 24 in the North, and 46 in the Centre and South-west. Going back a few years, it is seen that the tendency is to abandon the furnaces in the Centre and Midi. Generally speaking, the greatest activity appears in the North, considering the size of the installations and the contemplated erection

of further plants at Pont-à-Vendin, Dunkirk and Isbergues. The movement seems to be to choose a location near the coal supply, when the object of the manufacture of finished products is in view, and preferably near the coast, in order to give facilities for export. As regards the second point, the principal factor is the scarcity of coke in France. From 1905 to 1912 the output of pig iron in France has risen from 3,076,550 tons to 4,949,126 tons, whilst the output of coke at the mines in the north of France has increased from 1,772,793 tons to 2,443,442 tons. In the Meurthe-et-Moselle in 1911, 3,005,400 tons of German fuel were consumed, as against 1,783,500 tons in 1904. The ironmasters of the district have attempted to cope with the shortage of coke by the formation of a central coking company with headquarters at Auby, but it remains to be seen what success will attend the venture, the main difficulty being the question of coal supply. In the meantime an active participation is being taken in the coal researches in the south of the Pas-de-Calais, the Campine, and in Germany, in addition to the investigations in the French Lorraine, which, however, have been greatly hampered by the unwillingness of the Government to grant concessions. At any rate, the conclusion is that the iron manufacturers show an evident design to control their own coke supply. With regard to the location of the coking plants, the group interested in the Auby Company have recently built works at Sluiskil, in Holland, on the Terneuzen Canal, at Ghent. The objections to this scheme, as opposed to the facilities for procuring English and German coking coals, are the necessity of transporting the coke over two frontiers and the sacrifice of the by-products. Messrs. Wendel Frères already possess a coking installation in the Meurthe-et-Moselle, which is furnished with coal from the neighbouring collieries of the firm, with a small addition of English coal, but similar advantages are not to be found at other works in the district. The Pont-à-Mousson Company, however, have decided to erect a battery of 80 ovens at that place, but whether French, English, Belgian, Dutch or German coal will be used is problematical, the coal, in every instance, being at a considerable distance from the plant. Nevertheless, the company expect to derive some advantages from the surplus gas and the by-products, and it is proposed to erect a tar distillery. It is probable that mixed coals will be used, and it remains to be seen if satisfactory results can be obtained in this way. It is said that the Homécourt and Micheville works are contemplating a similar step, but nothing definite has been settled. M. Didier's opinion, however, is that the solution of the problem will be found in this direction, as the saving in freights and the profits from by-products manufacture will be found to outweigh other considerations. At the same time the export of iron ore, which has already found its way into England, is a factor to which due weight must be given, as it may greatly facilitate the interchange of English coking coal.

### Germany.

*Mining Accidents in the Ruhr Coalfield.*—In 1912, in the Dortmund district, 1,051 persons were killed by accident, which, on the basis of 361,151 persons employed, gives a death-rate of 2.91 per 1,000. In 1911, the death-rate was 2.23 per 1,000, 786 persons being killed. The following shows the deaths classified according to cause:—

	No. of deaths.	
	1911.	1912.
Below ground:		
Falls of roof.....	277	306
In shafts from the surface .....	71	56
In headings and inclined roadways ...	166	189
In horizontal roadways.....	47	61
By explosions of firedamp or coaldust	27	188*
Suffocation by gas .....	13	7
Explosives .....	22	30
Machinery .....	3	5
Various.....	68	83
Total (below ground) .....	694	925
On the surface:		
Machinery ..	16	27
Locomotives and wagons .....	24	35
Various.....	52	64
Total (below and above ground)...	786	1,051

\* In one explosion 114 persons were killed, in another 49, in another 16, and three others accounted for five, three and one deaths respectively.

Of the deaths due to accidents in horizontal roadways, 28 occurred where mechanical haulage was installed, 21 with animal haulage, and 12 with manual haulage; two of the deaths were due to electric shock. Under the head of "Various" (below ground) there were eight deaths from the same cause, whilst one man on the surface lost his life through contact with a high-tension cable, and five others were killed by electric shock.

*Ruhr Coal Market.*—In spite of the evident decline, the conditions as regards distribution may still be considered satisfactory, the traffic being heavy. The demand, however, is not so pressing, and customers, instead of living from hand to mouth, can obtain ample supplies at any time. Up to the present the pits have not had to complain of lack of



business or of any necessity for going on short time. The highly favourable condition of the Rhine has enabled large shipments to be sent to the up-river ports, and provide stocks against the time when river traffic will be suspended. Nevertheless, the participation for the present month cannot be maintained at the same level as in July. The demand for industrial coals has receded to such an extent that the Syndicate has to stock part of its output; and while the house coal trade is reviving, the unfavourable state of the coke market is reacting on the demand for coking coals. In briquettes the supply is rather in excess of the demand. Whilst the coke market is depressed, there is no sign of any diminution in the output, but stocks at the works are growing, broken coke alone being in better request. The export trade is large, Belgium having come in again as a buyer, whilst France and Holland are taking normal supplies.

**Coal Market in Upper Silesia**—The traffic returns for July constitute a record, amounting to 328,119 wagons, as compared with 295,567 in the same month of last year, and up to the present there is no sign of any falling off; in fact, the pits are unable to satisfy the requirements of consumers to the full, and deliveries are much in arrear. Even in industrial coals there is no slackening of the demand, although the quieter tone of the iron market would lead to the supposition that a decline is imminent. Coking coals are continually in good request, business is more active in gas coal, and house coals are moving better. In the outside-districts there is little competition on the part of English coals, especially in the Baltic provinces and the capital, and it is easily met by the low prices quoted. Exports to Austria are large, and might be still greater were any surplus available from the home trade. Russian Poland, too, is a constant buyer. In the coke market the entire output of blast-furnace and foundry coke is absorbed immediately, and there are no stocks; and even in small coke the trade is by no means poor.

**Miners' Wages in Prussia during the First Quarter of 1913.**—The following are the average earnings of the various classes of mine workers per shift for the first quarter of the current year. Upper Silesia: Hewers (33.1 per cent. of total working staff), 4.75 marks; other underground workers (32.6 per cent.), 3.42 marks; surface adult workers (25.1 per cent.), 3.14 marks; youths under 16 (4.7 per cent.), 1.25 marks; females (4.5 per cent.), 1.27 marks. Lower Silesia: Hewers (43 per cent.), 3.74 marks; other underground workers (26 per cent.), 3.34 marks; surface workers (27.1 per cent.), 3.04 marks (2.7 per cent.), 1.36 marks; females (1.2 per cent.), 1.66 marks. Dortmund district: Hewers (50.9 per cent.), 6.35 marks; other underground workers (26.5 per cent.), 4.46 marks; surface workers (19.4 per cent.), 4.28 marks; youths (3.3 per cent.), 1.47 marks. Saar district: hewers (48.1 per cent.), 5.20 marks; other underground workers (28 per cent.), 4.08 marks; surface workers (19.9 per cent.), 3.83 marks; youths (4 per cent.), 1.42 marks. Aachen district: Hewers (55.7 per cent.), 5.46 marks; other underground workers (17.1 per cent.), 4.19 marks; surface workers (24 per cent.), 3.95 marks; youths (3.2 per cent.), 1.64 marks. Left-Rhine district: hewers (63.3 per cent.), 6.20 marks; other underground workers (11.7 per cent.), 5.07 marks; surface workers (21.7 per cent.), 4.33 marks; youths (3.3 per cent.), 1.60 marks.

**Output of By-products from Gasworks**—Statistics are published by the Wirtschaftliche Vereinigung Deutscher Gaswerke A.G., of Cologne, which has 474 adherents, showing the sales of coke and by-products in 1912-13. In that year 2,141,910 tons of coke were made, of which 609,712 tons (valued at 10,436,008 marks) were sold. The production of tar amounted to 93,321 tons (valued at 26.97 marks per ton) and that of sulphate of ammonia to 36,158 tons (valued at 63.38 marks per ton).

**Coalmining in Upper Silesia**—In the annual report of the Committee of Collieries and Forges in Upper Silesia for 1912-13, it is stated that the opening of the Stettin-Berlin Canal will reduce the rates on English coal destined for the west of Germany *via* Stettin by about 75 pfennigs per ton. The committee also protests against rate concessions granted to the Lower Silesian collieries. With reference to the strike in the district, which broke out in April of this year, the report attributes the outbreak to political motives on the initiative of the Polish miners. It is pointed out that the rise in wages has been greater in Upper Silesia than in any other district in Germany. From 1887 to 1912 the average yearly earnings of adult male workers above the age of 17 has risen by 116.6 per cent., reaching, in the latter year, the sum of 1,268 marks. Skilled workers at the face obtain 150 marks, and some 200 to 250 marks per month. Absenteeism is deplored, however, this leading, it is said, to a loss of 10 per cent. in wages; a remedy proposed is the closing of public houses at 8 p.m. on week nights and at 2 p.m. on Sundays. Hauliers earn from 100 to 120 marks per mensem. In addition, the workmen receive free house coal, vegetables, milk, &c., at a low price, and lodgings, gardens, &c., at a specially low rate, whilst old married workers are given free houses, representing a value of up to 300 marks per year. During the last few years, indeed, the value of the houses has risen much more rapidly than selling prices of coal. During the period from 1908 to 1912, prices have fallen 100 marks per ton, whilst the average yearly wage has risen 100 marks, or, comparing 1912 with 1910, the figures

are 16 pfennigs and 123 marks. If the net profit be considered, the disproportion is still more marked. In justification of the longer hours worked in the coalfield, as compared with the Ruhr and Saar coalfields, it is pointed out that the conditions as regards temperature and work are much more favourable, and that the frequent outbursts of gas necessitate considerable interruptions to work.

### THE LONDON COAL TRADE.

THURSDAY, AUGUST 21.

The London coal trade during the past week has shown but little alteration from the previous condition and for the time of the year is in a very satisfactory position. Some of the better qualities of house and steam coals are reported as having obtained some slight increase in prices, but no decided change in previous prices has yet taken place. Merchants report a quiet state at the depots, but a better enquiry for filling up the cellars while the low prices still rule, although in most cases delivery is not wanted until after the customer returns from holidays. Stocks are now heavy at the delivery end and also at the relabelling stations, but colliery stocks are well below normal. Best house coals of all descriptions have a ready sale and some difficulty in obtaining supplies has led to many holders of these qualities asking and obtaining a slight increase in price. Sub-tones are quieter, but stocks are not heavy and prices show no tendency to ease. Best brights are in good demand and orders are accumulating at the colliery end. House nuts remain in a somewhat neglected position, but stocks are lighter and prices are firm. Kitchen cobbles and bakers' nuts are improving in demand, and there is a much better enquiry both for current and forward business. The cheap qualities of house coal are still in poor demand and low prices are offered to clear some of the heavy stocks now on hand at some of the collieries. Best hards and steams are in a strong position and prices are very firm, but the cheaper descriptions find it difficult at times to obtain orders without giving way in price. Small nuts and slacks are in poor request although the position is better owing to improved demand now that works have got over the holiday spirit. A recovery in price is confidently looked for very shortly in these qualities. Coke is very quiet and the prices show no improvement. Several of the buyers who have refused to consider contracts at any advance on last year are now inclined to buy over the winter months and one or two contracts are reported to have been placed recently at the full 1s. per ton advance, although, of course, the buyer has had the advantage of being in the open market during the two flattest months of the year—July and August. The seaborne market has ruled very quiet, but with little on offer. The enquiry, however, during the last day or two has been better, and the small quantity available has found a ready sale. Prices remain at 21s. 6d. for best and 20s. 6d. for seconds. Nine cargoes are reported as having arrived in the Thames so far this week.

#### Market quotations (pit mouth):

NOTE—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wain Main best coal .....	13/6	13/6
Do. nuts .....	12/6	12/6
Birley cube Silkstone .....	12/	12/
Do. branch coal .....	15/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	12/6	12/6
West Riding Silkstone .....	12/	12/
Kiveton Park H. coal .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	11/	11/
New Sharlston Wallsend .....	14/	14/
Wharfedale Silkstone coal .....	14/	14/
Do. Flockton Main .....	13/6	13/6
Do. Athersley house coal .....	11/6	11/6
Newton Chambers best Silkstone .....	15/	15/
Do. Grange best Silkstone .....	14/	14/
Do. Hesley Silkstone .....	13/	13/
Do. Rockingham selected .....	13/6	13/6
Do. Rockingham Silkstone .....	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best .....	11/	11/
Do. large nuts .....	10/9	10/9
Do. small nuts .....	10/	10/
Do. kitchen coal .....	9/6	9/6
West Hallam Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Do. London brights .....	10/	10/
Do. bright nuts .....	9/6	9/6
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Shipley do. brights .....	1/	1/
Do. do. nuts .....	10/9	10/9
Mapperley brights .....	11/	11/
Do. hard steam .....	10/9	10/9
Cossall Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Trowell Moor brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Grassmoor Main coal .....	12/6	12/6
Do. Tupton .....	11/	11/
Do. do. nuts .....	12/	12/

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal .....	12/6	12/6
Do. do. cubes .....	12/	12/
Do. special Derbys .....	11/9	11/9
Do. house coal .....	11/	11/
Pilsley best blackshale .....	12/6	12/6
Do. deep house coal .....	10/6	10/6
Do. hard screened cobbles .....	10/	10/
Hardwick best Silkstone .....	12/6	12/6
Do. Cavendish brights .....	11/6	11/6
Do. cubes .....	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/	12/
Do. small hards .....	11/	11/
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	12/	12/
Do. cobbles .....	12/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/	14/
Bestwood hard steam coal .....	12/	12/
Do. bright cobbles .....	11/3	11/3
Hucknall Torkard main hards .....	12/3	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. .....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/	12/
Do. hard steam .....	10/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/9	11/9
<b>Warwickshire.</b>		
Griff large steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	11/	11/
Do. loco Two Yard hards .....	14/	14/
Do. Ryder nuts .....	11/6	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Haunchwood steam .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Exhall Ell coal spires .....	12/6	12/6
Do. large steam coal .....	10/9	10/9
<b>Leicestershire.</b>		
Snibston steam .....	10/6	10/6
Do. cobbles .....	10/3	10/3
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/6	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	17/	17/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	10/	10/
Do. large nuts .....	10/	10/
Do. bakers' nuts .....	9/6	9/6
Do. Main nuts .....	10/	10/
Do. hards .....	9/6	9/6
Granville New Pit cobbles .....	11/6	11/6
Do. Old Pit cobbles .....	10/6	10/6
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/6	13/6
Snayd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	15/	15/
Do. cobbles .....	14/	14/
Apedale best .....	13/6	13/6
Do. seconds .....	13/	13/
Podmore Hall best .....	13/6	13/6
Do. seconds .....	13/	13/
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London		
Do. brights .....	13/	13/
Do. shallow one way .....	12/	12/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	11/	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/	12/
Do. one way .....	12/	12/
Do. shallow coal .....	12/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles .....	12/	12/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/	11/

#### From Messrs. Dinham, Fawcus and Co.'s Report.

**Friday, August 15.**—There was very little enquiry for seaborne house coal at to-day's market, which remained exceedingly quiet with no cargoes on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 20.

**Monday, August 18.**—Business in seaborne house coal was reported steady to-day, with no cargoes on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 30.

**Wednesday, August 20.**—There was an improved tone in the seaborne house coal market to-day, with Yorkshire selling at better prices. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 10.

The late Mr. Samuel Joshua Cooper, of Mount Vernon, Barnsley, formerly a colliery owner, who died in July last, left £751,446 gross, with net personalty £706,627.



### A SELF-REGISTERING WATER GAUGE.

A new type of self-registering water gauge and clock (Ochwadt's system) has just been put on the market by Messrs. John Davis and Son (Derby) Limited, of the All Saints Works, Derby, and large numbers are being supplied to meet the requirements of new General Regulations (section 69).

The construction of this apparatus, as shown in the illustrations, is simple and substantial, and gives reliable indications of the water gauge fluctuations by means of an automatic writing device on a chart. By this means a record is kept, and indispensable control over the fan engine can be maintained, as it records the water gauge during every portion of the hour day and night, or week if desired.

The base of the apparatus consists of two cylinders of equal width, connected together and filled with water

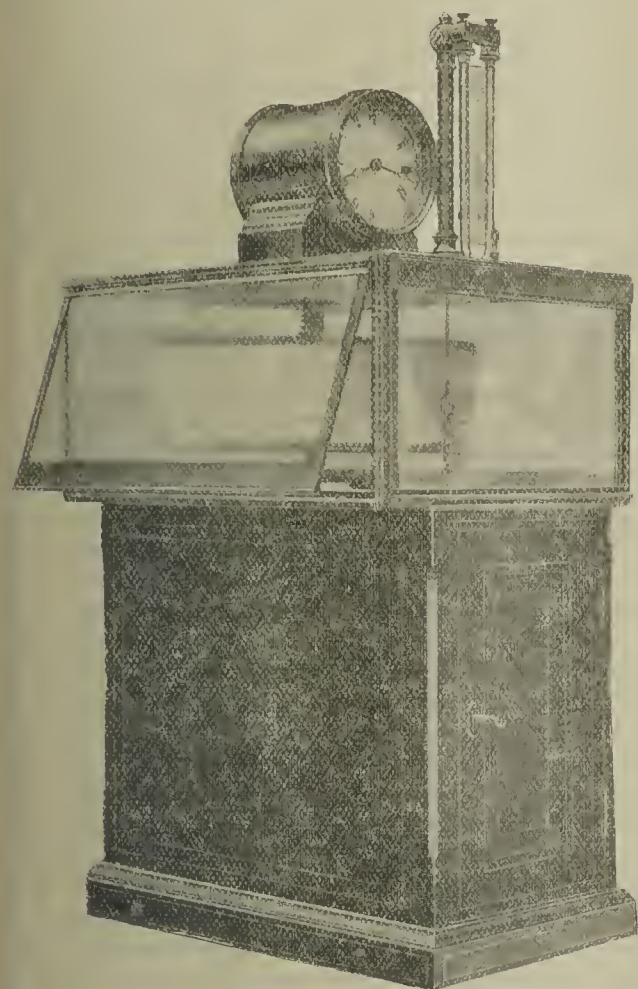


FIG. 1.—APPARATUS WITH 7-DAY CHART.

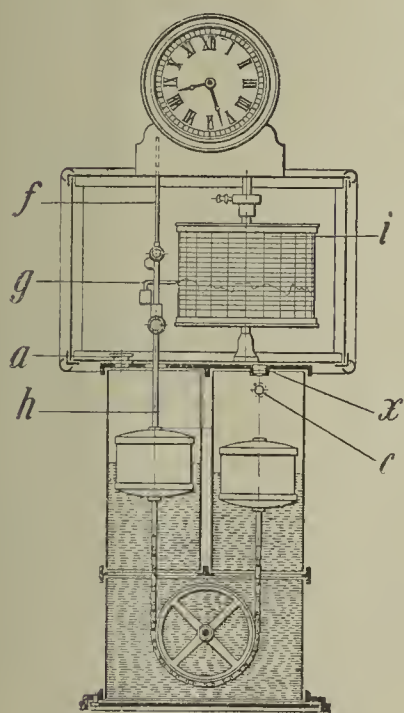


FIG. 2.—APPARATUS WITH 24-HOUR CHART.

to a certain height. In each cylinder is a float, the two floats being joined by a chain passing over a wheel. On one of the floats is a vertical rod *h* (fig. 2), to which the writing device *g* is attached. The air is admitted through the inlet pipe *c* (fig. 4) into the one cylinder, and here bears on the surface of the liquid. Each variation of pressure on the surface of the water in the two cylinders causes both floats, and also the writing device *g* connected with the same, to rise or fall respectively.

The top of the apparatus consists of a glass casing containing the drum, on which the chart is placed. This drum is rotated about its vertical axis by a clock fixed on top of the glass casing. The clock is arranged to run for a week, and the clockwork can be so adjusted as to rotate the drum either once in 24 hours or, for instance, as in the case of the apparatus shown in fig. 1, once in seven days.

The chart on the drum is provided with horizontal divisions to indicate the water gauge, and vertical

divisions indicating the hours. The apparatus operates as a vacuum gauge, the liquid being raised by the vacuum prevailing at *c*; that is to say, the float rises at *c* to the same degree as the water, whilst the other float sinks to the same extent. In consequence of this movement the writing device *g* travels over the rotating chart in such manner that the variations in pressure are shown by the coloured ink line.

The test of the position of the water level is carried out by closing the cock *c* and opening the screw *b* (figs. 3 and 4). The apparatus is filled at *a*, and when necessary the liquid is discharged at *k* (figs. 3 and 4). Should the examination of the water level once be omitted, and should the same sink in consequence of evaporation, the apparatus continues to operate for a long period, as the floats displace much more water than they require for floating.

The gauges are for the purpose of testing whether the writing device of the apparatus registers the actual vacuum. Where formerly only tachometers, stroke and revolution counters have been used, the apparatus offers great advantages; and where it is necessary to exactly control the pressure prevailing in the shafts, and where the protection of human life comes into question, the employment of this apparatus is of great importance. The apparatus is here of great service, as it not only

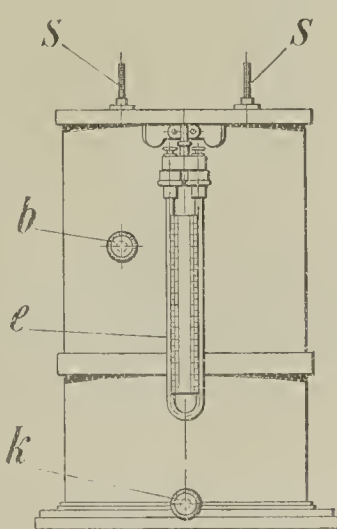


FIG. 3.

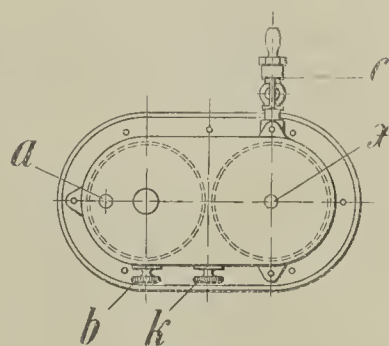


FIG. 4.

indicates the slightest variations of water gauge, but by automatically indicating the vacuum conditions, even becomes an informant in cases of negligence.

The apparatus can also be provided for pressure if desired.

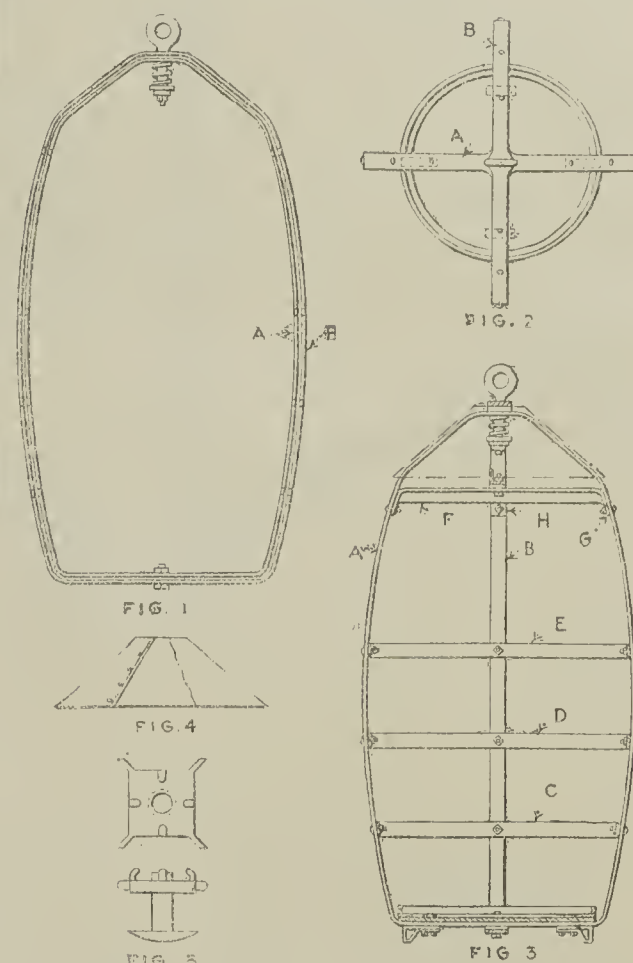
**The North Staffordshire Institute of Mining and Mechanical Engineers.**—A general meeting of the members of this institute will be held on Monday, August 25, 1913, in the North Stafford Hotel, Stoke-on-Trent, at 5 p.m., when a paper will be read by Mr. John Gregory, entitled, "Practical Examples of the Use of Concrete at Collieries."

**Colliery Projects in Southern Lancashire.**—A South Lancashire representative learns from officials of private and limited colliery firms and companies in south and south-east Lancashire that further important projects in the matter of developments are pending in those areas. The Tyldesley Coal Company Limited, who are opening out new Trencherbone mines at their extensive Cleworth Hall pits, are having new and up-to-date screening plant and other surface improvements effected there. Messrs. J. Speakman and Sons are sinking lower to other mines at their Wood End pits, Bedford Leigh. The Wigan Coal and Iron Company Limited are to sink new collieries in the Leigh district. The Abram Colliery Company are sinking to lower measures at their Abram pits, where important developments, including the opening out of the Bickershaw Six-foot Mine, have already been carried out. Messrs. J. Roscoe and Sons have provided new storerooms for explosives at the New Lester Colliery, Tyldesley. It has been freely reported that a Wigan syndicate contemplate opening new collieries in the neighbourhood of Astley Moss, but nothing definite can be gleaned concerning this proposed development. Preparations are being made by Messrs. A. Knowles and Sons Limited for starting a number of female surface workers at their Wheat Sheaf Collieries, Pendlebury, where improvements on the pitbrows have been effected.

### AN EMERGENCY CAGE.

Mr. G. S. Rice, mining engineer of the United States Bureau of Mines, has invented a collapsible hoisting frame to be used in emergencies when the regular cage of a mine is injured so severely as not to be available, which often happens during an explosion. This invention has been patented, but the invention may be used by "any person in the United States without the payment of royalty."

In the illustration of this device (for which we are indebted to *Coal Age*), fig. 1 shows the collapsed cage consisting of two bales or yokes A and B, one of which is smaller than the other. They are connected at the top and bottom by pivot bolts. Thus the two bales can be swung into a position at right angles to each other as shown in figs. 2 and 3, and secured rigidly by the hoops C, D and E, which are bolted to the bales. If desired, a flexible hoop or chain could be used in place of hoop E to make entrance to the cage less difficult. A hood, fig. 4, is dropped over the top of the cage, fitting loosely as a cap over the suspending bales. A cross-brace, consisting of two angle bars F and G, at right angles with flattened end-portions H and I and a



COLLAPSIBLE HOISTING FRAME.

pivoted connection at their intersection, is bolted to the frame members near the top of the cage. These may be rotated when detached from the bales so as to lie one within the other, thus economising space for shipment. The platform is supported from contact with the ground by four lugs. The hood can be removed whenever it is desirable to lower timber. The king bolt by which the cage is supported is arranged to have a swivelling movement so that the twisting of the cable will not turn the cage. A spring on the king bolt relieves the strain on the rope when the cage is started upward.

To facilitate the assembling of the cage, a special form of bolt and nut, illustrated in fig. 5, may be employed. The heads of the bolts are rounded in order that they may not catch on obstacles in the shaft. The nuts are provided with wing projections which can be grasped by the hand like an ordinary wing nut or readily turned by a flat bar or like tool if a wrench should not be available. For the storage of these bolts and nuts when not in use a bag should be provided attached to some member of the cage so as to be always available when needed.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, August 12, 1913, is as follows:—Abo, 1,022 tons; Amsterdam, 2,989; Antwerp, 824; Alderney, 133; Buenos Ayres, 5,063; Bremen, 1,295; Cronstadt, 12,451; Copenhagen, 349; Christiania, 546; Drontheim, 500; Gefle, 1,610; Ghent, 575; Hamburg, 12,042; Harlingen, 1,374; Landsrona, 1,302; Libau, 807; Leghorn, 301; Monte Video, 5,059; Monkmarsh, 189; Malmo, 1,484; Newfairwater, 770; Nieuport, 933; Reykjavik, 1,142; Riga, 4,036; Rouen, 4,260; Reval, 5,015; Rotterdam, 8,827; St. Petersburg, 5,130; Santos, 6,022; Stege, 769; Stettin, 204; Stockholm, 763; Tuborg, 1,220; Wasa, 399; total, 89,405 tons; corresponding period August 1912, total 94,095 tons; ditto 1911, total 90,959 tons; ditto 1910, total 87,144 tons.



## AN AMERICAN COAL STORAGE PLANT

W. E. Hamilton in *Coal Age* describes a storage plant of large capacity, which embodies some striking novelties in design. The system consists of cylindrical tanks, having conical roofs and floors. In the centre of each tank is a hollow tower, containing a spiral chute, and a pivoted bucket conveyor, which operates in connection with the chute and a track hopper. It will be seen from fig. 1 that the coal is carried on pivoted buckets, travelling on self-oiling wheels.

The coal is received from the mines in cars which are "spotted" over the track hoppers. From these it is carried by wheeled bucket conveyors to the top of the retainers or tanks, where it is discharged into the large hopper of a covered spiral chute. It glides down and fills this chute and then sliding gates are opened

At the beginning of the operation of storing, all gates of the spiral chute are closed, except the lowest one, and the coal flows out of this and fills the lower part of the retainer. As soon as the coal has reached its level of repose in the tank, this gate is closed and the next higher opened. The gate-controlled openings are large, and there are eight to each spiral turn, so that the difference in height between one gate and the next is very small—in fact, the top of one gate is higher than the bottom of the one next above it, so there is no falling of the coal. The gates are opened and closed, one after another, until the storage retainer is entirely filled, and the coal reaches the top of the tank in a conical pile, of which the hollow tower is the centre, and the steel wall of the retainer is the circumference. In this construction the strains occasioned by this great

coal in the spiral chute is practically uniform at every turn, as it is not carried by the coal at the point of discharge; in reloading (out of storage), there is none moved under pressure.

In this plan of "piping" the coal from the top of the pile, it is taken out of the centre so that the pressure on the wall of the retainer is reduced equally in all directions, and it is uniform at all times and stages of both operations—like the pressure of water in a tank. The "internal working" of a pile of coal when drawn off from the bottom is apparent. A cone-shaped depression forms at the top and throughout the pile one piece of coal is grinding against another, chipping, flaking and breaking off the edges into particles too small to be of much commercial value.

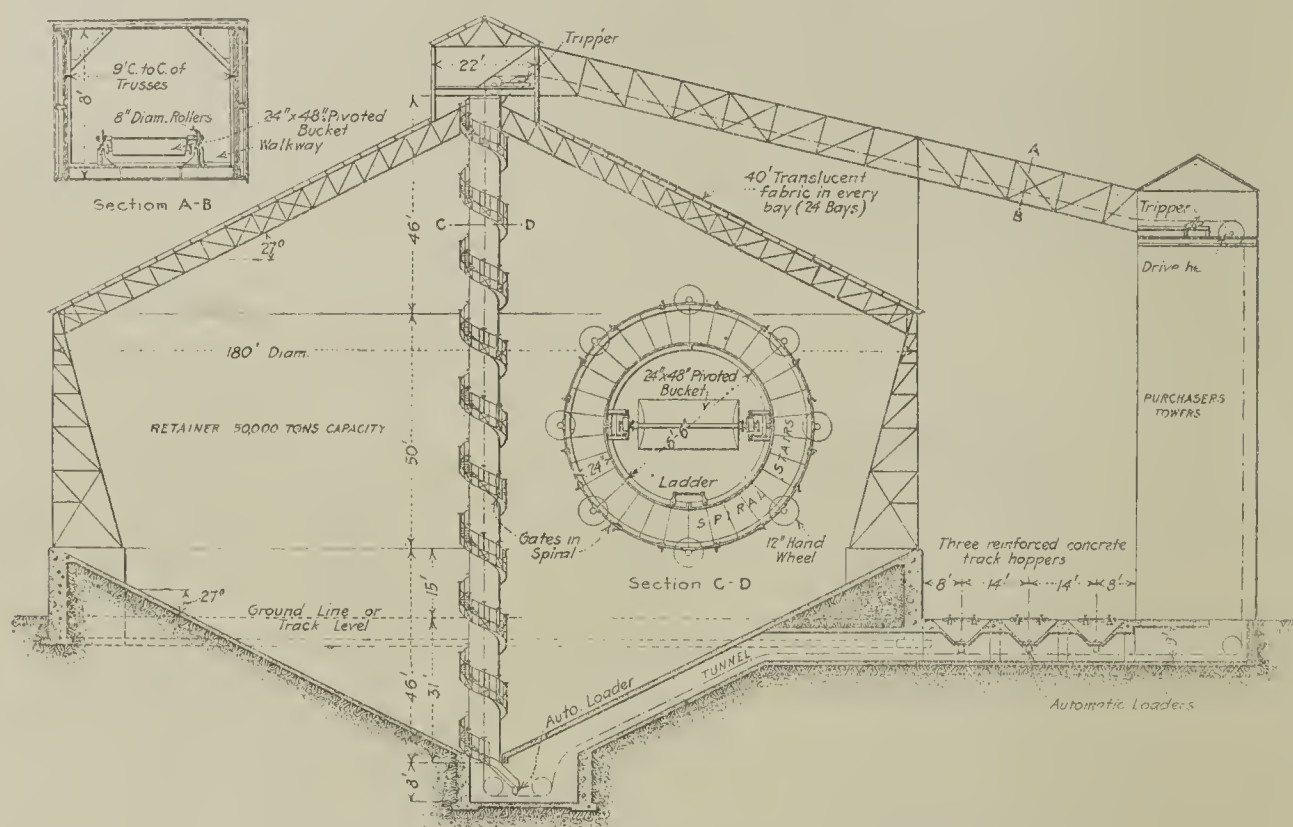


FIG. 1.—CROSS SECTION OF A SINGLE UNIT SHOWING SOME DETAILS.

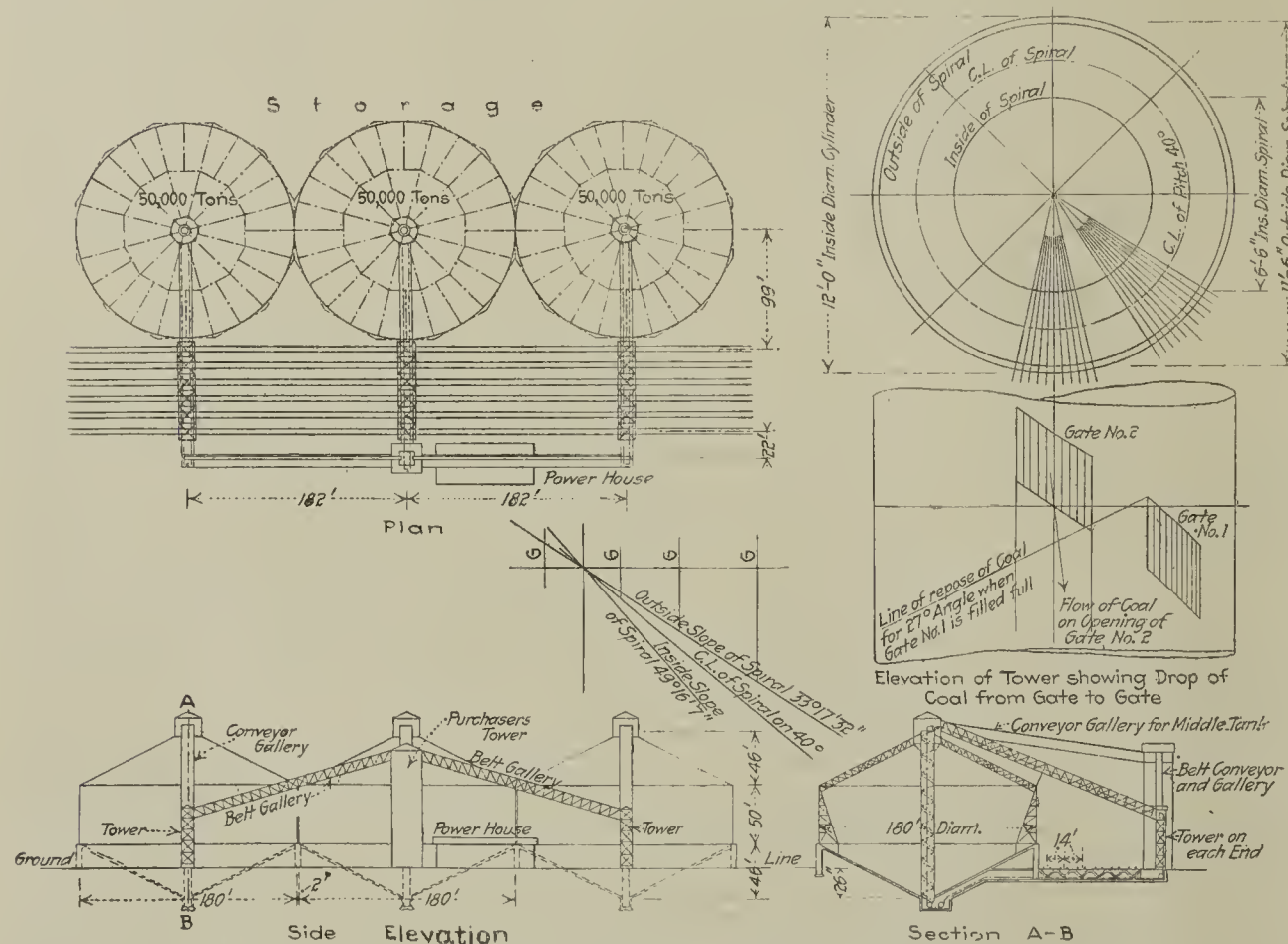


FIG. 2.—GENERAL PLAN OF THREE UNITS, AND DIAGRAM SHOWING MAXIMUM FALL OF COAL.

successively, which allow the coal to flow out into the retainer or tank.

The spiral chute has a capacity greater than that of the bucket conveyor, and may always be kept full, the angle of inclination ensures the coal sliding, and there is no "internal movement" or "working" of coal within the chute, such as would cause grinding or abrasion. The coal moves down the chute *en masse*, sliding on the smooth surfaces, and not grinding on other coal. The flow through the gates is regulated so as to keep the spiral chute filled, this being shown by its height in the hopper at the top of the tower. The buckets, after discharging into this hopper, travel on guides, down through the centre of the hollow tower, and through the spiral chute. Passing out of the retainer at the bottom, they return under the track hoppers and are again loaded and passed on to their discharge.

weight of coal are equally distributed on the outer wall of the retainer.

In reloading (out of storage), the preceding operation is reversed. Beginning at the top, the gates in the spiral are opened successively as they are uncovered by the lowering of the coal in the retainer; thus the coal is drawn from the top of the pile, and never from the bottom under pressure of overlying coal. The only labour required is for opening and closing the gates, and even this can be done mechanically.

The travel of the coal is retarded by the turns of the spiral, so that the pressure at the bottom of the chute where the coal passes into the pivoted buckets is only slightly greater than at the top, whereas, if this chute were vertical, straight and smooth, when full of coal, there would be a pressure of 2,000 lb. per square foot at the bottom, for each 50 ft. of height. The weight of

coal in the spiral chute is practically uniform at every turn, as it is not carried by the coal at the point of discharge; in reloading (out of storage), there is none moved under pressure.

## INDIAN AND COLONIAL NOTES.

## Australia

*Nationalisation in Victoria and Private Enterprise*—The directors of the Outtrim-Howitt and British Consolidated Coal Company consider that the Victorian Government has not kept faith with Parliament or with the people in the matter of the establishment of a State coalmine on the Powlett River field. The chairman of the company pointed out at the half-yearly meeting that Mr. McBride, who was Minister for Mines when the Bill for the establishment of the State coalmine was introduced, made three definite statements to Parliament: That the Government had no intention of entering into competition with private enterprise; that the whole of the coal basins would be thrown open for private enterprise, with the exception of such land as it was necessary to reserve for the use of the railways and public departments; and that the State mine would be subject to the same laws as applied to other coalmines in the State. Regarding the first of these undertakings, it is to be said that, if it was originally the intention of the Government not to compete with private enterprise, that intention was not adhered to; whilst on the second and third points raised it is contended that the promises given have been shamelessly violated. As the area reserved amounts to 52 square miles, it would seem as if the requirements of the Railways and Public Departments are very extensive, and apparently it has been decided that no leases are to be granted for the mining of coal by private companies anywhere else in the State. At least, that would seem to be the inference from the fact that the Outtrim-Howitt Company, in endeavouring to obtain leases in other districts, has utterly failed to do so. Again, says the *Australian Mining Standard*, the State mine has been exempted from rentals and exempted from any taxation whatever, while the rentals for leases have been increased by 150 per cent. and a royalty tax of from 3d. to 6d. per ton has been imposed. How far the treatment accorded to the State mine is on a level with that accorded to private companies is shown by the fact that, were the State mine on the same footing as others, the money it would have paid to the Government in rental and royalty during the past four years would have amounted to nearly £52,000, equal to about £13,000 per annum. The coal companies of the Gippsland district are not great concerns, but they have done great work. Their existence has meant much to the Melbourne public, much to the Victorian Railway Department, much to that part of Gippsland in which they are situated; and they are deserving of fair treatment. As it is, they are being crushed out of existence; they are being prevented from opening out in new directions to make up for the falling-off in the output of their present workings rendered unremunerative largely by the determination of the Wages Board; and for what? To further the cause of a mine that would not, unless owned by the State, be regarded as a payable proposition. To discourage so much of the coalmining industry of Victoria as does not appertain to the State is a folly of the first order.

## Newfoundland.

*Coal Resources*.—The Board of Trade are in receipt, through the Colonial Office, of the text of a lecture on the coal areas of Newfoundland which was delivered before the Newfoundland Board of Trade (i.e., Chamber of Commerce) by Mr. J. P. Howley, F.G.S., the geologist to the Government of Newfoundland. Mr. Howley states that there are three distinct and separate coalfields in Newfoundland. In the first field, that of the Codroys, six coalseams have been uncovered, one showing a thickness of 9½ ft. of good clean coal at its outcrop, and another averaging about 7½ ft. thick. These seams were worked for a time and yielded excellent coal, but were abandoned when it was found that the seams were decreasing in thickness. The second field is in the St. George's Bay area, and is perhaps the most promising, though not the most extensive, on the island; it has been traced in a longitudinal line for 5 miles, and is about 2 miles wide near the western end. This field has never been thoroughly investigated, but it is estimated that the aggregate thickness of the seams in this field is 27 ft., exclusive of seams under 1 ft. in thickness. The third and most extensive coalfield is that of the Humber or Grand



Lake area. This field was the most difficult to explore, but it has been ascertained beyond all doubt to be a large and most important coalfield.

#### Canada.

*The World's Coal Resources.*—The Geological Congress of the World held its first meeting in the Convocation Hall of the University of Toronto on the 7th inst. Over 600 delegates arrived, and the congress was officially opened by Sir Charles Fitzpatrick, Chief Justice of Canada and Administrator of the Dominion in the absence of the Governor-General. At the opening a monograph on the coal resources of the world was handed to the delegates. The introduction to the work gives the following information concerning the coal reserves and present supply in Canada compared with other countries. The Dominion has a total reserve of 1,234,269,000,000 tons, as against the 3,836,657,000,000 tons of the United States, and the total of 7,397,553,000,000 tons for the world, of which the Continent of North America contributes five-sevenths.

#### MINING AND OTHER NOTES.

At a meeting of the directors of the Pearson and Knowles Coal and Iron Company last week, Mr. C. W. Eames was appointed general manager over the firm's collieries at Ince and Coppull, the Moss Hall Collieries, the Wigan Junction, Low Hall and the Maypole Collieries, in succession to the late Mr. John Knowles, J.P.

A presentation was made on Saturday evening, August 16, to Mr. J. Bingley, late manager of the Mansfield (Crown Farm) Colliery, belonging to the Bolsover Colliery Company, by officials and workmen. The presentation took the form of a dressing case, and to Mrs. Bingley was presented a drawing room suite.

Arrangements are now practically completed for the commencement of the boring process at Sir Arthur Markham's new colliery which is to be sunk at Armthorpe, on the very borders of Doncaster, and which will tap the coal under the racecourse and under Earl Fitzwilliam's estates in the neighbourhood of the St. Leger town. The International Boring Company will carry out the process, in which much interest centres, in view of the fault which is known to exist in the district. Most of the boring tackle is now on the ground. It is stated that not only the Armthorpe undertaking, but the other enterprise projected by Sir Arthur Markham at Barnby Dun, also in the Doncaster district, is likely to be affected by the result of the borings which are about to be made. Probably, two or three boreholes will be put down, one in the neighbourhood of Thorne-road, to prove the existence of the Barnsley seam in the district generally. Their completion will probably decide at which place sinking operations shall first be commenced—viz., at Armthorpe or Barnby Dun. These boring processes are expected to occupy from four to six months.

At the Danum Hotel, Doncaster, Mr. F. M. Weeks, B.Sc., was entertained to a farewell dinner upon leaving Bentley Colliery (where he has been assistant to Mr. R. Clive, agent since 1911) to become sub-agent to the Harton Iron and Coal Company, Durham. During the evening Mr. Weeks was presented with a silver spirit flask, a clock and a pair of solid silver candlesticks, while a barograph is to be sent on to him.

Good progress is reported with the sinking of the Rossington Main Colliery, near Doncaster. One shaft has already reached a depth of 125 yards, the sandstone water bearing strata having been successfully negotiated. Recently there was an inrush of water in the No. 1 shaft, but there cannot now be any repetition of the trouble experienced at Bullcroft and Thorne, which necessitated the adoption of the expensive and lengthy freezing process.

The Home Office has issued the draft of an Order applying the provisions of section 116 of the Factory and Workshop Act, 1901, with modifications, to works in which iron or steel founding is carried on, so far as concerns the work of moulders. According to this Order, to enable each worker who is paid by the piece to compute the total amount of wages payable to him in respect of his work, the occupier or contractor must furnish him with written particulars of the rate of wages applicable to the work done by him at or before the time of his first employment on the work and on every subsequent occasion when the rates are fixed or altered, or must exhibit such particulars on a placard in the factory or workshop; provided that if the rates are not ascertainable before the work is given out, the particulars shall be furnished to the worker in writing when the work is completed. Such particulars of the work done as affect the amount of wages payable to each worker shall be furnished to him in writing when the work is completed. If anyone engaged as a worker in the aforesaid class of work, having received such particulars, whether they are furnished directly to him or to a fellow workman, discloses the particulars for the purpose of divulging a trade secret, he shall be liable to a fine not exceeding ten pounds.

It is stated that Selby has been selected for the establishment of a naval oil fuel depot. A large firm of English engineers is asking local contractors for an estimate for the laying of a pipe track from Selby to Grimsby, a distance of over 50 miles, for conveying oil from huge supply tanks to be erected in the Yorkshire town.

Mr. Geo. E. Robins, late manager of Strangeways Hall Colliery, who is leaving for New Zealand, has been presented with a gold watch by the officials and the workpeople at the colliery.

A correspondent understands that certain owners of collieries in the Burnley and Accrington districts of north-east Lancashire are about to provide pithead washhouses for the benefit of their workers who have voted in favour of the same. On the other hand, colliers in the Pendleton, Pendlebury and Clifton districts of south-east Lancashire have voted against baths at the pits.

According to the Bureau of Statistics of the American Iron and Steel Institute, 16,488,302 gross tons of pig iron were produced in the United States during the six months ended with June, as against 15,654,663 tons in the first half of 1912, and is 552,584 tons greater than the total production in 1908. On June 30 there were 304 furnaces in blast, as against 313 on December 31, 1912, and 266 on June 30, 1912.

A cricket match was played on Thursday of last week, at Hull, between Hull Coal Exporters and Leeds Town (1st team). The match was played at Hull Cricket Ground, and the Hull team were formed by Mr. E. O. Ohlson, president of the Hull Coal Exporters Cricket Club. The match was to aid the Hull branch of the Coal Trade Benevolent Association, and the result was that Leeds scored 222 all out, and Hull 207 runs for seven wickets, and the match was declared a draw.

The affairs of Richard Fosdick, trading under the style or firm of Richard Fosdick and Co., residing at Pentrich, Vernon-road, Bridlington, and carrying on business at Castle-buildings, Castle-street, Hull, and also at Mariner's-court, Goole, coal exporter, were to have been investigated at a public examination at Hull this week. The Official Receiver stated, however, that he had not completed his investigations, and the case was adjourned to the next sitting of the court. The statement of affairs presented to the court showed gross liabilities £20,818 5s. 8d., expected to rank for dividend £11,982 8s. 2d., net assets £967 7s. 6d., leaving a deficiency of £11,015 0s. 8d.

It has been decided to open a public relief fund on behalf of the men thrown out of employment by the Cadder Pit disaster. It is not yet known when the fire in the Cadder Pit is likely to be extinguished, and a number of the miners who have been idle for the past fortnight, as a result of the stoppage of work which followed the recent disaster, have temporarily left the district to look for employment elsewhere. About 40 miners have taken advantage of the company's offer to start men at Craigend and Carronhall.

Mr. Edward Wadham, of Milwood, Dalton-in-Furness, Lancashire, civil and mining engineer, steward of the Furness estates of the Duke of Buccleuch, and estate agent to Lord Dalkeith, who died on June 10, aged 85, left estate of the gross value of £61,420, of which £40,518 is net personalty.

The *London Gazette* announce that the Secretary of State for the Home Department has appointed Dr. John Smith, Brycehall, Kirkcaldy, to be one of the medical referees under the Workmen's Compensation Act, 1906, for the Sheriffdom of Fife and Kinross, and to be attached more particularly to the Kirkcaldy district.

In Hamilton J.P. Court on 15th inst., Robert Spence, miner, was charged with having, at Shawstonehead Pit, Cleland, where a new shaft is being sunk, maliciously set in motion a steam winch engine, thereby lifting from the pit bottom a "kettle" on which Robert Dempster, pit-sinker, was standing, and throwing him off, to the injury of his person. Accused pleaded guilty and said he did not mean to do any harm. The Fiscal said the accused had approached the machine in the absence of the engineman, who was attending to the boiler fire. The justices took a serious view of the offence and sentenced accused to 21 days' imprisonment.

The council of the Monmouthshire Colliery Officials' Association have decided to award two prizes for the best two papers contributed to the society's journal, as follow.—One prize of five pounds for the best paper on any subject, open to all members; one prize of three pounds, open to firemen only, the subject being "The Duties of a Fireman under the Coal Mines Regulation Act, 1911."

The success attending the courses of instruction in the Mining Department of Sheffield University is shown in the report of the last session, just issued by Prof. F. E. Armstrong. The total number of students entered for instruction in all courses was 2,082, which was 267 in advance of the total in the previous session. The largest number was in connection with the Derbyshire local classes, of which 53 were held last session at 31 centres, and were attended by 1,130 students. There were 40 classes in the West Riding, and 654 students; there were very satisfactory attendances at the courses in electricity applied to mining, the mining teachers' courses, the certificate courses at Sheffield and Derby, and the mining diploma courses. There were 14 students enrolled in the last named, which was equal to the largest number in previous years. Mr. L. Minnis was awarded the Cooke scholarship, the diploma in mining was awarded to Mr. C. C. Snow, and Mr. C. O. Deacon won the Deacon prize of £20 and the Bainbridge prize of £7. In connection with the certificate course, at Derby, the Bainbridge prize was awarded to Mr. G. P. Hay. The external lectures in the West Riding were mainly

directed to the dangers of coal dust and underground fire. Prof. Armstrong hopes to have installed for next session, in the mining museum at the university, apparatus for conducting experiments in ventilation and coal washing, designed to illustrate to students the important laws underlying these operations. It is also hoped to provide important apparatus and models of plants, &c., of a kind which students have not usually an opportunity of studying at local collieries. The work of the Department of Applied Chemistry, of which the report for the last session has also been issued by Prof. L. T. O'Shea, has an important bearing upon mining instruction, and lectures have been given for mining teachers, firedamp testing, coke oven course, as well as in laboratory work, gas manufacture, coke manufacture, and recovery of by-products, and other subjects directly associated with chemistry in its application to modern industries. The total number of individual day and evening students was 74, as against 111 last year, but the latter included 54 attending firedamp-testing courses, of which there were five, as against one course this year.

Messrs. Newton, Chambers and Co. Limited, Thornecliffe, near Sheffield, have lately placed an order with the Coppée Company (Great Britain) Limited, of King's House, Kingsway, London, W.C., for a complete coal-washing and by-product coking installation, to be erected at Thornecliffe. The plant will consist of a Coppée washery, with crushing plant for treating 500 tons of coal per day, together with a 500-ton crushed and washed coal storage bunker, which latter will be combined with the coal stamping station. The ovens will consist of a battery of 44 Coppée regenerative by-product ovens, provided with electrically-driven coal-compressing, coal-charging and coke-discharging appliances, and the by-product plant, on the direct process, includes the necessary plant for the recovery of tar, sulphate of ammonia and benzol, and all provision is being made in the plant for an extension to 60 ovens. The Coppée Company has also secured the order for a coal washery of 300 tons per day, to be erected at Messrs. Newton, Chambers' Grange Colliery, near Rotherham.

The Home Secretary gives notice that on July 30 he made an Order, which is now in force, extending the provisions of section 8 of the Workmen's Compensation Act, 1906, to writers' cramp, and consolidating the previous Orders of June 22, 1907, and December 2, 1908, with an alteration in regard to the definition of nystagmus, which is now scheduled as "The disease known as miners' nystagmus, whether occurring in miners or others, and whether the symptom of oscillation of the eyeball be present or not." The Order provides that a person suffering from writers' cramp shall not be entitled to compensation for a longer period than 12 months.

Mr. Hugh Ripley, of Welham Hall, Malton, Yorks, and late of Hob Green, Markington, Ripon, a director of the North-Eastern Steel Company Limited, left estate valued at £112,362 gross, with net personalty £104,567.

**Inspection of Collieries by Institute of Journalists.**—The members of the Institute of Journalists will to-day inspect the Hemsworth collieries belonging to the South Kirby, Featherstone and Hemsworth Collieries Limited, and probably the underground workings. A luncheon will also be held in the Hemsworth Colliery Institute.

**Coalmining in Ireland.**—In the House of Commons last week, Mr. Scanlan asked the Chancellor of the Exchequer whether he was aware that a private Bill under the name of the Arigna Valley Railway Bill was this session promoted by persons interested in the Arigna coal and iron ore field, with a view to providing railway facilities for the development of that field, that the Congested Districts Board for Ireland passed a resolution expressing their belief that this railway would greatly assist the development of the mineral resources of the Arigna Valley in the congested districts county of Leitrim, that the Bill was supported by the Midland Great Western Railway of Ireland Company and opposed by the Cavan and Leitrim Railway Company before a Select Committee of the House of Lords, and if he was aware that, as the Cavan and Leitrim Railway Company had intimated their intention of opposing the Bill at all its remaining stages, the promoters had had no alternative, in view of the period of the session, but to withdraw the Bill; seeing that the Treasury have for years contributed out of public funds money to the Cavan and Leitrim Railway Company to make good the deficiency in the guaranteed interest on the capital of that company, the payment for the year ending March 31 last amounting to £3,734, would he say whether the costs incurred by this company in respect of their opposition would be paid by that company and any deficiency in the said interest arising therefrom be made good by the Treasury; and whether the action of this company in this matter had been at the instance or with the knowledge and sanction of the Treasury.—Mr. Lloyd George said the Treasury had no separate information upon some of the statements made; the action of the Cavan and Leitrim Railway Company did not require Treasury sanction, and was not taken at the instance of, or with the knowledge of, the Treasury. As the Treasury recoupment of 2 per cent. for guaranteed dividend was already almost paid in full, only a small portion of the expenses of the opposition to the Bill could fall on public funds.



## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Surfacemen's Demand for 15 per Cent. Increase—Refusal by Employers—Repeated Breaches of Agreement—Gratifying Outlook for Trade, Higher Prices Realised notwithstanding Heavier Demand—Singular Strike at Swansea—Assertion that Maximum Wage must be Abolished—Miners' Federation Ballot upon Political Action—Coal Trimmers and Saturday Stoppage—Notable Developments at Glamorgan Company's Colliery.**

At a meeting of the Conciliation Board, in Cardiff, on Monday, the workmen's representatives submitted a demand for an advance of 15 per cent. in the wages of surface workmen, this being in compliance with the decision of the Miners' Federation of Great Britain a fortnight ago. The president of the South Wales Federation (Mr. W. Brace, M.P.) submitted the case for the surface workmen, and stated that the Miners' Federation of Great Britain had decided that the demand should be put forward in all the districts of the United Kingdom.

The reply on behalf of the owners was made by Mr. Evan Williams, who pointed out that they could not consider such a proposal, it being a distinct breach of the Conciliation Board agreement which the men had entered into for a period of five years, terminating in 1915. The general expectation is that if this matter be pressed to a decisive issue the coalowners will stand firm against the demand, not only in respect of the amount involved, but also for the reason stated at the Conciliation Board meeting—namely, that it is a breach of the agreement.

It had been anticipated that the workmen's schedule of rates would come forward for discussion, but as a matter of fact nothing was said concerning this, and no action taken, although the question has been raised in critical form by the refusal of employers in one Monmouthshire colliery to pay the new rates in respect of new work which has been opened out.

Both this new schedule and the request for 15 per cent. advance open out the serious issue of the value of collective bargaining—going to the root of the whole system of wage regulation. It is not, primarily, a matter as to the specific demands themselves, but it is, above all things, a question whether any wage agreement entered into is to be loyally observed on the workmen's side. If not, what is the value of entering into any agreement? This is the fundamental question now being debated.

Fortunately, the trade outlook is good—contract prices now under negotiation being at such a figure as will set a good standard for later transactions—and this fact is all the more gratifying because of the huge increase of output which is in sight, with its special risk of creating over-supply. Contracts already closed are at higher prices than prevailed this time last year, and market anticipation is that more than 1s. a ton increase will have to be paid generally. Another favourable feature is that the Egyptian State Railways come again to South Wales for the whole of their supply; so that evidently the trials of American coal which have been made for a year or two are not satisfactory—an experience probably shared also by other consumers.

A singular strike arose last week at Swansea, causing idleness of 3,000 men, and unfortunately it developed to such an extent that there was at one time the probability of prolonged stoppage. A dock labourer was summoned for assaulting a dock constable, who is said to have heard him use bad language. When the constable spoke to the man the assault is alleged to have taken place. Because the man was summoned upon the charge of assault, the pit-prop and other workers at the particular wharf stopped work; and because the Harbour Trust would not suspend the dock constable, other men engaged in general cargo work—to the number of about 3,000—stopped work.

The coal-trimmers continued at work and coal-shipping was continued. But practically every other branch was stopped. On Monday, however, work was resumed pending police court proceedings between persons directly concerned.

Discussing the outlook from the wage-earners' standpoint, Mr. Vernon Hartshorn, one of the chief of miners' leaders, declares that the minimum wage must be abolished. Originally 30 per cent. above the standard in South Wales, it was afterwards raised to 35 per cent., and he states that even 40 per cent. would not be satisfactory. In addition, according to him, the maximum must go. The minimum he regards as useless to the workmen, inasmuch as—according to his opinion—they have gained nothing by it; whereas, on the contrary, the maximum is an advantage to the employers, because it prevents the wage-rate going up at times like the present when the price of coal is very high. On one point he makes a curious assertion, for he states, "the higher the price, the greater is the proportion of profit to the employer." But it is notorious that the higher the price—which entails a higher wage-rate—the less is the output per man, and the less, consequently, the proportion of profit per ton of output. It may be, of course, that he means something different; for he states that the wage-rate increases at a bigger ratio than the cost of production when the maximum is in operation." His

fundamental point is that the wage-rate must not be set upon an economic basis, but must have an "ethical and social" sanction, instead of, as at present, being merely a "sordid business proposition." Unfortunately, business is almost entirely—of necessity—"sordid"; otherwise there would not be much business left; and even upon this basis the South Wales miner seems to have done fairly well these last few years.

After a strike extending over nearly three months, settlement has been effected of the dispute at Messrs. Graham's Colliery, Sirhowy. The dispute arose upon the dismissal of two fanmen, and 400 men came out on strike. The arbitrator decided that there has been a mutual misunderstanding, and therefore arranged a compromise, the colliery to be open for work on August 25, and all men to have the option of returning until Monday, September 8. As to the fanmen, they were to be found employment at a rate not lower than they had previously received. Any future complaint is to be dealt with by Mr. Onions (treasurer of the Federation) and Mr. Graham.

Mr. Waplington, agent for the Blaenavon Company, has been presented with a gold watch by the directors, in recognition of his conduct on the occasion of the fire at the Big pit. It will be remembered that three officials lost their lives, and that Mr. Waplington's promptitude in dealing with the accident prevented a much more serious disaster.

The voting papers have now been issued to the South Wales miners under the provisions of the Trade Union Act, 1913. They are asked whether they approve of political objects in connection with the Federation, and the papers have to be sent in before September 19. The votes will be counted, not in South Wales, but in Manchester. The ballot paper sets forth what the political objects are upon which the funds of the union would be spent—namely, in paying expenses of Parliamentary candidates, and also of candidates for public office, both before and after election; in the holding of meetings and provision of literature; on the maintenance of M.P.'s or persons holding public offices; also for registration purposes in the preparation of voters' lists; and on the holding of political meetings. Under the expression "public offices," it is explained that membership of councils and boards of guardians, &c., is included.

The coaltrimmers of Cardiff, Penarth and Barry, at a meeting on Sunday, decided to reject the north country compromise, and to abide by their former decision that they would cease work at one o'clock on Saturdays, commencing September 6.

The members of the union present at the meeting had submitted to them an offer from the employers' side of the Coaltrimming Board to settle upon the basis of the north country terms, which were that instead of stopping at one o'clock they should have a normal stoppage at noon, but work on till four at overtime rates when required, it being also permissible that (by agreement between the men and employers) a hoat could be worked after 4 p.m. on Saturdays at a special rate of 1s 6d. per hour per man. However, the Cardiff meeting on Sunday (as stated) declined to agree to such terms. Another general meeting, representing the whole kingdom, is being held, and upon this depend the future developments.

Feeling at Swansea with regard to the coal-trimmers' demand for a Saturday half holiday is very keen, for it is pointed out that the intention to stop work at one o'clock may mean really two days' detention, which is a very serious item in regard to short voyages—such as these to the north of France with anthracite coal. In addition to this, of course, is the injury to the collieries, which will be deprived of empties on the Monday morning.

Mr. Keir Hardie, in a question before the House of Commons on the last day of the sitting, drew attention of the Board of Trade to the dismissal of aged underground workmen in certain South Wales collieries, and asked whether there were any powers under the Minimum Wage Act for making representations to the employers in favour of having the men restored to their employment.—Mr. Robertson, M.P., stated that the district rules under the Act provided that workmen who had reached 63 years of age should be regarded as aged workmen within the meaning of the Act, and should be excluded from the right of wages at the minimum rate. The Board of Trade had no power to intervene; but if any action had been taken in contravention of the rule under the Act there was a remedy provided.

Mr. Keir Hardie also asked the Chancellor of the Exchequer, inasmuch as colliers under the age of 70 were being dismissed in South Wales, whether he would so extend the Old Age Pensions Act as to enable those workmen to come within the scope. Mr. Lloyd George answered that the Government could not undertake to promise any legislation on the lines suggested.

The Tredegar Company have presented silver medals to a number of their employees, who distinguished themselves at Bedwellty Colliery in rescuing two men buried under a fall. Mrs. Davies, wife of Mr. J. S. Davies, made the presentation to Mr. T. Evans, underground manager, and also to Messrs. Bounds and Jones (overmen), and Messrs. Burgess, Thomas, Morgan, and George.

The rejection, upon third reading, of the Cardiff Company's Bill to increase charges upon the coal trade by a total of £60,000 per annum has been the subject of much discussion at "the Docks," and Exchange opinion rather tends to the conclusion that instead of a revival of the proposal, which has now been rejected in two sessions, there is a likelihood of some scheme for change in the ownership and administration of the dock property. So far as can be discovered, there is no foundation for this idea—although, of course, it has to be borne in mind that more than one proposal for fusion of the dock property with the local railway companies has been mooted in times gone by, even going so far as Parliamentary proceedings to that end. It is obvious that greater facilities are necessary in view of the enormous increase of coal shipment—several millions of tons per annum—which is already in sight; and it was declared in the committee rooms, during the investigation upon the Bill just rejected, that it would not be fair to expect Lord Bute to put more of his own capital into an undertaking which did not yield sufficient return upon the investment. For the moment, of course—and probably for some months ahead—no definite action is likely to be taken; and the foregoing is only current gossip.

From the ovens attached to the new by-product plant of the Glamorgan Collieries, Rhondda, the first coke was drawn last week by Mrs. D. A. Thomas, wife of the chief of the Cambrian Combine. The new installation comprises about 100 ovens of the latest type, with by-product plant erected by Messrs. Koppers' Company, of Sheffield, the outlay being close upon £60,000. At least 400 tons of coal per day can be dealt with, producing 375 tons of coke, and 4 million cubic feet of gas; and the by-products to be recovered—sulphate of ammonia and tar—are estimated at 100 tons of the former and 180 tons of the latter per month. It is probable that benzol plant will be added at a later stage; and that also a large number of additional ovens will be put up. Half of the output of gas will be utilised in connection with the colliery, and the remainder has been offered to the Rhondda Council for lighting purposes. The laboratory at the Glamorgan Collieries is said to be of the highest type, having been laid out to the plans of Mr. A. Than, chemist to the company, who will be manager of the new plant.

There is an excess of 2 million cubic feet of gas going to waste, which the company offer to supply to the Rhondda Council at 7½d. per 1,000, but although (as Mr. D. A. Thomas said) the offer has been before the Council for a long time, no definite reply has been received, although the cost to consumers of the gas now being supplied in the district is 4s. 3d. per 1,000 ft.

According to the seven months' return for 1913, presented to the Newport Harbour Board, the exports of coal have increased from 2,132,656 tons in the corresponding period, to 2,752,128 tons, and the patent fuel from 73,370 to 78,893 tons; but it has to be borne in mind that the comparison is with the strike period of last year. The board re-elected Mr. J. W. Beynon, of Castleton, as representative of "miners and workers of coal."

At the Markham sinkings in the Sirhowy Valley the "old coal" seam has been reached at a depth of 600 yards. It proves to be 6 ft. 6 in. thick, and is of excellent quality. This is the seventh workable seam through which these sinkings have passed, and is regarded as the bottom seam.

**United States Coke Production.**—In 1912 the total production of coke, according to Mr. Edward W. Parker, of the United States Geological Survey, was 43,916,834 short tons, valued at 111,523,336 dols., an increase of 8,365,345 tons in quantity and of 27,392,487 dols. in value over 1911. In 1912 the production of beehive coke increased 5,164,701 tons, or 18 per cent., while that of the retort coke increased 3,200,644 tons, or 49 per cent. The progress in the construction of retort or by-product ovens has been the most significant feature of the cokemaking industry during the last few years. The number of retort ovens in operation increased from 4,624 in 1911 to 5,061 in 1912, a gain of 437, whereas the total number of all ovens decreased from 103,879 to 102,080, indicating that there were 2,236 fewer beehive ovens in existence in 1912 than in 1911. Some new ovens of the beehive type were built in 1912, but the number abandoned exceeded the new ones by 1,799. There were nearly 1,000 more retort ovens under construction at the close of the year, and contracts had been made for the construction of a number of additional plants. In addition to the gradual substitution of retort ovens for the wasteful beehive type, the cokemaking industry is being shifted from the vicinity of the mines to the centres of manufacture and population, where the gases may be utilised and the other by-products readily disposed of. The quantity of coal required to produce a ton of coke is much less than formerly. The average gain in 1912 compared with 10 years ago is probably at least 160 lb. It is doubtful if in the earlier years the actual yield of coal in coke exceeded 60 per cent., whereas in 1912 it was 67 per cent. This gain is largely due to the increase in the production of by-product coke, in which the yield of coke from a ton of coal is very much higher than in making beehive coke. In Illinois, Indiana, Massachusetts, Michigan, New Jersey, New York and Wisconsin, where coke is made exclusively in by-product plants, the yield varies from 69.6 per cent. (in Wisconsin) to 81.8 per cent. (in Indiana); whereas in the States, where beehive practice prevails, the yield in 1912 varied from 50 per cent. (in Georgia) to 66.5 per cent. (in Pennsylvania).



**CONTRACTS OPEN FOR COAL AND COKE.**

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

**Abstracts of Contracts Open.**

**AIRDRIE (SCOTLAND), AUGUST 26**—Coal, for the School Board. Particulars on application to the joint clerks of the Board, 10, Bank-street, Airdrie.

**BEVERLEY, SEPTEMBER 1**—Coal to various almshouses in the borough, for the Beverley Consolidated Charities, according to particulars obtainable from the clerk. Mr. J. Willis Mills, clerk, 31, Laigate, Beverley.

**BIRMINGHAM, AUGUST 27**—About 205,000 tons of coal to the generating stations of the Corporation Electric Supply Department. Particulars from Mr. R. A. Chattock, M.I.E.E., city electrical engineer and manager, 14, Dale End, Birmingham.

**BRADFORD, SEPTEMBER 1**—House coal, for the Corporation. Forms from Mr. Frederick Stevens, town clerk, Town Hall, Bradford.

**BURY ST. EDMUND'S, SEPTEMBER 1**—Coal and coke to the Shire Hall and police station at Bury St. Edmund's, for the West Suffolk County Council. Tenders to Mr. A. Townshend Cobbold, clerk to the West Suffolk County Council, Shire Hall, Bury St. Edmund's.

**CROYDON, SEPTEMBER 4**—Coal and coke for the Croydon Rural and Merton Joint Hospital Board. Forms from Mr. E. J. Gowen, clerk, Council Offices, Katharine-street, Croydon.

**DARLINGTON, AUGUST 30**—Best steam coal, for the Tees Valley Water Board, up to June 30, 1914, at the Merrybent Siding, Darlington, approximately 60 tons per week.

**DUMBARTON, AUGUST 25**—About 110 tons of house coal and 210 tons of washed nuts or tripping to the Joint Hospital. Tenders to Mr. Alex. Roberts, clerk to the Board, Town Clerk's Office, Dumbarton.

**DUMBARTON, SEPTEMBER 1**—About 100 tons of house coal and about 20 tons of washed nuts, for the Property Committee of the County Council. Tenders to Mr. W. Craig, county clerk, County-buildings, Dumbarton.

**EXETER, AUGUST 27**—Coal (screened and delivered) and dry broken coke, for the Devon County Council. Particulars of Mr. F. Bailey, clerk of the Council, Castle of Exeter.

**GLOUCESTER, AUGUST 25**—Rough small slack coal for a period of either six or 12 months, commencing October 1, for the Corporation. Specifications from Mr. F. H. Corson, engineer, Electricity Works, Commercial-road, Gloucester.

**GREAT YARMOUTH, AUGUST 25**—Best household coals, delivered free at the Great Yarmouth Hospital, for the Committee. Tenders to Mr. Richard F. E. Ferrier, honorary secretary, 33, Hall-plain, Great Yarmouth.

**HAMPTON (MIDDLESEX), SEPTEMBER 1**—Best Welsh double-screened steam coal, for the Urban District Council. Forms from Mr. Sidney H. Chambers, surveyor to the Council, Public Offices, Hampton, Middlesex.

**IPSWICH, AUGUST 28**—Best hand-picked hards, Bestwood, Newstead, Portland, Hucknall, New Hucknall, Linby, Watnall, Amblecote or Shirebrook steam coal; best Durham, Wallsend (well screened), best Silkstone (well screened) house coal; best anthracite beans from the Emlyn Colliery; also coke (well broken), to the workhouse, &c., for the Guardians. Forms from Mr. L. W. Greenhalgh, Guardians' Offices, 19, Tower-street, Ipswich.

**LONDON, SEPTEMBER 9**—Gas coal, for the Holborn Guardians. Forms from Mr. J. Allan Battersby, clerk to the Guardians, Holborn Union Offices, 53, Clerkenwell-road, E.C.

**MOLENBEEK (BRUSSELS), AUGUST 27**—Unscreened, 250 tons; cobbles, 20 tons; anthracite, 500 tons; and boiler slack, 100 tons. Tenders to the Collège des Bourgmestres et Echevins, Molenbeek-Saint-Jean.

**NEWPORT (I.W.), SEPTEMBER 11**—Fuel, for the Isle of Wight County Council. Particulars from Mr. J. Dufton, clerk, County Council Offices, Newport, I.W.

**POOLE, AUGUST 27**—Coal and coke, for the Guardians. Forms from the workhouse master.

**PORTLAND, SEPTEMBER 3**—Between 150 and 200 tons of large Welsh steam coal, and between 360 and 440 tons of anthracite nuts, for the Urban District Council. Forms obtainable at the office of the waterworks engineer, R. Stevenson Henshaw, Council Offices, Portland.

**RADSTOCK (SOMERSET), SEPTEMBER 4**—Coal and coke for the Council schools. Tenders to Mr. E. Martin, correspondent.

**ROCHDALE, AUGUST 27**—Steam coal, for the Electricity Committee of the Corporation. Forms from Mr. C. C. Atchison, M.I.E.E., engineer and manager, Dane-street, Rochdale.

**SUNBURY, AUGUST 30**—About 150 tons of best Derby bright coals, for the Trustees. Tenders to Mr. Charles E. Goddard, vestry clerk, Sunbury.

**TAUNTON, AUGUST 29**—About 500 tons Welsh through steam coal, also 1,000 tons of Somersetshire or similar small or slack steam coal, for the Corporation (Electricity Committee). Particulars from Mr. A. J. Howard, borough electrical engineer.

**TIPTON, SEPTEMBER 1**—Best thick coal or Cannock lumps and nuts (chiefly the latter) for the Tipton Education Committee. Tenders to Mr. E. Richards, secretary, Education Offices.

**TRALEE (IRELAND), AUGUST 31**—2,000 tons of best double-screened gas coal, for the Urban District Council, during 12 months ending August 31, 1914. Conditions from the engineer and manager, Mr. James E. Enright.

**UCCLE (BRABANT), AUGUST 26**—About 250 tons of anthracite and about 150 tons of unscreened bituminous coal, for the various services of the Commune. Tenders, addressed to M. le Bourgmestre, Uccle, Belgium.

**WINSFORD (CHES.), AUGUST 25**—Cannel and best screened gas coal, for the Urban District Council. Forms from Mr. Jno. H. Cooke, clerk to the Council, Council Offices, Russell-street, Winsford, Cheshire.

**WISBECH, AUGUST 23**—About 80 tons of Portland, Annesley, Bestwood, or Newstead best hand-picked hard coal, for the Guardians. Tenders to the Workhouse.

**WOKING, AUGUST 26**—About 300 tons of good hard hand-picked steam coal, from the Linby or Shipley colliery, for the Urban District Council. Forms can be obtained at the offices of the Council.

**YORK, AUGUST 25**—Coal to the electricity generating station, Foss Islands-road, York, during the 12 months ending September 30, 1914, for the Corporation. The quantity required will be approximately 10,000 tons, and tenders may be sent for either unscreened beans, pea slack, rough slack, or small peas quality. Tenders to Mr. J. W. Hame, engineer and manager, Electricity and Tramways Offices, Clifford-street, York.

The date given is the latest upon which tenders can be received.

**CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.**

**ALEXANDRIA (EGYPT), SEPTEMBER 30**—Oils, &c.—H.M. Consul-General at Alexandria (Mr. D. A. Cameron, C.M.G.) reports that tenders are invited by the Municipality of Alexandria for the supply of various articles required for the use of the Service du Nettoyement during 1913-14, including oils and colours, wood, steel and iron bars, angle iron, bolts and nuts, screws, rivets, brooms, buckles, wire, &c.\*

**BRUSSELS, AUGUST 29**—Fireclay Materials, &c.—Refractory materials, &c., required at the municipal gasworks—viz.: (1) 36 conical elliptical retorts, 15 conical ditto (both with sockets), and nine sections of conical retorts; (2) special fireclay pieces; (3) 40,000 firebricks, 240 by 120 by 60 millimetres (9½ in. bare by 4½ in. by 2½ in., 10,000 ditto, and other 10,000 ditto, and 20,000 ditto of the same dimensions, except that their respective thicknesses are to be 45 mm. (1½ in.), 30 mm. (1¼ in.) and 20 mm. (¾ in.); (4) 80 and 30 tons of cement. Information at the Service du Gaz, where the specification and each of the drawings may be purchased for 1 fr. (9½ d.)

**BURY, AUGUST 25**—Turbine Alternator, &c.—One 2,000/3,000 kw. turbine alternator, with exciter and surface condenser, for the Corporation. Conditions from Mr. S. J. Watson, M.I.E.E., Electricity Works, Bury; deposit, two guineas.

**CANBERRA (AUSTRALIA), SEPTEMBER 1**—Switchgear.—H.M. Trade Commissioner for Australia reports that tenders are invited by the Commonwealth Department of Home Affairs for the supply of switchgear for the power-house at Canberra, the new Federal Capital in New South Wales. The contract is divided into two sections: (1) Main power-house switchgear; (2) Diesel engine switchgear.\*

**DUBLIN, AUGUST 25**—Rails.—The following, for the directors of the Great Northern Railway Company (Ireland):—Bull head rails, flat-bottom rails, fishplates, cast iron chairs, and permanent way fastenings. Specifications from the secretary, Amiens-street Terminus, Dublin.

**DUBLIN, AUGUST 26**—Feed Pump, &c.—Feed pump, cast iron tanks, pipework, valves, steam separator, boilerhouse shutters, coal grab and steelwork, for the Corporation. Conditions from the city electrical engineer, Fleet-street, Dublin. Deposit 3 guineas.

**DUBLIN, AUGUST 26**—Meters.—Single-phase and three-phase alternating-current meters, for the Electricity Supply Committee. Specification may be inspected at the office of the City Electrical Engineer, Fleet-street, Dublin.

**EPSOM, AUGUST 25**—Cast Iron Water Main.—About 1,500 yards 6 in. cast iron water main in 12 ft. lengths and specials, for the Urban District Council. Particulars from Mr. W. Young, manager, Waterworks, East-street, Epsom.

**FRASERBURGH, AUGUST 25**—Steel Booms.—Steel sliding booms or storm gates for the Fraserburgh Harbour Commissioners, Fraserburgh. Information from Mr. G. N. Abernethy, M.Inst.C.E., 82, Caxton-house, Westminster, London, S.W.

**ITCHEN, SEPTEMBER 9**—Cast Iron Lamp Columns.—95 cast iron lamp columns, copper lanterns, burners, and fittings complete, for the Urban District Council. Particulars from Mr. T. A. Collingwood, surveyor to the Council.

**NEATH, SEPTEMBER 7**—Mains.—Laying and jointing of 6 in., 5 in., 4 in. and 3 in. cast iron and steel mains, special castings, the erection and fixing of valves, &c., bridge and steam crossings, valve chambers, excavations, pipe trenches, concreting, &c., for the distribution mains in the parishes of Resolven, Clyne and Neath Lower parishes, for the Rural District Council. Specification from Mr. D. M. Davies, M.I.M.E., Council Offices, Neath, upon receipt of £3 3s. (£2 2s. only returnable).

**NEWPORT (MON.), AUGUST 25**—Air Filter.—An air filter, together with air ducts, dampers, &c., for the Corporation. The air filter is required for use in connection with the turbo-alternator plant at the East Power Station, and may be either of the dry air or wet air type. Particulars from Mr. A. Nichols Moore, M.I.E.E., borough electrical engineer, Town Hall, Newport, Mon.

**ROCHDALE, AUGUST 27**—Filter.—Erection at their electric power station, Dane-street, Rochdale, of a wet air filter, for the Electricity Committee. Specifications from Mr. C. C. Atchison, M.I.E.E., engineer and manager, Dane-street, Rochdale, on receipt of a deposit of £1 1s., returnable.

**SHEFFIELD, AUGUST 26**—Firebricks.—350,000 firebricks and 54,000 arch-bricks, for the directors of the Sheffield United Gaslight Company (Grimesthorpe Works). Specifications from the engineer, Mr. J. W. Morrison, Commercial-street, Sheffield.

**TALODI (EGYPT), AUGUST 26-SEPTEMBER 8**—Galvanised Sheets, &c.—The London Agent for the Egyptian War Office notifies that tenders are invited by that department for the supply of (1) galvanised corrugated sheets, and (2) steelwork for steel-framed buildings at Talodi. Specifications from the office of Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.\*

**TRALEE (IRELAND), AUGUST 31**—Exhauster.—Supply and fixing complete at the Gasworks, of one exhaustor, capable of passing 10,000 cubic feet of gas per hour, for the Corporation. Specification from the engineer and manager, Mr. James E. Enright.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade 73, Basinghall-street, E.C.

**WAKEFIELD, SEPTEMBER 1**—Boiler, &c.—Various plant for extensions to the works of the electricity department, for the Corporation: (1) Water-tube boiler, superheater, stoker, &c.; (2) steam turbo-alternator, condensing plant, &c.; (3) high and low tension switchgear. Particulars from city electrical engineer, Old Town Hall, Wakefield. Deposit £1.

**WIMBLEDON, SEPTEMBER 1**—Turbine-alternator.—For the Corporation: (a) A 1,500 kw. turbine-alternator, with condensing plant and auxiliaries; (b) a 20-ton overhead travelling crane. Specifications from Mr. H. Tomlinson-Lee, borough electrical engineer, Electricity Works, Durnsford-road, Wimbledon. Deposit of £2 2s. (returnable).

**THE FREIGHT MARKET.**

On the north-east coast tonnage is not quite so plentiful, especially for the coasting ports, and rates in that direction are advancing. London is being done at 3s. 6d. from the Tyne, and Hamburg is quoted at up to 4s. The Bay is steady at from 5s. 9d. to 6s. to Bordeaux. The Baltic has been done at from 4s. 9d. to 5s. 3d. to Cronstadt. The Mediterranean is listed at from 8s. 1½ d. to 8s. 6d. to Genoa. At South Wales there has been a fair amount of activity. Rates for the Mediterranean and South America are steady. There is little change in other directions. The Humber is dull. There is a quiet enquiry for tonnage at about former rates at the Clyde. Homewards, there is a better enquiry from the Black Sea and Azof, and the outlook is improving. Eastern markets are quiet, but the tone is firm. The Mediterranean and ore trades are steady. The Baltic is firm. The tone in America is rather easier. The River Plate retains its steadiness, in spite of a rather limited enquiry.

Tyne to Amsterdam, 1,100, 3s. 4½ d.; Aalborg, 1,700, 4s. 10½ d.; Antwerp, 1,600, 4s.; Bordeaux, 3,200, 6s.; Barcelona, 3,500, 9s. 3d.; Chantenay, 2,100, 6s.; Carthage, 1,350, 11s. 6d.; Cronstadt, 3,200, 5s. 3d.; 4,400, 4s. 9d.; 5,000, 5s.; 5,500, 4s. 9d.; 3,900, 5s.; Elsinore, 1,100, 5s. 3d.; 1,400, 5s. 6d.; Genoa, 3,600, 8s. 6d.; 3,800, 8s. 4½ d.; 5,600, 8s. 1½ d.; 3,700, 8s. 3d.; Gibraltar, 3,500, 7s. 10½ d.; 700; 2,500, 8s. 3d. coal, 11s. 6d. coke, Admiralty; Honfleur, 1,000, 5s. 3d., two loading places; Hamburg, 3,000, 3s. 1½ d.; 1,700, 3s. 7½ d., from Dunston; Havre, 2,000, 4s. 3d., from Dunston; 1,250, 4s. 3d.; Helsingfors, 1,250, 5s. 9d.; Licata, 2,300, 10s. 9d. coal, 13s. 3d. coke, 300; 1,500, 11s.; Leghorn, 4,100, 8s. 6d.; 3,200, 8s. 9d.; 3,600, 8s. 6d.; 800; Lubeck, 1,800, 4s. 10½ d.; 600, 5s.; 500; Las Palmas, 4,500, 8s. 9d.; Lisbon, 2,300, 8s. coal, 10s. 3d. coke; London, 1,600, 3s. 1½ d.; 1,600, 3s. 6d.; Malta, 3,800, 7s. 8d.; Marseilles, 5,000, 8s., 600, from Dunston; 3,700, 8s., from Dunston; Naples, 3,300, 8s. 6d., reported; 2,500, 8s. 9d., 700, from Dunston; Port Said, 5,900, 8s. 3d.; Plymouth, 350, 5s. 3d.; Rouen, 1,500, 5s.; Riga, 1,700, 5s. 3d.; 1,200, 5s. 6d.; St. Petersburg, 2,000, 5s. 3d.; Savona, 8s. 6d.; 5,600, 8s. 1½ d.; 3,600, 8s. 4½ d.; 3,700, 8s. 3d.; San Remo, 3,000, 10s. 6d.; Servola, 5,300, 9s., 800; Spezzia, 3,600, 8s. 4½ d.; 3,700, 8s. 3d.; 4,000, 8s. 3d.; Salonica, 3,800, 10s. 6d., 400, 8d.; St. Nazaire, 3,000, 6s. 3d., Trignac terms, from Dunston; Venice, 5,500, 9s. 9d., 500, two loading places; 4,000, 9s. 6d.

Cardiff to Algiers, 4,700, 8½ fr.; 4,000, 8½ fr.; 3,200, 8½ fr.; Aden, 12s. 9d., August; Alexandria, 5,000, 8s. 9d., September 1; 4,400, 9s.; Ancona, 7,000, 9s. 9d.; Brindisi, 5,500, 9s.; 4,500, 9s.; 500; Bordeaux, 3,000, 6 fr., August 2; Colombo, 13s. 7½ d., August; 13s. 6d., P. and O., August-September; Calais, 3,800, 4s. 3d., end August; Catania, 3,700, 7s. 9d., 800; 2,500, 9s., 800; Cadiz, 1,500, 8s. 3d.; Dieppe, 2,300, 4s. 3d.; Genoa, 3,600, 9s.; 4,000, 8s.; 3,300, 8s.; 4,000, 8s. 6d.; 6,500, 8s. 3d.; Grimsby, 780, 3s. 9d., Admiralty; Honfleur, 4s. 9d.; 740, 5s. 3d.; Havre, 1,000, 4s. 7½ d.; 1,100, 4s. 10½ d.; Havre Canal, 1,400, 4s. 9d.; 1,200, 4s. 10½ d.; Islands, 5,300, 8s. 6d., September 8; Licata, 2,800, 11s.; Lisbon, 2,800, 6s. 7½ d., 400, August 30; 3,000, 6s. 6d.; Luderitz Bay, sail, 22s. 6d.; London, 2,300, 4s.; Las Palmas, 3,000, 8s. 6d., August 25; Leghorn, 4,000, 8s.; 4,000, 8s. 6d.; Malta, 3,000, 7s., end August; 4,300, 6s. 9d., August 25; Monte Video, 5,000, 18s., end August; Messina, 3,700, 7s. 9d., 800; Marseilles, 5,100, 9½ fr.; Maranham, sail, 18s. 6d.; Naples, 4,700, 8s. 3d.; 4,000, 8s. 3d.; 6,500, 8s. 3d.; Perim, 5,000, 13s. 3d.; Philippeville, 3,800, 11 fr. 12½ c.; Piræus, 4,500, 8s. 3d., August 26; Port Said, 5,000, 8s. 6d.; 3,500, 8s. 6d.; Pernambuco, sail, 18s. 6d.; 18s. 3d.; Portsmouth, 2,900, 2s. 6d., Admiralty; River Plate, 4,300, 18s. 9d., 1s.; 5,000, 19s., August 25; 3,800, 18s. 9d., August 25; 4,800, 19s., end August; Rio de Janeiro, 7,000, 16s., early September; 8,000, 16s., early September; 7,000, 16s. 1½ d.; 6,600, 16s. 9d.; 5,900, 16s. 6d., September 1; Rosario, 4,000, 20s. 9d., 200, September 1; 4,000, 20s. 6d.; St. Malo, 2,000, 4s. 6d.; Savona, 4,000, 8s.; 3,300, 8s.; 4,000, 8s. 6d.; Spezzia, 8s.; St. Petersburg, 2,100, 6s., August 25; Trieste, 5,600, 9s.; Valencia, 10s. 3d.; Victoria, Brazil, sail, 19s. 6d.; Venice, 7,000, 9s. 9d.

Newport to Villa Real, 750, 10s. 9d., September; Bordeaux, 1,500, 7 fr., 400; 1,650, 7½ fr.; Gibraltar, 1,750, 8s. 4½ d., August 23; Oporto, 1,000, 8s.; Bahia Blanca, 5,000, 19s., end August; sail, 17s. 9d.; Algiers, 3,100, 8½ fr., August 25; 962½ fr., fuel; Cronstadt, 4,700, 5s. 9d.; Monte Video, 4,400-5,000, 17s.; 3,500, 17s.; Naples, 6,000, 8s. 3d., 800.

Swansea to Marseilles, 3,200, 10½ fr.; Bayonne, 1,800, 8 fr.; Trouville, 700, 5s. 3d.; Rouen, 1,500, 5s. 3d.; 630, 5s. 6d.; Valencia, 2,650, 10s. 3d. coal, 11s. fuel, August 25; 1,300, 10s. 3d.; Pernambuco, 5,000, 17s. 6d., fuel, September, Naples, 3,600, 8s. 9d.; Genoa, 1,300, 9s. 6d.; 3,500, 9s., August 23; Bordeaux, 1,800, 8 fr.; Marseilles, 3,600, 10½ fr.; La Rochelle, 1,000, 6½ fr.; Honfleur, 900, 5s. 3d.; Barcelona, 2,000, 9s. 3d.; Stettin, 2,300, 5s. 6d.; Guernsey, 400, 5s.; Stugsund, 1,200, 6s. 9d.; Charente, 2,400, 7 fr.

Wear to Lisbon, 4,000, 7s. 3d.; Barcelona, 3,500, 9s. 3d.; Malta, 3,800, 7s. 8d.; St. Petersburg, 2,800, 5s.; Christiania, 1,650, 5s.; Gefle, 2,100, 5s. 6d.

Blyth to Cronstadt, 3,900, 5s.; 4,500, 4s. 9d.; Rouen, 1,500, 5s.; Havre, 1,250, 4s. 3d.; Boulogne, 1,400, 4s. 3d.; St. Petersburg, 2,000, 5s. 3d.; Riga, 1,800, 5s. 3d.; Windau, 1,700, 5s. 3d.; Aalesund, 1,500, 5s. 9d.; Helsingfors, 1,200, 5s. 9d.

Mersey to Santos, sail, 22s.

Weeser to Pensacola and Mobile, 7,200, 10s. 3d., kainit, end August.

Liverpool and Glasgow to Bombay, 22s. 6d.

Newport and Cardiff to Bombay, 14s., rails, August.

Hull to Cronstadt, 2,900, 5s. 3d.; Pernau, 2,000, 5s.; Svaneke, 600, 7s.; Cronstadt, 2,200, 5s.; Libau, 2,400, 5s.; Christiania, 680, 5s. 7½ d.; Riga, 3,600, 5s.; Bandholm, 1,400, 5s.; Nakskov, 1,400, 5s., 800; Nykjoting Falster, 2,000, 4s. 10½ d.; 350; Aarhus, 1,000, 5s. 7½ d., 275.



Liverpool to Barcelona, 3,000, 9s. 3d.; St. Petersburg, 1,400, 6s.; Aarhus, 2,000, 5s. 6d.; Burntisland to Hudiksvall, 1,300, 5s. 6d.; Glasgow to Bordeaux, 2,400, 8fr.; North Norway, 1,700, 5s. 4d.; Llanelli to Rouen, 680, 5s. 9d.; Wales to Bombay, 12s. 6d.; Immingham to Pernau, 2,000, 4s. 9d.; Troon to Genoa, 3,200, 8s. 6d.; Newport River to Algiers, 3,300, 9'62½ fr.; Five port to Libau, 1,500, 5s. 4½d.; 1,800, 5s. 4d.; Karrebeksmünde, 1,600, 5s. 6d.; Malmö, 1,200, 5s. 6d.; Port Talbot to St. Nazaire, 3,500, 5½ fr.; Bordeaux, 3,500, 6fr.; Trouville, 800, 5s.; August 30; Rouen, 2,000, 5s.; Rotterdam to Bordeaux, 5s. 10½d. steam coals, 6s. 7½d. fuel; Dieppe, 1,400, 4s. 10½d.; Porto Vecchio, 3,600, 8s. 9d.; August 25; St. Nazaire, 4,300, 5s. 9d. steam coal, 6s. 6d. fuel, 7s. 9d. coke; Algiers, 9fr., part cargo fuel, August 25; Malta, 3,000, 6s. 9d., August 26.

Homeward charters:—Azof, 4,000, 10 per cent., 13s. 6d. n.c. or any, September 5-20; 3,400, 14s. n.c. or any, 3d. less barley, September 20-30; 5,200, Rotterdam 12s. 9d., Emden or Weser 13s., Hamburg or Leith 13s. 3d., 3d. less barley, spot; 5,000, Rotterdam 13s. 6d., Antwerp, Emden, Weser 13s. 9d., Hamburg 14s., 3d. less barley, September 12-25; 6,000, 13s. 6d. n.c. or any, 14s. Hamburg, no reduction, October; 7,000, Rotterdam 13s. 9d., Emden or Weser 14s., Hamburg 14s. 3d., 3d. less barley, September; 3,400, 10 per cent., 14s. 9d. n.o. or any, 6d. extra Hamburg, September; 5,100, Rotterdam, 13s., 3d. less barley, end August; Kherson and Nicolaieff or Odessa, 3,800, two ports loading, Rotterdam 12s. 3d., Weser 12s. 6d., Hamburg 12s. 9d., 3d. less barley, ppt.; 4,100, Weser 12s. 7½d., Hamburg 12s. 10½d., 3d. less barley, days, August 28; 6,000, London or Rotterdam 12s. 1½d., Emden or Weser 12s. 4½d., Hamburg 12s. 7½d., ppt.; 3,100 max., 13s. o.c., September; 4,800, Rotterdam 12s. 3d., Hamburg, 12s. 6½d., 3d. less barley, days, August 20; 5,000, basis 12s. Rotterdam, August; 6,000, London or Rotterdam 12s. 1½d., Emden or Weser 12s. 4½d., Hamburg 12s. 7½d., ppt.; Kherson or Nicolaieff, 3,800, Bergen-Christiana Range, 15s. one port, 15s. 3d. two ports, 15s. 6d. three ports, August-September; 6,300, London or Rotterdam, 12s., reported; 4,200, Rotterdam 12s. 6d., London 12s. 9d., Weser or Hamburg 13s., no reduction, Sept. 1-15; Novorossisk, 3,400, Denmark, 17s. one port, 17s. 3d. two ports, 17s. 6d. three ports, oilcake, August-September; Nicolaieff or Odessa, 6,300, Rotterdam 12s., Hamburg 12s. 6d., no reduction, August-September; 6,600, Rotterdam 12s. 3d., Hamburg 12s. 9d., August-September; 6,800, Rotterdam 12s. 6d., London, 12s. 9d., Weser or Hamburg 13s., no reduction, September 1-15; Kurrachee, 4,600, United Kingdom-Continent, 19s. 7½d. p.p., option Mediterranean same rate; France 1s. extra, less 2 per cent., August 30-September 10; 9,000, United Kingdom-Continent, 18s. 9d. p.p. net, September; 6,000, 19s., net terms, August-September; New York, 2,150, River Plate, 29c., August-September; Hornillo Bay, 3,000, Stockton, 6s. 10½d., ppt.; Bilbao, 4,000, Rotterdam, 4s. 7½d., ppt.; Calcutta, 3,198 net, Hull, Antwerp or Dundee, 27s. 6d., jute basis, 2s. 6d. less, August-September; Delagoa Bay, 6,500, Kurrachee or Bombay, 7s. 6d., option Bhudnagar, 8s. 3d., September; time charter, European trade, £435, six months, delivery United Kingdom. Baltic charter, November-December; time charter, Pacific trade, 4s. 10½d., six months, delivery and redelivery United Kingdom-Continent; East Norway, one or two ports, sail, 18s. 3d., Buenos Ayres; San Lorenzo, 3,600, 10 per cent., United Kingdom-Continent, 20s. o.c., less 6d., August-September; 3,500, 10 per cent., 18s. o.c., less 6d., with Spanish options, October; 4,600, 10 per cent., 19s. 6d. o.c., less 6d., less 6d. more if p.p., September 10-25; 6,200, 10 per cent., 19s. 6d. o.c., less 6d., less 6d. more if Rotterdam, ppt.; 5,700, 10 per cent., 20s. o.c., less 6d., with option, ppt.; 5,600, 10 per cent., reported at 18s. 3d., p.p., August-September; 17s. 6d., o.c.; Savannah, 47s. 6d., Liverpool or Continent, September; 1,526 net, United Kingdom-Continent, 43s. 6d., Form O, September; 2,065 net, Liverpool or Manchester 43s. 9d., United Kingdom-Continent, p.p. 45s., two ports discharge 1s. 3d. extra, Form O, September; 3,320, 141 ft., United Kingdom-Continent, p.p.; 46s. 3d., Form O, two discharge 1s. 3d. extra, d.w. limited 4,500 tons, September; 1,935 net, Denmark, basis 19s. 6d. one port, oilcake, option Gulf loading 21s., November-December; 19s. 6d. one port, 19s. 9d. two ports, 20s. three, 20s. 4d. four, oilcake, option Gulf loading basis 21s., November-December; Wilmington, 2,691 net, Liverpool or Bremen, 41s. 3d., October; Porman, 3,500, Maryport, 7s. 9d., ppt.; nitrate ports, 2,953 net, United Kingdom-Continent or United States, 30s., January; New York, sail, 10½ dols., River Plate, September-October; Windau, 10s. 6d., Lowestoft, sleepers; Cambeltown, 56s. 3d., Sharpness, September; 57s. 6d., September; Sulina, 4,300, Denmark, basis 15s. 6d. one port, September 12; Burmah, 2,924 net, Holland, Antwerp, or Weser, 27s. 6d., August-September; nitrate ports, sail, p.t., South Africa; 30s. 6d., United Kingdom-Continent, less 6d., October-November; time charter, Australian trade, 4s. 10½d., two trips, delivery Newcastle, N.S.W., re-delivery West Coast South America, one month's coal and hire; time charter, Transatlantic trade, 5s. 6d., two round trips, via Gulf, delivery and re-delivery United Kingdom-Continent; Kohsichang, 27s. 3d., United Kingdom-Continent, September; Saigon, 6,000, Havre, Dunkirk, 27s. 6d. one port, 28s. 3d. both ports; Port Arthur (Texas), 950 stds., 10 per cent., Amsterdam and Swansea, 117s. 6d., September; Saleef, 2,346, Calcutta, Rs.7, salt, end August; time charter, South American trade; 5s. 3d. one round trip, delivery United Kingdom, re-delivery United Kingdom-Continent; time charter, Calcutta coal trade, 4s. 3d., 15 months, December-January.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—J. H. Bennett and J. Mundell, carrying on business as iron-mongers and hardware merchants, at West Hartlepool, under the style of Bennett and Mundell; J. S. J. Redfern and H. W. C. Robbins, carrying on business as electrical experts and mechanical engineers, at Hurst-street, Birmingham, under the style of Redfern, Robbins and Co.; T. E. H. Wagstaff, carrying on business as coal and iron merchants, at Normanton, under the style of Escott and Wagstaff.

## COAL, IRON AND ENGINEERING COMPANIES.

**Albany Engineering Company Limited.**—This private company has been registered, with a capital of £50,000 in £1 shares, to acquire and take over as a going concern the business now carried on at Ossory-road, Old Kent-road, S.E., under the style of "The Albany Engineering Company," and to enter into an agreement with Robert James White and John George White to carry on the business of iron-founders, mechanical and electrical engineers, manufacturers of implements and all kinds of machinery, toolmakers, brassfounders, metal workers, iron and steel converters; and also to carry on any business relating to the winning and working of minerals. First directors: Robert James White, John George White, Robert A. White, and Henry Handoll. Qualification, 200 shares. Remuneration, £50 per annum. Registered office, 80, Ossory-road, Old Kent-road, S.E.

**Astley and Tyldesley Collieries Limited.**—The half-yearly report shows a net profit of £34,472. It is proposed to pay a dividend of 17s. 6d. on the fully-paid ordinary shares and 14s. on £8 paid shares, the balance of £9,000 being carried forward. The dividend is at the rate of 17½ per cent.

**Brightside Foundry and Engineering Company Limited.**—The directors, in their report for the year ended June 30, state that the operations of the year, after providing for depreciation and all charges, have resulted in a profit of £9,965, to which is added £1,238, the amount brought forward from last year, making £11,203. From this sum has to be deducted the interim dividend at the rate of 5 per cent. per annum for the first half of the year on £45,000 5 per cent. preference shares £1,125, leaving a balance of £10,078 14s. 2d. The half-year's preference dividend to June 30, 1913, paid on July 1, has absorbed £1,125, leaving to be disposed of £8,953, which the directors recommend shall be dealt with: In payment of a dividend of 7½ per cent., free of income-tax, on 40,000 £1 ordinary shares, £3,000; as a reserve towards extensions now in progress, £2,000; placing to reserve account, £2,000; and carrying forward the balance of £1,953 14s. 2d. To fill the vacancy caused by the retirement of Mr. Benjamin Freeborough, the board had recently elected Mr. Patrick J. Benson, and the shareholders are asked to confirm his election.

**Burma Wolfram and Tin Mining Company Limited.**—This company has been registered, with a capital of £100,000 in £1 shares, to acquire any quarries, mines and mineral rights, and to explore, work and develop any tin, copper, coal, iron and other mines; to conduct the business of raising, crushing, washing and smelting ores; and also to carry on the business of engineers, colliery proprietors, coal and iron masters, ironfounders, smelters, metal workers and miners. Minimum subscription, 7 shares. Signatories: E. Pope, St. Stephens-chambers, Telegraph-street, E.C.; F. H. Rayner, 57, Medan-road, Clapton, N.E.; E. A. Foster, A. H. Foster, S. A. Rudland, Wm. Wills and Edith H. Brown, all of 6, Great St. Helen's, E.C. Qualification of directors, £100. Remuneration of directors, £150, and a proportion of the profits (not exceeding £2,000) per annum. Registered office, 6, Great St. Helen's, E.C.

**Consolidated Cambrian Limited.**—The directors of Consolidated Cambrian Limited have declared interim dividends for the half-year ended June 30, 1913, on the preference shares at the rate of 6 per cent. per annum, and on the ordinary shares at the rate of 10 per cent. per annum, less income tax.

**Darton Main Colliery Company Limited.**—This private company has been registered, with a capital of £50,000 in £1 shares, to carry on the business of colliery proprietors, coal merchants, quarrymen, ironmasters, miners, smelters, engineers, steel converters and ironfounders, and to purchase or otherwise acquire collieries, coal and other mines, minerals and other property in order to carry on the said businesses. Signatories: Harry Jaggar and Eva Jaggar, Carr House, Shelley, Huddersfield. Governing director, Harry Jaggar, Carr House, Shelley, Huddersfield.

**Fernhill Collieries Limited.**—The report for the year ended June 30, 1913, states that the profit for the 12 months was £43,990 9s. 1d., to which has to be added the balance brought forward from last year of £606 19s. 4½d., making £44,597 8s. 5½d.; deducting interest on debentures and loans £9,481 5s. 6d., and interim dividend on preference shares to December 31, 1912, of £681 18s. 7d., the amount available for distribution is £34,434 4s. 4½d. This amount the directors recommend dealing with as follows:—Dividend at the rate of 7 per cent. per annum on the preference shares for the half-year ended June 30, 1913 (less income tax), £3,500; dividend of 16 per cent. on the ordinary shares for the year ended June 30, 1913 (less income tax), £16,000; reserve account, £10,000; carry forward, £4,934 4s. 4½d. The output of coal for the year was 618,224 tons.

**General Chartering Company Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of merchants and traders in coal and iron ore, and colliery owners. First directors, A. Reichwald, Z. W. Dekkers and H. E. Erhardt. Qualification, £5. Remuneration, 15 per cent. of the net profits of the company earned in each year, to be divided among them proportionately. Registered office, Finsbury-pavement House, Finsbury-pavement, E.C.

**Guest, Keen and Nettlefolds Limited.**—The directors' report states that after making provision for bad and doubtful debts, the accounts show a profit of £453,092 16s. 5d., to which must be added the amount brought forward from last year, £206,375 9s. 2d., making an available balance of £659,468 5s. 7d. Deducting from this the amount paid for debenture interest for the 12 months and interim dividend on the preference and ordinary shares, amounting altogether to £160,952 3s. 4d., there remains a sum of £498,516 2s. 3d., which the directors recommend should be appropriated as follows:—To pay a dividend on the preference shares at the rate of 5 per cent. per annum, free of income tax, for the six months ended June 30, 1913, £43,000; to pay a dividend on the ordinary shares at the rate of 10 per cent. per annum, free of income tax, for the six months ended June 30, 1913 (making 10 per cent. for the year), £48,250; to pay a bonus on the ordinary shares of 1s. per share, free of income tax, £48,250; to place to the accident and fire insurance fund, £20,000; to place to reserve, £100,000; and to carry forward £239,016 2s. 3d.

**Hawthorn (R. and W.), Leslie and Co. Limited.**—The twenty-eighth annual report of the directors for the year

ended June 30 states that after making an allowance of £20,334 for depreciation and for leasehold redemption fund, and paying all interest and other charges, the net profit for the year amounts to £77,144, making with £20,630 brought forward, an available balance of £97,774. The directors recommend a final dividend of 7½ per cent., making 10 per cent. for the year, transfer to general reserve fund £33,000, making that fund £163,000, leaving £20,850 to be carried forward. The reserve fund now stands at £163,000; there is also a leasehold sinking fund account (for purchase and cancellation of debentures) amounting to £26,950; and a special reserve account of £27,000.

**Henley's (W. T.) Telegraph Works Company Limited.**—The directors have declared an interim dividend on the preference shares at the rate of 4½ per cent. per annum, less income-tax, and on the ordinary shares at the rate of 10 per cent. per annum, free of income-tax, for the half-year ending June 30 last.

**Igranic Electric Company Limited.**—This private company has been registered, with a capital of £35,000 in £1 shares, to carry on business as manufacturers of electrical apparatus, mechanical and electrical engineers, founders, and metal workers, &c. First directors: Frank Rogers Bacon, Frederick L. Pierce, Arthur W. Beresford, and George Augustus Mower, all of 147, Queen Victoria-street, E.C. Registered office, 147, Queen Victoria-street, E.C.

**Jessop (William) and Sons Limited.**—The directors have declared an interim dividend of 2s. per share, free of income tax, on the ordinary shares for the past half-year, being at the rate of 5 per cent. per annum.

**Moston Malleable Castings Company Limited.**—This private company has been registered, with a capital of £6,000 in £1 shares, to acquire and take over as a going concern and carry on the business of iron and steel founders now carried on by Tom Parkin, at St. Mary's-road, Newton Heath, Manchester, under the style of the Moston Malleable Castings Company, and to enter into an agreement with Tom Parkin to carry on the business of ironmasters, steelmakers, steel converters, colliery proprietors, miners, smelters, mechanical and electrical engineers, manufacturers of agricultural implements and other machinery, toolmakers, brassfounders and metal workers, also to carry on any business relating to the winning and working of minerals. First directors, Tom Parkin, St. Mary's-road, Moston, Manchester. Qualification, £100. Registered office, St. Mary's-road, Moston, Manchester.

**Port Matolia (Delagoa Bay) Limited.**—This company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of coalowners, coal factors and agents, mechanical and electrical engineers, toolmakers, iron and brass founders, metal workers, and iron and steel converters, &c. Signatories, M. T. Wigham, 826, Salisbury House, London Wall, E.C.; F. Wray, 63, Brownhill-road, Catford, S.E.; S. A. Andrews, "Iolanthe," Duncombe Hill, Honor Oak Park, S.E.; Mabel B. Orridge, 131, Notting Hill Gate, W.; A. S. Bassi, 56, Fotheringham-road, Enfield, N.; J. C. Hailey, Norbury, Sidcup.

**Roberts (Charles) and Co. Limited.**—The directors report for the year ended June 30 last that, after paying interest on debentures and maintaining the buildings, machinery and wagons in an efficient state, entirely out of revenue, the profit for the year amounts to £10,100, which, with the balance brought forward, gives a total of £10,452. The directors recommend that this sum be appropriated as follows: Interim dividend, paid March 1, 4 per cent.; dividend to be paid September 1, 6 per cent.; depreciation of buildings and machinery, £3,456; depreciation of wagons, £3,000; carry-forward, £396. The iron foundry has now been completed, and is in full working order.

**Theatromat Company Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on business as mechanical engineers, toolmakers, metal workers, machinists and electrical engineers, and to buy, sell, repair and alter any machinery, &c. First directors: Francis Bulmer, Walter William Harrison, Hans Hortmann, and James Wm. Reed. Registered office, 245, Shaftesbury-avenue, W.C.

**Thorpe Head and Co. Limited.**—At the second annual meeting of the shareholders, held on the 13th inst. at the offices of the company, Wharf-road, Pancras-road, N.W., dividends at the rate of 6 per cent. on the preference, and 10 per cent. on the ordinary shares were passed.

**Withank Colliery Company Limited.**—A dividend (No. 17) of 2s. per share has been declared for the six months ending August 31, 1913.

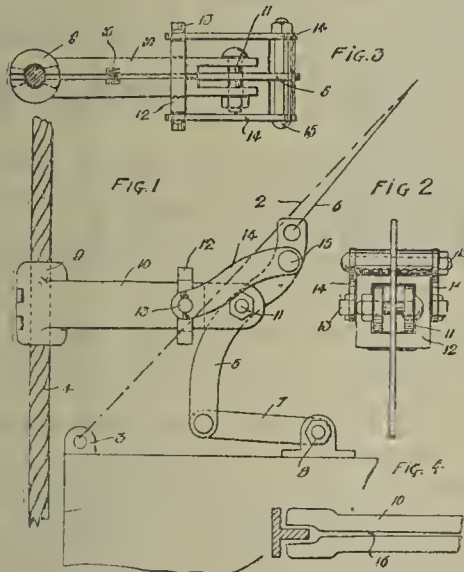
**Workington Iron and Steel Company Limited.**—The report for the year ended June 30 last states that the accounts for the fourth year's trading of the company show considerable improvement. There have been no serious labour disturbances such as marked the previous year. The new turbo-generating plant is coming into operation this month, and by the utilisation of exhaust steam a considerable reduction in the consumption of fuel is anticipated. This, together with further outlay at the colliery and mines, accounts for the heavy capital expenditure. The company have paid up £49,500 for shares in the Harrington Coke Ovens Limited at par; this will enable that company to substantially increase the supply of coke. The profits for the year also enable the company to strengthen their position by writing off double the amount of the previous year for depreciation, wiping out the balance of formation expenses, and establishing, for the first time, a reserve fund account. It is proposed, in addition to the interim dividend on ordinary shares of 2½ per cent., to now declare a further dividend of 3½ per cent., making 6 per cent. for the year. The profit on the year's working is £219,525 0s. 5d., which, with £15,839 10s. 11d. brought forward from previous year, gives for disposal £235,364 11s. 4d., which the directors propose to deal with as follows:—Dividend on 6 per cent. preference shares to December 31, 1912, £30,000; dividend on 6 per cent. preference shares to June 30, £30,000; interim dividend on ordinary shares of 2½ per cent., £27,427 18s. 6d.; final dividend on ordinary shares of 3½ per cent., £38,399 1s. 11d.; depreciation written off property account, £50,000; formation expenses written off, £7,579 13s. 3d.; reserve, £30,000; balance carried to next year, £21,957 17s. 8d. The return from the investments in Harrington Harbour and Dock, Workington Harbour and Dock, Beckermest Mines, and Harrington Coke Ovens has been remunerative.



# ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

3245 (1912). *Improvements in or relating to the use of Explosive Compositions for Blasting.* Société l'Air Liquide (Société Anonyme pour l'Etude et l'Exploitation des Procédés Georges Claude), of 48, rue St. Lazare, Paris, France.—Constitutes a modification of the invention set forth in the specification of prior patent No. 3102 of 1913. The invention set forth in the specification of the said patent relates to compositions adapted for explosion by the aid of liquid air or oxygen, and consists in providing compositions of aluminium and an inert porous material, such as kieselguhr, with a protective sheath or envelope of a particular character. The sheath or envelope described in the specification of prior patent is composed of an inert porous material capable of absorbing so much liquid air or oxygen that the whole of any external heat reaching the enveloped cartridge, after immersion, is utilised for some considerable time in evaporating the liquid from the said sheath or envelope, the cartridge proper being thus preserved in its fully saturated condition, and therefore in a condition that will afford a uniform and maximum explosive effect. According to the present invention the sheath or envelope of inert porous material, kieselguhr for example, is applied to cartridges of carbon or hydrocarbons, alone or mixed with an inert material. In addition to acting efficiently as a protective sheath or envelope to prevent the entrance of external heat into the cartridge proper, and to improving the rigidity of the cartridge as a whole, a sheath or envelope of the kind described, when used with cartridges composed as above mentioned, affords the additional advantage of containing liquid air or oxygen that becomes useful in burning any carbon monoxide produced during the combustion of the carbon or carbonaceous cartridge proper. (Two claims.)

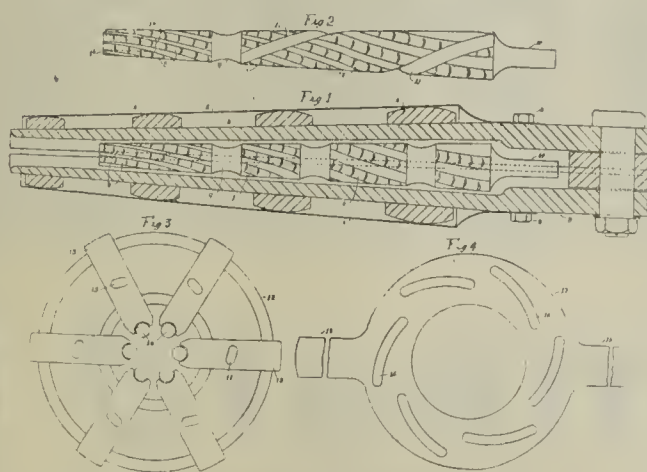
6020 (1913). *New or Improved Safety Device for Mine Cages, Lifts, Elevators and the like.* T. G. Sampson, of Ashley House, 177, Mount Pleasant-road, Ebbw Vale, Monmouthshire.—According to the invention the operation of the sliding loop or the like is made entirely independent of springs or the like, and such operation is brought about entirely by the weight of the cage or other body so that a positive and powerful engagement of the gripping jaws is secured immediately upon the breaking of the lifting and lowering rope. This action is brought about by connecting the sliding loop, as for example by a link with a lever which is connected at one end with the lifting and lowering rope and at the other end with the cage or other body, this



latter connection being of such a nature that when the lifting and lowering rope breaks and the lever is no longer restrained by its connection with such rope, the pull of the cage upon this lever turns the latter about its pivot, thereby forcing the sliding loop outwards and closing the gripping jaws on to the guide. Fig. 1 is a side elevation of one construction, and a view of a part of a guide rope and cage upon which the device is mounted. Fig. 2 is an elevation of the device as viewed from the right hand side of fig. 1. Fig. 3 is a plan of the device, and fig. 4 is a plan of a modified construction. (Four claims.)

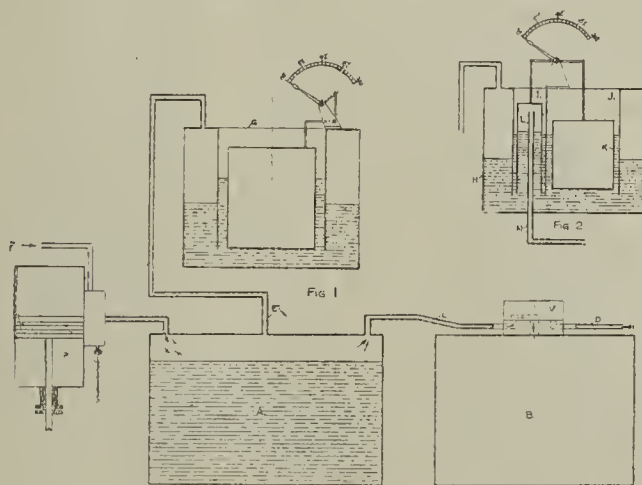
9227 (1913). *Improvements in or relating to Attachments for Ropes for Haulage and like purposes.* F. Ringrose, of Haugh Cottage, Bothwell, Lanarkshire, and T. Stevenson, of Lochside, Hamilton, Lanarkshire.—Relates to capelling and associated devices for winding and haulage and like systems of the kind wherein the strands at one end of the haulage or winding rope engage a helically fluted core or mandrel of tapered formation and are maintained in engagement therewith by means of a correspondingly tapered hose or capel. Fig. 1 is a section showing a general arrangement, the rope being omitted for the sake of clearness; fig. 2 is a side elevation showing a modified construction of mandrel; figs. 3 and 4 show on an enlarged scale details of a tool by means of which the strands of the rope may be threaded on to the mandrel. The said tool comprises a stock 12 fitted with movable dies 13, which are formed at their inner ends with recesses 14 for the reception of the strands and are provided with projections 15 adapted to engage cam slots 16 formed in a manually operable cover plate 17 rotatable

relatively to the stock 12 and provided with a handle or handles 18, the cam slots 16 being of such formation as to permit outward movement of the dies as the stock is



advanced on the mandrel in threading the strands thereon. (Three claims.)

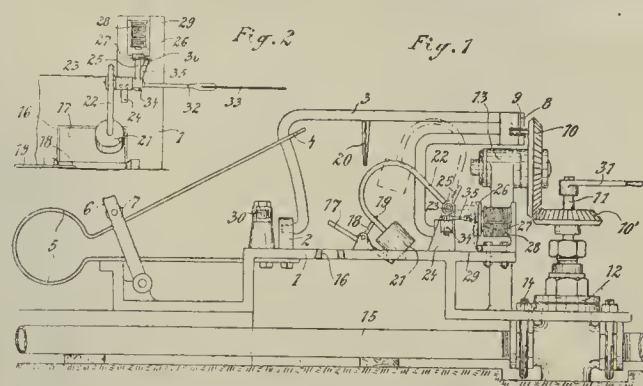
16300 (1912). *An Improved Apparatus for the Automatic Analysis and Indication of Gases.* P. R. Boulton, of the Electricity Works, Summer-lane, Birmingham.—Has particular application to an improved apparatus for analysing and indicating the percentage of carbon dioxide in furnace fuel gases or the like. The measuring vessel takes the form of a pump cylinder, the pump being used to propel or draw the gases through the apparatus. The indicator or recorder operating by virtue of gas pressure may communicate with the system at any point between the pump and the second receptacle, and said indicator or recorder may be of any suitable type, preferably that known as a liquid float gauge having a needle indicator for indicating the percentage of carbon-dioxide or other gas absorbed by the solution. This gauge is calibrated to read zero when gases are passing containing no CO<sub>2</sub>; therefore, when a percentage of CO<sub>2</sub> is contained in the fuel gases passing through the apparatus, a reduction in pressure due to absorption takes place and the needle moves over the calibrations to indicate the percentage of CO<sub>2</sub> absorbed. The pump may be arranged to force or draw the gases through the apparatus; if the gases are forced through, the



pressure in the absorbent tank or receptacle will be above that of the atmosphere, and if drawn through the pressure will be below. The pump will be mechanically connected to the valve which controls the flow of gas into and exit from the receptacle in such manner that the number of revolutions or strokes of the pump in a given time must bear a definite ratio to the number of operations of the valve in that time. If none of the gas passing through the apparatus is absorbed then the amounts entering and leaving the apparatus must be equal; consequently the pressure in the receiver and absorbent tank will attain a certain value, which pressure will be communicated to a pressure gauge, preferably of the liquid type. The gauge is calibrated to read zero under this condition. When a percentage of the gases passing through the apparatus is absorbed a reduction of pressure takes place and the pressure gauge moves over the calibrations to indicate the percentage absorbed. Fig. 1 shows diagrammatically the arrangement. In order to compensate for any variation of pressure in the flue, a modified type of gauge may be employed, the construction of which is shown in fig. 2. (Three claims.)

16441 (1912). *A Method of and Apparatus for Preventing the Spreading and Reducing the Effect of Coaldust and Fire-damp Explosions.* G. Kahler, of 31, Kaiserstrasse, and F. Junker, of 48, Schalkerstrasse, both in Gelsenkirchen, Germany.—In the Specification filed with Application for Letters Patent No. 16440, A.D. 1912, are described a method and apparatus for preventing the spreading and effect of coaldust and fire-damp explosions, which are based on the use of the powerful wave of air-pressure produced by a blasting shot for producing a water zone which fills the whole cross-section of the gallery. The apparatus described is provided for this purpose with a disc, which is adapted to receive the air-pressure and with the aid of a drop block to release a lock, controlling a member which, when released, operates a valve, and thereby opens a passage for water to a spraying installation adapted to produce the water zone. The object

of the present invention is to provide additional security in regard to setting the sprinklers in action at each blasting operation. To this end with the apparatus, described in the prior specification cited, are combined means which connect the device for putting into action the sprinklers with the device for firing the blasting charge, so that the operation of blasting produces action of the sprinklers independently of the action of the resultant air wave on the disc or vane. These connecting means, preferably electromagnetic, if in proper working order, ensure action of the sprinklers at each blasting operation, even if the vane is out of order, or the air wave is insufficient to actuate it, but if the said connecting means are out of order there is still the strong probability that the air wave will actuate the vane and produce action of the sprinklers. Fig. 1 is an elevation of the apparatus controlled by the electromagnet in its operative position; fig. 2 is a plan view of the electromagnet and its co-acting parts. In the first instance the drop block 21 is set by connecting the arm 25 with the armature 27, and after forcing down the spring 5 by means of the compressing lever 6, and preventing the bent member from springing back by means of the detent lever 30, the bent member is finally set by bringing the blades of the tongues 19 and 20 into engagement with one another. Thereupon the valve 12 is closed by means of the handle 31, and the detent lever 30 removed from the bent member 3. After placing the blasting charges in position, the conducting wires of the igniter used for the electrical ignition and the coils of the electromagnet are connected up in series or in parallel to the main conducting wires. When an electric circuit is closed by connecting an igniting device to the main wire, the result will be the breaking down of fresh coal on the one hand, and the release of the drop block by the electromagnet on the other hand, whereby the drop block is

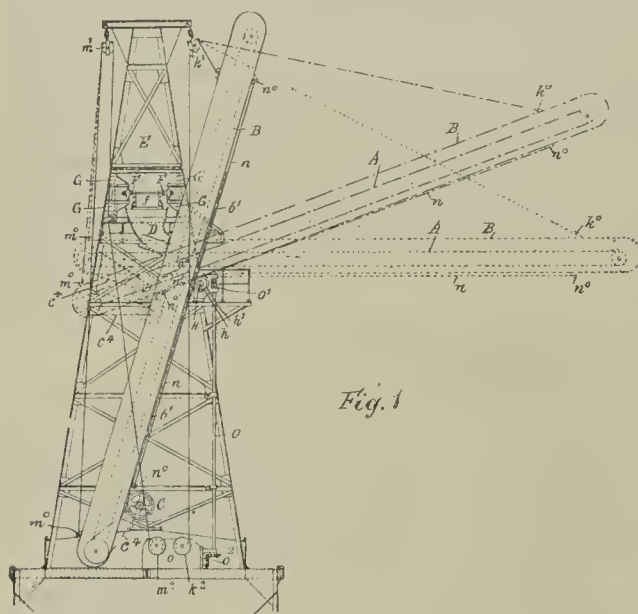


allowed to fall, and moves the tipping plate 17 out of its horizontal position. This results in the separation of the tongues 19 and 20, so that the spring 5 swings up the bent member 3, the striker 8 of which then strikes against the pin 9, and by rotating the bevel wheels 10, 10' opens the valve 12. The sprinkling water at high pressure is then able to enter the sprinkling pipe 15 between the valve 12 and the seat of operation, and is discharged from the said pipe into the gallery through the distributing devices in the form of fine jets, drops or mist. Owing to the gallery being completely filled with water for a greater or lesser distance, according to the arrangement of the distributing devices, the coaldust created by the effect of the blast is immediately soaked with water as it enters the gallery, and descends to the floor of the gallery, where it is still further soaked with water, until the valve 12 is closed by the handle 31. Should the nature of the coal and the position of working it be conducive to fire-damp explosions, the arm 32 of the pressure disc 33 may be revolvably mounted in an eye 34 of the bracket 24, and be provided with a pressure arm 35, carrying at its free end a pressure roller 36. The arm 32 is held in any desired manner so that it will only be caused to alter its angle to the bedplate by pressure coming from the seat of operation, its arm 35 being so proportioned that slight angular movement of the arm 32 causes it to force back the armature 27 until the armature nose 26 releases the detent arm 25. This arrangement enables the water zone to be instantly produced by fire-damp explosions not resulting from the effect of the blasting shot, so that the explosion gases and flames when entering the gallery immediately come into contact with the water, and are rendered harmless by the latter. (Three claims.)

16762 (1912). *Improved Construction of Conveyor and Means for Varying its Position.* W. G. Read, Whiston, Prescott, Lancashire.—Relates to an improved construction and improved means for the manipulation of a conveyor of the type in which, in a continuous manner, cargo in bulk in the condition of relatively small fragments or items, such as coal or grain for example, can be transferred from one situation to another, the conveyor being mounted within a girder, which latter is adapted to be pivoted about any portion of its length and translated longitudinally relatively to the said pivot. To vary the situation of the girder relatively to the pivot, the girder, on its under side, is provided with a pair of rails which run on rollers mounted on a shaft whose axis is transverse to the conveyor girder and situated about the centre of the length of the girder when the latter is housed in a position a little inclined from the vertical. To the said shaft on which the rollers are mounted, is secured a drum around the ends of which is wound, in opposite directions, a pair of wire ropes the ends



h, remote from the drum, are attached to eye-bolts red to the under side of the girder, one near each end thereof. By the rotation of the drum, the girder and the conveyor carried thereon will be longitudinally displaced relatively to the fixed axis of the grooved rollers and by means of two other independently motor-driven windlasses around which other wire ropes are wound and, after being reeved over pulley blocks, carried by an erection whose height is approximately equal to the length of the conveyor girder, are secured to eye-bolts fastened to the upper side of the girder, one near each end thereof. These wire ropes are provided in pairs, there being two ropes secured to each end of the girder. By hauling on the windlass, the ropes of which are secured to the lower end of the girder, and paying out the other pair of ropes, the girder will be rotated around the points of contact of the rails and rollers into a more or less horizontal position or beyond the horizontal position when desired. If, moreover, the drum which is co-axial with the rollers is rotated, the girder and conveyor will be longitudinally displaced relatively to the pivot and its extremity brought into any position at which it may be desired to deposit the material conveyed. To feed the conveyor with material, additional contrivances are required. These may vary according to circumstances, and as a

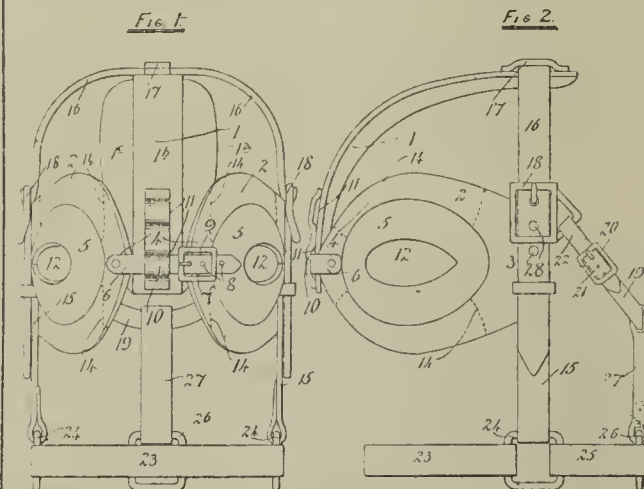


particular example it is proposed to combine with the conveyor another consisting of an endless chain of buckets, which travels at right angles thereto, and raises the material from the hold of the ship, the movement being longitudinal relatively to the ship, and, whilst travelling along an elevated girder, the buckets, *seriatim*, are caused to overturn and deliver their contents into a hopper from which they descend on to the first-mentioned conveyor, which delivers the material transversely to the ship into an adjacent ship or barge or on to an adjacent wharf. In the construction of the girder which carries the transverse conveyor an elongated gap is provided on its upper side for the reception of the discharging end of the hopper which feeds the material to the conveyor. For operating the longitudinally displacing drum, a worm-wheel may be secured to the drum shaft and be driven by a worm secured to a vertical shaft operated through bevel wheels driven by a motor from the deck of the ship. The accompanying drawing is a sectional end elevation showing the conveyor in full lines in the inoperative housed position and in dotted and dash-dot lines in two operative positions. (Two claims.)

17155 (1912). *New or Improved Waterproof and Dampproof Coating Material Especially Applicable to Explosives*. C. W. Hunter, of Michaelson House, Barrow-in-Furness, Lancashire.—Relates to a new or improved waterproof and dampproof coating material, which is especially applicable to explosives. According to the invention, a collodion varnish or medium has added to it China wood oil, or so-called Tung oil in suitable proportions. The collodion having this oil mixed with it permanently retains its dampproof and airproof qualities, and the coating does not change shape or crinkle, as has been the case when employing other oils for the purpose of rendering the coating flexible. (Two claims.)

17189 (1912). *Improvements in and relating to Combined Cap and Eye Guards or like Head Coverings or Protectors for Pit Ponies and the like*. D. MacFarlane, of 17, Hamilton-road, Bellshill, Lanarkshire.—The combined cap and eye guard consists of a centre band 1 of leather or the like preferably padded on the inside and extending from the top or other part of the pony's forehead down in front of same to a suitable point below the level of the pony's eyes. This centre band is preferably formed of three parts of leather or the like 1<sup>a</sup>, 1<sup>b</sup>, and 1<sup>c</sup>, which are first shaped to suit the pony's forehead and then secured together by sewing and then padded on the inside. Eye guards 2 of leather or the like, preferably somewhat oval in shape, as shown, with the outer ends 3 formed broader than the adjacent or inner ends 4, are formed with a raised surface or portion 5 in the central part are connected to the lower end of the centre band 1 by a strap and buckle attachment. A strap 6 of the buckle 9 may be passed through any of

the holes 8 in the strap 6, the distance apart of the two eye guards 2 may be varied. The lower front portion of the centre band 1 preferably has a strip of leather or the like 10 riveted to same by two or more rivets so that one or more loops or the like 11 are formed in order that the eye guards 2 may be adjusted vertically by passing the strap 6 of the buckle and strap attachment through one or other of these loops 11. The raised portion 5 of the eye guards 2 is preferably formed with an opening or hole 12 preferably oval in shape, as shown, and the guard being preferably formed of a double thickness of leather, a stiffening piece of



metal or the like 13 is placed between same and encircles the hole 12. The stiffener would consist of an oval or other suitably shaped metal plate 13 formed of a contour to fit the raised portion 5 of the eye guard 2 and formed with a central eye opening to coincide with the eye opening 12 in the guard 2. Suitable padding material 14 is preferably interposed between the eye guards 2 and the pony's head. If desired, the eye openings may be covered with gauze or wire netting of a suitable mesh either secured to the metal stiffening plate or the material of the guard. (Six claims.)

#### CATALOGUES AND PRICE LISTS RECEIVED.

We have received from Messrs. Crossley Bros. Limited, of Openshaw, Manchester, a description of new types of gas engine and suction gas plant which were shown at the Royal Agricultural Society's show at Bristol. These new engines are equipped with vertical valves, blow-off valve for cleaning the compression space whilst the engine is working, the Crossley patent variable admission governing gear, which graduates the charges according to the demands for power, whilst all producer-gas engines have a screw-down type of gas valve, provided with index plate to register the amount of the opening. In the new type of open-hearth suction gas plant, there are facilities for loosening any clinker which may adhere to the firebrick lining, in the shape of poke holes on the top of the generator, giving access to every part of the lining. The firegrate is composed of a number of stepped plates of such a diameter and so placed as to stand outside the angle of repose of the fuel. Another improvement is the removal of the vaporiser from the generator, which is now used for gasmaking only. The main vaporiser consists of a rectangular box which acts as a gas connection between the generator and scrubber, and contains a number of gilled tubes, which are free to expand or contract. The arrangement is such that the direction of flow is thus in harmony with the convection currents. The tubes are in series, the last one being a flash or superheating tube. Steam is taken from the last tube to the fire-grate. With this design of vaporiser the gas which has to be cooled is external to the water which has to be heated, so that the water is surrounded by a jacket of hot gas. The vaporiser serves the double purpose of making steam and of cooling the gas before it gets to the scrubber. Before leaving the vaporiser, the gas passes through two cascades of water forced from the overflow of the scrubber. A direct impingement is thus secured, and the heavier impurities are washed out of the gas before it reaches the coke. A direct effect of this is that the work the coke scrubber is called upon to do is greatly reduced, and the coke does not require to be renewed so frequently. The water supply to the vaporisers is automatic, and is so arranged that the engine exactly regulates the quantity of the water fed to the external vaporiser exactly according to the load.

We have received from the Sullivan Machinery Company, of Chicago, several of their new publications. These include a booklet of air-compressors illustrating different types; a separate bulletin dealing with cross compound power-driven compressors; a bulletin relating to hammer drills for quarry purposes and stone-dressing tools; and a handsome coal-cutter catalogue. The latter describes in detail the Sullivan chain and longwall heading machines, examples of which were shown at the recent Mining Exhibition.

The Doncaster Town Council are considering the question of connecting the town with many of the surrounding colliery districts by means of motor-omnibuses.

#### NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

##### Applications for Patents.

- 18204. Hand boring machine for use in mines. P. Marrow.
- 18209. Balanced double-beat steam-regulating valve, with fine adjustment for locomotives. N. J. Lockyer.
- 18212. Process for producing alloys stable against strong acids. W. Borchers and R. Borchers.
- 18214. Safety suspending devices for mine cages. T. Pearson.
- 18236. Process for the preparation from coal tar, creosote and the like of tar acids, such as phenol cresols and their homologues and other hydroxy derivatives of aromatic hydrocarbons occurring therein. F. J. Farrell.
- 18270. Process for converting fine coal into a marketable fuel. J. Evans.
- 18288. Apparatus for coupling and uncoupling railway wagons and the like. J. Darling.
- 18291. Super-heating. M. Churchill-Shann.
- 18293. Steam boilers. R. Ramsay.
- 18294. Lifts or hoists. A. Ramsden.
- 18306. Firing furnaces with gasified liquid fuel. J. Sackett and S. A. Cobbett.
- 18336. Transitory coupling for coupling a claw coupling with a screw coupling. L. Scheib, jun.
- 18351. Method of and means for separating metalliferous metals from their ores or other matter carrying same. J. D. Wolf.
- 18353. Manufacture of hexanitrodiphenylsulphide. H. Wade. (Carl Hartmann, Germany.)
- 18354. Use of explosives for filling projectiles, mines, torpedoes, primers, detonators, and the like. H. Wade. (Carl Hartmann, Germany.)
- 18355. Electrodes for electrodes for electric arc lamps. British Thomson-Houston Company Limited. (General Electric Company, United States.)
- 18380. Governing or regulating air-compressors and the like. T. A. Walker, E. R. Walker, and G. L. Walker.
- 18384. Apparatus for measuring and/or recording velocity and/or distance, also applicable as a course indicator. H. Munro.
- 18406. Method of and apparatus for obtaining oils and other products from carbonaceous matter or other materials containing hydrocarbons. W. G. Wilson.
- 18417. Fuel mixtures for internal-combustion engines. G. E. Heyl.
- 18418. Method of effecting the combustion of heavy oils in internal-combustion engines. G. E. Heyl.
- 18422. Treatment of tin ores and slags containing tin. Billiton Maatschappij (Firm of).
- 18430. Process for producing sulphochlorides of phenol-carboxylic acids and of their derivatives. Farbenfabriken vorm. F. Bayer and Co.
- 18457. Coating iron or steel sheets or other articles with zinc. E. A. Atkins.
- 18463. Pumps. F. G. Lake.
- 18480. Storage tanks or reservoirs for mineral oil. E. W. Moir.
- 18491. Petrol or like gas-generating apparatus. H. Harsant and C. H. Purvis.
- 18493. Method of and means for controlling furnaces by simultaneous induced and forced draught. L. Prat.
- 18510. Process of heating and moulding metals. F. H. de Lostalot.
- 18529. Bonnet arrangement for operating the doors of coal-boxes and the like. H. Brabbin.
- 18534. Means for regulating the temperature of superheated steam. Heenan and Froude Limited and G. M. B. Hilton.
- 18536. Compressed-air ejectors. C. H. Adams.
- 18542. Combustion of combustible mixtures. C. D. McCourt and Boncourt Surface Combustion Limited.
- 18547. Engine for generating power from the waves and tides of the sea. W. Gordon.
- 18550. Apparatus for conveying materials on the inverse side of a conveyor or carrier belt used for carrying coals and the like. J. M. Whitehouse.
- 18555. Fluid-operating control devices for gas and other fluid systems. G. N. Sperry and S. R. Barrett.
- 18571. Liquid-fuel burners. L. E. Smith.
- 18572. Centrifugal pumps. Siemens Schuckertwerke G.m.b.H.
- 18573. Pumps. J. M. Wood.
- 18593. Pumps. L. R. Gleason.
- 18599. Regenerator settings for vertical retorts. S. Glover and J. West.
- 18610. Devices for atomising liquid fuel, particularly applicable to burners using heavy oils. C. Hofmann.
- 18615. Density regulator for use in the manufacture of sulphuric acid and other purposes. L. Santa.
- 18621. Thermo-gasifying apparatus for liquefied gases, such as liquid carbonic acid. J. L. Laurent.
- 18641. Haulage clips. F. Lane and S. E. Williams.
- 18663. Transformers. British Thomson-Houston Company Limited. (General Electric Company, United States.)
- 18670. Rotary pumps and motors. W. J. Vincent and Rotoplunge Pump Company Limited.
- 18671. Rotary hydraulic transmission apparatus. W. J. Vincent and Rotoplunge Pump Company Limited.

##### Complete Specifications Accepted.

To be published on September 4, 1913.

1912.

- 11363. Apparatus for forming oxides of nitrogen. Island.
- 18460. Method of and means for reducing the viscosity of oils to render them suitable for heating and lighting purposes. McMurtrie and Robertson.
- 18487. Production of steam containing hydrocarbons for use in combustion motors and for other purposes. Taboulewitsch.
- 18686. Furnaces for steam generators, hot-water apparatus, air-heating apparatus, and analogous apparatus. Richard.

(Continued on page 394.)



BRUSSELS EXHIBITION: "GRAND PRIX."

ROUBAIX EXHIBITION, 1911: "GRAND PRIX"

# HOPKINSON'S

## "RDS" Steam Trap

PATENT

SUITABLE FOR ANY PRESSURE.

A large number of these traps have been in use for several years, and our experience has been so satisfactory that we have every confidence in recommending them to steam users. The workmanship and material are of the highest quality, and is altogether a far superior article to the many cheap bucket traps now on the market.

### SPECIAL FEATURES.

SIMPLICITY.

RELIABLE.

QUICK IN ACTION.

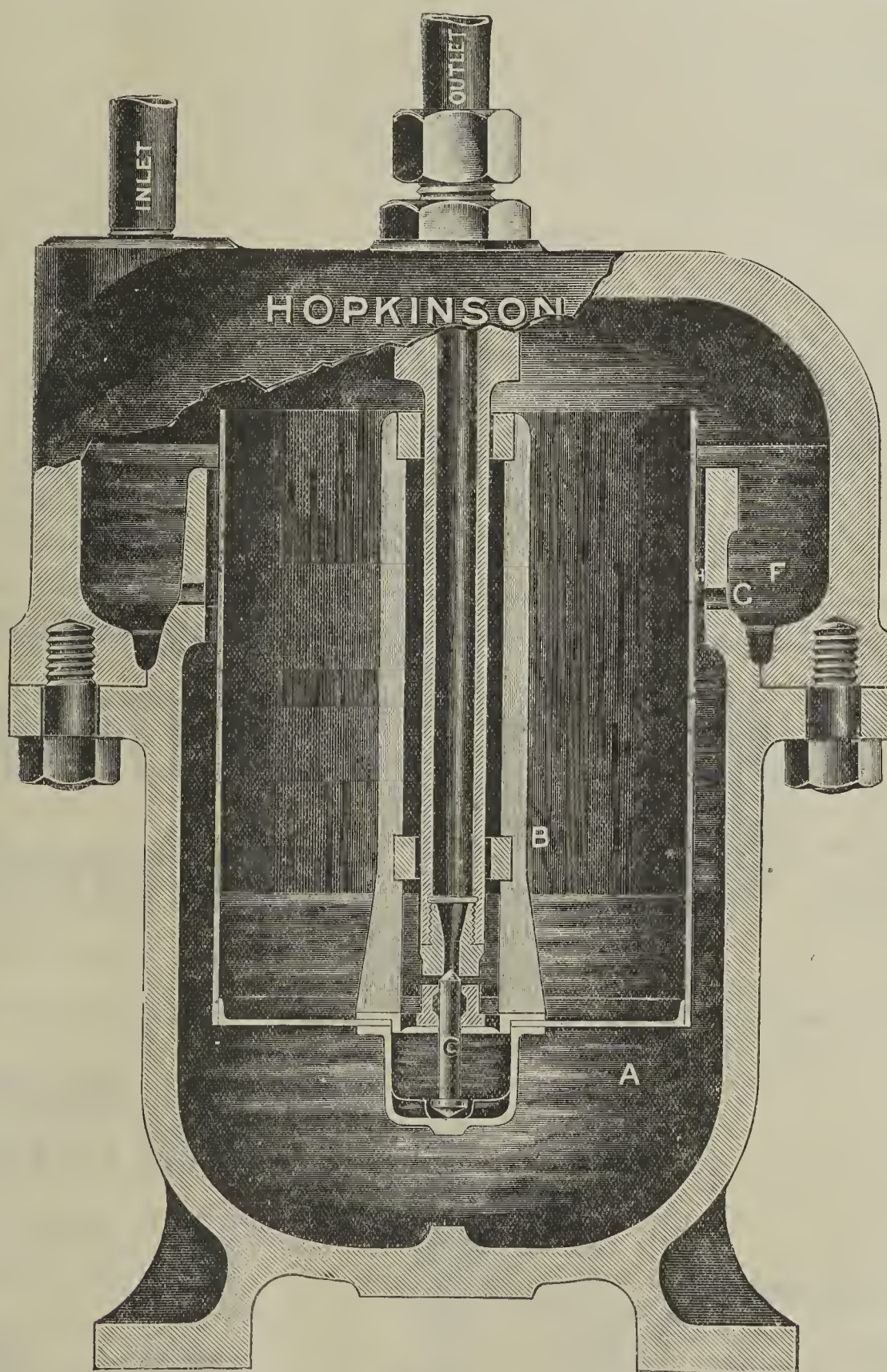
NO DRIBBLING.

STRONG INTERMITTENT  
WATER DISCHARGE.

QUICK CUT-OFF.

WILL LIFT ITS WATER  
2 ft. FOR EVERY 1 lb.  
STEAM PRESSURE.

FITTED WITH VALVE  
AND SEAT OF . .  
HOPKINSON'S 'PLATNAM'  
METAL, which is five  
times harder than .  
bronze and admirably  
suitable for with-  
standing the cutting  
action of the water.



CAST IRON BODY AND LID,  
HOPKINSON'S "PLATNAM" METAL VALVE AND SEAT.

### DESCRIPTION.

This steam trap is of the open float type, and consists in its simplest form of a Water Chamber A, Float with central guide B, Valve C, Water Inlet Pipe, and Water Discharge Pipe. The discharge pipe forms the guide for the float.

The valve remains on its seat until the float has sunk low enough to touch the collar on valve; it then immediately begins to discharge.

The Gallery or Water Pocket F is an important feature, as it fills with water when the Float is at rest; when the Float begins to rise from its lowest position, the water thus collected flows through the hole G into the body A, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most valuable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

Write for Catalogue 660, 4th Edition, post free, which illustrates and describes

### HOPKINSON'S PATENT SAFETY BOILER MOUNTINGS AND VALVES

For High-pressure Superheated Steam, High-class Exhaust and Water Sluice Valves for Condensing Plants, &c., Automatic Exhaust Valves, Reducing Valves, Steam Traps, &c., &c.

Pocket Edition of Catalogue, with Engineers' Tables, free on application.

# J. HOPKINSON & CO. LTD.,

## HUDDERSFIELD.



19051. Process for converting hydrocarbons of higher into those of lower boiling point. Leffer. (Patent of addition not granted.)
19052. Construction of heating elements for electric radiators and the like. Belling.
19053. Mechanical stokers for boiler and like furnaces. De Grahl.
19054. Breaking down of clinker in the furnaces of gas producers and the like. Gill.
25786. Pumps. Vanstraeten.
26098. Method or process for drying humid gases or vapours. Collett.
26204. Centrifugal air-compressors. British Thomson-Houston Company. (General Electric Company.)
26294. Centrifugal compressors. British Thomson-Houston Company. (General Electric Company.)
26426. Chemical treatment of bitumen, tar, pitch and other similar bituminous substances. D'Olivier-Mansan.
26480. Shaking grates for furnaces. Siegert.
26626. Mechanical lubricators. Ross and R. L. Ross and Co.
26809. Means for the interruption of electric circuits. British Westinghouse Electric and Manufacturing Company. (Westinghouse Electric and Manufacturing Company.)
28270. Apparatus for heating water or other liquids electrically. Bennett.
29988. Tube unions or couplings. Forst.
- 1913.
146. Furnace for roasting ores or other materials. Sovignet.
722. Process for the simultaneous production of nitrogenous compounds and combustible gas from nitrogenous fuel. Maule.
872. Apparatus and appliances for controlling winding engines. Rose and Whalley.
3465. Apparatus for the purification and distillation of benzol. Gasser.
3544. Manufacture of drawbars for railway and like couplings. Marks. (Samson Coupler Company.)
6248. Apparatus for regulating the superheating temperature of steam. Fried. Krupp Akt.-Ges. Germania-werft.
6647. Apparatus for the manufacture of insulated conductors or coils for electrical purposes. Siemens Brothers Dynamo Works. (Siemens Schuckertwerke Ges.)
7310. Supplying of injection to the fuel nozzles of oil engines. British Thomson-Houston Company. (General Electric Company.)
8280. Fuel pumps for internal-combustion engines. Hesselman.
8560. Rock drill chuck. Taylor and Gardiner.
10092. Percussive tools. Mellersh-Jackson. (Ingersoll-Rand Company.)
16833. Absorption machines for transforming heat, cold, and mechanical work. Altenkirch and Tenckhoff.
16834. Heat engines for transforming heat, cold, and mechanical work. Altenkirch and Tenckhoff.
16835. Absorption machines for transforming heat, cold, and mechanical work. Altenkirch and Tenckhoff.
- 1913.
16387. Process for producing alkyloxyalkyliden esters of cresotinic acids. Farbenfabriken vorm. F. Bayer and Co.

17181. Liquid fuel pumps for internal-combustion engines. Esnault-Pelterie.
17515. Furnaces for heating steam boilers by means of combustible gases or vapours. Cousin.
17525. Automatic mechanical stoking device for steam boilers or the like. Petersen.
17877. Treating illuminating and heating gases for purifying them and obtaining useful products therefrom. "Athion" Ges.
17887. Coke furnaces. Lütz.
17919. Process for producing a combustible liquid. Vidstrand and others.
18000. Liquid resistances. Akt.-Ges. Brown, Boveri et Cie.
18022. Centrifugal pump provided with a ring of guide buckets. Allgemeine Elektrizitäts Ges.

#### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

Cost of Living of the Working Classes in the United Kingdom in 1912, 5s. 5d.

Report Relating to Foundries, by Sir Ernest F. G. Hatch, Bart., 1½d.

EXPLOSIVES: REPORT FOR 1912, 2s.

Census, 1911: Vol. 8, Tenements, 6s. 2d.; Islands in the British Seas, 6½d.

Unemployed Workmen: Return, 1912-13, 4d.

Labour Gazette, August, 2d.

Minutes of Evidence, Industrial Council re Industrial Agreements, 5s. 10d.

MINES: Report for Durham District (No. 3) for 1912, 7d.; Ditto, Manchester and Ireland District (No. 5), 5d.

Trade Reports, &c.: Spain, 1912, 4½d.; Mexico, 1912, 5½d.; Trade with Central America, Columbia and Venezuela, 2s. 8d.; Abyssinia, Trade of Harrar, 1912, 1½d.; France, Trade of Nice, 1912, 2d.; Trade of Saigon, 4d.; Zanzibar Trade, 2½d.

MINES (No. 53): Book for Record of Readings of Barometer and Hygrometer, 1s.

**Grimsby Coal Exports.**—The exports of coal from Grimsby during the week ended Friday, August 15, were shown by the official returns to total 23,182 tons foreign and 511 tons coastal, as compared with 32,758 tons foreign and 97 tons coastal during the corresponding week last year. The shipments were as follow:—Foreign: To Ahus, 301 tons; Antwerp, 713; Dieppe, 723; Esbjerg, 407; Drammen, 1,100; Gefle, 4,379; Gothenburg, 1,982; Hamburg, 836; Helsingborg, 1,453; Landsrona, 3,845; Malmo, 3,056; Riga, 1,709; Rotterdam, 382; and Ystad, 2,296. Coastal: To London, 99 tons; Plymouth, 380; and Southwold, 32.

#### PUBLICATIONS RECEIVED.

A TEXT BOOK OF ASSAYING. By C. and J. J. Beringer. Thirteenth revised edition. 1913. London: C. Griffin and Co. Limited. Price 10s. 6d.

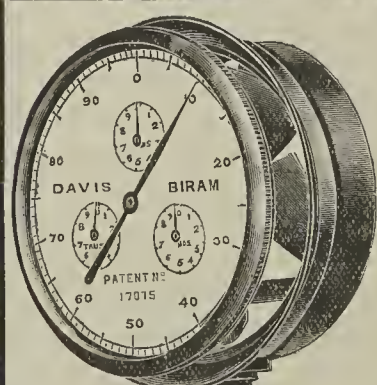
THE CYANIDE PROCESS OF GOLD EXTRACTION. By James Park. Fifth edition. 1913. London: C. Griffin and Co. Limited. Price 8s. 6d. net.

LE BOURRAGE EXTERIEUR. By V. Watteyne and E. Lemaire. 1913. Brussels: Lucien Narcisse.

"Year-Book of the Michigan College of Mines, 1912-1913"

"Bulletin of the American Inst. of Mining Engineers" (No. 80), August; "Bulletin de la Société d'Encouragement pour l'Industrie Nationale" (Tome 120, No. 1), July; "Revue Universelle des Mines de la Métallurgie" (Tome 3, No. 1), July; "Mines Department of the Union of South Africa: 'Statistics for the Month of June'"; "The Journal of the Western Society of Engineers" (Vol. 18, No. 6), June, price 50c.; "The Journal of the Franklin Institute" (Vol. 176, No. 2), August, price 50c.; "The Report for the Year 1912 of the National Physical Laboratory"; "Annales des Mines Table des Matières, 1902-1911"; "Transactions of the Institute of Mining Engineers," Vol. 45, Part 4, 1913, price 6s.; "Western Australia Department of Mines Reports on 'Victorious' and 'Gimblet' Mines at Ora Banda" (by A. Montgomery); "Department of the Interior Bureau of Mines Technical Paper 46: 'Quarry Accidents in the United States, 1911,'" (by A. H. Fay); "Coalmine Accidents in the United States, January, February, March and April 1913" (by A. H. Fay); Technical Paper 52, "Permissible Explosives" (by C. Hall); Technical Paper 53, "Drilling of Oil and Gas Wells" (by O. P. Hood and A. G. Heggem).

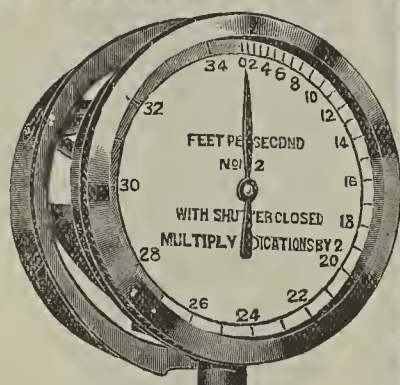
**Wages and Profits in America.**—A report of United States Secretary of Commerce, who has made an investigation of the benefits to miners under the agreement with the anthracite operators last spring, says the miners have received about 4,000,000 dols. in money and the operators about 13,450,000 dols. as a result of higher prices of coal. The increase in wages was 5.6 per cent. and it was made to cover a period of four years, the operators taking all risks of trade fluctuations. The miners also received concessions which cannot be measured in money. The report says that the increase in wholesale prices of coal, measured by net receipts from sales since May 20, amounted to an average of approximately 26 cents per ton as compared with prices from June to September 1911. The report estimates the increase on prepared sizes at 31.23 cents and on pea and smaller sizes 16.14 cents per ton. Of the 13,450,000 dols. additional money alleged to have been received by the operators, the report says 10,900,000 dols. was derived from the general increase in prices and 2,550,000 dols. from the suspensions of April and May discounts. The estimate of the increase in the price of coal will not be regarded as correct by the operators.



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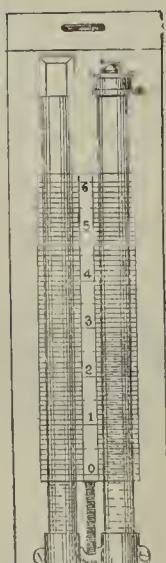


Patent  
No.  
16215

DAVIS-LYALL  
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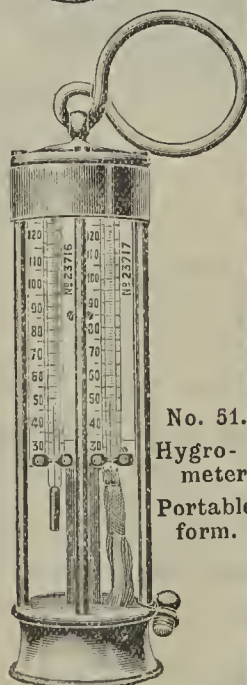


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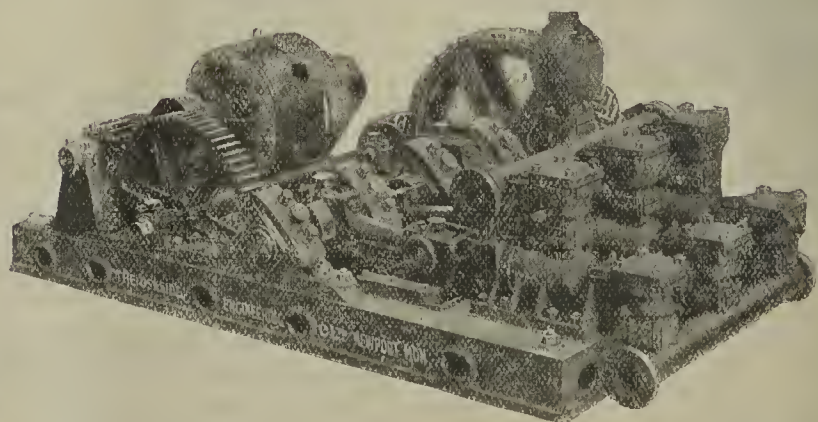
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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY, AUGUST 29, 1913.

No. 2748.

## PITCH WORKERS' CANCER.

### The Withdrawal of the Regulations.

A second report on the draft regulations proposed to be made for the manufacture of patent fuel (briquettes) with the addition of pitch has just been presented by Alfred Herbert Lush, barrister-at-law. [Cd. 7051.]

It will be recalled that in 1911 Mr. Lush was directed by the Secretary of State to hold an enquiry, and made a report on the enquiry, dated August 15, 1911.

The principal conclusions and recommendations of that report were that the patent fuel industry was not on the whole an unhealthy one and the use of the manufactured article involved no risk to health. There were, however, certain eye troubles amongst the workers, owing to fragments of pitch striking the eyes or pitch-dust getting into the eyes, and also certain skin troubles. Neither the mode in which pitch-dust operates to produce cancer nor the particular ingredient in the pitch-dust which is at fault had then been ascertained. This danger from pitch-warts was a serious one, and a case for regulations had been established so far as related to pitch workers and those who manufacture the briquettes, but not as to those who only handle the manufactured article, or, like the smiths and fitters, are only incidentally concerned with the manufacture, nor as to those who are only occasionally employed as casual labourers. The remedies proposed in the draft regulations were the prevention of dust in the factories by the encasing of disintegrating machines and elevators carrying the mixture of coal and pitch, the provision at the works of baths and lavatory basins and their compulsory use by the men, and the provision of overalls and goggles which the men were to be compelled to wear.

As to prevention of dust, some of the older works were excessively dusty, but it was not clear that the regulation as drawn was the best that could be devised. It did not provide for the encasing of the elevators which carry pitch only, and it failed to allow any alternative, such as exhaust ventilation, to the encasing. As regards the overalls and goggles, no suitable or practicable form of either had been invented. As to compulsory bathing and washing, it was reasonable to suppose that the evils could be remedied by some form of washing which would remove the pitch-dust from the skin, but what form of baths, and what kind of soap or cleansing substance would best effect this object, how often the washing must be performed, and whether washing at home was equally efficacious with washing at the works, were all matters of conjecture. Except in Swansea, there was a strong feeling against baths. The report recommended that time should be allowed for experiments to determine the various questions then unsettled, and that subject to certain conditions the enquiry should be adjourned for that purpose.

In November 1911 the Secretary of State, by a circular issued to the manufacturers, consented to the adjournment of the enquiry, in accordance with the above recommendation, to October 1912. There were certain conditions imposed by this circular in regard to experimental baths, &c. The experiments contemplated in the report and circular were considerably delayed by labour troubles and other unavoidable causes, and in consequence the enquiry stood over until March 1913, when it was resumed, Mr. Lush holding sittings at Cardiff and at Swansea. In the first place, Mr. Lush says that he is satisfied that the employers have endeavoured to carry out fairly and honourably the conditions of the circular as they understood them.

A complete installation of three shower baths, with hot and cold water and accommodation for the deposit and airing of clothes, was erected by the Crown Preserved Coal Company at the Crown Works, Cardiff, and opened for use in July 1912. Men willing to try the experiment of taking the baths were found amongst the workers, and the baths were continually used by these men up to the time of the enquiry. At Swansea a slipper bath was provided by the Graigola Merthyr Company at the Graigola Works, and some use has been

made of it by one or two of the men. Baths have also been erected by the Atlantic Patent Fuel Company, at the Atlantic No. 2 Works at Swansea, and by the Cardiff and Newport Patent Fuel Company (Arrow Brand) at the Arrow Works, Newport. The former were not completed in time for use before the enquiry. Those at the Arrow Works were completed by May 1912, but no use was made of them up to the close of the enquiry.

Lavatory basins, well supplied with hot and cold water and all necessary conveniences, have been provided by the Graigola Merthyr, the Atlantic and the Pacific companies at Swansea, and by the Crown Preserved Coal Company both at Cardiff and at Port Talbot. Similar accommodation was provided at the Arrow Works, Newport.

A great deal has been done to reduce the excessive amount of dust. At Swansea Mr. Hilditch, H.M. Inspector of Factories, estimates the reduction at 50 per cent. More could still be done, in the opinion of the inspectors, but Mr. Lush thinks this can only be effected by agreement, for the requirements of No. 2 of the draft regulations seem to have been already carried out in every case where the physical conditions of the factory will admit it, and in some cases the companies have done considerably more than is necessary to satisfy those requirements. A great improvement, quite outside the scope of the draft regulation, has been effected at the Graigola Works, Swansea, and also at the Crown Works, Cardiff, in the erection of sheds to cover the stocks of pitch.

Some minor suggestions made in the former report have received attention. Overalls have been tried for factory workers, but nothing suitable to the needs of the men has been produced. The problem of finding a suitable form of goggles to protect the eyes is no nearer solution. Eye-baths and lotions have been provided at several factories, and various simple remedies have been kept in readiness for petty accidents. Iglodine in particular has been found to be of service. Several kinds of soap have been tried, and of these carbolic soap and a liquid pine-tar oil have been the most popular. No soap has been of much benefit for relieving the burning sensation of the skin. For this purpose Fuller's earth or flour plastered on the face before exposure to the pitch-dust have been more successful. Whiting, which is used in some of the tar works, does not appear to have been tried in fuel works. A point to which considerable importance is attached is the early resort to medical treatment when pitch-warts appear, especially when they occur in those situations which involve greater risk of epithelioma. The men now show a disposition to adopt this course, which may prevent much suffering and save some lives. In the case of one man, Dr. Edwards, of Swansea, treated two pitch-warts, which had already become malignant in character, with zinc sulphur applied by the process of ionisation, and at the end of a month's treatment there seemed to be a good prospect of complete cures.

### Results of Experience.

Considerable experience with baths and wash-basins has now been obtained at Cardiff and Swansea, but the results have differed curiously as between the two towns. In accounting for the difference of experience between Cardiff and Swansea a good deal must be allowed for the strong prejudice against the baths which has all along existed among the Cardiff workers, and no doubt there was much exaggeration in their evidence. One witness was of opinion that the taking of baths had aged the men 10 years, and most of them declared that they suffered great agony every day they used these baths, yet each of these men had persevered with the baths for many months without any apparent necessity or inducement. They were obviously surprised and puzzled when they were told of the experience of the Swansea men. It is to be noted that opinion in Swansea, though favourable to the voluntary use of baths and wash-basins, is decidedly opposed to compulsion, and Mr. Lush is convinced that in every place the dislike of compulsion has been a most serious obstacle to acceptance of the proposals of the draft regulations.

This is largely due to the temperament of the South Wales worker, who has many fine qualities, but is not patient of discipline. In Mr. Lush's judgment, the compulsory use of baths or basins is not at present practicable in South Wales.

There was not much evidence available as to the results of the various improvements effected since the issue of the Secretary of State's circular upon the health of the fuel workers. The number of men certified between June 1911 and March 1913 for compensation under the Workmen's Compensation Act appears to be 18—namely, 14 at Swansea and four at Cardiff—as against 30 between July 1907 and June 1911. These were all cases of pitch-warts or epithelioma, there being no case of injury to eyes. Two men out of the 18 had been included in the previous list of 30, and one of these two died just before the resumption of the enquiry, the cause being stated on the certificate of death as pitch cancer. It is now known that there have also been cases of pitch-warts not sufficiently serious to incapacitate the men from work, but no figures can be given. It would be material to know if men who leave fuel works for other employments continue their liability to pitch warts, but apparently this has not been ascertained.

The general impression formed is that there has been a real improvement in the health of the men, especially at Swansea. A complete absence of cases of blood poisoning was attributed by Mr. Merrells to the use of iglodine for accidental injuries. How the credit for the improved health in other respects is to be apportioned between the reduction of dust, the use of the washing facilities and the new shed over the pitch stocks at the Graigola Works, it is impossible to say.

### Differences Between Pitch Cargoes.

In the former report attention was called to the fact that there are great differences between some cargoes of pitch and others in the amount of pain caused to the faces of the workers, and it was suggested that this might afford a clue to the source of the poison. Further evidence has now been given by Mr. Hilditch on the point. He finds that cargoes coming from Maryport or Goole are specially complained of by the men as producing irritation of the skin. The yellow stains produced indicate the presence of anthracene in exceptional proportion, and go to support the theory which Mr. Hilditch advanced at the first stage of the enquiry, that anthracene, or one of the phenols given off with it, is the source of the poison. A piece of evidence tending in the same direction was given by Mr. Jenkyn Evans, the works manager of the Arrow Works at Newport. He stated that the process his company uses requires a pitch that is not so "rich" as that used by other companies—that is to say, a pitch that does not contain anthracene and the higher oils in so high a proportion. It is remarkable that these Arrow works have been exceptionally free from cases of pitch-warts and epithelioma, although they have by no means compared favourably with other works as regards the amount of pitchdust to which the men have been exposed.

### The Origin of Cancer.

Evidence of great interest and importance was given by Dr. H. C. Ross. He has been engaged for some years in collaboration with Dr. J. W. Cropper upon research work on the origin of cancer, and since the early part of 1910 he and his colleague have directed their attention to the special problem of the pitch workers. They have conducted a number of experiments and have put forward a theory, which may be shortly stated as follows:—It is known that every physical injury, however slight, causes the death of some of the living cells of which the body is composed, and that this is followed in the normal course of healing by a multiplication of surviving cells in the neighbourhood of the injury, which quickly begin to reproduce their kind by the process of cell division. This multiplication, or proliferation, of cells is, in the view of Dr. Ross and his colleague, excited by certain chemical agents, called by them "auxetics," which are set free by the decomposition of the dead cells. The proliferation may often be excessive,



may give rise to thickening of the injured tissue, but to benignant tumours, but auxetics alone do not produce cancer. In order that cancer may supervene there must usually, perhaps invariably, have been chronic injury going on for some time, and certain other chemical agents called "kinetics," or "augmentors," must be added to the auxetics, neither the kinetics nor the auxetics being sufficient alone to produce the result. The effect of the kinetics is largely to increase the proliferation, and their origin is to be attributed to putrefactive organisms. In addition to the natural kinetics and auxetics, which arise within the body, there are substances of like chemical composition which can be artificially applied from without to produce the same effects. It is in the chemical action of these auxetics and kinetics, and not in mechanical irritation, that Messrs. Ross and Cropper find the cause of cancer.

The experiments on which the theory is based have been of two kinds. In the first place leucocytes and other living cells have been spread on a jelly which contained substances suspected of auxetic or kinetic properties, and the resulting process of cell reproduction observed under the microscope. Next, these substances which the jelly process has shown to be effective in inducing this reproduction have been injected into the bodies of animals and have there produced tumours of malignant character. Another line of investigation consisted of the application of auxetics to the surface of ulcers, where they were found to give rise to granulation tissue and accelerated healing, and a highly interesting proposal has recently been made by Dr. Ross to employ auxetics to accelerate healing after surgical operations, though, for obvious reasons, not in cancer cases.

Amongst the substances treated in these experiments have been a number of samples of coal and of coal products, such as tar, pitch and the oils given off in the distillation of tar. The more important results arrived at may be shortly stated as follows, on the assumption that a substance is mischievous or otherwise according as the experiments did or did not indicate the presence of both auxetics and kinetics:—

Pitch obtained from gasworks tar is mischievous, but not that from the tar of blastfurnaces. This result is in exact accordance with Dr. Legge's observation that blastfurnace pitch can be used without any appreciable risk of the pitch-warts and pitch-cancer which arise from the use of gasworks pitch.

If the distillation of gasworks tar is carried to a temperature of 360 degs. Cent., the resulting pitch is no longer mischievous.

Pure anthracene oil is not mischievous, but the commercial rough anthracene cake is so.

The bituminous coal from which gasworks pitch is obtained contains agents of the same mischievous character as those of the pitch, but these are rarely found in the Scotch splint coal, which is the main source of supply for blastfurnace pitch.

A sample of tar oil which contained carbolic acid proved innocuous, but it became mischievous upon the acid being extracted. This result is of much importance in its bearing on the theory that cancer is due to irritation, because it goes to prove that an acid of a strongly irritating character is so far from exciting the undue proliferation that it serves to prevent it.

The samples indicated by the jelly experiments as being the most mischievous were further tested, as in the case of previous experiments, by injection into the bodies of living animals, and in every case tumours were produced. The conclusion at which Dr. Ross has arrived is that the mischievous ingredient is not the anthracene oil itself, but is some member of the amidine group which comes off in distillation at about the same temperature as the anthracene oil, and is present as an impurity in the rough anthracene cake. Its origin, he believes, is not in the process of distillation, but in the coal itself, being due to some vegetable organism which perished long ages ago whilst the coal measures were being deposited upon the earth, so that it is the chemical action of decomposed organisms of the carboniferous period that brings about the warts and cancer of the pitch workers of to-day.

"What happens to the workmen at the briquette factories is probably this. The air being laden with pitchdust and the men frequently sweating profusely while they work, the dust sticks to the skin and becomes impacted in the follicles, or, in the case of the scrotum, in the folds of the skin. The sweat being acid dissolves the auxetics and kinetics out of the pitch, and cell proliferation is the result. At first the skin becomes red and swarthy, then small tumours in the shape of warts appear, and if the production of auxetics is continued, ulceration will supervene. Cancer is the final result of these ulcers."

#### Proposals for Eliminating Mischievous Ingredients.

The great importance of the work of Messrs. Ross and Cropper, in its bearing upon this enquiry, is that it points to the possibility of striking at the source of the evil by eliminating from the pitch the ingredients that give rise to the mischief. Even before the opening of the enquiry in 1911 Dr. Ross and his colleague had begun to experiment in this direction. The first method to be tried was washing the pitch, as it had been found that both auxetics and kinetics are soluble in water. This method was perfectly successful for its immediate purpose, but unfortunately the pitch so treated proved to be unsuitable for the manufacture of briquettes. Next the tar itself was washed before distillation, but this course was found to be objectionable from the point of view of the tar distillers. It has already been mentioned that if distillation be carried to a temperature of 360 degs. Cent., the pitch that is left should according to the experiments be harmless, but the method thus indicated is open to the objection that this pitch would be too dry for use in briquettes. Mr. Hilditch has since suggested that the defect might be remedied by subsequently restoring some of the middle oils to the pitch. It appears that anthracene and other higher oils are necessary to impart the "richness" which most of the factories require in their pitch, but it may be a method could be found of restoring these without the impurities in the rough anthracene cake which are believed to be the source of the mischief. Minor suggestions made by Dr. Ross for reducing the risk of disease, pending a complete solution of the problem of eliminating it altogether, include the carrying of distillation to the highest point of temperature that will leave pitch of a serviceable quality, and the mixing of a proportion of less bituminous coals in the production of the tar.

A quite different method has just recently been tried by a West Bromwich firm of tar distillers—namely, the addition of a small quantity of formaldehyde to the tar before distillation. According to the tests applied by Dr. Ross, this has the effect of neutralising the auxetics and kinetics contained in the tar, and there appears to be a good prospect that the process will prove commercially practicable. Since the close of the enquiry, arrangements have been made for thoroughly testing this process in both its medical and its commercial aspects at the factories of the Crown Preserved Coal Company. It is proposed to begin these tests in October next, and that observations of the effects on the health of the workers will be made by medical men nominated by the Home Office.

#### The Draft Regulations.

The position at the close of the enquiry was this. The manufacturers had done a great deal to reduce the dust evil and in other ways to improve the health conditions of the workers, and they were obviously willing to do anything further that was reasonably required. Compulsion on the men had been shown to be impracticable, because the workers are unwilling to submit to it, and it cannot be said that their objections are altogether unreasonable. It has not yet been proved that the taking of baths is a complete prevention of the evil, and there is reason to doubt whether taking them at the works is suitable for all workmen under all circumstances. In the absence of such compulsion it would be useless and unjust to ask the employers to incur expense on the scale contemplated by the draft regulations. The case for overalls and goggles had been abandoned for lack of suitable contrivances. The wider knowledge made available by the enquiry had led to the conclusion that the proposals of the draft regulations for preventing dust in the factories were not fully adequate for the purpose. This objection applies with special force to the important question raised by the evidence of Mr. Sydney Smith as to the danger of dust explosions. Lastly, there was the prospect that a commercially practicable method of eliminating the mischievous agent may shortly be available, and the whole scheme of the draft regulations thus rendered obsolete. The enforcement of such a method, if happily one should be proved suitable, must necessarily be left to future regulations, and it may be that these will be applied not to the manufacture of patent fuel, but directly to the tar industries—a course that may have beneficial effects extending a good deal beyond the special objects of this enquiry.

Under these circumstances, it became obvious that the objects of the Secretary of State in issuing the draft regulations might be better secured by some other method than that of those regulations. It was accordingly intimated by Mr. Llewelyn Williams that the draft regulations might be withdrawn, provided a satisfactory arrangement could be come to for carrying out voluntarily by the employers certain improvements which the Home Office authorities deemed essential for the protection of the workers. For this purpose, con-

ferences were held at the Home Office on April 29 and June 24, and attended by representatives of all the large factories of South Wales. An arrangement satisfactory to all parties was arrived at. The terms include the provision of baths, wash-basins and accommodation for clothing on a scale which, in the absence of compulsion on the workers, should be amply sufficient for all requirements, and also the encasing of the coal elevators, as well as those that carry the mixture, to the reasonable satisfaction of the inspectors of factories. In one or two of the works difficulties as to encasing may arise from peculiarities in the construction of the works or in the process used, but it has been agreed that if these should result in any differences between the owners and the factory inspectors as to what can reasonably be required, Mr. Lush is to have power to decide them hereafter. In the interval between the two conferences much of the necessary work has been put in hand by all the employers concerned. They have dealt with the proposals in a generous spirit, and there is every reason to expect satisfactory results.

The small factories which exist in various parts of the country were not represented at the conferences, and no agreement has been made on their behalf. As pointed out in the former report, their conditions differ widely from those of the large export factories. They cater for the home trade on a small scale and with intermittent employment. It may hereafter prove necessary for the Home Office to deal with them, but at present there are no materials on which to recommend that the draft regulations should be sanctioned as against them, or that any other method of dealing with them should be adopted, for the case as to these small factories has not really been put in evidence.

As to the larger factories, there is no difficulty, and Mr. Lush has no hesitation in recommending that the present draft regulations be withdrawn, but necessarily this is without prejudice to the right of the Secretary of State to make future regulations for the industry if for any reason they should appear to him to be required.

In conclusion, he points out that these draft regulations, though now to be withdrawn, have already to a large extent effected their purpose, and Dr. Legge and the Factory Department may be congratulated upon having by their labours brought about great improvements in the health conditions of the fuel workers, with every prospect of still further improvements. It may be that by the light they have thrown upon the peculiar conditions of the disease as it affects those engaged in that industry, they have done their part in helping on the solution of the general problem of cancer.

#### The Home Secretary and Rescue Brigades at Mines, &c.

—The following letter has been addressed by Mr. McKenna, the Home Secretary, to Mr. J. Duncan Millar, M.P.:—Dear Duncan Millar,—You made some enquiries a day or two ago on points arising under the Coal Mines Act, and I am glad to let you have full answers to your questions. As regards the steps taken in Lanarkshire to secure the carrying into operation of the Rescue and Aid Order, the position is that a circular was sent out earlier in the year to the owners who had not complied with the Rescue Order. A reply was received from the Lanarkshire owners to the effect that immediate steps would be taken to comply with the provisions generally of the Order, but contending that the provision of smoke helmets fed with fresh air by a tube and bellows was a sufficient compliance with the requirements as to portable breathing apparatus. I am unable to accept this view, and steps are being taken to enforce the Home Office opinion. With regard to the question of hydraulic stowage of wastes, this is being investigated by the Committee on Spontaneous Combustion in Coalmines from the point of view of safety of working where the coal is liable to heat. I am afraid that I cannot anticipate the findings of the Committee, and must await their report. As regards inspection, including that of pit ponies, I can assure you that should it hereafter be found that the inspecting staff is insufficient to carry out their duties under the Act, the question of increase will certainly be considered, but it must be remembered that very large additions to the staff have been made in the last few years. As to the examination held in May for certificates of competency, I find that the results of the examination were only received from the examiners on July 26. Candidates were informed of the result of the examination a few days ago, and steps are being taken to issue certificates as soon as possible to the successful candidates. The standard of these examinations, which is the last point to which you refer, is a matter for the Board of Mining Examinations, and I could not interfere with their discretion in any way. As you know, this Board is thoroughly representative of the whole industry. The safety of the men depends to a large extent on the competence of the managers, and I think you will agree that the Board are well advised in endeavouring to secure as high a standard as possible, especially as the Royal Commission, who went carefully into the matter, expressed the opinion that the standard had not kept pace with the progress of mining knowledge, and urged the necessity for a much higher standard in some districts. —Yours, sincerely (signed), R. McKenna, August 8, 1913.



#### FOUR-CLAW DETACHING HOOK AND AUTOMATIC LOWERING ARRANGEMENT

The winding engine controller, which has of late engrossed the attention of mine managers and inventors, in view of the requirements of the new Act, has rather threatened, as a matter of technical interest, to throw into the background the claims of the detaching hook. The two appliances, however, have each their separate province; and if the developments of the safety hook have been less notable, it has been mainly due to degree of perfection that has already been attained in the "King" hook and its later variants. A new form has recently been brought to our notice, this being the "four-claw" hook made by Messrs. the Judson-Jackson Company Limited, of 50, Marsham-street, Westminster, S.W., who are also makers of various descriptions of machine tools. This hook, which is made under Martin's patent 22892 of 1905, is constructed with four safety catches, two resting on the top plate of the cylinder and two on the bottom plate, thus providing for cases in which the cylinder may have been badly worn by the rope. In addition, a special long shackle and pin are provided, which readily enable the cage to be lowered after an overwind.

The construction and action of the hook will be understood from the accompanying illustrations, of which fig. 1 shows a front view of hook closed; fig. 2 a side view of same closed, whilst fig. 3 shows a sectional view of hook in position after an overwind.

The catch and side plates are made from Siemens-

the upper catches, they come into catching position before the top shackle is released, and a partial overwind with its risks is impossible.

The hooks are stocked in nine standard sizes for loads from 1 to 20 tons, whilst hooks to support heavier loads can be supplied.

#### GEOLOGICAL RESEARCH IN THE COALFIELDS.

The *Summary of Progress* of the Geological Survey of Great Britain and the Museum of Practical Geology for 1912 has been issued.

In his introduction Dr. J. J. H. Teall, the director, states that during the year 1912 the primary 6 in. survey of England and Wales has been continued on the same lines and in the same districts as in the previous year. In the Denbighshire district progress has been made with the surveying of the coal measures and also of the older and newer rocks which come within the limits of the new series one-inch Ordnance maps in which the coalfields occur. In the Warwickshire and Staffordshire district the survey of the northern portions of the visible coalfields of Warwickshire and South Staffordshire has been completed, as well as that of the intervening area occupied by the new red sandstone formation. In the London and the south-eastern district work has been carried on in Berkshire, Buckinghamshire, Hertfordshire, Middlesex and Surrey. The original survey of the Highlands of Scotland has proceeded on the usual lines.

In the Warwickshire and Staffordshire district the

Ayrshire, and it is evident that some important modifications, which will render more accurate our knowledge of the boundaries of the coalfields and of their structure, will have to be made in the old maps. Evidence of an unconformity in the millstone grit has been obtained in South Lanarkshire. This is of some general interest, for, although it has long been known, from the researches of Dr. Kidston and the late Dr. Traquair, that an important palaeontological break occurs at this horizon in other parts of Scotland, no actual unconformity has been hitherto detected.

An area of trias, largely concealed by drift, has been surveyed in the Wirral peninsula of Cheshire, between the estuaries of the Dee and the Mersey. In the Warwickshire and South Staffordshire district the mapping of the broad belt of triassic rocks lying between the two coalfields has been continued. Some work has also been done on the east side of the Warwickshire coalfield, where an outlier of keuper sandstone, not hitherto recorded, has been met with.

#### Denbighshire.

*Lower Coal Measures.*—In surveying the north-western part of the Flintshire coalfield Mr. Wedd finds, in respect to the lowest part of the coal measures, that as the outcrop of the Holywell shells passes south-eastwards from Holywell to Halkin it affords evidence of lithological change, affecting the greater part of the group, but perhaps chiefly the lower half. Parallel changes of lithological character are further found by Mr. Wedd to affect the higher portion of the lower coal measures. In the tract north of Mold and west of Northop, surveyed by Mr. Lamplugh, the lower coal measures exhibit a continuation of the changes in lithological character noticed by Mr. Wedd in the tract adjoining on the north. These changes have not been allowed for in the previous mapping, so that considerable alteration of the old map (79 SE.) will be required.

*Middle Coal Measures.*—In the country north and east of Mold surveyed by Mr. Lamplugh the outcrop of the productive coal measures is for the most part concealed by drift. The exposed tracts are, however, more numerous than are shown on the old map, as is particularly the case on the southern slope of the Alyn Valley between Leeswood and Pontblyddyn, where the drift is rarely thick enough to hide the coal measures. The district is so dislocated by faults that the position of these beds in the sequence cannot be fixed with any certainty until all the mining information of the neighbourhood has been collected and studied. Mr. Wedd's work in the northern part of the Flintshire coalfield has led him to some wide-reaching conclusions, which, if confirmed, will explain the hitherto baffling distribution of the coalseams in this area. A comparison of numerous shaft sections of the Denbighshire and Flintshire coalfield from Ruabon to Hawarden and Mostyn affords strong ground for believing that the thickest and most important seam—the Main coal, as it is called in the Denbighshire and the greater part of the Flintshire coalfield—is one continuous seam throughout, and is the Five-yard coal of Mostyn. This seam is present under the coastal tract both south-east and north-west of the town of Flint, and apparently the same coal is worked at Neston, on the opposite or Cheshire side of the Dee estuary. But in the immediate neighbourhood of Flint the Main coal is everywhere missing, together with all the higher workable coals, and also in places one or more important seams below the Main coal. Instead of the measures containing these seams, we find at Flint a thick group of barren strata, for the most part red. Yet at Bagillt, barely 3 miles north-west of Flint, a shaft of the Bettisfield Colliery proves that not only is the Main coal present, with the complete sequence of coal-bearing measures below it, but also 350 ft. of middle coal measures, including three or four minor seams, above the Main coal.

In passing from Bagillt towards Flint, an interruption of the normal sequence is first found at Coleshill little more than a mile and a-half distant. There the Main coal and the two seams next below it, the Three-yard and Brassy coals, are absent, and the position of one or both of the latter two coals is occupied by a small thickness of red measures. At the New Flint or Deeside Colliery the Three-yard coal is the highest seam present in the western shaft, where it is succeeded by about 300 ft. of barren red measures, while in the eastern shaft little more than 200 yards distant, the Brassy—the next lower seam—is overlain by 500 ft. of similar barren measures, and the Three-yard coal is shown in plans of the colliery to end abruptly against red rock between the two shafts. A similar state of things is found in other shafts at Flint; and at the Bryncoch Colliery, nearly a mile south of the town, the Middle measures containing small unidentified seams



FIG. 1.—FRONT VIEW OF HOOK CLOSED.



FIG. 2.—SIDE VIEW OF HOOK CLOSED.

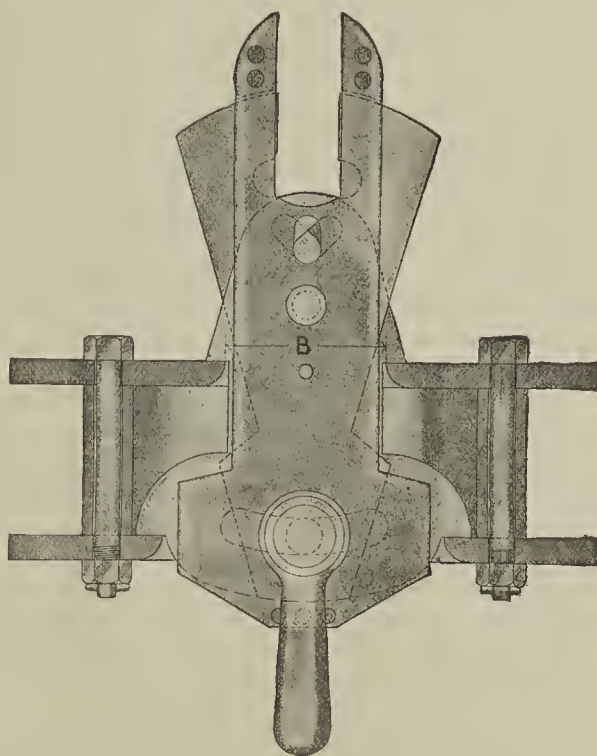


FIG. 3.—SECTIONAL VIEW OF HOOK IN POSITION AFTER OVERWIND.

Martin mild steel, and the shackles and pins of Farnley or Low Moor iron. The factor of safety is very ample, being over 10 to 1, and stress of 25 tons to the inch.

A special feature of the hook is the slotted quadrant hole at the lower end of each catch plate, through which the bottom shackle pin passes; the load, either when hanging from the top shackle or from the four catch edges after an overwind, is wholly on the two plates, not on the outside frame, whose only function is to keep the plates in a proper position and to guide the hook when entering the cylinder. The fulcrum pin, during all ordinary work in winding, is quite clear of stresses, and the only work which ever comes on it is the frictional resistance of the opening plates and the shearing of the small copper pin. This arrangement obviates the troublesome wear which occurs on the fulcrum pins of some designs of safety hooks.

After an overwind, to put the hook into working order a special long shackle is provided, the pin for this passing through the hole above the fulcrum pin; after the rope has been brought over the pulley and attached to the special shackle, the catch plates are so arranged that the lifting of the cage a few inches brings the catch plates into their closed position, enabling the hook to be lowered through the cylinder, either on to the shuts or on to the special beams across the pit at the lower landing, where the hook can be connected to the ordinary shackle and a new copper pin inserted. The cage is then ready for work again.

Owing to the small amount of travel required to open

tracing of the boundaries of the Etruria marls, the Halesowen sandstones and the Keele beds—all of which overlie the productive coal measures—has made much progress. Many new occurrences of the thin bands of *Spirorbis* limestone which characterise the Halesowen and Keele groups have been noted, and amongst them some which prove that the sandstones and marls of a large tract near Tamworth, hitherto regarded as keuper sandstone, must now be assigned to the Keele beds. The unconformable super-position of the true keuper upon them has been exposed to view. In Warwickshire the mapping of the coal measures has been continued southwards, the unconformable junction with the Cambrian rocks has been traced for some distance, and a complete section of the lower grey measures, which alone contain workable coalseams, has been constructed. The general conclusions arrived at during the first survey, more than 50 years ago, as to lateral changes in the productive measures in a north and south direction have been confirmed.

In Denbighshire and Flintshire the most important result of recent work in this area has been the recognition of an unconformity at the base of the upper barren measures. The unconformity cannot be seen at the surface, but pit sections show that in the neighbourhood of Flint the upper part of the productive measures containing the main coal is absent, red measures belonging to the upper group there resting directly on lower members of the middle group.

In Scotland, the revision of the carboniferous areas has proceeded in South Lanarkshire and North



low the horizon of the Main coal are overlain by about 230 ft. of barren red measures.

It thus becomes clear that in the neighbourhood of Flint an important part of the coal measures, including the Main coal and neighbouring seams, has been removed, and that the place of these missing measures is occupied by barren red strata that pass unconformably on to the lower beds of the middle coal measures. The unconformable junction is not, however, anywhere seen at the surface; but the barren red measures are well exposed, as described below.

**Upper Coal Measures.**—The upper coal measures have not hitherto been recognised as occurring in Flintshire, except beneath the head of the Dee estuary, where they were reached in a deep boring and identified by Dr. Strahan. Mr. Wedd, however, finds that the barren measures above described as lying unconformably on the Middle coal measures in the neighbourhood of Flint, belong to this division. One bed of grey shale includes two little coalseams varying up to 6 in. and 1 ft. in thickness. The greatest ascertained thickness of these measures at Flint is 504 ft. in one of the shafts of the New Flint or Deeside Colliery, and they occupy a continuous area of more than a square mile, which includes nearly the whole town of Flint. This tract is limited on the east by a north-south fault, which brings up the productive middle measures.

#### Warwickshire.

**The Lower Grey Measures or Productive Measures on the East Side of the Coalfield.**—A complete sequence of these measures has been obtained by Mr. Eastwood, partly from surface observations, but largely from information kindly supplied by the various mine managers. Special assistance has been given by Mr. Lindley, of the Nuneaton Colliery; Mr. Phillips, of the Ansley Hall; Mr. Trench, of the Haunchwood; and Mr. Harper, of the Griff Colliery.

The relative position of the various coals that are or have been worked in the district is shown in the following table, given in descending order:—

COAL, the Four-foot.	
Measures, varying from 50 to 130 feet.	
COAL, the Two-yard	} Forming one seam.
Thin parting	
COAL, the Ryder	} Forming one seam.
Thin parting	
COAL, the Bare	} Total 90 ft.
Measures, variable	
COAL, the Ell	} Total 90 ft.
Measures, variable	
COAL, the Slate or Nine-foot.	
Measures with thin coal (Lady Coal). 90 ft.	
Coal, the Seven-feet.	
Measures, including several coal seams. 90 ft.	
COAL, the Bench.	

The Four-foot seems to have been worked so far as it lay at small depth; its working is discontinued.

Of the Two-yard, Ryder and Bare seams, the upper only is now worked; the other two were worked near the outcrop. The upper seam is known locally as the Two-yard, and the one immediately below is called the Ryder, but which of the two is the Ryder that is extensively worked to the north-west and west is not yet clear. The Two-yard varies in thickness from 5 to 6 feet; the Ryder is about the same; the Bare is between 2 and 3 feet thick. The Ell coal is about 4 ft. thick; it is only in occasional demand at present, but was worked to a considerable extent in some of the older pits. The slate coal varies from 9 to 10½ feet in thickness and is still rather extensively worked. The workable part of the Seven-feet coal is from 5 to 6 feet thick. It is less worked than the Two-yard or the slate, the workings in it being discontinued in some pits. The Bench coal was formerly worked near the outcrop, but it is not now mined in the deeper shafts. It varies in thickness from 11 ft. with thin partings to 5 ft. solid.

The seams between the Seven-feet and the Bench are only worked in association with a clay, and the coal is not sent away. The beds between the Seven-feet and the Bench have been laid open in Messrs. Stanley Brothers' clay pit No. 3. Here the Bench coal forms the steeply sloping eastern side of the pit, while the Seven-feet occupies the brow of the western side. In this excavation some unusual phenomena have been observed in connection with a "dumb fault" or wash-out in the seam next below the Seven-feet. The dip suddenly increases for a few feet and the middle and upper parts of the seam are replaced, or washed out, by a lenticular mass of sandy shale, though the lower part is continuous. The upper part continues for a short distance on top of the shale, gradually thinning away but becoming broken up and mixed with a shale material before ending off. The lenticle extends for about 30 ft. and, where it terminates, the lower part of the coalseam is up sharply from beneath it. The seam does not come in its full thickness, but thickens and thins throughout the rest of the excavation. The Seven-feet seam is not affected, but the under-

lying coal, immediately beneath the point where the dip suddenly increases, is sharply cut off, as though faulted down, for it is said to occur in full thickness at a lower level beneath the wash-out or shale lenticle.

These wash-outs are a feature of the northern part of the Warwickshire coalfield, but have not been exposed to view of recent years. They are especially abundant in the Ryder coal, and one is known to attain a width of more than a mile. Their comparative scarcity in the Seven-feet coal may be connected with the fact that this seam has a roof of marine shale, while that of the Ryder is either estuarine or freshwater.

Little is known at present of the beds between the Bench coal and the base of the coal measures. In the Stockingford area a number of small trial pits was made not far from the uprising mass of Cambrian shales in search of a good bed of clay. None was found nor was any workable coal met with.

**Changes in the Coalseams.**—The re-survey of the Warwickshire coalfield, which started from the northern end, has now progressed sufficiently far south to verify the conclusion reached in the former survey by Mr. Howell and published in 1859 in the *Memoir* on the district. The coalseams may be divided into two groups, in the upper of which the coals thin and deteriorate going north and in addition become much further apart, while in the lower the coals tend to thicken and improve going north and also become further apart, but less markedly than in the case of the upper seams. At the north end of the field the Seven-feet, the Double and the Bench are worked, but none of the upper seams.

In the belt of ground lying between Wilnecote and Kingsley the Seven-feet of the lower group and the Four-feet of the upper are both worked; in passing southwards through this belt the upper seam thickens and improves, while the lower deteriorates until at the south end, on the west side of the field, its working has locally ceased. In the Haunchwood area Mr. Eastwood's account shows that the working of the lower seam is discontinuous, while higher thick seams have come on that are unrecognisable at the north end of the field; further, these seams have already come close together, three forming practically one seam.

**The Etruria Marls and Espley Rocks, or Lower Red Marls.**—Mr. Eastwood finds that the Etruria marls in the Stockingford area have a thickness of about 170 ft. The phenomena are much the same as those observed on the opposite side of the field at Whateley. To the north-west of Stockingford, Mr. Eastwood finds that these lower red beds change in character and are no longer recognisable as marls. In addition, they become much thinner, and may be locally absent altogether. As the Etruria marls had not been recorded on the north-eastern edge of the coalfield, a brief visit was paid to that region, and it was ascertained that strata of considerable thickness intervene between the Halesowen series and the grey coal measures, but that they are, as a whole, unlike the normal marl.

#### South Staffordshire.

The survey of the South Staffordshire coalfield has been continued by Dr. Gibson in the districts of Bilston, Wednesbury and West Bromwich.

The mapping of the Keele beds has been continued by Mr. Cunningham in the neighbourhood of Great Barr and Hamstead.

#### Ayrshire

**Monkredding and Montgreenan.**—The thin coal provisionally taken by Mr. Wilson as the base of the coal measures is exposed on the right bank of the Lugton Water about a quarter of a mile north-east of Burrowland. The rocks between it and the Kilwinning Main consist mainly of fakes and faky sandstone with a few thin coalseams, which are very irregular. In this area the position of the Kilwinning Main is, as a rule, partly occupied by intrusive sheets of dolerite which have "burnt" the coal. About half-a-mile west of Burrowland, however, these intrusions die out, and the Kilwinning Main has been worked to the crop. About half-a-mile south of Outer Smithstone and 2 miles north-west of Kilwinning, a coal about 6 ft. thick has been worked in crop pits. The seam is rather dirty, and has generally been supposed to be the Borestone coal of the Dalry basin; but the new evidence gathered seems rather to suggest a coal-measure age, for the beds exposed below the coal near Smithstone are the characteristic hard fireclays and lavas which are believed to belong to the millstone grit.

**Kilmarnock.**—The Ladyha coal is well seen in the old sandstone quarry just north-east of Dean Castle, and again in the Craufurdland Water about 330 yards west of this castle, there being an east and west fault, with a downthrow of more than 100 ft. to the south, between these two places. The identification of the seam is facilitated by the presence of an impure blackband ironstone containing very abundant remains of fish

teeth, scales, &c., about 8 or 10 feet above it. In the quarry the coal is about 16 in. thick, but in the Craufurdland Water it is only 13 in. In the burn just south-east of Dean Castle, and also in the Fenwick Water near the foot, the beds a little below the Hurlford Main coal are well exposed, and comprise, among other things, a massive bed of calcareous ironstone containing abundant *Carbonicola* and good cone-in-cone structure. This bed is also associated with parrotly shales which also contain *Carbonicola*. Mr. Clough states that the ironstone and shale together form an unusually thick development of "musselbeds," and he thinks it very possible that they may represent "The Musselband," which usually comes 30 ft. or so above the Airdrie blackband ironstone in the Lanarkshire coalfield. If this should turn out to be the case, it will help to support Mr. J. Brown's correlation of the Splint coal (top part of the Hurlford Main) of Kilmarnock with the Splint seam of Lanarkshire.

**Intrusive Igneous Rocks.**—Mr. Anderson records a feature of special interest with regard to two thin west-north-west dykes intrusive in coal measures strata near the Sourlie plantation. The more westerly one was met with in underground workings in the Turf coal and in the Wee coal immediately under, but no trace of it was found in the Ladyha coal workings, 25 fathoms below the last, nor in the Ell and Stone coals, which lie still lower. With regard to the eastern one, the case was exactly similar, the dyke being found in the two upper, but not in the three lower coals. There would thus seem to be evidence of dykes dying out in depth in these two cases.

In the Stevenston and Kilwinning area, Mr. Anderson states that the two highest workable coals in the coal measures—the Bowbridge and Crawford seams—are not at present being wrought to any extent. Of the group of four coals which come next in order—the Five-quarter, Parrot, Turf and Wee—the Turf provides a good household coal, while the Wee coal has in places a pavement of good fireclay, used for firebricks. The next coal in descending sequence is the shale coal, which has a roof of oil shale, formerly distilled in retorts at Annicklodge and Doura. Ammonium sulphate was produced from this shale as well as oil, but the industry was stopped because of the distance the crude oil had to be taken to a refinery. The next coal (Ladyha) has, like the Wee, a good fireclay in places as its pavement. The Ell, the Stone and the Lower Wee coals are mostly used for steam and furnace purposes. The Kilwinning Main coal usually contains partings, which may increase in thickness so as to make it unworkable. The Raise coal, which is the lowest coal measure seam of workable thickness, is not now being wrought.

Near Kilmarnock considerable areas in some of the coalseams have been "burnt" and rendered useless by the intrusion of whin "floats" (sills) and "gaws" (dykes). It is nevertheless to be noted, Mr. Clough states, that not uncommonly a seam may still be worked even when a thin float occurs in it, the injurious effects only extending a very short distance from the intrusion.

In the above district some of the thin coals which were formerly neglected, and which even now could not be worked at a profit by themselves, are yet being worked in conjunction with the fireclays that occur immediately below or above them.

Near Monkredding House the coals below the Highfield (Index) limestone have been worked on a small scale.

#### South Lanarkshire.

**Wishaw District.**—The area revised by Mr. Macgregor between Wishaw and Motherwell is occupied by strata lying between the Ell coal and Skipsey's marine band—the top of the productive measures. The structure of this part of the Wishaw coalfield is well known from the extensive workings in the Thick Ell, Main and Splint seams. The faults are very numerous and often of considerable magnitude; their prevalent direction is north of north-west and their throw generally to the south-west.

The increasing demand for the valuable road metal supplied by the acid igneous rocks intrusive in the lower old red sandstone has led to the opening of several new quarries and trial pits in the Lesmahagow district. The evidence thus obtained necessitates some local modification and extension of the boundaries of the areas of intrusion on the existing maps.

In the area between Wishaw and Camps, Motherwell, the Ell, Main and Splint seams are nearly exhausted, but are still wrought to a small extent in old stoop workings from Shields Colliery. The Pyotshaw and Humph are also workable seams, and the Virtuewell is raised at Heathery, Shields and Dalzell collieries. The Kiltongue is also wrought from Dalzell pit, but has still to be opened up over most of the area; where workable it averages about 2 ft. to 2 ft. 6 in., but may be represented only by two thin seams with a fireclay parting.



Of the Drumgray seams, two only are known to exceed 1ft. 6in. in thickness. Very little is known as to the Armadale coals in this area, but it is unlikely that any of these are workable under present conditions.

### THE BENNETT DUPLEX VERTICAL OVERWINDING CONTROLLER.

A new form of overwinding and over-speed controller for winding engines has been invented by Mr. S. G. Bennett, of Lay Lands, Spital, Chesterfield, whose name is already associated with several ingenious devices designed to promote the safety of winding operations.

The apparatus now under notice is termed a duplex overwinder, because, although the same driving gear works the whole machine, separate and independent mechanisms are provided for working the steam throttle valve and brake, and for working the emergency brake. The gear for the former is shown in the front elevation, fig. 1, while the latter gear is shown in the back elevation, fig. 2. This arrangement permits the gears being independently timed, which is a pronounced advantage in working the overwinder, and further ensures efficiency and reliability, while at the same time it greatly simplifies its general construction.

The overwinder is driven by a spindle A from the engine shaft, which by means of the mitre gearing B revolves the screw-threaded shaft C on which a traversing cross-head nut and pointer D travels up and down, its position corresponding with that of the cages in the pit shaft. A vertical governor of a sensitive character E is mounted on and driven by a vertical spindle F by means of the gearing G, the spur wheel being attached to the lower end of the screwed shaft C and the pinion to the governor spindle. The lower end of this spindle rests on suitable bearings in bedplate H, the upper end being held in position by the bracket I. The motion of the governor operates the levers J K, and also causes the floating fulcrum Z of the floating lever L to ride, through which the motion is communicated by means of a short link to the lever T, the floating lever being so named since the fulcrum Z is continually changing its position when the character of the wind demands it. The outer end A' of the floating lever engages with the traversing nut D at the lower end of its stroke, and this traversing nut also engages with the lever M at the other end of its stroke, the motion being communicated to the floating lever by means of the connecting rods O and P, through the rocking bar R, the whole being accurately timed by the adjustable set pin S fixed to the floating lever L and the top lever M. The opposite end B' of the lever T rests on a ratchet or stopped segment U. This ratchet is attached to a bell-crank trip lever V, and its lower end is jointed to the steam throttle valve and brake rod W, which is fitted with balance weights as usual which throw forward the trip lever whenever the outer end of the lever T is raised and the trip lever is released. This rod W operates the steam throttle valve in the usual way and so regulates the speed of the engine.

The method by which the gear works is as follows:—The traversing nut D exactly corresponds with the position of the cages in the pit shaft, its total traverse representing the total depth of the wind. When approaching the end of the wind, the traversing nut engages either with the top lever M or, if working downwards, with the floating lever L. Although the floating lever is forced downwards, provided the engine driver has slowed down the engine preparatory to stopping, the governor weights will be at rest, and consequently the fulcrum Z of the floating lever will be in its lowest position, and therefore the outer end of the lever T will not rise, so that no forward motion of the trip lever V and corresponding movement of the brake rod W can take place. Therefore the steam throttle valve will not be interfered with, and it is obvious that the winding may be continued all day under similar conditions. If, however, the steam has not been completely cut off by the engine driver, the engine will continue its motion, but in that case the traversing nut continues also to travel, and by forcing the outer end A' of the floating lever slightly lower it causes the opposite end to rise, together with the corresponding end of the lever T. This upward movement releases the various steps of the ratchet segment U, and instantly the trip lever, being released, the steam throttle valve is immediately operated through the brake rod W, and steam is cut off from the engine. It will thus be seen that the top lever M and the floating lever L remain inoperative so far as the traversing nut is concerned, excepting when the latter engages with them at each end of the wind.

The control of the engine during the wind is undertaken by the governor, which regulates its speed through-

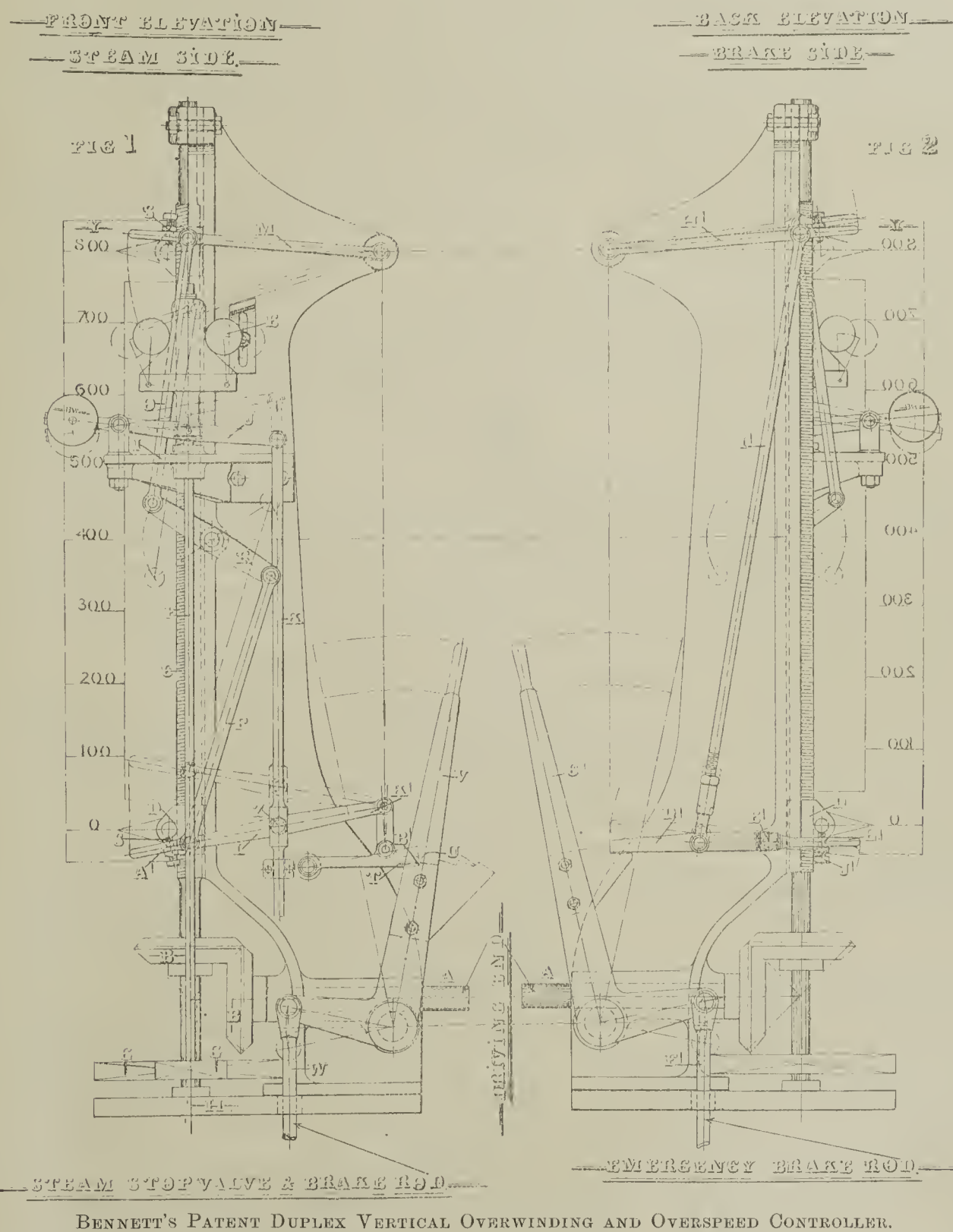
out the whole wind. The governor is adjusted to a certain definite speed, and in the event of the engine exceeding this speed the governor weights open and the movable fulcrum of the floating lever is raised. This rising of the governor weights, due to increased speed, is of course communicated to the floating lever, as previously described, and by raising the floating fulcrum Z it also raises the end K' of the floating lever, since the other end A' is only permitted to rise a certain distance until it comes into contact with a stop which is mounted in the frame of the machine. The governor thus has the effect of lifting the outer end of the lever T when the trip lever immediately falls forward until the lever T engages the second step of the ratchet segment, and the steam throttle valve is operated to that extent. If the engine continues to race there is a correspondingly greater rise in the fulcrum and the lever T rises sufficiently to clear two steps, or it may be sufficient to clear all the steps at once, when the trip lever falls forward to its maximum throw and the steam is completely cut off. It is obvious, therefore, that the movement to cut off steam may be gradual or rapid, depending upon the conditions of the wind at that moment. If the engine is not under control towards the end of the wind, both

Whenever the traversing nut depresses the outer end G' of the lever D', the opposite end rises and releases the trip lever C', which, owing to balance weights, immediately falls forward and operates the emergency brake rod. When the traversing nut is travelling upwards, it comes, when necessary, into contact with the top lever H'. When this lever is raised its motion is communicated to the lever D' by means of the coupling rod I', the emergency brake being thus operated at each end of the wind when required.

In the event of the controlling gear having operated during any wind, or at the end of any wind, it can be instantly reset by the engine driver putting into their normal position the trip levers V and C'.

It will be seen that the construction of the overwinder is extremely simple, and the combined action of the governor and traversing nut upon the floating lever ensure the utmost sensitiveness and accuracy in meeting the exigencies of the wind under all possible conditions.

The former inventions of Mr. Bennett, to which we have alluded above, are his patent rope-releasing and cage supporting gear and patent cage retaining gear. The former possesses the advantage that the movement



BENNETT'S PATENT DUPLEX VERTICAL OVERWINDING AND OVERSPEED CONTROLLER.

the traversing nut and the governor come into operation, the former by depressing the outer end of A' of the floating lever, and the latter by raising the fulcrum of the floating lever. This combined movement may lift the lever T to its maximum height instantly, and in the event of it being lifted above all the steps of the ratchet segment, the trip lever falls forward to its maximum throw, thus completely cutting off steam.

The mechanical or emergency brake is operated by separate mechanism, which is clearly shown in fig. 2. Instead of the floating lever being employed to operate the trip lever C', an ordinary lever, D', is used. This moves on a fixed fulcrum E', and is operated by the traversing nut D at each end of the wind in the manner previously described. An adjustable pin J' is employed for correct timing of the contact with the traversing nut. The trip lever C' is bell cranked in shape, and the lower arm is attached to the emergency brake rod F.

of releasing the rope does not begin until after the lower part of the releaser attached to the cage is actually resting upon the steel dogs designed for suspending the cage. The appliance is now being made for loads up to 20 and 25 tons.

The cage-retaining gear consists, briefly, of a series of keps attached in slots in the guide rails to the upper part of the headgear, the cage being provided with projecting pieces, thus forming a species of rack-catch. A full description of these gears appeared in the *Colliery Guardian*, March 19, 1909, p. 578, and formed the subject of a paper read before the North Staffordshire Institute in 1910. We understand that both have since been adopted by a number of collieries, and have given complete satisfaction in working.

Rumours are again rife of numerous important developments in the mining industry at Banton, near the town of Kilsyth, in Stirlingshire.



## MINERAL STATISTICS FOR 1912

first part of the Annual General Report on Mines Quarries for the year ending December 31, 1912, by the Chief Inspector of Mines, has been issued as a Blue Book [Cd. 7025]. This part, as hitherto, sets forth the district statistics for the year. Comparative tables give under similar heads the figures relating to mines for the years 1873 to 1912, and to quarries for the years 1895 to 1912.

## Persons Employed.

The total number of persons employed in and about all the mines of the United Kingdom was 1,117,148, of whom 1,089,090 worked at the 3,265 mines under the Coal Mines Act, and 28,058 at the 645 mines under the Metalliferous Mines Act.

Compared with 1911 there is an increase of 21,877 persons at the mines under the Coal Mines Act, and a decrease of 967 persons at the mines under the Metalliferous Mines Act.

Of the 1,089,090 persons working at the mines under the Coal Mines Act, 878,759, or 80.7 per cent., were employed below ground. Of the 210,331 surface workers, 6,486, or 3.08 per cent., were females. There is an increase of 207 females as compared with 1911.

The number of young persons under 16 employed below ground in these mines was 50,447, or 5.74 per cent. of the underground workers; the total number of surface and underground workers under 16 was 71,043, or 6.52 per cent. of all workers.

At the mines under the Metalliferous Mines Act, 16,726 persons, or 59.6 per cent., worked below ground, and of the 11,332 surface workers, 176, or 1.55 per cent., were females.

At the quarries under the Quarries Act there were 79,887 persons employed, of whom 51,055 worked inside the actual pits or excavations, and 28,832 outside. Compared with 1911 there is a decrease of 998 in the number of the inside workers, and of 1,978 in the number of the outside workers, making a total decrease of 2,976 in the number of persons employed at quarries.

The persons employed occasionally at quarries are not included in the above figures.

## Output of Minerals.

The total output of minerals at the mines under the Coal Mines Act was 273,192,001 tons, of which 260,398,578 were coal, 2,287,719 fireclay, 6,744,258 ironstone, 3,184,826 oil-shale and 576,620 sundry minerals.

Adding 17,760 tons from open quarries, the total output of coal was 260,416,338 tons, which is a decrease of 11,475,561 tons on that of the previous year.

The output of coal from mines under the Coal Mines Act was 260,398,578 tons in 1912, as compared with 271,878,124 tons in 1911. The actual falling off in production is, however, somewhat less than the figures indicate. In previous years some owners have been in the habit of returning the gross weight sent out of the pit, including dirt; this year the net output of coal has been returned by these owners, who estimate that the amount of dirt would have been included, if the returns had been made in the same way as in previous years, was 2,267,789 tons.

The actual falling off, therefore, of output (including the small quantities obtained from quarries) is 9,207,772 tons.

The decrease in the output of coal is accounted for by the national strike of coalminers (which lasted from March 1 to April 10), and is much less than might have been anticipated; but before the strike the collieries in most of the districts were worked very hard.

The output in 1912 and the decrease or increase in the eight inspection districts as compared with the previous year (including the small quantities obtained from quarries) were as follow:—

	Output.*	Gross decrease or increase.
Scotland .....	40,032,193	... -1,685,970
Newcastle .....	28,442,899	... -2,348,891
Durham .....	25,993,058	... -1,916,142
York and North Midland .....	65,163,586	... -1,816,584
Manchester and Ireland .....	10,608,481	... - 496,961
Liverpool and North Wales .....	15,939,777	... - 462,572
South Wales .....	50,267,923	... + 67,196
Midland and Southern.....	26,236,210	... - 547,848
Total .....	262,684,127	... -9,207,772

\* In order to give the proper comparison with the output for 1911, the figures under this head include the estimated amount of dirt as mentioned above. The figures for 1912 given in the paragraph above are the net figures—i.e., excluding dirt.

The average output of mineral at mines under the Coal Mines Act was 311 tons per person employed underground, a decrease of 20 tons on the preceding year.

The total output of minerals at the mines under the Metalliferous Mines Act was 3,024,621 tons, of which 1,000,868 tons were iron ore.

The total quantity of stone and other minerals obtained from the quarries under the Quarries Act was 43,158,035 tons, of which 4,916,972 tons were iron ore. Adding to the produce of mines and of quarries over 20 ft. deep 453,293 tons obtained from shallow open workings, we arrive at a total output of iron ore of 13,790,391 tons.

## Fatal Accidents.

At the mines under the Coal Mines Act there were 1,151 separate fatal accidents, causing 1,276 deaths. Compared with 1911 there is a decrease of 61 in the number of accidents and an increase of 11 in the number of deaths. Of the 1,276 persons killed, 71 were under 16 years of age, as against 78 in the preceding year.

At the mines under the Metalliferous Mines Act there were 40 fatal accidents, which caused 43 deaths. Compared with 1911, there is a decrease of one in the number of fatal accidents, whilst the number of deaths is the same.

At the quarries under the Quarries Act there were 71 fatal accidents, which resulted in 75 deaths. Compared with 1911 there is a decrease of 25 in the number of accidents and of 24 in the number of deaths.

## Non-fatal Accidents.

The returns under section 1 of the Notice of Accidents Act, 1906, show that the total number of non-fatal accidents occurring during the year which disabled for more than seven days was 150,217 at mines under the Coal Mines Act, by which 150,652 persons were injured; at mines under the Metalliferous Mines Act, 1,641, by which 1,650 persons were injured; at quarries under the Quarries Act, 4,597, by which 4,620 persons were injured.

Compared with 1911, there is a decrease of 15,964 in the numbers of persons injured at mines under the Coal Mines Act, of 94 at mines under the Metalliferous Mines Act, and of 569 at quarries under the Quarries Act.

The non-fatal accidents reported to the inspectors during the year were, in mines under the Coal Mines Act, 5,078 (a decrease of 432 as compared with 1911); under the Metalliferous Mines Acts, 210 (a decrease of seven as compared with 1911) in quarries under the Quarries Act, 1,025 (a decrease of 145 as compared with 1911).

It should be noted that in the case of accidents due to explosions of firedamp or coaldust or of any explosive, or to electricity or overwinding, all such accidents are reportable to the inspector when causing any injury whatsoever. As the tables of non-fatal accidents (17 to 22) do not in these cases give the figures in detail, supplementary tables are added on page 34 of the report.

## Death-rates from Accidents.

The death-rate of the underground workers at the mines under the Coal Mines Act was 1.25 per 1,000 persons employed, as against 1.29 in 1911; the death-rate of the surface workers was 0.83 per 1,000 employed, as against 0.73 in the previous year. The death-rate of the underground and surface workers as a whole was 1.17, as against 1.19 in 1911.

The death-rate per 1,000 young persons under 16 years of age employed underground at mines under the Coal Mines Act was 1.07, for surface workers 0.83, and for underground and surface workers 1.00 for the year 1912. The corresponding figures for 1911 were 1.24, 0.51, and 1.05 respectively.

At the mines under the Metalliferous Mines Act, the death-rate of the underground workers was 2.33 per 1,000 persons employed, and of the surface workers 0.35 per 1,000. The corresponding figures for 1911 were 2.06 and 0.61 respectively. The death-rate of the underground and surface workers as a whole was 1.53, whilst that of 1911 was 1.48.

At the quarries under the Quarries Act, the death-rate from accidents of the workers inside the actual pits or excavations was 1.1 per 1,000, and of the persons employed at factories and workshops outside the quarries, but connected with them, 0.66 per 1,000. The corresponding figures for 1911 were 1.56 and 0.58 respectively. The death-rate of the inside and outside workers as a whole was 9.4 in 1912, as against 1.19 in the previous year.

Although there is an increase in the number of deaths from accidents at mines under the Coal Mines Act as compared with the previous year, the death-rates per 1,000 persons employed below ground, and for surface and underground combined, are the lowest on record. In this respect, as when considering the question of output, the fact of the national strike has to be borne in mind. Had there been no strike, the number of fatal accidents would have been greater, and the death-rates also, as they would have been calculated on the same number of persons employed as are given in the tables, no allowance having been made on account of the strike in the returns regarding persons employed.

## THE KARLIK-NAHLIK BARRIER FOR HAULAGE INCLINES.\*

This barrier, which is intended to prevent tubs from being pushed into haulage inclines when there is no truck ready to receive them, is illustrated in figs. 1-3, and consists of an operating device, a transmitting lever, the barrier proper and a releasing device. The operating mechanism is composed of two elliptically bent levers *a a*, which are keyed at the upper end to a shaft *b*, mounted on a crossbeam in the floor of the incline by means of eyes *c c*, in such a position that the flat bars *a* project between the rails of the inclines at a

FIG. 1.

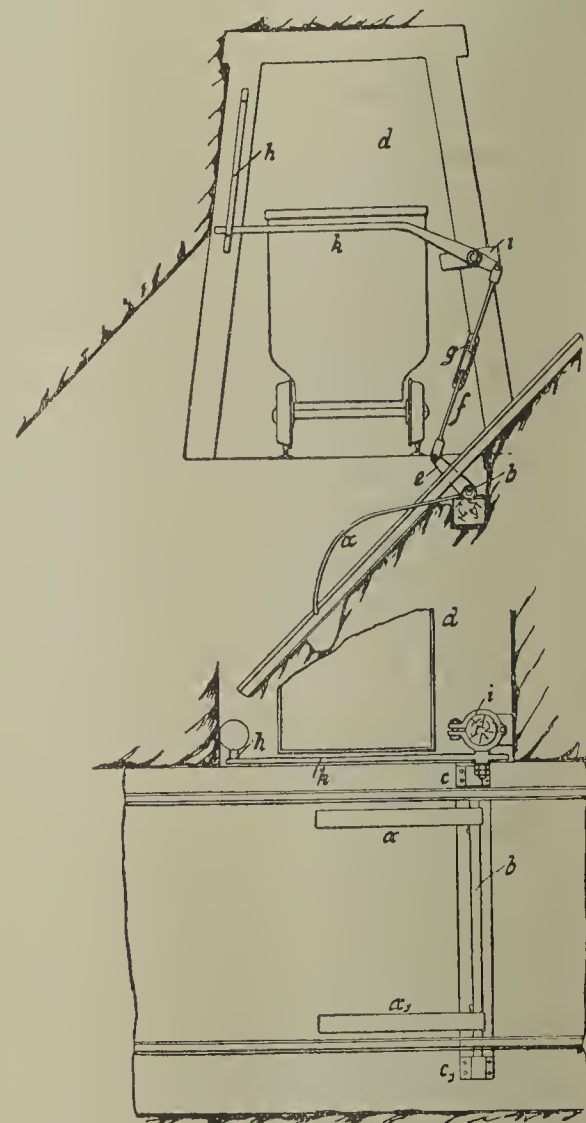


FIG. 2.

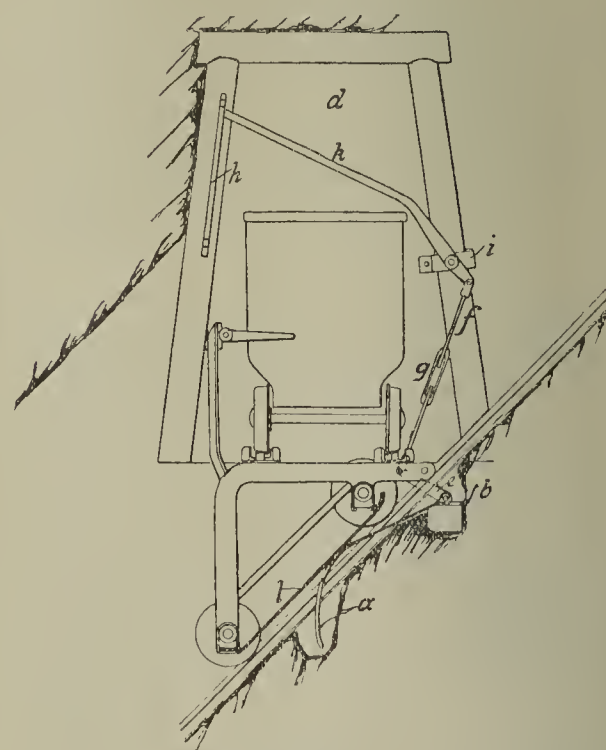


FIG. 3.

point opposite the level from which the tubs are to be transferred to the truck.

The transmission device consists of a crank-shaped lever *e* secured at one end to the shaft *b*, whilst the other end is traversed by a pin on which is articulated the forked end of a drawbar *f*, the centre of which is fitted with a turn buckle *g*. The barrier *k* is a double lever with arms of unequal length, adapted to pivot about a pin on a hinged clamp *i* which is secured to an upright or one of the timbers. The short arm of the lever is articulated to the free end of the drawbar, whilst the longer arm is guided in a slide *h*, also attached to one of the timbers or uprights, so that this longer arm bars the entrance to the incline.

The releasing device consists of two flat bars (1)

\* J. Czaplinski. Oesterreichische Zeitschrift für Berg- und Hüttenwesen.



secured on the wheel axles of the truck; and the whole arrangement is so balanced that, when in the position of repose, the long arm of the barrier lever is horizontal, and thus bars the entrance to the incline, whilst the bent bars *a a* project above the level of the track rails (fig. 1). As the truck approaches the mouth of the level, the bars *a* are depressed by the releasing device (1), thus turning the lever *e* through a certain angle, this causing the drawbar to pull down the short arm of the barrier lever and raise the long arm of same in its slide. This opens the way to the incline and the tub standing in the level can be pushed on to the truck in the incline. As soon as the truck is moved away the long arm of the barrier lever drops automatically and raises the bent bars *a a*.

The advantages of this barrier reside chiefly in its simplicity of construction and absolute reliability in working, in whichever direction the truck may be travelling. Moreover it is quite automatic in action and does not depend on the attention of the setter on. Even where the rock pressure is heavy, the upkeep and repairs are small.

#### NORTH STAFFORDSHIRE INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

A general meeting of the members of this institute was held on Monday evening at the North Stafford Hotel, Stoke-on-Trent, Mr. J. T. STOBBS, vice-president, in the chair.

The CHAIRMAN, Mr. E. B. WAIN, and Mr. G. P. HYSLOP referred with regret to the loss the institute had sustained by the death of their secretary, Mr. F. R. Atkinson, and it was decided to forward a letter of condolence to the family.

The CHAIRMAN reported that the council of the institute had nominated the following gentlemen for election at the annual meeting as officers of the institute:—President, Mr. Hugh Johnstone; vice-presidents, Messrs. J. Gregory, W. Statham and J. T. Stobbs; council, Messrs. J. R. L. Allott, W. Barber, F. E. Buckley, J. Cadman, D.Sc., A. S. Heath, J. Heath, N. R. H. McGowan, W. Tellwright, J. Wain, H. V. Athron, W. J. Bates, W. G. Cowlishaw, A. Daniels, W. G. Salt and E. P. Turner; treasurer, Mr. G. E. Lawton; hon. secretary, Mr. G. P. Hyslop; assistant secretary, Mr. A. J. B. Atkinson.

#### Practical Examples of the use of Concrete at Collieries.

Mr. JOHN GREGORY read a paper on the use of concrete at collieries, observing that he proposed briefly to give some examples of work actually carried out at the Sneyd Collieries, Burslem. He said:—

The size and disposition of the reinforcement are matters of calculation requiring considerable technical skill. For important surface works this is somewhat out of the province of mining engineering, and it will be found an advantage to get designs from engineers or architects who have specialised in concrete work. With regard to the support of underground roadways, however, other conditions prevail. The crushing effect of the strata in deep mines is an unknown quantity, and as the stresses are chiefly in compression, the writer has preferred to put in a thick concrete lining, combined with heavy steel girders, rather than a correctly designed thinner liner dependent for its success upon an elaborate system of reinforcement. This has the merit of being more easily put in by the ordinary colliery labour, and if the necessity should arise, it lends itself more readily to repair or renewal.

The first application at Sneyd Collieries was in 1909 when, owing to the failure of a brickwork barrel arch, 4 ft. in thickness, it was necessary to reconstruct the insets in a pit, 1,860 ft. deep. Steel girders, 12 in. by 6 in. by 56 lb. per foot, were obtained, bent to a circle having an internal diameter of 14 ft., each ring being composed of three segments, secured at the joints by fishplates and bolts. On the eastern side of the pit the ground was very bad owing to the roadway intersecting a large fault having a downthrow of 100 yards, and here the girder rings were spaced 18 in., centre to centre. Where the ground was more settled, this distance was increased to 3 ft. centres. Sufficient ground was taken out to allow of at least 18 in. of concrete being put in, measuring from the inside face of the finished arch, and the concrete was well rammed in between and at the back of the girders, making a smooth finished barrel arch of 14 ft. diameter.

The girder rings were taken down the pit in sections and erected in position, a special portable standard being designed for raising the top segments. Temporary laggings laid on the top of the girder rings served to support the roof whilst the concrete was being put in, being removed as the work progressed, and although three parallel lines of rails were in use during the time the work was in progress, no interruption of coal-drawing was occasioned.

When cross-cuts joined the main road, the spacing of the girder rings was increased to allow of smaller rings, having an internal diameter of 7 ft. 6 in. or 6 ft., to be inserted, their axes being at right angles to the main tunnel. In these instances old rails were used to bridge the space between the large girders, resting on the inner flanges. The concrete lining at the junction was properly

groined, and when finished had an exceedingly neat appearance.

The results achieved were so satisfactory that it was decided to adopt a similar method of securing a cut, 200 yards long, at a depth of 2,610 ft. This was also driven through the large fault already mentioned, and with the original timber supports the cost of upkeep of the road was very heavy. Girder rings of the same section, but 10 ft. internal diameter, were put in, the spacing again being dependent on the nature of the ground. Where it was necessary to provide manholes, two rings of 12 ft. diameter were placed eccentrically to the axis of the main tunnel. This work was also commenced in 1908, and so far as appearances go it will be unnecessary to spend a single penny in maintenance during the life of the colliery.

Since the completion of the above, many of the main roads, airways and water lodges have been lined in a similar manner. In very few instances have signs of crushing been observed, and in no case has it been necessary to renew the concrete, though this would be a much less expensive operation than renewing brickwork arches. The slight crushing which has taken place has invariably occurred where the roof had fallen to a considerable height, and the space intervening between the top of the concrete arch and the solid ground had been made good with chocks and loose debris, making the crush on the arch unequal. Now this is filled up solid with concrete or brickwork, or if this is not practicable the concrete lining at the weak spot is considerably strengthened.

Stables and motor houses have been constructed in concrete, and although their initial cost is somewhat high, the saving in upkeep will soon repay for the first charge. It has also been found an advantage to use concrete in motor houses which would otherwise have been adequately supported by timber. In good ground a modified cross-section has been adopted, and the steel formers made from old pit rails bent to a shape resembling a square with rounded corners. The sides are smooth and dust is easily removed, and the entire absence of combustible material commends itself where electrical apparatus is installed.

In one or two instances girder rings, 12 in. by 6 in. section, embedded in concrete in a similar manner to that described for the roadways, have been used with conspicuous success for pit shaft repairs. Where the shafts cut the 100 yards fault already mentioned, brickwork lining, 4 ft. 6 in. thick, has been crushed; but where this has been replaced by concrete, no sign of weakness has yet been observed. Many other instances in which the use of concrete is a distinct advantage suggest themselves, and there seems no limit to its useful application. Straight steel girders, with concrete rammed in between, have been used in air crossings, floors for double landings, foundations for machinery, &c. In several instances, main airways have been lined with concrete without the use of girders, the smooth surface of the finished work reducing the friction of the air and presenting no ledges for the deposit of dust.

On the surface, the most important use to which concrete has been applied up to the present is in the construction of a bunker to hold 300 tons of pit dirt and a gantry carrying a creeper and tram rails for carrying the loaded pit tubs to a tippler on the top. This work was designed and executed by reinforced concrete specialists. The cost was approximately equal to that of a steel structure, and the advantages gained are an increased life and the saving of the expense of painting every few years.

Engine-room floors, stillages for oil stores, &c., on the surface have been put in by the colliery staff. For work of this class expanded metal makes an excellent reinforcement, and data are readily obtainable for the construction of floors suitable for safe working loads of from  $\frac{1}{2}$  cwt. to 6 cwt. per superficial foot.

A further application of concrete, of special value where old shallow mines have been worked, is in the formation of rafts for the foundations of heavy or valuable buildings. For important work these should be properly designed to avoid unnecessary waste of material, but for small jobs the writer has found old rails interlaced with steel guide rods, or even wire ropes, quite successful. The examples given might be multiplied indefinitely.

For the benefit of those who might be inclined to adopt reinforced concrete, Mr. Gregory offered some practical hints on the selection and the mixing of the materials:—

**Cement.**—For all reinforced work, and particularly for underground application, when some considerable time generally elapses between the mixing of the concrete and its being placed in position, a slow setting cement should be selected. Considerable variation exists in this respect with different makes, and before adopting any particular brand tests should be carefully made. The selected cement should, in addition, comply with the British standard specification as to fineness, specific gravity and tensile strength.

**Sand.**—This requires equally careful selection to the cement. Examined under the microscope, the grains should be sharp and angular. Many sands are mixed with clay or loam, and this is fatal to the making of sound concrete. Washing is sometimes resorted to to eliminate these impurities, but in this district no difficulty is experienced in obtaining suitable qualities locally.

**Aggregate.**—For underground work the writer strongly advocates broken granite. In the work described two sizes have been used, namely,  $\frac{1}{2}$  in. chippings and  $1\frac{1}{2}$  in. screened stone. For many purposes on the surface broken bricks or saggars may be advantageously used, but it must be remembered that the sand and cement simply form a matrix or mortar binding the aggregate together, and the greater the strength of the individual fragments of aggregate the greater the ultimate strength of the concrete as a whole. The aggregate forms the

major bulk of the finished concrete, and it is necessary to get good cement and sand to bind together material which cannot in itself offer considerable resistance to a crushing load.

**Gauging.**—The correct proportions of the various classes of aggregate sand and cement vary according to the size and shape of the individual fragments. Theoretically the interstices or voids in the large stone should just be filled by the smaller stones, and the voids still remaining should be completely filled up by the mortar of sand and cement. In practice a considerably larger proportion of the smaller material must be used, in order to ensure a compact concrete, owing to inequalities in mixing and stowing. The voids in the various grades of aggregate are easily determined by filling a box of known capacity level full with the stone to be tested and adding a measured quantity of water until it is on the point of overflowing. With the aggregate adopted at Sneyd the following proportions by measure of the material give good results:—

$1\frac{1}{2}$ in. broken granite .....	36 per cent. or 9 parts.
$\frac{1}{2}$ in. granite chippings ..	32 " or 8 "
Sand .....	20 " or 5 "
Cement .....	12 " or 3 "

The proportion of neat cement to aggregate, including sand, is thus 1 to  $7\frac{1}{2}$ .

The aggregate sand and cement are measured out accurately in the proportions stated above and then mixed well dry, after which a measured quantity of water is added and the whole thoroughly mixed wet.

Owing to the finished concrete forming a homogeneous whole without interstices, the bulk is considerably reduced in mixing, and forms only 60 per cent. of that of the dry material. For making 1 cubic yard of concrete, therefore, the following table gives the quantity of each ingredient based on the proportions already stated:—

	Cubic feet.
$1\frac{1}{2}$ in. broken granite.....	16.2
$\frac{1}{2}$ in. granite chippings.....	14.4
Sand.....	9.0
Cement.....	5.4
	45.0

The mixing can be done by turning the material over with spades, but careful supervision is necessary, and it is difficult to ensure that the whole of the ingredients are thoroughly incorporated first in the dry state, and afterwards when the water is added. When much work is likely to be carried out, the writer strongly advises a machine, the cost of which is speedily recouped by the saving in labour, and absolute uniformity in the quality of the cement is secured.

**Cost.**—The cost of the application of concrete underground is dependent to a great extent on local conditions. The nature of the ground to be excavated and the facilities for the transport of the materials to the site are factors which it is necessary to take into consideration for each individual job. The following table gives the cost of the raw materials for 1 cubic yard of concrete as used at Sneyd Collieries, and will be some guide in working out an estimate:—

Material.	Cubic feet.	Weight in lb.	Total weight in lb.	Price per ton.	£	s.	d.
		cu. ft.	lb.	s. d.			
$1\frac{1}{2}$ in. granite.....	16.2	84	1,360.8	9 6	0	5	9
$\frac{1}{2}$ in. chippings ..	14.4	84	1,209.6	7 6	0	4	0
Sand .....	9.0	80	720	6 6	0	2	1
Cement .....	5.4	95	513	36 0	0	8	3
Water.....	—	—	202.6	—	—	—	—
Total per cubic yard.....					£1	0	1

The cost of stowing the concrete in position, including fixing the centring, is approximately 3s. per cubic yard, and mixing with the machine about 2d. per cubic yard.

If girder rings are used, their cost has to be added, and as an example, the cost per lineal yard of a barrel arch 11 ft. in diameter, with rings spaced 3 ft. centres, is given:—

	£	s.	d.
1 girder ring, 19 cwt., at £10 .....	9	10	0
6.55 cubic yards concrete at £1 .....	6	10	10
Stowing cement 6.55 cubic yards at 3s. ...	0	19	8
Fixing girder rings .....	0	7	6
	17	8	0

This, of course, excludes the cost of excavation or of mixing the concrete and conveying it underground to the position required. Where the girder rings can be dispensed with, it will be seen that the cost can be enormously reduced, the steel representing more than half of the total expenditure.

It is important that running water does not come in contact with the concrete until it has set, as the cement is liable to be washed out. When this has to be contended with, the general method adopted has been to put in temporary dams and pipe the water across the green concrete.

Finally, Mr. Gregory hoped that the examples he had quoted would be of service to those who had difficult roads to maintain, and, provided that the work was properly carried out, he was convinced they would find that the reduction in maintenance charges and the increased safety to life and limb would speedily repay for the capital expenditure.

#### The Discussion.

The CHAIRMAN said he had attended the institute meetings regularly for the last 14 or 15 years, but he did not remember having heard a paper which treated a subject so openly, and took the mining profession into the writer's confidence, as this paper had done. Further, in giving a very full series of the costs that



incurred in carrying out the work, Mr. Gregory what was very unusual in papers submitted to meetings. The paper would be of enormous benefit to the profession, and would be welcomed by all the mining institutes of Great Britain.

Mr. W. STATHAM said it struck him, in hearing the paper read, that if the roof yielded a large amount of water, there would be some difficulty in getting the cement to set.

Mr. E. B. WAIN said it was something like 25 years since he first made use of concrete underground, and then it was in the nature of an experiment. The difficulty in those days was to get suitable formers, on which to build up the cement work without very heavy cost. He therefore adopted the simplest possible method, namely—putting in a  $4\frac{1}{2}$  in. brick lining and back filling with concrete. The road was used for carrying steam and exhaust pipes, and was driven through some of the worst ground in the district—that was between the Ten-feet and the Bowling Alley seams. That had lasted for 25 years without splintering a brick. It was now ten years since he put in a large engine-house, somewhat on the lines of Mr. Gregory's work. He, however, was content with brick side walls and girders bent to a radius of about 20 ft., filled in with concrete in exactly the same way as Mr. Gregory had adopted in his barrel arch. In this case there was a considerable space over the concrete that was filled in between the girders, and in order to avoid the unequal strain which Mr. Gregory had referred to, that space was filled in with a rougher concrete made of Astbury—hydraulic—lime and rough ashes. That engine-house was in bad ground, under the Cockshead coal—a place somewhat similar to where Mr. Gregory had been working—but it had stood without showing the slightest possible fracture. For rough foundation work and for the filling in of road sides he thought a much cheaper and more serviceable concrete might be made by the use of cheap local material, mixed with mortar grout made with hydraulic lime. He had used it for many years, and when he had had to cut it through he had found it quite as tough as the best cement grout. It was a very valuable paper, and not one that would lead them astray as regards the cost of this work. The cost appeared at first sight to be enormous, but when they took into account the heavy expenditure that had to be incurred year after year for the renewal of timber in main roads, if they obtained a substantial lining such as Mr. Gregory had described, there was no doubt they would effect true economy. He ventured to say that the use of rail rings with a concrete back, such as was adopted in one of the cases described by Mr. Gregory, would amply repay them in the case—not of main roads subject to continual pressure—but in tunnels and headings where they wanted to resist what might be called steady pressure. If many of their roads had been lined 20 years ago in a similar manner, they would have saved the cost many times over. Apart from the strength given to the road, the great advantage of a concrete lining was that it gave a surface that practically resisted the deposit of dust, and further, that it prevented the atmospheric influence which did so much to cause disintegration in the measures overlying the coal. A thin skin of concrete would often do a great deal more service than very heavy timbering. Mr. Wain, supplementing, added that about a fortnight ago he had the pleasure of seeing in this country a pit shaft lined entirely with concrete. It was a most excellent piece of work. The pit was 22 ft. in diameter, and it was lined with concrete blocks, cast almost like tubbing blocks, and 4 in. to 5 in. thick. There were about 20 blocks to the circle, and they were cast with a dovetail. They were sent down the pit, dropped into position, and cemented together, and when the complete ring was in place, it was back filled with loose cement. It was possible in 24 hours to line 20 ft. of the shaft. He hoped it would stand well, and he believed it would. He never saw a nicer looking pit in his life.

A hearty vote of thanks was then accorded to Mr. Gregory.

Mr. GREGORY, in reply to Mr. Statham, said that in the work done at Sneyd they had not had difficulty with water to contend with. They had had some water, but they had been able to divert that by means of corrugated sheeting until the concrete was set. The initial setting of the concrete took place very rapidly, and as soon as that was accomplished the running water could not do any damage. Directly the initial setting had taken place, although the concrete might not have much strength, there was no risk of the cement being washed out. Twenty-four or 36 hours should be sufficient. He then referred to Mr. Wain for his additional remarks on the use of concrete, made of cheaper materials, and agreed with Mr. Wain. Concrete made of Astbury lime had been in use at Sneyd to

his knowledge for 25 years. The only objection to its use in certain places was that it took a considerably longer time to harden than cement concrete. For the foundations of engines that was not a matter of great moment, and he knew of no more admirable material than Astbury lime for such a purpose. In reply to a question by Mr. Buckley as to the length of roadway that was concreted at a time, Mr. Gregory said it was generally done in lengths of 5 or 6 feet. Where the girders were spaced at 18 in. centres, there was only a distance of 12 in. from flange to flange. Before the concrete was filled in, centring was put in consisting of flat bar iron bent to a semicircle, on which were laid wooden laggings, consisting of boards 1 in. thick.

On the motion of the CHAIRMAN, seconded by Mr. STATHAM, a vote of thanks was passed to Mr. F. H. Wynne (H.M. inspector of mines), who for a number of years had acted as librarian of the institute, and who had now left the district.

#### CONTINENTAL MINING NOTES.

##### Belgium.

It is stated that a number of mines in the Liège district are about to found an export syndicate, with the object of vending their products in Alsace-Lorraine, Switzerland, and France.

The following shows the exports and imports of fuel during the seven months ended with July:—

	Exports.		Imports.	
	1913. Tons.	1912. Tons.	1913. Tons.	1912. Tons.
Coal .....	2,885,460...	2,877,604...	5,218,869...	4,621,004
Coke .....	619,776...	551,414...	689,902...	530,775
Briquettes .....	348,697...	379,947...	274,135...	247,119

The imports include 3,006,086 tons of German coal, 617,582 tons of coke, and 267,822 tons of briquettes from the same country, increases of 346,436 tons, 136,047 tons, and 40,214 tons respectively. Imports of British coal have also risen, from 926,363 tons to 1,398,403 tons.

##### France.

*Miners' Wages in the Nord.*—The official returns of wages in the Nord during the first half of the present year are as follow:—Average daily wages, underground workers, 6'02 fr.; surface workers, 4'17 fr.; all workers, 5'52 fr. Output of marketable coal per day per underground worker, 904 kilogs.; per surface worker, 2,413 kilogs.

##### Germany.

*Ruhr Coal Market.*—The Syndicate has fixed the output for August at 95 per cent. of the participation for coal, 75 per cent. for coke and 85 per cent. for briquettes, the latter alone having been reduced. This decision indicates that business has remained on the old level and that no falling off is expected for September. The traffic returns for July show an increase of about 400,000 tons in comparison with the same month last year, and during the present month deliveries have been very large, so that it is expected that by the end of September the output will be equal to the whole year's figures in 1912.

*International Association of Boring Engineers.*—The twenty-seventh meeting of this association will be held in Munich on September 7-10. The papers to be read include "The Diesel Engine and the Petroleum Industry" (R. Diesel); "Concrete Linings for Deep Boreholes" (A. Schwemann); "Threads for Boring Tools and Bits" (P. Stein).

##### Russia.

A briquette factory has been established at Kharkoff by the Railways Administration, but its operations are at present hampered by lack of fuel. For the same reason the trials of anthracite as a locomotive fuel have been relinquished. The Council of Ministers have authorised the Railways Department to purchase from 30 to 50 million pounds of British coal for the south-western railways, the intention probably being to import at Odessa. The scarcity of fuel has been greatly aggravated by strikes in the Baku oilfields, and there is a prospect that the import duties on Roumanian oil will be temporarily abolished.

*Reported Discovery of Oil Shale in Skye.*—A correspondent of the *Glasgow Herald* reports that an important discovery of oil shale has been made in the island of Skye. The extent and value of the deposits are not yet fully known, but it is stated that the seam discovered is about 11 ft. in thickness, that it extends over a considerable area, and that, although not of first-class quality, or so good as the seams worked so energetically in the Lothians, it is likely to prove sufficiently good to be worked successfully, considering the improved methods of operation now followed by the leading shale oil firms. The deposit was located quite recently by Mr. G. W. Lee, D.Sc., a member of the scientific staff of the Scottish Geological Survey and Museum, Edinburgh, who was carrying out a detailed examination of the geological structure of the east coast of Skye.

#### SHORT WEIGHTS IN COAL CARGOES.

##### Collieries Exonerated.

The following are the principal passages in the report of the Committee on Humber Coal Weights, presented to the Baltic and White Sea Conference, the British Steamship Owners' Association, and the West of England Steamship Owners' Protection and Indemnity Association Limited. The report, after an interesting review of the committee's investigations, exonerates the collieries from any suspicion of falsification of weights of coal cargoes, and makes a series of suggestions as to how the discrepancies complained of by shipowners actually have arisen. Extracts (occasionally condensed) follow:—

Four years ago various owners complained that their ships, when at Humber ports, were not receiving credit for all the coal cargo loaded, and that the figures inserted in the bills of lading showed a less weight than was actually put on board. It was not seriously thought that any falsification was deliberately practised, but it was alleged as a fact that, for some cause or causes unknown, ships were not getting credit for all the cargo loaded at these ports.

The question was discussed at the Christiania meeting of the Baltic and White Sea Conference in 1910, and a committee was appointed to investigate. Shortly afterwards, the General Shipowners' Society of London, the West of England Steamship Owners' Association and the British Steamship Owners' Association gave their approval to the efforts of the Committee and authorised that body to represent them in any representations or negotiations it might take in hand, thus enabling the Committee to speak on behalf of almost the whole of the tonnage engaged in the Baltic and White Sea trade.

A close enquiry was conducted at Hull and elsewhere into the special circumstances surrounding the Humber coal shipments. The Committee also approached the railway companies engaged in carrying the coal from the mines to the places of shipment.

The results of the enquiry were embodied in a report submitted to and discussed at the Antwerp meeting of the Conference in 1911. After that meeting the Committee continued its work. There was, however, considerable caution and hesitancy on the part of the railway companies owing to the fact that, on the Humber, the competition between the railway companies for the custom of the collieries was very keen, and the railways were unwilling to offend the collieries if it could be avoided. Particularly they stipulated that any action taken should be joint action by all the railway companies interested, so that no company should appear more aggressive against the collieries than its competitors. The railway companies stated that, although they did not systematically weigh the coal forwarded by them for shipment, but accepted the colliery companies' weights, yet they now and then checked these weights by private test weighings made upon a few wagons at a time, and if they found that the weights given by any colliery were not reliable, they drew the attention of the colliery to the position and warned it that more attention must be paid by it to its weights. The railway companies stated that their past experience was that the weights given by the collieries were, on the whole, very accurate and quite satisfactory.

Some time afterwards the railway companies furnished the committee with returns of two check weighings. One of these amounted to 1,406 tons and the colliery invoice figures to 1,403 tons. The second totalled 2,842 tons and the colliery figures 2,838 tons. In each case the understatement was insignificant. The objection which the shipowner took to these weights, however, was that they were taken at various odd times upon small quantities of two or three wagons at a time, and were, therefore, not in any way comparable to weights taken from an entire cargo.

Eventually the committee decided itself to weigh a cargo at Hull. In September 1911 a favourable opportunity presented itself. The result was that the colliery company's weights showed 4,688 tons, and the dock weights 4,721 tons, an understatement by the colliery of about 33 tons, or less than 1 per cent., which could not be considered very serious.

About the same time the owners of another steamer decided, on their own account, to weigh the cargo destined for their steamer, and the returns were as follow:—Dockside returns, 5,445 tons; colliery returns, 5,416 tons—an understatement of about 30 tons. Another interesting weighing took place at Hull in connection with a new steamer. The results showed:—Dockside weights, 6,039 tons; colliery weights, 6,007 tons—an understatement of about 32 tons. In these three tests the understatements were not so serious as to account for anything like the large discrepancies, amounting sometimes to 100 tons or more, of which shipowners, both inside and outside the conference, had complained.

Shipowners, of course, admit that, for various reasons, their vessels do not always lift equally good cargoes each voyage, but the complaint which some owners made against the Humber ports was that their vessels regularly loaded there worse cargoes than at other shipping centres—for instance, in the Bristol Channel. The method of weighing pursued at the Bristol Channel was found to be very much



more satisfactory than that at the Humber. On the Bristol Channel, the dock companies weigh every truck loaded into the ship, and do the weighing at the ship's side just before the coal is loaded. The empty wagons are thereafter tared, so as to verify the tare painted on them. On the Humber, on the contrary, the only time the coals are weighed is when they leave the collieries, which are always at a considerable distance from the place of shipment.

When, however, the shipment of Welsh coals was investigated, it was found that, even in Wales, though so satisfactory a system was in operation, there were still many complaints by owners regarding weights—in fact, perhaps as many complaints as on the Humber. In 1908, the dock authorities at Cardiff had appointed Mr. M. W. Aisbitt, M.I.N.A., to examine and report upon the system of weighing, and as to whether the complaints were justified. He reported that, after careful examination, he was unable to find any flaw in the system, that the weighing machines were of modern pattern—indeed, the best that money could buy—and were quite accurate and regularly inspected by the makers; that the wagons were carefully retared and checked, that the additions were always exact, and that the dockside weights nearly always agreed with the colliery weights within a very small fraction. Consequently, he was of opinion that unsatisfactory cargoes could not be attributed to any mistake in weighing at the dockside. He then proceeded to discuss in a detailed manner the various causes which might make a ship get a poor intake on any particular occasion.

Similar complaints by shipowners had been made in respect of other Bristol Channel ports, and the Newport Dock Company, in 1911-12, made very careful investigations into the question. They took a number of tests of ships loading at their docks, comparing the invoice weights supplied by the collieries with the weights as ascertained by the dockside weighing machines, and noting the effect upon the ship as the cargo was loaded. The company published a very full and detailed report as to their conclusions.

The comparison of South Wales methods with the Humber practice threw much light upon the subject in general, and it was thought well to take into consideration also the method of shipment at north-east coast coal ports. There the method of shipment more closely resembles that of the Humber, as there is no weighing of the coals after they leave the pit; but as the distance from the mines to the places of shipment there are much shorter, less time elapsed between weighing the coal at the colliery and shipping it on board the steamer.

The Yorkshire collieries which ship coals from Hull and other ports on the east coast also ship from the west coast by Partington in the Manchester Ship Canal. The Manchester Ship Canal Company—which is an independent dock and canal company—weighs every ton that is shipped. The company was asked, therefore, whether it found that the Yorkshire collieries were inclined to understate the weights of coal sent forward by them. The general superintendent of the Canal made it clear in his reply that his company does not find that the Yorkshire colliery companies understate their weight to any serious extent. From his figures it would appear that perhaps the colliery companies may be inclined to be somewhat generous with their weights, but this does not amount to anything serious—usually less than 1 per cent. This testimony bears out in a decisive manner the evidence obtained from the weights taken at Hull. Of a series of seven weighings supplied by the Ship Canal Company, as being typical instances, there were five cases where the colliery company had given more coal than their invoices showed, and two where they had given less coal; but the overstatements were so slight as not to amount to more than  $\frac{1}{4}$  per cent.

The following conclusions may, perhaps, fairly be accepted. There seems to be no ground for suggesting that deliberate under-statement of their weights by either the shippers or the collieries is at all prevalent, and although some cases of wilful misstatement have come to the committee's knowledge, these can only be regarded as isolated instances. A certain large and well-known colliery combination do allow a rebate or discount in coal amounting to about 2 per cent.; such rebate is perfectly open and candid, being shown by the colliery company upon their invoices to their buyers. The shippers in filling the figures into the bill of lading, insert the net weight shown on such invoice, i.e., with the 2 per cent. deducted, on the ground that there is always a wastage of at least 2 per cent. before the cargo reaches the buyers. Such a system of discounts given in coal instead of cash was certainly common in various parts of the country in former times under the name of "ingrain"; but the evidence obtained by the Committee is to the effect that "ingrain" is no longer prevalent as a recognised trade usage.

On the other hand, there is evidence to show that there is a tendency on the part of the collieries generally, without giving any actual percentage of "overweight," to give the turn of the scale in favour of their customers. The Committee have in mind, for instance, a firm of coal merchants who, from time to time in landsale transactions in case of need, sell coal to their customers at the same price that they pay to the colliery, relying for their profit upon the overweight which they know they will receive from the

colliery. The Committee is of opinion, however, that the overweight given by most collieries is not large, amounting as a rule to something less than 1 per cent., and would thus probably not more than cover the wastage on the voyage. It must also be remembered that the shipowner is only entitled to be paid freight on what he delivers at the discharging port. If, however, the ship has also to submit at the port of discharge to the deduction of 2 per cent. in lieu of weighing, this would cause the shipowner to lose freight on 3 per cent., which is a good deal more than the ordinary wastage of the cargo. The statement that the collieries purposely give somewhat generous weights does not apply to Bristol Channel ports.

Another point which certainly must cause unsatisfactory cargoes occasionally is the effect of heavy rain on a cargo of coals in standing in trucks. Where the coal has any considerable journey to make in rainy weather, or even on a short journey when the rain is severe, a weight of moisture must fall on the coals equal certainly to 3 per cent. of their own weight.

To the extent set out above, the enquiries of the Committee show that there were certain grounds for the complaints of owners regarding the weights at Humber and other coal-loading ports; but the Committee must also impress on owners that its investigations have shown that no one should rashly impugn the accuracy of the colliery weight returns, which are based on an actual weighing of the whole cargo, whilst the shipowners' figures are, at best, an estimate. Unless the owner has actually weighed the cargo into his ship, he has no really reliable figures. It is possible to tell roughly how much a ship has on board at the time of sailing, but to tell accurately is almost impossible.

It should be noted that the conclusions of the report of the Alexandra Docks are founded on experiments made upon 40 ships at Newport and those of Mr. Aisbitt upon observations of 14 ships at Cardiff, Barry and Penarth. The reports, which, in the main, are in entire agreement, state that one of the most fruitful causes of mistake as regards draft arises in connection with the "hogging" and "sagging" of vessels. The experiments show that nearly every ship that is loaded develops a "spring" during her loading, and this spring, if it is a "hogg"—i.e., a camber so that the ends are depressed and the middle elevated, may make, in the case of an ordinary large tramp, as much as 36 tons gain over the builders' estimated dead weight and, correspondingly, a loss of the same amount if the spring is a "sagg"—i.e., the ends elevated and the middle depressed. Thus, it will be seen that this is a matter to which great attention should be paid. The question is one for practical shipmasters and marine superintendents.

Other cases in which unsatisfactory cargoes had been loaded were found by the investigators to be due to such causes as inaccurate estimates of the surplus bunkers left on board. The investigators found that in nearly every case the engineers had stated less bunkers than were actually on board, the amounts varying from 10 tons upwards. Another cause was from the tanks not having been allowed to drain properly; in one case, this alone accounted for 30 tons. Another cause was an accumulation of rubbish having been allowed to gather about the ship. In one extreme case, it was found on removing the vessel's flooring that about 50 tons of rubbish had accumulated. Another cause was the miscalculation of the stores and drinking-water.

Another rather obvious cause, but one by no means uncommon, was the vessel not being loaded quite down to her marks. This, of course, may easily occur where the vessel is loading in choppy water, as the "lop" on the water makes it difficult to tell exactly when the vessel is down to her marks. Then there is the question of making the proper allowance for fresh or brackish water, which is always a question requiring careful attention. A circular, recently issued by the Marine Department of the Board of Trade (Official Circular No. 1530), stated that representations had been made to the Board that the reduction of freeboard in fresh water allowed by the existing scale is in some cases insufficient—especially in modern ships—and that facilities will be afforded in any particular case upon application to the surveyors, with a view to the fresh-water allowance as shown in the vessel's certificate being reconsidered. Mr. Vickery, general manager of the Alexandra Docks and Railway, Newport, states that such a reconsideration would, in some cases, increase the carrying of ships from his port by from 30 to 40 tons.

Briefly summarised, therefore, the main causes of error may be suggested as follow:—

1. Loading the vessel in a disadvantageous manner, for instance, causing her to develop a "sagg" owing to mistake in manner or order of loading the cargo or pumping out the tanks.
2. Drainage left in tanks and bilges, or defective loading, causing it to be impossible at the last to dry the tanks, &c.
3. Mistaken estimate of surplus bunkers, either through erroneous calculation or through deliberate under-estimate.
4. Light loading—caused either by insufficient allowance in respect of the change from fresh water to salt, or through unfavourable surface conditions at the time of

taking the final draft and consequent excessive caution as to loading down to the marks.

5. Extra weights on board are not allowed for in the displacement scale, such as accumulation of rubbish, extra stores or drinking water, &c.

Other causes might be suggested, but the above will show that it is very difficult to be quite sure that the master's figures founded on his displacement scale are correct, and that the figures given by the dock company or the railway company or the colliery are wrong.

## PARLIAMENTARY INTELLIGENCE.

### HOUSE OF COMMONS.—August 20.

#### Aged Workers and the Minimum Wage.

Mr. KEIR HARDIE asked the President of the Board of Trade whether his attention had been drawn to the dismissal of a number of aged underground workmen from the Deep Duffryn Colliery and at Messrs. Nixon's Navigation and Cwm Cynon collieries, South Wales, on the score of age; whether the periods of continuous service of these men in the employ of the companies named ranged from 15 years in the lowest case to periods of 30, 45, 47 and 53 years in the highest; whether under the Coal Mines Minimum Wage Act provision was made for aged workmen accepting a lower rate of wages than that agreed upon for normal workmen; whether the age for South Wales had been fixed at 63 years; and whether he would cause enquiry to be made into all the facts of the case in order to ascertain whether he had any powers under the Minimum Wage Act or otherwise to make representations to the companies named in favour of having the men restored to their employment.

Mr. JOHN ROBERTSON pointed out section 1 (2) of the Coal Mines (Minimum Wage) Act required that the district rules should lay down conditions, as respects the district to which they applied with respect to the exclusion from the right to wages at the minimum rate of aged and infirm workmen. The district rules for South Wales provided that a workman who had reached 63 years of age should be regarded as an aged workman within the meaning of the Act, and should be excluded from the right to wages at the minimum rate. As at present advised, he did not think that the Board of Trade had any power in the matter. Of course if any action had been taken in contravention of the rule above mentioned the remedy was provided in the Act.

**Water Supply for New Yorkshire Coalfield.**—The opening up of the new coalfield in the South Yorkshire district around Doncaster has meant a great additional demand for water supply. It happens fortunately at the present time that the Leeds Corporation has a great deal of surplus water to dispose of. This they are offering to Doncaster, and both the Corporation and the Rural District Council intend to avail themselves of the offer. The Doncaster Corporation have agreed to take a supply commencing at 500,000 gallons per day, with the right to increase up to 2,000,000 gallons per day, as and when required. The Leeds authorities intend to lay a pipe track from their reservoir at Leighton to the boundary of the Doncaster Corporation water area at a point near the Bodles on the Doncaster side of the Sun Inn. The object of Leeds is to supply, not only the borough of Doncaster and the area under the jurisdiction of the corporation, but any other authorities as well who may be upon the line of pipes and be requiring a water supply. After being filtered at the Moortown reservoir, the water will be pumped into pipes which will be laid through Scholes, Aberford and Ferrybridge to Doncaster. At Marr, not very far from the neighbourhood of the Brodsworth Colliery, a service reservoir will be constructed capable of holding 9,000,000 gallons of water. The cost of this, as well as of laying the pipes, will be borne by the Leeds Corporation. The latter will lodge an application in Parliament next November for statutory powers, and when the Bill comes to be considered it is expected some members of the Doncaster Corporation will attend and support it. It is stated the additional supply will be sufficient to serve Doncaster and the district for some time to come. At present, in addition to being the water undertakers for their own town, the Doncaster Corporation supply Balby, Hexthorpe, Wheatley, Cantley, Bentley, Arksey, Sprotboro', Warmsworth, Conisboro', Thrybergh and Hooton Roberts, although they have not been called upon for a full supply for all these townships. The water question came up at last week's meeting of the Doncaster Rural District Council, when a letter was read from the Ardwick-le-Street Parish Council, in which they said they would prefer to be included in the new water supply from Leeds than receive their supply from the Brodsworth Colliery, as at present proposed. They suggested that the matter should be deferred until it was seen how the Leeds scheme progressed. The clerk pointed out that before the Leeds scheme came forward the District Council had been in communication with the Brodsworth Colliery Company, who agreed to supply water to Adwick. The council were committed to take water from them or repay them any expense to which they might have been put. It might be two or three years before the Leeds supply could be got, and it would be necessary to tell the colliery company not to incur any further expenditure on their behalf. This was agreed to.



## THE COAL AND IRON TRADES.

THURSDAY, AUGUST 28

## Scotland.—Western District.

## COAL.

The coal trade has been increasingly active during the past week, and the demand for various classes is stronger than ever. The best qualities of all coal have experienced a brisk enquiry, but the inferior qualities are somewhat weaker. Splint coal is very much in demand, orders being plentiful; the shipping qualities are fully booked up to the middle of next month. Business in navigation coal is also very active, and the demand is in excess of the supply. Steam coal is in fair demand, but for this class collieries are able to overtake existing orders. Owing to the continued good weather the demand for household coal remains rather weak. Small coals are in good request, a strong demand for trebles being the most noticeable feature. The shipments amounted to 102,128 tons, compared with 111,055, and 181,055 in the corresponding week of last year, 71,499 tons coastwise, and 30,629 foreign.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	12/6 to 14/	11/9 to 13/
Ell .....	12/6 to 13/	13/
Splint .....	12/6 to 15/6	12/9 to 15/
Treble nuts .....	13/ to 13/6	13/6
Double do. ....	12/3 to 12/6	12/9
Single do. ....	11/ to 11/3	11/3

## IRON.

The position of the Glasgow pig iron warrant market is practically unchanged, the turnover still being small and amounted to only 10,000 tons. Prices have shown an easier tendency, and closed about fivepence lower than the previous week. Business was done in Cleveland warrants during the week at 55s. 13 days, 55s. 1d. one month, 54s. 9½d. cash, and closed at 54s. 6d. cash. Cumberland hematite was offered at 67s. 6d. without any transactions being recorded. Business continues in a hand-to-mouth condition, the reduction in prices having failed to induce much extra business. Prices of Scotch makers' iron dropped sixpence all round with the exception of Carron iron, which is quoted one shilling less than the previous week. Govan and Monkland are quoted f.a.s. at Glasgow, Nos. 1, 68s., Nos. 3, 66s. 6d.; Carnbroe, No. 1, 72s. 6d., No. 3, 68s. 6d.; Clyde, No. 1, 74s., No. 3, 69s.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 74s. 6d., Nos. 3, 69s. 6d.; Glengarnock, at Ardrossan, No. 1, 74s. 6d., No. 3, 69s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 69s., No. 3, 68s.; Dalmellington, at Ayr, No. 1, 70s., No. 3, 68s.; Shotts, at Leith, No. 1, 74s. 6d., No. 3, 69s. 6d.; Carron, at Grangemouth, No. 1, 75s., No. 3, 70s. per ton. Scotch hematite is quoted 73s. per ton for delivery at West of Scotland steelworks. The imports of pig iron into Grangemouth during the week from Middlesbrough and district were 12,411 tons. There are 88 furnaces in blast in Scotland, compared with 87 in the previous week and 88 in the corresponding period of last year. Of the total, 35 are producing ordinary iron, 48 hematite, and 5 basic. Makers of galvanised sheets are now much busier, and prospects for the rest of the year are bright. The reduction in the price of spelter, which is now £5 10s. per ton less than in January, has made the cost of production considerably lower, and the prices now being obtained, namely, £11 to £11 5s. per ton for 24 gauge sheets in bundles, works out at a fair margin of profit. Prices are much firmer than have been obtainable for some time. The most prominent feature has been the increased exports to India, which for the seven months have amounted to 129,000 tons, an increase of 45,000, which is half the total in excess over the same period last year. Malleable iron makers have not experienced much increase in business even with the recent reduction in prices. The home demand has improved slightly, but orders for abroad are slow. It is expected that trade all round will take a turn for the better in the near future.

## Scotland.—Eastern District.

## COAL.

Collieries in the Lothians are now working at full pressure, extra shifts being the rule at a number of the pits owing to the inability of the coalmasters to secure the necessary amount of labour. There is a strong demand for all classes of coal and no difficulty is experienced in disposing of the output, and tonnage at the various ports is plentiful. Prices for all qualities of coal are firm.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/ to 13/3	12/9 to 13/
Secondary qualities .....	12/ to 12/3	11/9 to 12/
Treble nuts .....	13/ to 13/6	13/6 to 14/
Double do. ....	12/6 to 12/9	12/3 to 12/6
Single do. ....	11/3 to 11/6	11/6 to 12/

The Fife coal trade continues busy, an active demand for all qualities of large and small coal being experienced. Collieries are hard pressed to fulfil obligations, the accumulation of tonnage at Methil and Burntisland being unusually large. Shipments during the past week have been well up to the standard, amounting to 130,806 tons compared with 130,820 in the previous week and 122,838 tons in the corresponding week of last year.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/6 to 17/	16/9 to 17/
Unscreened do. ....	14/6 to 15/	14/9 to 15/
First-class steam coal .....	14/ to 14/6	14/ to 14/3
.....	11/6 to 12/	11/6
.....	14/3 to 14/6	13/ to 13/9
.....	12/6 to 13/	12/3 to 12/9
do. ....	11/ to 11/6	11/3 to 11/6

The total shipments from Scottish ports were 341,211 tons compared with 324,349 in the previous week and 360,907 in the corresponding week of last year.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 137,255 tons of coal and 2,438 tons of coke were despatched from Tyne Dock, a decrease of 1,926 tons of coal and an increase of 2,438 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 60,181 tons of coal and 1,175 tons of coke, an increase of 6,549 tons of coal and a decrease of 3,244 tons of coke. The Blyth shipments totalled 92,651 tons of coal and coke, a decrease of 11,455 tons. The Russian State Railways have definitely entered the market for tenders of 250,000 tons of steam coals for delivery at Black Sea ports from October to the end of December (O.S.). Yorkshire, Scottish and North-country coals are being asked for, Welsh coals being definitely excluded. This is regarded as only an instalment of a very large enquiry, which (as indicated last week) may reach about 800,000 tons. Tenders are wanted by August 30. It is reported that something like 130,000 tons of steams have already been ordered by the south-western railways from Russian merchants who still have to cover their commitments on this side. In addition, tenders have been forwarded of 20,000 tons of local steams for a railway terminating at Novorossisk. In respect of this latter enquiry, local merchants are stated to have secured an order for a cargo of from 5,000 to 6,000 tons—price not stated. This will be the first cargo of local steams sent to this destination for a very long time indeed and may be a hopeful augury for the near future. The position of private consumers of coal in Russia with reference to the coal tax does not appear to be very clear, but, in view of the failures of home supplies, there appears the likelihood that the manufacturer will share along with the State in the temporary abrogation of the impost. The Continental railways mentioned last week as enquiring for 50,000 tons of North-country steams turn out to be the Egyptian State Railways, who are enquiring, in addition, for 388,000 tons of Welsh and 5,000 tons of Scottish steams. Shipment is to be from September to January, or over 12 months. It is stated that there is every probability of a large share of the order for north-country coal coming to this district. Should this be so and should any considerable part of the Southern Russian allotment find its way hither also, a "squeeze" in the local steam coal market may be looked for with confidence—or trepidation—according to the point of view. It should not be forgotten, moreover, that the Russian State Railways are considering tenders also of 250,000 tons of steams for delivery to Røval, Riga and Libau during the last three months of this year. The Norwegian Trunk Railways have received tenders of 12,000 tons of Lambton or Yorkshire steams for shipment from October to January. A recent enquiry for quotations of 30,000 tons of Durham coking coal for Belgian consumers has been withdrawn, in consequence of the high prices tendered. The following gas coal sales are recorded:—From 35,000 to 40,000 tons of Durham seconds for delivery over next year at 12s. f.o.b.; a large quantity of Wear specials (Londonderry) for similar delivery at 13s. 6d. f.o.b., and a quantity of bests for September shipment at 15s. f.o.b.; 60,000 tons bests for shipment to Genoa over next year at 20s. c.i.f.—a price estimated to leave about 12s. 6d. f.o.b. Some surprise has been occasioned by the sale of a considerable quantity of best Blyth steams, direct by the colliery, for October-December delivery at the low price of 13s. 9d. per ton f.o.b. There has been quite a rush of buyers since the transaction became known, but the colliery has closed its books at the figure and even at 3d. per ton more. Several parcels of good Durham bunkers, aggregating about 30,000 tons, for delivery over next year, are stated to have been sold at 11s. 6d. f.o.b. for ordinaries and 12s. 6d. for bests. Collieries are being offered from 12s. to 12s. 6d. for Tyne gas primes and 13s. 6d. for Wear specials, delivery over next year, and it is possible that some considerable items of business may be concluded soon at these figures. The Gothenburg Gasworks invite tenders of 20,000 tons of options of Durham gas coals for September-June delivery. The Stavanger Gasworks have arranged for 10,000 tons of Wear gas specials for shipment over the ensuing 12 months at 20s. per ton c.i.f. The prompt coal market is quiet, consequent on scarcity of supplies and congestion of loading turns, and Northumbrian coals are a shade less firm on the week. Other descriptions of fuel are generally well maintained, however. The following are the variations in f.o.b. quotations for prompt shipment:—Best steams, Blyths are easier on the week; Tynes, 3d. cheaper; Tyne seconds, ditto; unscreened, 3d. advanced; smalls, Blyths, 6d. lower; Tynes, 3d. cheaper; specials, 6d. fallen; gas bests, 1½d.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	15/ to 15/3	15/3
Do. Tynes (Bowers, &c.) .....	15/3	15/3 to 15/6
Secondary, Blyths .....	13/	13/
Do. Tynes (Hastings or West Hartleys) .....	13/3	13/6
Unscreened .....	11/9 to 12/9	11/9 to 12/6
Small, Blyths .....	9/ to 9/3	9/6 to 9/9
Do. Tynes .....	7/9	8/
Do. specials .....	9/6	9/6 to 10/
Other sorts:—		
Smithies .....	14/	14/
Best gas coals (New Pelton or Holmside) ...	15/ to 15/1½	15/
Secondary gas coals (Pelaw Main or similar) .....	14/	13/9 to 14/
Special gas coals .....	15/3 to 15/6	15/6
Unscreened bunkers, Durham .....	13/3 to 14/6	13/9 to 14/6
Do. do. Northumbrians .....	12/ to 13/	12/ to 12/6
Coking coals .....	14/ to 14/6	13/6 to 14/
Do. smalls .....	13/6 to 14/	13/6
House coals .....	15/6	15/6
Coke, foundry .....	20/ to 21/	20/ to 22/6
Do. blast-furnace .....	19/	19/ to 20/
Do. gas .....	16/6 to 17/6	16/6 to 17/6

increased; seconds, stronger; specials, weaker; unscreened bunkers (Durhams), in buyer's favour; Northumbrians, 6d. increased; coking coal, ditto; smalls, ditto; coke, foundry, 1s. 6d. cheaper; and blastfurnace coke, similarly reduced. Other descriptions of fuel are unchanged. The prospects for September are very good, there being a considerable enquiry. There is some likelihood also that there will be less congestion of loading turns in the month to come.

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 102,290 tons of coal and 195 tons of coke as compared with 115,300 tons of coal and 650 tons of coke for the corresponding period of 1912, being a decrease of 13,010 tons of coal and 455 tons of coke. The tone of the coal market is firm and with a growing enquiry for September shipment, current prices are now asked for that position. The South Russian State Railways are enquiring for 250,000 tons of coal chiefly from this district for shipment to Black Sea ports from October to January. This is having a very steady effect on the market and forward coals are firmly held. The Stavanger Gas Works are inviting offers of 10,000 tons of special Wear gas for delivery over 12 months. The Norwegian Trunk Railways are asking for immediate offers of 12,000 tons of Lambton or Yorkshire coal for shipment October to January. Tenders are also required for 16,000 tons of special Wear gas by the Randers Gas Works, and the Horsens Gas Works have contracted for 6,000 tons of special Wear gas for delivery over next year. Both best and secondary gas sorts are fully steady, coking coals are in full demand, and bunkers are in fair request. There is a little better enquiry for coke. Current quotations are about as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/6
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	16/6	16/6 to 17/
Ordinary do. ....	16/	16/
Other sorts:—		
Lambton screened .....	15/9	15/9
South Hetton do. ....	15/6	15/3
Lambton unscreened .....	14/	13/9 to 14/
South Hetton do. ....	13/10½	13/9
Do. treble nuts .....	17/	17/
Coking coals unscreened ..	13/6 to 13/9	13/6
Do. smalls .....	13/3 to 13/6	13/3
Smithies .....	15/6	13/9
Peas and nuts .....	17/	16/3
Best bunkers .....	14/9	14/6
Ordinary bunkers ..	14/	14/
Coke:—		
Foundry coke .....	20/6	21/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	19/6	20/
Gas coke .....	18/	18/

Notwithstanding the long loading turns, coal freights are well maintained. Recent fixtures include:—Coasting: London 3s. 7½d., Antwerp 3s. 9d., Calais 5s. 3d., Ronen 5s. 6d. Bay: Bordeaux 6s., Rochefort 6s. 6d. Baltic: Aalborg 5s. 6d., Kiel 5s., Wyburg 6s. 6d., Swinemunde 5s., St. Petersburg 5s. 3d. Mediterranean: Genoa 8s. 9d., Oran 8s. 6d., Palermo 10s. 3d., Naples 8s. 3d., Port Said 8s. 4½d. and the River Plate 19s.

## Middlesbrough-on-Tees.

## COAL.

The fuel trade is steady. All descriptions of coal are firm, and good enquiries are reported. The heavy demand for steam coal for the Russian railways has strengthened other descriptions, and business over the fall of the year promises to be brisk. Gas coal is in good request, deliveries are larger, and quotations are strong. A large quantity of best gas coal is said to have been sold forward at 20s. c.i.f. Genoa. The current quotation for best Durham gas coal is 15s., whilst second kinds are 14s. to 14s. 3d., and specials 16s. The rather large demand for bunker coal is met by an ample supply. Ordinary Durham bunkers are 13s. 9d. to 14s. f.o.b., superior sorts about 14s. 6d., and special kinds up to 15s. 6d. Household coal is in fairly good demand, and the price runs from 15s. 6d. to 15s. 9d. Coking coal shows no change, prices ranging from 13s. 9d. to 14s. 6d. A lot of coke is being taken up—local requirements being very heavy, whilst demand for export is also good. Values, however, are rather easier. Though many sellers hold out for rather more, medium blastfurnace kinds are said to be obtainable at 17s. 6d. delivered at Teesside works. Foundry coke is quoted 22s. 6d. f.o.b., and gashouse coke 16s. 6d.

## IRON.

There is a rather better tone in the iron trade so far as Cleveland pig is concerned, but business is still on only a limited scale. To meet autumn requirements, however, demand is likely to improve in the very near future, and fairly good business over the fall of the year is looked for. A few sales of No. 3 g.m.b. Cleveland pig have occurred this week at 55s. 3d. for early f.o.b. delivery, and no doubt some merchants would still accept that figure for the ruling quality, but most sellers now put the price at 55s. 6d. No. 1 Cleveland pig is quoted 57s. 9d., and is firm at that figure, whilst No. 4 foundry is 55s., No. 4 forge 54s. 9d., and mottled and white iron 54s. 3d. to 54s. 6d.—all for early delivery. Somewhat discouraging accounts are given of the hematite branch of the staple industry, but it must be borne in mind that hematite quotations are still high as compared with ruling rates for Cleveland pig. Second hands are now pressing sales of Nos. 1, 2 and 3 east coast hematite at 69s. for either early or forward delivery, and are not meeting with much success. Foreign ore is lifeless. Nominally market quotations remain on the basis of 20s. ex-ship Tees for rubio of 50 per cent. quality, but it is understood that purchases could be made on good deal lower terms. There is little new to report concerning manufactured iron and steel. Quotations are unaltered. New work is not easily obtained, but a few orders keep coming in. Messrs. Dorman, Long and Co. Limited have contracted to supply the East India Railway with 11,000 tons of 88 lb. to the yard rails, and also to supply the fishplates in connection with the work.



South-West Lancashire.

COAL.

The continued fine weather, coupled with the extensive holiday-making in various towns, has had the effect of reducing the demand for household coal for the inland trade. Prices, however, remain unchanged. There is a fair quantity of coal being consumed in forges and manufacturing. Steam coal for bunkering is in good request, excursion steamers taking full quantities, but supplies are equal to requirements for this business, and although the strike at Haydock Collieries continues, it has had little effect on prices for this class of fuel, prices for screened Lancashire steam coal ranging from 13s. 6d. f.o.b. for ordinary qualities to 14s. or 14s. 3d. for the best grades. The coastwise and cross-channel trade for household fuels continues as reported last week. Slacks on the whole seem to be in better demand, without any change in prices.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best	16/3	16/3
Do. (f.o.b. Garston, net)	16/6 to 17/	16/6 to 17/
Medium	14/6	14/6
Do. (f.o.b. Garston, net)	15/ to 15/6	15/ to 15/6
Kitchen	12/3	12/3
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.)	13/6 to 14/3	13/6 to 14/3
Best slack	10/3	10/3
Secondary slack	9/6	9/6
Common do.	9/	9/

South Lancashire and Cheshire.

COAL.

The attendance on the Manchester Coal Exchange on Tuesday was only moderate, and very little business was transacted. The demand for house coal continues very quiet. Furnace coal meets with steady enquiry and there has been a better demand for shipping coal at full rates. Slack is still affected by the "wakes" season, and this will be accentuated next week in Oldham district. Prices generally are steady and are as follow:—

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best	16/6 to 17/	16/6 to 17/
Medium	15/3 to 16/	15/3 to 16/
Common	12/6 to 13/	12/6 to 13/
Furnace coal	12/6	12/6
Bunker (f.o.b. Partington)	14/	14/
Best slack	10/ to 10/6	10/ to 10/6
Common slack	9/ to 9/6	9/ to 9/6

IRON.

Only a moderate attendance on 'Change, the holidays still being in evidence. Prices are without change and good foundry iron can be procured at 61s. to 62s. Forges are not busy. Prices for iron bars are without alteration, but some of them appear to be turning their attention to rolling steel bars out of foreign billets and this helps to keep them more fully occupied. At the same time it has brought the price down, bars being now quoted at £7 5s. Steelmakers are not so busy in billets or bars, and prices rule at £5 5s. and £7 5s. respectively. Engineers only moderately employed. Foundries are fairly well off for work. Wagon builders still working full time.

Yorkshire and Derbyshire.

COAL.

There was only a small attendance at the Yorkshire Coal Exchange on Tuesday, and business was dull and quiet. Very few orders for house coal or factory fuel were given out, although several parcels of the latter quality were on offer at special rates. The pits have averaged about five days this week, but stocks in colliery sidings have increased. The supply of empty wagons is ample, and traffic is being cleared satisfactorily. The outlook for next month is considered satisfactory, and it is expected that full-time work will become general.

**House Coal.**—Considering the hot weather, London factors and merchants are taking good supplies of local house coal—more particularly the best qualities of Silkstone and Haigh Moor. Contract deliveries are generally well in hand, but there has been a lull in the call for secondary sorts during the past few days. All quotations for the London district are firmly held. Local merchants in the West Riding report an exceptionally quiet demand from the public. Cheap bagging sorts for kitchen use sell fairly well, but apart from these there is little doing. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

**Gas Coal.**—Stock at the pits are unusually light for the time of year, although the pits are working full time, and a full average output is being raised. Quite three-quarters of the output is needed to satisfy the requirements of current contracts, and the balance is disposed of without difficulty for export. A few additional acceptances of contracts over the next 12 months are reported, and in each case it is said that the full 1s. advance has been secured.

**Manufacturing Fuel.**—The Lancashire holidays and the quieter state of trade generally have caused a heavy tonnage of slacks and nuts to be thrown on to the open market. This has resulted in prices receiving a further set-back, and also in the collieries having to carry a very large number of loaded wagons in stock. Under the circumstances special quotations are the rule.

**Washed Furnace Coke.**—Average samples of patent oven coke realise from 12s. 6d. to 13s. per ton at the ovens. Forward business is practically at a standstill, as buyers think that bottom prices have not yet been reached. Stocks are heavy, although a large number of behive ovens have been put out.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected	14/ to 14/6	14/ to 14/6
Wallsend & London best	13/6 to 14/	13/6 to 14/
Silkstone best	13/6 to 14/6	13/6 to 14/6
Do. house	12/3 to 12/9	12/ to 12/6
House nuts	11/6 to 12/	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best	16/6 to 17/6	16/6 to 17/6
Silkstone best	15/6 to 16/6	15/6 to 16/6
Do. house	14/6 to 15/6	14/6 to 15/6
Other qualities	14/3 to 14/9	14/ to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal	12/ to 12/6	12/3 to 12/9
Gas nuts	11/ to 12/	11/ to 12/
Unscreened gas coal	10/6 to 11/	10/6 to 11/
Other sorts:—		
Prices at pit:		
Washed nuts	11/6 to 12/	11/6 to 12/
Large double-screened engine nuts	10/6 to 11/	10/9 to 11/3
Small nuts	10/ to 10/6	10/ to 10/6
Rough unscreened engine coal	10/ to 10/6	10/ to 10/6
Best rough slacks	8/ to 8/6	8/ to 8/6
Small do.	7/ to 7/6	7/6 to 8/
Coking smalls	7/ to 7/6	7/3 to 7/9
Coke:—		
Price at ovens:		
Furnace coke	12/6 to 13/	12/6 to 13/

Barnsley.

COAL.

The collieries within a near radius of Barnsley have been set down for the greater part of the week owing to the local holidays, and the local market on Wednesday was of a holiday description. The chief feature was the continued strong demand for steams on shipping account. The prospect of further buying on account of Russia and Egypt caused those who still have arrangements to make to be making keener enquiry, and prices were influenced by the prospective extra demand. Best large steams were rather more scarce than was the case a few weeks ago, and although there was no advance in quotations, a much stronger tone prevailed, and forward business was not pushed by sellers. In a similar way the position of secondary descriptions of Barnsley hards has improved from the coalowners' standpoint. The output is being cleared to a much greater extent than formerly, and the approach of the Doncaster race week, when traffic is almost suspended, is beginning to be felt. The railway companies, however, are dealing with traffic in a much more expeditious way, and a big volume of business is being quickly handled. Prices were slightly harder than a week ago, and higher figures have been asked for than for forward delivery. The situation in regard to small manufacturing fuel remains much the same, although it is expected that before long a greater tonnage will be required when the cotton districts in which work is being considerably interfered with owing to holidays are again in full swing. In respect to gas coal, collieries still find it difficult with the reduced output to meet their obligations under contract, and the local holiday will add a further difficulty in this respect. There is little buying outside contract deliveries, and prices are stronger. The demand for house coal of all descriptions continues to be active, and some of the London merchants are now taking winter deliveries in order to lay in stocks. In the nearer markets, however, there is not so much animation shown, but best qualities of fuel are still none too easily obtainable, and prices continue to be firm. The position in regard to coke, if anything, is rather weaker, manufacturers having to contend with a very irregular market, and concessions are still having to be made.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone	14/6	14/6
Best Barnsley softs	13/9 to 14/	13/9 to 14/
Secondary do.	11/ to 13/	11/ to 13/
Best house nuts	13/ to 13/3	13/ to 13/3
Secondary do.	11/ to 13/	11/ to 13/
Steam coals:—		
Best hard coals	13/3	13/ to 13/3
Secondary do.	12/	11/9 to 12/
Best washed nuts	11/6 to 12/	11/6 to 12/
Secondary do.	10/9 to 11/	10/9 to 11/
Best slack	8/ to 8/6	8/ to 8/6
Rough do.	6/6 to 7/6	6/6 to 7/6
Gas coals:—		
Screened gas coals	12/6 to 13/	12/6 to 13/
Unscreened do.	11/6 to 12/	11/6 to 12/
Gas nuts	12/ to 12/9	12/ to 12/9
Furnace coke	12/6 to 13/	13/

Hull.

COAL.

The Humber coal market is fairly active for best steam coal, though business this week is somewhat hampered by the holidays in the Barnsley district, and a difficulty in arranging tonnage. Best Yorkshire steam hards for prompt shipment maintain their value, while Derbyshires and Nottinghamshires show an improvement. Secondary sorts and smalls are weak, though there are signs of the home demand beginning to pick up again. The forward market is not easy to forecast. Colliery proprietors, in view of the big demands for South Russia, are holding prices firmly, and are looking forward to a strong market for the remainder of the Baltic season. Already Russian merchants are reported to be buying for shipment to the Black Sea ports. Coal is coming along over the rails fairly well, all things considered, and about normal quantities are being shipped at the docks where ready loading turns are available. The freight market remains pretty much the same, a big steamer of 6,500 tons having been booked for Cronstadt at 5s., a shade more being required for handy tonnage, though there is no great eagerness to book vessels in view of the reports of strikes at Riga and other Baltic ports. In the Mediterranean direction there has been more activity, two large steamers having been chartered to load for Alexandria at 8s. 10½d., which

is 1½d. more than was paid a week ago. An attempt is being made to bring the Humber coal workers to agree to knocking off at one o'clock on Saturdays instead of four o'clock, as is now the case, but for the present it seems doubtful whether they will be persuaded to run away from the agreement made with the coal exporters only a few weeks ago. The following are the approximate prices for prompt shipment f.o.b. Hull, &c.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards	16/3 to 16/6	16/3 to 16/6
Washed double-screened nuts	13/6 to 13/9	13/6
Unwashed double-screened nuts	13/	13/
Washed single-screened nuts	12/9	12/9
Unwashed single-screened nuts	12/6	12/3 to 12/6
Washed smalls	10/6	10/6 to 10/9
Unwashed smalls	9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys	13/3 to 13/6	13/6
Rough slack	9/9	10/9
Pea slack	9/	9/ to 9/3
Best Silkstone screened gas coal	14/	13/6 to 13/9
Best Silkstone unscreened gas coal	13/	12/9 to 13/
Derbyshire:—		
Best steam hards (Hull)	15/9 to 16/	15/9
Do. (Grimsby)	15/6 to 15/9	15/6
Derbyshire nuts (doubles)	14/	13/
Derbyshire nuts (doubles) (Grimsby)	13/9	12/9
Derbyshire large nuts	14/3	14/ to 14/6
Do. do. (Grimsby)	14/	14/
Nottinghamshire hards	15/9	15/9
Do. do. (Grimsby)	15/6	15/6

Chesterfield.

COAL.

The general tone of the coal market is firm, and in house coal a larger volume of business is passing than is usual at this time of the year. Orders are coming to hand pretty freely, and it is probable that prices will be advanced on the first of September. The holidays are slightly interfering with the demand for fuel for manufacturing purposes, and customers, in many cases, request that deliveries may be suspended for a few days. This is, however, the customary position of affairs in the month of August, while the advent of September usually reopens a period of activity. It will certainly do so this year seeing that collieries are in most cases fully booked up for some months to come, and that the industries of the country are on the whole well placed for work. Prices of manufacturing fuel are well maintained, and the slightest increase in the present demand will have the effect of advancing these still further. Slack for boiler firing is steadily coming into greater demand, and with the close of the holiday season now at hand, full work will be resumed in connection with the Lancashire cotton mills, when this class of fuel will be in greater request than ever. Considerable difficulty will be experienced in satisfying customers' requirements seeing that collieries hold no stocks, and are dependent upon the output of the pits from day to day. There is an all round complaint that the output of coal is below the normal owing to the irregularity of the attendance of the workmen, who are passing through a period of exceptional prosperity, and are therefore by no means indifferent to an occasional day's abstention from work. Steam coal for locomotive use continues in good demand. The tone of the export trade is strong, and prices are very firm. The prospect of substantial orders coming to the Humber ports for steam coal for Russian gives increased strength to the position. Considerable activity will prevail until the close of the shipping season. To-day's price of the best brands of Derbyshire Top Hards is 15s. 6d. per ton delivered free alongside steamer at Grimsby. Cobbles are in good demand for near Continental ports. Washed fuel is in steady request, and prices are without change. The condition of the coke market continues unsatisfactory. The demand is slow, and prices are weak. The output of this fuel must inevitably be reduced unless the demand should speedily improve, of which there is no sign at present. Coking fuel is in steady request.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals	14/6	14/6
Secondary do.	12/6	12/6
Cobbles	12/	12/
Nuts	11/	11/
Slack	9/	9/

IRON.

The iron trade remains in a lifeless condition, and makers of finished iron are becoming anxious with regard to new orders, which are difficult to secure. Buying of pig iron is at a standstill at the moment.

Nottingham.

COAL.

Taking the coal trade as a whole, there has been a fair amount of business done in Nottinghamshire during the past week. Matters are beginning to improve, and it is expected that a continued improvement will be experienced as the autumn approaches. At present the domestic fuel branch has not been characterised by any marked revival; still, orders are gradually increasing. There is a better demand for best qualities, which are undoubtedly being purchased for stocking purposes, while common qualities are selling satisfactorily, though inferior sorts are in rather quiet request. There is a firmer tone in the steam coal section, shipments having become more active. Large steamers are keeping in good demand, and of this class of fuel there is not much stock in hand; for medium qualities there is a fair sale, and, speaking generally, in this section there is every reason to believe that a good tone will be main-



tained until the close of the shipping season. There is an improving demand for slack now that the manufacturing works are in full swing again, and values are keeping steady. The position in regard to gas coal is moderately satisfactory, prices being well maintained.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	12/6 to 13/	12/6 to 13/
Good house coals.....	11/ to 12/	11/ to 12/
Secondary do. ....	10/ to 11/	10/ to 11/
Best hard coals .....	11/9 to 12/6	11/6 to 12/6
Secondary do. ....	10/6 to 11/6	10/6 to 11/
Slacks (best hards).....	8/3 to 8/9	8/3 to 8/9
Do. (seconds) .....	7/3 to 7/9	7/3 to 7/9
Do. (soft).....	7/3 to 8/	7/3 to 8/

Leicestershire.

COAL.

The condition of business appears to be improving all round. There is more enquiry generally and the collieries, as a whole, are receiving more business. The total of the output has increased and stocks are considerably less than they were some few weeks ago. The enquiry touches all kinds of coal, households are more in demand in all qualities and there is no lessening in the demand for steam coals of all sorts. Local merchants are generally rather busier and looking forward to a very considerably-increased activity in the near future. The prospects for the coming season in this district are improving and a busy time is anticipated. Quotations are well sustained and a revised list is anticipated for the coming months, which will note an increase most likely.

South Staffordshire, North Worcestershire and Warwickshire.

Birmingham.

COAL.

Despite the tropical weather the pits are doing good trade for prospective rather than for current needs. Householders are stocking in anticipation of next month's advance in prices, and for works fuel there is a regular call. Smalls constitute the weak department. Quotations:—

Prices at pit.

	Last week's prices.	Current prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep .....	16/6	16/6
Do. best shallow .....	14/6	14/6
Do. seconds do. ....	13/	13/
Best hard .....	14/	14/
Forge coal.....	11/	11/
Slack .....	8/6	8/6
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand - picked cobs .....	13/9	13/9
Best hard spires .....	14/6	14/6
Forge (steam) .....	10/	10/
D.S. nuts (steam) .....	9/6	9/6
Small (do.) .....	8/6	8/6

IRON.

The attendance was better than last week, and the conditions were pretty much the same. Purchases are steady but of small bulk, and stocks are gradually accumulating. Enquiries, however, are increasing, and this is regarded as a good augury. A strong position is maintained in the galvanised corrugated sheet trade, both on home and foreign account. The needs of agricultural districts are increasing, and there is pressure for delivery. Prices for 24-gauge sheets range from £11 to £11 10s. f.o.b. Black sheets are in better request, but the output is in excess of the demand. The slackness in the tin-plate industry in South Wales has caused makers to turn their attention for the time being to the production of sheets. Current quotations are £8 2s. 6d. to £8 5s. per ton for doubles delivered in the district. For best bars the demand is quiet, though good supplies are always required by the engineering trades. It cannot be said, however, that the recent reduction of 10s. a ton has brought any great amount of work. Makers of merchant bars are doing a quiet, steady business, but there is no forward or speculative buying. Prices remain at £7 10s. to £7 15s. a ton, and for commoner qualities £7. Rounds, squares and flats are firm at £7 12s. 6d. to £7 15s. per ton three-eighths basis. Foreign competition is not so serious as it was, inasmuch as the business doing is for quantities only sufficient to meet current needs, and therefore necessitating prompt delivery. Pig iron has not gained strength on the week, neither have sales developed. A feeble attempt was made to quote up Derbyshire brands to 56s., but the sellers themselves did not expect to do any business at that figure. In steel more business is reported, as the firstfruits of the recent drop of 10s. a ton, but enquiry is still on the slow side. Competition is keen in the semi-raw branch, and prices range from £5 to £5 5s. for Siemens and Bessemer qualities respectively. This is only 2s. 6d. to 5s. above Belgian prices. Copper sheets have been advanced £1 a ton, and the basis now stands at £86. Trade is slow.

Forest of Dean.

Lydney.

COAL.

The house coal pits of this district have been doing a brisk business since last writing, despite the intense heat of the last week or two. Five and six days' work is still being done each week, and stocks are comparatively low. The shipping department is maintaining a good demand. There is a steady flow of tonnage, which is receiving almost prompt attention. Railborne orders, too, are coming in

well. Slacks are hanging at the moment. Steam coals, too, are not in such urgent request as recently, but the pits are kept going at full time.

Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	16/6	16/6
Forest .....	15/6	15/6
Rubble .....	15/9	15/9
Nuts .....	14/	14/
Rough slack .....	8/	8/
Steam coal:—		
Large .....	13/ to 13/6	13/ to 13/6
Small .....	9/6 to 10/	10/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

Devon, Cornwall, and South Coast.

Plymouth.

COAL.

Messrs. W. Wade and Son state that there has been a considerable movement among many of the largest south coast merchants and several coal contracts have been arranged extending over the approaching season. The prolonged negotiations over these contracts have ended in a compromise, both as to price and quantities required, so that each side has reserved a certain margin for future negotiation. In some colliery districts prices are quoted firmer for current shipments. Freights are unchanged.

THE WELSH COAL AND IRON TRADES.

THURSDAY, AUGUST 28.

North Wales.

Wrexham.

COAL.

It is interesting to learn that still another new colliery is to be opened shortly near to Wrexham by the Llay Main Colliery Company Limited, where borings have been carried on for some considerable time past, and this company has acquired a capital of about £250,000, and at the head of it are Mr. E. S. Clarle, Llay Hall Colliery, and Messrs. R. Armitage and C. E. D. Rhodes, of Rotherham. This pit will be near to the last new colliery which was opened about two years ago, and which is now working successfully. The local collieries have not been working full time of late, and at least two of them are undergoing enforced idleness. Owing to the erection of a new pit head at Bersham Colliery, this pit has been "playing" for some little time past, but as this work is now nearing completion, an early resumption of winding operations is anticipated. At the Wynnstey Colliery an accident occurred to the guides, by which a rope was broken and the carrier fell to the bottom of the shaft. Although there was some damage done, there fortunately was no loss or accident to life. This colliery therefore is *hors de combat* for the present. As the output of these collieries is off the market, it is somewhat to the advantage of the other collieries who are working. With regard to trade generally, the house coal business is still weak, but with the advent of September there should be a marked improvement, as many public institutions will then be inviting tenders and getting in their winter supplies of fuel, and householders generally will be looking forward to obtaining supplies before the cold weather comes along. The demand for gas coal is of a satisfactory character, and the tonnage which has gone away on account of these contracts has been fairly considerable, and the new contracts and prices are now all in full swing. Steam coal is moderately well sold, the biggest bulk being taken by railway companies to cope with the holiday traffic, which will continue until the end of next month, if the weather keeps good. Local brickmakers and other industrial concerns are working well just now, and take a fair proportion of this class of coal, for which prices remain steady. The shipping trade is only moderate at the time of writing. Nuts, as usual, are well sold, chiefly being taken against gas coal contracts, while slack is slightly easier in tone, but the rougher qualities fetch fairly good prices. Gas coke sale is still slow, but the demand for this also will materially increase as soon as the tenders before referred to are on the market. Current prices are as follow:—

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal .....	15/ to 16/	15/ to 15/6
Secondary do. ....	14/ to 15/	14/ to 14/6
Steam coal .....	12/6 to 13/	12/3 to 12/6
Gas coal .....	13/ to 13/9	13/ to 13/6
Bunkers.....	12/ to 12/6	12/ to 12/3
Nuts .....	11/ to 11/9	11/ to 11/3
Slack .....	6/ to 8/6	6/ to 8/
Gas coke (at works) .....	15/ to 16/8	15/ to 16/8
Prices landsale:—		
Best house coal .....	17/6 to 18/4	16/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	15/ to 16/8

Monmouthshire, South Wales, &c.

Newport.

COAL.

The coal trade has maintained a perfectly steady tone for some days now, giving for the time a stability to quotations not often seen in the local coal market. The only apparent change is a weakness for forward coal, which is perhaps more imaginary than real, being based upon an anticipated greater output, but this may quite possibly be dealt with as it comes along, the supply of tonnage now here and due to arrive being better than for some time past. In the freight market rates have a tendency to improve which it is hoped will continue to attract a sufficient quantity of tonnage. The pitwood trade shows very little alteration, the present value of good French fir being around 21s. 6d. to 22s. ex-ship. Patent fuel and coke likewise show practically the same values as last recorded.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	17/3 to 17/9	17/3 to 17/9
Western-valleys, ordinary	16/9 to 17/	16/9 to 17/
Best Eastern-valleys .....	16/ to 16/6	16/ to 16/6
Secondary do. ....	15/9 to 16/	15/9 to 16/
Best small coals .....	8/6 to 9/	8/3 to 8/9
Secondary do. ....	7/6 to 8/	7/6 to 7/9
Inferior do. ....	7/ to 7/3	7/ to 7/3
Screenings .....	8/9 to 9/	8/6 to 8/9
Through coals .....	13/3 to 13/6	13/3 to 13/6
Best washed nuts .....	14/3 to 14/9	14/3 to 14/6
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/6 to 20/	19/6 to 20/6
Furnace coke .....	22/ to 23/	22/ to 23/
Foundry coke .....	26/ to 27/	26/ to 27/6

IRON.

There is very little fresh to report in the condition of the local iron and steel trades. At bar mills work continues much about the same, while quotations remain unaltered. Imports for the past week are again over 6,000 tons, values of these ruling firm. Rail mills continue to be well employed, with values showing no alteration. The pig iron market has been inactive, with a resulting depression in values, which are easier. The tin-plate trade remains quiet, with many idle mills throughout the county. Steel rails: Heavy sections, £6 10s. to £6 15s.; light, £6 15s. to £7. Tin-plate bars: Bessemer steel, £4 16s. 3d.; Siemens, £4 16s. 3d. to £4 17s. 6d. Tin-plates: Bessemer or Siemens primes, 20 × 14, 13s. 3d.; ditto, 28 × 20, 26s. 7½d. Finished black plate, £9 15s. to £10 per ton. Pig iron: Welsh hæmatite, 74s. to 75s., delivered to works in the district.

Cardiff.

COAL.

The coal trade is in a very healthy condition, with the exception that the outputs are considerably below their normal proportion, the result being that colliery proprietors have great difficulty in fulfilling engagements, and a large number of vessels are still on demurrage. As a matter of fact more demurrage has been incurred within the past two weeks than for a considerable time. High prices have been offered for small parcels of coal to complete the loading of steamers, so as to prevent further demurrage being incurred, but most of the collieries being in the same position, they were not able to take advantage of the tempting prices. For business some little time ahead (say after September 10), 21s. net is being paid for the best Admiralty coal, and even at this figure, comparatively speaking, small quantities are available. The fact is that the collieries are very well sold and therefore are able to maintain their prices. The outlook appears very promising and sellers are sanguine that round about 20s. as a minimum will be obtained over the remaining months of the year. Freights are still on a moderate basis and tonnage is sufficient for the business in hand. Charterings this week amounted to 300,140 tons as compared with 268,150 tons, or an increase of 31,990 tons. The shipments during the week were rather disappointing, amounting to 246,681 tons from Cardiff, or a decrease of 138,139 tons as compared with the corresponding period of last year. From Newport the shipments were 75,143 tons, or a decrease of 656 tons, Swansea 74,641 tons, an increase of 14,222 tons, and from Port Talbot 32,958 tons, or an increase of 5,458 tons on the corresponding week of last year. No doubt the difficulties in stemming account for the rates which are now being paid, and no relaxation is expected until normal outputs are once more resumed. The large enquiry from the Egyptian State Railways, which is now on the market, is expected to have a firming tendency on second-class Admiralty coals and, in addition to this, the Russian orders which are now coming forward, more particularly for North-country coal, will also have a stiffening effect. It is many years since enquiries for such large quantities of coal have

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	20/6 to 21/	21/
Superior seconds .....	19/6 to 20/	20/ to 20/6
Ordinary do. ....	18/6 to 19/	18/6 to 19/
Best bunker smalls.....	11/6	11/6 to 11/9
Best ordinaries.....	11/3	11/3 to 11/6
Cargo qualities .....	9/ to 9/3	8/9 to 9/
Inferior smalls.....	7/6 to 8/9	8/ to 8/6
Best dry coals .....	18/6 to 19/	18/ to 19/
Ordinary drys .....	16/3 to 16/9	15/9 to 16/6
Best washed nuts .....	16/	16/
Seconds .....	15/	15/
Best washed peas .....	14/ to 14/3	14/3 to 14/6
Seconds .....	13/ to 13/3	13/ to 13/6
Dock screenings .....	11/9	11/3
Monmouthshire—		
Black Veins .....	18/6 to 18/9	17/6 to 17/9
Western-valleys .....	18/	17/ to 17/6
Eastern-valleys .....	17/3 to 17/6	16/6 to 16/9
Inferior do. ....	15/9 to 16/	15/ to 15/3
Bituminous coals:—		
Best house coals (at pit)	20/6	20/
Second qualities (at pit)	17/6 to 17/9	18/
No. 3 Rhondda—		
Bituminous large .....	17/6	17/6
Through-and-through...	15/3 to 15/6	15/
Small .....	12/3 to 12/6	12/6
No. 2 Rhondda—		
Large.....	13/6	13/6
Through-and-through...	11/ to 11/3	11/6
Small .....	8/9	8/6 to 8/9
Best patent fuel .....	22/6	22/6
Seconds .....	19/6 to 20/6	21/
Special foundry coke .....	30/	28/
Ordinary do. ....	25/ to 26/	25/ to 26/
Furnace coke .....	20/ to 21/	20/ to 22/
Pitwood (ex-ship) .....	22/6	22/ to 22/3

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.



come forward from Russia, where undoubtedly at the present time a fuel famine exists. The small coal market is also firmer, current prices at the time of writing for best large sorts being round about 9s. Best qualities realise 1s. 6d., and other sorts about 11s. 3d. Up to the present no new contracts for next year have been reported, but it is known that negotiations are proceeding, and from the number of enquiries about it would appear that buyers are beginning to realise that considerably higher prices will have to be paid for next year's contracts than for this. For Monmouthshire coals the market has been somewhat irregular, but at the time of writing quotations for best Black Veins are 18s. 6d. to 18s. 9d., best western valleys 8s., and best eastern 17s. 3d. to 17s. 6d. net. Rhondda bituminous coals show no alteration, and for fancy house coals the quotation remains the same, but for second qualities there is a slightly firmer tendency, the price now being 17s. 6d. to 17s. 9d. The coke market is quiet, best foundry being 30s., good 25s. to 26s., and furnace 20s. to 1s. Shipments of patent fuel last week amounted to 3,731 tons, the Crown Company exporting 13,980 tons, Swansea 15,701 tons, and Newport 4,100 tons. Best brands are still quoted at 22s. 6d. for September shipment. There is very little business in the market, but makers are asking up to 20s. for best brands for shipment over next year. The Bona-Guelma Railway Co. have invited tenders for 6,000 to 54,000 tons for delivery from October 1 to March with an option for June loading. The pitwood market is somewhat firmer, best French fir commanding 22s. 6d. per ton. The following table shows the total amount of coal exported from the Bristol Channel ports to the principal countries of the world for the seven months of this year compared with the corresponding period of last year, and showing the increase or decrease in each case:—

	Total Seven months. 1913.	Increase. Tons.	Decrease. Tons.
Russia .....	311,895	76,664	—
Sweden .....	139,045	34,020	—
Norway .....	64,366	794	—
Denmark .....	22,283	339	—
Germany .....	181,982	45,192	—
Netherlands .....	73,727	—	2,468
Java .....	20,411	—	3,231
Dutch possessions in Indian Seas .....	12,448	2,538	—
Belgium .....	301,922	136,183	—
France .....	4,315,014	1,342,963	—
Algeria .....	455,346	178,522	—
French Somaliland .....	33,285	14,523	—
Madagascar .....	5,728	—	3,631
Portugal .....	501,328	155,312	—
Azores .....	12,392	—	4,950
Madeira .....	78,341	18,992	—
Spain .....	767,783	189,227	—
Canary Islands .....	439,995	28,135	—
Italy .....	3,223,719	544,131	—
Italian East Africa .....	5,301	—	20,811
Austria-Hungary .....	212,575	146,231	—
Greece .....	187,251	60,985	—
Bulgaria .....	—	—	16,251
Roumania .....	77,490	3,510	—
Turkey (European) .....	44,260	—	14,184
„ (Crete) .....	—	—	6,563
„ (Asiatic) .....	41,999	—	33,249
Egypt .....	1,126,795	254,696	—
Tripoli .....	1,832	—	6,004
Tunis .....	108,926	46,797	—
China (exclusive of Hong Kong) .....	15,175	2,213	—
Mexico .....	14,598	27	—
Peru .....	8,697	—	4,680
Chile .....	328,804	—	7,775
Brazil .....	1,026,823	309,185	—
Uruguay .....	375,229	13,864	—
Argentine Republic .....	1,876,204	466,917	—
Channel Islands .....	34,251	—	7,239
Gibraltar .....	135,611	—	1,857
Malta and Gozo .....	359,624	219,224	—
Sierra Leone .....	26,100	11,855	—
Southern Nigeria .....	30,214	8,370	—
Cape of Good Hope .....	19,251	7,942	—
Mauritius and De- pendencies .....	26,631	17,131	—
Aden & Dependencies .....	87,064	—	20,816
British India .....	66,749	28,811	—
Federated Malay States .....	8,988	—	2,493
Ceylon .....	135,367	—	3,526
Wei-hai-Wei .....	6,909	6,909	—
Hong Kong .....	38,228	17,520	—
Canada .....	9,891	2,227	—
British West India Islands .....	3,360	—	2,809
Falkland Islands .....	11,140	10,387	—
West Africa: French .....	106,645	52,182	—
„ Portuguese .....	145,577	—	34,445

IRON.

The demand for tin-plates has improved during the past week, and prices are rather firmer, buyers offering 13s. 3d. for 20 x 14, oil sizes at 13s. 4½d., and 19s. for 20 x 10—makers demanding about 3d. to 6d. per box more. Shipments, however, have been comparatively small, only amounting to 55,485 boxes, whilst the receipts from works were 66,798 boxes, leaving 297,604 boxes in warehouses and vans as compared with 220,644 boxes at the corresponding date of last year. Imports of foreign steel have been of a negligible quantity during the week, and prices of home bars have been fully maintained—24 16s. being made for Siemens and £4 15s. for Bessemer. Welsh pig iron is slightly easier, being quoted from 72s. to 73s. 6d. f.o.t. In the galvanised sheet trade makers are busy, and fresh business in considerable quantity is expected from Canada; 24-gauge corrugateds still command £11 to £11 5s. The iron ore market is weak, best rubio being offered at 18s. 6d., ordinary from 17s. to 17s. 6d., and Almeria at 18s. Scrap metals are slightly better, heavy wrought being 51s. to 52s., cast and heavy steel 55s., light wrought 35s., double-headed rails 60s. to 62s., and mixed sections 56s.

COAL.

The trade of the port last week suffered further injury by the three days' strike. The coal trade was fairly active,

but the patent fuel exports were under the average. The shipments of coal and patent fuel amounted to 103,383 tons. There was a capital attendance on 'Change this morning, and the undertone of the anthracite coal market was strong. Swansea Valley large was in good request, with last prices fully upheld. Red Vein large continued to improve. Machine-made nuts and cobbles were firmer. There was a steady demand for rubby culm at last quotations, but enquiries for duff were falling off, and values were not quite so firm. In the steam coal department there was no material alteration, large continued a very strong market, but through coals were without change.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 23/6
Secondary do. ....	19/6 to 20/6	18/9 to 20/
Big Vein large (less 2½ per cent.) .....	17/6 to 18/9	17/6 to 18/9
Red Vein large do. ....	12/9 to 14/6	12/9 to 14/6
Machine-made cobbles (net) .....	21/6 to 23/	21/ to 22/
Paris nuts (net) .....	23/6 to 26/	22/6 to 25/
French do. do. ....	23/6 to 26/	22/6 to 25/
German do. do. ....	23/6 to 26/	22/6 to 25/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	12/ to 13/6	12/ to 13/6
Do. fine peas (net) .....	—	—
Rubby culm (less 2½ p.c.)	7/3 to 7/6	7/ to 7/6
Duff (net) .....	5/9 to 6/3	5/9 to 6/3
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/6 to 12/6	11/6 to 12/6
Small do. ....	8/6 to 9/6	8/6 to 9/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.)	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

IRON.

During the past week the iron and steel trades appeared to be in a condition of considerable uncertainty. Recent reports, however, were more encouraging so far as the tin-plate trade was concerned. The shipments of tin-plates were 55,485 boxes, receipts from works 66,798 boxes, and stocks in the dock warehouses and vans 297,604 boxes. The Mannesman Tube Works, Landore, continue exceedingly busy. The engineering trade did not have such a brisk week as usual, but the foundries are working better again.

Llanelli.

COAL.

The coal trade of this district is characterised by a more cheerful tone, and since the holidays the enquiry has improved for most kinds. The demand for the manufacturing coals is certainly better than it has been for some time, and the slump which was predicted to last over the next few months is lifting, and both orders and prices are improving. The works people are getting to realise that prices have got as low as they can go, and are now prepared to consider contracts over a good period. The anthracite market is also a great deal better, and it looks as though the trade will experience a good winter. For nearly all kinds there is an upward tendency, and prices have advanced. Horticultural large for prompt delivery is difficult to get, and collieries are booking up their make over the next six months at least. Prices this week are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	20/6 to 22/	20/6 to 22/
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	17/ to 18/	17/ to 18/
Red Vein do. ....	12/6 to 13/6	12/6 to 13/6
Machine-made cobbles ...	19/6 to 20/6	19/6 to 20/6
German nuts .....	22/ to 24/	20/ to 22/
French do. ....	22/ to 24/	22/ to 24/
Paris do. ....	22/ to 24/	22/ to 24/
Machine-made beans .....	19/ to 21/	20/ to 21/
Do peas .....	12/6 to 13/6	12/ to 13/
Rubby culm .....	6/6 to 7/	6/6 to 7/
Duff .....	5/6 to 7/	4/6 to 5/6
Other sorts:—		
Large steam coal .....	17/ to 18/	17/ to 18/
Through-and-through ...	11/6 to 12/	11/6 to 12/
Small .....	9/ to 10/	9/ to 10/
Bituminous small coal ...	10/ to 11/	10/ to 11/

THE TIN-PLATE TRADE.

Liverpool.

There has been rather more enquiry the last few days, but no great weight of orders has been placed, buyers not caring to pay makers' prices for forward shipment. For shipment over the next two or three months, however, quite a fair trade has been done. Spot lots continue to be sold at low figures, but for plates to make works are standing to their quotations, which may be called:—Coke tins: I C 14 x 20 (112 sh. 108 lb.), 13s. 1½d. to 13s. 3d. per box; I C 28 x 20 (112 sh. 216 lb.), 26s. 6d. to 26s. 9d. per box; I C 28 x 20 (56 sh. 108 lb.), 13s. 6d. to 13s. 9d. per box; I C 14 x 18½ (124 sh. 110 lb.), 13s. 7½d. to 13s. 9d. per box; I C 14 x 19½ (120 sh. 110 lb.), 13s. 7½d. to 13s. 9d. per box; I C 20 x 10 (225 sh. 156 lb.), 19s. 6d. to 19s. 9d. per box; I C squares and odd sizes, 13s. 6d. to 13s. 7½d. basis for approved specifications. Terns are quietly steady at 23s. 3d. to 26s. 6d. per box for I C 28 x 20. Charcoal tins are in quiet demand at 15s. 6d. basis and upwards according to tinning. Coke wasters are quoted:—C W 14 x 20, 12s. 3d. per box; C W 28 x 20, 25s. 6d. to 25s. 9d. per box, C W 14 x 18½, 11s. 6d. to 11s. 7½d. per box; C W 20 x 10, 15s. 9d. per box—all f.o.b. Wales, less 4 per cent.

THE IRISH COAL TRADE.

THURSDAY, AUGUST 28.

Dublin.

Locally the coal trade is almost at a standstill, so many consumers being away for the holidays, and the extremely warm weather being against the household branch. The city is in a state of unrest owing to the various labour troubles existing, and as it is the week of the great annual Horse Show, ordinary business considerations are laid aside for the time being. Prices remain unchanged, as follow:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best kitchen, 24s.; Orrell slack, 21s., steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. Irish coals at Wolfhill (Queen's County) are:—Best large coal, 20s. per ton; best household, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth; steam coals for contracts, 17s. 6d. per ton. During the past week experiments have been made on the Great Southern and Western Railway engines with the coal from the Wolfhill mines, the tests being under the supervision of the engineering department of the railway, and the mining officials. At a recent meeting of the Castlecomer Board of Guardians a resolution was passed to request the proprietor of the Queen's County collieries to proceed with the work of reopening the Firoda mines, he having acquired mineral rights in that district. The coaling vessels arriving in this port during the past week amounted to 56 as compared with 44 the week previously, chiefly from Ardrossan, Irvine, Liverpool, Point of Aire, Garston, Workington, Newport, Ayr, Preston, Troon, West Bank, Cardiff, and Swansea. The total quantity of coal discharged upon the quays was 13,947 tons.

Belfast.

There is no change of any importance in the coal trade this week, business upon the whole being fairly good, as many consumers are now laying in supplies for autumn and winter before the usual advance in prices takes place. There is no change in quotations, but prices of nearly all classes are firm. Rates in the city are:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current quotations ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Cargoes arriving during the week were chiefly from Girvan, Partington, Garston, Glasgow, Ayr, Preston, Ardrossan, Troon, Whitehaven, Ellesmere Port, Point of Aire, Manchester, Neath Abbey, Sharpness and Maryport. Between the 3rd and the 16th inst. the total number of colliers entering the harbour was 89. It is stated that a movement is on foot to develop the Slieveardagh coal-mines in the Mullinahone district, county Tipperary. A local committee has been formed, and public support is to be evoked to place the project on a business footing.

THE BY-PRODUCTS TRADE.

Tar Products.—The market generally is steady. Benzols keep firm and in request. Pitch also is firm. Carbolics are only moderate, and naphthas quiet. Toluol commands good prices, but creosote calls for no special comment. Nearest values are:—

Benzols, 90's .....	1/1½
Do. 50's .....	1/11½
Do. 90's North .....	1/1
Do. 50's North .....	1/11½
Toluol .....	1/11½
Carbolic acid, crude (60 per cent.) .....	1/3 to 1/4
Do. crystals (40 per cent.) .....	4½ to 4¾
Solvent naphtha (as in quality and package) ...	10
Crude ditto (in bulk) .....	5½
Creosote (for ordinary qualities) .....	3
Pitch (f.o.b. east coast) .....	43/6 to 44/6
Do. (f.a.s. west coast) .....	43/ to 43/6
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

Sulphate of Ammonia.—The general tendency seems to be in favour of better prices in all quarters, the forward position in particular being decidedly firmer, and makers are evidently disposed to hold firmly even at the advanced prices which in some cases have been paid. Closing prompt prices are:—

London (ordinary makes) .....	£12/7/6
Beckton (certain terms) .....	—
Liverpool .....	£13
Hull .....	£12/18/9
Middlesbrough .....	£12/17/6
Scotch ports .....	£13/2/6 to £13/5/
Nitrate of soda (ordinary) per cwt. ...	10/7½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

Mr. Andrew Williams, of Hope-street, Rhos, has been appointed under-manager at Hafod Colliery, one of the largest and deepest pits in South Wales.

The entrance examination for the South Wales and Monmouthshire School of Mines (joint diploma course) will be held on September 23, 1913. Entrance forms for the examination may be had on application to the secretary, H. M. Ingledew, Esq., 4, Mount Stuart-square, Cardiff, or to the Registrar, University College, Cardiff. Applications to be returned on or before September 9, 1913 to George Knox, Principal, School of Mines, Treforest.



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## ADVERTISEMENTS.

## Offices for

**ADVERTISEMENTS and PUBLICATION—**  
**30 & 31, FURNIVAL STREET, HOLBORN,**  
**LONDON, E.C.**

Telegraphic Address—"Colliery Guardian, Fleet, London."  
 Telephone—1354 Holborn.

## CONTRACT ADVERTISEMENTS:

PRICES FOR SPECIAL POSITIONS ON APPLICATION.

PRICES FOR ORDINARY POSITIONS :—

Single Column (3 inches wide):

For 52 insertions 2s. 6d.	} per insertion for each inch in depth.
" 26 " 3s. 0d.	
" 13 " 3s. 6d.	

Double Column (6 inches wide), double the above rates.  
 Three Columns (9 inches wide), three times the above rates.

## MISCELLANEOUS ADVERTISEMENTS:

Advertisements are inserted on the last white page or leader page at the following rates:—

One insertion ...	10s. 0d. per inch per insertion.
Three insertions	9s. 6d. " "
Six insertions ...	9s. 0d. " "

A reduction of 25 per cent. is allowed on advertisements of second-hand machinery.

SITUATIONS VACANT AND WANTED: One Penny per word (which must be prepaid), minimum 2s. 6d.

(A Classified List appears on page 448.)

## SUBSCRIPTIONS.

The Colliery Guardian, published at 2.30 p.m. on Friday, can be supplied direct from the Publishing Offices, post free for twelve months, at the following rates, payable in advance:—

For the United Kingdom ...	£1 1 0
For Foreign Countries and Colonies	£1 7 6

When foreign subscriptions are sent by Post Office Orders, advice should be sent to the Publishers.

Telegraphic Address—"COLLIERY GUARDIAN, FLEET, LONDON."  
 Telephone—1354 HOLBORN.

Established 1866.

## PATENTS, DESIGNS AND TRADE MARKS.

**Harris and Mills, Chartered Patent**  
 Agents, 34 and 35, HIGH HOLBORN, LONDON, W.C.

Telegraphic Address—"Privilege, London." Tel. No. Holborn 2763.

Circular of useful information and prices for British and Foreign Patents post free.

Chart of 187 Mechanical Motions with description of each, post free 6d.

## ASSOCIATION OF PRIVATE OWNERS OF RAILWAY ROLLING STOCK.

Formed in 1891 for the Protection of the Rights and Interests of Private Owners.

Applicants for particulars and terms of membership may be sent to the SECRETARY, Clarence Chambers, Gloucester.

The Oldest Diamond Drill Company. Established 1872.

## BORING FOR MINERALS.

SPEED AND CERTAINTY. CYLINDRICAL "CORES."

**THE AQUEOUS WORKS AND DIAMOND ROCK-BORING CO. LTD**  
 GUILDFORD ST., YORK ROAD, LAMBETH, LONDON, S.E.  
 Besides numerous other important contracts, completed (in 1897)  
 the Deepest Boring in the United Kingdom to 3,500 ft.  
 Great Experience in Boring for WATER.

## The Cambrian School of Mines,

CEMETERY ROAD, PORTH, GLAM.

## AN UNIVERSITY TRAINING AT YOUR OWN HOME.

Lessons and Instruction by Post for candidates for FIRST and SECOND Class Mine Managers' and Mine Surveyors' Home Office Examinations; Surveying and Electrical Engineering for London City Guild's Examinations; also A.M.E.E. Examinations and Government Inspectors' Exams. Candidates for the above write without delay for free Syllabus, and book of Previous Examination Questions.

(DEPT. C.) CAMBRIAN MINING SCHOOL, PORTH, GLAM.

## Briquette Machinery Ltd.,

161, Water Lane, LEEDS.

Machinery for Briquetting Peat, Lignite, Coke, Coal, Iron, Copper, Nickel, Cement;

Also Sawdust, Waste Cereals, Offals, Sewage.

PATENT COAL DRIER.

## The U.M.S.

is conducted by

T. A. SOUTHERN & H. W. HALBAUM

(Etab. 1883).

(late H.M.I.M.)

(Greenwell Medallist)

men qualified to prepare you for the highest mining positions.

The U.M.S. is the sure road to promotion. Employers know that

OUR PRACTICAL TRAINING FITS MEN FOR POSITION.

That is why U.M.S. men obtain and hold nearly all the best positions.

42 of H.M. Inspectors are U.M.S. men.

LESSONS BY POST only. Syllabus free.

Dept. A3, The U.M.S., CARDIFF.

## HEAD, WRIGHTSON

AND CO. LTD.,

— FOR —

## COLLIERY PLANT.

See Illustrated Page Advertisement in August 8 issue.

## LOCOMOTIVES

For Sale or Hire.

ALWAYS IN STOCK. QUICK DESPATCH.

THOS W. WARD Ltd., Sheffield.

Telegrams—"Forward."

Telephones—4321 (6 lines).

## NEW FORMS, &amp;c.,

RECENTLY ISSUED UNDER  
 THE COAL MINES ACTS.

— See Page 453. —

**Wanted, Surveyor between the ages of**  
 18 and 22, able to make a fast needle survey and requiring further experience: colliery near Leeds and Wakefield; give references, age and wage.—Address, **Box 5351, Colliery Guardian Office, 30 & 31, Furnival-street, Holborn, London, E.C.**

**Wanted, First-class Certificated Colliery**  
**MANAGER** for a mine in Derbyshire, Kilburn seam; must be practical pitman and hold good testimonials.—Apply, **Box 5352, Colliery Guardian Office, 30 & 31, Furnival-street, Holborn, London, E.C.**

**Wanted, an Under-Manager for a**  
 Derbyshire colliery, Kilburn seam; must have first-class certificate, be a good practical pitman, and have good testimonials.—Apply, **Box 5353, Colliery Guardian Office, 30 & 31, Furnival-street, Holborn, London, E.C.**

**Situation Vacant.—An Under-Manager**  
 wanted for small colliery, one accustomed to thin faulty seams and bad roofs.—Apply, **Box 5354, Colliery Guardian Office, 30 & 31, Furnival-street, Holborn, London, E.C.**

**First-class Certificated Colliery Manager**  
 required for a small colliery in North Wales; must be a good practical man, and able to survey; state age, experience and salary required.—Apply to **Box 5355, Colliery Guardian Office, 30 & 31, Furnival-street, Holborn, London, E.C.**



**Lattice Girder Bridge** as per illustration,  
 96 ft. long, 7 ft. by 7 ft. inside, in three lengths, has been across  
 L. & N. W. Railway, FOR SALE.—Apply, **LEAMORE BRICK CO.,**  
 Walsall.

## GEO. N. DIXON &amp; CO.,

43, CASTLE STREET, LIVERPOOL.

Auctioneers and Valuers,

**COLLIERIES, Brickworks & Mining Plant.**

**Wanted, Certificated Colliery Manager,**  
 for a large Colliery in the Midlands; must be thoroughly accustomed to longwall method of working; experience with electrical and compressed air coal-cutters and face conveyors essential.—Apply, stating age, experience, and wages required, to **Box 5360, Colliery Guardian Office, 30 & 31, Furnival-street, Holborn, London, E.C.**

**Coal Trade.—Son of well-known Lancashire**  
 engineer desires to represent, or interest, in colliery, or factor, between Manchester and Stockport, family and engine fuel.—"J.", 34, King-street, Lancaster.

**Wanted immediately, 90 Second-hand**  
 Cast Iron PIPES, 6 in. bore, 7 1/2 in. diameter, with 3 bands or belts 2 1/2 in. wide, flanges 12 1/2 in. diameter, 1 1/2 in. thick, with 8 brackets and 8 1/2 in. square holes in each flange, with raised and truly turned faces.  
 When tendering please give approximate weight of each pipe.  
**WESTMINSTER COLLIERY,**  
 Wrexham.

EDMONTON URBAN DISTRICT COUNCIL.

TENDERS FOR STEAM COAL AND SLACK AND BROKEN AND UNBROKEN COKE.

## The Edmonton Urban District Council

invite TENDERS for the supply and delivery at the Angel-road or Edmonton Low Level Station of the Great Eastern Railway (at the option of the Council) of STEAM COAL, and SLACK AND BROKEN and UNBROKEN COKE for the period between the 29th September, 1913, and the 30th September, 1914.

It will be a condition of the contract that the firm whose tender is accepted shall pay to all workmen in their employ rates of wages not less and observe hours of labour not greater than the rates of wages and hours of labour in force within the district.

Persons tendering are requested to quote nett prices without trade discounts.

Forms of tender and full particulars may be obtained at the Council's Offices, Town Hall, Edmonton.

Sealed tenders (which must be upon the forms supplied by the Council) endorsed "Tender for Coal, Slack and Coke," to be delivered at my office not later than 12 o'clock (noon) on Tuesday, the 9th September next.

The Council do not bind themselves to accept the lowest or any tender and the person whose tender may be accepted will be required to enter into a proper contract and provide such sureties as the Council shall direct.

Town Hall, Edmonton, 28th August, 1913.

By order, **WM. FRANCIS PAYNE,**  
 Clerk of the Council.

**For Sale, fifty First-class 12-ton Coal**  
 WAGONS, five doors.—Apply, "**MERCHANTS,**" **Box 5359,**  
 Colliery Guardian Office, 30 & 31, Furnival-street, Holborn, London, E.C.

## TUBES &amp; FITTINGS, IRON AND STEEL.

Tubes for Gas, Water, Steam, and Compressed Air.  
 Electric Tramway Poles, Pit Props, High Pressure Steam Mains, &c.

**JOHN SPENCER LTD.,** Globe Tube Works, WEDNESBURY

## J. W. BAIRD AND COMPANY

PITWOOD IMPORTERS,

WEST HARTLEPOOL,

YEARLY CONTRACTS ENTERED INTO WITH COLLIERIES.

## OSBECK &amp; COMPANY LIMITED

PIT-TIMBER MERCHANTS,

NEWCASTLE-ON-TYNE.

SUPPLY ALL KINDS OF COLLIERY TIMBER.

TELEGRAMS—"OSBECKS, NEWCASTLE-ON-TYNE."

\*\* For other Miscellaneous Advertisements see Last White Page.

## Forthcoming Annual Meetings.

Manchester Geological and Mining Society—

October 14, 1913

Institution of Mining Engineers—

Sept. 24, 25 & 26, 1913 (Manchester)

Midland Counties Institution of Engineers, Sept. 1913

South Staffordshire and Warwickshire Institute of

Mining Engineers ... .. October 20, 1913

## The Colliery Guardian.

LONDON, FRIDAY, AUGUST 29, 1913.

The use of concrete in coalmines was the subject of a valuable paper read on Monday at a meeting of the North Staffordshire Mining Institute by Mr. John Gregory, of Sneyd Colliery Burslem.

Mr. William Walker's report on the Rufford Colliery accident has been laid upon the table of the House of Commons.

At the Glamorgan Collieries, Rhonda Valley a new battery of coke ovens, with by-product plant, constructed by Messrs. Koppers Coke Oven and By-product Company, Sheffield, at a cost of £60,000, has been put in operation.

A second report by Mr. A. H. Lush on the enquiries held by him as to the application of proposed new regulations in regard to the use of pitch in the manufacture of briquettes has been published. Mr. Lush reviews the experience



gained since the institution of the enquiries, and recommends that the regulations should be dropped.

Mr. John Field, of West Bromwich, died on Sunday night, in his eighty-third year. Mr. Field was a past-president of the South Staffordshire and East Worcestershire Institute of Mining Engineers, and was formerly chairman of the Sandwell Park Colliery Company.

A special committee has been appointed to enquire into the allegations of excessive sickness claims and malingering among insured persons. The investigation is limited to England.

It looks as if the official enquiries which are to be held with reference to the recent pit disaster at Cadder will have to be delayed for some time. Towards the end of last week the fire was still raging in the pit, and until it is extinguished and an inspection made an enquiry is bound to be inconclusive. The fatal accidents enquiry which was to have been held on Tuesday of the present week was postponed, and no other date has, so far, been announced. It may also be mentioned that the date has not yet been fixed for the Home Office enquiry, which is to be conducted by Sir Henry Cunynghame.

On Saturday the wages committee of the Northumberland miners met the coalowners at Newcastle for the consideration of an application on behalf of the miners for an advance of wages. Wages were advanced by  $3\frac{3}{4}$  per cent., making wages  $52\frac{1}{2}$  per cent. above the basis of 1879 in the case of underground workers and banksmen, and 42 per cent. in respect of other classes of surface labour. The advance takes effect as from Monday first.

The South Wales coalowners and workmen have given the three months' notice required by the Minimum Wage Act to terminate the award and vary the rules and scheduled rates of wages fixed by Lord St. Aldwyn in July last year. The owners seek a variation of the abnormal places rule so that they may average the shifts worked during any two weeks, and pay on the amount which may be less than the 4s. 7d. standard wage fixed for colliers. The workmen seek to enlarge the rule by removing the restrictions, and to give 4s. 7d. instead of 4s. 3d. also to a collier who is not in charge of a working place. Other alterations are also sought by each side.

The closing sitting of the Scottish miners' congress was occupied with a criticism by the president of the action of the Derbyshire miners in supporting Mr. Barnett Kenyon, the new member for the Chesterfield division, and by a discussion on the housing question.

In another column we give extracts from an important report conducted by the shipowners engaged in the Baltic trade in regard to shortage in coal cargoes. The result is to exonerate the collieries completely from any charge of supplying short weight.

The Iron and Steel Institute and the South Wales Institute of Engineers hold meetings next week in Belgium.

At a colliery near Neath on Tuesday two men were suffocated by foul air.

It is stated that the important contract to supply the Cunard Steamship Line at Liverpool with their annual requirements of Yorkshire washed steam coal over next year has again been secured by the Carlton Main Colliery Limited, of Barnsley. The requirements are understood to total about a quarter of a million tons.

In the examinations for colliery managers' and surveyors' certificates, held in May last, 31 candidates passed in the first class, 105 in the second class, and 13 in the surveyors' examination.

### **More Trouble.**

A NOTE of warning has been sounded in South Wales. In addressing the shareholders of Fernhill Collieries Limited this week Mr. D. A. THOMAS alluded to the demand which had been put forward by the Miners' Federation of South Wales for an advance of 15 per cent. in the wages of the surfacemen about collieries, and said that if the workmen persisted in their determination to obtain the concession in spite of the existing agreement, there would be trouble. Mr. THOMAS, however, adopted the optimistic view that the workmen would not persist in their demand, and prophesied that there were not likely to be any serious or prolonged strikes in the South Wales colliery districts during the next twelve months or so.

It will be remembered that the present situation is due to a recent resolution of the Miners' Federation of Great Britain pressing for an immediate advance of 15 per cent. in the wages paid to men working on the surface of the pits at all collieries at which agreements had not already so far been obtained. The agents of the Federation in the various districts were instructed to communicate with the employers, and to report the results of the negotiations by August 30.

According to the existing agreement of the Board of Conciliation for the Coal Trade of Monmouthshire and South Wales, dated April 8, 1910, which will remain in force until March 31, 1915, wages were not to rise above 60 per cent. above the standard of December 1879. This maximum was reached at the last settlement, so that any demand for a further advance is a direct contravention of the agreement. The coalowners of South Wales have decided unanimously to resist the demand, rightly maintaining that, if collective bargaining between employers and trade unions were to be of any value and were to continue, agreements, once entered into, must be kept. Mr. THOMAS went on to say that, of course, if Parliament said they must pay that 15 per cent. advance, no doubt they would be loyal subjects of the Crown and obey the law, but that only *force majeure* would remove their determination to resist.

Passing to more general topics, Mr. THOMAS reviewed the effect of recent legislation upon the conditions of the coalmining industry. In his opinion the most serious adventure of the Government in this direction had been the Coal Mines Act, which had involved the country in an increased cost of several millions of pounds a year, and there was no certainty that its provisions would materially reduce the number of accidents. The official figures covered periods of completed 12 months, so that a direct comparison between the figures showing the rate of accidents for the months before and after the coming into operation of the Act was not available. In considering the rate of fatal accidents for underground workers for the year 1912, which had recently been reported to be 1.25 per 1,000, as against 1.29 in 1911, and the lowest on record, it must be remembered that there was a national strike in 1912, which kept the collieries idle for five or six weeks, and that if allowance were made for that hiatus the actual rate would have been nearly 1.40 per 1,000.

In South Wales the Minimum Wage Act has not produced apparently any serious effect, the direct cost being estimated at less than 1d. per ton. Had the employers, however, accepted the proposals first put forward by the Miners' Federation, it would have meant several shillings in the cost of production.

The tendency of all the legislation has been,

throughout, to increase the cost of production, and although the burden comes first upon the coalowners it is eventually transferred to the public, thereby narrowing the margin of commercial competition, and domestic expenditure.

We entirely agree with Mr. THOMAS that the matter is one of grave public importance. The coalowner can, within the limits prescribed by foreign competition, pass the burden on to the consumer; but it is the consumer who has to pay in the end.

### **Trade Summary.**

The London coal trade remains very quiet, with only a small tonnage being placed under new orders. Prices are practically stationary, with some slight increases for the best qualities of house and steam coals, and an easier tendency with cheap steams. Small nuts and slacks are still very quiet. Some of the Warwickshire collieries are reported to have reduced their prices for contract. A movement is on foot to advance retail prices early next week, but nothing definite has yet been decided on.

The prompt market for steam coal at Newcastle is quiet, but forward business is more lively. Supplies of tonnage are short, and loading turns congested. Gas coals are firm. Coke is down considerably, although coking coals are dearer.

The tone of the Durham coal trade is firm, with a strong enquiry for September loading. Coking coals are in full demand, and there is a slightly better enquiry for coke.

There is a slackened demand for Lancashire house coals, but prices remain unchanged. Other varieties are in good request.

Business in West Yorkshire has been dull, few orders having been given out, and stocks have increased. The outlook, however, is promising.

Local holidays have interfered with business in South Yorkshire, but there is a well-sustained demand for hard coals on export account, and prices are slightly harder. Gas coal is scarce. House coal is in normal request. Coke is rather weaker.

The prevailing tone in Derbyshire is one of firmness, and a larger business is passing in house coal, with a prospect of an advance in prices. Prices of manufacturing coal are well maintained, although deliveries are being somewhat curtailed.

Trade at Cardiff is healthy, the only fly in the ointment being the shortage of output, which entails heavy demurrage. Small coal is firmer. Monmouthshire coals are somewhat variable. House coals show little change. Coke is quiet.

The Scottish coal trade shows increased animation, and the demand for all classes of fuel is in the ascendant.

### **OBITUARY.**

The death took place last week, in his 51st year, at his residence, 11, Victoria-circus, Dowanhill, Glasgow, of Mr. Thomas Arrol, a director of the firm of Sir William Arrol and Co., engineers, Glasgow.

The death is announced at Bogside, Kilsyth, of Mr. John Irvine, retired colliery manager, who was one of the oldest and best known natives of the town. Deceased many years ago took a prominent part in the development of the coal-fields in the Kilsyth district.

The death has occurred at Fartown, Pudsey, Yorkshire, of Mr. Christopher Wilson, who was well known as a coal merchant until recent years. He was 77 years of age and had been closely connected with the public life of Pudsey for over 30 years. Prior to the interment of his remains this week there was a service at the parish church. Mr. Wilson leaves two sons and a daughter.

The death took place from heart failure, at the Woodlands, Hill Top, West Bromwich, on Sunday night, of Mr. John Field, who was in his 83rd year. Born at Hill Top, Mr. Field was trained as a mining engineer, his father being the owner of the Tantany Colliery, West Bromwich. He had been president of the South Staffordshire and East Worcestershire Institute of Mining Engineers. Mr. Field managed his own collieries at Toll End and Coles Farm, and was for 25 years a director of the Sandwell Park Colliery Company, and for a long period its chairman. He took a prominent part in public work, and at the time of his death was "father" of the West Bromwich Board of Guardians. Before the incorporation of the borough he was a member of the old commissioners; he was one of the original members of the town council, a justice of the peace, and chairman of the licensing Bench.

News has been received in Newbiggin of the death in South Australia of Mr. Walter M. Redfearn, who was associated with the sinking of the Newbiggin Colliery. Mr. Redfearn left Newbiggin about two years ago, since when he had been in the employ of the Government in Southern Australia, where he was engaged in superintending irrigation works. He was the joint author with Mr. E. M. Bainbridge of a paper which was read at the annual meeting of the Institution of Mining Engineers in Newcastle in 1910.



## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### THE ILLUMINATING POWER OF SAFETY LAMPS.

SIR,—We observe in your current issue a letter referring to the candle-power of our Wolf benzine lamp. The Wolf lamp has a well-known and world-wide reputation for high illuminating power, and your readers will find independent comparative tests on page 78 of Dr. Llewellyn's book on *Miners' Nystagmus*.

We notice that your correspondent has suppressed a line from Prof. Bowen's report (of which we beg to enclose a copy), in order to make the Cremer lamp show to better advantage. As a matter of fact, we possess the right to manufacture and sell this lamp, but must confess that we had not hitherto recognised its remarkable superiority.

WM. MAURICE,

General Manager,

Bank-street, Wolf Safety Lamp Company.  
Sheffield, August 20, 1913.

[COPY.]

Mining Department, The University,  
Leeds, May 4, 1911.

I have carried out preliminary comparative tests as to the illuminating power of various lamps. The lamps were burning paraffin, except in the case of the Wolf and Cremer lamps (in which benzine was used). The Davy lamp is taken as a standard of comparison:—

1. Davy lamp, round wick .....	1'00
2. Clanny, unshielded, round wick .....	3'27
3. Marsaut (A and B), single-gauze, flat wick ...	3'25
4. Marsaut (N), double burner, round wick .....	4'41
5. Wolf, double gauzes, flat wick .....	4'40
6. Cremer, double gauzes, flat wick, lower air inlet closed .....	4'97
7. Cremer, lower air inlet open .....	5'58

The photometer used was of the Bunsen type, of a modern pattern. The flames were standardised as to height in each case.

(Signed) DAVID BOWEN,

F.G.S., M.Inst.Min.E. (London and America), &c.,  
Acting Professor of Mining at Leeds University.

(Lamps 1 and 2 were unshielded, 3 to 7 shielded.)

SIR,—It may interest your readers who have followed the recent controversy regarding "Nystagmus and Electric Lamps" to learn that the writer has been able to obtain by comparatively small modifications in our standard oil lamps an illumination of well over 1-candle power.

This could be applied to our existing lamps, and the total cost for the increased oil and the fittings will not run out to more than from  $\frac{1}{4}$ d. to  $\frac{1}{2}$ d. per lamp per week increase.

The light is a fine white colour, and the lamp complies with the Government regulations regarding number of gauzes, and maintains this illumination of more than 1-candle power to the end of the shift. If, therefore, the theory of certain persons respecting the prevention of nystagmus by a lamp giving 1-candle power is correct, this lamp should be the means of knocking nystagmus in the head at a cost which is only a fraction of that of the electric lamp, and which is only a fraction of the inconvenience of the electric lamp, and still leaves in the hands of the miner the only simple and reliable gas indicator, namely, an oil flame.

E. A. HAILWOOD,

Manager and Secretary,

Morley, near Leeds, Ackroyd and Best, Limited.  
August 26, 1913.

### MINE MANAGERS' EXAMINATIONS.

SIR,—With your permission, I should like to draw attention to some points in connection with the examination for first-class and second-class certificates of competency as managers and under-managers of mines, held in May last:—

1. How could any candidate for first-class certificate possibly do the surveying paper in the time allowed him, *i.e.*, practically only two hours, when the candidates for surveyors' certificates required four hours to do the same paper? Surely the first-class men should have had the same time to do the work in, instead of less, as they naturally are not so well up in this subject as a surveyor who devotes his whole study to surveying.

2. That a candidate who has had most, or even some, experience in non-fiery mines, debarred from his certificate, although his work at the

examination may be up to the standard required, just because he has had little or no experience in fiery mines? In some of the evidence given before the Royal Commission on Mines such a course was suggested. But, if this is so, would it not be much better to make this condition known to aspiring candidates, than allow them to waste both time and money in vainly trying, time after time, to get a certificate?

3. Is it not possible to let each candidate know what percentage of marks he gained in each subject, and so let an unsuccessful candidate know where he failed to come up to the standard? This has been done previously in connection with the examination for inspectors of mines, and could easily, I think, be done in this examination too. This would be a great boon to candidates in letting them know where they are deficient.

4. In connection with the *viva voce* examination is it not time that a change was made? Here one man, generally a local colliery manager or agent, carries out this part of the examination, and being alone he can practically do what he likes with the persons who come before him. Supposing he is a young man serving his time, or is an official, or workman at a neighbouring colliery to his, the chances are that he is known to the examiner; and the questions put to him may be as easy as A B C compared to the questions given to another candidate who is not so favourably placed. Now as the vocal examination carries with it about double the amount of marks that any of the papers do, this is obviously an unfair advantage. To prevent a candidate being subject to the vagaries of one person, I think it would be more like the spirit of the times if at least two examiners were present in the one room, and one of these a person disinterested in the actual working of coal mines, or a stranger in that particular coalfield in which the examination is being held. Hoping to see a reply to question two and some discussion on the other points raised.

CANDIDATE.

Stanley, S.O., Durham,  
August 19, 1913.

### BOOK NOTICES.

**Industrial Poisoning from Fumes, Gases and Poisons of Manufacturing Processes.** By Dr. J. RAMBOUSEK. Translated and edited by T. M. LEGGE, M.D., D.P.H.  $8\frac{1}{2}$  in. by  $5\frac{1}{2}$  in.; xiv. + 360 pp.; 58 figs. London: Edward Arnold. Price 12s. 6d. net.

Dr. Rambousek, who is chief State health officer at Prague, is fortunate in securing such an authority as Dr. Legge, H.M. Medical Inspector of Factories, as a translator for his work. The author's dedication of the book as "intended for all who are, or are obliged to be, or ought to be, interested in industrial poisoning," is a particularly happy one, which may smite some uneasy consciences. Indeed, it serves to adumbrate two prominent facts—namely, the great number of manufacturing processes attended by toxic dangers, in a greater or less degree; and the vast amount of research that has been undertaken in regard to such matters.

From an occupational point of view, a great proportion of these processes are grouped under the chemical industry, but this is made to cover a wider ground than might be generally assigned to it. It is significant that the mining and metallurgical industries are every day being brought more nearly to the borders of the chemical industries, if they have not already crossed them, owing to the increased attention claimed by by-products. The dangers at these points do not appear, however, to be excessive. To take some of those dealt with, the cases of poisoning in gasworks and at coke ovens, it is stated, are not excessive. In addition to the possibility of carbonic oxide poisoning, ammonia, cyanogen and sulpho-cyanogen compounds, and benzene have to be borne in mind as possible sources of danger. In the distillation of wash oil severe poisoning can arise. Industrial poisoning from blastfurnace gas, however, is frequent. Industrial poisoning in the preparation of ammonia and ammonium compounds is stated to be rare, but those engaged in subliming ammonium carbonate incur special risks, due to the escape of gases containing carbon bisulphide and cyanogen compounds. Again, severe injury to health or poisoning cases scarcely arise through manipulations with a use of tar; there must be mentioned, however, the effects caused on the skin by tar, and in tar distillation, and in the production and use of benzene industrial poisoning frequently occurs. Anthracene workers frequently suffer from severe skin affections, and many of the raw substances used in the manufacture of coal tar dyes, as well as the intermediate products, are poisonous.

Two short chapters deal with the smelting and other industries. Part II. deals with the symptoms and

treatment of industrial poisoning, and Part III. with preventive measures. Great stress is here laid upon the use of oxygen and the employment of rescue appliances.

The arrangement of the work, undoubtedly a matter of no little difficulty owing to the way in which industries and processes overlap, is admirable, and the first part contains a concise description of a great many processes such as might be expected in general treatise, but is nevertheless a valuable aid to the reader. In an appendix is a copious collection of references to contemporary authorities, which should prove most useful to the student.

**The Standard of Value.** By WILLIAM LEIGHTON JORDAN. Eighth edition. 9 in. by 6 in. 292 pp. London: Simpkin, Marshall, Hamilton, Kent and Co. Price, 7s. 6d. net.

Mr. Jordan is a vigorous advocate of the double standard, a subject the intricacies of which, we fear, prevent it from obtaining the attention which it properly deserves. The artificial fixation of standards has, of course, consequences to which due weight is not always given when statistical comparisons of trade are made. Thus, as the author points out, the rise or fall in the value of trade in any years may be due not only to variations in the absolute value of the articles exported or imported, but also to variations in the absolute value of the coinage equivalent.

The curative effect of a separate silver standard is an influence which the author argues well. According to him, the connection between the price of silver and that of the average of other commodities is a necessary consequence of value and price, both being determined by supply and demand, the difference between them being that value is determined by the supply and demand of the commodity valued, and price by the ratio between the value of the commodity period and that of the commodity in which the price is quoted.

### COLLIERY ACCIDENTS.

#### Eastwood.

The inquest on two miners, Edwin Spaulton (31) and Edward Gladstone Clarke (30), who were electrocuted by an electrical cutting machine at Moor Green Colliery, was held at Eastwood on Tuesday. The jury found that the two men were accidentally electrocuted, and expressed the opinion that every man working at a coal-cutting machine should be supplied with a copy of the rules, and that the particulars of every machine examined should be entered in the log book.

In the course of evidence, John Edward James, Eastwood, whose work it was to clean the dirt from the cutting bars of the coal-cutter, said he was in the pit at the time of the accident. Before actually commencing operations Spaulton connected the trailing cable with the machine, and after clearing the coal face went to switch on the current. The bar did not revolve fast enough, however, and accordingly Spaulton, saying that the switch would not go over the second contact, told witness to go and obtain help. When he left to obey this order the deceased men had stopped the machine and were sitting down. When witness reached Joseph Daykin, who was working about a mile from the scene of the occurrence, Daykin instructed him to tell the men not to work the machine, but upon returning he saw that the bar of the coal-cutter was sparking and throwing dirt up towards the gate end. He warned the men to come away. As he approached he observed sparks also coming from the haulage ropes, and came to the conclusion that the best thing would be to switch off at the main switch, and thus disconnect the machine. He accordingly went to do this, and on returning to the cutter to find the men, observed the man Spaulton lying between the machine and the coal face.

Joseph Daykin, machine chieftain and contractor, said the remains of Clarke were underneath the bar of the coal-cutter, and Spaulton was lying about 12 ft. away.

Mr. L. G. F. Routledge, chief electrician, said the method of coal-cutting by machinery had existed in the pit for about five years. During that time they had never had any serious accident, although he had heard of them elsewhere. At Moor Green there was a weekly examination of all apparatus by a competent electrician. Witness overlooked the cutter the day following the accident, and on opening the box containing the motor found a defect in the controller switch—namely, a broken stator barrel contact, and another defect on the pummel, in the nature of a burned-out earth connection. To those he attributed the accident and the death of the two men.

Mr. Robert Nelson, H.M. electrical inspector of mines, said he absolutely agreed with Mr. Routledge's explanation of the cause of the accident. There was no occasion for the cutter-bar to run other than underneath the coal.

In summing up, the Coroner expressed the opinion that the men working the machines ought to have some kind of education or definite instructions, and that the system of examination was not so effectual as it ought to be.

**Grimsby Coal Exports.**—The exports of coal from Grimsby during the week ended Friday, August 22, were shown by the official returns to total 32,206 tons foreign and 780 tons coastal, compared with 22,875 and 490 tons respectively for the corresponding week of last year. Shipments:—Foreign: To Aarhus, 1,936 tons; Ahus, 1,067; Antwerp, 714; Dieppe, 1,409; Drontheim, 2,376; Gefle, 8,998; Gothenburg, 2,017; Hamburg, 900; Helsingborg, 1,685; Hoganas, 929; Limhamn, 3,845; Malmo, 581; Riga, 2,308; Rotterdam, 393; Skien, 863; and Ystad, 2,185. Coastal: To Managissy, 160 tons; Rye, 180; Southwold, 178; and Whitstable, 262.



## LABOUR AND WAGES.

## North of England.

At a meeting of Northumberland coalowners and miners' representatives at Newcastle on Saturday, the employers agreed to an advance in wages of  $3\frac{3}{4}$  per cent., to take effect on August 25. This increase makes the wages of the underground workmen and banksmen  $52\frac{1}{2}$  per cent. above the standard of 1879, and those of other classes of surface workers 42 per cent. above the standard.

The strike at Easington Colliery, East Durham, by which 1,500 men and boys have been idle a fortnight, came to an end on Saturday afternoon. The cause of the dispute was the refusal of the men to ride in the cage in batches of 60. At a conference of representatives of masters and men on Thursday of last week, the management agreed to make such alterations to the engine as would remove the men's objections. The men decided to return to work, but to still protest against 60 men riding at once. It was also decided that an agitation for the reduction of the number should be pursued in the county of Durham, and if necessary in the whole country.

An unusual dispute has arisen at North Seaton Colliery in consequence of the management having prohibited the men from taking files into their working places. The hewers declare that for years they have used the files and found them extremely useful in keeping their gear in order, and have decided to refer the matter to the executive committee of the Northumberland Miners' Association, with a view, if possible, of having the files restored to them.

The Cumberland Coal Trade Conciliation Board considered on Wednesday the demands for a 15 per cent. advance in surfacemen's wages on the standard prevailing in February 1912, a minimum wage of 5s. for surfacemen, and that the standard rate for mechanics and all colliery labourers in Cumberland be 5s. and 4s. per day respectively, plus current percentages. After a prolonged discussion the owners intimated that they could not concede any of the men's demands.

It is reported that one of the collieries, known as the Delves Pit, belonging to the Consett Iron Company, Limited, is to be closed. The men and boys to the number of 400 have received 14 days' notice to terminate their engagement. At the present time the colliery is one that provides a portion of the supply of coal for the Consett works besides a number of coke ovens and the Consett brickworks.

The executive committee of the Northumberland Miners' Association, in a report issued to the branch secretaries this week, states that any financial member who was on strike during the national stoppage last year, and who lived in a rented house at the time, would be paid rent allowance according to the result of the branch votes when voting on the last annual council meeting, provided that he was now financial, or had removed to another trades union of which he was at present a financial member.

## Federated Area.

The North Staffordshire Miners' Federation, at a meeting at Burslem on the 25th inst., decided, in the event of all colliery workers in the district not being in the union by September 20, that a fortnight's notice to terminate contracts would be given, to commence on September 27. Mr. Samuel Finney, secretary to the Federation, stated that of the 30,000 colliery workers in North Staffordshire, from 800 to 1,000 remained outside the union.

Mr. Fred Hall, M.P., speaking at Normanton this week, said the Minimum Wage Act had not been of that service to the workers of the country that those who framed it intended it should be. That was because the Act contained so many safeguards for the employers and none for the workmen, that it had become somewhat of a dead letter so far as a minimum wage was concerned to the greater part of the country. "We have given notice," added Mr. Hall, "to change the condition of things, because it has had a year's experience, and we are so much enamoured of it that we should not care if they repealed the Act to-morrow."

At a full meeting of the Derbyshire Miners' Association on Saturday, at which the action of the Labour Party in regard to the Chesterfield election was considered, it was unanimously resolved:

"That this council is astonished to hear that the executive of the National Labour Party refused to sanction the adoption of the candidature of Mr. Barnet Kenyon, especially as the representatives of the Independent Labour Party and the Miners' Federation, Mr. A. Henderson and Mr. John Robertson, had informed the Miners' executive of their satisfaction, and instructed the secretary in charge to call the emergency committee of the Labour Party together at once to appoint speakers and to issue the usual manifesto.

"We, the Derbyshire Miners' Association, further instruct our officials to make all enquiries and ask for copies of all or any information supplied to them on which they founded their decision and refusal to carry out Mr. Henderson's instructions, and that the whole matter be left in the hands of the executive to deal with."

It was resolved that Messrs. W. E. Harvey, secretary, and Mr. Frank Hall, treasurer of the Derbyshire Miners' Association, be instructed to consult counsel as to the association's legal status in this and other matters, and to take what steps they may deem necessary to give to the Derbyshire Miners' Association its ultimate political freedom.

A strike of boys had the effect of throwing idle over 2,000 pit workers at the Dinnington Colliery last week-end. It is understood some pony drivers were reprimanded for an alleged breach of rules, and were not allowed to work the night shift. Incensed at this, they

assembled at five o'clock next morning, and persuaded the day lads not to descend. The result was that the colliery had to set down, the local union officials being unsuccessful in getting the lads back. A number of interviews have been held between the lads and the manager of the colliery, Mr. J. Searston, and it is reported the mine manager had to be protected by the police.

A dispute between the Brodsworth miners' pick-sharpening committee and the sharpeners having resulted in the immediate dismissal of one of the latter, a general meeting was called for the purpose of dealing with the situation. The sharpeners complained of long hours and excessive work, and demanded a reduction of hours or increase in wages. This was declined, it being pointed out that the wages, £2 10s. per week, in addition to extra sums received from the miners, were higher than those paid at other collieries, while the work was proportionately less. It is expected the dismissal of one of the sharpeners, a fortnight's wages being paid in lieu of notice, will have the effect of producing peace.

The men employed at Bentley colliery are interviewing the management with reference to the settlement of a few outstanding grievances. They complain that the removal and relaying of crossgates causes much delay in stallmen getting places again, and that they consequently have to remain in the "market." The miners contend if this work was performed by the stallmen themselves, and not by the colliery company, such delay would be averted. In regard to clause A of the price list the men contend that where four men are working in a stall, two should be contractors on opposite shifts, and where six men are working three should be contractors, one on each shift. Other points being dealt with are insufficiency of timber trams, home coals, long-standing cases of men wanting stalls, it being alleged that in several instances fresh comers receive places before those who had been at work at the pit for a considerable period. The manager, Mr. D. McGregor, has promised to look into these matters and remedy them as far as possible.

On Saturday afternoon, August 23, Mr. Thomas Greenall and Mr. Thomas Ashton, president and secretary respectively of the Lancashire and Cheshire Miners' Federation, laid the memorial stones of new headquarters for the trade union miners of Lancashire and Cheshire, which are being built in Bridgeman-street, Bolton. The buildings will comprise commodious suites of offices and an assembly room capable of seating 450 or 500 persons. The executive council of the Federation will hold their monthly meetings in the new hall instead of in Wigan and Salford alternately, as at present. The cost of the buildings, with equipment, will be about £5,000.

At a meeting of the Lancashire and Cheshire Miners' Federation, held at Bolton last Saturday, it was announced that a special levy of 4d. per week is to be made upon the members of the Federation in order to augment the strike pay of the 6,000 men who are out on strike against a few non-unionists at Messrs. R. Evans and Co.'s collieries in the Haydock, Golborne, and St. Helens districts.

Speaking at Bolton, on Saturday, Mr. Thomas Greenall, president of the Lancashire and Cheshire Miners' Federation, said he thought that unless the colliery proprietors were prepared more reasonably to consider the matter of the surface hands, they were at the present time fast hastening to the state of things that took place last year.

The annual report of the Notts Miners' Association states that during the year the membership had increased by 1,400, the total number of members being 33,784. Contributions from the branches, paid by members, in the 12 months amounted to £32,494 3s., interest on investments realised £4,217, the total income during the period being £37,080 10s. The payments included £2,505 4s. 2d. for management expenses, salaries, conferences, doctors, conferences and meetings and printing; £1,239 17s. 4d. in strike pay; £2,376 12s. 7d. to members thrown out of work by breakages of machinery and other causes; £5,952 12s. in old age pensions; £1,524 14s. in contributions to the Miners' Federation, sanatoriums, convalescent homes, trades councils, and grants to unions which appealed for assistance; £391 1s. 8d. law costs; and £308 19s. 6d. minimum wage expenses. After meeting all expenses, £21,950 has been placed in the bank. The total worth of the association at the end of June was £141,454 4s. 9d. During the year 20 members were killed at work, and in each case the full amount of compensation was obtained. In one case, in which the man's death could not be traced to accident, the employers very generously, and at the association's request, gave the widow £100.

At two or three collieries in Notts the question of non-unionists is causing some friction, and at the monthly council meeting of the Notts Miners' Association on Saturday, August 23, the secretary (Mr. C. Bunfield) reported more particularly on the question of affairs at Brierley Hill Colliery where, in addition to non-unionists, there are other grievances. The report was accepted, and the matter left in his hands. It was decided that a ballot of the members of the association be taken on September 9, 10, and 11 under the No. 2 Trade Union Act (1912), which gives power on a majority vote to provide a fund for political purposes.

Addressing 3,000 miners at Pelsall, near Walsall, on Wednesday, Mr. W. E. Harvey, M.P., vice-chairman of the Miners' Federation of Great Britain, said he had a warning to give to colliery owners which would be a revelation to them. The Federation had decided that wages agreements should terminate on March 15, 1915, and after that date agreements would only be made on a new basis. A 50 per cent. advance upon the 1888 basis would be the new standard on which all future advances would have to be made. A great future lay before labour, and at no distant date there would be a Minister of Mines.

## Somersetshire.

In a letter addressed to the Bristol miners, Mr. W. Whitefield states that the whole of the winding engine-men (with the exception of one colliery) having joined the union, it has been possible for him to act for them in the name of the association, and thereby seek to improve their position. On August 7 an application was made by Mr. Whitefield on behalf of the winding engine-men for 1s. per day advance, making 6s. instead of 5s. per day, and he reports that the owners of the collieries have granted the application, at least so far as 20 per cent. will mean 6s. per day in place of 5s., which means that at five out of the six pits there is a uniform wage of 6s. per day of eight hours.

## Scotland.

At a mass meeting of the Lanarkshire Branch of the Scottish Colliery Firemen and Shot Firers' Union, held at Hamilton on Saturday night, the following resolution was carried unanimously:—"That in the event of any of their fellow-workmen at Watson's being dismissed through refusing to comply with the appeal of the Lanarkshire Miners' Union agents to join that union all the colliery firemen at Watson's will cease work." Addressing a meeting of the Kilsyth branch of the association, Mr. Wright, general secretary, said great progress had been made with the organising work. The board had agreed to demand a conference with the Scottish coalowners on such questions as:—(1) Better wages for colliery firemen; (2) improved conditions of a nature so as to allow firemen to be able to carry out their statutory duties; (3) hours of employment; (4) an agreed term of notice for all firemen and shot-firers in Scotland.

At the resumed annual conference of the Scottish Miners' Federation in Edinburgh on Friday, last week, Mr. T. Gibb (Lanarkshire) moved a resolution urging upon the members the necessity of supplementing their trade union activities by political action and the strengthening of the Parliamentary Labour Party.—Mr. John Robertson, who seconded the resolution, said he believed that the action taken by the Labour Party and the executive of the Miners' Federation of Great Britain in refusing to endorse the candidature of the Liberal candidate for Chesterfield would have the entire approval of the Scottish Miners' Federation.—The chairman (Mr. Smillie) said loyalty to the party had not been shown in that part of Derbyshire. The necessity for an active Labour propaganda was more necessary than ever. The Chesterfield miners had, by their action at the recent by-election, made it more difficult to convince people of the necessity of returning Labour members to the House of Commons and of showing them that the Labour Party were in earnest and were not going to be set aside. He knew that the Derbyshire miners could be brought to their way of thinking in a very short time.—The resolution was adopted.

A discussion on the housing problem, so far as it affected those engaged in the mining industry, was introduced by Mr. Joseph Sullivan, Lanarkshire, who moved a resolution demanding the demolition of all insanitary dwellings and the substitution of a new type of house to be built on the cottage principle, with every modern convenience. Mr. Robertson, who seconded, referred to a recent Government report showing that in the mining districts, which were for the most part situated in the open country, the death-rate amongst children in 12 months exceeded the death-rate in the slums of many of the industrial cities. If they took as a standard of comparison other districts, such as Hampstead, Port Sunlight and Bournville, they would find that the conditions of affairs in such mining villages was deplorable. In Lanarkshire, for instance, during the last 20 years, they found that if there had been anything like decent home conditions, 10,000 children might have been alive and well to-day. The resolution was passed.

The conference considered a resolution pressing for an alteration in the system of appointing medical referees under the Workmen's Compensation Act. It was held that men specially qualified to deal with particular cases should be appointed, and that a medical board of three referees should decide disputed cases. The resolution, which was agreed to, also declared that when workmen were held to be able to do light work the employer should be compelled to provide suitable employment or pay full compensation.

Office bearers for the ensuing year were elected as follows:—President, Mr. R. Smillie; vice-president, Mr. John Robertson; treasurer, Mr. W. Adamson, M.P.; secretary, Mr. R. Brown.

## Miners' Federation of Great Britain.

An exceedingly heavy agenda has been prepared for the annual conference of the Miners' Federation of Great Britain, to be held at Scarborough on Tuesday, October 7, and the following day. The subjects for discussion include the position of checkweighmen, the regulations under the new Mines Act, the continuing and the amendment of the Minimum Wage Act (passed as a consequence of the national strike of last year), the question of a new wage basis for the British coalfield in substitution for the present standard of 1879 and 1888, the prohibition of evictions during trade disputes, the improvement of housing in mining districts, the question of payment for long-distance travelling underground, the amendment of the Workmen's Compensation Act, the extension of the Eight Hours Act to surface workers, a five days' working week, and the nationalisation of land, mines and railways.

The members of the Midland branch of the National Colliery Owners' Association on Wednesday paid a visit to the Blackwell Colliery Company's now by-product plant at their B Winning colliery. They were conducted over the modern works by the general manager (Mr. J. T. Todd). The plant has an output of about 1,600 tons per week. After the inspection, the company had tea in the Brigade Hall, Blackwell, as guests of Mr. J. T. Todd.



## — PROGRESS. —

*The Decomposition of Coke Oven Gas.*

The reheating of coke oven gases in the regenerators decomposes the gases and reduces their calorific powers. Some determinations on the subject are given in *Stahl und Eisen*; from trials carried out at the Frederic-Guillaume works at Mulheim, it appears that the gas loses 13 per cent. of its value at 900 degs., 14 per cent. at 1,000 degs., and 27 per cent. at 1,065 degs., decomposition beginning at about 700 degs. In heating to 1,060 degs., which is a minimum for the gas chambers of Martin furnaces, the loss in calorific power reaches 24 per cent. Tests have also been made by passing a determined gas over bricks raised to various temperatures, with the result the calorific power fell from 2 to 6 per cent. at 800 degs., 6 to 13 per cent. at 1,000 degs., and 33 per cent. at 1,200 degs. The changes in composition were as follow: Increase in hydrogen, 75 to 78 per cent.; increase in carbon monoxide, 50 to 129 per cent.; reduction of methane, 77 to 83 per cent.; reduction of carbon dioxide, 100 per cent.; reduction of heavy carbides, 100 per cent. The gas, in losing a portion of its calorific power, gains in volume, thus increasing the speed of the furnace. This decomposition of the gas as a function of the temperature depends on the length of the heating period. The greater the speed of circulation, the less important is the decomposition for a given temperature. In order to establish the loss of energy through heating, it is indispensable to ascertain the increase in volume, the proportion of solid carbon deposited, and the water content.

*Producer-Gas in America.*

Bulletin 55 of the U.S. Bureau of Mines is a monograph by R. H. Fernald on "The Commercial Trend of the Producer-Gas Power Plant in the United States." It is estimated that in the United States at the present time gas engines, with an aggregate capacity of about 200,000-horse power, derive their power from producer gas, and that with an aggregate rating of 350,000-horse power or more derive their power from blast-furnace and coke-oven gas. The bulletin consists largely in the digested views of manufacturers and operators with whom the Bureau has been in communication. It is probable that at the present time there are in the United States 900 or 1,000 producer-gas power-plants, ranging in size from 15 to several thousand horse power. The following shows the figures supplied by manufacturers, divided according to the fuel used:—

	No. of plants.	Total horse-power.
Anthracite .....	610	89,470
Bituminous coal...	77	86,615
Lignite.....	32	10,230
Wood .....	1	500
Oil.....	2	325
Total.....	722	187,140

One of the most important developments is the use of small bituminous coal producers.

The following companies have blastfurnace and coke-oven gas power plants installed:—Allis-Chalmers Company, American Iron and Steel Company, American Steel and Wire Company (2), Buckeye Engine Works, Carnegie Steel Company, Cornwall Ore Bank Company, Empire Gas and Electric Company, Illinois Steel Company, Lackawanna Steel Company, National Tube Company, Pennsylvania Steel Company, Snow Steam Pump Company, Westinghouse Machine Company. The principal development in this field has been during the past five years, the aggregate horse-power of the above installations being 339,280.

*Lighting Gas from Coke Ovens.*

The first installation in France in which coke oven gas has been utilised for town lighting was at Roche-la-Molière, the gas works supplied being those at Firminy. A description was given by M. Chanial at the 40th Congress of the Société Technique du Gaz. The Firminy works also supply the suburb of Chambon-Feugerolles, the two places having a total population of 32,000. The installation at Roche-la-Molière comprises a set of 20 Koppers horizontal ovens, producing from 24,000 to 25,000 cubic metres of gas per 24 hours, or 557 cubic metres per ton of coal carbonised. During the initial coking period the gas is drawn off into a receiver, the quantity suitable for illuminating purposes thus diverted being 4,000 cubic metres per day. The remainder of the gas after purification is used for heating the ovens and in heating boilers at the station. The by-products include about 1,000 lbs. of sulphate of ammonia per day. The gas is compressed for purposes of distribution by means of Roots blowers. M. Chanial

gives a description also of a new type of flexible joint, constructed of rubber, and invented by M. Berthet, of Firminy, which is used in connection with the mains, 7 kilogs. in length, joining up the coking plant with the gas works. This joint permits of extension or contraction in a longitudinal sense as well as in a transverse direction, without affecting the tightness. The calorific power of the gas varies from 4,700 to 4,900 calories.

## THE LONDON COAL TRADE.

THURSDAY, AUGUST 28.

The London coal trade during the past week has been very quiet, and the attendances on the market have been very thin indeed. Sellers have been far more in evidence than buyers, but the colliery prices remain very steady, although new business has come to hand in very small quantities. Almost all the merchants seem to find the purchases they have made sufficient for their current requirements, and when they do require some extra quantity, the prices quoted second-hand are usually lower than the colliery prices, and in consequence the order is placed in other hands rather than with the colliery. Collieries, generally speaking, however, have a considerable difficulty in meeting all their obligations under contract, and with a good number of orders on their books they can at present view this state of affairs with equanimity. The hot weather now being experienced has caused a falling off of orders at the depots for the moment, but a good tonnage is understood to have been sold for delivery next month, and a busy time is confidently anticipated on the turn of the month. Retail prices, it is hoped, will see an advance early next week, and this usually has the effect of stimulating the public to place their orders for filling up, where they have not already done so. Best house coals show some stiffening in prices owing to an increased demand, but Silkstones are going off rather slowly, and in some cases, show a temporary ease in price. All the better qualities of brights are in very good demand, and higher prices are obtainable for prompt deliveries. House nuts are still slow, but prices are beginning to show some tendency to improve. Hard cobbles and bakers' nuts are quietly in request and prices steady, but cheap brights and cobbles find a very poor demand, and prices show no improvement. The best qualities of hards and steams are in good request still, with prices firm, but the cheaper steams are finding a somewhat lessened demand, although no alteration has been noticeable as yet in price. Small nuts and slacks are still very slow, but orders are a bit more plentiful, although no improvement can as yet be made in prices. Coke of all descriptions is heavy, and prices are somewhat weaker. It is reported that some of the Warwickshire collieries have decided to reduce their contract prices for nuts and cobbles, and several of the buyers who have resented the advance of 1s. per ton have now come in on the revised scale. Apart from this, the position for forward business remains very firm, and collieries show no tendency to go back on their position. On the other hand, the buyers who have decided not to contract at the advanced rates, show no inclination to alter their decision. The seaborne market is still very quiet, with practically no cargoes on offer, but a slightly better enquiry is noticeable, and some small parcels of Yorkshire coals are reported as being sold at somewhat better prices than have been ruling recently. Official prices, however, remain the same, at 21s. 6d. for best and 20s. 6d. for seconds.

## Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/6	13/6
Do. nuts .....	12/6	12/6
Birley cube Silkstone.....	12/	12/
Do. branch coal .....	15/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone.....	12/6	12/6
West Riding Silkstone .....	12/	12/
Kiveton Park Hazel .....	13/	13/
Do. cobbles.....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	11/	11/
New Sharlston Wallsend .....	14/	14/
Wharfedale Silkstone coal.....	14/	14/
Do. Flockton Main .....	13/6	13/6
Do. Athersley house coal.....	11/6	11/6
Newton Chambers best Silkstone.....	15/	15/
Do. Grange best Silkstone .....	14/	14/
Do. Hesley Silkstone .....	13/	13/
Do. Rockingham selected .....	13/6	13/6
Do. Rockingham Silkstone .....	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best.....	11/	11/
Do. large nuts .....	10/9	10/9
Do. small nuts.....	10/	10/
Do. kitchen coal .....	9/6	9/6
West Hallam Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Do. London brights .....	10/	10/
Do. bright nuts .....	9/6	9/6
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Shipley do. brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Mapperley brights .....	11/	11/
Do. hard steam .....	10/9	10/9
Cossall Kilburn brights.....	11/	11/
Do. do. nuts .....	10/9	10/9
Trowell Moor brights.....	11/	11/
Do. do. nuts .....	10/9	10/9
Grassmoor Main coal .....	12/6	12/6
Do. Tupton .....	11/	11/
Do. do. nuts.....	12/	12/

	Current prices.	Last week's prices.
<b>Derbyshire—(cont).</b>		
Clay Cross Main coal .....	12/6	12/6
Do. do. cubes .....	12/	12/
Do. special Derbys .....	11/9	11/9
Do. house coal .....	11/	11/
Pilsley best blackshale .....	12/6	12/6
Do. deep house coal .....	10/6	10/6
Do. hard screened cobbles .....	10/	10/
Hardwick best Silkstone .....	12/6	12/6
Do. Cavendish brights.....	11/6	11/6
Do. cubes .....	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/	12/
Do. small hards.....	11/	11/
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards.....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	12/	12/
Do. cobbles .....	12/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/	14/
Bestwood hard steam coal.....	12/	12/
Do. bright cobbles .....	11/3	11/3
Hucknall Torkard main hards.....	12/3	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts.....	11/	11/
Do. do. High Hazel H.P. ...	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts.....	11/3	11/3
Sherwood H.P. hards .....	12/	12/
Do. hard steam .....	10/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/9	11/9
<b>Warwickshire.</b>		
Griff large steam coal.....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	11/	11/
Do. loco Two Yard hards .....	14/	14/
Do. Ryder nuts.....	11/6	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts.....	11/	11/
Haunchwood steam .....	10/9	10/9
Do. screened cobbles.....	11/	11/
Do. nuts .....	11/	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts.....	11/	11/
Exhall Ell coal spires.....	12/6	12/6
Do. large steam coal.....	10/9	10/9
<b>Leicestershire.</b>		
Snibston steam.....	10/6	10/6
Do. cobbles .....	10/3	10/3
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/6	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts.....	10/6	10/6
Netherseal hards .....	17/	17/
Do. Eureka .....	12/6	12/6
Do. kitchen.....	10/6	10/6
Ibstock kibbles .....	10/	10/
Do. large nuts .....	10/	10/
Do. bakers' nuts .....	9/6	9/6
Do. Main nuts .....	10/	10/
Do. hards .....	9/6	9/6
Granville New Pit cobbles.....	11/6	11/6
Do. Old Pit cobbles .....	10/6	10/6
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/6	13/6
Sneyd best, selected .....	14/6	14/6
Do. deeps.....	14/	14/
Silverdale best.....	15/	15/
Do. cobbles .....	14/	14/
Apedale best .....	13/6	13/6
Do. seconds.....	13/	13/
Podmore Hall best .....	13/6	13/6
Do. seconds.....	13/	13/
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London		
Do. brights.....	13/	13/
Do. shallow one way.....	12/	12/
Do. deep nuts.....	11/6	11/6
Cannock steam.....	11/	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/	12/
Do. one way .....	12/	12/
Do. shallow coal .....	12/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles ...	12/	12/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles.....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards.....	11/	11/

## From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, August 22.—There was a good enquiry for Yorkshire and seaborne house coal to-day, and the market was steady at last prices. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 21.

Monday, August 25.—The seaborne house coal market was fair to-day with a better demand owing to short supplies. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 31.

Wednesday, August 27.—For the small supplies of Yorkshire at market there was a fair enquiry, and better prices were obtained. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 8.



BRITISH RAILWAYS IN 1912.

The annual returns in respect of the capital, traffic, receipts and working expenditure of the railway companies of the United Kingdom for the year 1912 have been issued as a Blue Book [Cd. 6954].

The total amount of authorised capital at the end of 1912—£1,410½ millions—exceeded the total at the end of 1911 by approximately £9½ millions. The total amount of railway capital returned as paid-up at the close of 1912 was thus £1,335 millions, an increase of about £11 millions as compared with £5½ millions in 1911 and £4 millions in 1910. The average rate of dividend on the ordinary capital was 3·45 per cent. in 1912, as compared with 3·62 per cent. in 1911. The average rate of dividend on the preferential capital fell from 3·56 per cent. in 1911 to 3·52 per cent. in 1912, and the rates on other classes of capital remained substantially unchanged. The gross receipts from traffic, £118,310,000, represent a sum of £5,047 per mile of line open at the end of the year for traffic, as against £5,007 per mile in 1911. In spite of a decline in the tonnage of merchandise minerals and in the number of passengers conveyed, gross traffic receipts for the year 1912 are the highest recorded, and show, on comparison with those for 1911, an increase of about £300,000 from passenger traffic and £1,000 from goods traffic. Of the total, £54·26 millions were received from passenger traffic and £64·05 millions from goods traffic.

In spite of the coal strike, the receipts in 1912 from "general merchandise" were the highest recorded, and increased receipts from this branch of the traffic more than compensated for the decline in receipts from minerals. Even the latter were greater than in any previous year except 1907 and 1911, and fell short of record figures for 1911 by less than 2 per cent. "Minerals" alone, the receipts amounted to £75,000, a decrease of £571,000, or 1·9 per cent., but the tonnage carried amounted to 401·6 million tons, a decrease of 8·2 million tons, or 2 per cent. The increase in the production of coal in 1912 was considerably greater than that in the mineral traffic of the previous years. Probably the stocks of raised coal at collieries in other places were smaller at the end than at the beginning of the year. The aggregate quantity of coal carried as cargo, and also for their own use, by steamers in the coastwise and in the foreign trade) decreased 9 per cent.

The number of miles travelled by passenger trains, in normal circumstances tends to increase annually, was less than in any year since 1906; and the number travelled by goods trains, which fluctuated between 153·8 millions and 169·7 millions during the years immediately preceding, fell in 1912 to 151·9 millions; the decreases being, of course, due chiefly to the coal strike. The receipts per train mile from goods were 101·14d., as against 50·26d. for passenger, the corresponding figures in 1911 being 96·97d. and 47·85d. The average receipts per train mile from traffic have been steadily rising for some years whilst those from passenger traffic have in most years tended generally to decline. The large increases under both heads in 1912 are no doubt attributable in great part to the economies in working in the coal strike rendered necessary.

The working expenses rose from £78·62 millions in 1911 to £81·22 millions in 1912, an increase of £2·60 millions, or 3·3 per cent. The gross receipts were higher per cent., but the net receipts declined by 2·6 per cent. The proportion per cent. of working expenses to receipts was 63·2 in 1912 and 61·8 in 1911. Various heads of expenditure were as follow (in millions):—Maintenance of way, works, and stations, £10·05; locomotive power, £21·84 (+ £0·78); and renewal of carriages and wagons, £7·16 (+ £0·18); traffic expenses, £23·46 (+ £0·95). The expenditure on "locomotive power" increased by £100,000, as compared with an increase of £400,000 in 1911, and that on "repair and renewal of carriages and wagons" by £180,000. As to the amounts of "rates and taxes" paid by the railway companies, there was a small increase in 1912, and the total amount (£5,129,000) was the highest recorded. The following figures show the expenditure of coal and coke, and of materials used in the working of engines, for the 15 principal companies:—

Year.	Expenditure on coal and coke.	Expenditure on materials in locomotive repairing department.
1903	£4,959,000	£2,211,000
1904	4,874,000	2,151,000
1905	4,810,000	2,189,000
1906	5,048,000	2,329,000
1907	6,175,000	2,593,000
1908	6,539,000	2,567,000
1909	5,541,000	2,474,000
1910	5,613,000	2,514,000
1911	5,661,000	2,553,000
1912	6,201,000	2,533,000

It will be seen that the amount expended on coal and coke by these companies rose from £5,661,000 in 1911 to £6,201,000 in 1912, and that there was a slight decrease in their expenditure on materials for the repair of locomotives.

The following statement affords some indication of the course of prices of coal and materials in recent years. The figures quoted in the case of coal relate to all descriptions of coal, and not to those kinds only which are used for railway locomotive purposes:—

Year.	Approximate price of coal at the mines, according to the "Mineral Statistics."		Average export prices computed from the quantities and declared values of the exports.	
	Per ton.		Of coal.	Of iron and steel rails.
	s. d.	Per ton.	s. d.	Per ton.
1903	7 8	11·8*	5·32	
1904	7 2½	11·02*	4·84	
1905	6 11½	10·47*	5·00	
1906	7 3½	10·82*	5·63	
1907	9 0	12·63	6·54	
1908	8 11	12·65	6·12	
1909	8 0½	11·20	5·79	
1910	8 2½	11·63	5·86	
1911	8 1½	11·31	5·13	
1912	9 0½†	12·57	6·16	

\* The price includes up to October 31, 1906, the export duty of 1s. per ton on coal valued at more than 6s. per ton. † From information specially supplied to the Board of Trade by the Home Office.

The statement shows a large increase in the average price of coal, and a small increase in the average price of iron and steel rails, in 1912 as compared with the average prices in the previous year.

It may be of interest to compare the number of train miles run with the quantity of fuel consumed for locomotive purposes, and also with the cost of fuel to the companies. The following table shows the annual percentage increases or decreases which have occurred in these figures year by year since 1902 so far as the particulars are available:—

Year.	Increase (+) or decrease (−) in each year as compared with the previous year.		
	In total train-mileage (all railway companies).	In quantity of fuel consumed for locomotive purposes (by all railway companies).	In cost of fuel to 15 principal railway companies).
	Per cent.	Per cent.	Per cent.
1902	+0·2	+2·8	−15·8
1903	−1·5	+0·6	−1·6
1904	+0·8	+0·4	−2·5
1905	+1·0	+1·3	−1·3
1906	+3·3	+4·3	+4·9
1907	+3·4	+6·9	+22·3
1908	−1·2	−3·3	+5·9
1909	−0·9	−1·8	−15·1
1910	+1·0	+1·6	+1·2
1911	+1·3	+2·8	+0·9
1912	−3·8	*	+9·5

\* Not yet available.

During the years 1902-1911 the quantity of coal consumed for locomotive purposes increased by 16·3 per cent. and the total train mileage by 7·5 per cent., passenger train mileage having increased by 20·6 per cent., while goods train mileage decreased by 9·6 per cent. The increase in coal consumption per train mile was no doubt attributable to an increase on the whole in the speed of passenger trains and to heavier loading of goods trains. In 1912 the total train mileage decreased by 3·8 per cent. The quantity of coal consumed for locomotive purposes by the companies collectively has not yet been ascertained.

As regards the amounts paid as wages in the locomotive and traffic departments, the following figures, which relate to the 15 principal railway companies of the United Kingdom, are given:—Working of engines, £5,801,000; repairing and renewing engines, £2,508,000; in traffic department, £16,004,000. On the assumption that the expenses of the smaller companies on account of wages showed the same tendency to increase as those of the larger, the following increases are shown:—Locomotive department, 1·8 per cent.; traffic department, 4·9 per cent.; two departments taken together, 3·8 per cent. The total length of the running track of the railways of the United Kingdom at the end of 1912 was 40,034 miles, and the total length of sidings was 14,875 miles. At the end of 1911 the length of running track was 39,916 miles, and that of sidings was 14,660 miles. At the end of 1912 the length of line (in equivalent of single track) worked solely by electricity was 210¾ miles, and 281 miles were being worked partly by electricity. The corresponding lengths of line at the end of 1911 were 206¾ and 258 miles respectively. The increase in the length worked partly by electricity is again due chiefly to the extension of electrical working on the London, Brighton and South Coast Railway. The total quantity of electrical energy used in 1912 was 252,925,833 Board of Trade units as compared with 250,296,470 in 1911. These figures do not represent the entire quantity of electrical energy generated, the quantity lost in conversion being excluded.

In 1912 the working of the railways of the United

Kingdom was carried on under considerable difficulties. Strikes, especially the coal strike, caused great loss of traffic and increased expenditure. Great numbers of passengers, on the shorter journeys, availed themselves of a new means of locomotion in active competition with the railways, and a wet summer adversely affected the holiday traffic. But the general trade of the country remained prosperous throughout the year, and the proportion borne by the net earnings of the companies to their total paid-up capital, although smaller than in 1910 and 1911, was greater than in any other year since 1899.

The Railway Companies (Accounts and Returns) Act, 1911, came into force at the commencement of the current year, and the changes introduced by that Act in the form of the accounts and statistics furnished by the companies will necessitate considerable changes in the form of the annual returns.

The following table shows the quantity of minerals carried by the principal companies in 1911 and the receipts therefrom, as well as the length of track and sidings open on December 31, 1912:—

Company.	Tons.	Gross receipts. £	Miles of track and sidings.*
<i>England and Wales—</i>			
Alexandra (Newport and South Wales) Docks and Railway	5,783,628...	62,037...	106
Barry	10,047,669...	272,506...	290
Brecon and Merthyr	3,101,023...	63,943...	107
Burry Port and Gwendraeth Valley	582,156...	15,774...	32
Cambrian	545,293...	58,875...	381
Cannock Chase and Wolverhampton	510,535...	5,385...	7
Cardiff	1,870,708...	30,653...	129
Cheshire Lines	4,662,459...	122,180...	421
Cleator and Workington	1,292,356...	45,478...	59
Dearne Valley	1,697,544...	36,583...	42
E. & W. Yorkshire Union	623,441...	14,420...	19
Furness	3,298,895...	224,028...	369
Great Central	28,812,918...	2,039,593...	2,333
Great Central and North Staffs Joint	296,544...	9,471...	26
Great Eastern	7,312,608...	979,470...	2,550
Great Northern	16,702,654...	1,601,357...	2,677
Great Western	44,302,418...	3,578,033...	6,708
Hull and Barnsley	3,959,494...	343,758...	296
Lancashire and Yorkshire	18,468,593...	1,330,396...	2,201
Llanelli and Mynydd Mawr	292,581...	11,571...	14
London and N.-Western	43,141,667...	3,620,364...	5,535
London and S.-Western	4,026,000...	460,544...	2,223
London, Brighton and South Coast	2,906,808...	364,614...	1,246
Manchester Ship Canal and Railway†	1,724,236...	32,591...	157
Manchester, S. Junction and Altrincham	2,022,758...	16,387...	36
Maryport and Carlisle	747,161...	48,068...	100
Methley Joint	518,733...	6,533...	14
Midland	40,978,344...	4,791,433...	4,860
London and Tilbury Section	675,815...	37,364...	225
Midland and Great Northern Joint	691,128...	49,102...	337
Neath and Brecon	1,346,912...	54,659...	54
North-Eastern	47,713,503...	3,323,694...	4,869
North London	1,578,513...	64,791...	69
North Staffordshire	5,620,943...	364,267...	504
Oldham, Ashton-under-Lyne, and Guide Bridge	966,189...	6,155...	18
Rhymney	9,432,375...	243,662...	162
Somerset and Dorset	651,553...	57,679...	177
South-Eastern & Chatham	4,121,250...	399,982...	1,587
South Yorkshire Joint	832,823...	21,890...	35
Stocksbridge	278,462...	6,707...	5
Taff Vale	17,986,785...	567,692...	387
Wirral	439,976...	8,493...	40
Metropolitan	2,171,195...	47,381...	132
Metropolitan District	248,238...	3,600...	66
Total England and Wales (all lines)	346,858,755...	25,541,995...	42,506
<i>Scotland—</i>			
Caledonian	20,590,593...	1,247,574...	2,722
Glasgow and S.-Western	6,916,206...	406,976...	1,105
Great North of Scotland	565,680...	68,795...	523
Highland	289,673...	47,365...	636
North British	23,923,852...	1,552,555...	2,663
Total Scotland (all lines)	52,437,567...	3,330,178...	7,794
<i>Ireland—</i>			
Great Northern of Ireland	571,052...	82,334...	828
Great Southern and Western of Ireland	647,953...	103,175...	1,544
Midland (Irish Sections)	398,848...	47,189...	367
Total Ireland (all lines)	2,267,616...	303,007...	4,609

\* Equivalent of single line. † In addition to the traffic on the canal, amounting to 3,294,163 tons of minerals, on which dues, tolls and wharfage were paid to the company, a very large traffic, of which no returns are made, passed free along the canal.

At the half-yearly ordinary meeting of the shareholders of the Seaham Harbour Dock Company, Mr. S. J. Ditchfield (who presided), stated that the shipments of coal for the past half-year amounted to 1,035,300 tons. The shipments had not increased as they could have desired, and were, in point of fact, a little short of what they were a year ago. The shortage was not due in any way to the coal-shipping facilities they had at the harbour, but to the fact that the miners were not working as well as they ought to do and might do, for he supposed the higher wages they were now receiving suggested to them they should take things more leisurely and have a longer spell of holidays. Then again the minimum wage which they got also tended to give them more money to spend than they otherwise would have. Furthermore, the weekly pays were, to his mind, a means of inducing men to lie idle more frequently than they used to do.



### MINE MANAGERS' EXAMINATIONS.

The following is a list, communicated by the Home Office, of the successful candidates at the examination held by the Board for Mining Examinations on May 27, 28 and 29, 1913, at Edinburgh, Newcastle, Sheffield, Wigan, Cardiff and Birmingham, to whom certificates of competency as managers and under-managers of mines, and certificates of qualification as surveyors of mines have been granted under the Coal Mines Act, 1911:—

**First-class (managers):**—Thomas Walter Adam, Thomas Bernard Adkins, Clement John Archer, Norman Elsdale Barber, Thomas Bauld, Arthur John Allan Britton, Samuel Bunting, Robert Claytor, Edgar Walton Dakers, Richard William Erasmus, Andrew Farquhar, Peter Gaskell, Kenneth Malcolm Guthrie, Frank Hancock, Alfred Bessell Hare, James Reginald Hewitt, George Batty Hollings, George Trevor Hollingworth, Joseph Percy Hunter, George James Brooke Le Mesurier, Willie Lewison, Valentine Place Leyson, Morton Howell Llewellyn, Jenan Lloyd-Jones, Sydney Alfred Adam Matthews, Peter Milligan, jun., Hubert Scholes, Joseph Austin Simpson, Thomas Wallwork.

**Second-class (under-managers):**—Samuel Barker, Carlo Edovardo Mansueto Bergna, Henry Black, Arthur James Blyton, Robert John Boulter, Ernest Boyd, James Bradshaw, James Fleming Burns, John William Case, John Catterall, William Chalmers, Albert Thomas Chaplin, William Chapman, William Charlton Clark, Alexander Colquhoun, Robert Colquhoun, Walter Cooper, William Corbett, Francis William Eden Cottam, James Cramer, Evan Llewellyn Davies, Harry Fawcett, William Fenn, William Ferguson, James Fisher, jun., Ivor Lewis Foster, James Reynold Foster, John Fraser, David Fryer, Anthony Grey, John Charles Hacking, Ernest Llewellyn Hampshire, William Charles Harris, John Harvey, William Henderson, Arthur Hinchliffe, Thomas Hollinsworth, John Hopkins, Amos Horner, Robert Hunter, John Nairn Hart Hutchison, Charles Hynd, Robert Imrie, jun., Samuel Johnson, Samuel Johnston, William Kell, James Lee, Albert Edward Littlewood, Willie Lumb, Dugald McFarlane, Thomas Marriott, Tom Maughan, Robert Cowan Mercer, George Milbourn, David Millar, John Monaghan, Thomas Morgan, William Morgan, Thomas Morris, George Thomas Oglanby, George Osman, William Campbell Parker, Thomas William Parkin, Arthur Powell, David Price, William John Rawle, John Rees, Vernon Richards, Herbert Charles Richardson, James Riley, Charles Edward Robinson, Thomas Robinson, William Lewis Robinson, Robert Rogerson, John Rowbotham, Archibald Russell, Graham Russell, Richard Rylance, Edward Sample, Wilkinson Serginson, George Edward Spooner, Stanley Edgar Spruce, John Stanworth, David McCandlish Steedman, James Hill Stephenson, Matthew Stephenson, Robert Stewart, William Stott, George Stoves, John Strang, Joseph Birch Taylor, Richard Tickle, Harry Tipton, Emrys Thomas, John Thomas, Samuel Thomson, John George Wailes, William Wallace, Daniel Washington, Roderick Wearmouth, David Evan Williams, Joseph Winson, Hans Karl Wolf, William Henry Wright, Alexander Young, William Young.

**Surveyors:**—Henry Ball, John Brownlie, Robert Nair Chalmers, Cecil Clarke, Edgar Walton Dakers, James Forsyth Gibson, Alexander Johnston, Nehemiah Jones, James Lohoar, Frank Mawson, Frederic Percy Newell, Frank Oxley, Alexander Thomson.

### MINING AND OTHER NOTES.

In connection with the difficulties of Messrs. James Watson and Co., iron merchants and brokers, Glasgow, Middlesbrough, and elsewhere, which brought about a crisis in the iron trade, a circular has been issued by Messrs. W. B. Peat and Co., chartered accountants, London, in which it is stated that with the approval of the committee of creditors a trust deed has now been granted by the firm in favour of Sir William B. Peat. One of the largest creditors has agreed to withdraw £50,000 of his claim, and hand over securities of an estimated value of about £10,000, provided the liquidation is carried through by private arrangement, and that the partners of the firm are discharged within a reasonable time.

Presiding at the meeting of the Commercial Gas Company, Mr. W. G. Bradshaw said the outstanding feature was the large increase in the cost of coal and oil. They were now paying for their coal 54 per cent. more than they did two years ago. When their contracts were made in the spring of 1912 the cost per ton f.o.b. on the Tyne was 2s. 7½d. per ton higher than in the previous year, and their coal contracts this year were made at a further advance of 2s. 1½d., being an increase in those two years of 4s. 9d. per ton. On the quantity used by the company that represented an additional cost of £47,500. If it had not been for the fact that residuals had come to their rescue they would not have been able to make both ends meet. In the past 25 years the price of coal had almost doubled.

We are informed that Mr. Percy Ormand, chief instructor to the South Midland coalowners in mine rescue work, and lecturer at the Birmingham University, has been appointed director and representative to Messrs. Nobel's, explosives manufacturers, Glasgow. He commences his new duties on September 1.

The engineers of the Edinburgh Collieries Company have finished their survey and levelling of the old horse wagon railroad from Tranent to Cockenzie Harbour, which, it is believed, is again to be used for the shipment of coal.

At Pontefract last week a pony driver was summonsd for taking two matches and a cigarette down the Haigh Moor seam of the Prince of Wales Colliery, at Pontefract, on August 11. Mr. Will Bentley, for the prosecution, said the management had placed a man at the pit-head to shout "Search your pockets" as each man received his lamp, and they were also seriously considering the advisability of asking the Bench to commit future offenders to prison without the option of a fine. Defendant was fined 20s. and costs.

It is stated that 50 tons of coal from the Snowdown colliery, near Dover, was taken by the Norwegian steamer "Herdis," for her bunkers, in Dover docks last week. This was the first occasion on which Kent coal has been supplied for steamships' bunkers.

At the Haddington Sheriff Court recently, before Mr. Sheriff Macleod and a jury, a fatal accident enquiry was held respecting fatal accidents to John Gardner, engineer, and John Daniel Aitken, labourer, who both were killed in Bankpark Colliery, Tranent, by the cago rope breaking and allowing the cage to fall down the shaft into the sunp. Evidence showed that the wire rope, which was of 24 strands, had one strand broken two days before the accident, but no weakness in the rope had been anticipated therefrom. The break of the rope showed that it had apparently rotted, by rust or otherwise, from the inside.

Active operations are in progress in connection with the mining industry in the coal area in the West Benhar district. The Summerlee Company and United Collieries Company have purchased large interests. The area worked for ironstone by Messrs. Addie and Sons, and later by the Benhar Coal Company, has been taken over by the Summerlee Company. There are in all four pits, covering an extensive field. Near West Craigs boring operations are in progress on behalf of the United Collieries Company. It is considered most probable that the seam of coal which is being worked at Chryston and Bedlay will be found in the Auchengeich Valley. The Government, it is stated, have advanced to the United Collieries Company over £40,000 for improving and erecting houses for their workers.

For several years past objections have been raised periodically in the United States to the ownership of coal-mines by the railroads. An enquiry by Congress, conducted through the departments of the Government, into the anthracite coal business is being urged by a resolution which has been introduced in the House of Representatives by Representative Murray, of Massachusetts. Mr. Murray asserts "that there is now on hand in the executive departments enough data to show that 90 per cent. of the available anthracite coal and between 85 and 90 per cent. of the anthracite shipped each year is in control of the seven railroad systems which form the only means of transporting the coal to the market.

The Admiralty's revised specification (1912) for the supply of oil fuel for the Navy has been issued. A comparison of these specifications with those of 1910 shows that certain modifications were made in regard to flash-point, sulphur, acidity and viscosity in 1912. The oil fuel supplied must consist of liquid hydrocarbons, and may be either (a) shale oil; or (b) petroleum as may be required; or (c) a distillate or a residual product of petroleum. The flash-point shall not be lower than 175 degs. Fahr. close test (Abel or Pensky-Martens). In the case of oils of exceptionally low viscosity, such as distillates from shale, the flash-point must be not less than 200 degs. Fahr.). The proportion of sulphur contained in the oil shall not exceed 3·00 per cent. In no case must the quantity of acid exceed 0·05 per cent. The quantity of water delivered with the oil shall not exceed 0·5 per cent. The viscosity of the oil supplied shall not exceed 2,000 seconds for an outflow of 50 cubic centimetres at a temperature of 32 degs. Fahr. The oil supplied shall be free from earthy, carbonaceous or fibrous matter, or other impurities which are likely to choke the burners. The ratio which the oil supplied bears to the original crude oil should be stated as a percentage.

The Middlesbrough Corporation have made an arrangement with Messrs. B. Samuelson and Co. Limited, of Middlesbrough, by which that firm have undertaken to supply the gas required for consumption in Middlesbrough of a quality suitable for all the purposes for which town gas is usually employed. To meet the demand for gas Messrs. Samuelson have placed an order for a battery of 46 regenerative coke ovens with complete by-product recovery plant working on the Otto "direct recovery" system. They have already in operation 200 Otto waste heat ovens. The gas consumption of Middlesbrough is about 600,000,000 cu. ft. per annum, and the plant will have to carbonise about 110,000 tons of coal yearly.

The President of the Board of Education has appointed a Departmental Committee to enquire and report, after consultation with the bodies and persons concerned, as to the steps by which effect shall be given to the scheme of the report of the Royal Commission on University Education in London, and to recommend the specific arrangements and provisions which may be immediately adopted for that purpose and as the basis of the necessary legislation.

It is stated that, during the ensuing autumn, Mr. James Fairley, of Shafto House, Craghead, chief agent for the South Moor Coal Company Limited, and Messrs. Hedderley Bros., owners of Craghead and Holmside Collieries, will retire. Mr. Fairley was born at Belmont, Durham, 74 years ago, and served his apprenticeship as joiner and engineer with Messrs. J. Bowes and Partners. Subsequently he undertook the management of Sheriff Hill Colliery, and left there for Craghead 42 years ago. Under Mr. Fairley's regime, the number of pits at Craghead and South Moor have been increased from four to ten.

A circular has been issued by the Pekin Syndicate giving information regarding the company's operations before an annual meeting. It states that the recent decrease in output, recorded in the monthly statements, was caused by the flooding of two of the most productive pits, Nos. 2 and 3. Steps have been taken to increase the output of No. 6 to 600 tons per day, whilst a scheme was approved in April last by the directors whereby coal can be worked in the native way, cheaply and without new plant, by small pits which it is hoped will yield up to 1,000 tons per day in due course. Several of these pits are already being sunk. Further, in May last the directors approved of another proposal for putting down a pair of modern shafts in No. 24 borehole, where good coal is proved to exist at a depth of 300 ft. This plant will be electrically worked from the present power plant, and is estimated to produce 1,000 tons per day. The first shaft on July 2 was already 120 ft. deep, and coal was expected to be reached about the middle of August. The directors announce that the Agent General, Mr. J. R. Brazier, is compelled to sever his connection with the company and return to Europe for family reasons. The appointment has been given to Mr. J. P. Kenrick, who has occupied the position of engineer-in-chief at the collieries for six years.

Messrs. Siebe, Gorman and Co. Limited, of 187, Westminster Bridge-road, London, S.E., inform us that after examination of all types on the market, the North Wales Coalowners' Association has decided to adopt the "Proto" (Fleuss-Davis patent) rescue apparatus for their rescue station at Wrexham and the various collieries affiliated thereto. The "Proto" apparatus has now been exclusively adopted by the Coalowners' Associations of Lancashire, Cheshire, North and South Staffordshire, Leicestershire, Warwickshire, Derbyshire, and North Wales. In addition over 100 collieries in this country alone have adopted it. It is also exclusively used in all the Canadian Government rescue stations, and by the United States Government whose latest rescue car is equipped with it. Amongst other important users are the Governments of Cape Colony, Transvaal, Queensland and Japan.

At Dipton, Mr. James E. Riddle, secretary of the Northern Colliery Under-managers' and Colliery Officers' Mutual Aid Association, and late under-manager of the Lintz Colliery, has been presented with a purse of gold and a handsome walking stick, subscribed for by the officials and workmen of the Lintz Colliery and other friends, upon his leaving Lintz to take up the duties of agent and manager of the West Denton Colliery Company.

Mr. Samuel Joshua Cooper, of Mount Vernon, near Barnsley, formerly a large colliery owner and landowner, has died on July 11, aged 82, leaving an estate valued at £751,446 gross, of which the net personal estate has been sworn at £706,627.

A serious burning accident took place at the Pannier Dunnikier Collieries, Kirkcaldy, on Monday, as the result of which William Jack (26), night underground manager, and John Stewart (39), miner, both lie in Kirkcaldy Hospital suffering from severe injuries. The accident occurred in the parrot coal section of the pit, where, it is understood, Jack, accompanied by Stewart, had gone to investigate the consequence of complaints made regarding firedamp in that part of the mine. The two men were in the vicinity of the firedamp, when, through some cause, this had become ignited.

About two o'clock on Tuesday afternoon an inrush of water occurred in the Northern District (Woolston), North Walbottle Colliery. The workers in the district escaped without injury. It is anticipated that work will be resumed by the end of the week.

An instance of successful resuscitation comes from Scotland. Last week at No. 1 Pit, at Auchenreoch, Kirkcaldy, a gas feeder burst in a section of the mine where 40 men were engaged, and one, Patrick M'Intyre, was overcome. When recovered some three hours afterwards he was unconscious, but a dose of oxygen was administered, and artificial respiration applied, and eventually he was brought round.

The Snowdown Colliery Company Limited, Ninington, near Dover, has recently installed one of the latest pattern self-indicating colliery weighing machines manufactured by W. and T. Avery Limited, Birmingham, designed to facilitate the rapid weighing of trains of loaded trucks. The trucks are all balanced to the same tare weight, and the actual net weight is indicated automatically by the machine itself by the simple action of the loaded truck passing over the weighing portion of the rails. The rails are 24 in. gauge and the weighing quadrant allows for a margin of weight from 9 to 16 cwt. by divisions of 1 lb. The range of weighing and tare of trucks can, of course,



anged to suit requirements. The Denby Iron and Coal Company Limited has recently had installed one of the most modern types of Farman-Barrow machines made by the same firm for the quick weighing of trucks and printing net weight upon a continuous tape. The machine has a capacity of 60 cwt. and is graduated by 7 lb. divisions. The weight of the trucks is tared and may vary up to 10 cwt. by 7 lb. divisions. When the net weight of the contents of the truck is read off the steelyard, the weight is printed upon a continuous tape which can be cut off at the end of a day's weighing and pasted in a book as a permanent record.

Two more furnaces are going into blast in Cumberland. One has already been lighted at Distington and an additional one will be put into draught at Cleator Moor, in the course of a few days, the number blowing thus being increased from 15 to 17. This increase in the output is due chiefly to an anticipation that a renewal of activity in the Cumberland hæmatite iron market will take place next month, users of the special brands for which Cumberland furnaces are famous having but small stocks of metal on hand. The new bench of retorts at the Addiewell oil works is almost completed and will be in full operation in a short time. As the retorts will require about 300 extra tons of fuel daily, the shale miners in the district anticipate saving less broken time in future.

The Bebside Coal Company has just erected a new headframe over the old Yard Seam shaft. The new gear was supplied by Messrs. Head, Wrightson and Co., Stockton-on-Tees, to the particulars supplied by Mr. George Dunn, the competent engineer, and were successfully put into position. The old ones removed without in the least degree interfering with the coal traffic in the shaft. This is the first occasion on which Mr. Dunn has accomplished this difficult task, the others being at the adjoining shaft at Bebside and at High Pit, Choppington.

## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

The latest, "A Fortnight's Holiday on Full Pay"—Federation Ballot on Political Action—Notices to Terminate Minimum Wage Act Award—Workmen seek Amendment of Compensation Act—Coal-trimmers' Determination to Stop Work on Saturday Afternoons—Notable Protest by Shipowners—The Demand for 15 per cent. Increase to Surface-men—Llanelli's Charter and the Coal Trade—Sunday Work in the Collieries—Fuel Workers and the Plich Disease—Railwaymen also Call for Saturday Afternoon Holiday—New Hospital for Seamen.

The action of the coaltrimmers as to a Saturday holiday is only one indication of general unrest; rather—and its novelty is striking—is a suggestion that there should be a holiday granted to the miners at full wages while they are absent; and it is stated that the Western Valleys district of Monmouthshire will place before the Federation a proposal that the periodical holidays of a few days each now taken during the year shall be merged into "one good summer day at full wages." From another quarter the idea of a fortnight is mooted. The argument is based upon a statement that whilst the manager, firemen, clerks, and others, get holidays on full wages, "the men do the hardest work and run the greatest risk do at present enjoy that privilege."

The ballot under the Trade Unions Act with reference to political action takes place throughout the field on September 9, 10 and 11, and afterwards the miners will be sent out of the district to representatives of the Miners' Federation of Great Britain.

The difficulty created in Labour Party circles by the Chesterfield election has nowhere been more keenly felt than in South Wales, the importance of the result being intensified at the moment by the fact that the ballot of the men as to contributions for political action is about to take place. The question arises definitely in South Wales, where Mr. Brace, president of the Federation, is retiring from the Glamorgan seat, which he has held as a Liberal; where, also, Mr. Hartshorn contested a seat as an independent candidate against Mr. Hugh Edwards, now Liberal M.P. Other constituencies were contested by Labour men against Liberals. The recourse to political action is becoming more and more characteristic of the trade union procedure; and has a probability of being manifested in the endeavour to bring the miners under the operation of the Eight Hours Act and also under the Minimum Wage Act.

Both sides of the Conciliation Board have given notice under the Minimum Wage Act to terminate the award, and to vary the rules and scheduled rates. Mr. St. Aldwyn's award does not appear to be satisfactory to either side, and the rules which have been made under it are also the subject of keen dispute. The employers, for example, desire that in respect to the wage rate of a collier, the rule shall impose a fortnight's period for averaging, while the workmen wish to abolish certain restrictions of the existing clause. The employers desire that the wages of hauliers and boys should not be fixed at so high a figure, and also to abolish the award to colliers for paying their helpers 6d. per day in excess of the fixed rate. As to the rule providing for

payment of six turns for five in afternoon and night shifts, the workmen wish to have a change, which will provide that "each six turns shall be at an amount not less than the minimum rate for the time being" applicable to the grade. The workmen wish to increase the minimum for several grades by as much as from 1d. to 4d. per day in different grades.

After discussion by representatives of the two sides of the district board, in all probability Viscount St. Aldwyn will again be called in to decide the points that have been raised, and to fix the wage rates and rules for the ensuing 12 months.

At a meeting of the Monmouthshire Western Valleys Miners' Council it was decided to suggest amendments to the Compensation Act. The council desire that verbal notice of accident given to the employer or his officials shall be deemed a legal notice; that compensation be paid equal in amount to the loss of wages sustained as the result of injury, payment to commence from the date of disablement; that compensation be paid a workman for permanent injury whether the injury affects his earning capacity or not; that an injured workman be paid the same rate of wages as before the accident; and that the power now vested in county court judges to retain compensation money in court shall be restricted. It is also desired to have the amount of minimum pay raised from 10s. to 15s. per week.

The coaltrimmers of Penarth, with those of Cardiff and Barry, met on Saturday, and reports were submitted by delegates who had attended the Birmingham conference. The meeting resolved unanimously that there should be no departure from the previous resolution that they would cease work at one o'clock on Saturdays, commencing September 6.

The decision of the conference to adhere to the demand for cessation of work on Saturdays is all the more remarkable in view of the fact that on the east coast modifications have been secured. Both on the Tyne and the Humber different arrangements have been made. In the latter, for instance, the men will work on until five, and even till 11, if a vessel can be finished; whilst on the Tyne they will work till four, and later as may be agreed. In South Wales, work on Saturdays has hitherto been till five, but the men worked till eight if they could finish the loading. To make what is practically a seven hours difference in regard to vessels that might be finished for sea is a matter of grave consequence, in view of the heavy demurrage which might be entailed, as well as inconvenience at the collieries on Monday through lack of empties.

It has been estimated that considerably over half-a-million tons of coal are shipped in Cardiff alone on Saturday afternoon; and the whole of this will be hung up if the trimmers carry out their decision of stopping work at one o'clock as from September 6. Further negotiation is highly probable, so that some different arrangement may be reached; but there remains the singular fact that one of the shipowners' associations at Cardiff has notified the Trimming Board that its members will not consider themselves bound by any decision which that Board may arrive at concerning the coal-trimmers or similar questions. A similar notification has been sent to the Freighters' Association. The particular organisation which thus rejects the Trimming Board as intermediary is the Bristol Channel Shipowners' Association. Their reason for declining to be bound by any decision arrived at is that they have no voice in those decisions.

One suggestion in regard to the 15 per cent. demand presented on behalf of surfacemen is that whilst it may not be carried to the extreme of a strike (there being not sufficient funds in the Federation coffers to finance the men during idleness), the Parliamentary representatives of the trade unions, &c., will endeavour to attain the same end by inclusion of the surfacemen in the Minimum Wage Act. It is further suggested that they should also be brought under the provisions of the Eight Hours Act.

One significant incident is the granting of a charter to Llanelli, which brings the tin-plate capital into line with the other large municipalities of the country. As instancing the rapid growth of Llanelli, it may be pointed out that since 1909 there has been an increase of 41 per cent. in the number of tin-plate mills—namely, from 60 to 85; and in addition the steelworks and foundries, &c., employ hundreds of men. The harbour is Llanelli's great difficulty; and continuous endeavours are made to improve the access to the port, so as to ensure shipment of coal at Llanelli rather than that the coal should be carried by rail to Swansea, as at present. Practically the whole of the Glanamman district, which is so rapidly progressing, might ship at Llanelli if access of large vessels could be secured to the port; and large sums of money are being spent in order to make this practicable. Already the ratepayers bear a burden of 1s. 6d. in the £ towards the cost of harbour improvement; but as trade increases and the town extends, a larger income is secured, and these burdens, of course, decrease.

At a meeting of the South Wales miners' council, held in Cardiff on Saturday, complaint was made that at certain collieries the Eight Hours Act was being evaded, because men were employed on Sunday afternoons and evenings; and the council gave instructions that the agents in the different localities should make

special enquiry, the intention being to strenuously oppose any increase in Sunday labour.

In the course of an interview one of the workmen's leaders referred to the report of Commissioner Lush upon risks in the patent fuel industry, and declared that it was not the Home Office that had been backward, or the employers; but the men themselves who did not realise the danger they were running, and did not take advantage of facilities for washing, &c., which the Home Office had induced the employers to provide. He considered that the men were subjected to serious danger, and that until the mischievous substance in the pitch could be removed without injuring the pitch for commercial purposes, the proposed regulations could be only a palliative. It has been demonstrated that the proper cleansing of the skin was a preventive of injury to the workmen; but there existed prejudice to this on the part of some of the older workmen; and he hoped that one result of the enquiry would be to enlighten the men as to the necessity for keeping their skins as clean as possible.

The dispute at the Raven Colliery, Garnant, which has been in existence for a month, was a subject of consideration in Swansea on Saturday, at a general meeting of men's representatives and directors of the company. The men had originally demanded the suspension of an official, pending enquiry, for alleged breach of regulations; and on Saturday they claimed that he ought to be dismissed. The directors, however, could not assent to this demand, and the difficulty continued.

The joint sub-committee appointed by the Conciliation Board has again met in Cardiff to deal with special cases in regard to the wages and hours of banksmen. Further evidence was taken as to the conditions of employment of banksmen at several collieries, and the committee further adjourned.

The miners of Blaina, in Monmouthshire, suggest that the present working hours of 6 till 2 shall be changed to 7 to 3 on five days a week—and the management of the collieries is being approached with a request to sanction this change—but that the working hours on Saturday shall remain from 6 till 2.

Mr. W. Jenkins made an offer, on behalf of himself and fellow directors, to build and equip a hospital at Pentwyn, in the Rhondda, if the workmen would maintain it by poundage; and the result of the voting by ballot is just announced, a large majority favouring acceptance of the generous proposal.

## HEMSWORTH COLLIERY.

Visited by Journalists.

On Friday last a party of journalists, who have been taking part in the conference of the Institute of Journalists at York, visited the Hemsworth Colliery of the South Kirkby, Featherstone and Hemsworth Collieries Limited, at the invitation of County Alderman Col. J. Reginald Shaw, J.P., and the directors. A large number availed themselves of the invitation and travelled to Hemsworth by special saloon, being taken in motors to the colliery. Here they were most courteously received by Col. Shaw (mayor of Pontefract and chairman of the company), Mr. A. W. Archer (managing director), Mr. T. Beach (manager of Hemsworth Colliery) and other officials.

A tour of the extensive colliery was at once commenced under skilful guidance. A party of about 30 mustered up sufficient courage to visit the underground workings. There was plenty to see, however, on the bank. Especial interest was taken in the apparatus to prevent overwinding. Shaw's overwinder, which is attached to the engine, is an invention of the late Mr. John Shaw.

The washing of the small coal and its passage to the ovens, of which there were 44 Simplex at work, was shown. The extraction of ammonia and the manufacture of sulphate of ammonia were watched with the greatest eagerness.

Those who inspected the underground workings saw again how the ingenuity of the late Mr. John Shaw came to the aid of the miner, for they witnessed at work his patent expander for breaking down coal. This apparatus consists of a wedge, which is carried detachably, on the end of a long screw spindle and placed between a pair of converging planes. The top and bottom falls of the wedge are furnished with a series of screw balls, which are retained in position by steel screw plates. These balls travel in races on the converging planes, and there is thus a minimum amount of friction. The converging planes terminate in a flat, which is bored for securing to the crosshead, the latter consisting of a screwed nut provided with transversely projecting studs, to which the extensions of the planes are attached by means of bolts. A 3½-in. hole is drilled into the face, and into this hole the expander is inserted and the wedge forced along the converging planes, expanding them to a sufficient extent to bring down the coal. Another invention of the late Mr. John Shaw in use at these collieries is his quick-discharging hoppers wagon, by means of which four men can empty eight wagons per minute, 480 wagons per hour, 5,760 wagons or 57,600 tons in 12 hours, or 11,520 wagons, equalling 115,200 tons in 24 hours, at the small cost of 0.0042d. per ton.

Following the inspection of the works, Col. Shaw and the directors entertained the journalists to luncheon in the Hemsworth Colliery Institute.



# CONTRACTS OPEN FOR COAL AND COKE.

Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

## Abstracts of Contracts Open.

**BARRY, SEPTEMBER 10.**—Best house, steam, and nut coal, for the Urban District Council. Particulars from Mr. J. C. Pardoe, surveyor, Public Offices, Barry.

**BRADFORD, SEPTEMBER 1.**—House coal, for the Corporation. Forms from Mr. Frederick Stevens, town clerk, Town Hall, Bradford.

**BURY ST. EDMUND'S, SEPTEMBER 1.**—Coal and coke to the Shire Hall and police station at Bury St. Edmund's, for the West Suffolk County Council. Tenders to Mr. A. Townshend Cobbold, clerk to the West Suffolk County Council, Shire Hall, Bury St. Edmund's.

**CAIRO (EGYPT), SEPTEMBER 15.**—Coal tenders are invited by the Egyptian State Railways and Telegraphs Department for the supply and delivery of (1) 50,000 metric tons of North Country colliery screened steam coal, and 5,000 metric tons of Scotch colliery screened steam coal; (2) 385,000 or 120,000 metric tons of Welsh colliery screened steam coal; and (3) timber. Copies of the specifications, containing forms of tender, from Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, London, S.W.\*

**CARNARVON.**—Coal, for the Education Committee. Forms from E. R. Davies, secretary of education, County Education Offices, Carnarvon.

**COATBRIDGE, SEPTEMBER 4.**—Coal, nuts, peas and coke, for the Old Monkland School Board. Tenders to Mr. R. Gray, clerk, Municipal-buildings, Coatbridge.

**CROYDON, SEPTEMBER 4.**—Coal and coke for the Croydon Rural and Merton Joint Hospital Board. Forms from Mr. E. J. Gowen, clerk, Council Offices, Katharine-street, Croydon.

**DUMBARTON, SEPTEMBER 1.**—About 100 tons of house coal and about 20 tons of washed nuts, for the Property Committee of the County Council. Tenders to Mr. W. Craig, county clerk, County-buildings, Dumbarton.

**FINCHLEY, N., SEPTEMBER 1.**—Coal suitable for burning with chaingrate stokers at the electricity works, for the Urban District Council. Forms from Mr. E. Calvert, electrical engineer, Squires-lane, Finchley, on payment of £1 (returnable).

**HAMPTON (MIDDLESEX), SEPTEMBER 1.**—Best Welsh double-screened steam coal, for the Urban District Council. Forms from Mr. Sidney H. Chambers, surveyor to the Council, Public Offices, Hampton, Middlesex.

**HASTINGS, SEPTEMBER 9.**—About 1,400 tons of Welsh steam coal, for the Corporation. Forms from Mr. P. H. Palmer, M.I.C.E., borough engineer, Town Hall, Hastings.

**HULL, SEPTEMBER 2.**—House coal and coke for the Sculcoates Guardians. Forms from Mr. J. H. Wild, solicitor, clerk to the Guardians, Union Offices, Harley-street, Hull.

**LONDON, SEPTEMBER 9.**—Gas coal, for the Holborn Guardians. Forms from Mr. J. Allan Battersby, clerk to the Guardians, Holborn Union Offices, 53, Clerkenwell-road, E.C.

**MALTON, SEPTEMBER 6.**—About 5,000 tons of washed gas nuts, for the directors of the Malton Gas Company. Forms from Mr. Henry Tobey, secretary.

**MANCHESTER, SEPTEMBER 3.**—About 2,200 tons house coal, 2,620 tons burgie, 870 tons peas nuts, for the Guardians. Forms at the Poor Law Offices, New Bridge-street.

**NEWPORT (I.W.), SEPTEMBER 3.**—Best Welsh steam coal, free from dust, slate and flake. Sealed tenders, endorsed "Coal," to Mr. H. E. Stratton, clerk.

**NEWPORT (I.W.), SEPTEMBER 11.**—Fuel, for the Isle of Wight County Council. Particulars from Mr. J. Dufton, clerk, County Council Offices, Newport, I.W.

**PORTLAND, SEPTEMBER 3.**—Between 150 and 200 tons of large Welsh steam coal, and between 360 and 440 tons of anthracite nuts, for the Urban District Council. Forms obtainable at the office of the waterworks engineer, R. Stevenson Henshaw, Council Offices, Portland.

**RADSTOCK (SOMERSET), SEPTEMBER 4.**—Coal and coke for the Council schools. Tenders to Mr. E. Martin, correspondent.

**TIPTON, SEPTEMBER 1.**—Best thick coal or Cannock lumps and nuts (chiefly the latter) for the Tipton Education Committee. Tenders to Mr. E. Richards, secretary, Education Offices.

The date given is the latest upon which tenders can be received

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

**ALEXANDRIA (EGYPT), SEPTEMBER 30.**—Oils, &c.—H.M. Consul-General at Alexandria (Mr. D. A. Cameron, C.M.G.) reports that tenders are invited by the Municipality of Alexandria for the supply of various articles required for the use of the Service du Nettoyement during 1913-14, including oils and colours, wood, steel and iron bars, angle iron, bolts and nuts, screws, rivets, brooms, buckles, wire, &c.\*

**BASINGSTOKE, SEPTEMBER 17.**—Electrical Plant.—Supply and erection of the following plant, for the Corporation, viz.: (a) Diesel generators, balancer set and booster set; (b) storage batteries; (c) switchboard and instruments; (d) cables and cable laying; (e) overhead travelling crane. Tenders may be for any section, but not for part of a section. Particulars, Mr. F. Reginald Phipps, A.M.Inst.C.E., F.S.I., borough engineer, Town Hall, Basingstoke.

**CARDIFF.**—Coal Trucks.—For the supply of 200, or part thereof, new 12-ton coal trucks, for the Great Western Colliery Company Limited, 34-35, West Butte-street, Cardiff. Specifications obtainable at the office.

**CARDIFF, SEPTEMBER 12.**—Electrical Plant.—Erection at the Roath Power Station, for the Corporation: (1) A 200 kw turbine alternator with surface-condensing plant

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

and auxiliaries; (2) a 700 kw. rotary converter; (3) boiler-house plant in three sections. Forms from Mr. Arthur Ellis, city electrical engineer and manager, Central Offices, The Hayes, Cardiff, on payment of a deposit of one guinea (returnable).

**CANBERRA (AUSTRALIA), SEPTEMBER 1.**—Switchgear.—H.M. Trade Commissioner for Australia reports that tenders are invited by the Commonwealth Department of Home Affairs for the supply of switchgear for the power-house at Canberra, the new Federal Capital in New South Wales. The contract is divided into two sections: (1) Main power-house switchgear; (2) Diesel engine switchgear.\*

**EDINBURGH, SEPTEMBER 22.**—Turbines.—For the Corporation, two mixed pressure steam turbines and direct-current generating plant, each set to be of 1,500 kw. capacity. Specification, form of tender from the engineer, Dewar-place, Edinburgh, on payment of a deposit of £2 2s. (returnable).

**ITCHEN, SEPTEMBER 9.**—Cast Iron Lamp Columns.—95 cast iron lamp columns, copper lanterns, burners, and fittings complete, for the Urban District Council. Particulars from Mr. T. A. Collingwood, surveyor to the Council.

**LONDON, SEPTEMBER 23.**—High-tension Switchgear.—Additional main high-tension switchgear, including the reconstruction of existing main high-tension switchgear at the Council's generating station, Greenwich, for the London County Council. Specifications, form of tender, &c., on application to the clerk of the Council, County Hall, Spring-gardens, S.W., upon payment of £2 (returnable).

**LONDON, SEPTEMBER 24.**—Coal-hauling Plant.—For the Hammersmith Borough Council:—(a) Automatic weighing machine; (b) coal hoppers and tank; (c) dredger and water-pump; (d) weldless steel pipes and connections; (e) travelling jib crane and track; (f) endless belt conveyors. Specifications and forms of tender can be obtained from Mr. G. G. Bell, engineer and manager, 85, Fulham Palace-road, Hammersmith, London, W., upon payment of £10 10s. (returnable).

**LONDON, SEPTEMBER 24.**—Coal Storage Tanks.—Construction of five coal storage tanks in riveted steelwork, including necessary excavation, mass concrete, &c., at the Council's electricity works, Fulham Palace-road, Hammersmith, for the Hammersmith Borough Council. Forms, &c., on application to Mr. H. Mair, M.I.C.E., borough surveyor, and on deposit of £5 5s. (returnable).

**NEATH, SEPTEMBER 7.**—Mains.—Laying and jointing of 6 in., 5 in., 4 in. and 3 in. cast iron and steel mains, special castings, the erection and fixing of valves, &c., bridge and steam crossings, valve chambers, excavations, pipe trenches, concreting, &c., for the distribution mains in the parishes of Resolven, Clyne and Neath Lower parishes, for the Rural District Council. Specification from Mr. D. M. Davies, M.I.M.E., Council Offices, Neath, upon receipt of £3 3s. (£2 2s. only returnable).

**TALODI (EGYPT), SEPTEMBER 8.**—Galvanised Sheets, &c.—The London Agent for the Egyptian War Office notifies that tenders are invited by that department for the supply of (1) galvanised corrugated sheets, and (2) steelwork for steel-framed buildings at Talodi. Specifications from the office of Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.\*

**WAKEFIELD, SEPTEMBER 1.**—Boiler, &c.—Various plant for extensions to the works of the electricity department, for the Corporation: (1) Water-tube boiler, superheater, stoker, &c.; (2) steam turbo-alternator, condensing plant, &c.; (3) high and low tension switchgear. Particulars from city electrical engineer, Old Town Hall, Wakefield. Deposit £1.

**WIMBLEDON, SEPTEMBER 1.**—Turbine-alternator.—For the Corporation: (a) A 1,500 kw. turbine-alternator, with condensing plant and auxiliaries; (b) a 20-ton overhead travelling crane. Specifications from Mr. H. Tomlinson-Lee, borough electrical engineer, Electricity Works, Durnsford-road, Wimbledon. Deposit of £2 2s. (returnable).

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

## THE FREIGHT MARKET.

Although outward chartering from the north-east coast has not been so brisk as was the case a week ago, rates have materially stiffened. At the time of writing, coasting business is being done at 3s. 7½d. to London from Tyne and 4s. 3d. to Hamburg. The Baltic is based on from 5s. 1½d. to 5s. 3d. to Cronstadt, and the Bay on from 6s. to 6s. 1½d. to Bordeaux. The Mediterranean has advanced to from 8s. 6d. to 8s. 9d. to Genoa. At South Wales business has been moderately active. The Mediterranean is fairly steady, and the River Plate is firm. The Bay and coasting trades are stronger. The Clyde is quiet, but firm. At the Humber the market is slightly stronger. Homewards, there has been a fair number of charters recorded. New York advices report a quiet market, as the most pressing orders have been filled, and charterers are not willing to operate at present figures for September positions. Time-charter tonnage is in good demand at firm figures. The Eastern markets are quiet, but steady. The Black Sea and Azof are brisk and firm. The Mediterranean and ore trades are steady, as is also the Baltic. The River Plate has developed a more buoyant tone, with a strong demand for prompt tonnage.

Tyne to Abo, 700, 6s. 6d.; Antwerp, 4s. 6d.; 1,700, 5s.; Aalborg, 1,700, 4s. 10½d.; Alicante, 2,000, 10s. 3d.; Bordeaux, 3,700, 6s.; Bahia Blanca, 4,000, 18s. 3d.; Bayonne, 1,700, 6s. 9d.; Barcelona, 5,300, 9s. 1½d. coal, 11s. 1½d. coke, 700; Cronstadt, 1,800, 8s. 9d. coke; 1,250, 9s. coke; Catania, 2,600, 9s. 6d.; Calais, 1,750, 5s. 3d.; Genoa, 5,500, 8s. 9d.; river loading; 6,500, 8s. 3d.; 6,000, 8s. 3d.; 3,500, 8s. 7½d.; from Dunston; Hamburg, 3,400, 4s. 1½d.; 2,200, 4s. 3d.; Kiel, 2,100, 5s.; London, 1,400, 3s. 7½d.; 1,800, 3s. 7½d.; Licata, 1,500, 11s., 300; Naples, 3,500, 8s. 3d.; Oran, 2,800, 8s. 6d.; Porto Ferrajo, 4,900, 8s.; Palermo, 2,400, 9s. 6d.; Port Said, 6,600, 8s. 4½d.; from Dunston; Rochefort, 1,500, 6s. 6d.; Rouen, 5s. 3d.; 1,800, 5s. 6d.; St. Petersburg, 2,700, 5s., 500; 2,700, 5s. 3d.; Studebaking, 700, 6s. 3d.; Swinemunde, 1,500, 5s.; Savona, 1,000 coal 8s. 9d., 2,000 coke 11s. 9d., from Dunston; Wallvik, 1,700, 5s. 9d.; Zeebrugge, 1,600, 3s. 9d., August.

Cardiff to Alexandria, 4,400, 8s. 9d., 500, September 1;

Ancona, 5,200, 9s. 6d.; 9s. 9d.; 9s. 6d., 500; Alicante, 1,200, 9s.; Aden, 5,000, 12s. 10½d., September; 12s. 10½d., September-October; Augusta, 4,600, 8s. 3d., 800; Almeria, 1,300, 9s. 6d.; Bordeaux, 2,100, 6½ fr.; Brest, 1,200, 4s. 3d.; Boulogne, 700, 5s. 3d.; Civita Vecchia, 4,000, 9s. 3d., end August; 4,400, 9s. 3d.; Cape Verds, 5,500, 9s. 3d., September; Chantenay, 3,400, 6½ fr.; Calais, 1,100, 4s.; Cadiz, 2,200, 8s. 3d.; Charente, 1,800, 7½ fr.; Constantinople, 4,700, 9s. 6d., September 8; Dundee, 500, 5s. 6d.; Dakar, 3,300, 10s. 6d., September 10; Danube, 5,200, 10s. 6d. coal, 13s. coke; 4,400, 10s. 6d.; Devonport, 2,200, 2s. 4½d., Admiralty; Franchez, sail, 800, 14s., free of port charges; Gibraltar, 1,300, 8s. 4½d.; Genoa, 5,300, 8s. 3d.; 2,700, 8s. 6d.; 4,000, 8s. 3d.; 6,000, 8s. 4½d., September 3; 5,300, 8s. 4½d.; Haulbowline, 2,200, 2s. 10½d.; Haida Pasha, 3,500, 9s. 6d.; Las Palmas, 2,100, 8s. 6d., September 1; 5,300, 8s. 6d.; Lisbon, 6s. 6d., 500, September 1; 1,700, 7s. 6d., 300; Messina, 5,700, 8s. 3d., 800; 4,600, 8s. 3d., 800; Monte Video, sail, 3,500, 15s., 125, 15s. 3d., 150; Malta, 5,000, 7s., September 8; Marseilles, 2,700, 10 fr., 150; Naples, 8s. 3d., 800; 4,000, 8s. 3d.; 4,500, 8s., 800, August 30; 3,200, 8s. 9d., 500; Nantes, 3,000, 6½ fr.; Port Said, 5,000, 8s. 6d.; 6,000, 8s. 4½d., August 30; 6,500, 8s. 6d., Sept. 1; Palma, 2,800, 9s. 3d.; 1,300, 10s. 6d.; Para, 5,000, 14s. 9d., early September; Portsmouth, 1,900, 2s. 6d., Admiralty; 2,900, 2s. 9d.; 2,200, 2s. 6d.; Pernambuco, sail, 18s. 3d.; 19s. 6d.; Palermo, 3,200, 9s., 400; Piræus, 4,100, 8s. 1½d.; Rio de Janeiro, 6,500, 16s. 9d.; Rouen, 1,550, 5s. 3d.; River Plate, 4,800, 19s. 4½d., early September; 6,600, 19s. 6d., September 1; 5,400, 19s. 6d.; 6,000, 19s. 6d., September 1; 3,500, 19s. 6d.; St. Malo, 2,000, 4s. 3d.; 500, 5s.; Sables, 1,500, 6½ fr.; St. Nazaire, 3,300, 5½ fr.; 2,300, 5½ fr.; Seville, 1,600, 9s. 3d.; St. Petersburg, 1,800, 6s.; Santa Liberata, 2,900, 9s., 400, September 1; Torre Annunziata, 4,000, 9s. 3d., end August; 4,400, 9s. 3d.; Teneriffe, 8s. 6d., September; Taranto, 5,200, 9s., 400, 10d.; Vigo, 1,100, 7s. 3d.; Valencia, 2,700, 8s. 9d.; Villa Constitucion, 4,500, 20s. 6d.; Venice, 7,000, 9s. 9d.; 7,000, 9s. 6d., end August; 5,200, 9s. 6d.; 7,800, 9s. 6d.; 9s. 6d., 500.

Newport to Naples, 3,800, 8s. 3d., 800; 4,200, 8s. 3d., 800; Torre Annunziata, 4,200, 8s. 3d., 800; Genoa, 5,500, 8s. 3d., end August; 4,400, 8s. 3d., end August; Gibraltar, 1,300, 8s. 4½d.; Seville, 1,600, 9s. 6d., 250; 1,500, 9s. 3d., 300; Nantes, 1,300, 6½ fr.; Bahia Blanca, 5,000, 19s. 3d., early September; St. Petersburg, 1,800, 6s.; Bordeaux, 2,100, 6½ fr.; Calais, 1,900, 4s. 9d.

Swansea to Bari, 3,200, 10s. coal, 10s. 9d. fuel; Brest, 300, 5s.; 1,300, 4s. 7½d.; Rouen, 1,900, 5s. 3d.; 1,200, 5s. 3d., 1,000, 5s. 6d.; Charente, 2,400, 7 fr.; Constantinople, 4,000, 10s. 6d.; Genoa, 2,600, 8s. 6d.; Barletta, 3,500, 10s. coal, 10s. 9d. fuel; St. Malo, 250, 5s.; 1,400, 4s. 6d.; Pécamp, 5s.; Honfleur, 1,400, 5s.; Alexandria, 3,600, 9s. 6d.; St. Nazaire, 2,300, 6½ fr.; Calais, 1,100, 4s. 6d.; Stettin, 2,000, 5s. 3d., 1,000; Boulogne, 1,200, 4s. 6d., 1,100, 4s. 9d.; London, 1,300, 4s.; Belfast, 450, 3s. 6d.; Caen, 800, 5s. 3d.; Stettin, 2,000, 5s. 3d.; St. Valery, 3,000, 8s.; St. Nazaire, 1,500, 6½ fr.

Llanely to Lisbon, 1,000, 8s., 300.

Wear to Rochefort, 1,500, 6s. 5d.; Aalborg, 1,300, 5s. 6d.; Wyburg, 1,500, 6s. 6d.; Rokokla, 1,500, 6s. 6d.; Buenos Ayres, 5,000, 19s. 3d., 250; River Plate, 5,000, 19s.; London, 1,800, 3s. 7½d.

Blyth to Palermo, 2,400, 9s. 6d., 350; 3,100, 10s. 3d., 800; Catania, 2,600, 9s. 6d., 600; Aalborg, 1,150, 5s. 6d.; St. Petersburg, 2,700, 5s. 3d.; Antwerp, 600, 4s. 3d.; 900, 4s. 3d.

Goole to Bruges, 750, 4s. 3d.; Boulogne, 1,200, 4s. 9d.; Antwerp, 650, 4s. 3d.

Sharpness to Rouen, 1,300, 5s. 6d.

Wales to Catania, 2,500, 9s. 3d., 600, 9s., 800, September; Piræus, Zea or Syra, 3,500 and 5,000, 8s., August-September; Monte Video, sail, 15s. 6d.

Glasgow to Cronstadt, 1,500, 8s., coke; Genoa, 8s. 3d.; Savona, 8s. 3d.; Leghorn, 8s. 3d.; Buenos Ayres, 23s., coal basis; Kotka, 1,400, 5s. 9d.; Almeria, 1,000, 11s. 6d.

Rotterdam to Port Said, 6,000, 8s. 3d.; Malta, 3,000, 6s. 9d.; St. Nazaire, 3,600, 5s. 10½d., Trignac terms; Havre, 1,700, 4s. 6d., September 1; Naples, 5,700, 8s., August 30; Porto Vecchio, 5,700, 8s. 6d., September 10; Bilbao, 4,200, 5s. 3d., September 15.

Port Talbot to Genoa, 5,200, 8s. 4½d.; 3,000, 8s. 9d.; Rouen, 1,500, 15s. 3d.; Chantenay, 3,500, 6½ fr.; Nantes, 3,000, 6½ fr.

Hartlepool to Leghorn, 4,600, 8s. 4½d., 500; Hamburg, 2,000, 4s. 3d.

Manchester to Buenos Ayres, sail, 18s. 6d.

Hull to Cronstadt, 6,500, 5s.; 4,800, 5s.; Alexandria, 5,500, 8s. 10½d.; 4,500, 8s. 10½d.; 5,500, 8s. 9d.; Riga, 4s. 9d.

Boston to Boulogne, 1,200, 4s. 9d.

Immingham to Cronstadt, 48,000, 5s.; Kiel, 1,500, 5s. 3d.; Troon to Genoa, 8s. 6d.

Newport River to Algiers, 3,300, 9½ fr., fuel.

Forth to Rokokla, 1,100, 6s. 3d.

Fife port to Cronstadt, 2,300, 5s. 4½d.; 3,000, 5s. 4½d.

Bo'ness to Viborg, 1,200, 6s. 3d.

Homeward charters:—Kherson or Nicolaieff, 5,200, Bergen-Christiana Range, 15s. 9d., one port, 16s. two ports, 3d. less barley, early September; Kherson, Nicolaieff, Odessa or Horli, 4,500 max., Rouen, 15s. 6d., early September; Porman, 1,650, Maryport, 7s. 9d., option Workington 8s. 6d., ppt.; 3,600, Tyne Dock, 6s. 9d., mid-Sept.; 3,600, Jarrow, 6s. 9d., mid-September; Odessa, 6,200, Antwerp or Rotterdam, 12s. 9d., no reduction, September 1-15; 6,800, Rotterdam 12s. 6d., Hamburg 13s., with 3d. less barley up to half cargo, ppt.; Poti, 5,100, Antwerp, 16s., 500-500, ppt.; 4,800, Rotterdam, 14s. 4½d., 800-800, ppt.; West Australia, 2,656 net, Negapatam, Madras and Chittagong, 31s. 6d., jarrah, September; 2,380, Natal, 37s. 6d., jarrah, October-October; Buenos Ayres, 8,900, 10 per cent., Rotterdam, ppt.; Buenos Ayres-La Plata, 5,500, 10 per cent., United Kingdom-Continent, p.p., 16s. 9d., no reduction, early September; Colastine, 4,500, 10 per cent., Muhlgraben, 33s. 6d., option one port, Continent, 28s. 6d., quabrahoe, spot; Bilbao, 3,200, Middlesbrough, 5s. 6d., ppt.; 3,000-3,500, 5s. 6d., ppt.; Wilmington, 2,838 net, Liverpool or Bremen, 40s., cotton, October; 42s. 6d., Havre; Gulf, 4,625 net, United Kingdom-Continent, 17s. p.p., net form, September; 18s., net form, October 25-November 25; 2,722 net, 140 ft., London, Hull, Antwerp, Tyne, Rotterdam, Bremen, or Hamburg, 47s. 6d., one port, 48s. 9d. two ports, September; 2,703 net, two ports to two, 46s. 3d., September; Newcastle, N.S.W., sail, 26s., Callao, 24s. 6d., Chili; nitrate port, sail, 30s. 9d., United Kingdom-Continent, October-November; time charter, West Coast South America trade, reported at 4s. 9d., one round trip, delivery and re-delivery United Kingdom-Continent, ppt.; Pugwash, 60s., Manchester; Weston Point, 12s. one port, 12s. 6d. both ports, Calcutta and



or Rangoon, salt; Gulf timber port, 170s., Buenos Ayres; Poti, 4,500, Garston, 13s. 6d., 500-500, ppt.; Kurrachee, 2,317 net, United Kingdom-Continent, Antwerp, 19s. one port, 19s. 6d. two ports, France 1s. extra, net terms, September-October; 18s., United Kingdom-Continent, full cargo barley, September; San Lorenzo, 3,700, 10 per cent., United Kingdom-Continent, 19s. o.c., less 6d., October 1-31; 5,300, 10 per cent., 18s. 6d. o.c., less 6d., ex. France, October 1-31; 4,200, 10 per cent, 20s., less 6d., September 20-October 10; 4,400, 10 per cent., 19s. o.c., less 6d., October 1-31; 4,100, 10 per cent., 19s. o.c., less 6d., October 5-November; 6,500, 10 per cent., Antwerp, 18s. 6d., no reduction direct, September; 5,500, London or Rotterdam, 19s., no reduction direct, ppt.; Sapelo, 1,680 net, United Kingdom-Continent, 107s. 6d., September; 105s. one port, 107s. 6d. two ports; 110s. three ports; Rosario, 5,500, 10 per cent., United Kingdom-Continent, 19s. 6d. o.c., less 6d., cancelling October 10; South Australia, sail, 30s., United Kingdom-Continent, spot; time charter, States and West Indies, £900, 12 months; time charter, Australian-Eastern trade, 7s. 6d., delivery Newcastle, N.S.W., redelivery Java; Azof, 3,300, 10 per cent., 15s. 3d. n.c. or any, 15s. 9d. Hamburg, August-September; Muroran and Kushiro, 6,000, United Kingdom-Continent or Copenhagen, two ports to two, 32s., September-October; Saigon, 7,000, Marseilles, Havre or Dunkirk, 28s. 6d. one port, 29s. 6d. two ports, rice, 1s. extra maize, September-October; Savannah, 2,580 net, 150 ft., Bremen and Newdenham, 47s. 6d., option Gulf loading 48s. 9d., early September; La Goulette, 3,700, Jarrow, 9s. 6d., f.t., ppt.; San Juan, 4,000, Rotterdam, 7s. 3d., ppt.; Fremantle, sail, 32s. 6d., United Kingdom-Continent, January: Kherson, Nicolaieff or Odessa, 5,400, London or Rotterdam 12s. 9d., Hamburg 13s. 3d., with 3d. less barley, September; South Russia, 6,000, London or Rotterdam 13s., Hull, Antwerp or Emden 13s. 3d., Hamburg or Weser 13s. 3d., with 3d. less barley, September 15; Kherson and Nicolaieff or Odessa, two ports, 7,400, L.H.A.R. 12s., Hamburg 13s. 3d., ppt.; Marmagoa, 2,298 net, West Coast United Kingdom, one port, and Antwerp, 24s. 6d., on d.w., September; La Falaie, 4,000, Barrow, 8s. 9d., early September; Torrevieja, 5,000 max.; Calcutta, 10s., salt, October; time charter, Transatlantic trade; 5s. 1½d., one round trip, delivery Rotterdam, re-delivery United Kingdom-Continent, *via* States; time charter, Baltic trade, about 1,100 stds, £800, nine or 10 months, delivery March, 1914.

## COAL, IRON AND ENGINEERING COMPANIES.

**Barlow Engineering Company Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire and take over as a going concern the business now carried on at 130, Queen Victoria-street, E.C., under the style of the Barlow Engineering Company, and to enter into an agreement with Leonard Minton Lawler and William Hector Barnes; also to carry on business as electrical, mechanical and general engineers, iron and brass founders, metal workers, and iron and steel converters, &c. First directors: William Dickinson, "Highfield," Bexley Heath, Kent; Leonard Minton Lawler and William Hector Barnes, both of 130, Queen Victoria-street, E.C. Registered office, 100c, Queen Victoria-street, E.C.

**Baumaterialien Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of metal workers and merchants, and iron, brass, steel and metal founders, &c. Minimum cash subscription, seven shares. First directors: Egon Manger and Basil Alfred Reeves. Registered office, 5, Salters Hall-court, Cannon-street, E.C.

**Brynafan Colliery Company Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to purchase or otherwise acquire from the Brynafan Colliery Company, Tonmawr, Pontrhydyfen, the several mines known as the Brynafan Colliery, and to enter into an agreement with James Benjamin Garsed Price; and also to carry on the business of colliery proprietors, &c. First directors: Thomas Hughes, Queen-street, Pontrhydyfen; Gwilym Llewellyn, Nantywhaid Farm, near Pontrhydyfen; David Morgan Jenkins, 97, Leonard-street, Neath; William Thomas, Maesgwyn, Pontrhydyfen; and Thos. Thomas, Ardwyn, Pontrhydyfen. Qualification, 50 shares.

**Budd and Tom Limited.**—This private company has been registered, with a capital of £500 in £1 shares, to acquire and take over as a going concern the business carried on at 54, Summerland-street, Exeter, under the style of "F. Budd," and to carry on the business of coal merchants, colliery proprietors, and miners; also to search for, make merchantable, and deal in coal, minerals, and other metals. First directors: Frederick Budd, 54, Summerland-street, Exeter; and James Ward Tom, Bath-road, Exeter. Registered office, 54, Summerland-street, Exeter.

**Cammell, Laird and Co. Limited.**—A circular has been issued to the debenture holders, in which the latter are called to attend a meeting to hear, and, if desired, to pass a resolution. The directors explain that in view of the first mortgage debenture maturing at the end of the year they have entered into provisional arrangements for replacing them by an issue of a similar amount (£500,000) of first mortgage debenture stock. The security for this new issue will be the same as that for the maturing debentures—namely, a specific first charge on the company's fixed properties at Sheffield and Penistone, together with certain shares in the Workington Iron and Steel Company Limited, with the slight variation that for the sake of convenience and with the consent of the trustees certain additions made at the Sheffield and Penistone works since the mortgage debentures were issued in 1898 will be substituted for a corresponding value in preference shares of the Workington Iron and Steel Company. The security of the existing holders of 4½ per cent. and 5 per cent. debenture stock is not otherwise varied.

**Canada Iron Corporation Limited.**—A receivership has been appointed, Mr. White, head partner in New York of Messrs. Deloitte, Plender and Griffiths, having been appointed; provisional liquidator. It is understood that he will be appointed permanent liquidator with a view of reconstruction. The corporation was incorporated in Canada on June 4, 1908, and owns ironmines, blast furnaces, foundries, and other works in Ontario, Quebec, New Brunswick and Nova Scotia. The head office is in Montreal, but there is a London committee of directors, of which Sir James Heath is chairman. The authorised capital is 8,000,000 dols.,

of which 7,741,300 dols. has been issued—4,832,000 in dols. common stock, and 2,909,000 dols. in 6 per cent. preferred stock (cumulative since January 1, 1911). No dividend has been paid on either class of share. The corporation has issued £353,000 6 per cent. consolidated bonds, and £600,000 6 per cent. first mortgage sterling bonds, redeemable at 110 per cent.

**Dalmellington Iron Company Limited.**—The directors of the Dalmellington Iron Company Limited, after placing £7,000 to general reserve and writing off £19,336 for depreciation, have declared a final dividend of 7½ per cent., free of income-tax, making 10 per cent. for the year.

**Dalton Mining Syndicate Limited.**—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on business as proprietors of iron ore, copper and other mines, and to enter into an agreement with Augustus Horace Strongitharm. First directors: Theobald Fitzwalter Butler, Infield, Barrow-in-Furness; E. Drewry, Holker House, Cark-in-Cartmel, Lancs.; and Augustus Horace Strongitharm, Croslands Park, Barrow-in-Furness. Qualification, £100.

**Derby Coal Company (1913) Limited.**—This private company has been registered, with a capital of £100,000 in £1 shares, to acquire and take over as a going concern the business of coal merchants now carried on by the Derby Coal Company Limited (in liquidation) at 2, Babington-lane, Derby, and to enter into an agreement with the Derby Coal Company, and its liquidator, Wm. Hart; to carry on business as dealers in coal, colliery proprietors, miners, engineers and ironfounders. First directors: Thomas Hugh Smith, "Craigmore," Normanton, near Derby, and David J. Bate, 46, Breedon Hill-road, Derby. Qualification: 100 shares. Registered office, 2, Babington-lane, Derby.

**Guest, Keen and Nettlefolds Limited.**—The report of the directors for the 12 months ended June 30, 1913, states that, after making provision for bad and doubtful debts, the accounts show a profit of £453,092 16s. 5d., to which must be added the amount brought forward, £206,375 9s. 2d., making an available balance of £659,468 5s. 7d. Deducting from this the amount paid for debenture interest for the 12 months and interim dividend on the preference and ordinary shares, amounting altogether to £160,952 3s. 4d. (as detailed in the balance-sheet), there remains a sum of £498,516 2s. 3d., which the directors recommend should be appropriated as follows:—To pay a dividend on the preference shares at the rate of 5 per cent. per annum, free of income-tax, for the six months ended June 30, 1913, £43,000; to pay a dividend on the ordinary shares at the rate of 10 per cent. per annum, free of income-tax, for the six months ended June 30, 1913 (making 10 per cent. for the year), £48,250; to pay a bonus on the ordinary shares of 1s. per share, free of income-tax, £48,250; to place to the accident and fire insurance fund, £20,000; to place to reserve, £100,000; to carry forward, £239,016 2s. 3d.—£498,516 2s. 3d.

**Hardy Patent Pick Company Limited.**—The report of the directors and statement of accounts states that the net profit for the year is £11,058 17s. 2d., and the profit brought forward from last year £8,116 12s. 4d., making a total of £19,175 9s. 6d. The directors propose to deal with the profit as follows:—To payment of interest on debentures, £1,271 5s.; to payment of dividend on the 7 per cent. preference shares, £1,736; to payment of dividend of 5 per cent. on the ordinary shares, £3,500; to provide for depreciation of tools and patterns, £1,000; to provide for depreciation of plant, &c., £3,000; to carry forward to next year £8,668 4s. 6d.

**Heald (H. T.) and Co. Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of colliery owners, coal merchants and agents, dealers in iron ore, steel and iron, coal and iron masters, brass and iron founders, quarry proprietors, and electrical and mechanical engineers. One of the first directors is George Thomas Heald (managing director), the other is to be elected by signatories. Remuneration, £100 per annum. Signatories: G. T. Heald and Thomas Penrose Heald, both of 181, Cathedral-road, Cardiff.

**Hill (Richard) and Co. Limited.**—This company reports for the year ended June a profit of £12,061, making with £2,762 brought forward, an available total of £14,823, less £898 for directors' remuneration and expenses, and £1,691 for depreciation on plant, &c. The preference dividend absorbs £5,400. The directors recommend a final dividend on the ordinary shares of 2½ per cent., making 5 per cent. for the year, leaving £2,584 to be carried forward.

**Manvers Main Colliery Company Limited.**—The directors have declared a final dividend of 3s. per share.

**Nelson's Coal Conveyor Limited.**—This private company has been registered, with a capital of £1,200 in £1 shares, to acquire the benefit of an invention for improved apparatus for conveying coal in mines, and to enter into an agreement with Charles Anthony Nelson, "Glenview," King's-road, Wallsend-on-Tyne. First directors: Robert James, Henry Cawood Embleton, Charles Anthony Nelson, and Noel Phillip Wentworth Brady. Qualification, 100 shares. Remuneration, £225 divisible. Registered office, Milburn House, Newcastle-on-Tyne.

**New Monckton Collieries Limited.**—The twelfth annual report states that after charging depreciation, the net profit for the year ended June amounts to £55,009, making with £20,533 brought forward £75,542. Debenture interest absorbs £4,288 and preference interest £5,100. The directors recommend a dividend of 10 per cent., the dividend on the ordinary, including interim payment, absorbing £8,500; to place £30,000 towards the cost of an additional shaft at the newly-acquired Barnsley seam coal area, and £5,000 to reserve against overpaid mine rents, carrying forward £22,654.

**Newport Abercarn Black Vein Steam Coal Company Limited.**—A scheme for the sub-division of the capital was duly approved on the 21st inst. at extraordinary general meetings of the preference and ordinary shareholders and by a joint meeting of both classes, held at Winchester House, Old Broad-street, E.C. The resolutions were carried unanimously, as was a further resolution authorising the payment of compensation to any member of the board retiring under the scheme of reorganisation.

**Parnall and Sons Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on business as engineers and brass and iron founders, also dealers in and manufacturers of machines of all kinds.

Signatories: Arthur Henry Gibson, 39, Waterloo-street, Birmingham; and Gilbert Christopher Vyle, Soho Foundry, Birmingham.

**Roberts (R. J.) Limited.**—This private company has been registered, with a capital of £5,000 in £10 shares, to acquire and take over as a going concern the business of general ironmongers, iron, steel and metal merchants, colliery furnishers, agricultural implement makers and engineers, formerly carried on by R. J. Roberts at Oswestry, Salop, and now carried on by Edward L. Rogers under the style of R. J. Roberts and Co., and to enter into an agreement with E. L. Rogers. First directors, Edward L. Rogers (permanent managing director), 6, King-street, Wrexham, and Arthur Thomas, Holbach-road, Oswestry.

**St. Helens Colliery and Brickworks Company Limited.**—The report for the year ended June 30 last states that, after making provision for debenture interest and deducting the dividend paid in February, the profit for the year is £26,680. A further dividend of 5 per cent. is recommended, £7,000 being written off for depreciation and £10,000 placed to reserve fund, carrying forward £10,020.

**South Hetton Coal Company Limited.**—The directors have declared a dividend of 12s. 6d. per share, free of income-tax, on the ordinary shares for the past half-year, carrying forward £8,980.

**South Staffordshire Mond Gas Capital Scheme.**—In conformity with this company's Acts of Parliament, 1901 and 1913, and the Acts incorporated therewith, an extraordinary meeting of shareholders of the company will be held at the Queen's Hotel, Birmingham, on September 8, for the purpose of considering and, if thought proper, of passing resolutions authorising the issue of preference shares, the exchange of preference shares for debenture stock, and the re-issue of such debenture stock.

**Spencer (John) and Sons Limited.**—The accounts for the year to June 30, including £4,103 brought forward, show a profit of £74,601. After providing for debenture interest, &c., the directors recommend a further dividend of 3½ per cent., making 6 per cent. for the year, together with the appropriation of £13,160 to renewals and improvements expenditure, setting aside £10,000 for depreciation and carrying £11,667 forward. For 1911-12 5 per cent. was paid, and for 1910-11 3½ per cent.

**Standard Peat and Coal Company (Bristol) Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on business as coal merchants, colliery proprietors, miners and engineers, and to acquire the business of Frank Percy James, trading as the Standard Coal Company, at Bristol. First director: Frank Percy James, 8, Southampton-parade, Cotham Hill, Bristol. Qualification, 100 ordinary shares. Registered office, 8, Southampton-parade, Cotham Hill, Bristol.

**Staveley Coal and Iron Company Limited.**—Final dividend of 2s. 6d. per share on the fully-paid and 1s. 10½d. per share on the part paid, with bonus of 5 per cent. This, with the interim paid in January, makes a total distribution of 25 per cent.

**Steel Company of Scotland Limited.**—After writing off special expenditure, amounting to £31,660, the directors recommend that, subject to audit, £30,000 be carried to the reserve fund and that a dividend of 10 per cent. be paid, leaving £20,433 to be carried forward.

**Sudd Fuel (Suddite) Limited.**—An extraordinary general meeting of the holders of the 7 per cent. cumulative participating convertible preference shares was held on the 20th inst., at which an agreement was accepted providing for the conversion of 25,000 of the unissued portion of such shares into shares to be known as "paper preference shares," carrying, in addition to all the existing rights, special advantages on the formation of an intended subsidiary company. It was also provided that the subscribers to the paper preference shares should have a commission of 10 per cent., to be payable in fully-paid cumulative participating convertible preference shares at par. At a meeting of ordinary shareholders, which was subsequently held, a similar resolution was approved.

**Swan, Hunter and Wigham Richardson Limited.**—The directors have decided to pay interim dividends of 2½ per cent. upon the preference shares and 2½ per cent. upon the ordinary shares.

**Wigan Coal and Iron Company Limited.**—The directors have declared an interim dividend at the rate of 5 per cent. per annum for the six months ended June 30 last, this being an instalment on account and in anticipation of the dividend for the current year.

**Cancer and Coal.**—The *Lancet* has recently discussed the connection between cancer and the use of coal as fuel. In Nairnshire and the Orkneys, where some districts and islands use coal as fuel and others peat, it has been found that the coal-burning districts were invariably much more affected with cancer than those that burned peat. The only exception was certain islands which burned peat but nevertheless showed a high cancer rate. In these cases the peat was found to be of a peculiar sulphurous kind, more or less resembling coal. These facts have been brought to light by Mr. C. E. Green, F.R.S.E., in two recent communications to the *Edinburgh Medical Journal*. The *Lancet* says it would seem from Mr. Green's researches that there is a direct relationship between the sulphur content of the fuel consumed and the mortality from cancer in the districts investigated. He attributes the ill-effects to the action of sulphur dioxide formed in the process of combustion, and notes an analogy between this and the formation of tumours on the roots of plants owing to the use of vitriolated manures. "Whether sulphur be the true agent or not, we have before us one more piece of evidence tending to connect the incidence of malignant disease with the action of chemical irritants—a discovery which may be set beside Mr. H. C. Ross's work on the appearance of epithelioma in tarworkers, and the well-known clinical observations on the frequency of intrathoracic neoplasms in cobalt miners and of scrotal epithelioma in chimney sweeps."



# THE COLLIERY GUARDIAN

## MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below:—

Am. Inst. El. Engin. = American Institute of Electrical Engineers.  
Am. Mach. = American Machinist.  
Bl. Diam. = Black Diamond.  
Bull. Am. Inst. Min. Engin. = Bulletin of the American Institute of Mining Engineers  
Bull. Standards = Bulletin of the Bureau of Standards.  
Canad. Min. Jl. = Canadian Mining Journal.  
Cassier's Mag. = Cassier's Magazine.  
Chem. Engin. = Chemical Engineer.  
Coal and Coke Op. = Coal and Coke Operator.  
Coal Tr. Bull. = Coal Trade Bulletin.  
Colliery Eng. = Colliery Engineer.  
Colliery Guard. = Colliery Guardian.  
Dingler's Polytechn. Jl. = Dingler's Polytechnisches Journal.  
Econ. Geol. = Economic Geology.  
El. Maschbau = Elektrotechnik- und Maschinenbau.  
El. Z. = Elektrotechnische Zeitschrift.  
Inst. Mech. Engin. = Institution of Mechanical Engineers.  
Int. Congr. Appl. Chem. = International Congress of Applied Chemistry.  
Iron Coal Trades Rev. = Iron and Coal Trades Review.  
Iron Tr. Rev. = Iron Trade Review.  
Jl. Ind. Engin. Chem. = Journal of Industrial and Engineering Chemistry.

Kohle Erz = Kohle und Erz.  
Licht Wasser = Licht und Wasser.  
Mechn. Engin. = Mechanical Engineer.  
Metall Erz. = Metall und Erz.  
Metallurg. Chem. Engin. = Metallurgical and Chemical Engineering.  
Mex. Min. Jl. = Mexican Mining Journal.  
Min. Engin. World = Mining and Engineering World.  
Min. Science = Mining Science.  
Min. Scient. Press = Mining and Scientific Press.  
Montan. Rdsch. = Montanistische Rundschau.  
Montan-Ztg. = Montan Zeitung.  
North-west Min. and Met. = North-west Mining and Metallurgy.  
Railw. Age Gaz. = Railway Age Gazette.  
R.-Arb.-Bl. = Reichsarbeitsblatt.  
Schweiz. El. Z. = Schweizerische Elektrotechnische Zeitschrift.  
Stahl Eisen = Stahl und Eisen.  
Stein Braunkohle = Stein und Braunkohle.  
Techn. Bl. = Technische Blätter.  
Techn. Gem. Bl. = Technisches Gemeindeblatt.  
Techn. Mitt. Nachr. = Technische Mitteilungen und Nachrichten.  
Tiefbohrwes. = Tiefbohrwesen.  
Trans. Am. Iron and Steel Inst. = Transactions of the American Iron and Steel Institute.

Times Eng. Supp. = Times Engineering Supplement.  
Trans. Inst. Min. Engin. = Transactions of the Institution of Mining Engineers.  
Trans. N. Eng. Inst. Min. Engin. = Transactions of the North of England Institute of Mining and Mechanical Engineers.  
U.S. Bur. Min. Bull. = United States Bureau of Mines Bulletin.  
U.S. Geol. Survey = United States Geological Survey.  
Wood Pres. Wld. = Wood Preserving World.  
W. Va. Coal Min. Inst. = Western Virginia Coal Mining Institute.  
W. Va. Geol. Surv. = Western Virginia Geological Survey.  
Z. Berg.-Hütten Salinenwes. = Zeitschrift für das Berg-, Hütten- und Salinenwesen im Preussischen Staate.  
Z. Int. Ver. Bohring. = Zeitschrift des Internationalen Vereins der Bohringenieure und Bohrtechniker.  
Z. Schiesswes. = Zeitschrift für das Gesamte Schiess- und Sprengstoffwesen.  
Ztg. Ver. D. Eisenb.-Verw. = Zeitung des Vereins Deutscher Eisenbahnverwaltungen.  
Z. Zentr. Berg. Betrsl. Oest. = Zeitschrift des Zentralblatt Verbandes der Bergbau-Betriebsleiter Oesterreichs.

\*\* We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

### I.—General

World's Civilisation Dependent upon the Fuel Supply. F. W. Saward. "Coal Coke Op.," 1913, p. 165. (Abstract of paper read before Mich. Ohio Ind. Coal Dealers' Assn.) 2s. 3d.  
1911 Mineral Statistics for Spain. (Estadística Minera de España en el año 1911.) "Ingeniería," 1913, p. 154.  
The Upper Silesian Mining and Metallurgical Industry in 1912. (Die obereschlesische Bergwerks- und Hütten-Industrie im Jahre 1912.) "Glückauf," p. 899. 1913. 2s. 6d.  
Statistics of the Roumanian Mine Products: Petroleum, Natural Gas, Coal and Salt. (Die Statistik der rumänischen Bergwerksprodukte: Erdöl, Erdgas, Kohle und Salz.) "Z. Int. Ver. Bohring.," 1913, p. 133.  
Abstract Report of the Rhine-Westphalia Coal Syndicate for 1912. (Bericht des rheinisch-westfälischen Kohlsyndikates ueber das Geschäftsjahr 1912.) "Glückauf," 1913, p. 825. 2s. 6d.  
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Coalmine Accidents in the United States 1896-1912, with Monthly Statistics for 1912. F. W. Horton. Techn. Paper 48, U. S. Bur. of Min., 74 p.; ill.  
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Competition on the Berlin Coal Market, Zentgraf. (Der Wettbewerb auf dem Berliner Kohlenmarkt.) "Glückauf," vol. 49, 12, p. 449-60, 14, p. 530-40. 5s.  
Miners' Wages in 1912. (Excluding the officials receiving fixed salaries.) (Bergarbeiterloehne im Jahre 1912; mit Ausschluss der festbssoldeten Beamten und Aufseher.) "R. Arb. Bl.," vol. 11, 3, p. 191-2.  
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### II.—Education.

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### III.—Geology.

A Geological Survey for China. "Min. Scient. Press," 1913, p. 973. 1s. 4d.  
Geology of the Pittsburgh Coal Beds. J. W. Boileau. "Coal Coke Op.," 1913, p. 163. (Abstract of paper read before Coal Min. Inst.) 2s. 3d.  
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The Original Material from which Combustible Organic Deposits were Derived. (Das Urmaterial der brennbaren organogenen Ablagerungen.) Dr. P. Kessler. "Techn. Bl.," June 14, 1913, p. 185.  
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A Remarkable Carbonaceous Deposit near Putnam, New Mexico. W. Forster. "Econ. Geol.," vol. 8, 4, p. 360-8.  
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Germany's Coal Reserves. H. E. Böker. "Colliery Guard.," vol. 106, 2747, p. 371; 6 fig. 6d.

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The Hess Dustless Mining Machine. R. C. Taylor. "Coal Coke Op.," 1913, p. 185; ill. (Paper read before W. Va. Coal Min. Inst.) 2s. 3d.

Hislop's Patent Oil-testing Machine. "Colliery Guard.," vol. 106, 2745, p. 268; 2 fig. 6d.

### VI.—Working of Minerals.

Coal-cutter with Saw and Auger Movement. R. C. Taylor. "Coal Age," vol. 4, 1, p. 11-3; 6 fig. 1s. 3d.  
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The Jherria Coalfield, India, and its Future Development. G. H. Greenwell. "Trans. N. Eng. Inst. Engin.," vol. 63, 3, p. 144-62; 1 plate.  
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A Notable Scottish Colliery. "Colliery Eng.," vol. 33, 12, p. 671-3; 3 fig.

### VII.—Boring, Shaft Sinking, and Tunnelling.

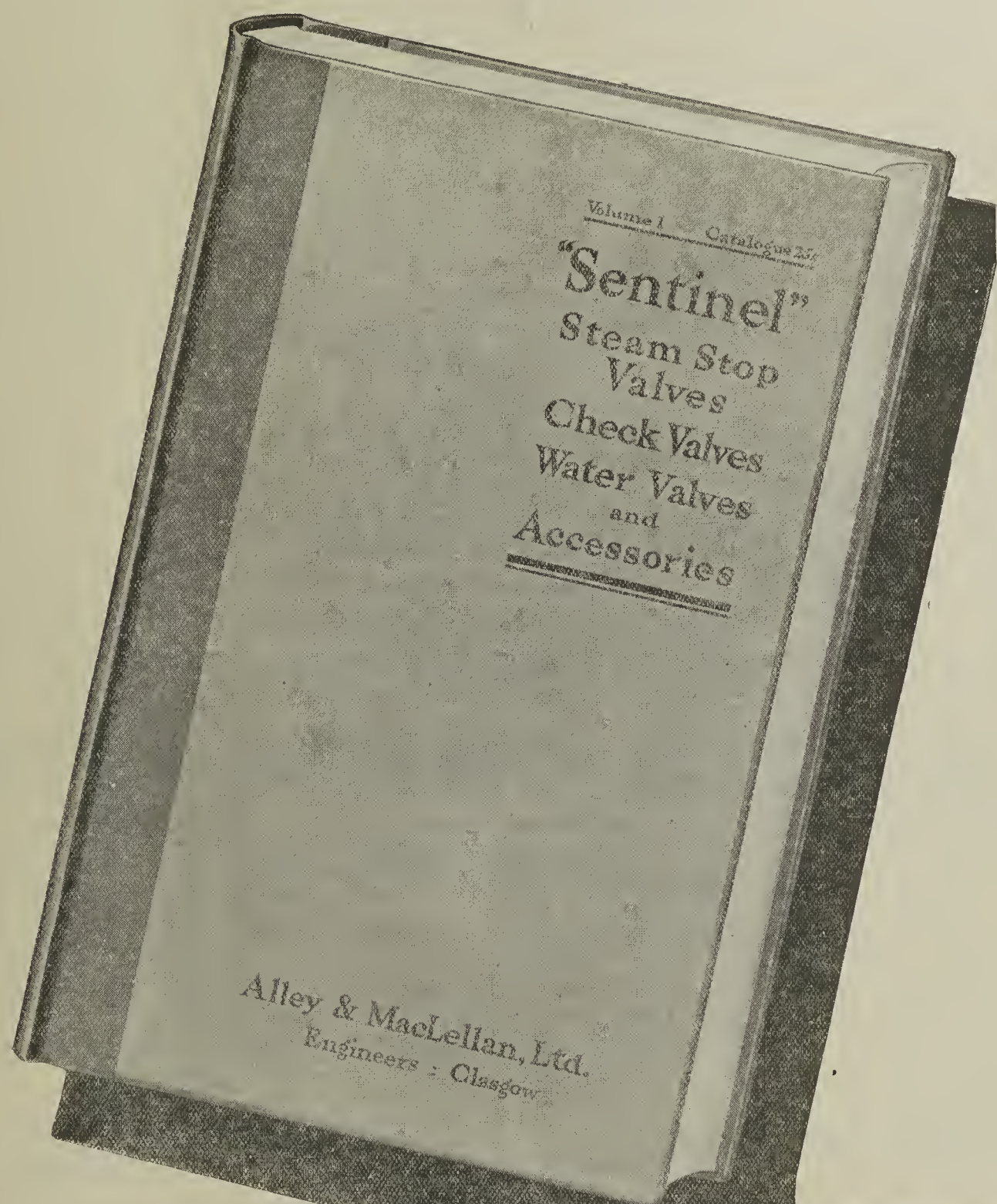
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Determination of Appropriate Size of Entries. (Die Ermittlung der zweckmässigen Grubenweite.) A. Wagener. "Bergbau," 1913, p. 337. 2s.  
Compressed-air Rock Percussion Drills. (Pressluftgesteins-Stossbohrmaschinen.) "Stein Braunkohle," 1913, 6, p. 85-6. 2s. 6d.  
Prevention of Dust in Machine Milling. (Staubverhütung bei maschinellem Bohren.) "Kohle Erz," 1913, 11, p. 250-1.  
Packing the Joints of Ferro-concrete Tubbing Plates for Shaft Lining. (Dichtung von tuebbingartigen Platten aus Eisenbeton fuer Schachtauskleidungen.) "Tiefbohrwes.," 1913, 6, p. 24; 7 fig. 2s.

### VIII.—Explosives, Blasting.

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Starting Explosions. (Die Initialzündungen der Sprengstofftechnik.) Neitzel. "Z. Schiesswes.," 1913, p. 190.  
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Use of Liquid Air as Mine Explosive. (Die Verwendung von flüssiger Luft zu Sprengzwecken im Bergbau.) Kolbe. "Z. Zentra. Berg. Betrbl. Oest., 1913, p. 298.

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#### IX.—Timbering, Packing, &c.

Reinforced Concrete in Mines. S. M. Dixon. "Trans. Inst. Min. Engin.," vol. 45, 3, p. 528-48; 17 fig. 8s.

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Framing Shaft Timber Sets by Machinery. C. T. Rice. "Min. Engin. World," vol. 39, 2, p. 49-55; 10 fig. 1s. 3d.

How to Reduce Falls from Roof and Sides. D. J. Griffiths. "Coal Age," vol. 4, 2, p. 47-8. 1s. 3d.

Hydraulic Stowing. V. Viannay. "Colliery Guard.," vol. 106, 2745, p. 284. 6d.

#### XI.—Winding and Haulage.

The Use of Steel Ties in Mining. J. Clark Evans. "Coal and Coke Op.," 1913, p. 191. (Paper read before W. Va. Coal Min. Inst.) 2s. 3d.

Investigations of the Prussian Commission (Part II.) in England, Austria, Belgium and France. (Die Verhandlungen und Untersuchungen der Preussischen Seilfahr-Kommission.) "Z. Berg. Hütten Salinenw.," p. 259, 111 p.

Automatic Mine Hoisting. G. B. Rosenblatt. "Min. Scient. Press," June 14, p. 897; ill. 1s. 4d.

Unusual Systems of Winding in Shafts, especially Bucket Elevators. (Ueberaussergewöhnliche Hauptschacht-Fördersysteme, im besonderen über die Schachtförderung mittels Becherwerkes.) M. Lehmann, Diss., Svo. 56 p.; 58, ill. Aachen.

Prime Cost and Efficiency of Electrically-driven Main Hauling Engines. (Anlagekosten und Wirkungsgrad bei elektrisch betriebenen Hauptschacht-Fördermaschinen.) Meller. "El. Z.," 1913, 6, p. 155; 1 fig.

Results of the Prussian Rope Statistics for 1911. (Ergebnisse der preussischen Seilstatistik fuer das Jahr 1911.) F. Buerklein. "Glückauf," vol. 49, 14, p. 520-26. 2s. 6d.

Electrical Chain Haulage on No. IV. Level at Rheinelbe Pit I/II. (Zubringerkettenbahn mit elektrischem Antrieb für die IV. Sohle der Schachtanlage Rheinelbe I/II.) "Bergbau," 1913, 6, p. 99-100, 10, p. 379. 4s.

The Functions of Safety Appliances and Speed Regulators for Winding Engines. (Die Aufgaben der Sicherheitsvorrichtungen und Fahrtregler fuer Foerdermaschinen und ihre Loesungen.) "Techn. Mitt. Nachr.," 1913, 6, p. 163-9; 8 fig. (A short note on the appliances and their action, followed by a description of a few special forms.)

Hailwood's Patent Tub Greaser. "Colliery Guard.," vol. 106, 2746, p. 325; 3 fig. 6d.

Coefficients of Friction between Wood and Iron. L. Klein. "Colliery Guard.," vol. 106, 2744, p. 230. 6d.

#### XII.—Signalling.

Shaft Signalling Devices Operated from the Moving Cage. J. Kersten. "Colliery Guard.," vol. 106, 2747, p. 373; 12 fig. 6d.

#### XIII.—Lighting.

Miners' Electric Safety Lamps. "Trans. N. Eng. Inst. Min. Engin.," (Details of various types of lamps now in use.)

Effect of Diminished Oxygen Supply on the Safety Lamp. (Die Einwirkungen der Verminderung des Sauerstoffgehalts der Luft auf die Sicherheitslampe.) "Techn. Bl.," 1913, p. 161.

Mixed Lights Danger in Mining. J. T. Beard. "Coal Age," vol. 3, 24, p. 927. 1s. 3d.

Miners' Electric Safety Lamps. "Trans. Inst. Min. Engin.," vol. 45, 3, p. 477-82; 6 fig. (Description of the Gray-Sussmann and the Wolff alkaline lamps.) 8s.

Approved Safety Lamps. "Colliery Guard.," vol. 106, 2745, p. 269; 3 fig. (The Patterson lamps.) 6d.

#### XIV.—Ventilation.

A Self-registering Water Gauge. "Colliery Guard.," vol. 106, 2747, p. 385; 4 fig. (Ochwald's system.) 6d.

Water Gauge. "M.E.," "Colliery Guard.," vol. 106, 13, 170; 1 fig. 6d.

Use of Fans by Three-phase Cascade Motors. "Colliery Guard.," vol. 106, 2744, p. 230. 6d.

#### XV.—Mine Gases, Testing.

Mine Gas Ignition. J. W. Powell. "Coal Age," vol. 3, 26, p. 985-8; 2 fig. 1s. 3d.

Fighting the Firedamp Dangers. (Bekaempfung der Schlagwettergefahr.) "Dingler's Polytechn. J.," 1913, p. 203-4; 1 fig.

Firedamp Detectors. Forstmann. "Colliery Guard.," vol. 106, 2743, p. 172. 6d.

Apparatus for Gas Analysis Laboratories at Coalmines. G. A. Burrell and F. M. Siebert. "Colliery Guard.," vol. 106, 2747, p. 368; 5 fig. (From Tech. paper 14, U.S. Bur. Mines.) 6d.

The Comparative Inflammability of Mixtures of Pit Gas and Air by Momentary Electric Arcs. W. M. Thornton. "Colliery Guard.," vol. 106, 2745, p. 268. (Abst. paper read before N. Eng. Inst. Min. Engin.) 6d.

#### XVI.—Coaldust.

Small Coal and Dust: Its Production, Prevention, Treatment, and Utilisation with Special Reference to Dry Mines. Paton. "Trans. Inst. Min. Eng.," vol. 45, 3, p. 421-9; 21 fig. 8s.

New Experiments with Coaldust and Means of Obviating the Danger of Same. (Nouvelles Expériences sur les Poussières de Houille et sur les Moyens de Combattre leurs Dangers.) J. Taffanel. Svo., 399 p. Paris: Dunod et Pinat.

Preventing Danger from Coaldust. (Bekaempfung der Kohlenstaubgefahr.) "Dingler's Polytechn. J.," 1913, 13, p. 204-5. (Paper read by Prof. Dr. Tuebben at the Berlin Academy of Mines, 1913.)

Fighting the Dangerous Coaldust. (Die Bekaempfung des gefaehrlichen Kohlenstaubes.) J. Recktenwald. (Samml. Berg Huettenmaenn Abh. H. 121.) Svo., 8 p. Kattowitz. 1s. 6d.

The Automatic Distribution of Stonedust. Hyve. "Colliery Guard.," vol. 106, 2744, p. 233; 4 fig. 6d.

Coalmining in the United States of America, with Special Reference to the Treatment of Coaldust and Haulage by Electric Locomotives. S. Dean. "Colliery Guard.," vol. 106, 2746, p. 322. (Abst. paper read before N. Eng. Inst. Min. Engin.) 6d.

#### XVII.—Explosions.

Coaldust Explosions: The Influence of Obstructions. "Times Eng. Supp.," 1913, 434, p. 23. 9d.

#### XVIII.—Mine Fires.

Coalmine Fires. "Colliery Eng.," vol. 33, 12, p. 690-2. (Fires classified according to locations. Their causes and some of the methods of combating them.)

#### XIX.—Rescue and Ambulance.

Rescue Methods for Mines. (Das Rettungswesen im Bergbau.) G. Ryba. "Z. Zentr. Ver. Berg. Betrbl. Oest.," 1913, p. 287; ill.; p. 326; ill.

A Safety Device for Miners. (Eine Schutzvorrichtung für Bergleute.) "Stein Braunkohle," 1913, 6, p. 85; 2s. 6d.

A Mine Rescue Trolley. "Colliery Guard.," vol. 106, 2744, p. 219; 1 fig. 6d.

An Emergency Cage. "Colliery Guard.," vol. 106, 2747, p. 385; 5 fig. 6d.

#### XX.—Drainage, Pumping, &c.

Device for Draining of Mining Fields, &c. (Vorrichtung zur Entwässerung von Grubenfeldern, Grubenräumen u. dergl.) Fehisch. "Stein Braunkohle," 1913, 6, p. 81-3. 2s. 6d.

An Improved Pipe Coupling. "Colliery Guard.," vol. 106, 2744, p. 221; 1 fig. 6d.

#### XXI.—Preparation.

Shaking Screens in a Concrete Tipple. O. G. Petersen. "Coal Age," vol. 3, 25, p. 958-60; 6 fig. (A short arm screen is used in order to reduce the horizontal strains.) 1s. 3d.

Drying of Brown Coal and its Economy. (Das Trocknen der Braunkohle und seine Wirtschaftlichkeit.) Diss., Svo. 6, 147 pp.; 13 ill. Dresden, 1913.

#### XXII.—Briquettes.

Fuel Briquetting in 1912. E. W. Parker. Adv. chap. "Min. Resources of U.S.," U.S. Geol. Survey, 10 pp.

Briquetting Lignite. (Ueber Braunkohlenbrikettierung.) E. Gmeyer. "Montan. Rdsch.," 1913, p. 527; ill. 2s. 6d.

Briquetting Coal. "Colliery Eng.," vol. 33, 12, p. 687-9; 2 fig. (Forms of briquettes. A description of the Shedlock system and apparatus as used in England.)

Commercial Aspects of Coal Briquetting Industry. C. T. Malcolmson. "Eighth Int. Congr. Appl. Chem.," vol. 25, p. 687-99.

Coke Oven By-products in 1912. "Colliery Guard.," vol. 106, 2743, p. 170. (Abst. report under Alkali Works Act.) 6d.

Direct Recovery of Tar and Ammonia from Coke-oven Gas by the Still Process. F. Korten. "Colliery Guard.," vol. 106, 2743, p. 185; 1 fig. 6d.

#### XXIII.—Coke Ovens.

The Evolution of the Coking Gas Exhauster. (Die Entwicklung der Kokereigasassager.) A. Thau. "Glückauf," 1913, p. 888; ill. 2s. 6d.

Coke Output in the United States in 1912. E. W. Parker. "Coal and Coke Op.," 1913, p. 217. (Report U.S. Geol. Surv.) 2s. 3d.

Genesis of Coke Manufacture. J. Coyne. "Coal and Coke Op.," 1913, p. 167. 2s. 3d.

Beehive and By-product Methods of Coke Manufacture Contrasted. C. A. Meissner. "Coal and Coke Op.," June 5, p. 127. (Trans. Am. Iron and Steel Inst.; abstract.) 2s. 3d.

Benzol from Coke Oven Gas. (Die Fabrikation des Benzols aus Koksofengasen.) A. Gobiet. "Montan. Rdsch.," 1913, p. 524. 2s. 6d.

The Mechanical Handling of Coke from Coke Ovens. G. F. Zimmer. "Cassier's Mag.," vol. 43, 6, p. 564-9; 10 ill.; 44, 1, p. 34-40; 8 ill. 2s.

Mechanical Quenching and Loading. A. Thau. "Gas World," 59, 1511; Supp., p. 11-3. 10d.

By-product Coking in Great Britain. "Gas World," vol. 59, 1511; Supp., p. 8-11. (A list of producers, with details of plant.) 10d.

The Modern By-product Gas Oven. A. C. Meissner. "Gas World," vol. 59, 1511; Supp., p. 14-7. 10d.

By-product Ovens for the Manufacture of Coke. C. A. Meissner. "Iron Tr. Rev.," vol. 52, 23, p. 1294-8; 24, p. 1350-4, 8 fig.; 25, p. 1412-5, 6 fig.; 26, p. 1455-7, 2 fig. 4s.

The Pishel Coking Test. M. A. Pishel. "Colliery Eng.," vol. 33, 12, p. 674-9; 1 fig. (Method of determining the coking or non-coking quality of a coal by its adherence to the mortar when pulverised.)

Recent Investigations Regarding the Hardness of Coke. O. Simmersbach. "Stahl Eisen," vol. 33, p. 512-20. 2s. 9d.

Travelling, Sifting and Loading Devices for Coke. (Fahrbre Sieb und Verladeapparate für Koks.) "Jl. Gasbeleuchtung," vol. 56, 14, p. 318-21; 3 fig.; 1 ill. (Apparatus which allow a simultaneous separation according to sizes and loading.) 3s.

Production and Industrial Application of By-product Coke Oven Gas. J. Becker. "Chem. Engin.," vol. 18, 1, p. 23-9; 3 fig. 2s. 3d.

The Supply of Coke Oven Gas for Towns and Economical Questions in connection herewith. (Die Versorgung von Staedten mit Koksengas und die kommunalpolitische Seite dieser Frage.) R. Neubling. "Techn. Gem. Bl.," vol. 15, 21, p. 326-7.

The Supply of Coke Oven Gas from the Rhenish-Westphalian Coke Works to Different Towns and its Economic Importance. (Die Versorgung der Staedte und Gemeinden mit dem Koksengas der Kokereien der Rheinisch-westphaelischen Industriebezirkes und die wirtschaftliche Bedeutung desselben.) M. Petzold. "Licht Wasser," vol. 18, 5, p. 56-7; 6, p. 65-6; 7, p. 77-8; 8, p. 87-9; 9, p. 100-2; 10, p. 113-4; 11, p. 126-8.

#### XXIV.—Fuels, Testing, &c.

Experiments and Results of the Testing of Fuels. (Verfahren und Ergebnisse der Prüfung von Brennstoffen.) F. W. Heinrichsen and S. Taczak. "Glückauf," 1913, p. 852; ill. 2s. 6d.

Methods of Testing Fuels. (Verfahren und Ergebnisse der Prüfung von Brennstoffen.) F. W. Heinrichsen and S. Taczak. "Glückauf," 1913, p. 816; ill. 2s. 6d.

Methods for Determining Coal Consumption. (Zur Methode der Feststellung des Kohlenverbrauchs.) E. Jüngst. "Glückauf," 1913, p. 822. 2s. 6d.

Errors in Determination of Moisture in Coal. W. F. Hillebrand and W. L. Badger. "Eighth Int. Congr. Appl. Chem.," vol. 27, p. 77.

Report of the Committee on Fuel Analysis. "Eighth Int. Congr. Appl. Chem.," vol. 27, p. 84-6.

Resinic Compounds in Bituminous Coal. S. W. Parr. "Eighth Int. Congr. Appl. Chem.," vol. 27, p. 79.

Spontaneous Combustion of Coal. H. C. Porter and F. K. Ovitz. "Eighth Int. Congr. Applied Chem.," vol. 27, p. 80-2.

Rapid Determination of Ash in Coal. H. M. Uhlmann and N. W. Buch. "Eighth Int. Congr. Appl. Chem.," vol. 25, p. 771-3.

Constituents of Coal Soluble in Phenol. J. C. W. Frazer and E. J. Hoffman. Dept. Int. Bur. Mines, Tech. Paper 5.

Sub-bituminous and Lignite Coal as Locomotive Fuel. S. B. Flagg. "Mechn. Engin.," vol. 31, 805, p. 693-4; 2 fig. 9d.

Sampling Coal Deliveries and Types of Government Specifications for the Purchase of Coal. G. S. Pope. "Chem. Eng. and Wks. Chemist," vol. 3, 26, p. 162-4 and p. 206-9.

The Use of Benzol. "Colliery Guard.," vol. 106, 2746, p. 325. 6d.

Fuel for Motor Vehicles (Spirit from Coal and Shale). "Colliery Guard.," vol. 106, 2743, p. 174. 6d.

#### XXV.—Steam Engines and Boilers.

Main and Auxiliary Plants with Turbo Engines in Modern Mine Working. (Haupt- und Hilfsanlagen mit Turbomaschinen in neuzeitlichen Grubenbetrieben.) E. Blau. "El. Maschbau," 1913, 4, p. 69-75; 2 fig., 6 ill. (Drive of electric generators, pumps, fans, compressors, &c.)

Application of Tar Oil for Power Engines and Industrial Furnaces. (Verwendung des Teeroels fuer Kraftmaschinenzwecke und industrielle Feuerungsanlagen.) W. Schoenburg. Svo., 15 p. (Samml. Berg Huettenmaenn. Abh. H. 122.) Kattowitz, Boehm.

The Smoke Nuisance. A Question of Conservation. R. C. Benner and J. J. O'Connor, jun. "Jl. Ind. Engin. Chem.," vol. 5, 7, p. 587-93; 5 fig. 3s. 6d.

A New Method of Cooling Gas Engines. B. Hopkinson. "Colliery Guard.," vol. 106, 2744, p. 218; 1 fig. (Abst. paper read before Inst. Mech. Engin.) 6d.

#### XXVI.—Compressed Air.

Rules for Determining Efficiency of Fans and Compressors. (Regeln fuer Leistungsversuche an Ventilatoren und Kompressoren.) R. Schoettler. "Fördertechnik," 1913, p. 97; ill. 2s. 6d.

Notes on the Comparative Efficiencies of Compressed Air v. Hydraulic Power in Mining Operations. "Canad. Min. Jl.," vol. 34, 12, p. 361-2. 1s. 6d.

Flow of Compressed Air in Pipes. J. A. Brown. "Am. Mach.," vol. 39, 2, p. 55-7; 1 fig. (Formule for obtaining flow of compressed air in pipes, given in chart form.) 1s.

#### XXVII.—Electricity.

Central Power Station for Mines. J. S. Jenks. "Coal Tr. Bull.," June 2. (Paper read before Am. Inst. El. Engin.)



Explosion-proof Totally Enclosed Motors and Apparatus. Schlagwettersicher gekapselte Motoren und Apparate.) H. König. "Schweiz. El. Z.," 1913, 1, p. 1-4. (Discussion of the new regulations for explosion-proof motors, issued by the Union of German Engineers. Description of various types of enclosed motors.)

Virginian Hydro-Electric Plant to Supply Coalmines. "Coal Age," vol. 4, 1, p. 2-7; 16 fig. (The mines are 60 miles away from the generating plant.) 1s. 3d.

Hydro-Electric Power for British Columbia Mines. J. Thompson. "Min. Engin. World," vol. 39, 1, p. 3-5; 5 fig. 1s. 3d.

Westinghouse Loose-handle Oil-immersed Drum Type Star-Delta Starter. "Colliery Guard.," vol. 106, 2744, p. 220; 1 fig. 6d.

#### XXVIII.—Surface Transport.

Box Car for Grain and Coal Traffic. "Railw. Age Gaz.," vol. 55, 2, p. 57-8; 3 fig. (Features of a 200 Burnett hopper bottom grain car.) 1s. 6d.

An Italian Aerial Tramway. "Coal Age," vol. 3, 26, p. 998-1002; 8 fig. (Transports about 1,000,000 tons per annum over 11 miles of rugged country to the harbour of Savona.) 1s. 3d.

Types of Self-acting Grabs. Verschiedene Selbstgreiferarten.) "Kohle Erz," 1913, 8, p. 178-86; 6 fig. (Various types for handling goods in bulk, put on the market by the Deutsche Maschinenfabrik A. G., Duisburg.) 2s. 6d.

The Coal Conveying and Stocking Plant of the Société Anonyme les Transports de Savone. (Die Kohlenfoerder- und Stapelanlage der Société Anonyme les Transports de Savone.) Pietrkowski. "El. Z.," 51, p. 1326-8; 5 ill. (The plant comprises an unloading station for ships in the port of Savona, a Pohlrig aerial ropeway, 11 miles long, from thence to Guiseppe, unloading plant and silos at this terminus which is connected with Turin and Milan by a double main line. The ropeway and handling plant are operated electrically throughout, with direct current 250 or 500 volts, transformed from 22,000-volt polyphase current in a submarine station.)

Ash and Coal Handling Equipments. H. J. Edsall. "Coal Age," vol. 4, 2, p. 38-41; 10 ill. 1s. 3d.

Telpherage Plant at a German Electricity Works. "Colliery Guard.," vol. 106, 2744, p. 217; 3 fig. 6d.

An American Coal Storage Plant. W. E. Hamilton. "Colliery Guard.," vol. 106, 2747, p. 386; 2 fig. (From "Coal Age.") 6d.

#### XXIX.—Sanitation, Diseases, &c.

Welfare Work Among Coalminers. I. D. Shaw. "Coal and Coke Op.," 1913, p. 187. (Paper read before W. Va. Coal Min. Engin.) 2s. 3d.

Notes on the Effect of Temperature in Mines in Great Britain. J. Cadman. "Trans. Inst. Min. Engin.," vol. 45, 3, p. 509-24; 3 tab. 8s.

Mine and Mine Town Sanitation. J. H. White. "Coal and Coke Op.," 1913, p. 189. (Paper read before W. Va. Coal Min. Inst.) 2s. 3d.

Industrial Diseases. "Colliery Guard.," vol. 106, 2745, p. 272. (Report of Departmental Committee on Clonic Spasm of the Eyelids.) 6d.

#### XXX.—Mining Laws, Royalties.

Mine Taxation and Mine Exhaustion. (La Ley Vigente de Tributacion Minera. V. C. Gracetti. "Ingenieria," 1913, p. 149, and p. 161.

The Influence of the New Mining Law on the Relation of Miner and Pension. (Die Einwirkungen des neuen Knappschaftsstatuts auf das Verhaeltnis der Grubenbeamten zur Knappschaftspensionskasse.) Rasch. "Kohle Erz," 1913, p. 530. 2s. 6d.

The Basis of Disposal According to the General Mine Law. (Die Grundlagen der Enteignung nach dem Allgemeinen Berggesetz. VI.) H. Gottschalk. "Glückauf," 1913, p. 778. 2s. 6d.

Improving Mining Statistics. (Zur Reform der Montanstatistik.) M. Caspar. "Montan. Rdsch.," 1913, p. 513. 2s. 6d.

Assessing and Taxing Coal in the Ground. W. Griffith. "Colliery Eng.," vol. 33, 12, p. 669-70.

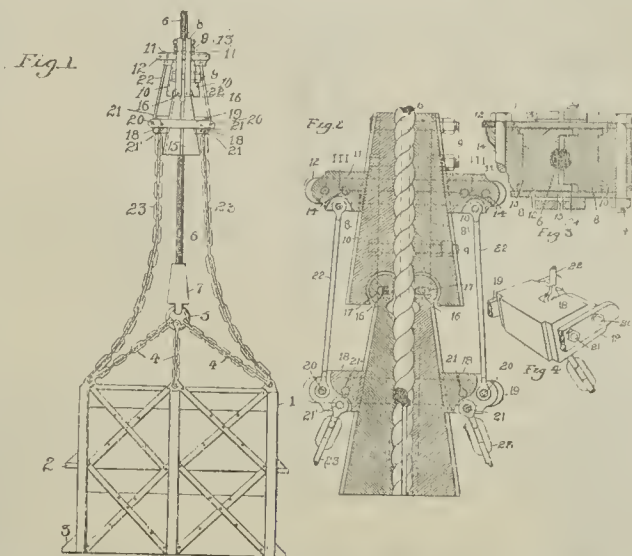
The New General Regulations. "Colliery Guard.," vol. 106, 2744. Supp. 6d.

Regulations for Ganister Mines. "Colliery Guard.," vol. 106, 2746, p. 323. 6d.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, August 19, 1913, is as follows:—Antwerp, 465 tons; Amsterdam, 568; Aalborg, 1,125; Alexandria, 1,320; Buenos Ayres, 4,958; Bremen, 1,220; Cronstadt, 25,790; Christiania, 504; Constantinople, 746; Copenhagen, 485; Drontheim, 347; Guernsey, 225; Ghent, 1,470; Harlingen, 1,354; Harburg, 8,644; Harnae, 1,632; Hamburg, 9,225; Kiel, 1,180; Nakskov, 1,005; Newfairwater, 308; Oporto, 934; Pernau, 1,825; Riga, 4,524; Rotterdam, 9,841; Reval, 1,892; Rouen, 5,854; St. Petersburg, 5,898; Stettin, 265; Stockholm, 305; Trelleborg, 3,911; Varberg, 558; Wyk, 105; Wasa, 502; total, 98,985 tons; corresponding period last year, 130,963 tons.

#### ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

1593 (1913). *Improvements in Safety Appliances for Hoists and the like.* C. Methven, of Herminie, Westmoreland county, Pennsylvania, U.S.A.—Fig. 1 is an elevation of a two-deck mining cage with improved automatic safety device applied thereto. Fig. 2 is a central vertical section of that part of the safety device in which the invention resides. Fig. 3 is a section of fig. 2 on the line III—III. Fig. 4 is a perspective view of one of the lower wedge blocks with fragments of the parts directly attached thereto. In case the chains 4 break, or the cable 6 pulls out of the socket 7, or the cable parts between the socket and the safety clamp or catch, the bridle chains 23 would be drawn



downwardly by the cage, causing the wedge blocks 18 to wedge the clamping members 15 tightly to the cable. The downward movement of the wedge blocks 18 would through the links 22 draw the wedge blocks 11 downwardly and cause the members 8 to grip the cable with greater force than they were being gripped by the action of the bolts 9. (Six claims.)

5279 (1913). *Improvements in Safety Brakes for Mine Cages or the like.* D. Wilson, 41, Market-street, Kirkcaldy.—Relates to improvements in safety braking devices for mine cages and the like, of the type including toothed pivoted

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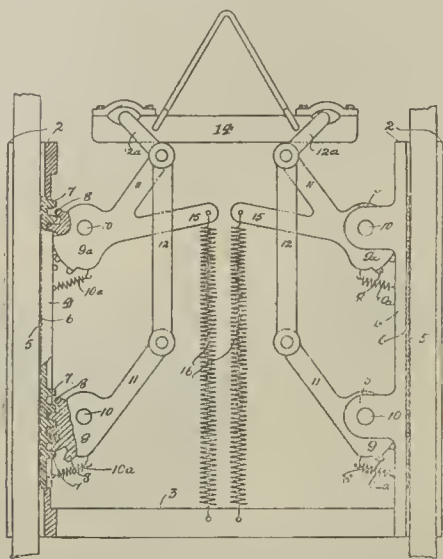
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shaped members operatively connected to the winding rope. The accompanying drawing illustrates the improved safety brake partly in side elevation and partly in section. The cam members 9 and 9<sup>a</sup> on being operated by the springs cause the brake shoes to approach the guides and contact therewith, whereupon by virtue of the engagement of teeth 8 thereof with the teeth 7 of the rack, said cams 9 and 9<sup>a</sup> are



driven by said rack which during the descent of the cage is caused to move relatively to said cams 9 and 9<sup>a</sup>. The cams in being further operated in this way apply further pressure to the brake shoes until the cage comes to rest. (Two claims.)

7938 (1913). *Improvements in or connected with Coke Ovens*. N. Schuster, of St. Stephen's House, Westminster.—Relates especially to coke ovens of the vertical type; to the arrangement of heating flues and means for controlling the direction and flow of the products of combustion there-through, whereby the carbonising chambers are evenly heated and the combustion regulated with accuracy; and further relates to means whereby the heat of the products of combustion during their passage to the chimney is largely utilised for heating the incoming air prior to its delivery to the heating flues. Fig. 1 is a sectional elevation of a battery of vertical coke ovens constructed in accordance with the invention, the section being taken through one of the carbonising chambers on the line X—Y of fig. 2; and fig. 2 is a sectional plan of the same taken on the line X'—Y' of fig. 1. The gas for combustion is admitted from the supply main H to the vertical gas passages K, but is shut off from the passages J, and thus gas is supplied to the lower heating flue L of each pair. At the same time the damper P<sup>3</sup> is open to admit atmospheric air to the flue P, while the damper P<sup>5</sup> is closed, and the damper P<sup>4</sup> of the flue P<sup>1</sup> is closed while the damper P<sup>6</sup> is open. Air is thus drawn through the chequered brickwork of the heated chambers N<sup>1</sup> of the regenerators, and passes through the flues S and

FIG. 1

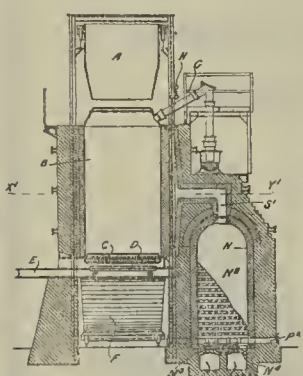
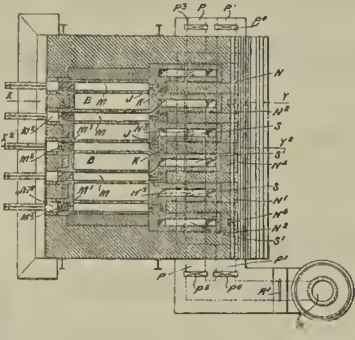


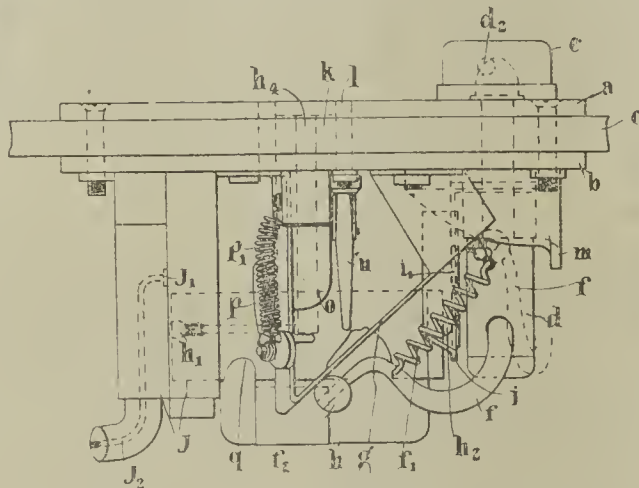
FIG. 2



enters the heating flue L of each pair. The products of combustion then pass from the flue L to the flue M of each pair, and are drawn from the flue M by the chimney draught into the flues S<sup>1</sup>, and therefrom through the regenerator chambers N<sup>2</sup> and so pass into the flue P<sup>1</sup> and to the chimney, the products of combustion giving up in their course the greater part of their heat to the brickwork in the regenerator chambers N<sup>2</sup>. Periodically the course is reversed, which is effected by shutting off the gas supply from the gas passages K and admitting the supply to the passages J. The damper P<sup>3</sup> is then closed, the damper P<sup>4</sup> opened, the damper P<sup>5</sup> is opened and the damper P<sup>6</sup> is closed. With this construction the air supply of any pair of superposed flues can be regulated by means of the dampers M<sup>1</sup>, and similarly the communication of any regenerative chambers with the chimney or outer atmosphere can be controlled by the dampers operative from the passages P<sup>2</sup>; moreover at one time of the operation the products of combustion flow through each pair of superposed heating flues in one direction, and at the next reversal flow through the same heating flues in the opposite direction, and thus the oven is capable of perfect and even heating and the air supply of any pair of heating flues can be regulated as required. (Eight claims.)

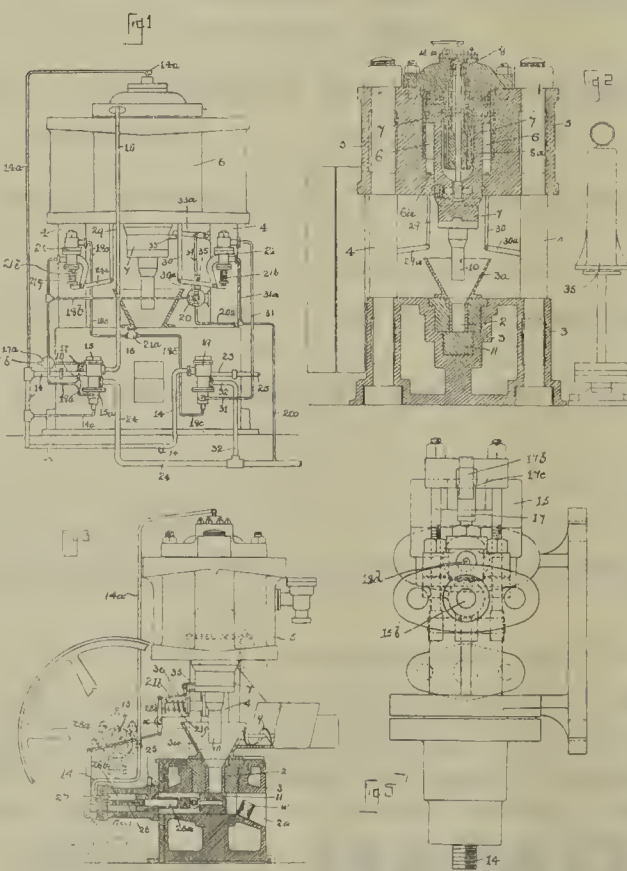
111110 (2). *Improvements in and relating to the Lighting of Mines and like Safety Lamps*. A. Paxton, Tyncoed, Cheshire.—Relates to an improved electric apparatus for lighting miners' and like safety lamps, of the kind in which a magneto generator is enclosed in a flame and gas

proof casing, and consists in the provision of the improved switch and locking arrangement for closing a contact when the lamp is in a predetermined position and for locking the whole lighting apparatus in an inoperative position when it is attempted to make unauthorised use thereof. In carrying the invention into effect, a magneto generator, which may



be of a high or low tension type, in which latter case it is used in conjunction with an induction coil, is enclosed in a flame and gas proof casing, either of insulating material or of metal, more especially iron, with flanged and well planed faces. The magneto is arranged to be driven by a suitable gear, such as pinions, worm and worm wheel, chain or belt, or by means of a coil spring or other device, such driving gear being mounted either inside or outside the casing and being operated preferably by means of a handle arranged outside the casing. The accompanying illustration is a front elevation of the switch mounted on and underneath the top part of the casing. (Five claims.)

16826 (1912). *Improvements in Hydraulic Briquetting Machinery*. G. H. Denison, of Hunslet Foundry, Leeds, Yorkshire, and C. Korte, of 10, Avenue Crescent, Harehills-avenue, Leeds.—Relates to hydraulic briquetting machines and consists in an improvement in or modification of the invention for which Letters Patent dated March 24, 1911, and numbered 7365 were obtained, and the object is to produce briquetting machinery which shall, automatically and in the specific sequence of actions hereinafter described, perform its several functions under the same conditions as are set forth in their former specification—that is to say, it is arranged that the governing of all the parts by hydraulic pressure shall be of such a character that no succeeding function can be started before the preceding function has been efficiently performed. The mechanism which compresses and forms the briquette is also employed for discharging said briquette from the mould or die, and the alterations in the several valves which govern these actions are only of such a character as will enable the water under pressure to perform the functions desired in such a manner as to efficiently perform each function before the succeeding function is permitted to commence. Fig. 1 is an elevation illustrating the press and most of its pipe connections with the several controlling valves which regulate the flow of the water. Fig. 2 is a sectional elevation showing the internal construction of the main press and die or mould within which the briquettes have to be formed. Fig. 3 is a side elevation, partly in section, showing means whereby



the compressed briquettes are dislodged from the machine. Fig. 5 is an end elevation illustrating the type of the main governing valve used for controlling the flow of the water as hereinafter described. The pressing tool, after pressing the briquette, is made to recede therefrom and subsequently to again advance to force said briquette from the mould,

its said receding and advancing movements being automatically effected by hydraulic pressure. A sliding block is so arranged that at one time it may form the base of the mould while at another time it may be withdrawn therefrom to lay bare the lower orifice therein in order that the compressed briquette may be forced from said mould. The valve mechanism is so constructed and arranged that the sliding base piece of the mould may be automatically moved by hydraulic pressure. The invention also provides for valve devices constructed and arranged so as to control the advancing and receding movements of the pressing tool by regulating the flow of water under pressure. Principal and subsidiary governing or controlling valves are arranged in conjunction with weighted devices for governing the valve devices when a predetermined pressure has been reached. (Eight claims.)

16855 (1912). *Improvements in the Production of Nitrogen from Products of Combustion*. J. Harger, Ph.D., of Grange Hollies, Gateacre, near Liverpool.—Relates to an improvement in the method of preparing nitrogen cheaply and in a comparatively pure condition, suitable for use, for instance, in preventing explosions and fires in coalmines, buildings, vessels and the like as set forth in Patent Specification No. 28075 of 1911. The nitrogen may be obtained from the products of combustion, either from boilers, or from gas engine exhaust or other sources. In the earlier specification it was suggested to eliminate the carbon monoxide and carbon dioxide when required by suitable chemicals or filters. It has been found preferable, however, to get rid of these substances by other means. To eliminate the carbon monoxide, unburnt carbon and hydrocarbons in gases which are to be used, for instance, for diluting or replacing the air in the mine, the gases are passed over a catalytic agent at the surface of which the carbon monoxide and unburnt carbon and hydrocarbons are completely burnt to carbon dioxide. Good results are obtained by passing the gases under a high pressure over a catalyst which may be at a relatively low temperature, and preferably placed in the tubes of a boiler. The pressure may be as high as 100 lb. or 150 lb. per square inch, but pressures of about 80 lb. or 90 lb. are sufficient for obtaining good results. The temperatures may be between 100 and 200 degs. Cent.—i.e., a temperature such as is usual in flue gases, when high pressures are employed as above stated. After this step, the carbon dioxide is extracted in the known way when required, by compressing and cooling the gases in presence of water, and finally cooling by expansion to such an extent that the carbon dioxide is liquefied and can be trapped off. This cooling may be performed, for instance, by causing the compressed gases to expand whilst doing work in an air engine, the exhaust from which is used to cool the compressed gas which is led to the air engine, so that the combined pressure and low temperature may be sufficient to cause the condensation of the carbon dioxide, which is separated before the gases are expanded and collected in iron cylinders or the like. The almost pure, very cold, dry nitrogen so formed may then be led by branch pipes into the various waste heaps or goafs in the case of a coalmine, which are liable to spontaneous combustion. In this way the goafs are always full of gas containing very little, if any, oxygen or carbon dioxide. It is preferable to use a gas-fired boiler as the source of the products of combustion used for preparing the nitrogen, as in this case the catalytic substance used to ensure complete combustion can be conveniently placed in the tubes of the boiler. The gases should be sent into the boiler under high pressure from an air-compressor and there mixed in exactly the right proportions for complete combustion, so that the flue gases will consist of an almost pure mixture of carbon dioxide and nitrogen with a small amount of water vapour, and perhaps a little sulphur dioxide. If the latter is present to any appreciable extent it should be eliminated before proceeding further. If the pressure at which the gases are injected into the boiler be high enough, say about 80 lb. per square inch, the subsequent compression to enable the carbon dioxide to be eliminated may be omitted altogether. A high pressure in the boiler furnace has also the advantage that the amount of gas which can be burnt on a certain quantity of catalytic material is directly proportional to the pressure. Mine gas containing a small percentage of methane—1½ per cent. or over—either alone or mixed with gas from a producer, can be conveniently used after compression in an air-compressor to heat a boiler, the tubes of which are filled with catalytic material as described. A coaldust-fired boiler in conjunction with a catalytic device may also be used with advantage, as the products of combustion are comparatively uniform in composition and the percentage of unconsumed oxygen can be reduced to a minimum. Instead of using a gas- or coaldust-fired boiler as the source of the nitrogen, the exhaust from a gas engine may be used, except where the gas engine is arranged to be scavenged with air, in which case the resulting exhaust would contain too much oxygen to be suitable for the purpose in question, and such exhaust must be modified accordingly. Ordinary flue gases may be used, but they are open to the objection that they usually contain too much oxygen and are too variable in composition. In any case the gases should be passed under pressure over a catalytic substance in order to ensure absence of carbon monoxide and smoke, and then cooled to extract the water and carbon



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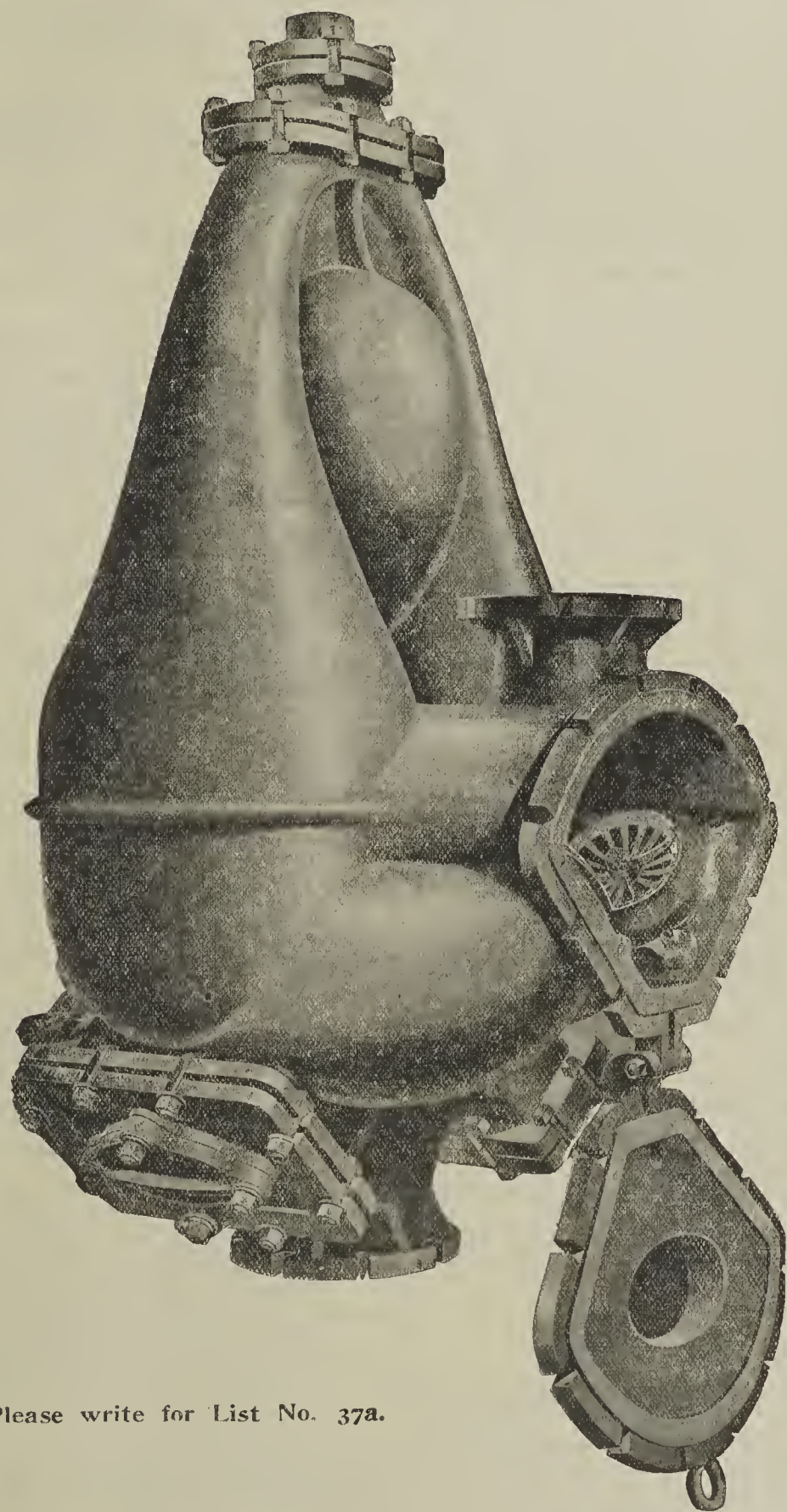
That needs no oil or packing, has nothing to get out of order, and can be left at work for weeks without attention.

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le. As a catalytic agent, various substances such as clay, asbestos, &c., may be used, but it is preferred to use titaniferous bog iron ore, as this gives very satisfactory results. The bog iron ore may be mixed with fireclay and moulded and burnt into small bricks or other shapes, or it may be used in the form of lumps about  $\frac{1}{4}$  in. by 1 in. after burning off the organic matter. The temperature of the gases leaving a Lancashire or other boiler, while not nearly as great as that of the exhaust from an internal combustion engine, is quite sufficient to enable the catalyst to work. Thus, it has been found that titaniferous bog iron ore will induce the combination of carbon monoxide at a little below 200 degs. Cent. At any temperature above 200 degs. Cent. it acts rapidly and completely. The heat of the burnt gases after passing over the catalyst may be used to heat up feed-water, and in the case of a gas-fired boiler to heat the air and gas supplied to the boiler, &c. Such catalysts will convert carbon monoxide into dioxide if sufficient oxygen is present. It is, however, a disadvantage to have always an excess of oxygen to allow for slight variations in the composition of the gases. For this reason it is preferred to use an equilibrator for supplying oxygen when required, and absorbing any excess of it at other times. The equilibrator contains a partially oxidised mass of granulated copper or scrap copper wire. If there is excess of carbon monoxide, it is oxidised by the copper oxide, while if there is an excess of oxygen, it is removed by the copper that is simultaneously present. In setting up the apparatus a slight excess of air must be admitted to oxidise some of the copper, but in normal working, when sufficient copper oxide has been once formed, only the exact amount required for complete combustion is allowed. Owing to fluctuations of pressure and other conditions, there will be at one time a slight excess of air, and at another time a slight excess of gas. The equilibrator is preferably constructed so as to contain not only the partially oxidised mass of granulated copper or scrap copper wire, but also the titaniferous bog iron ore or other catalyst. The apparatus may be made of iron divided into two parts, the first of which contains the catalyst. The second part containing the copper may be fitted with a silica plate, so that any prolonged reducing or oxidising action can be seen and remedied by regulation of the quantity of air supplied to the boiler or internal-combustion engine. By means of this apparatus, a constant supply of inert gas of known composition and entirely free from carbon monoxide is automatically obtained. If desired, the copper and copper oxide may be placed in the tubes of the boiler itself to act both as catalyst and also as an equilibrator, while the gases are passed over the material at a high pressure. Before treating the resulting gases to remove water and carbon dioxide, any sulphur dioxide present should be eliminated. This is easily done by passing the gas through a small scrubber charged with limestone. If a gas engine is used it is better to take out the sulphur compounds before the gas reaches the engine. The gases are then compressed by an air-compressor in the ordinary way and again the heat evolved may be utilised for heating up feed water for other purposes. The gases still under pressure are cooled to the ordinary air temperature in any suitable way and then led to a part of the mine or the building where power is required. Traps are arranged at intervals along this pipe in order to run off the water that condenses. The compressed gas may now be used for doing work in an air engine, and the carbon dioxide separated from the compressed gases as described. (Three claims.)

#### PUBLICATIONS RECEIVED.

"Proceedings of the South Wales Institute of Engineers" (vol. 29, No. 4), price 5s.; "Trade of the Union of South Africa, Southern and Northern Rhodesia, and British South Africa for the Month of June," price 3s. 6d.; "Revista Tecnica del Ministerio de Obras Publicas, Publication Mensuel" (Año 3, No. 30).

#### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

Statutory Rules and Orders: Workmen's Compensation Industrial Disease, 1½d.

Consular and Trade Reports, 1912: Italy, Naples, 2d.; Spain, Barcelona, 7d.; Russia, Finland, 5½d.; New Zealand, 3½d.; Affairs of China (China No. 3, 1913, 11d.).

Bills: Education Acts (1870-1911) Amendment Bill, 1½d.; Housing of Working Classes, No. 2, Bill, 2d.

Acts, 1913: Finance, 1d.; Children (Employment Abroad), 1½d.; Crown Lands, 1d.; Companies, 1d.; Bankruptcy and Deeds of Arrangement, 4d.

MINES AND QUARRIES REPORTS: Scotland District, 1s. 8d.; Ditto, Part I., District Statistics, 8½d.

Foreign Trade and Commerce: Figures to July 31, 1913, 5½d.

Statement of Trade, Vol. II., 1912, 4s. 6d.

Monthly Returns of United Kingdom for 1912, 1s. 7d.

Report of L.G.B., 1912-13, Part II., Housing and Town Planning, 1½d.

Second Report of Patent Fuel, by A. H. Lush, 2½d.

Part I. Report, 1912, 8½d.

#### NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

##### Applications for Patents.

18694. Safety lamps or the like and apparatus in connection therewith. E. A. Hailwood.  
18705. Compound for treating coal and like fuel. J. H. Harris.  
18712. Railway vehicle couplings. O. Claus and R. Claus.  
18717. Axle lubricators for colliery trams, tubs, corves, and like vehicles. H. T. Williams and A. Johnson.  
18735. Process of desulphurising shale oils obtained from Kimmeridge and like shales, and producing valuable products therefrom. W. A. Hall.  
18740. Method of sinking shafts, and of rendering the linings and walls thereof waterproof. E. Andre.  
18769. Recovery of nickel from its ores. H. L. Sulman, H. F. K. Picard, and A. E. Roberts.  
18783. Machinery or apparatus for the manufacture of tin, terne, and like coated metal plates or sheets. R. Thomas and Co. Limited, and J. Lewis.  
18785. Driving chains. C. G. Renold and Hans Renold Limited.  
18796. Indicator and annunciator for use with winding and other engines. J. Davis.  
18806. Treatment of slag for the manufacture of bricks and for other purposes. W. E. Evans. (Edgar Rouse Sutcliffe, Belgium).  
18821. Ovens and driers suitable for use in the manufacture of tiles, bricks, pottery and analogous ware for annealing and for other purposes. C. Dressler.  
18822. Manufacture of fuel. W. Smith.  
18833. Method of and means for effecting the efficient transmission of electric signalling impulses through insulated cables and wires. A. Williams.  
18853. Fuel briquettes. G. F. Humphrey and G. A. Ratten.  
18856. Purifying steel. E. Humbert.  
18858. Turbine installations. Vulcan Werke Hamburg und Stettin Akt.-Ges.  
18860. Couplings for railway and like vehicles. L. Boirault.  
18865. Turbines. C. T. Owens.  
18866. Coating sheet steel or iron by dipping. P. B. Taylor.  
18880. Rope haulage clip. H. S. Hunter and W. Bell.  
18884. Picking belts. J. Bagshaw.  
18887. Steam-generating plant. J. Masters.  
18908. Means for facilitating the control of the combustion in steam boiler and other furnaces. S. J. Ross and H. Schofield.  
18912. Method of increasing the rate of transmission of heat in the chequer-brick heaters of blastfurnaces. A. Pfoser, O. Strack and Gebrüder Stumm G.m.b.H.  
18920. Treatment of lignite. T. Rigby and N. Testrup.  
18932. Treatment of peat or bog material for industrial purposes. A. Dickson.  
18937. Ore concentration. G. A. Chapman.  
18943. Method of separating materials of different specific gravities. L. A. Dibdin.  
18944. Separation of ore. E. Primosigh.  
18970. Pulleys and guide rollers for haulage ropes and chains. R. McGregor and McGregor Brothers Limited.  
18984. Treatment of peat, sawdust, nut shells and other ligneous or carbonaceous materials. R. F. Strong.  
19072. Portable closets or commodos for use in mines and the like. C. W. Roberts and D. W. Cooper, trading as Wollescote Galvanising Company.  
19075. Expanded metal sheets. G. E. Montagnon and F. Atkinson.  
19111. Manufacture of armour-plate. S. O. Cowper-Coles.  
19112. Process for the concentration of ores. S. O. Cowper-Coles.  
19169. Methods of and apparatus for raising or forcing liquids. H. A. Humphrey and W. J. Rusdell.  
19191. Method of and apparatus for producing cement and the like from blastfurnace slag and like smelting products. W. Lessing.

##### Complete Specifications Accepted.

To be published on September 11, 1913.  
1912.

14376. Apparatus for making coke and gas. Nelsen.  
15217. Metal pipes and connections for use in tin-plate works or the like. Hooper.  
16493. Method of distilling benzol hydrocarbons from saturated wash-oil or benzolated creosote. Still.  
16940. Method and apparatus for grading or sizing solid materials. McKesson and Rice.  
18650. Process and apparatus for automatically recording particulars of the wagons entering and leaving railway-station yards, depots or the like. Sokoloff.  
18705. Regulation of the air supply to gas-producers and retort settings. Brooke.  
19013. Self-contained automatic steam pump. Rava.  
19026. Quadruple-acting horizontal suction pump. Thould, and Grice-Hutchinson.  
19074. Building bricks or blocks. Predragovic and Speiser.  
19125. Steam condensing plant working under vacuum. Morison.  
19171. Valves and valve gear for reciprocating fluid-pressure engines. Douglas.  
19223. Driving wheels for conveyors. Read.  
19224. Means for facilitating the transfer by conveyors of material stored in bulk. Read.  
19489. Smoke-consuming and fuel-economising apparatus for furnaces and the like. Thomas.  
19574. Process for the removal of metallic zinc from galvanised iron. Beringer.  
19588. Volume indicators, particularly for use with fluid-pressure braking apparatus. Jackson.  
20675. Weighing apparatus. Denison.  
22467. Safety grip on sides of pit shafts with overwinding appliance. Yardley.  
23100. Drilling or boring machine operated by pressure fluid having working cylinders arranged at an angle to each other. Pokorny and Wittekind Maschinenbau Akt.-Ges.

25936. Apparatus for separating light or smaller material from heavier or larger material by means of water currents, applicable to cereals and their products, and for cleansing fruit and seeds, and for the separation of large and small particles of minerals in a granular state. Higginbottom.  
27493. Means for punching sheet material. Rogers.  
28336. Over-speed and overwind prevention gear for colliery winding-engines and the like. Yates and Miller.

1913.

70. Systems for the distribution of oxygen. Dragerwerk Heinr. and Bernh. Drager.  
1142. Processes for preparing synthetically ammonia or other nitrogen-hydrogen compounds. Hlavati.  
2349. Vaporisers for suction gas-producers. Dallas and Storey.  
5588. Level and clinometer. Davies.  
6073. Centrifugal pumps. Sefton-Jones. (Kiefer.)  
6599. Tubes of tabulous steam-generators. Soc. J. and A. Niclausse.  
10164. Eflexible electric conductors. Western Electric Company. (Western Electric Co.)  
10266. Steam regenerative-accumulators. Fried. Krupp Akt.-Ges.  
16341. Apparatus for and process of purifying blastfurnace and other gases and freeing them from dust particles. Smith, Bagley, and Feilmann.  
11871. Lubrication of apparatus for rolling metal plates. W. Gilbertson and Co. and Jenkins.

##### Complete Specifications open to Public Inspection before Acceptance.

1913.

13463. Hoisting buckets. Brosius.  
18336. Transitory coupling for coupling a claw coupling with a screw coupling. Scheib, jun.

#### CATALOGUES AND PRICE LISTS RECEIVED.

The Chicago Pneumatic Tool Company send us catalogues of enclosed self-oiling compressors and the "Rockford" railway motor cars.

The A.E.G. Journal for July contains particulars of a new oil engine; also, an account of the company's activities in Silesia, and the arrangements carried out in their factories for the prevention of industrial accident.

The Machine Mining Monthly for July contains an excellent illustrated description of the Diamond Coal-cutter Company's exhibit at the recent Mining Machinery Exhibition at the Agricultural Hall. The company are now stocking a high-class steel for coal-cutter picks.

Messrs. Curtis's and Harvey Limited (Cannon-street House, E.C.) will be glad to send one of their "Little Shooter's" year books on receipt of a penny stamp to cover postage. The year book contains a diary and useful statistical and other information, upon which much care has evidently been bestowed.

Messrs. Herbert Morris Limited, of Loughborough, favour us with a catalogue describing a "2240" pulley block of the American type. The block is fitted with a one-way automatic brake, which allows free rotation in lifting and creates sufficient resistance in lowering to keep the load in balance. All the chains are made of treble-refined iron. The booklet describes a few other manufactures of the firm, including the H.M.B. pulley block worm-gear, the H.M.B. travelling pulley block (spur-gear), the Q.E.F. runway, the Morris hand overhead travelling crane, the "wedge-lock" hoist block, &c.

The new catalogue that has just been issued by Messrs. W. H. Willcox and Co. Limited, of 38, Southwark-street, S.E., is a wonderful production. Measuring 9 in. by 12 in., it contains 735 closely-printed pages of superfine paper testifying to the wide range of activities covered by the firm. It would be impossible to give here more than a brief indication of the contents, which relate to lubricants and general stores, engine fittings and boiler mountings, pumps, hoses, &c., lamps, shafting, lathes, tools, winches, &c. There is no engineer who will not find this volume of service to him.

"Modern Appliances for Mine Blasting" is the title of a little brochure issued by Messrs. Alfred Field and Sons, of Newcastle-on-Tyne and Annfield Plain, describing some of the shot-firing appliances supplied by them. This firm adopt a special method of coiling and stringing detonators, which obviates entanglement and kinking; their cartridges also are packed in patent glass cases, having an inner tube with sealed end for receiving the detonator. The pamphlet shows various patterns of connectors of T or Y form, and there is an illustration of a simple method of water stemming. In conclusion, some useful directions for use in general blasting are given.

**Partnerships Dissolved.**—The London Gazette announces the dissolution of the following partnerships:—H. H. L. Lewis and W. Hendra, both of Townmead-road, Fulham, trading under the style of Lewis, Hendra and Son, iron-founders; C. Richards, A. E. Wilcox, and H. E. Pitman, carrying on business as furnishing and general brass-founders, at Paragon Works, Henrietta-street, Birmingham, under the style of Wilcox and Pitman, so far as regards C. Richards; R. Knowles, W. Knowles, F. Aspdon and R. Bury, carrying on the business of quarry proprietors, under the style of the Moss Crop Quarry Company, at Darwen; R. F. Tyhurst and R. G. Tyhurst, carrying on business as coal and builders' merchants, at Uckfield, under the style of Tyhurst and Son.



# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY, SEPTEMBER 5, 1913.

No. 2749.

## THE SINKING AND EQUIPPING OF BEDWAS COLLIERY.\*

By EDMUND L. HANN.

In the following paper the author endeavours to give an account of the sinking and the lay-out of the Bedwas Colliery as far as possible without repeating what has already been placed before the institute in the paper on "The Sinking and Equipping of Penallta Colliery." Whilst the sinking and lay-out of the Bedwas Colliery has to a large extent followed Penallta, there have been some considerable modifications, partly due to local circumstances and partly to the experience gained at Penallta.

The shafts, both of which are 21 ft. diameter, are sunk on a north and south line and on the side of the Brecon and Merthyr Railway, half-a-mile east of Bedwas Station, and are to the south of the main anticlinal, the dip of the strata as found being 9 in. in the yard.

also so that the engine could be coupled up as a single cross-compound.

A Robey cross-compound air compressor, capacity 5,000 cubic feet of free air to 90 lb. pressure, with drop valves on the steam cylinders and Daw valves on the air cylinders. (This compressor is now being fitted with new air cylinder ends with disc air valves.) Main dimensions:—Steam high-pressure cylinder, 24 in.; low-pressure cylinder, 44 in.; air high-pressure cylinder, 26 in.; low-pressure cylinder, 40 in.; stroke, 48 in. It was ordered of ample capacity, so that all pumping which could not be conveniently done by electrical centrifugal pumps could be done by compressed-air reciprocating pumps.

Owing to the bad reports of the water available for feed water locally, it was decided to use Lancashire boilers, and in the first instance three boilers 30 ft. by 8 ft. 6 in., with dished ends and corrugated flues, were ordered, whilst during sinking operations three addi-

washed duff, 17,023 tons; total value at Bedwas, £7,786. The author has been supplied with figures from the Penallta sinking. The value of coal used—assuming the cost at the pit to be the same as Bedwas—was £16,301. The difference is no doubt largely accounted for by the shorter time taken in sinking at Bedwas and additionally by the fact that a mixed-pressure turbine was available during the greater part of the sinking, and practically the whole of the electric power required for pumping, ventilating and small surface motors was generated from exhaust steam from the winding engines and air compressor.

A 500 kw. 3,000 volts 50 cycles Belliss-A.E.G. reciprocating set was ordered to drive all small motors, for lighting, and to do any electric pumping that might be necessary before the larger electric generators were installed.

The headgears on both pits are built of rolled steel joists, the height to sheave centres being 70 ft. The

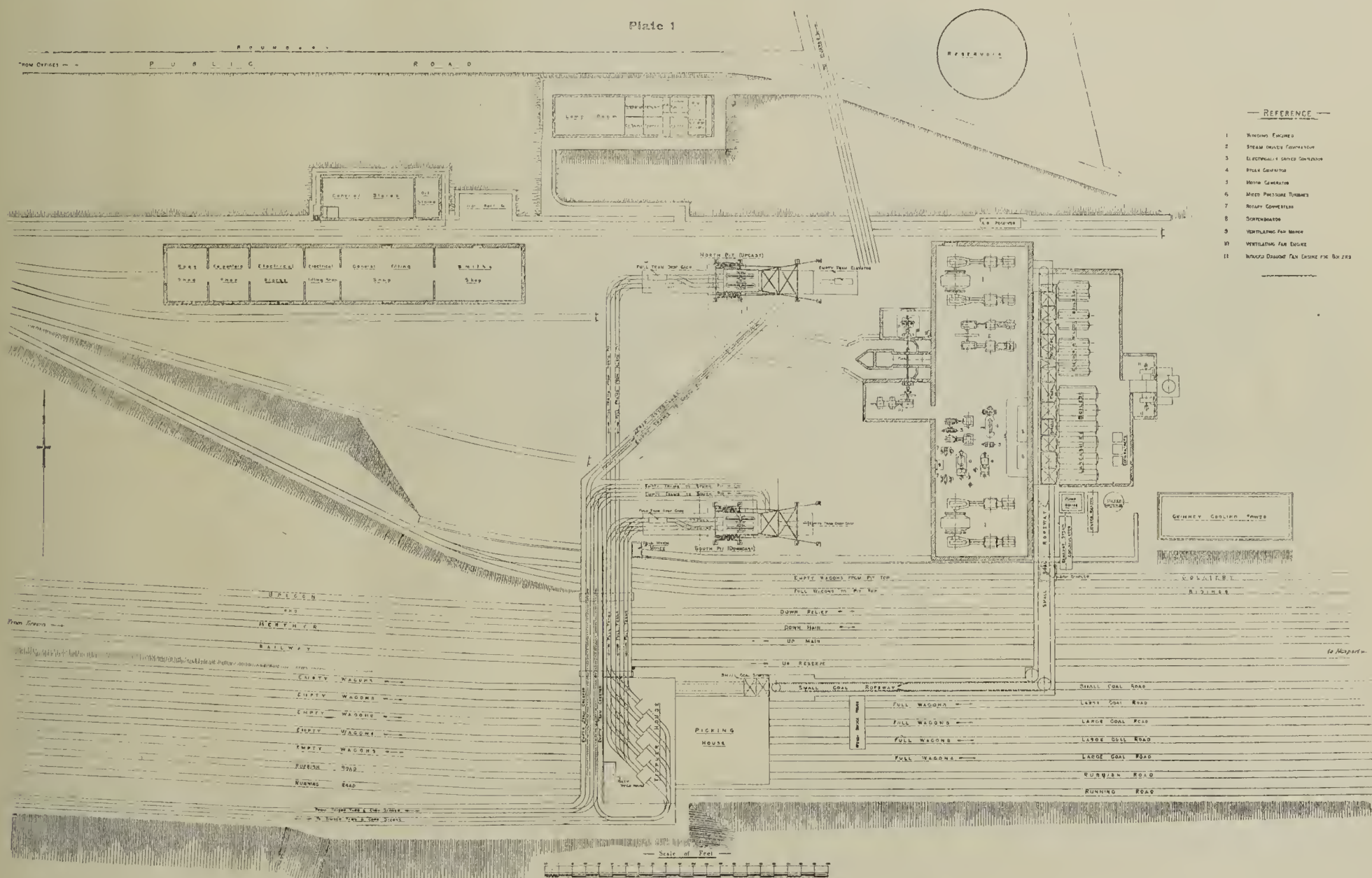


FIG. 1.—PLAN OF GENERAL LAY-OUT OF SURFACE.

### Plant for Sinking.

It was decided to instal the permanent plant before sinking, and consequently the following plant was ordered immediately the site of the pits was fixed:—

Two pairs of four-cylinder tandem compound drop-valve winding engines by Robey and Co. (The superheat 120 degs. Fahr., and steam pressure 160 lb. per square inch, which were decided upon were considered to be rather beyond the limit for the satisfactory operation of Corliss valves. The main dimensions are:—High-pressure cylinders, 31 in.; low-pressure cylinders, 52 in.; stroke, 72 in. The drums are semi-conical, with three dead coils and three live coils on 14 ft. diameter, rising in three coils to 22 ft. diameter, the drum being so arranged that during sinking operations the diameter should be 14 ft. and parallel, and

tional and similar boilers were installed. By combining the corrugated flue with the dished end it was hoped to get rid of the trouble usually resulting from the extreme rigidity of the dish-ended boiler, and experience has shown that this trouble has been to some extent reduced. Sugden's superheaters were fitted to each boiler and a Green's economiser. A Sirocco induced draught fan was installed with the intention of adding a second similar fan at a later date on the other side of the chimney. A Kennicott water softener of 10,000 gallons per hour capacity and a CO<sub>2</sub> and draught-recording apparatus were put down at the same time.

It may be of interest to give particulars of the amount of fuel used during sinking—i.e., from the time that the site was taken over, to the completion of actual sinking work. The coal was purchased from various local collieries, and the quantities and value on site are as follow:—Ordinary unwashed small coal, 1,480 tons;

plant ordered so as to be ready to deal with any water that might be met consisted of two sets of Weisc and Monski electrically driven sinking pumps; these pumps were described in Mr. George Hann's paper\* on "The Sinking and Equipping of Penallta Colliery." However, during sinking at Bedwas, owing to the fact that all the large feeders which were met were immediately caught, these pumps were never used, and have been disposed of to the Powell Duffryn Company for the Britannia sinking, where they have been successfully employed. In addition to these there were available one 5,000 gallons per hour, one 10,000 gallons per hour, and one 15,000 gallons per hour compressed-air pumps, all capable of throwing about 300 ft. with 80 lb. compressed air.

At both pit tops, runners operated by compressed air were used in the first instance, though in the case of

\* From a paper read before the South Wales Institute of Engineers and published in the *Proceedings*.

\* *Proc.*, vol. xxvii., No. 1, p. 47.



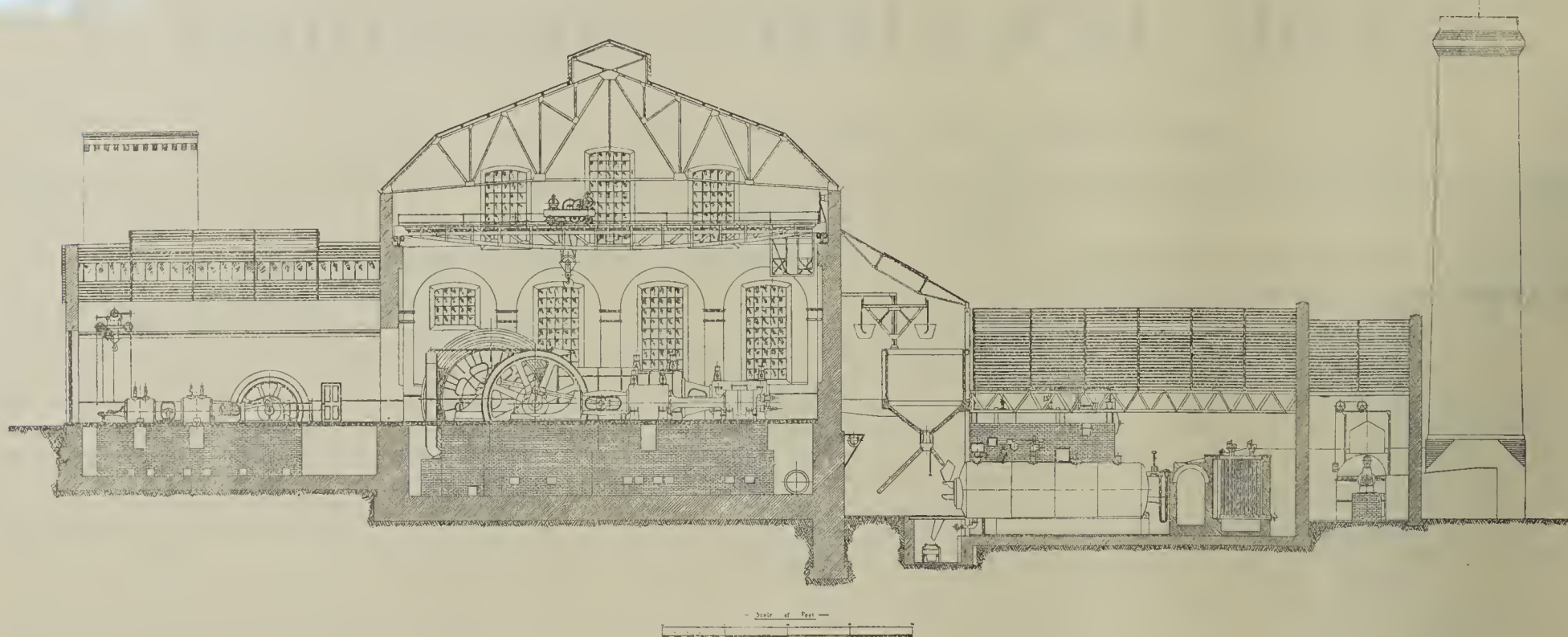


FIG. 2.—CROSS SECTION THROUGH ENGINE-HOUSE AND BOILER-HOUSE.

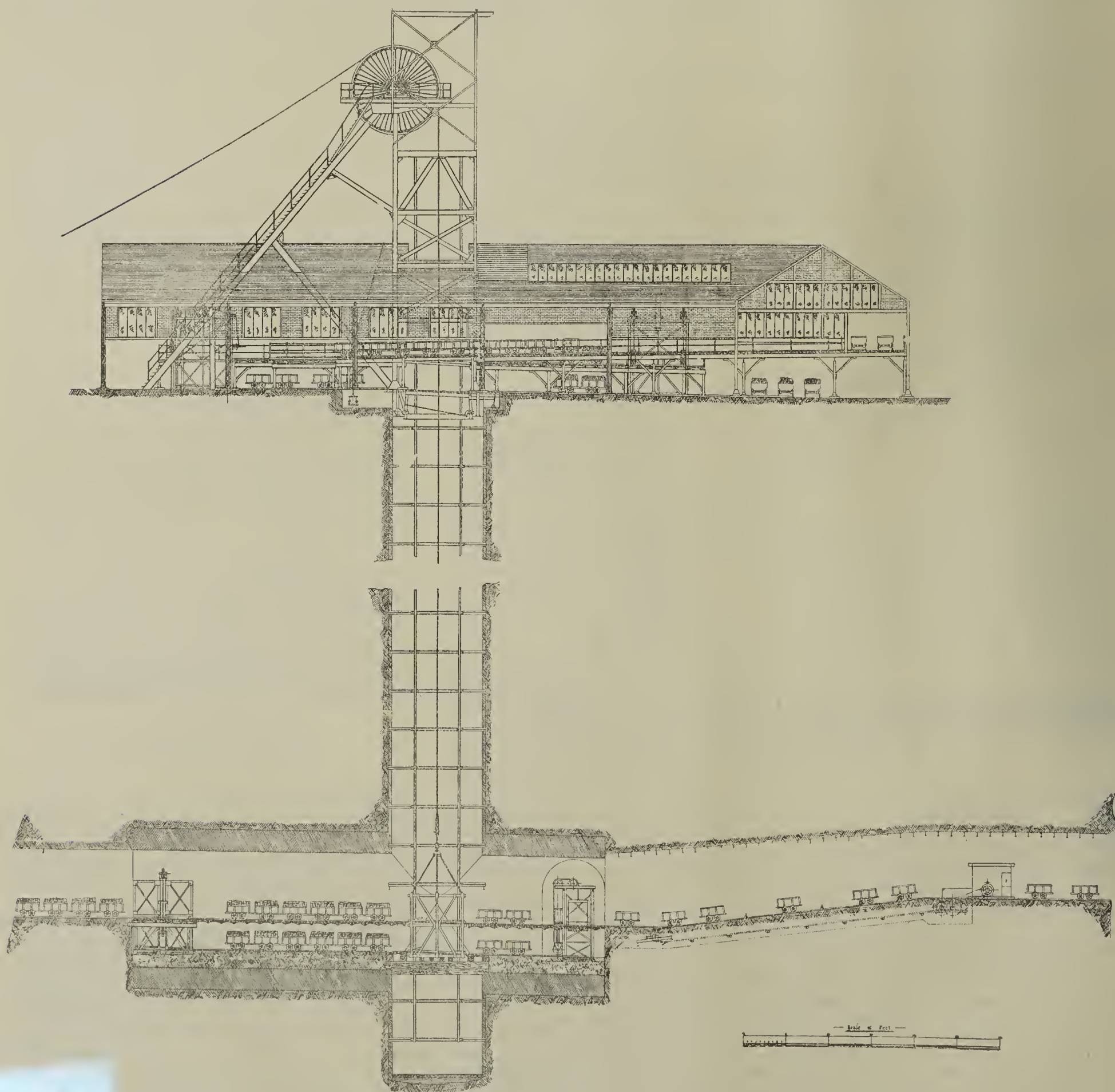


FIG. 3.—SOUTH PIT TOP AND SECTION THROUGH SOUTH PIT BOTTOM.



the North Pit at a later date, and at the request of the contractor, folding doors were substituted in order that guides might be used. It may here be mentioned that although the locked coil ropes from the walling-stage capstan were used as guides, there was one occasion on which the runner stuck in the shaft and afterwards fell down on to the bowk; fortunately, at the time there were no men in the bowk. After this experience it was not deemed desirable to use guides in the South Pit. From the experience at Bedwas the writer is of opinion that in taking into consideration the advantages and disadvantages of both systems, the Rule 40, sub. (3) of the Coal Mines Act, 1911, is more likely to increase the number of accidents than otherwise, unless the exemption by inspectors, as provided for, is freely given.

The sinking of the two pits was proceeded with by crane to a depth of about 50 yards during the erection of permanent machinery, and water-tight work was put in to hold back the surface water. This work consisted in concentric brickwork with a 2 in. cavity filled with cement. On April 4, 1910, the sinking commenced in the North Pit with the permanent machinery. At a depth of 80 yards from the surface a feeder of 9,000 gallons per hour was struck; great care was taken to catch the water at this point, and a 10,000 gallon Pearn duplex pump was put in a hole in the side of the shaft, sinking being suspended for three days (April 23 to April 26). At a distance of 150 yards 6,000 gallons per

The ventilation was done by means of an electrically-driven Sirocco fan of 8,000 cubic feet per hour capacity at the top of each pit, and air pipes 2 ft. in diameter were used in the shaft, whilst great care was taken to keep good joints throughout the pit.

The South pit sinking started with permanent machinery on May 27, 1910, the pit being then 54 yards deep. At a depth of 87 yards a feeder of water, 8,000 gallons per hour, was struck, and sinking was carried on with a water barrel to 94 yards (June 30), when sinking stopped to make a hole in the side of the shaft for a 15,000-gallon duplex Pearn pump. On July 8 sinking was resumed. At 102 yards a further 3,500 gallons per hour was struck, increasing to 6,000 gallons at a distance of 120 yards. A 5,000-gallon horizontal compressed-air pump was fixed on byatts in the shaft, pumping to the 15,000-gallon pump. Sinking was stopped on August 29, 1910, to make lodge-room for a 20,000-gallon electrically-driven centrifugal pump, and sinking was resumed on September 6. At 200 yards a further quantity of water was struck, and at 216 yards this water increased to nearly 10,000 gallons per hour; it, however, later decreased to 7,000 gallons per hour. On October 28 sinking was stopped to make a hole in the side of the shaft for a 10,000-gallon Pearn duplex pump for pumping to surface. Sinking was resumed on November 3. At a depth of 296 yards more water was struck, amounting to 3,400 gallons per hour, and a

water which were met, were that an ample supply of pumps was kept at the colliery, and that even with 8,000 gallons per hour making at the bottom of the pit it was possible to proceed with sinking until a pump could be installed at the week-end, due to the winding engines being sufficiently powerful to enable an 800-gallon suction water barrel to be used.

Out of a depth of 1,594 yards sunk in the two pits 1,045 yards, or approximately 65½ per cent., was in rock. With the pressure of compressed air which was available (90 lb. per square inch) most of the rock did not present any particular difficulty, but naturally the speed of sinking was less than is usual in shale and does not compare with the speed attained in the Midland coalfield, where the strata are of a very soft nature.

The whole of the sinking was carried out by Mr. Fred Piggott, mining contractor, Caerphilly.

#### Surface Equipment.

The general lay-out of the surface will be gathered from the accompanying plan (fig. 1).

The position of the engine-house was fixed so that the pit bottom arches would be in line with the level course of the strata.

In addition to the plant described above, which was put down before sinking, the whole of the necessary surface plant for dealing with 2,000 tons of coal per day was proceeded with whilst the sinking operations were progressing.

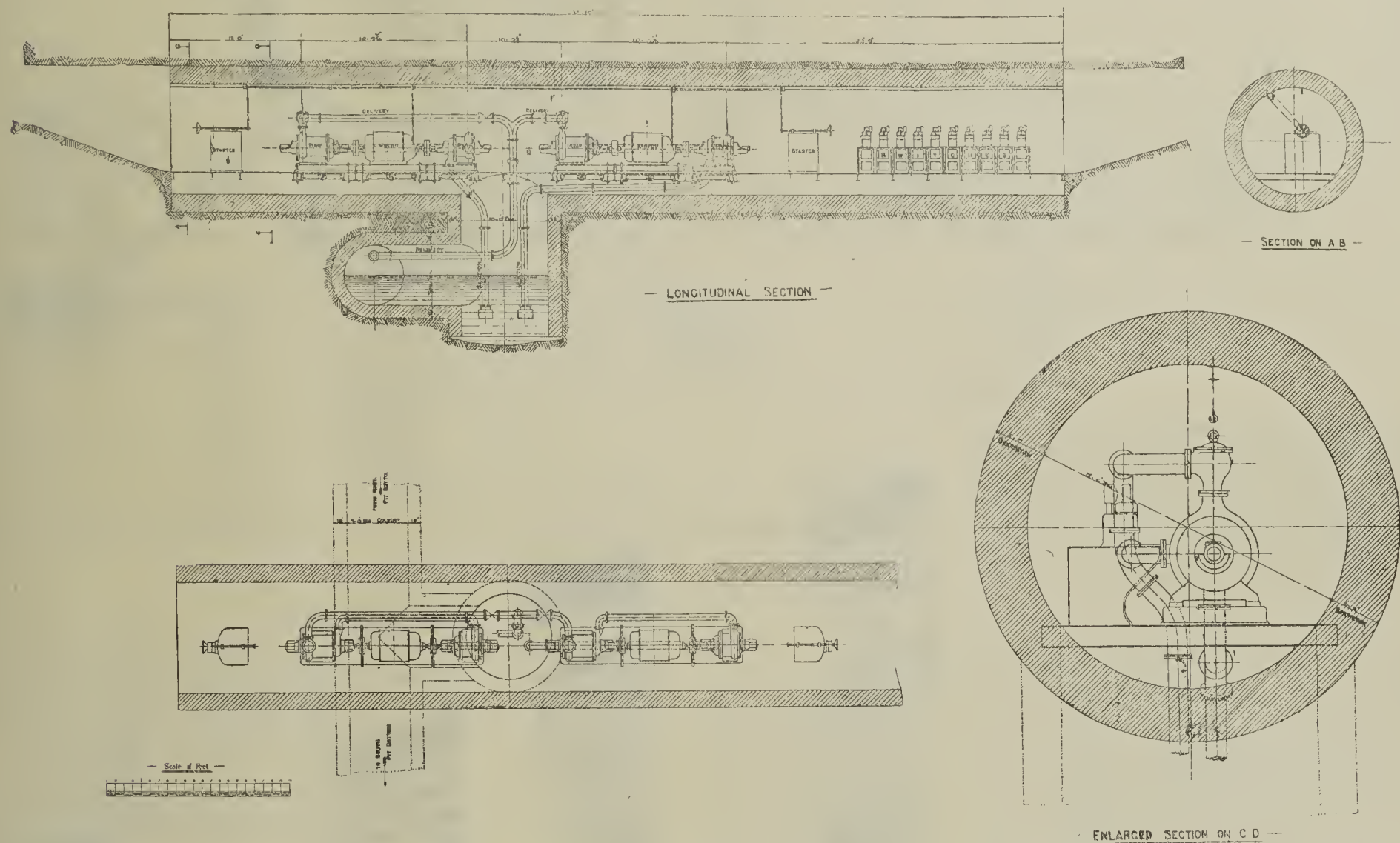


FIG. 4.—ARRANGEMENT OF PUMP ROOM BETWEEN NORTH AND SOUTH PITS.

hour was struck, and a pump was installed in a hole in the side of the shaft. Sinking was stopped three days (June 27 to June 30). At 250 yards another feeder of 6,500 gallons per hour was struck, but sinking was continued with the water in the bottom to 321 yards; during this time the water was wound up by a suction barrel of 800 gallons capacity. On November 11 the sinking was stopped to make a lodge-room and pump-house for a 60,000 gallon per hour Sulzer pump at the 315 yards line. This was completed, and cable, pipes, &c., put in by December 8. From this point the sinking proceeded rapidly to 590 yards, when it was decided to make a hole in the Big Rock seam and fix a 5,000-gallon pump to throw to the Sulzer pump, so as to get rid of a small feeder of water (3,000 gallons per hour) which was delaying the sinking. This work was done during week-ends, in order to avoid any delay in sinking. The Black Vein was proved on November 11, 1911, at a depth of 768 yards.

Although the North pit throughout was the leading pit, a considerable amount of water was struck in the South pit. In every case this was separately dealt with, so as to avoid the loss of time which would be involved in holing through between the pits, and the North Pit was at a depth of 730 yards when the first holing was made, whilst it was then chiefly done in case a large quantity of gas should be tapped in the steam-coal measures.

compressed-air pump was again placed upon byatts in the shaft, pumping to the 10,000-gallon pump. On June 19, 1911, at a depth of 540 yards, the Little Rock seam was struck, and at 602 yards on August 2 the Big Rock seam was proved. Sinking was suspended from August 5 to August 12 for driving a heading in the Rock seam. At a depth of 670 yards, 3,000 gallons per hour of water was struck. On October 23, 1911, sinking was suspended to drive a heading in the Rock seam from the South to the North pit to take a column of water pipes from a pump placed at a depth of 685 yards in the South pit, pumping water to a pump in the North pit at 527 yards. Sinking was resumed on November 30. At a depth of 755 yards the Big Vein was proved, and at a depth of 789 yards, on February 16, 1912, the Black Vein was reached, the total depth of the South pit to the bottom of the sump being 804 yards.

The average speed of sinking from the time of commencing with the permanent machinery to the completion of the sumps—i.e., including all time taken in fixing pumps, making lodge-rooms, &c., and holidays, was 8.33 yards per week, and excluding making lodge rooms and holidays 9.33 yards per week. Many of the feeders enumerated above decreased after a few weeks, and it was found that the permanent water amounted to 45,000 gallons per hour.

The two main factors which enabled the speed of sinking to be maintained through the many feeders of

**Boiler-house.**—The boilers are situated immediately behind the engine-house and are covered over with a slate roof. The number of Lancashire boilers was increased to six. It was then decided to instal two Babcock and Wilcox units, each capable of evaporating 20,000 lb. of water per hour, with chain-grate stokers.

It was further found that with Lancashire boilers working at high pressure it was necessary to start up very carefully so as to avoid strains. With water-tube boilers fitted with chain-grate stokers, in cases of emergency the writer has repeatedly seen boilers started up from dead cold and raising steam at 150 lb. per square inch in less than one hour. The question of ground space occupied showed a large saving in favour of the water-tube boilers, which is generally accepted as being not less than 30 per cent.

The chain-grain stoker referred to is a modification of the travelling chain-grate stoker which has been for many years largely used for burning bituminous coals from other coalfields. These modifications, which were necessary in order to burn Welsh coal, were evolved at Penrikyber Colliery by Messrs. Babcock and Wilcox after some years of experiment. For burning Welsh coal it was found necessary to modify the boiler setting, so that the same high furnace temperature necessary for complete combustion was established by the more direct radiant heat given off by the Welsh coal. Again, it was found that on account of the Welsh



containing a much higher percentage of fixed carbon, it was necessary with this design of furnace to arrange the arches so that the full arch effect was maintained at a later point in the furnace than in the case of the bituminous coals—in other words, the coal which undergoes gradual distillation after entering the furnace in an absolutely level layer, is slowly carried forward into an increasing furnace temperature until it has been wholly reduced to ash and clinker. An eight-hours test taken at Penrhybydd with hand-firing done by the ordinary fireman without any special instructions and using ordinary unwashed small coal, showed the efficiency of boiler, furnace and superheater to be under 60 per cent., and the author considers that this result is

pipes are all of mild steel, with electrically welded flanges, which are drilled to the British Standard Table 11. Two Sirocco induced-draught fans are placed one on either side of the chimney, each being capable of dealing with the gases from the whole of the boilers required under steam.

The fan is one of Walker's Indestructible type, capable of producing 400,000 cubic feet of air at 5 in. w.g. running at 135 revolutions. On both ends of the fan shaft Hele-Shaw clutches are fitted, on the one side for steam-engine drive and on the other side for motor drive. This enables the drive to be changed from steam to electric, or *vice versa*, whilst the fan is working.

The engine is a 500-b.h.p. Paxman-Lenz horizontal

vacuum. The exhaust-steam piping is so arranged that either the engines can exhaust into the accumulator, or, if the turbine is not running, into the condenser direct. Any surplus steam from the accumulator which cannot be used by the turbine is taken to a feed-water heater, so that no exhaust steam escapes to the atmosphere unless the feed water is already at approximately boiling point.

After taking into consideration the conditions prevailing, it was decided that the maximum compressed-air demand should be taken as 8,000 cubic feet per minute at 80 lb.; and as there was already a 5,000 cubic feet compressor installed, it was considered the best policy to put in a further two compressors of 4,000 cubic feet

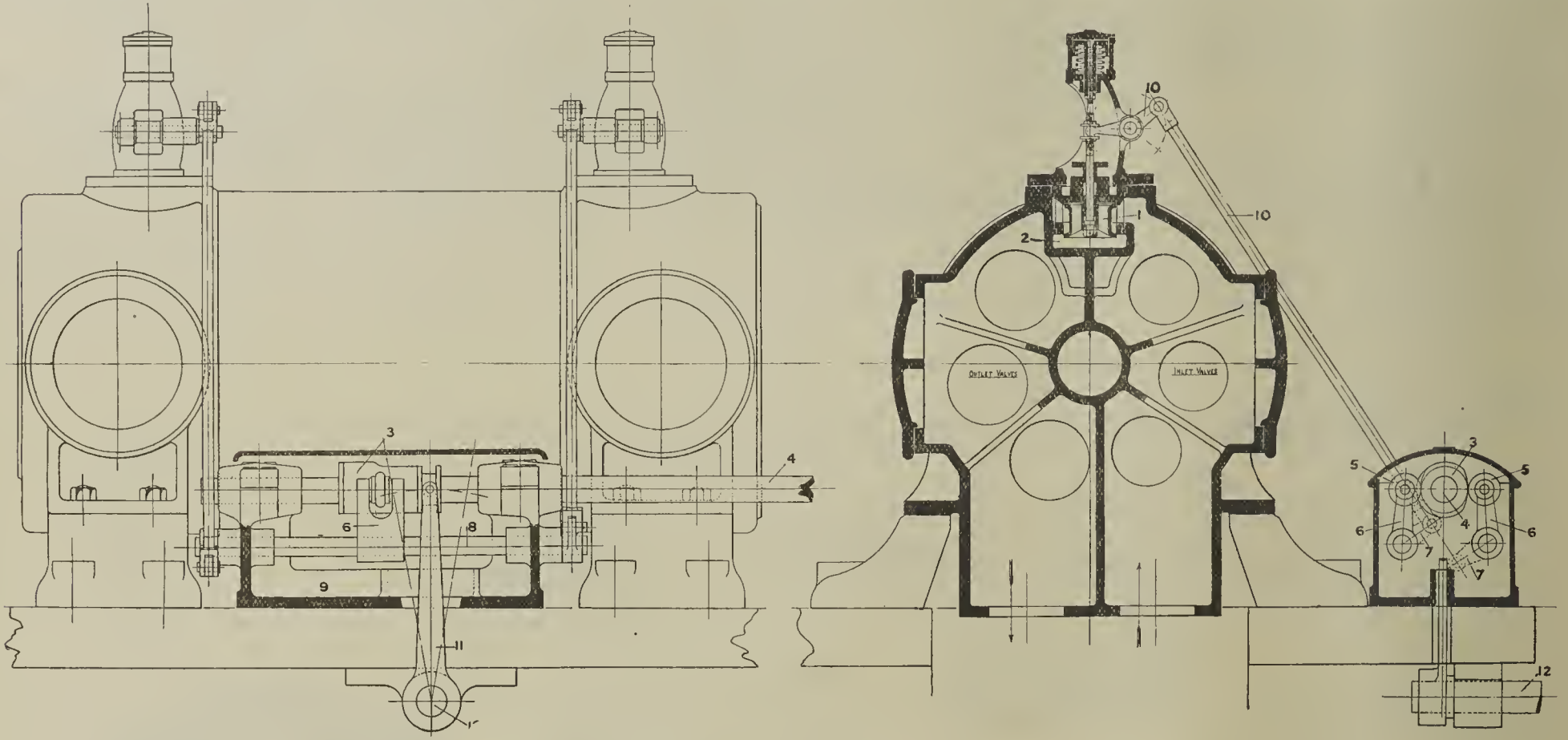


FIG. 5.—ROBEY PATENT UNLOADING DEVICE FOR CONSTANT-SPEED AIR COMPRESSORS.

quite as high as is normally obtained at collieries; this low efficiency being chiefly due to the unnecessarily thick fires which are usually maintained, and to the frequency with which the furnace doors are opened for firing and cleaning. With the chain-grate stokers there is no difficulty in maintaining an efficiency of about 73 per cent. throughout the 24 hours, provided that the boilers are kept in good condition. The six Lancashire boilers are now being fitted with Bennis's sprinkler stokers. In addition to the advantages in efficiency in favour of the mechanical stoker which are apparent from these figures, there are the following further advantages:—Reduced cost of brickwork repairs; an arch well built with high-class firebricks will last 18 months, whilst owing to the fact that the chain grates form practically no clinker on the side wall these last very much longer. Reduced labour cost; this applies with more force when overhead bunkers, elevators and conveyors are installed. Increased average evaporation per boiler, causing decrease in capital outlay. The need for cleaning fires is done away with (in the chain-grate stokers the ashes and clinkers are automatically deposited at the rear of the grate).

This installation of water-tube boilers and Lancashire boilers appears to afford a good combination, the Lancashire boilers affording a large steam and water storage, whilst the water-tube boilers are easily regulated and are capable of taking any sudden demands for extra steam which may occur; though some special tests which were made at Bedwas showed that the water-tube boilers were quite capable of meeting all the demands of the colliery load without any serious variation in steam pressure.

The coal is taken direct from the small-coal bunker at the screens by means of a Bleichert aerial ropeway to ferro-concrete bunkers over the boiler stand. The capacity of the ropeway is 30 tons per hour, and the bunkers hold 350 tons; these latter, as well as the ash bunkers, are built on the Kahn system of ferro-concrete construction. The ashes are dealt with by a tray conveyor running the whole length of the boiler-house in front of the boilers. This deposits them in the ferro-concrete bunker, whence they can be dropped into railway wagons. There are two Hall's vertical compound engines, each with a capacity of 10,000 gallons per hour, and a piping arrangement as shown in plan (Fig. 6) so that the steam from any boiler can be sent by two separate ways to the engine-house. The

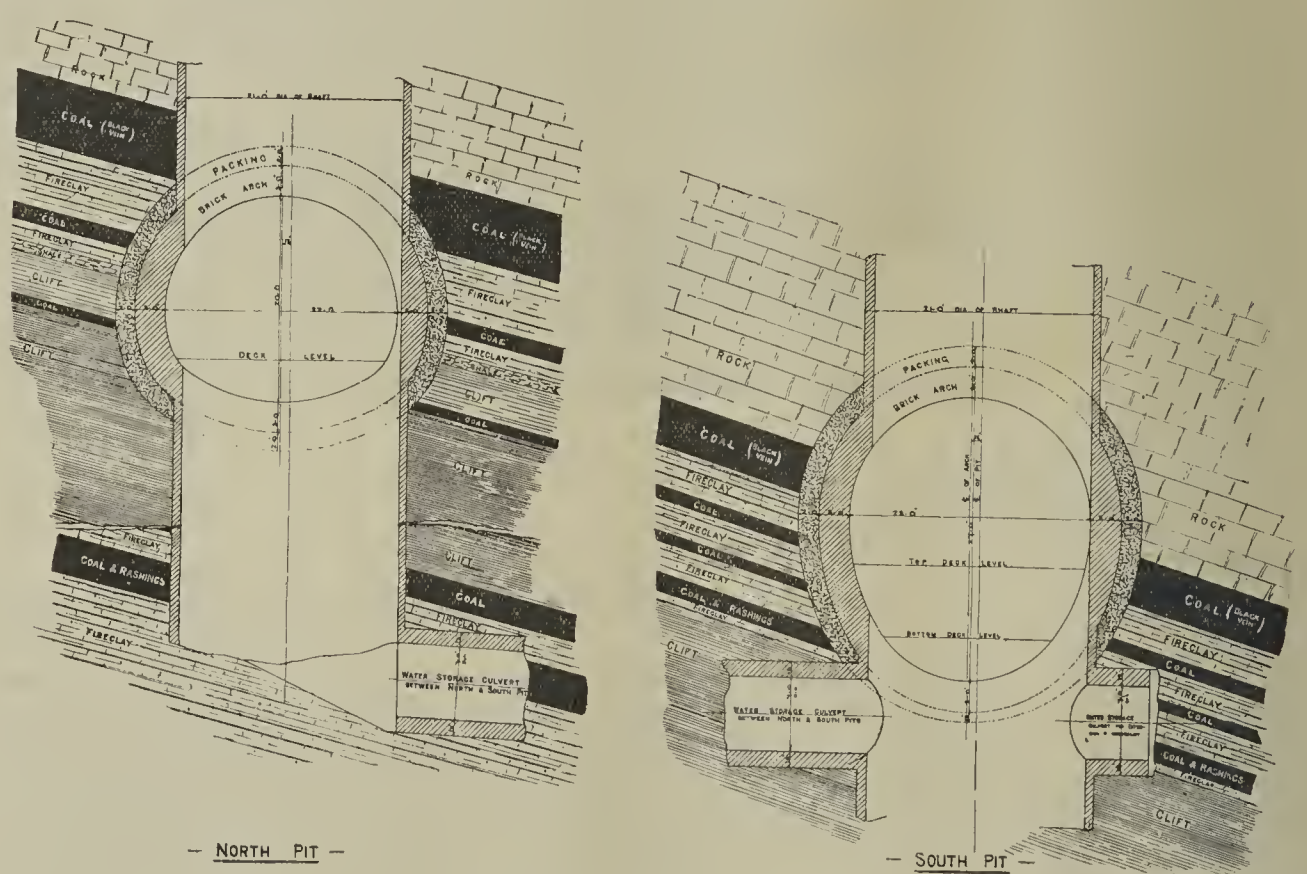


FIG. 6.—SECTION OF PIT BOTTOMS.

tandem compound engine. Cylinder sizes are: high pressure, 17½ in.; low-pressure, 29½ in. by 30 in. stroke. The feature of this engine is the drop-valve gear, in which the drop valves, instead of being brought on to their seats in the usual way by means of springs with dashpots, are lowered on to the seats by specially formed cams, which allow the valves to fall rapidly until they are almost entirely closed, when they are gently dropped until the valves are quite tight. By this arrangement the shock on valves and seatings is reduced, whilst the engine is to all intents quite silent.

An exhaust-steam utilisation plant was installed almost immediately after sinking commenced. This comprised one Rateau accumulator, which was designed to give sufficient storage to bridge over winding-engine stops of 45 seconds; one 1,250-kw. B.T.H. Curtis mixed-pressure turbo alternator with Le Blanc jet type condenser, and motor-driven rotary air pump designed for 27½-in.

capacity, so that during full work there should always be one machine as stand-by, also the smaller units would be more economical during the periods of light load.

In laying out the plant at Bedwas the following were the chief objects which were kept in view:—

1. To obtain duplicate drives for fan and air-compressor, so as to give stand-by in case of breakdown.

2. To obtain an economical drive during periods when the demand for power is small, such as the afternoon shifts, week-ends and holidays.

3. To utilise, as far as possible, the whole of the exhaust steam available.

In order to obtain the above objects, it was decided to put in an electric-motor drive for the fan in addition to the steam engine, and, further, to drive at least one of the 4,000 cubic feet air-compressors electrically. At the



same time a second mixed-pressure turbo alternator of 1,500 kw., complete with Worthington jet condenser and rotary air pump, was provided. The turbine is Prof. Rateau's design, and the alternator is made by Messrs. Brown, Boveri and Co. The speed of the set is 3,000 revolutions per minute.

Many schemes for variable-speed electric drives were considered, and eventually D.C. motors driven through rotary converters were ordered. It was not anticipated that both the 4,000 cubic feet air-compressors would be required for some time—i.e., until the colliery opened out—neither that it would be required to run both the

fan and air-compressor electrically at the same time, consequently, one 500 kw. rotary converter, 500 volts, three-phase, 50 cycles, to 500 volts D.C. was ordered.

In considering the best system to adopt, the following were the conditions which influenced the decision in favour of the D.C. plant:—

1. A complete range of speed between 72 and 135 revolutions per minute would be obtained for the fan drive, which would be required in opening out the colliery.
2. Simplicity of speed-control. This is especially valuable on the air-compressor drive, where it has to be done automatically.
3. The power factor of the load on the generating plant could be improved.
4. Owing to the fact that only one rotary converter was required for the two motors, the initial cost was moderate.
5. The 3,000-volt to 500-volt transformer would act as spare to the existing transformer, which is used for small A.C. motors.
6. Any surplus current from the rotary converter became available for a variable-speed D.C. motor drive, such as the induced-draught fan motor, or for any other drive when variable speed is required.
7. A comparatively slow-speed air compressor could be used with a direct-coupled motor.

The general experience at collieries where mixed-pressure electric power plants have been installed, and where the colliery is so situated that its supply cannot be linked up with other collieries, has been that, owing to the large fluctuations in the amount of exhaust steam available and the current demand, it is not possible either to utilise fully the exhaust steam or to obtain a satisfactory load factor. The installation at Bedwas is designed so as to get over this difficulty, and with the choice of electric drives available should enable the load factor to be kept at a reasonably high standard, and more especially should enable the almost complete utilisation of the exhaust steam. While such a plant calls for an increased expenditure, there appears to be no doubt that power can be produced at a price considerably lower than it can be supplied by an outside source, and this should amply repay the increased expenditure, particularly in view of the large power consumption of the pumping plant which has had to be installed.

The motors are arranged with speed regulation. The fan from 72 to 135 revolutions per minute—i.e., full speed of fan—whilst the air-compressor motor has a speed variation of 80 revolutions to 125 revolutions per minute, the speed being regulated by means of a Thury regulator, which is actuated by the air pressure. The

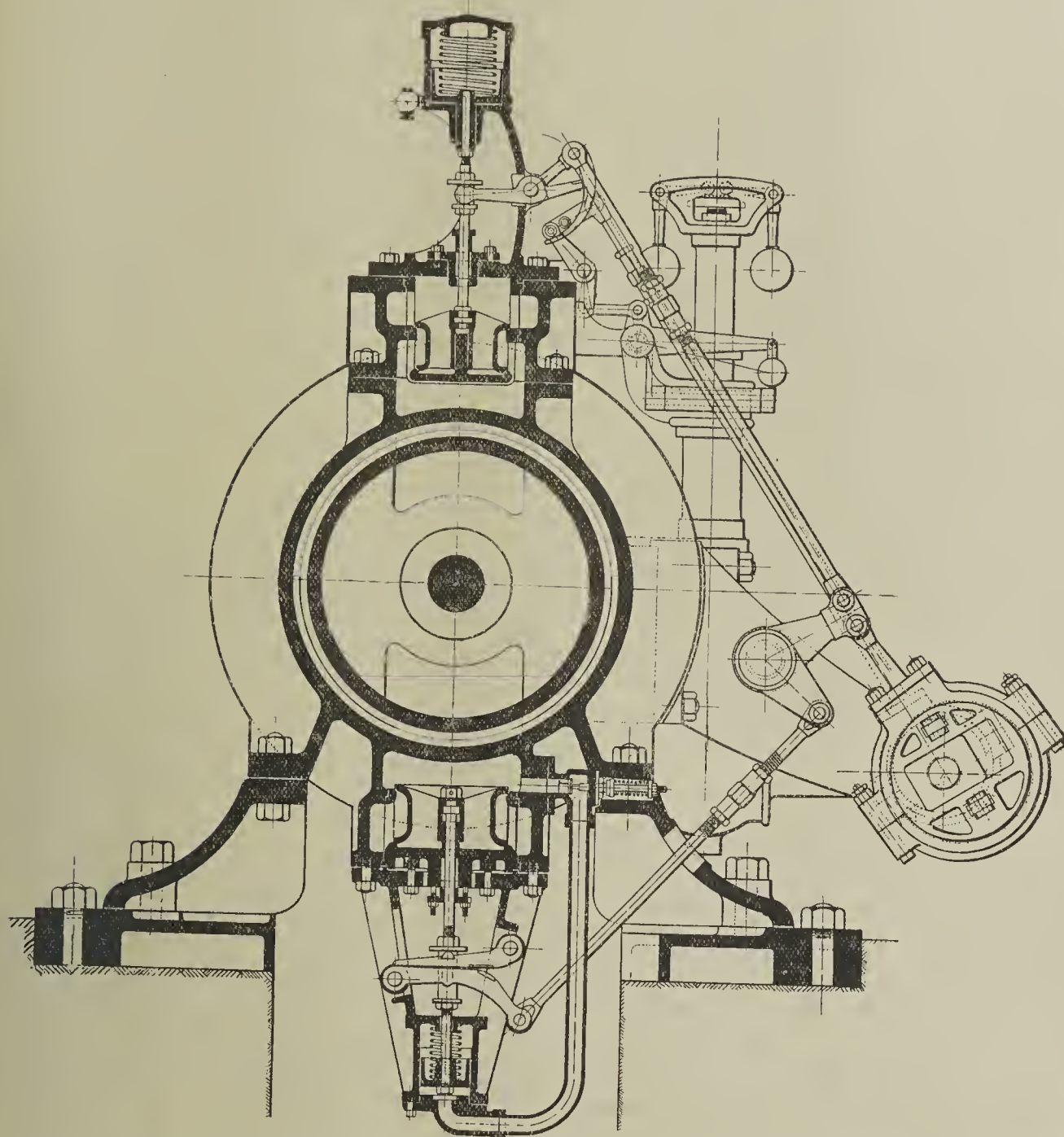


FIG. 7.—SECTION THROUGH HIGH-PRESSURE CYLINDER OF WINDING ENGINE, SHOWING VALVE GEAR.

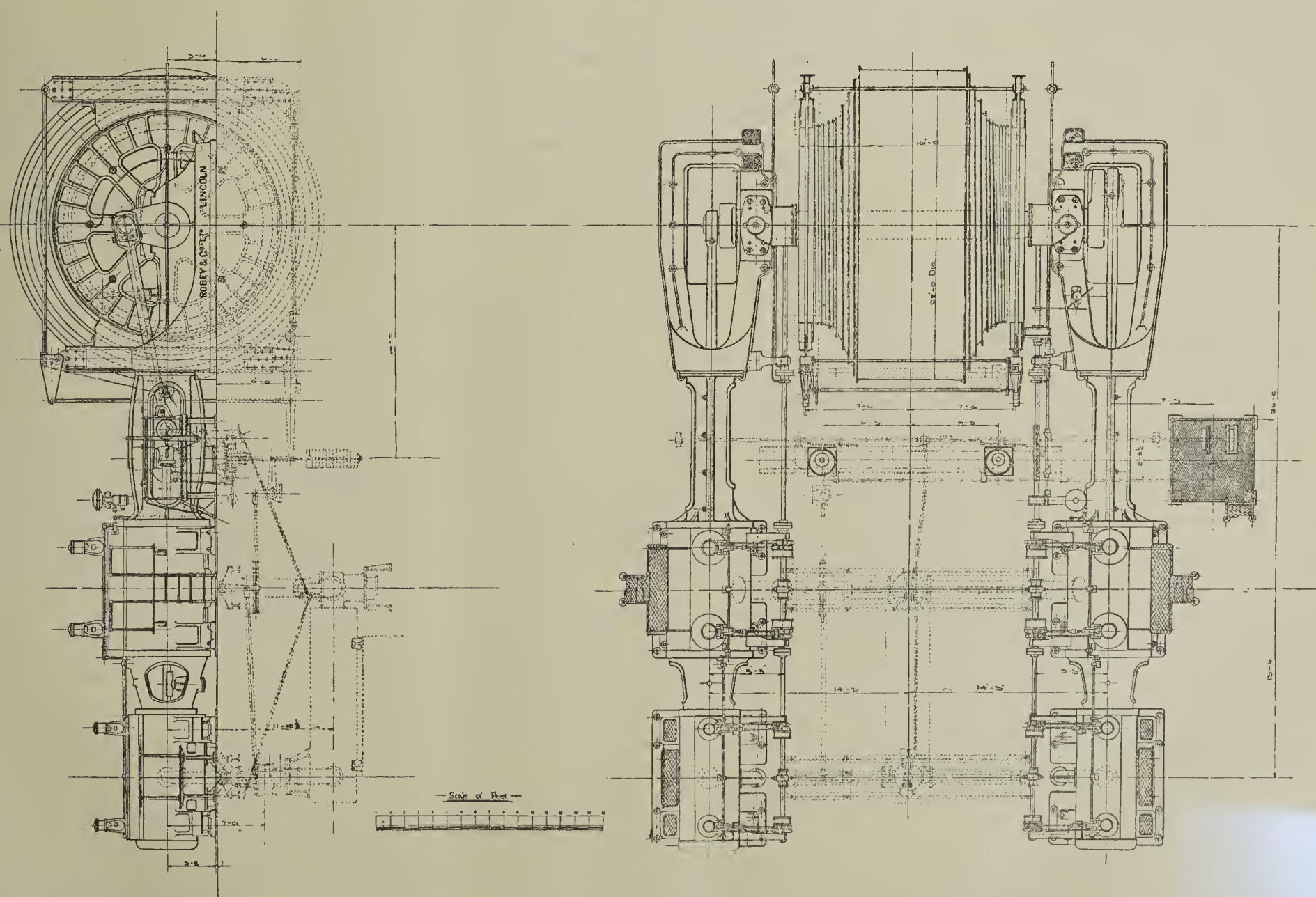


FIG. 8.—GENERAL ARRANGEMENT OF 31" & 52" 72" TWIN TANDEM DROP VALVE WINDING ENGINE.



section to the constant-speed air compressor is that the load is thrown on and off by the unloading device, and consequently the capacity of the generating plant is much more taxed than with the variable speed motor. Further, the low-speed compressor is more accessible and more easily examined and repaired by the colliery staff.

Below the speed of 80 revolutions per minute the air supply is regulated by the Robey unloading device on the compressor, which is under the control of the air governor. The following describes the action of this device:—Sectional views are given in the accompanying drawings, which show a side and end view of the compressor, while the diagrams show the action of the unloading gear. The apparatus consists of an equilibrium control valve 1 at each end of the compressor cylinder, with which it is connected by means of a port 2, the inlet control valve being, of course, connected with the inlet pipe. Each valve is held on its seat by means of a spring, the upper side of the spring holder acting as a dashpot. These valves are controlled by a cam 3 on the ordinary valve shaft 4, which revolves at the same speed as the compressor shaft. The mechanism employed is shown at 5, 6, 7, 8, 9, &c., and is provided at each end of the cylinder. The cam is so shaped as to open the valves during the whole of the suction stroke, and close them wholly or partially during the compression stroke, according to the amount of air required—that is to say, supposing the compressor to be half loaded, the valve 1 will remain open for approximately half of the compression stroke, thus allowing half of the volume of air to flow back to the atmosphere or intercooler, as the case may be. The shape of cam also brings it about that the point of closing of each valve is variable from the beginning to the end of the stroke, so that the compressor can be unloaded to any extent. The cam 3 can be moved along the shaft 4 by a lever 11 pivoted to a shaft 12, the latter being actuated from an air governor, in which the compressed air in the receiver acts on the underside of a plunger counterbalanced by means of a weight or spring. It will thus be seen that the unloading device being always in action the valve is not liable to stick, while the valve also acts as an additional induction valve.

The pit tops have been laid out so that the full coal from both pits will gravitate to the screens, the empties from the screens being raised by creepers, so that they gravitate to the top decks of either pit whilst they are led by a controller to the bottom decks. The general arrangement can best be seen from the pit-top plan.

The North pit (upcast) has been fitted with single-deck cages and rope guides for opening out, whilst the permanent pumping plant is being installed and the South pit fitted as the main winding shaft. The cage for the South pit will be double decked with rail guides. The equipment of this shaft does not call for any special description, being very similar to that at Penallta.

A section of the strata through which the shafts have been sunk accompanies the paper. An analysis of the Black Vein gave the following result:—

	Per cent.
Fixed carbon.....	67.45
Volatile matter.....	29.65
Ash .....	2.05
Water (moisture).....	0.85
	100.00
Percentage of sulphur ...	0.67

On the west side of the pit an upthrow fault of about 40 yards was met in the shaft pillar, and in driving level course through this fault a seam was struck with the following section:—

	Ft. in.
Hard cliff top.....	4 8
Coal .....	0 6
Shale .....	
Hard cliff bottom.....	

After driving in this seam to the edge of the shaft pillar, a working face was opened until a district of about eight places was developed, when an outburst of water occurred. This water (about 10,000 gallons per hour) broke out between the working shifts when no one was in the district, and burst up the hard floor of the seam, breaking timber and squeezing the cogs out from the gobs. It was milky for the first few days, but gradually became clear and reduced in quantity to about 4,000 gallons per hour. It was decided to abandon the workings in this seam until a larger pumping plant was available, as the nature of the outburst of water pointed to the probability of this being the Lower Four-feet seam, which is known to be subject to such outbreaks, and there was only available at the bottom of the pit one 10,000-gallon per hour three-throw electric pump.

Now in order two sets of Sulzer centrifugal pumps, each capable of delivering 560 gallons per minute to the surface. The total manometric head which the pumps have to throw is 2,507 ft. In

order to deal with this head, it was necessary to employ 13 stage pumps, each set consisting of a five-stage and an eight-stage pump, coupled in series, with a combined bed plate to take also the electric motor, which is placed between the pumps.

The drawing of the pump room shows the general arrangement, from which it will be seen that the two sets have been placed in line. This arrangement necessitated a very long pump room, but was adopted on account of the advantage gained by being able to keep the size of the arches to the smallest possible diameter, a point of importance when it is only with the greatest difficulty that arches of any considerable size can be made which will withstand the heavy "squeeze" which takes place at these depths.

The North pit arches were put in with the greatest care, special precautions being taken to ensure that there was not less than 2 ft. of packing at any point, the material for packing being boiler ashes. The bricks used were good quality Staffordshire blue, a proportion being tapered culvert bricks, so as to reduce the thickness of the joints. These arches have now been in for approximately 18 months, and unfortunately the results have been disappointing. The inverts have been forced upwards, and parts of the inner ring of brickwork of the arches have fallen away and had to be removed, while at the junction of the arches with the pit-walling the brickwork has been badly crushed and has had to be repaired. The South pit arches have only recently been built, and sufficient time has not yet elapsed to give any information as to results.

The question of using ferro-concrete construction was considered; but the difficulty in removing the arches and replacing them in case of failure appeared so serious that it was not considered advisable to adopt this method of construction.

**The Harworth Colliery.**—The site of the new colliery which is to be sunk at Harworth, near Bawtry, a few miles from the Doncaster border, has now been selected. The recently-formed colliery company have secured a large amount of land near the village of Harworth, something like 60 acres of which are expected to be utilised for the surface works of the pit. This area is situated between the lane which leads from Harworth to the Bawtry-Blyth road and the road which runs from Harworth to Serlby Park. It is expected the shafts will be sunk in what is at present a cornfield, close to the Waterslack plantation. The colliery sidings will be laid out towards Styrrup, and the colliery will be linked up with the Great Northern Railway Company's main line between the stations of Scrooby and Ranskill. A number of German surveyors have lately been taking observations in the district. Sinking will be preceded by boring operations to test the thickness and character of the upper coal measures, and it is expected these operations will be begun in September. Sinking will follow on as a matter of course immediately they are completed. The boring, it is said, will probably be carried to the depth of 120 yards, which will yield evidence as to the quantity of water likely to be encountered. This is not expected to be of great volume, as it is believed that the upper red sandstone, which gave so much trouble at Thorne, Hatfield and other collieries of the Doncaster district, crops out to the east of Harworth. It is hoped that some four months from now sinking operations will have been begun. Much of the plant is already on order, and arrangements have been made for a temporary railway from the Great Northern main line to be laid down. Coal is expected to be reached at a depth of 850 yards. The company who will run the Harworth Colliery will be partly German in composition, but this notwithstanding, it is understood the sinking will be carried out by a British contractor, and that British labour will be employed. Herr Hugo Stinnes, one of the biggest colliery owners in Germany, and who exports a lot of English coal annually, is stated to be providing a good deal of the capital, and with him will be associated Herr Knepper, who is well known in connection with the Westphalian coalfield; Mr. James Russell Ferguson, and Mr. Arnold Lupton. It was the latter who secured the option on the Harworth royalty. The whole of this will be taken up by the new company, but as the area is too large to be conveniently worked entirely from the Harworth pit, there is every probability that another colliery will eventually be sunk more to the south. In this connection the neighbourhood of Blyth is mentioned. Considerable interest is being taken in South Yorkshire in the project, and the formation and composition of the company seems to have caused some surprise. It was generally believed that the enterprise would have been undertaken by an existing company at present operating not far from Doncaster. The German gentlemen on the Harworth directorate are, however, reported to have been on the look-out for an investment in the district for some considerable time past. Herr Stinnes has dealt in British coal for many years, and has his own line of steamers and offices in London, Newcastle, and elsewhere, with large interests in the German coalfield as well.

## IRON AND STEEL INSTITUTE.

### Meeting at Brussels.

The autumn meeting of the Iron and Steel Institute was opened at Brussels on Monday. Mr. A. COOPER, of Middlesbrough, the president, was in the chair, and there was a large attendance of members.

Baron E. de LAVELEYE (Brussels) read a paper giving an historical survey of the metallurgy of iron in Belgium. He said that a comparison between the development of the Belgian production of iron with that of neighbouring countries obtaining their fuel and ores from the same source, Germany and France, showed that Belgium had well maintained her industrial position, despite the efforts of her powerful competitors, and despite the dumping with which unprotected countries, or countries but imperfectly protected by Customs duties, were always menaced. No other country exported so large a proportion of its produce as Belgium.

A paper upon "The Manufacture of Coke in Belgium" was given by Baron EVENCE COPPEE, of Brussels, whilst M. GEVERS-ORBAN read a paper on "The Distillation of Tar in Metallurgical Practice," and M. E. G. HOUBAER, of Seraing, a paper on "The Utilisation of Blastfurnace and Coke-oven Gases in Metallurgy." "Present Methods of Testing, with Special Reference to the Work of the International Testing Association," were dealt with by Prof. H. HUBERT, of Liège.

Sir ROBERT A. HADFIELD, F.R.S., Sheffield, read a paper on "The Heating and Cooling Curves of Manganese Steel"; and Dr. J. E. STEAD and Prof. H. C. H. CARPENTER read papers on "The Crystallising Properties of Electro-deposited Iron."

The business meeting of the institute was concluded on Tuesday. Papers were read by M. GUSTAVE TRASENSTER, of the Ougrée-Marihaye Company, on "The Use of Oxygen in Blastfurnace Practice"; by Mr. BENJAMIN TALBOT, manager of the Cargo Fleet Works, Middlesbrough, on "Modern Open-hearth Steel Furnaces"; by General LEANDRO CUBILLO, of Madrid, on "The Manufacture of Armour-piercing Projectiles"; by Mr. EMIL GATHMANN, of Baltimore, U.S.A., on "The Commercial Production of Sound Steel Ingots"; by Mr. OTTO FRICK, of London, on "The Electric Refining of Steel in an Induction Furnace of Special Type"; by M. ARMAND BAAR, of Liège, on "Reinforced Pile Foundations for Blastfurnaces"; by Messrs. E. D. CAMPBELL and F. D. HASKINS, of Michigan U.S.A., on "The Effect of Heat Treatment on the Colorimetric Test for Carbon in a 0.32 Carbon Steel"; and by ALBERT SAUVEUR, of Harvard, on "The Allotropic Transformations of Iron." The following papers were taken as read:—"A Method of Preparing Sections of Fractures of Steel for Microscopic Examination," by Prof. A. CAMPION and Mr. J. M. FERGUSON (Glasgow); "So-called Crystallisation through Fatigue," by Mr. F. ROGERS (Sheffield); "A Note on the Principal Deposits of Iron Ore in Chili," by Mr. G. VATTIER and NICOMEDES ECHEGARAI (Valparaiso); and a paper by Dr. J. E. STEAD (Middlesbrough), on "A New Method for the Determination of the Critical Points A<sub>1</sub>, A<sub>2</sub>."

In the afternoon the members and other visitors, by invitation of the reception committee, had a pleasant drive to the Park of Tervueren, where they inspected the Congo Museum, which, with the park, was given to the nation by the late King Leopold. In the evening the members of the party were received by King Albert, at the Royal Palace, Brussels.

On Wednesday there was an excursion to the International Exhibition at Ghent, and on Thursday visits were paid to various institutions and works.

Herr Adolph Groiner, of Seraing, has been elected president for the coming year.

**Sunday Labour at Scottish Pits.**—A good deal of interest was aroused by the reference made to religious needs at the General Assemblies of the Church of Scotland and the United Free Church in May last, and that interest has been quickened by the resolutions adopted and the speeches made at the Congress of the Scottish Miners' Federation. At the conference a resolution was adopted to the effect that double payment should be enforced for Sunday labour. In regard to the allegations made at the Congress, the *Scotsman* publishes an interesting interview with a representative of the coalowners. He declared that a large amount of Sunday labour was due to the impossibility of getting a few men to work on Saturday afternoon or night to do certain repairs that could not be done while the pits were working, and things had been made more difficult by the Eight Hours Act, which precluded a man from resuming work underground until he had rested 16 hours after his previous shift. If repairs were not made on the Saturday night or Sunday, the men would not be able to resume work on the Monday. The necessity for repairing staffs being at work when coal was not being drawn had become greater than ever from various causes in recent years. If the coal-cutting machines got thrown out of gear on the Saturday, or the men filling the coal cut failed to complete the whole stretch or all the coal was not cleaned up before the shift was finished, the work must be done on the Saturday night or the Sunday if a complete resumption was to be made on the Monday, and if men could be got on Saturday night there would be no necessity for the work referred to being done on Sunday. About half the work, he said, probably was due to the Act, the balance to a refusal to work on the Saturday nights, and other causes such as pump work and repair work. One is driven to the conclusion by the resolutions that the aim is more money and less work.



THE COAL AND IRON TRADES.

THURSDAY, SEPTEMBER 4.

Scotland.—Western District.

COAL.

The coal trade in the West of Scotland continues very active. The output from the collieries is being well disposed of, while some classes of coal are booked up to the end of the present month. The demand for all coal continues brisk, the better qualities being in particular request, while the shipping qualities of splint coal are still unobtainable for immediate loading. The heavy demand for treble nuts is the outstanding feature among smalls and prices for all classes are well maintained. The shipments for the district during the week were 102,937 tons, compared with 102,128 in the previous week, and 111,821 tons in the corresponding week of last year. Of the total shipments the foreign exports were 43,988 tons, and coastwise 58,949 tons. The clearances were at Glasgow 67,188 tons. Bowling 371, Greenock 1,567, Ardrossan 7,837, Troon 8,289, Irvine 1,317, and Ayr 16,368 tons. Taken all round the industry is in a healthy condition in this district. Prices generally show a stiffening tendency.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	12/6 to 14/	12/6 to 14/
Ell .....	12/6 to 13/	12/6 to 13/
Splint .....	12/6 to 15/6	12/6 to 15/6
Treble nuts .....	13/ to 13/6	13/ to 13/6
Double do. ....	12/6 to 12/9	12/3 to 12/6
Single do. ....	11/ to 11/3	11/ to 11/3

IRON.

Business during the earlier part of the week in the pig iron market showed little alteration from the condition of things ruling recently, but towards the close a brisk buying movement set in chiefly on London account. In one day the turnover amounted to 12,500 tons, which is more than has been done in any week for some considerable time past. Prices showed a sharp advance, rising about 1s. 6d. per ton, and closed at 56s. per ton cash. Business was also done at 56s. 1d. cash, 56s. 5d. one month, and 57s. 1d. three months. The imports of pig iron into Grangemouth from Middlesbrough and district amounted to 11,643 tons. There are 88 furnaces in blast in Scotland, being the same number as in the previous week and in the corresponding week of last year. The position of the manufacturing branches is still very moderate an absence of fresh business being acutely felt among makers. Prices of Scotch makers' iron are unchanged from last report. Govan and Monkland are quoted f.a.s. at Glasgow, Nos. 1, 68s., Nos. 3, 66s. 6d.; Carnbroe, No. 1, 72s. 6d., No. 3, 68s. 6d.; Clyde, No. 1, 74s., No. 3, 69s.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 74s. 6d., Nos. 3, 69s. 6d.; Glengarnock, at Ardrossan, No. 1, 74s. 6d., No. 3, 69s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 69s., No. 3, 68s.; Dalmellington, at Ayr, No. 1, 70s., No. 3, 68s.; Shotts, at Leith, No. 1, 74s. 6d., No. 3, 69s. 6d.; Carron, at Grangemouth, No. 1, 75s., No. 3, 70s. per ton. Scotch hematite is quoted 73s. for delivery at West of Scotland steelworks.

Scotland.—Eastern District.

COAL.

The coal trade in the Lothians district has made a rapid recovery from the effects of the recent strike. Collieries generally are working at full pressure, and outputs are correspondingly heavy. The demand for all classes of coal continues strong, and with a large amount of tonnage at the various ports no difficulty is experienced in disposing of the production of the collieries. Shipments are well up to the average, foreign exports bulking largely, while coastwise shipments are fairly satisfactory. Of the total clearances over 100,000 tons were for foreign shipment, and about 30,000 coastwise, the full amount disposed of reaching 130,838 tons. At Grangemouth 50,495 tons were despatched, Granton 12,840, Leith 45,964, and Bo'ness 21,529 tons.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/ to 13/3	13/ to 13/3
Secondary qualities .....	12/ to 12/3	12/ to 12/3
Treble nuts .....	13/ to 13/6	13/ to 13/6
Double do. ....	12/6 to 12/9	12/6 to 12/9
Single do. ....	11/3 to 11/6	11/3 to 11/6

Business in the Fife coal trade continues in a strong condition, a brisk all-round demand being experienced. All classes of large coal have been in urgent request, while among small coal treble and double nuts command most attention, and prices generally are well maintained. Owing to a slight congestion at the ports shipments have not been so large as expected, although well up to normal. Shipments for the week amounted to 124,965 tons, compared with 130,806 in the previous week, and 125,900 in the corresponding week of last year. The clearances were at Burntisland 53,400 tons, Methil 64,129, Charleston 51, Tayport 788, Alloa 3,341, Dysart 1,837, and Wemyss 1,429.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/6 to 17/	16/6 to 17/
Unscreened do. ....	14/6 to 15/	14/6 to 15/
First-class steam coal .....	14/3 to 14/6	14/ to 14/6
Third-class do. ....	11/9 to 12/	11/6 to 12/
Treble nuts .....	14/3 to 14/6	14/3 to 14/6
Double do. ....	12/6 to 13/	12/6 to 13/
Single do. ....	11/ to 11/6	11/ to 11/6

The total shipments from Scottish ports during the week were 358,740 tons, compared with 341,211 in the previous week, and 355,009 in the corresponding week of last year.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 144,148 tons of coal and 1,342 tons of coke were despatched from Tyne Dock, an increase of 33,116 tons of coal and 1,112 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 53,575 tons of coal and 2,628 tons of coke, a decrease of 17,359 tons of coal and an increase of 1,276 tons of coke. The Blyth shipments totalled 96,552 tons of coal and coke, an increase of 827 tons. With reference to the Russian State Railways' enquiry for 250,000 tons of Yorkshire, Scottish, Northumberland or Durham steams for delivery at Black Sea ports up to the end of the year, it is reported that 100,000 tons of South Yorkshire hards have been ordered. The report needs verification, however. There is a more reliable statement that Russian merchants have received the order for 50,000 tons of steams at a price which has not been divulged. Indeed, the fact that a large order has been given to Russian merchants is beyond dispute, for the merchants are now doing their best to cover their contract commitments in this district and in Yorkshire. As, however, their ideas as to prices are at considerable variance with those of the collieries, they have not made much progress up to the time of writing. The railways which, as reported last week, allotted contracts to Russian merchants for 130,000 tons of steams, are stated to be the Vladikavkaz railways. The coal is to be shipped over 12 months from now to Novorossisk, and is still to be bought in the English market. It is stated that a cargo of local steams has been purchased for prompt shipment in respect of the 20,000 tons required by the Novorossisk Railways. A similar cargo of Scottish coal is said to have been taken. The following bunker sales are reported this week:—From 20,000 to 30,000 tons of best unscreened South Durhams for delivery from now to the end of next year at 14s. f.o.b.; from 150,000 to 200,000 tons best Durhams for shipment over next year to the coaling stations at 12s. 6d. f.o.b.; good Durhams for shipment over next year at 12s. 4½d. f.o.b.; ordinary Tynes for similar shipment at from 11s. 11½d. to 11s. 6d., and ordinary Tynes for shipment up to the end of the present year at 12s. 9d. f.o.b. The Norwegian Trunk Railways are stated to have contracted for 12,000 tons of South Hetton steams for October-January shipment at about 15s. 3d. per ton f.o.b. The Randers Gasworks have purchased 16,000 tons of Durham gas specials for shipment in four cargoes this year and eight cargoes over 1914. The price is said to be on the basis of current figures. The Horsens Gasworks have bought 6,000 tons Durham gas bests for similar delivery at a price which has not leaked out. Some 8,000 tons of Northumberland steams and 3,000 tons of bunkers have been sold for early shipment to the West Coast of South America. Northumberland steam smalls (any class) are stated to have been sold by second-hand holders for delivery over next year at 6s. 6d. per ton, f.o.b. The Norwegian State Railways are inviting early offers of 80,000 tons of steams for shipment over the first and second quarters of next year. The Ghent Gasworks want a supplementary quantity of from 10,000 to 12,000 tons of gas coal for shipment this year. The Belgian Railways are stated to be asking for about 35,000 tons of Durham coking seconds for shipment from October to December. Good coking coals are stated to have been sold over next year at 12s. 6d. f.o.b. A change has come over the prompt coal market during the last week. Tonnage is no longer abnormally plentiful—indeed, it is rather scarce—and supplies of fuel are offering in large quantities in contrast with the sparing amounts available recently. The tonnage shortage is now delaying business and buyers are inclined to hold off in the hope of further weakening an already considerably-eased market. In the steam coal section, best Blyths have fared worse, the reductions in the selling values of other steams being slight. Durham coals are generally weaker. Coke is cheaper also. F.o.b. quotations for prompt shipment have varied as follows:—Best steams, Blyths, are from 6d. to 7½d. cheaper on the week; Tynes, easier; unscreened, 3d. reduced; smalls, Blyths, from 6d. to 9d. lower; Tynes, 3d. fallen; specials, from 3d. to 6d. decreased; gas bests, 1½d. to 3d. down; seconds, easier; specials, 3d. lower; unscreened bunkers (Durhams), 6d. to 9d. decreased; coking coal, 3d. to 6d. less; smalls, 6d. cheaper; coke, foundry, 1s. to 2s. down; blastfurnace, 1s. 6d. reduced. Other descriptions of fuel are steady.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	14/6 to 14/7½	15/ to 15/3
Do. Tynes (Bowers, &c.) .....	15/ to 15/3	15/3
Secondary, Blyths .....	13/	13/
Do. Tynes (Hastings or West Hartleys) .....	13/3	13/3
Unscreened .....	11/6 to 12/6	11/9 to 12/9
Small, Blyths .....	8/6	9/ to 9/3
Do. Tynes .....	7/6	7/9
Do. specials .....	9/6 to 9/3	9/6
Other sorts:—		
Smithies .....	14/	14/
Best gas coals (New Pelton or Holmsido) .....	14/9 to 15/	15/ to 15/1½
Secondary gas coals (Pelaw Main or similar) .....	13/6 to 14/	14/
Special gas coals .....	15/ to 15/3	15/3 to 15/6
Unscreened bunkers, Durhams .....	12/9 to 13/9	13/3 to 14/6
Do. do. Northumbrians .....	12/ to 13/	12/ to 13/
Coking coals .....	13/9 to 14/	14/ to 14/6
Do. smalls .....	13/6	13/6 to 14/
House coals .....	15/6	15/6
Coke, foundry .....	18/ to 20/	20/ to 21/
Do. blast-furnace .....	17/6	19/
Do. gas .....	16/6 to 17/6	16/6 to 17/6

Sunderland.

COAL.

The exports from Sunderland last week amounted to 100,755 tons of coal and 210 tons of coke as compared with 117,105 tons of coal and 2,110 tons of coke for the corresponding period of 1912, being a decrease of 16,350 tons of coal and 1,900 tons of coke. The coal market is sluggish, and the tone one of easiness—being dominated to a large extent by the short supply of tonnage offering for September. There is, however, a strong enquiry for forward loading

and the undertone is good. Gas coals are active. Foundry and gashouse coke is steady, but bunkering is quiet, and the turn easier. Coking coals are also cheaper. Households are quiet. The Stavanger Gas Works have contracted for 10,000 tons of special gas at 20s. c.i.f.—shipment over 12 months commencing September. A parcel of 14,000 tons of best Durham unscreened bunkers have been sold at 14s. f.o.b. Middlesbrough Dock between now and the end of the year, which is considered a very good price. The Ghent Gas Company are inviting offers of 12,000 tons of Durham gas coal, and the Norwegian Railways are in the market for 80,000 tons of coal for delivery over the first half of next year. Quotations are about as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals .....	15/6	15/6
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	16/6	16/6
Ordinary do. ....	16/	16/
Other sorts:—		
Lambton screened .....	15/6	15/9
South Hetton do. ....	15/3	15/6
Lambton unscreened .....	13/9	14/
South Hetton do. ....	13/9	13/10½
Do. treble nuts .....	16/9	17/
Coking coals unscreened .....	14/	13/6 to 13/9
Do. smalls .....	13/9	13/3 to 13/6
Smithies .....	14/6	15/6
Peas and nuts .....	17/	17/
Best bunkers .....	14/3	14/9
Ordinary bunkers .....	13/9	14/
Coke:—		
Foundry coke .....	19/6	20/6
Blast-furnace coke (dlvrd. Teesside furnaces) .....	19/	19/6
Gas coke .....	17/	18/

With very little tonnage available and demand for boats brisk, the tone of the freight market is strong. Recent fixtures include:—Coasting: London 3s. 7½d., Hamburg 4s., Calais 4s. 6d. Bay: Bordeaux 6s. 3d., St. Nazaire 6s. 3d., Lisbon 8s. 3d. Baltic: Cronstadt 5s. 6d., Stockholm 5s. 6d., Reval 5s. 4½d., Memel 4s. 9d. Mediterranean: Genoa 5s. 6d., Catania 9s. 6d., Novorossisk 9s., Constantinople 9s. 6d., Port Said 9s., Las Palmas 8s. 9d.

Middlesbrough-on-Tees.

COAL.

There is a fair amount of business passing in fuel. Enquiries for gas coal are on a very satisfactory scale, and deliveries are fairly heavy. Best Durham gas is quite 14s. 9d., and some sellers hold out for rather more; whilst second quality stands at about 14s.; and as much as 16s. is named for special kinds. Bunker coal is plentiful, and values show a downward tendency. Ordinary Durhams are obtainable at 13s. f.o.b., and some purchases have been made at a trifle less. Superior bunkers are quoted 14s., and specials 15s. Household coal is quiet at 15s. 6d. to 15s. 9d. Coking coal is easier at 13s. 6d. Demand for coke for local consumption is heavy, and average blastfurnace qualities are in the neighbourhood of 18s. delivered at Teesside works. Best foundry coke ranges from 19s. 6d. to 20s. f.o.b., and gashouse coke is quoted 16s. 6d.

IRON.

The Tees iron and steel shipments during the month of August were on a fairly good scale, being over 5,000 tons more than in the previous month. The pig iron loadings amounted to 111,254 tons, 101,530 tons being shipped from Middlesbrough, and 9,724 tons from Skinningrove. For July the despatches were given at 105,935 tons, and for the corresponding month of last year the clearances reached 115,323 tons. Of the pig iron cleared at Skinningrove during the month just ended 9,184 tons were despatched to Scotland, and 540 tons to Holland. Of the pig iron loaded at Middlesbrough 70,689 tons went abroad, and 30,841 tons coastwise. Scotland was the largest buyer, taking 21,674 tons, whilst France imported 10,532 tons, Italy 9,565 tons, Germany 8,663 tons, Belgium 7,213 tons, Sweden 7,039 tons, Japan 5,938 tons, and Denmark 4,928 tons. The loadings of manufactured iron on the Tees during August totalled 13,494 tons, 7,915 tons going abroad, and 5,479 tons coastwise, and steel 43,485 tons, 38,641 tons going foreign, and 4,844 tons coastwise. As usual, India was the largest buyers of both manufactured iron and steel, receiving 6,374 tons of the former, and 13,287 tons of the latter. New South Wales imported 4,902 tons, the Argentine 2,740 tons, Portuguese East Africa 2,055 tons, and Natal 2,044 tons. Outside speculators are once more dabbling a little in Middlesbrough warrants, and thus causing slight fluctuations, which to some extent disturbs business in makers' Cleveland pig, but the state of the staple industry is very healthy, and Cleveland iron is now being bought rather freely to meet autumn needs. No. 3 g.m.b. is firm at 56s. 6d. f.o.b. at which figure substantial sales have been recorded, whilst No. 1 is 59s., No. 4 foundry 56s., No. 4 forge 55s. 9d., and mottled and white iron each 55s. 3d.—all for early delivery. Forward business commands a little above the foregoing quotations. Middlesbrough warrants stand at 56s. cash buyers—an advance of 1s. 6½d. on a week ago. Quietness still characterises the East coast hematite branch of the iron trade. Buyers are very backward, and hesitate to pay 69s. for mixed, at which figure merchants are pressing sales for either early or forward delivery. No. 1 hematite is 69s. 6d., and No. 4 is 68s. Prices of foreign ore are still based on 20s. ex-ship Tees for rubio of 50 per cent. quality, though some best rubio is believed to have been sold this week at round about 19s. 6d. The manufactured iron and steel industries present few new features. Enquiries are fairly good, and a few contracts are being made. Large orders on Australian and Indian account are expected to be placed shortly, and hopes are entertained that a considerable share will be secured by firms in this district. Heavy steel rails are a little easier £6 10s. being now the price. Quotations for other descriptions are stationary.

South-West Lancashire.

COAL.

There has been a little improvement in the iron and household trade during the past week, the cooler weather experienced during the last two days having rather



lated the demand. Prices still remain unchanged. Quantities of fuel are being sent for consumption to houses and manufactories. Bunker fuel on contract account is being taken in fair quantities, although excursion steamers will now be easing off a little. At the moment there is very little outside enquiry, and though the strike at Haydock Collieries still drags on, prices of steam coals do not seem to be affected, those ruling for screened being 13s. 6d. f.o.b. for ordinary to 14s. or 14s. 3d. for the best qualities, but in some instances there is a little shading, especially on the commoner qualities. The strike at Dublin appears to be having a little effect on the shipments of fuel to that port, and consequently there has been a little lull in the coastwise and cross-Channel shipments during the past week; prices, however, remain unchanged. There is nothing fresh to report in regard to slacks, prices for which are as reported last week.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—	16/3	16/3
Best .....	16/6 to 17/	16/6 to 17/
Do. (f.o.b. Garston, net) .....	14/6	14/6
Medium .....	15/ to 15/6	15/ to 15/6
Do. (f.o.b. Garston, net) .....	12/3	12/3
Kitchen .....	13/9 to 14/6	13/9 to 14/6
Common (f.o.b. Garston, net) .....	12/6 to 13/	12/6 to 13/
Screened forge coal .....		
Best screened steam coal (f.o.b.) .....	13/6 to 14/3	13/6 to 14/3
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

### South Lancashire and Cheshire.

#### COAL.

The attendance on the Manchester Coal Exchange on Tuesday was moderate, the Oldham annual stoppage affecting many members. House coal continues to meet with only a poor demand. Furnace coal is in good call and shipping business is fairly good. Slack is naturally influenced by the "wakes" and is quiet. Official prices are as at foot.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—	16/6 to 17/	16/6 to 17/
Best .....	15/3 to 16/	15/3 to 16/
Medium .....	12/6 to 13/	12/6 to 13/
Common .....	12/6	12/6
Furnace coal .....	14/	14/
Bunker (f.o.b. Partington) .....	10/ to 10/6	10/ to 10/6
Best slack .....	9/ to 9/6	9/ to 9/6
Common slack .....		

#### IRON.

The latest drop in pig iron by the Lincolnshire Association makers of 3s. per ton should tempt buyers. Good foundry iron can now be got at 60s. here. The forges keep their prices up for Crown bars £8 and £7 10s. for second quality. They are none too busy. Some very low prices are named as being taken by them for steel rolled out of Continental billets. The English makers of steel bars are getting £7 5s. for bars and £5 5s. for billets, and working more or less from hand to mouth. Engineers are only moderately employed. Wagon builders still full of work. Foundries fairly well booked.

### Yorkshire and Derbyshire.

#### Leeds.

#### COAL.

The attendance at the Yorkshire Coal Exchange on Tuesday was fairly representative, although many of the members are still away on holiday. Business was fairly satisfactory. It was reported that the pits had worked fully five days, and that stocks on the week had shown very little change. The supply of empty wagons is excellent, and traffic is being moved expeditiously. It was said that the demand for works fuel shows some improvement in view of the stoppage of the pits for Doncaster week.

*House Coal.*—The turn of the month and the change to colder weather have caused an improvement in the demand, particularly for best qualities. London merchants and factors are not only taking full contract quantities, but also buying pretty freely in the open market. Contrary to expectation, lowest summer prices were not withdrawn on Monday. This step is likely to be taken within the next few days. The demand from the eastern and southern

	Current prices.	Last week's prices.
House coal:—		
Prices at pit (London):		
Haigh Moor selected ...	14/6	14/ to 14/6
Wallsend & London best	13/6 to 14/	13/6 to 14/
Silkstone best .....	13/6 to 14/6	13/6 to 14/6
Do. house .....	12/3 to 12/9	12/3 to 12/9
House nuts .....	11/6 to 12/	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best .....	16/6 to 17/6	16/6 to 17/6
Silkstone best .....	15/6 to 16/6	15/6 to 16/6
Do. house .....	14/9 to 15/6	14/6 to 15/6
Other qualities .....	14/3 to 14/9	14/3 to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 12/	11/ to 12/
Unscreened gas coal ...	10/6 to 11/	10/6 to 11/
Other sorts:—		
Prices at pit:		
Washed nuts .....	11/3 to 11/9	11/6 to 12/
Large double-screened engine nuts .....	10/3 to 10/9	10/6 to 11/
Small nuts .....	10/ to 10/6	10/ to 10/6
Rough unscreened engine coal .....	10/ to 10/6	10/ to 10/6
Best rough slacks .....	8/ to 8/6	8/ to 8/6
Do. ....	7/ to 7/6	7/ to 7/6
Do. ....	7/ to 7/6	7/ to 7/6
Do. ....		
Do. ....	12/6 to 13/	12/6 to 13/

counties is better than last week, and all quotations operating on the London Coal Exchange are firmly held. In the West Riding the retail trade is still unsatisfactory, but prices are officially unchanged. Current quotations:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

*Gas Coal.*—September schedules specify a considerable increase in the deliveries ex-contract, and the pits are able to work full time without difficulty. In some cases it is reported that the delivery of gas nuts is in arrears. Open market business is scarce, but the few new contracts reported are all at the official advance of 1s. per ton. There is a ready outlet for any surplus tonnage of unscreened gas coal for shipment at Hull and Goole.

*Manufacturing Fuel.*—With the resumption of work in Lancashire there is a rather better call for slacks and small nuts. Supplies, however, are still in advance of market needs, and special prices are often met with. Coking slacks are freely offered, in some cases at considerable reductions.

*Washed Furnace Coke.*—If anything, the demand shows signs of improvement, but quotations remain in the neighbourhood of 12s. 6d. to 13s. per ton at the ovens. Forward business is very difficult to negotiate, as buyers refuse to contract for more than three months ahead. Stocks are considerable, both in trucks and on the benches.

#### Barnsley.

#### COAL.

The position in regard to all classes of steam coal continues to be very firm. The quantity of surplus coal after meeting contract supplies is only slight, and will be much the same next week owing to the Doncaster races, which will not only cause goods traffic in this district to be almost entirely suspended, but will account for the absence of a large number of miners from work. With the extra tonnage required for export, enquiries were numerous for the placing of substantial orders, but with the prospect alluded to, coalowners were very firm in the quotations and not a great deal of business was fixed up. Sellers believe that they are on safer ground in holding aloof from any further contracts. Railway companies have been pressing for larger supplies, so that collieries are well cleared of stocks. The best hards were particularly firm, with an upward tendency, and secondary descriptions have also stiffened a little on the week, and there is every indication that higher prices will again be obtained before the end of the shipping season. The fact that the Grimethorpe and Frickley Collieries have secured the renewal of the quarter million tons contract for the Cunard Steamship Company occasioned little surprise. The coal is a mixture of large, steams, nuts and slacks, but the price is not disclosed, though it is expected the figure will exceed the reported price of 10s. 6d. per ton of a year ago. In regard to small steam coal, although prices on current account are about the same, the practical completion of the holidays in the textile districts is expected to restore the demand for slacks to the normal, and prices are not so easy on forward account. A large tonnage is, however, still on the market, the consumption for coke manufacture continuing to be of a reduced description. The enquiry for steam nuts, however, continues to be fairly regular, and prices are more steady. The big demand for gas coal, largely on foreign account, continues, and the full working of the collieries is necessary to maintain the supply. With respect to the house coal trade, the demand is of a fairly active character, and stocks are still slight. More is being taken on contract account for the southern markets, and more is being put into stock in the expectation that the coalowners will attempt to obtain a further advance in prices at the opening of next month, when winter quotations on contracts come into operation. The best qualities continue to be the more scarce, and in the nearer markets there is not any great animation being shown. Business in respect to coke is little changed, and prices are about the same as last quoted.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone .....	15/	14/6
Best Barnsley softs .....	14/3 to 14/6	13/9 to 14/
Secondary do. ....	11/ to 13/6	11/ to 13/
Best house nuts .....	13/ to 13/3	13/ to 13/3
Secondary do. ....	11/ to 13/	11/ to 13/
Steam coals:—		
Best hard coals .....	13/3 to 13/6	13/3
Secondary do. ....	12/ to 12/3	12/
Best washed nuts .....	11/6 to 12/	11/6 to 12/
Secondary do. ....	10/9 to 11/	10/9 to 11/
Best slack .....	8/ to 8/9	8/ to 8/6
Rough do. ....	6/6 to 7/6	6/6 to 7/6
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/6 to 12/	11/6 to 12/
Gas nuts .....	12/ to 12/9	12/ to 12/9
Furnace coke .....	12/6 to 13/	12/6 to 13/

#### Hull.

#### COAL.

A quieter tone has come over the Humber coal market. The demand for export is not so brisk as it was, the current idea for the moment being that better terms are to be had by waiting. We are now within measurable distance of the close of the Baltic shipping season, and a good deal of coal has to be bought and despatched between now and the middle of October. The requirements of South Russia are being looked forward to to supply a good bit of business, but not a great deal seems to have been done so far, though buying has been taking place both in South Yorkshire and north by Russian merchants. Best Yorkshire steam hards are easier on the week, while Derbyshires and Nottinghamams are similarly quoted lower. Secondary sorts and smalls are lower in sympathy, and rough slack is in poor demand. The quieter state of affairs referred to last week continues, and considerably less is going for shipment than was the case three or four weeks ago—consequently loading conditions are good. There has been more activity in the freight market, and rates show a firmer tendency. Several steamers have been taken up for Cronstadt at 5s. 1½d. to 5s. 3d., but little is doing for Riga, where tonnage is held up by the strikes. The first steamer to load coal for Odessa from Hull for a long time has been chartered to carry 4,900 tons, the rate paid being 9s. 9d., and enquiries are on foot for further steamers

to carry coal to South Russia. The labour position on the Humber is one of unrest, the coal trimmers at Immingham are coming out on strike on Saturday if their demands for higher wages are not conceded, while at Goole and Hull the question of the national Saturday half-holiday is engaging attention. At Goole, where the men are under a recent agreement to work late on Saturdays in the interests of the trade of the port, the shipowners have to-day decided to hold their men to that agreement. At Hull a conference between the shipowners and exporters and the men's representatives failed to come to an understanding, the latter stating that they were bound by the Birmingham resolution. It remains to be seen how far the men at the ports will carry out that resolution. The following are the approximate prices for prompt shipment f.o.b. Hull, etc.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	16/ to 16/3	16/3 to 16/6
Washed double-screened nuts .....	13/3 to 13/6	13/6 to 13/9
Unwashed double-screened nuts .....	12/9 to 13/	13/
Washed single-screened nuts .....	13/	12/9
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls .....	10/3 to 10/6	10/6
Unwashed smalls .....	9/3 to 9/6	9/6
West Yorkshire:—		
Hartleys .....	13/3	13/3 to 13/6
Rough slack .....	10/3 to 10/6	9/9
Pea slack .....	9/	9/
Best Silkstone screened gas coal .....	13/3 to 13/6	14/
Best Silkstone unscreened gas coal .....	12/6	13/
Derbyshire:—		
Best steam hards (Hull) .....	15/6	15/9 to 16/
Do. (Grimsby) .....	15/	15/6 to 15/9
Derbyshire nuts (doubles) .....	13/	14/
Derbyshire nuts (doubles) (Grimsby) .....	12/9	13/9
Derbyshire large nuts ...	14/ to 14/6	14/3
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	15/6	15/9
Do. do. (Grimsby) .....	15/	15/6

#### Chesterfield.

#### COAL.

The condition of the coal trade of North Derbyshire is satisfactory, and the feeling is hopeful with regard to the approaching winter. At present, the demand for house coal is much more active than is usual at this time of the year, while stocks are distinctly low. Prices are firm, with a tendency to rise; indeed, an advance in quotations is likely to take place during the present month. Owing to the holiday season, the demand for fuel for industrial purposes is rather quiet, but the position will now steadily improve and it is not improbable that a very brisk demand will be experienced for all qualities, more especially those that are suitable for steelmaking. Slack is in quiet request, owing to the reduced wants of the Lancashire cotton mills, many of which are rendered idle by the annual wakes, the last of which is held this week. With a resumption of work, boiler fuel will come into active demand and the tendency of prices is to advance. With so much small fuel being taken off the market for the various collieries' own requirements in connection with their by-product plants, it is feared that there will be considerable difficulty in meeting the coming demand satisfactorily. In the export trade there is considerable interest displayed with regard to the Russian enquiry for 250,000 tons of steam coal for shipment over the next few months, and the Hull shippers are hopeful that a fair share of the business will come to the Humber ports. In this event the market would remain firm until practically next spring, seeing that the coal would be shipped to the southern ports, which would remain open during the winter. The demand for steam coal for general prompt shipment is good and prices are firmly held by the collieries. Cobbles and nuts for near Continental ports are in steady request, but the demand for the smaller kinds is rather quieter. There is no improvement in the coke market, where the demand is slow and prices weak. There is, however, a growing feeling that the bottom has been touched. Coking fuel moves freely at prices that remain firm in sympathy with other classes of slack.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

#### IRON.

There is a little more enquiry in the market for pig iron and the outlook for the winter months is regarded more hopefully.

### Nottingham.

#### COAL.

With the opening of September the coal trade in Nottinghamshire is gradually expanding, and the general position is satisfactory, whilst the outlook for the present month is encouraging. In the household section merchants are commencing to take supplies on a larger scale in view of the autumn trade. During the latter part of August the weather has not been helpful, but the snap of colder weather at the commencement of the present week is certain to stimulate sales. Prices all round are showing a firmer tendency in this section, and for certain qualities fractional advances are being demanded. Best households are in increasing demand, and sales of various qualities at the landsale depots are on the upgrade. There is a more active tone in the steam coal branch, for while the amount of fuel which is being sent away for shipment is increasing, industrials are in better request in the home market, with the result that values are firm, and if the improvement is



continued the probability is that more remunerative rates will be obtained. At present the slack market does not show any marked change, and although fractional reductions have been conceded in some cases, the position is not regarded as unsatisfactory. There is a fair sale for gas fuel, but coke is in rather quiet request.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	13/ to 13/6	12/6 to 13/
Good house coals.....	11/ to 12/6	11/ to 12/
Secondary do. ....	10/ to 11/	10/ to 11/
Best hard coals .....	12/ to 12/6	11/9 to 12/6
Secondary do. ....	10/6 to 11/6	10/6 to 11/6
Slacks (best hards).....	8/3 to 8/6	8/3 to 8/9
Do. (seconds) .....	7/6 to 8/	7/3 to 7/9
Do. (soft).....	7/3 to 8/	7/3 to 8/

Leicestershire.  
COAL.

The general aspect of business in this district has been gradually improving and at the present is of a decidedly cheerful character. The enquiry continues active and most of the collieries have a very satisfactory amount of business on hand, besides the business coming forward. Stocks are all round much depleted and, in many instances, there is little (if any) on hand. The output is being gradually increased and at some collieries practically a full week is being worked. The enquiry for household coals of all descriptions is better, and a further increase in this is looked for, as consumers are more disposed to fill up stocks. Steam coals are quite active, cobbles and nuts are all in request and also slacks. Special nut slacks are in very good request. Local merchants are doing more business and their autumn season appears to have begun. The quotations are quite firm and the new list issued this week makes an increase all round and this appears to be a basis which will be fully sustained. The advance is on special summer prices which have been current.

South Staffordshire, North Worcestershire  
and Warwickshire.

Hednesford.

COAL.

There is no change of consequence to report this week in connection with the coal trade of the Cannock Chase district. Business is well up to the average for the time of the year and the collieries are working fairly well—in some cases nearly full time being worked. Prices, on the whole, are gradually stiffening. The house coal trade is not yet very brisk, but is steadily improving, and there is a fairly satisfactory demand for fuel for manufacturing purposes. Business is slightly better at the landsale depots.

Birmingham.

COAL.

Several price readjustments have been made with the advent of September, mostly in an upward direction. Slack is an exception, but it is expected that this will soon harden up. The collieries in this district are busy, and are looking forward to a brisk winter's trade in all departments. Quotations :—

Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep .....	16/6	16/6
Do. best shallow .....	14/6	14/6
Do. seconds do. ....	13/	13/
Best hard .....	14/6	14/
Forge coal.....	11/	11/
Slack .....	8/	8/6
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand - picked cobs .....	13/6	13/9
Best hard spires .....	15/	14/6
Forge (steam) .....	10/6	10/
D.S. nuts (steam) .....	9/6	9/6
Small (do.) .....	8/6	8/6

IRON.

The market produced no marked sign of returning animation; neither was there any cause for discouragement or pessimism. A steady trade is being done throughout the district, with full time in most branches. The perplexing feature is the almost entire absence of forward or speculative buying. Labour and political troubles have pressed so heavily in recent months, that confidence seems to be temporarily lost. Consumers of finished material buy what they want at the moment, and no more, and the makers regulate their purchases of raw material accordingly. This, however, is a passing phase. During the week there has been a sharp revival in Cleveland iron in view of the heavy October shipments. Northern iron does not now come to the Birmingham market, but the rise will undoubtedly have a steadying effect here. It will stiffen the backs of producers, and unless the demand begins to move more freely a furnace here and there will probably be blown out rather than that iron should be made for stock. It is hoped, however, this will not be necessary. An increased enquiry is to be noted, and it is felt that sales must be negotiated soon. Prices are unchanged as follow :—South Staffordshire common 53s. to 54s., part-mine 54s. to 55s., cold-blast 125s., Northamptonshire forge 52s. 6d. to 54s., Derbyshire 54s. to 55s. The bar mills have a fair amount of employment, although the aggregate is undoubtedly short of their output capacity. Makers of marked bars are in receipt of repeat orders from their regular customers. Business in second-class bars is still held back, with the result that trade is quiet, and the highest price obtainable is about £7 12s. 6d. Common iron can be bought down to £7, or even less. A slow demand is experienced in the strip trade. For best steel strip £8 is quoted, for strong gauges for the hinge trade £7 15s., for ordinary hoops £7 15s., and for gas strip

£7 10s. to £7 12s. 6d., according to order. The call for galvanised sheets is well maintained, and the mills are working full time. The home trade is good, and the best markets abroad are the East and West Indies, South America, Australia, New Zealand, and South Africa. The minimum price for export is £11, and manufacturers quote up to £11 10s., according to circumstances. Black sheets are sluggish, and the plant of the district is not operating full time. Business in the steel trade shows an improving tendency, and most makers have from two to three months' work on hand. They could do with more. A reduction of 10s. a ton in spiegel is welcomed by steel producers. Semi-raw steel is unchanged at £5 to £5 5s. for Bessemer and Siemens qualities respectively.

Forest of Dean.

Lydney.

COAL.

Business in house coals in this district continues to show a firm tone. Orders are plentiful, and the collieries are all engaged practically full time. It is in the shipping department that the greatest activity is seen, and a good number of steamers and sailing craft are being loaded this week. Stocks at the dock sidings are nil. The rail trade, too, is very satisfactory, and it is very evident that merchants are now getting as much coal as they can in anticipation of an early rise in values. Rough slack at 8s. at pit is not easily placed. The steam coal market is not so good just now, and excepting where there are good contracts colliery owners are experiencing a difficulty in disposing of surplus output at other than low figures.

Prices at pithead.

	Current prices.	Last week's prices.
House coals :—		
Block .....	16/6	16/6
Forest .....	15/6	15/6
Rubble .....	15/9	15/9
Nuts .....	14/	14/
Rough slack .....	8/	8/
Steam coal:—		
Large .....	13/	13/ to 13/6
Small .....	10/6	9/6 to 10/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

CONTINENTAL MINING NOTES.

Belgium.

The Senate has passed, by 63 votes to 19, the new taxes on trading companies to meet the increased military expenditure. Henceforth, the existing taxes on companies' profits and on mines will disappear, and there will be instead a tax of 4 per cent. on share dividends and on the interest of bonds and debentures. Numerous protests have been raised against the imposts, which, it is stated, will weigh heavily on colliery enterprise.

The decision of the railway authorities to revert to a system of open tenders has not passed without criticism. It is maintained that one year's trial is insufficient to test the new system, especially during a period which has notoriously been favourable to sellers. The State purchases about 1,800,000 tons for the railways, and it is held that it would have had to pay 19½ or 20 francs per ton for coal in open competition for coal which, under the basis system, it has procured at an average price of 18fr. Nevertheless there is little chance that the step now being taken will be reconsidered, and an adjudication will probably be held in October.

France.

Coalmining in the Nord in 1912.—The report of M. Mettrier, Chief Engineer of Mines, contains some interesting points. The output of the department in 1912 advanced by 160,259 tons, or 2·41 per cent., nearly half of which came from the Aniche collieries. The average value also increased by 84 c. per ton. It is noted that the department is itself the largest consumer of coal in France, followed by the Meurthe-et-Moselle, the Seine, and the Pas-de-Calais. During 1912 the collieries set aside 521,060 fr. for State pensions, as well as 113,167 fr. for old age pensions not provided for by statute, and 90,652 fr. for the necessitous relief of aged miners and their families; 12,516 workmen, or about a third of those employed, are lodged in houses owned by the companies, which now number 9,764, the average rental being 76 fr. per annum. Turning to features of technical interest, the average depth of winding is 496 m., ranging from 142 to 840 metres (at Douchy). Hydraulic stowage is employed at Escarpelle, for the maintenance of surface support, and at Anzin for the protection of the shafts. There is no increase in the employment of coal-cutters, but the use of small percussive machines is growing, 114 being employed in 1912 to get 94,342 tons of mineral, or about 3,330 kilogs. per shift per machine; about 580 hammer-drills are also in use. At the end of the year there were below ground 35,011 tubs, 1,228 horses, and 14 compressed-air locomotives. The number of shots fired by electricity constitute 60 per cent. of the total. As regards the treatment of coaldust, 122 arrêts-barrages using inert dust have been installed, four using water, whilst there are 30 dustless or stonedust zones and 15 watered zones. Rescue equipment consists of 27 Vanginot compressed-air appliances and 40 Tissot regenerative appliances, the number of trained rescue men being 271. All the collieries wash their coals, 4,113,999 tons being so treated in 1912, or 52·89 per cent. of the total output. There were during the year 308 Coppée ovens without recovery and 441 recovery

ovens, of which 176 were Otto ovens, 120 Collin ovens, 109 Solvay ovens, and 36 Still ovens. In these 1,094,313 tons of coal were carbonised, the average yield of coke being 77·28 per cent. The average by-products recovered were 20·33 kilogs. of tar, 9·37 kilogs. of sulphate and 4·30 kilogs. of benzol per ton of coal. The average selling price of coke was 23 fr. 78 c., as against 22 fr. 21 c. in 1911. Thirteen briquette presses were at work and 21 presses for the manufacture of "eggettes." In this way 1,073,507 tons of coal and 99,216 tons of pitch were employed to produce 1,172,723 tons of agglomerated fuel. The average price was 21 fr. 47 c., as against 19 fr. 52 c. in 1911.

Germany.

Ruhr Coal Market.—There is no change in the market, and though on the whole business may be characterised as quite brisk, it is not up to the normal standard for this time of year. The necessity for working short time is said to have arisen at several pits owing to lack of orders; and this is not surprising in view of the enormous output to be got rid of and of the slackness in the iron industry. The demand for other industrial coals is also comparatively small, especially in the case of coking coal, stocks of which are accumulating at the pits. Greater activity is being displayed in gas coal, but the house coal trade is not up to expectations. In South Germany business is quieter again, current requirements having been covered, so that a considerable portion of the large oncoming shipments has to be put into stock. It is particularly difficult to obtain new orders for industrial coals, though buyers are taking delivery freely on older purchases. House coal is again in demand, though not to a sufficient extent. Offers of English coals are few and the prices are high. Exports to Belgium, Holland and France continue large. The coke market is not very favourable, and a good proportion of the output of blastfurnace and foundry coke has to be stocked.

Coal Market in Upper Silesia.—The situation remains practically unaltered, business being satisfactory throughout. Consumers' requirements are still very extensive, and not only tax the productive capacity of the pits, but even give rise to difficulties. The prospects of a scarcity of railway wagons during the present month has stimulated consumers to lay in their supplies as far ahead as possible, so that the railway traffic returns average about 12,000 wagons per diem. Industrial coals are the most in demand, and will probably improve still more, as an improvement is becoming evident in the iron industry. The demand for coking coals is difficult to satisfy completely, the cokeries being extremely busy, and larger deliveries are being made in both gas and house coals. The export trade to Austria-Hungary is large, and the demand from Russian Poland cannot be met completely. In the other outside markets, English competition is making itself felt now and again, and forces prices down. The coke market is also satisfactory. Blastfurnace and foundry coke can hardly be turned out fast enough, and the smaller kinds are well looked after too.

Hamburg Coal Trade.—Mr. H. W. Heidmann, of Hamburg, writes: The imports of coal into Hamburg have been in August:—

From	1913. Tons.	1912. Tons.
Northumberland and Durham...	229,510	244,381
Yorkshire, Derbyshire, &c. ....	72,895	68,616
Scotland .....	103,421	139,536
Wales .....	5,832	5,872
Coke .....	—	104
Total.....	411,658	458,509

Russia.

In regard to the recent extensive orders in England and Wales for coal destined for the consumption of the railways, it may be pointed out that during the first seven months of this year the output of coal in the Donetz coalfield had been increased by 125 million poods, as compared with the quantity raised in the same months of last year, notwithstanding that the mines have been seriously hampered by a shortage of labour, due to the demands of agriculture, a shortage which may be ameliorated as the year advances. During July the stocks of coal in the hands of the railways were raised from 78 to 95½ million poods, of which 15 million poods were foreign coal. It is an eloquent fact that the Municipality of Rostoff-on-Don, right in the centre of the anthracite region, has petitioned for the importation, duty free, of a million poods of coal for the urgent needs of the population. During the first half of the present year the railways received 182½ million poods of coal, of which 15 million poods came from Great Britain, of a total of 30 million poods imported. For the second half of the year the railways have fixed their requirements at 190 million poods. In the aggregate, it is anticipated that the consumption of the railways will exceed that of 1912 by 62 million poods, contributory causes being: (1) the substitution of coal for oil on the Moscow-Korusk, Riazan-Ural, Moscow-Kazan, Vladicaucasus and South-Eastern lines, absorbing 40 million poods of coal; (2) the substitution of coal for wood on the Western, Libau-Romni, Poliessie, Riga-Orel and North Ural lines, absorbing 12 million poods; (3) the increased traffic on other lines, absorbing 10 million poods.



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\* \* \* For other Miscellaneous Advertisements see Last White  
 Page.

### Forthcoming Annual Meetings.

Manchester Geological and Mining Society—  
 October 14, 1913

Institution of Mining Engineers—  
 Sept. 24, 25 & 26, 1913 (Manchester)

Midland Counties Institution of Engineers, Sept. 1913

South Staffordshire and Warwickshire Institute of  
 Mining Engineers ... .. October 20, 1913

### The Colliery Guardian.

LONDON, FRIDAY, SEPTEMBER 5, 1913.

With next week's issue of the *Colliery*  
*Guardian* will be given a special supplement  
 containing a summary of the reports of H.M.  
 inspectors of mines for 1912.

The Trades Union Congress has been held  
 during the present week at Manchester.

There will be no variation of the wage-rate  
 in South Wales during the next three months,  
 the present maximum rate of 60 per cent. above  
 the 1879 standard remaining unchanged.

The French naval authorities are asking for  
 tenders for 100,000 tons of best Welsh Admiralty  
 large steam coal for delivery between October  
 and March of next year.

The autumn meeting of the Iron and Steel  
 Institute has been held during the present week  
 at Brussels. The autumn meeting of the  
 Institute of Metals was held last week at Ghent.

The Home Secretary gives notice that on  
 August 26, 1913, he made an Order under  
 Section 33 of the Coal Mines Act, 1911,  
 approving certain types of safety lamps for  
 use in all mines to which the Act applies,  
 subject in each case to the conditions specified  
 in the schedule to the Order. The Order  
 revokes and consolidates the previous Orders  
 of January 14, March 13, April 18, May 3, and  
 June 27, 1913.

The Home Secretary gives notice that on  
 August 29, 1913, he made general regulations  
 under section 77 of the Coal Mines Act, 1911,  
 determining for the purposes of that section  
 what are sufficient and suitable accommodation



and facilities for taking baths and drying clothes, and as to the constitution, powers and duties of the committees of management under that section.

The Petrol Substitutes Joint Committee have, it is stated, been successful in discovering a process for obtaining a satisfactory motor spirit from a by-product of coal.

The annual meeting of the British Association opens at Birmingham on Wednesday next.

The South Wales Institute of Engineers visited Ghent this week. The general meeting of the institute was held on Monday at the Palais des Fêtes of the Exhibition, when several prominent Belgian engineers attended.

### Capital and Wages.

If one result of the International Geological Congress, which has recently held its twelfth session in Canada, will be to bring forcibly before this country the enormous fuel resources of our competitors in the world's commerce, it will have done us a good service. The chief work of the Congress has been the preparation of an exhaustive summary of the coal resources of the world, which are estimated at 7,397,533 millions of tons, to which the United States contributed 3,214,174 millions of tons, Canada 1,234,269 millions of tons, which, taken together, equal more than one-half of the world's total. On the other hand, the estimated resources of the United Kingdom amount to 189,535 millions of tons, or about one-fortieth.

This must be an unwelcome enlightenment to many of us, for an assumed monopoly of coal supply has been usually regarded as the Englishman's birthright.

But the countries which are the happy possessors of this almost limitless supply of fuel are well known to be equally well equipped, in addition, with abundant natural resources of every description, and as the economic combination of these prime essentials—raw material and fuel—form the basis of successful industrial competition, it is not surprising that an immense export of British capital should have occurred during the past 15 years or so.

The inevitable conclusion—namely, that British investors have waked up to the fact that the advantage which we have hitherto possessed over other countries is largely one of custom and tradition—is referred to in a powerful article by Mr. A. A. MITCHELL, on "The Influence of Trade Unions on Wages," which appears in the current issue of the *Edinburgh Review*. The author points out that "essentially and in the nature of things, looking to the natural resources of different countries, there was never, perhaps, any reason why British gilt-edged investments should hold the unique place they did 15 years ago."

As return on invested capital is due to the difference between the total cost of production and the realised price, it is evident that any permanent decrease in the margin in one country as compared with others will tend to drive capital elsewhere. It would therefore seem to be very short-sighted policy, at a time when the virgin resources of comparatively new countries have a tendency to attract capital, to decrease the return upon capital which is invested in this country by artificially raising wages which, at any rate in the coal trade, are the prime factor in the cost of production.

This artificial raising of wages, which appears to be the chief aim of trade unionism at the present time, has a direct tendency to repel capital, and that country where there is least trade unionism will—other things being equal—have an advantage in obtaining capital.

This is no reflection on ideal trade unionism, but upon its abuse, for, as Prof. SMART has held, pure trade unionism should have the effect of maintaining the efficiency of the stream of labour by favouring the strong employer and putting a premium on the good worker.

Unfortunately the aim of present-day trade unionism, unlike such contrivances for increasing the productivity of labour as technical education and improved machinery, is not to increase the total product, but only to obtain a larger share for labour at the expense of other factors. As Mr. MITCHELL declares, the argument from the disputed statement that labour has lost something of late years in comparison with capital, to the need for a more aggressive labour policy is to read the moral exactly backwards. What is most urgently needed is to foster inducement to invest capital at home rather than to bring it to a vanishing point.

### Trade Summary.

The London coal trade is reviving. Buying is still restricted, but many arrears of orders for house coals booked prior to the holidays are still to be delivered. Best hards are firm; second qualities moderate. Small nuts and slacks unusually weak. Coke is still very plentiful. Stocks at the depots are accumulating, and all re-labelling stations are full. "Wakes" and "feasts" are lessening the output, and the shipping trade continues firm. The house coal market is improving, and the near approach of an advance in public prices has stimulated trade.

Tonnage at Newcastle is no longer so plentiful, and larger supplies of coal are on offer. The market is easier, and buyers are holding off. All classes of fuel, including coke, are weaker.

The Durham coal market is sluggish, owing to the short supply of tonnage. Gas coals are fairly active, however, and coke is steady.

Lancashire house coals do not show any marked improvement. Other classes of fuel are in steady demand, but rather more slacks are on offer.

Conditions in West Yorkshire have undergone little change. House coal is in rather better request, and the demand for works fuel has also improved.

In South Yorkshire general firmness prevails, in anticipation of the Doncaster race week, whilst the outlook further ahead is satisfactory. House coal is being taken up more rapidly. Coke is dull.

The Derbyshire house coal trade is more active, and prices are firm. The demand for manufacturing sorts is quieter. A considerable weight of steam coal is being booked for export.

The market at Cardiff is undecided in tone. Tonnage is scarce and freights are rising. But little better-class steam coal, however, is offering, and the collieries show unabated confidence in the future. Small coal is dull. Monmouthshire coals are down considerably. Bituminous coals have undergone no change, and the same remark applies to patent fuel.

The Scottish coal trade continues active in all branches.

### THE BY-PRODUCTS TRADE.

**Tar Products.**—There is a steady market and fairly good enquiry. Benzols and pitch keep firm. Naphthas are rather quiet and on the west coast crude carbolic is the turn easier, while crystals are easier all round. Creosote firm and without alteration in price. Nearest values are:—

Benzols, 90's .....	1/1 to 1 1/4
Do. 50's .....	1/1 to 1 1/4
Do. 90's North .....	1/0 1/2
Do. 50's North .....	1/1 1/2
Toluol .....	1/1 1/2
Carbolic acid, crude (60 per cent.) .....	1 2/3 to 1 1/4
Do. crystals (40 per cent.) .....	4/4
Solvent naphtha (as in quality and package) ...	9/4
Crude ditto (in bulk) .....	5/5
Creosote (for ordinary qualities) .....	3/3
Pitch (f.o.b. east coast) .....	4 1/6 to 4 5/6
Do. (f.a.s. west coast) .....	4 5/6 to 4 1/6
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—The tendency towards higher prices continues, and in most cases advances are being secured. The forward position is naturally strong and £13 12s. 6d. is required to secure supplies for delivery up to the end of this year, while makers are in no hurry to do business, even on those terms. Closing prompt prices are:—

London (ordinary makes) .....	£12/8/9
Beckton (certain terms) .....	—
Liverpool .....	£13/5
Hull .....	£13/2/6
Middlesbrough .....	£13/2/6
Scotch ports .....	£13/7/6
Nitrate of soda (ordinary) per cwt. ...	10/9

[Sulphate of ammonia, f.o.b. in bags, less 2 1/2 per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

### INDIAN AND COLONIAL NOTES.

#### India.

The Burelia Coal Company is the title of a new concern which has recently been registered in India with a capital of Rs. 9,00,000. The registered offices are situated in Calcutta.

The directors of the Bengal Iron and Steel Company have received a telegram from the managing agents in Calcutta, stating that the river has flooded Ramnagore Colliery, only No. 5 incline being workable. It is estimated that it will take about four months to dewater. No lives were lost.

**Water Supply in the Jherria Coalfield.**—A special meeting of the Indian Mining Association was held on August 6 at Calcutta, when Mr. W. A. Ironside (president) delivered an address. He said it had been deemed advisable to convene the meeting to consider the question of water supply in the Jherria coalfield. A scheme was first mooted in 1908, and in 1909 the Government appointed a committee. The report of this Committee, which did not touch the important question of finance, was issued towards the end of last year. Mr. Ironside said a scheme had been placed before them which provided for an initial estimated expenditure, after cutting out Dhanbaid, of some 30 lakhs of rupees, and consisted largely of a large reservoir and dam, with the usual connecting channels, 13 miles of aqueduct and about 85 1/2 miles of pipe line varying from 3 to 22 inches diameter. Further the estimated cost of subsidiary reservoirs capable of holding 1,200,000 gallons appeared on the low side at 70,000 rupees; and in addition between 200 and 300 miles of pipes would be necessary to connect with the collieries, to be paid for by them. The president referred to the objectionable features of a surface system of distribution, if that was intended, during the hot weather, and to the difficulties that would arise through subsidence over the whole 85 1/2 miles. Were the collieries to be compensated for the coal left for support if that was proposed? To provide effective support, he said, would mean 7 1/2 million tons of coal, and he had not included the subsidiary reservoirs. Further, he was convinced that they would be unable to run this huge scheme on an annual maintenance cost of 31,000 rupees, of which 16,000 rupees was to be the cost of filtration only. Finally, the following resolution was declared carried by a large majority:—

"That if the Government of Bihar and Orissa will not agree to the proposal of the Indian Mining Association to hold in abeyance the Jharra water-supply scheme, until it can be seen what result is likely to accrue from the operations of the Mines Board of Health, to be formed under the Mining Settlements Act, that, as an alternative, the committee of the Indian Mining Association is hereby empowered to request the Local Government to proceed with the Jharra water-supply scheme, provided they will undertake that the general cess on all collieries in the district will not at any time exceed 6 pies per ton calculated on the despatches, and that the rate for filtered water supplied to collieries will not exceed 2 annas per 1,000 gallons."

#### Australia.

**Recent Coal Finds.**—Reported discoveries of coal, writes our Sydney correspondent, are becoming somewhat frequent in the Commonwealth. The New South Wales Under-Secretary for Mines, who has been visiting Queensland, describes a remarkable seam of coal in that State. It is situated at Blair Athol, about 200 miles west of Rockhampton. "I was," he says, "down a colliery, 115 ft. from the surface to the top of the coal seam, which is over 65 ft. thick, with no shale bands. The coal is of good, hard quality—so hard, in fact, that they shoot it down with gelignite. The coal does not coke, but it is splendid steaming coal, low in ash, and does not clinker. It is also very good for household purposes."

#### Canada.

**International Geological Congress.**—Our Toronto correspondent writes:—The opening meeting of the twelfth International Geological Congress was held in the Convocation Hall of Toronto University on the 7th ult., about 500 delegates from all parts of the world being in attendance. Addresses of welcome were delivered by Sir Charles Fitzpatrick, Administrator of the Government in the absence of the Duke of Connaught, on behalf of the Canadian Government; Hon. W. H. Hearst, Ontario Minister of Mines, representing the Provincial Government; Controller Thomas Church, on behalf of the city of Toronto; and President Falconer, of Toronto University. Dr. Frank D. Adams, of McGill University, the president of the Congress, assumed the chair and, in a brief speech, returned thanks for the honour conferred upon him. He was followed by R. W. Brock, of the Canadian Geological Survey, general secretary of the Congress, who stated that the executive had arranged excursions to points of special geological interest, covering in all a distance of 20,000 miles, which would afford the delegates some idea of the geology and natural resources of the country. Dr. Emil Tietze, of Austria, made an appropriate reply on behalf of the delegates expressing their appreciation of the cordial welcome and facilities for research extended to them.

At the afternoon session, at which Dr. T. Tscherny, director of the Russian Geological Survey, presided, the



...r discussion was the "Coal Resources of the World." Brock, general secretary, presented the monograph ...e subject prepared on the initiative of the Congress ...prising three volumes, containing in all 1,360 pages, and an atlas in colour published by Morang and Co. Limited, Toronto. This monograph is intended to form a companion work to the *Iron Ore Resources of the World*, published under the auspices of the Eleventh Congress. Its preparation was entrusted to a committee, consisting of G. G. S. Lindsey, convener, Frank D. Adams, R. W. Brock, D. B. Dowling, Charles Fergie, James McEvoy, J. B. Porter and Wm. McInnes. The editing was done by Wm. McInnes, D. B. Dowling and W. W. Leach, of the Canadian Geological Survey. It contains reports from 64 countries, most of which are in English, a summary of which is given in the first volume. The preface, by R. W. Brock, acknowledges the cordial support given by geological surveys and other Government departments throughout the world. In addition to the data furnished from these sources, information was obtained from specialists who had opportunities for the study of particular fields—so that the reports presented may be taken as the latest and most authoritative pronouncements upon the coal resources of the world.

Owing to the lack of uniformity in the usage of different countries in regard to the commercial classification of coals, it was found necessary to adopt an arbitrary classification that might be used by all. A scheme of classification was drawn up, dividing the coals into A, B, C, and D groups with various subdivisions, based mainly on composition and heating value. In this scheme A corresponds roughly to anthracite, B and C to bituminous, and D to sub-bituminous coal, brown coal and lignite.

The total coal reserves of the world compiled from all the reports received amount to 7,397,533,000,000 tons, of which nearly 4,000,000,000,000 are bituminous coals; nearly 3,000,000,000,000 are brown coals of various grades, and nearly 500,000,000,000 are anthracite. Of the anthracite coals, Asia, with the great Chinese fields, has by far the largest supply of any of the great Continental divisions, furnishing 407,637,000,000 tons. In bituminous coals, America takes the lead by a great margin with 271,080,000,000 tons, and is also in the first place in the various grades of brown coals. The world's production for 1910 was about 1,145,000,000 tons, so that, making allowances for loss in mining and regions that cannot be economically mined, there still remains many hundreds of years before the exhaustion of the supply may be looked for.

Great Britain is estimated to have a reserve of 189,534,000,000 metric tons, most of it bituminous, while France has 17,584,000,000, also chiefly bituminous. Germany's actual reserve is 94,865,000,000 tons of *Stein* coal and 9,314,000,000 of brown coal, though it is probable that there is a large further reserve. The Russian report gives 235,997,000,000 tons of all grades.

The actual coal reserves of Canada are 675,000,000 tons of Class A, 29,161,000,000 tons of Class B and C, and 384,968,000,000 tons Class D. In addition to these, the probable coal reserves are estimated at as 1,433,000,000 tons Class A, 254,500,000,000 tons Class B and C, and 563,482,000,000 tons Class D. British Columbia, Alberta and Nova Scotia are the leading coal provinces. Ontario shows a "probable" reserve of 25,000,000 tons of an inferior soft quality. The production of Canada at the present time is in the neighbourhood of 12,000,000 tons annually, so that, allowing for a considerable increase in the output, the figures show that actual exhaustion of the supply lies very far in the future.

An interesting discussion followed the presentation of the report. J. M. Gordon, of Montreal, objected strongly to the classification of coals used by the editors, contending that existing methods of classification were wrong. He asserted that the attempt to classify by chemical analysis was absurd, as the differences between the varieties were in texture and the openness of the grain, and that coal could only be classified by microscopical examination. The commercial classification by length of flame was only comparative, as there was no relation between fixed carbon and volatile matter.

A. Deflaine, of Paris, presented a paper setting forth in detail the coal resources of France.

Prof. Krusch, of Germany, read a paper prepared by Mr. Bokar upon the classification of coal, the author contending that an ideal classification was at present impossible, in view of our insufficient knowledge of the combination and genesis of coal.

A. E. Kitson, of the West African Gold Coast Survey, gave an interesting description of the brown coal deposits of Victoria, Australia, which attain the extraordinary thickness of from 808 to 1,110 feet. Incidentally, he stated that he was disposed to agree with Mr. Gordon's views as to classification, as the character of coal depends largely on its source of origin.

All interested in the coal industry will be glad to know that the important work entitled "The Coal Resources of the World" has just been issued in Canada, and the English agents are the American Book Supply Company Limited, 10, Abchurch Lane, London, W.C.

**Mountain Coalfield**—Latest information concerning the Mountain coalfield shows that the ... in character from the other cretaceous

coal measures of British Columbia in the irregular character of the beds of coal; that the area is intensely folded; that the coal in the southern portion of the field is much seamed with calcite and quartz, giving a high percentage of ash; and that the actual area of economic coal is much smaller than was originally reported. Mr G. S. Malloch, of the Geological Survey of Canada, places the total area of the field at 45 miles by 30 miles, over parts of which the coal-bearing rocks have been removed by erosion; while, in addition to the quartz and calcite veinlets present in nearly all seams he examined, niggerheads and numerous thin bands of bone occur. He also reports the field much faulted. The address by Mr. G. Watkins Evans at the Nanaimo meeting of the Western Branch of the Canadian Mining Institute, endorsed the observations made by Mr. Malloch. Mr. Evans examined the southern portion of the field for the National Finance Company Limited last summer. Mr. Evans estimates the economic area of the southern part of the field at 25 square miles. Mr. G. Grossman examined the northern or Klappan portion of the field for the National Finance Company and Alvo von Alvensleben Limited. His report on that area is much more favourable than the reports on the southern section, stating that portion of the field contains five seams aggregating 35 ft. of clean anthracite of high grade and covering an area of 80 square miles, with a strike of north-west and south-east.

**Marketing of Coal in Vancouver.**—The evidence before the commission enquiring into coal supplies and prices in British Columbia has established the fact that the average selling price of Vancouver Island coal in the mine bunkers is 3 dols. 75 c. per ton. It costs, says the *Mining and Engineering Record*, of Victoria, B.C., 75 c. to 1 dol. to transport that coal from the docks of the coal companies on Vancouver Island to the bunkers at Vancouver. The average selling price at the Vancouver bunkers is 6 dols. 50 c. per ton, and the additional charge over that figure is to cover sacking and delivery in the various parts of the city and suburbs. The profit of the Vancouver coal merchants probably averages about 2 dols. per ton, against which they have loss in weight and from breakage and various fixed charges.

COASTWISE SHIPMENTS IN JULY.

According to the monthly coal tables, the following were the shipments coastwise during July:—

From	Total cargo.		Total bunker.	
	1912.	1913.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.
Bristol Channel ports .....	414,743	346,617	23,265	28,751
North-western ports .....	301,589	295,663	68,163	71,388
North-eastern ports .....	534,762	609,939	28,839	21,779
Humber ports.....	201,435	206,653	10,350	13,587
Other ports on east coast.....	19,944	6,741	6,752	8,209
Other English ports .....	1,789	2,700	8,715	5,944
Total from England and Wales .....	1,474,262	1,468,313	146,084	149,658
Ports on east coast of Scotland.....	121,056	93,560	18,993	12,458
Ports on west coast of Scotland.....	155,193	140,352	40,537	44,078
Total from Scotland .....	276,249	233,912	59,530	56,536
Irish ports .....	—	10	3,136	5,703
Total from United Kingdom .....	1,750,511	1,702,235	208,750	211,897

The destination of cargo shipments was as follows:—

To ports in	July 1912.	July 1913.
	Tons.	Tons.
England and Wales .....	1,128,445	1,139,052
Scotland .....	169,556	127,422
Ireland .....	452,510	435,761

Shipments to London aggregated 687,248 tons.

The head of the Department of Mining at the University College, Nottingham, is Prof. W. Hutchison McMillan, B.Sc., M.I.M.E., and the college provides complete courses in mining and in mine surveying, both of which are recognised by the Home Office. Students are also prepared for the B.Sc. degree of London University in Mining. All information and prospectus may be obtained from the registrar, Mr. T. P. Black, M.Sc., Ph.D.

**Supply of Motor Spirit.**—In the course of the past few weeks the Petrol Substitutes Joint Committee, which is composed of representatives from the Royal Automobile Club, the Automobile Association and Motor Union, and the Society of Motor Manufacturers and Traders, it is stated, has discovered a process by means of which it is hoped that fully 40,000,000 gallons of British motor spirit will be available annually, without further depletion of the country's mineral resources. The spirit is said to be got from a by-product of coal at present produced in this country in enormous quantities. Excellent results, the Committee state, have been obtained from a small demonstration plant, and it is confidently hoped that the full-sized commercial plant now in course of building will be equally successful.

BOOK NOTICES.

**Liquid Steel—Its Manufacture and Cost.** By DAVID CARNEGIE, assisted by SYDNEY C. GLADWYN (London: Longmans, Green and Co., pp. xxv. + 520. 25s. net).

Mr. Carnegie, with the aid of Mr. Gladwyn, has produced an exhaustive treatise on steel-melting, and has endeavoured to treat the subject from the detailed commercial standpoint by making elaborate calculations of costs for a large variety of processes and modifications of processes. Such an attempt in book form is somewhat novel, and so is the plan of confining the book to the melting stage of the process of steel manufacture. As a result, only the cost of the molten steel as delivered to the ladle or ingot mould is discussed, and the vital differences in value and selling price of the final products is thereby ignored. This renders the otherwise very complete comparison of the various steel-melting processes somewhat incomplete. On the other hand, it is doubtful whether the numerous calculations of cost are really worth the very large space they occupy; the actual figures given can, after all, only be regarded as typical examples based on certain assumptions, and therefore possess no absolute value. In these circumstances they can only be regarded as guides to the manner in which the costs of a process can be analysed, and it would seem that for such a purpose a smaller number of typical cases to serve as examples would have been sufficient.

The descriptions of plant and processes given throughout the book are clear and excellently illustrated, and these will serve as a valuable guide and reference book to the present status of steel-melting practice. It would, however, be interesting to know how much of the information given in the book is based on the authors' own definite knowledge and how much is derived from patent specifications and the claims of more or less interested parties. In some of their remarks upon the influence of various factors upon the behaviour of the steel, both when molten and afterwards, the authors appear to be a little vague and to rely too implicitly upon the published views and statements of "authorities." Thus Arnold's dictum that sulphide of manganese is "harmless" in steel is quoted

unreservedly, and all the more recent work on the harmful effects of non-metallic enclosures in steel is ignored. Actually, Arnold's "harmless" sulphide of manganese only refers to a comparison with the vastly more dangerous sulphide of iron. The authors evidently look upon sulphur in steel from the standpoint of the steelmaker rather than that of the steel-user.

The book is doubtless one that should find a place on the shelves of every expert steel metallurgist; such a one will study it with much profit and some reservations. For students, its relatively high price and large bulk will perhaps be a deterrent, but even for them its strictly commercial view-point should be instructive.

The boring operations at Cantley Colliery, Armthorpe, near Doncaster, are expected to start forthwith. They are being carried out under the superintendence of Herr William Heyroth, of the International Boring Company, Erkelenz, Germany. This company will also carry out the freezing process, should it be decided to freeze the shaft.

**Colliery to be Reopened in Cannock Chase.**—We understand that another colliery is to be opened in the Cannock Chase coalfield. This is the old Mid-Cannock Colliery which has been closed for many years. It has been acquired by Messrs. W. Harrison Limited, of the Brownhills Collieries. The work of laying down new modern plant will be commenced shortly, and the opening out of the gateroads, &c., will be undertaken without delay. The area of deep coal is an extensive one. The work of preparation will occupy the attention of the new owners well into next year, and, when ready, the output will provide employment for a large number of miners.



THE IRISH COAL TRADE

THURSDAY, SEPTEMBER 4.

Dublin.

Business in most branches of the coal trade is very active this week, in consequence of the labour disturbances in the city, and consumers are sending in their orders, as there is already some trouble with the carters in the employment of one of the large coal firms, which it is feared may extend. A meeting of the merchants engaged in the coal trade has been held to consider what action should be taken in the event of their men refusing to handle and deliver coal for certain city firms whose employees are at present on strike or locked out, and the decision arrived at was that the men be directed to deliver coal wherever required, and on their refusal to do so their services will be dispensed with. Since then the Coal Merchants' Association has decided to look out all the members of the Transport Union. There is no change so far in prices of any class of fuel. Quotations in the city are:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best kitchen, 24s.; Orrell slack, 21s., all less the usual 1s. per ton discount for cash; steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton; house coal, retail, 1s. 7d. per sack. Irish coals at Wolfhill (Queen's County) are:—Best large coal, 20s. per ton; best household, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth; steam coals for contracts, 17s. 6d. per ton. The coaling vessels arriving during the past week amounted to 56, being the same number as the week previously, chiefly from Maryport, Garston, Cardiff, Manchester, Newport, Ellesmere Port, Ayr, Point of Aire, Saundersfoot, Whitehaven, Troon, Workington, Preston, Newcastle and Campbelltown. The total quantity of coal discharged upon the quays was 21,000 tons.

Belfast.

Demand for house coal for immediate use is quiet on account of the fine weather, although some consumers are purchasing for winter while prices are at the lowest. Prices have not been advanced at this side, but Scotch coals are much firmer than last week. There is a fairly good demand for steam qualities, and quotations are all unaltered. Rates in the city are as follow:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current quotations ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. There is a good import trade, and stocks are increasing. Cargoes arriving during the week were chiefly from Ayr, Garston, Maryport, Glasgow, Irvine, Preston, Partington, Troon, Campbelltown, Swansea, Whitehaven, Ardrossan, Newport and Girvan.

THE WELSH COAL AND IRON TRADES.

THURSDAY, SEPTEMBER 4.

North Wales.

Wrexham.

COAL.

There is a distinctly brighter tone in the coal market of this locality at the present time. Prices are denoting an upward tendency. The majority of the collieries are working fairly good time, though the two pits reported as being stopped for repairs last week have not yet resumed winding operations. They expect to be able to restart in a few more days. Some of the colliery companies have been suffering greatly of late by the number of men who absent themselves from work on the slightest pretext, or on no pretext at all. In regard to the house coal trade, things are looking better. There are more enquiries now on the market than there has been for some time, and there has also been an increase in the tonnage disposed of during the past week. Most of the enquiries now to hand are for contracts, either for public institutions or merchants' trade, and they are being fixed up at satisfactory prices. The gas coal business is pretty much the same as it was last week, as now the contracts are settled, the normal quantities are being taken, though perhaps in some cases a slightly increased tonnage is sought. The demand for steam coal remains steady, and the prices obtained herein are on the average those which prevailed last week, with an advance of about 3d. per ton in some instances. The tonnage which has been taken for locomotive and industrial contracts has been satisfactory. In the shipping trade this locality has had a fair share of orders, and there is here a tendency to an average advance of about 3d. Nuts and slack are in moderate demand, and there is an improvement in the amount of business done in gas coke. Average prices on this market are as below:—

Prices at pit f.o.r. :—	Current prices.	Last week's prices.
Best house coal .....	15/ to 16/	15/ to 16/
Secondary do. ....	14/ to 15/	14/ to 15/
Steam coal .....	12/6 to 13/6	12/6 to 13/
Gas coal .....	13/ to 14/	13/ to 13/9
Bunkers.....	12/ to 12/6	12/ to 12/6
Nuts .....	11/ to 11/6	11/ to 11/9
Slack .....	6/6 to 8/6	6/ to 8/6
Gas coke (at works) .....	15/ to 16/8	15/ to 16/8
Prices landsale:—		
Best house coal .....	17/6 to 18/4	17/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

Monmouthshire, South Wales, &c.

Newport.

COAL.

Present conditions in the steam coal market have been now consistent for some days, the prevailing features being weakness and irregularity. The colder weather has, at last, driven colliers back into the pits after a prolonged holiday season, and it may be fairly said that normal outputs have been regained. Relieved of anxiety as to production, coal-owners are now concerned regarding disposal of their outputs, for buyers seem determined to hold off the market as long as possible in order to still further weaken sellers' quotations. These, just at present, are very patchy

according to the position of colliery stems, a few pits still quoting firmly, but the majority showing wishful to secure prompt business with a view to keeping going pits that otherwise must stop. There is really very little actual business passing; more especially is this true for forward bookings, regarding which neither buyers nor sellers seem to be in earnest. Abundant supplies of small are on hand, stocks of these being indeed excessive. House coals are quiet and easy, coke and patent fuel also tending that way. Pitwood has been fairly steady, good wood ruling around 21s. 9d. ex-ship. In the freight market outward chartering has not been of an encouraging volume; rates continue firm for all directions, with owners showing little inclination to close. Latest approximate ruling quotations may be taken as follow:—

Prices f.o.b. cash 30 days, less 2½ per cent.

Steam coals:—	Current prices.	Last week's prices.
Best Black Vein large ...	17/3 to 17/6	17/3 to 17/9
Western-valleys, ordinary	16/9 to 17/	16/9 to 17/
Best Eastern-valleys .....	16/ to 16/6	16/ to 16/6
Secondary do. ....	15/9 to 16/	15/9 to 16/
Best small coals .....	8/3 to 8/6	8/6 to 9/
Secondary do. ....	7/3 to 7/9	7/6 to 8/
Inferior do. ....	6/9 to 7/	7/ to 7/3
Screenings .....	8/6	8/9 to 9/
Through coals .....	13/ to 13/6	13/3 to 13/6
Best washed nuts .....	14/3 to 14/6	14/3 to 14/9
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/6 to 20/6	19/6 to 20/
Furnace coke .....	22/ to 23/	22/ to 23/
Foundry coke .....	26/ to 27/0	26/ to 27/

Cardiff.

COAL.

It is rarely that so many incidents affecting the coal trade have cropped up as during the past week. Saturday last witnessed the disappearance of the old pilot cutters and the advent of a steam pilot service. The 93 pilots who serve the port of Cardiff will in future work on a rota system, with two weeks on duty and one week off duty. All their earnings will be pooled, and after deducting expenses will be divided proportionately. The coal trimmers have decided to cease work at one o'clock on Saturdays. When it is considered that over half a-million tons of coal are shipped at Cardiff alone over the year on a Saturday afternoon, it will be readily understood what a hardship will be inflicted on vessels, which, when this comes into operation, for the sake of perhaps 30 or 50 minutes' extra work, are practically held up over the week end. In addition to the delay occasioned thereby, it will probably mean the payment of demurrage charges. By their ill-considered action the coal-trimmers will place Cardiff at a decided disadvantage with the north-country ports. Then there is the more serious demand of the surfacemen for a 15 per cent. advance. A spirit of unrest also prevails amongst some of the railway men, and between 60 and 70 brakemen employed on the Barry Railway stopped work on Monday because the company refused to grant them an advance of 10 per cent. The stoppage in this instance, however, was of short duration, for it was reported on Tuesday that the men had gone back to work. Amidst all these perplexities, it is, however, satisfactory to notice that there is to be no variation in miners' wages through the ensuing three months. At present the coal market seems to be in a state of indecision. The supply of tonnage is not nearly so great as one could wish, with the result that freights are going up. As much as 9s. 6d. is now being paid to Genoa, which is an advance of 2s. when compared with the rate ruling only two or three weeks ago. As far as best steam coals are concerned, they are not much affected, as comparatively speaking there is very little free coal to be had direct from the collieries, and 21s. net is being asked and obtained in more cases than one. This figure is likely to be maintained, for the French Marine have come into the market within the last few days for no less than 100,000 tons of best coals for delivery at Toulon and Bizerta. The coals named in the specification are Ferndale, Nixon's Navigation, Cambrian Navigation, Penrhykyer, Hood's Merthyr, Ocean, Hill's Plymouth, Insole's Merthyr, and the National; 50,000 tons are to be delivered between October and the end of the year, and the remainder between January and March. It is evident that the experiments tried with Welsh coal by the French Admiralty some few months ago have given satisfaction. The shipping of so large a quantity to the French naval ports is bound to have a stiffening effect on the market. Second Admiralty coals are not quite on as firm a basis, and buyers with ready tonnage at command are able to obtain concessions. Superior qualities are still quoted at 19s. 6d. to 20s., and ordinary seconds at 18s. 6d. to 19s., but inferior sorts are obtainable at 17s. 6d. to 18s. The Russian State Railways are in the market for 250,000 tons of second-class coals for shipment to the Black Sea between October and January. There seems to be no doubt that a coal famine exists in Russia. The supplies of oil, about which so much lately has been heard, are not proving sufficient by a long way to meet the requirements of Russian consumers, who have in consequence to fall back upon coal. For some time statements have been in circulation that in certain districts the supply of oil, instead of increasing, is actually diminishing. This will no doubt cause those who were inclined to look upon oil as the coming fuel to pause before committing themselves to oil engines. So far as best coals are concerned the general opinion is that oil, except for very particular purposes, will not be a rival of coal. Its cost is prohibitive and, in addition to that, the regularity of supply is by no means assured. As regards forward business (notwithstanding that September has only just been entered upon), a fair number of orders seem to have been placed. The most important steamship contract yet placed is that of the Cunard Steamship Company, who have once more arranged to use Barnsley washed steam coal. Other companies, however, still pin their faith to Welsh steam coal, notwithstanding that prices for delivery over next year are 1s. to 1s. 3d. per ton over those of last year. Colliery people at present are showing no anxiety to contract and buyers are rather concerned at this indifference, as it seems to show that coalowners are pretty confident as to the future. Besides, it is rather early at present to enter into large contracts for next year. In the past, the end of October and beginning of November have been the usual contracting

periods, and colliery people are evidently of opinion that they will lose nothing by waiting. As far as the latter steam coal descriptions at 18s. 3d. to 19s. 3d., and for second qualities at 17s. to 17s. 3d. per ton. The shipments to foreign countries from the five chief points of the Channel last week amounted to over 562,000 tons, of which 381,487 tons were despatched from Cardiff alone. The Egyptian States Railways are in the market for large supplies and the Belgian States Railways are expected to come forward also within the next week or so. The small coal market is very dull. Charterings have not been anything like as heavy as usual, with the result that prices are dropping. Bunkers are 10s. 6d. to 10s. 9d., cargo qualities 7s. 9d. to 8s. 3d. A substantial fall has taken place in Monmouthshire coals, Black Veins selling at 17s. 6d. to 17s. 9d. and western-valleys 17s. to 17s. 3d. f.o.b. Cardiff. In best house coals there is no change, but second-class descriptions are 3d. per ton dearer. No. 3 Rhondda bituminous is still quoted at 17s. 6d., but No. 2 qualities are selling at 12s. 6d. to 13s. Shipments coastwise for the month of July amounted to 346,617 tons, as against 414,743 tons in the corresponding month of last year, being a decrease of 68,126 tons. From Cardiff they totalled 174,626 tons, of which Southampton took 46,500 tons, London 36,600 tons, Liverpool 30,300 tons, and Bristol 23,135 tons. From Newport there were shipped 65,377 tons, of which Dublin took 12,180 tons. Swansea shipped 39,848 tons, of which London took 21,520 tons. Port Talbot shipped 13,585 tons and Briton Ferry 11,860 tons. The Cardiff Journal of Commerce published the following as the declared price per ton of coal exported from the undermentioned ports during the month of July:—

	Cardiff.	Newport.	Port Talbot.	Swansea.
	s. d.	s. d.	s. d.	s. d.
Large steam .....	17 6	16 4	15 2	15 3
Through-and-through	13 10	15 2	11 6	11 3
Small .....	9 4	11 2	9 6	9 5
Large anthracite .....	26 2	29 0	15 8	17 4
Household .....	—	—	—	—

Prices in July of last year were:—

	Cardiff.	Newport.	Port Talbot.	Swansea.
	s. d.	s. d.	s. d.	s. d.
Large steam .....	16 2	14 10	15 7	14 11
Through-and-through	12 1	11 4	10 9	10 3
Small .....	8 11	10 5	8 2	8 5
Large anthracite .....	27 6	—	17 2	17 3
Household .....	17 3	—	—	—

There is no alteration in patent fuel, best brands of which are still quoted at 22s. 6d. Shipments for the week exceeded 41,000 tons, of which the Crown company were credited with 16,689 tons, and other local makers 9,006 tons, and Swansea with 16,079 tons. The market for future contracts is very strong, makers of best brands asking as much as 20s. The Algerian States Railways are reported to have placed contracts for about 20,000 tons for delivery over next year, but at what price has not transpired. The Bona-Guelma contracts for about 36,000 tons have also been placed with local makers. The coke market is all to pieces. Special foundry is 30s., ordinary foundry 25s. to 27s. Furnace coke at ovens is 15s., which is equivalent to 17s. 6d. or 18s. f.o.b. Everybody is reported to have coke to sell. Pitwood is 22s. 3d.

Prices f.o.b. Cardiff (except where otherwise stated).

Steam coals:—	Current prices.	Last week's prices.
Best Admiralty steam coals .....	20/6 to 21/	20/6 to 21/
Superior seconds .....	19/6 to 20/	19/6 to 20/
Ordinary do. ....	18/6 to 19/	18/6 to 19/
Best bunker smalls.....	10/6 to 10/9	11/6
Best ordinaries.....	10/	11/3
Cargo qualities .....	7/9 to 8/3	9/ to 9/3
Inferior smalls.....	7/6	7/6 to 8/9
Best dry coals .....	18/6 to 19/	18/6 to 19/
Ordinary dries .....	16/3 to 16/9	16/3 to 16/9
Best washed nuts .....	16/	16/
Seconds .....	15/	15/
Best washed peas .....	14/	14/ to 14/3
Seconds .....	13/	13/ to 13/3
Deck screenings .....	11/9	11/9
Monmouthshire:—		
Black Veins .....	17/6 to 17/9	18/6 to 18/9
Western-valleys .....	17/ to 17/3	18/
Eastern-valleys .....	16/6 to 16/9	17/3 to 17/6
Inferior do. ....	15/9 to 16/	15/9 to 16/
Bituminous coals:—		
Best house coals (at pit)	20/6	20/6
Second qualities (at pit)	17/9 to 18/	17/6 to 17/9
No. 3 Rhondda:—		
Bituminous large .....	17/6	17/6
Through-and-through...	15/	15/3 to 15/6
Small .....	12/3 to 12/6	12/3 to 12/6
No. 2 Rhondda:—		
Large .....	12/6 to 13/	13/6
Through-and-through...	11/	11/ to 11/3
Small .....	8/3 to 8/6	8/9
Best patent fuel .....	22/6	22/6
Seconds .....	20/ to 21/	19/6 to 20/6
Special foundry coke .....	30/	30/
Ordinary do. ....	25/ to 27/	25/ to 26/
Furnace coke .....	17/6 to 18/	20/ to 21/
Pitwood (ex-ship) .....	22/3	22/6

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

IRON.

Though several of the tin-plate works which had been idle for a considerable time have now been re-started, both receipts at the docks and shipments continue very small. Last week the shipments only totalled 65,402 boxes, whilst the receipts from works amounted to 89,693 boxes, so that stocks have been increased to 321,895 boxes, as against 177,761 boxes at the corresponding week of last year. Prices keep very low, due to the anxiety of makers to keep their works uninterruptedly. But they have this consolation, that the lower prices of plates have increased consumption. 20 × 14 cokes are 13s. 1½d. to 13s. 3d., and oil sizes 13s. 6d. and 19s. 3d. In the bar trade there is no



al change, £1 16s. 3d. being still quoted for both is and Bessemer qualities. Sheet bars are being by the German makers at 87s. 6d. Very few orders coming forward for galvanised sheets, but £11 continues to be steadily quoted for 24-gauge corrugateds. From 700 to 800 men are still stopped at Lysaght's works through the bursting of a flywheel, and it is anticipated that in that section work will not be resumed for a fortnight. The decision of the directors of the Mannesmann Tube Company to erect branch works at Old Trafford, Manchester, has given great disappointment. In addition to the acquirement of 64 acres, they are arranging for an option for the purchase of a further 50 acres, which would seem to imply operations on a very large scale, but there is said to be no thought of the removal of the present works at Landore. A company has been formed for the construction of three jetties at Porthcawl for the dismantling and breaking up of old steamers and battleships. The company, which will have a capital of £60,000, is influentially backed by some of the largest steelmakers in South Wales and the Midlands. There is a lock-out of iron moulders at Cardiff. Welsh pig iron is 73s. 6d. to 74s. 6d. delivered. Best rubio iron ore is 18s. 6d. to 19s., seconds 17s. to 17s. 6d.

**Swansea.****COAL.**

The trade of the port last week was quite satisfactory, both the coal and patent fuel trades displaying considerable activity; the shipments together amounted to 111,529 tons. There was a good attendance on 'Change this morning, and there was no material alteration in the general condition of the anthracite coal market, the undertone remained steady, with values ruling around last week's figures. Swansea valley and Red Vein large well maintained their position. Machine-made descriptions continued to exhibit a steady tone. The demand for rubbly culm was not quite so good, and slightly lower prices were being quoted. Duff was not so steady. In the steam coal market large was stronger, but other descriptions were without alteration.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
<b>Anthracite:—</b>		
Best malting large (hand picked) (net) .....	21/6 to 24/6	21/6 to 24/6
Secondary do. ....	19/6 to 20/6	19/6 to 20/6
Big Vein large (less 2½ per cent.) .....	17/6 to 18/9	17/6 to 18/9
Red Vein large do. ....	12/9 to 14/6	12/9 to 14/6
Machine-made cobbles (net) .....	21/6 to 23/6	21/6 to 23/6
Paris nuts (net) .....	23/6 to 26/6	23/6 to 26/6
French do. do. ....	23/6 to 26/6	23/6 to 26/6
German do. do. ....	23/6 to 26/6	23/6 to 26/6
Beans (net) .....	16/6 to 19/6	16/6 to 19/6
Machine-made large peas (net) .....	12/ to 13/6	12/ to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	6/9 to 7/	7/3 to 7/6
Duff (net) .....	5/6 to 6/	5/9 to 6/3
<b>Steam coals:—</b>		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/6 to 12/6	11/6 to 12/6
Small do. ....	8/6 to 9/6	8/6 to 9/6
<b>Bituminous coals:—</b>		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) .....	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

**IRON.**

The tinplate trade during the past week continued quiet; many of the works in the district are fully engaged, but the position on the whole is less satisfactory. Employment in the pig iron industry showed an improvement on both a week and a month ago. The yield of steel last week was much below the average, and several furnaces were at a standstill. The iron and brass foundries were working satisfactorily, and the engineering shops had ample orders on hand. The shipments of tinplates last week were 65,402 boxes, receipts from works 89,693 boxes, and stocks remaining in the dock warehouses and vans 321,895 boxes.

**Llanelly.****COAL.**

The position in this market is more cheerful than it has been for several months, and there is now every appearance of the trade being firm at least over the next six months. Both from inland and the works there is a better enquiry, and colliery order books are now in a satisfactory condition. There has also been a welcome advance in some of the prices, and even from the works where a slump has been predicted for the remainder of the year sellers have been able to book up at increased prices. Anthracites of all kinds are doing better, and the demand in some instances is equal to the make. Large machine-made kinds and culm are in better request. There are signs of improvement in the tinplate trade, and several of the works have restarted. This has entailed an increased consumption of smalls, and prices in consequence are firmer. This week quotations are:—

Prices f.o.b.

	Current prices.	Last week's prices.
<b>Anthracite:—</b>		
Best malting large .....	20/ to 22/	20/6 to 22/
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	17/ to 18/	17/ to 18/
Red Vein do. ....	12/6 to 13/	12/6 to 13/6
Machine-made cobbles ...	19/6 to 20/	19/6 to 20/6
German nuts .....	23/ to 24/	22/ to 24/
French do. ....	23/ to 24/	22/ to 24/
Paris do. ....	23/ to 24/	22/ to 24/
Machine-made beans .....	19/ to 21/	19/ to 21/
Do. peas .....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	7/ to 7/3	6/6 to 7/
Duff .....	5/6 to 7/	5/6 to 7/
<b>Other sorts:—</b>		
Do. 1. ....	17/ to 18/	17/ to 18/
Do. 2. ....	11/6 to 12/	11/6 to 12/
Do. 3. ....	9/ to 10/	9/ to 10/
Do. 4. ....	11/ to 12/	10/ to 11/

**THE LONDON COAL TRADE.**

THURSDAY, SEPTEMBER 4.

The London coal trade for the past week has begun to show a little more activity, although orders from the general public are said to be very slow. It is, however, a recognised fact that the bulk of the merchants have a large number of orders on hand, booked at the lowest summer prices, and whose delivery has been delayed until after the holidays, so that the buying during the past week or so has been more pronounced, and the market itself more buoyant. Many of the Midland collieries, however, have not only withdrawn all special quotations, but have advanced the pit prices (without, however, issuing an official list) to a point beyond the market value, and orders for these qualities are therefore very feeble. The ostensible reason, however, of the higher prices, is to check the flow of orders until the order books are more clear, and the contract quantities more level. The holiday season, so apparent in the London district during the whole of last month, has made itself felt in the colliery neighbourhoods lately in the diminution of output, and the various "wakes" and "feasts" are now in full swing, especially in the Lancashire and Yorkshire districts. The overplus of private wagons waiting to be loaded at the colliery end has made it difficult at times to get the orders in colliery or railway wagons away with anything like regularity. Both on Friday and Monday last, the question of the advance in public prices came up for discussion, and the merchants held one or two meetings to ventilate the subject. In both cases, however, the question was adjourned. On Monday the question of a 6d. advance was mooted, but was speedily negatived. The general impression was that within the next few days the advance of at least 1s. per ton will be announced, and possibly 6d. per ton on stove coals. The main reason for the adjournment on Monday last was that some of the merchants had offered in some cases to allow a rebate of 1s. 6d. and 2s. per ton on large orders, but it was stated that this was done to compete with the lower quotations issued by many of the other merchants who do not usually pledge themselves to the standard prices. The depots are all showing signs of an increasing stock of fuel in readiness for the winter's demand, and the marshalling stations and relabelling junctions are becoming congested. New business continues within modest bounds, but in many cases heavy arrears have to be made up. Durham and Yorkshire offerings are still conspicuously small, and the market quotations continue nominally 21s. 6d. for best Wallsend and 20s. 6d. for seconds. Twenty-nine vessels were reported as arriving in the Thames for Monday's market, and only five on Wednesday. Very little Yorkshire coal is coming forward to the London markets, for the shipping still absorbs the whole of the output, and the stoppages for the usual feasts, &c., are making the quantities available very small. The South Leicester prices are very firm, and in some cases the collieries are withdrawing all offers, as the new contracts absorb all the nuts and cobbles available beyond the house markets. Warwickshire have partially amended their contract arrangements, and the new prices do not in all cases carry the full 1s. advance in the summer months of 1914, so that considerable confusion is at present felt on all sides, and especially amongst those who have settled earlier in the year. Manufacturing fuels are steady, but the smaller kinds are exceedingly weak. Best hards are firm, but the second qualities are difficult to sell at the present list prices. Cobbles and nuts are improving in demand, but buyers are still limiting their purchases until the actual consumption begins. Small nuts and slacks have been very plentiful, and prices are considerably weaker. "Spot lots" have been sold at very low rates to clear the sidings.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/6	13/6
Do. nuts .....	12/6	12/6
Birley cube Silkstone .....	12/	12/
Do. branch coal .....	15/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	12/6	12/6
West Riding Silkstone .....	12/	12/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	11/	11/
New Sharlston Wallsend .....	15/	14/
Wharfedale Silkstone coal .....	14/	14/
Do. Flockton Main .....	13/6	13/6
Do. Athersley house coal .....	11/6	11/6
Newton Chambers best Silkstone .....	15/	15/
Do. Grange best Silkstone .....	14/	14/
Do. Hesley Silkstone .....	13/	13/
Do. Rockingham selected .....	13/6	13/6
Do. Rockingham Silkstone .....	13/	13/
<b>Derbyshire.</b>		
Wingfield Manor best .....	12/	11/
Do. large nuts .....	11/9	10/9
Do. small nuts .....	9/6	10/
Do. kitchen coal .....	8/6	9/6
West Hallam Kilburn brights .....	12/	11/
Do. do. nuts .....	11/9	10/9
Do. London brights .....	10/	10/
Do. bright nuts .....	9/9	9/6
Do. small nuts .....	9/6	10/
Manners Kilburn brights .....	11/6	11/
Do. do. nuts .....	11/	10/9
Shipley do. brights .....	11/6	11/
Do. do. nuts .....	11/	10/9
Mapperley brights .....	11/6	11/
Do. hard steam .....	10/9	10/9
Cossall Kilburn brights .....	11/6	11/
Do. do. nuts .....	11/	10/9
Trowell Moor brights .....	11/	11/
Do. do. nuts .....	10/9	10/9
Grassmoor Main coal .....	12/6	12/6
Do. Tupton .....	11/	11/
Do. do. nuts .....	12/	12/

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal .....	12/6	12/6
Do. do. cubes .....	12/	12/
Do. special Derbys .....	11/9	11/9
Do. house coal .....	11/	11/
Pilsley best blackshale .....	12/6	12/6
Do. deep house coal .....	10/6	10/6
Do. hard screened cobbles .....	10/	10/
Hardwick best Silkstone .....	12/6	12/6
Do. Cavendish brights .....	11/6	11/6
Do. cubes .....	11/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/	12/
Do. small hards .....	11/	11/
Do. deep largo steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	12/	12/
Do. cobbles .....	12/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/	14/
Bestwood hard steam coal .....	12/	12/
Do. bright cobbles .....	11/3	11/3
Hucknall Torkard main hards .....	12/3	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. ...	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/	12/
Do. hard steam .....	10/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/9	11/9
<b>Warwickshire.</b>		
Griff large steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	11/	11/
Do. loco Two Yard hards .....	14/	14/
Do. Ryder nuts .....	11/6	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Haunchwood steam .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	11/	11/
Exhall Ell coal spires .....	12/6	12/6
Do. large steam coal .....	10/9	10/9
<b>Leicestershire.</b>		
Snibston steam .....	10/6	10/6
Do. cobbles .....	10/3	10/3
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/6	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	17/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	10/	10/
Do. large nuts .....	10/	10/
Do. bakers' nuts .....	9/6	9/6
Do. Main nuts .....	10/	10/
Do. hards .....	9/6	9/6
Granville New Pit cobbles .....	11/6	11/6
Do. Old Pit cobbles .....	10/6	10/6
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/6	13/6
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	15/	15/
Do. cobbles .....	14/	14/
Apedale best .....	13/6	13/6
Do. seconds .....	13/	13/
Podmore Hall best .....	13/6	13/6
Do. seconds .....	13/	13/
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London		
Do. brights .....	13/	13/
Do. shallow one way .....	12/	12/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	11/	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/	12/
Do. one way .....	12/	12/
Do. shallow coal .....	12/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles .....	22/	22/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/	11/

**From Messrs. Dinham, Fawcus and Co.'s Report.**

Friday, August 29.—The seaborne house coal market remained steady to-day, with a poor demand, and no cargoes pressing for sale. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 14.

Monday, September 1.—There was an improved tone in the seaborne house coal market to-day, but no actual sales of Durham or Yorkshire cargoes made; only a small quantity of the latter seconds changed hands. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 30.

Wednesday, September 3.—There was no alteration in the seaborne house coal market to-day, no cargoes being on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 5.



### NEW RESCUE STATIONS IN YORKSHIRE.

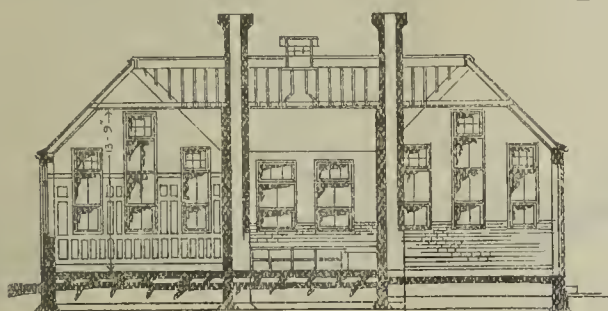
Contracts have been accepted for the work in the erection of a mining rescue station which is being built off Eastgate, a central site in Barnsley, for the training of men belonging to various collieries within a near radius of the town. The station, the planning of which has been carried out by Messrs. Crawshaw and Wilkinson, architects, Barnsley, will contain some original features. The working gallery, which will be placed around an observation room, will occupy a site of 140 ft. by 9 ft., and the observation hall will be 63 ft. by 14 ft. The doors will open outward, and have spring locks, to afford immediate exit by the workers when necessary. The administrative block will comprise committee-room, large apparatus-room, 33 ft. by 14 ft.,

passage of the motor-car when called to the scene of a disaster. The floor of the building is laid flush with the corridor approach. From the entrance doors a passage leads into the observation hall, which is 55 ft. by 26 ft., is floored with hard granolithic paving and rises clear to the steel-framed roof, partly of glass and slates. In this hall the motor-car will always stand in readiness for a call, just as a fire engine awaits its summons in the fire station. The car will be equipped with Draeger breathing apparatus, and with other rescue appliances. In this hall the men from the pits will receive their instruction in rescue work. This work will be carried out in a gallery which runs round two sides of the hall and partly round a third, and which can be seen through the glazed panels of the doors. The training gallery rises

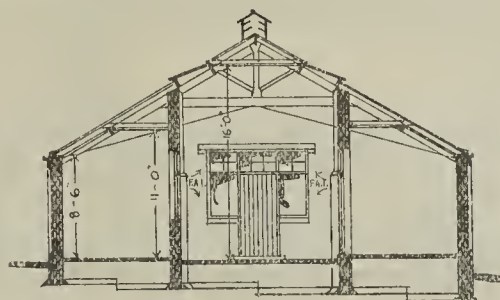
observation hall it occupies the greater part of the ground floor of the new building. There is an office and waiting room, a room for the storage of clean apparatus, and another for repairing and cleaning apparatus which has been used. There is a store room, waiting room for the men, dressing room and a bath room with a range of six shower baths, lavatory and other conveniences. Upstairs there is a committee room 22 ft. 6 in. by 8 ft. 9 in., and a bedroom for the single men who will live on the premises. There is also an instructor's cottage, which is built as a wing to the main building. This contains sitting room, kitchen, scullery, offices and three bedrooms. On the gable ends of either side of the main doorway are ornamental plaques bearing the respective inscription "D.R.S."



Front Elevation.

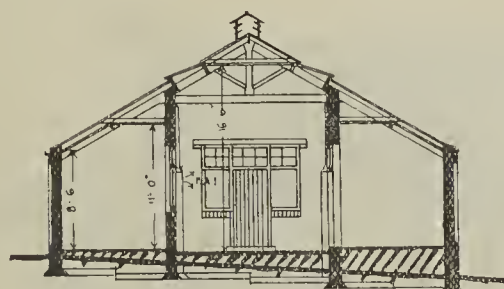


Section thro' Administrative Block.



Section thro' Galleries.

FIG. 1.—BARNSELY RESCUE STATION.



Section A.B.

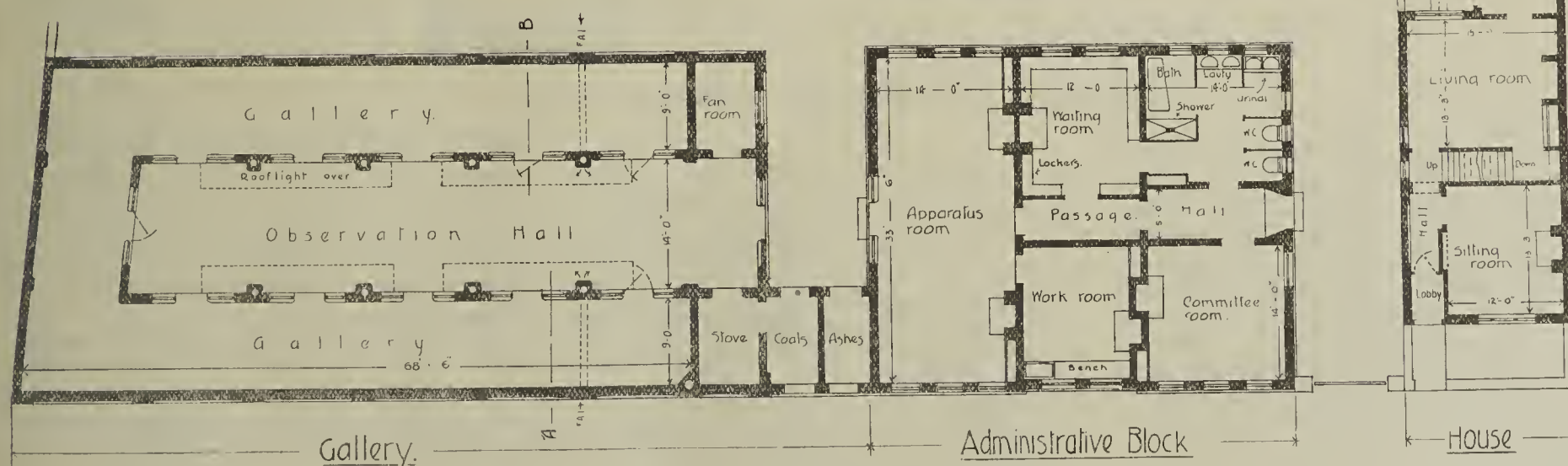


FIG. 2.—PLAN AND SECTIONS OF NEW RESCUE STATION AT BARNSELY.

waiting-room, workshop, and repairing-room, with baths, &c. A house for the instructor is also to be included on the site. The accompanying elevation and plans have been kindly supplied to us by the architects.

The handsome new central rescue station for the Doncaster colliery district, which is being erected at Wheatley, is now fast approaching completion. The building is most conveniently situated close to Wheatley Park, and is at the corner of Wheatley-lane and the new Wentworth-road. The station has been built by Messrs. Thornton and Son, of Doncaster, and designed by Mr. J. E. Knight, of Rotherham. It is almost a *fac simile* of one which is at present being erected in that town to serve the collieries of the Rotherham district. It is approached by wide entrance gates, which lead up to the main doors, 10 ft. wide, so as to permit of the easy

to the present height of the building, but for training purposes it will be roofed over at a low level. The men will have to make their way along it in a stooping position. The floor is covered with rough ashes to resemble a colliery road, at one end is a large stone and at the other end a powerful fan to draw air through the passage on the same principle that a colliery fan works. Teams will be trained in the method of using the breathing apparatus and will be sent into the fume gallery with stretchers, the doors being closed behind them. Smudge will be burnt in the furnace with sulphur, the hot air will be drawn through the gallery, and thus the conditions will approximate closely to those found in the pit after an explosion.

The training gallery has a total length of about 100 ft., and is 8 ft. 6 in. wide throughout. With the

and "1913." The station is to be placed in charge of a competent instructor whose duty it will be to train the teams of rescue men from the various collieries interested in the station. There will, of course, be telephonic communication with all the collieries, and a rapid turn-out will in every way be assured. Great satisfaction is expressed locally at the provision of this fine rescue station.

The Right Hon. Sir Fitzherbert Edward (Stafford-Jerningham), 11th Baron Stafford, of Costessey Hall, Norwich, and of Shifnal Manor, Shifnal, Salop, joint owner with the Duke of Sutherland and Lord Granville of the Lilleshall Collieries, Shifnal, left unsettled property of the gross value of £27,390, of which the net personalty has been sworn at £19,828.



## THE MANUFACTURE OF COKE IN BELGIUM.\*

By Baron EVENCE COPPÉE, Brussels.

Since the volatile matter and coking power of the coals decrease as the depth of working increases, our coke-makers have been compelled during the last 50 years constantly to improve their methods of manufacture, in order to be able to deal successfully with coals of decreasing coking quality. The situation, however, will be considerably changed for the better in the near future owing to the recent discovery of new coalfields in the provinces of Limbourg and Hainaut, which are proved to be rich in gas and coking coals of good quality.

Until about the middle of the last century, coke was made in this country in beehive ovens. It was at this period that Smet of Charleroi and Evence N. Coppée, my father, introduced the first ovens which were heated at the side and underneath by the gas evolved from the coal during coking. They were the pioneers of this type of oven, which marked an important era in the

of Coppée waste-heat by-product oven shown in figs. 1 and 2. About 85 per cent. of all the recovery ovens working and under construction in Belgium are of either the Coppée or Smet-Solvay type. At the present time we have only about 100 non-recovery ovens in use, representing about 3 per cent. of our total coke production, all of which will soon be replaced by by-product ovens.

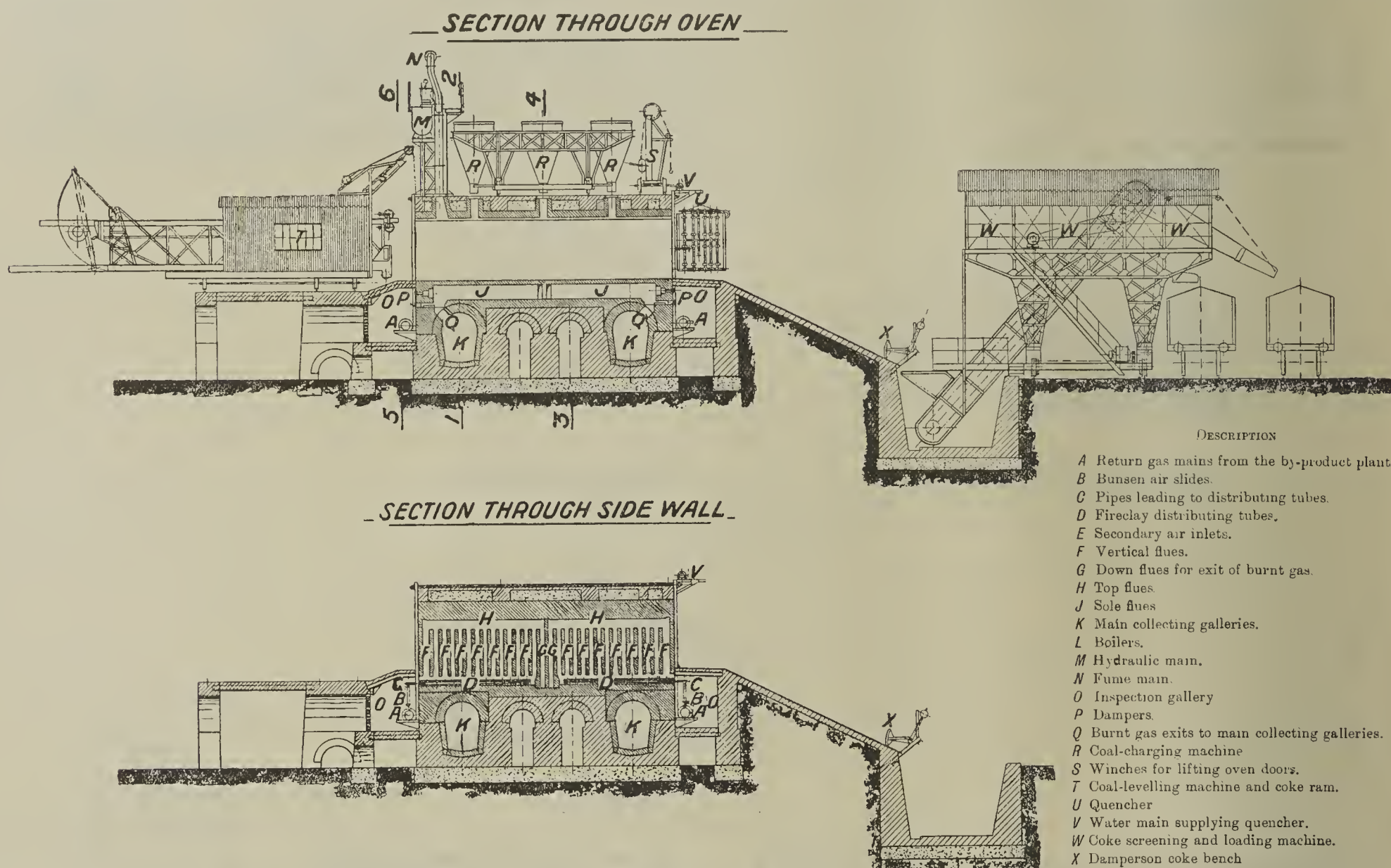
In England, by-product recovery has not made as much progress, and I think that there may be two chief reasons for this:—

1. The first recovery ovens erected were by no means as perfect as they are now, and produced a coke which was undoubtedly inferior to beehive coke, thus prejudicing ironmasters against the "patent" ovens.

2. On account of difficulties in connection with refractory materials, the early constructors had several very unfortunate experiences, resulting in defective working of the ovens.

In spite of the fact that most of the English bricks are capable of resisting high temperatures equally as

the temperatures at which different bricks begin to fuse. The temperatures are plotted as abscissæ and the expansions (in thousandths) as ordinates. The curve A refers to a Belgian brick, and it will be seen that it expands regularly up to about 700 degs. Cent., at which temperature it reaches a maximum dilatation of a little over  $\frac{1}{1000}$  or about 0.5 per cent., and when heated further no more expansion takes place. Similar curves have been obtained with another Belgian brick B, and a German brick D. G is a French brick. All the above are good bricks, eminently suitable for coke-oven construction. H is a brick of English origin, which has a rather high expansion, but is otherwise good. Looking, on the other hand, at the remaining curves, we see that the bricks E and F, which are of French manufacture, reach a maximum expansion at about 800 degs. Cent. and 900 degs. Cent. respectively, after which they commence to contract. Two varieties of English bricks K and L have the same characteristics, though to a less extent. It is evident that bricks which behave in this manner are unsuitable for coke-oven construction,



FIGS. 1 AND 2.—COPPÉE WASTE-HEAT BY-PRODUCT OVEN.

manufacture of coke. This method of heating was first of all applied to the beehive oven, and later to retort ovens which were arranged for mechanically discharging the coke. Smet's oven with horizontal flues and the Coppée oven with vertical flues were the prototypes of all the present types of modern by-product retort ovens, and were very shortly followed by others, among which I may mention the Dulait oven at Charleroi, the Rexroth oven at Saarbruck, and the Creusot oven at Creusot. In 1865, Appolt designed a vertical type of oven which was also specially arranged for coking coals of low agglutinative power, but it did not meet with much success.

An early attempt to recover by-products from coke-oven gas seems to have been made at Newcastle-upon-Tyne about the year 1763; however, the credit for the first real solution of the problem on anything like a practical basis must be given to Carvès, who erected a plant in France in 1867. He encountered many difficulties with his original oven, and it was not until about 1882 that coking with by-product recovery can be said to have been firmly established. About this time Smet-Solvay also introduced his by-product oven.

Later on, modifications were from time to time introduced into the design of the Coppée retort oven in order to render it suitable to meet the new conditions which had come into existence, without, however, the abandonment of the distinctive characteristics which had been possible for the successful results hitherto attained. From these modifications led up to the present type

From paper read before the Iron and Steel Institute, 1913.

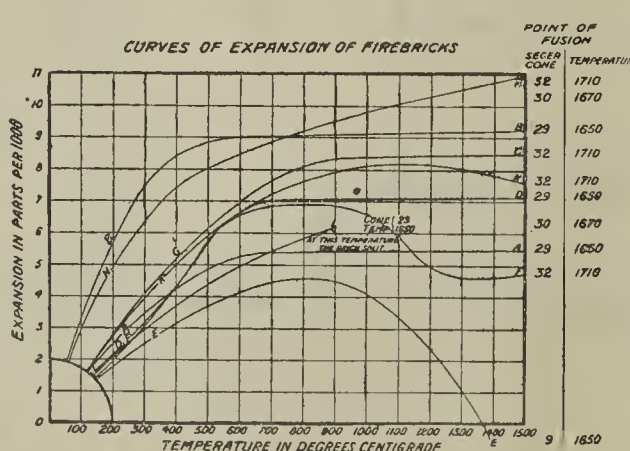


FIG. 3.

well as Continental bricks, they have the great disadvantage of contracting at high temperatures, thereby causing cracks and dislocations in the structure of the ovens. The result is that all the leading constructors are now using Belgian or German firebricks for those parts of their ovens which are in direct contact with the hot gases. English firebrick makers in general have not seen their way clear to manufacture bricks which will pass the very stringent tests imposed upon them, or where the quality of the bricks seems to be satisfactory, their high price is prohibitive.

The quality of firebricks for coke-oven building is a question of paramount importance, and I have prepared a series of curves in fig. 3 showing both the expansion of various bricks with increasing temperature and also

inasmuch as the contraction would set up cracks and dislocations in the oven structure, thus allowing direct communication between the coking chamber and the heating flues, with consequent loss of gas and by-products. Another English brick L begins at about 900 degs. Cent. to develop cracks and fissures which render it useless.

Later on, with the development of the gas engine, for which a good deal of credit must be given to the Belgian firm of John Cockerill, a marked stimulus was given to the regenerative oven which would furnish a rich surplus gas suitable for use in gas engines. With the improvements which were made in regenerative ovens, it was found that by preheating the air required for combustion, only about 40 to 60 per cent. of the gas evolved during the distillation was necessary for heating the ovens, and consequently 60 to 40 per cent. of the gas might be used for other purposes. I should like to take this opportunity of correcting an error often made when comparing waste heat and regenerative ovens. One frequently reads or hears this question spoken of as if there were a gain in energy by using a regenerative oven instead of a waste-heat oven, but as a matter of fact this depends upon the use to which the gas is put. From a given quantity of coal, the thermal energy evolved in the hot burnt gases of waste-heat ovens is greater than that evolved in the live gas from regenerative ovens. Regenerative ovens, generally speaking, coke at a higher temperature than waste-heat ovens; and as the volume of brickwork is larger in the former case, the loss of heat by radiation is higher in regenerative ovens than in waste-heat ovens. If we apply the surplus thermal energy to raising steam in



each case, the effect of this will be that while waste-heat ovens will produce from 0.75 to 1 ton of steam per ton of coal coked, regenerative ovens coking the same quality of coal will only produce from 0.6 to 0.7 ton of steam per ton of coal coked.

It is not economical to put down regenerative ovens for raising steam, except in special cases where the boilers cannot be near the ovens when the use of hot gases from waste-heat ovens would be uneconomical owing to great loss of heat by radiation and conduction. If, however, we use the surplus gas from regenerative ovens in a gas engine, the situation becomes completely reversed. Although the thermal energy contained in the burnt gases from waste-heat ovens is greater than the energy contained in the live gas from regenerative ovens, yet the power produced by consuming the live gas in a gas engine is considerably more than the power produced from boilers heated by the hot gas of waste-heat ovens, because a gas engine has a higher efficiency than the combination of a boiler and steam engine.

I have prepared diagrams which will be found in figs. 4 and 5 to indicate as nearly as possible the ultimate distribution of the whole of the thermal energy contained in the gases evolved from waste-heat and regenerative ovens respectively. It is in this question of power production that the regenerative oven has such a great advantage over the waste-heat oven.

In the Coppée regenerative oven the side wall contains 30 vertical flues divided into five groups of six. During each period of reversal three flues in each group serve as combustion flues, while the hot burnt gases pass down the remaining three flues whence they are conducted under the sole of the oven. When the reversal takes place the gases traverse each combustion chamber in the opposite direction, the flues which previously served as combustion flues now serving to carry away the burnt gases and *vice versa*.

The burnt gases pass from the sole flue into one or

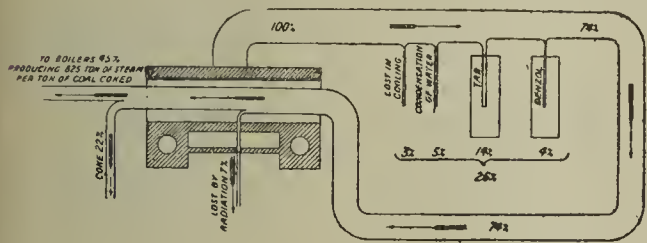


FIG. 4.—DIAGRAM SHOWING THE ULTIMATE DISTRIBUTION OF THE THERMAL ENERGY CONTAINED IN THE GASES EVOLVED FROM A WASTE-HEAT OVEN.

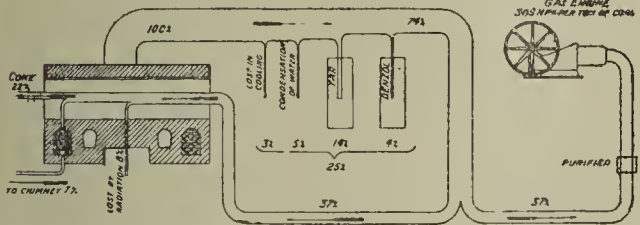


FIG. 5.—DIAGRAM SHOWING THE ULTIMATE DISTRIBUTION OF THE THERMAL ENERGY CONTAINED IN THE GASES EVOLVED FROM A REGENERATIVE OVEN.

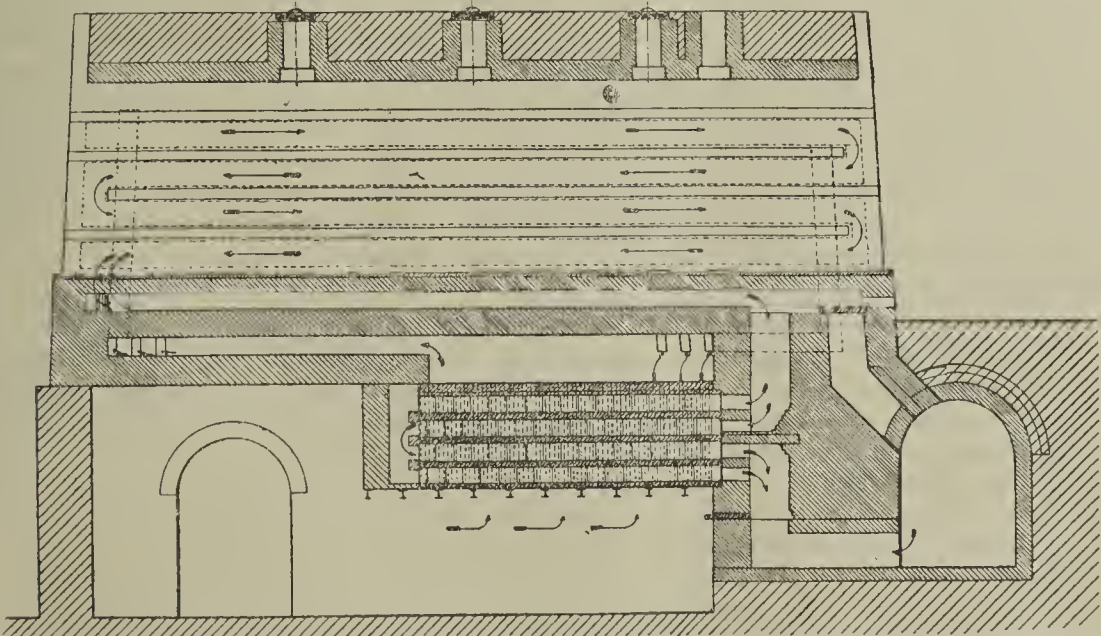


FIG. 6.—SEMET-SOLVAY REGENERATIVE BY-PRODUCT OVEN.

wall. In order to obtain a uniform temperature along the whole of the side wall, the ideal arrangement would be that each rising flue should alternate with a descending flue; but in practice no difficulty is found in maintaining this uniform temperature by reversing three flues at a time. On the other hand, in certain types of ovens the gas is reversed in one half of each side wall at a time—the flues of one half of the side wall (*i.e.*, about 15 flues) being used as combustion flues, while those of the other half lead away the burnt gases. This arrangement is certainly less suitable than the one that I have just described, as it results in a less regular heating of the oven, necessitating a greater consumption of gas, thus diminishing the percentage of gas which may be available for power production.

Owing to the greater regularity of heating, a regenerative oven will coke about 5 per cent. more coal in a given time than a waste-heat oven of the same size. In the Solvay recuperative oven the cold air circulates in the regenerator in an opposite direction to the hot gases which give up their heat to the air by conduction through a thin wall. This recuperative system is thus continuous. The Solvay recuperative oven is illustrated in fig. 6. The burnt gases, on leaving the sole flue, pass through the recuperator in a double horizontal circuit. The horizontal flues are formed of specially shaped bricks having small vertical passages in which the air is heated by conduction. The air ascends through the recuperator in an opposite direction to the hot gases, and reaches the gas burners by vertical chimneys managed at both ends of the piedroit of the ovens. Arrows on the plate show the air and gas circuit.

Before using the surplus gas from regenerative ovens for power production in gas engines, a certain amount of chemical purification is necessary. The percentage of sulphur contained in the gas evolved from the ovens is fairly high; and although a large proportion of this is removed during the process of recovering the by-products, the amount of sulphur contained in the so-called “clean” gas is too high for the gas to be used in engines without further purification. The purification is usually carried out by passing the gas through a

INDUSTRIAL AGREEMENTS IN THE COAL TRADE.

We give in this and following issues a digest of the evidence tendered by representatives of the coalowners and miners before the Industrial Council in the course of their enquiry into industrial agreements.

Durham and Cleveland.

The first witnesses to give evidence in regard to the coal trade were Mr. A. F. Pease and Mr. J. H. B. Forster, representing the Durham Coalowners' Association and the Cleveland Mineowners' Association. Mr. Pease said the former association was formed in 1872, and now covered 95 per cent. of the firms and companies in the county. At present, he believed, there was only one large firm outside it, in addition to a number of small people on the edges of the district. Of the 158,000 persons employed in 1911, 150,000 were employed by members of the association. Mr. Pease next put in as evidence copies of the various agreements arrived at since 1872, dealing with wages, conditions, hours and modes of working. The sliding scale prevailed from 1877 until 1889, when it was terminated by the men. For some years wages were settled by direct negotiation, and in 1892 a 13-weeks strike occurred against a reduction in wages. In 1895 a conciliation board was formed; this, again, was terminated by the men after a year or two, but was re-formed a few years later, in 1899. That board was now in existence.

The witness next described the machinery for dealing with local disputes, adding that as long as he could remember there had only been one strike, with the exception of one with regard to the rules. Really they had only had one breach of an agreement as between the union and themselves, and that was with regard to the recent coal strike, when the question in dispute should have been referred to the conciliation board. As a rule, the union and its officials did their very best to see that agreements were carried out; but they had a good many instances, especially amongst the boys, of kicking over the traces. In connection with this, the witness put in the following statement:—

LIST OF LOCAL STRIKES DURING THE YEARS 1910 AND 1911.

Cause of stoppage.		1910.			1911.		
		No. of stoppages.	Days idle.	Total days lost.	No. of stoppages.	Days idle.	Total days lost.
1	Dissatisfaction with eight hours' agreement...	101	1,135 $\frac{3}{8}$	1,242,313	—	—	—
2	Fatal accidents.....	16	15 $\frac{1}{2}$	16,250	17	15 $\frac{1}{2}$	17,153
3	Dissatisfaction with earnings.....	78	103 $\frac{1}{2}$	57,724	60	72 $\frac{1}{2}$	55,922
4	Summonses issued or damages claimed.....	9	7 $\frac{1}{2}$	7,194	11	11 $\frac{1}{2}$	8,660
5	Ponies.....	9	5 $\frac{3}{8}$	2,861	1	$\frac{1}{2}$	59
6	Idle on days other than recognised holidays (or shifts preceding).	9	14	18,685	4	3 $\frac{1}{2}$	5,677
7	Putters demanding or refusing to hew, or lads putting, &c.	13	10 $\frac{1}{2}$	7,042	8	19 $\frac{1}{2}$	5,306
8	Objections to discharge or suspension of men	6	8 $\frac{5}{8}$	1,540	8	10 $\frac{3}{8}$	9,493
9	Houses or fire coal.....	—	—	—	4	12 $\frac{3}{8}$	6,257
10	Miscellaneous.....	88	72 $\frac{1}{2}$	138,005	16	78 $\frac{3}{8}$	50,626
Total.....		329	1,373 $\frac{1}{2}$	1,491,614	129	224 $\frac{7}{8}$	159,153
		Average number of workmen laid idle on each day of stoppage..... 1,086			Average number of workmen laid idle on each day of stoppage..... 709		

In 1911, 159,153 days were lost, and that might be taken as a normal year. A considerable number of those disputes occurred without the support of the responsible officials, and he thought the union, if it was recognised by the owners, should be responsible for its members. In the first place, there ought to be some easy way of getting money from the union if the men broke their contract and went out without notice. That was subject to agreement having been entered into voluntarily by both sides, and he would not advocate this course in the case of a compulsory agreement. As far as the owners' association was concerned, they tried to persuade the outsider to come in, but he would not call it pressure, and they had had no experience of owners endeavouring to get the better of members of the association by undercutting them.

In the case of a question that was not local, witness said either side might move it off the joint committee and make a county question of it, when it would become a question of negotiation between the two associations. As a rule, the owners would send it to the wages committee, who would meet a committee of the men. If they failed to agree, it would be referred back to the two associations, and, if pressed further, would go to the Conciliation Board, at the wish of either party. Witness added that there were a great many instances where the awards of the joint committee were not kept, but there was a rule that if either side were not carrying out the decision of the committee, and that could be proved to the satisfaction of the chairman,

other of two regenerators which pass under the whole length of the battery of ovens. Thus, during successive periods of half an hour, each regenerator serves alternately to extract the heat from the gases produced by combustion, and to preheat the air to a temperature of between 1,000 and 1,100 degrees Cent.

The operation of reversal is very simply effected by a single movement of the reversing valve and of the cocks admitting the gas to the combustion flues in the side

battery of oxide purifiers; but it is not necessary, however, to carry the elimination of sulphur to the same extent as in gas intended for lighting purposes. From certain recent observations which have been made with respect to the effect of sulphur on the cylinders of gas engines, it would appear that the corrosive effect is due more to condensation in the cylinder produced by variation in the load than to the presence of sulphur.

(To be Continued.)



side in default could not have any of their cases heard at that particular pit or colliery until they complied with the previous decisions of the joint committee. That had generally proved effective.

Speaking of the Durham and Cleveland committees, Mr. Pease said the great difference was that in Cleveland they had no permanent chairman. In cases of dispute, failing agreement, the matter was referred to two referees on each side, none of whom had any connection with the dispute. When they failed to effect a settlement, an umpire was called in. There was another rule in Cleveland to the effect that no cases should be brought to the joint committee until an effort had been made at the particular mine to settle them by a meeting between the management and representatives of the men. In Durham that was customary, but not obligatory.

Turning to the Durham Conciliation Board, witness said its powers were very wide indeed, and there was practically nothing that could not come within its jurisdiction. There might be some questions that would be regarded as questions of discipline rather than negotiation, but he could not point to any concrete case. As to the regulation of wages, witness said the men had gradually kept on getting a little more, and a little more, above the sliding scale. The main arbitration award was one by Sir Horace, afterwards Lord, Davey, which gave the men  $6\frac{1}{4}$  per cent. above the old sliding scale. Ever since then settlements have been negotiated as to whether  $6\frac{1}{4}$  per cent. was sufficient or not. Witness said the selling price of coal was arrived at by dividing the total amount of money received for coal at the pit's mouth by the total output on which wages were paid. The raisings of two or three firms, members of the Owners' Association, who used most of the coal they raised for their own purposes, were omitted. These firms would produce more than 10 per cent. of the total output. In fixing wages, they usually took  $1\frac{1}{4}$  per cent. to correspond to 2d., as in the expired sliding scale, but the men were asking that the variation should be modified. That was simply a guide. The only occasion upon which a decision was not accepted was in 1892, but there was no conciliation Board in existence at that time. The present Board was terminable by either side by six months' notice, and that fact, he thought, had a tendency to keep both parties reasonable. He did not think there was so much danger of breaches of agreement with regard to general wages arrangements; the danger was with regard to other settlements. The constitution of the Conciliation Board gave both sides power to settle on behalf of their own side; but in Cleveland on all questions, and in Durham on many questions, negotiated outside the Conciliation Board, it would be an advantage if the men's representatives had larger powers to settle, and witness thought they would frequently effect very much better settlements if they had not always to go back to their men with regard to very small matters.

Witness said there was no appeal from the Joint Committee properly so called to the Conciliation Board, but there was an appeal from any committee of the two sides formed for the discussion of a particular point to the Conciliation Board. When the Eight Hours Act was passed they had many meetings, but the matter never went to the Conciliation Board. About one-third of the men struck against the settlement, but eventually they enforced the agreement as it was originally settled. The men's chief leaders acted loyally by their agreement and did their best to persuade the men, and one of the reasons why he should like to provide for some sort of penalty was that it would strengthen the position of the men's leaders in a case of this sort, where a section of the men kicked over the traces.

On the question of compulsion witness expressed the opinion that it would be better if things were worked as they were in Cleveland, where it was much more simple to arrange matters than in the Durham coal trade, because the interests of the different owners were much more identical, and there were not so many variations of conditions. As to the method of imposing a penalty, Mr. Pease said he could not see why a body having the powers of a trade union, which they were asked to recognise and negotiate with, should not be held amenable for its actions in just the same way as any other company with which they dealt. But it would mean an alteration in the law, and there was the further difficulty of defining a breach of agreement. It only became a breach of agreement when there was an organised arrangement to interfere with the employers' trade by the whole of the men leaving work at the same time, or a sufficient number to prevent him from carrying on his business. There might be cases where the difficulty was great in deciding whether the union was responsible or not; but he did not think there would be any great difficulty in Durham, as, having regard to

the way in which the county was organised, no breach could take place without the consent of the union. There were two kinds of compulsion: First, it would be much easier to enforce a voluntary agreement than a compulsory agreement; and if there were a voluntary agreement it should be possible to make it enforceable just the same as a contract, although even that was very often difficult. The difficulty was that the individual did not break an agreement if he gave in his notice. It must be a primary condition that the two associations or unions recognised each other's powers to negotiate on behalf of their members. If they agreed that each party should be liable in the sum of liquidated damages, there was still the difficulty that the owners would be unable to recover against a trade union, even if they had agreed beforehand.

Witness here mentioned a curious case known as the Washington case, where the men broke an agreement. The men throughout the county balloted to override the leaders to the effect that the men should be given strike pay, notwithstanding that it was against the rules. The leaders refused and the trustees refused to pay the money. The case went to the courts, who decided that the leaders and trustees were right; and that decision, he believed, had greatly strengthened the hands of the executive in Durham. In a great many cases, he thought, if the men knew that the union would be penalised, they would think twice before they went on strike. Of course, there was the further question as to how far the unions should be given power to recover from the individuals who caused the strike. He hardly thought they could refuse a man work because he had broken an agreement in a fit of temper; but he should be made to pay something.

Witness said the boys were the most difficult to control. It was a curious thing that in nearly all the strikes of the boys, they went out without notice, and the owners were constantly enforcing fines against them. He would rather have the power to apply to the unions for the fines, and have the power, if the union asked the owner to do so, to deduct them from future wages. Witness agreed that it would be unfair for the employer to threaten to close a pit, with the ulterior object of reducing wages, contrary to an agreement. Similarly, the men had a perfect right to leave the colliery rather than accept a reduction in wages; but they had no right to stay at that colliery and ask for work on different terms. It was a question of notice. Witness added that in every case of alleged victimisation there was machinery, where a man was dismissed, for having the case fully considered. They had a great many meetings between the associations on the discharges of men, but sometimes the men did not take advantage of the arrangements.

Mr. Pease admitted that the employers occasionally violated agreements, and in such cases he quite relished the idea that the association should be mulcted in damages, and that the colliery owner who had run crooked should be made to pay.

Witness said he attached great importance to trying to negotiate without calling in an umpire too frequently. If the umpire was too easily available, both sides were in a hostile frame of mind, for when they fought before an umpire, they could not give anything away, and there was not the same opening for compromise.

As to the item in the table relating to "fatal accidents," witness said an agreement had been signed by the two associations to the effect that if a man was killed before a certain time of the day in the pit, the pit should be loosed out, but the pit was not to lie idle the next day; but if he was killed after a certain time in the day, then it was a recognised county custom that the pit should lie idle the following day. That was one of the things that they had had great difficulty to get the men to carry out. The item represented the time during which the men had laid the pits idle in excess of the period to which they were entitled.

In regard to the introduction of a maximum and minimum rate of wages, Mr. Pease said he would far rather stay as they were. There was a much greater feeling of fairness between owners and men if they felt that when prices rose to a very high level the men were getting a corresponding increase of wages, and when, unfortunately, they fell to a very low level, the owners obtained relief which was absolutely necessary. The conditions in the Federated area were very different from those prevailing in the North of England, where prices were controlled to a far greater extent by the prices of iron and steel, which fluctuated very greatly.

Witness said he could not recall any case in Durham in which the men who had run counter to the advice of the leaders had been paid strike pay.

Mr. Forster said he generally agreed with what Mr. Pease had said.

(To be continued).

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### EMERGENCY RESCUE APPARATUS.

SIR,—I find that in your issue of August 1 there is a letter by Mr. R. H. Davis, director of Seibe Gorman, in which a reference is made to a letter of mine in the previous issue on emergency apparatus. Now, as this matter of emergency apparatus is of the greatest importance to the rescue men of Notts and Derbyshire, or any county where it is known, I should be glad if Mr. Davis would enlighten us a little on one or two points. In the first place Mr. Davis states that they have been making a similar apparatus for some time. Surely Mr. Davis does not compare the "Salvator," described on page 18 of their catalogue, with this little apparatus. Mr. Davis states in his letter that the price is £7, but I find on page 17 of their catalogue that the price is from £14 to £16. If Mr. Davis means the "Salvator," then I must say that there is not the slightest comparison between the two, for comparison by weight is as follows:

	lb.
Huskisson apparatus, weight slightly over .....	1
Huskisson apparatus, weight with case and strap ..	2
Oxygen cylinder to form a complete unit .....	7
Total.....	9

The above weights are when the apparatus is being used for inspecting old workings or sewers or any place where the air is thought to be foul. But for rescue work the apparatus (1 lb.), or with case (2 lb.), only would be carried in addition to the ordinary appliances carried by the teams in this district, for the simple reason that the Huskisson apparatus is instantly connected to one of the spare cylinders carried by the team, or could even be connected to the cylinders on the man's apparatus should the apparatus fail.

Now Mr. Davis's apparatus is shown as being of 13 lb. weight. Does this include the oxygen cylinder? I think not; and does this 13 lb. include the caustic soda, which would be anything up to 4 lb. extra? If Mr. Davis claims comparison, will he give weights to the following:—(1) Oxygen cylinder; (2) canvas and rubber bags, &c.; (3) soda? It must be borne in mind that the Huskisson apparatus requires no soda or any other chemicals. It could also be practically carried in a pocket of a jacket, each member of a team could carry at least one apparatus in the small tin box, and if used with the small cylinder to form a complete apparatus. The half-hour type has been worn 40 minutes several times, and if used by the rescue teams and attached to these larger cylinders will last one and a-quarter hours.

—On behalf of the Oxcroft team, H. MILNER.

136, North-road, Clowne, near Chesterfield.

September 2, 1913.

### LOW-TEMPERATURE CARBONISATION.

SIR,—In the issue of the *Car Illustrated* for March 12, 1913, appeared an article, by Mr. J. Owen, under the title "Benzol from Coal," which embodied a report by Mr. W. J. A. Butterfield, F.I.C., giving results of a series of tests made by him on Durham and Yorkshire coal and cannel, on behalf of the *Car Illustrated* and *Westminster Gazette*.

Mr. Butterfield, in his summary, states that the process of obtaining motor spirit from cannels and shales can, in his opinion, be successfully worked if only 20 gallons of spirit is obtained per ton of cannel or shale. Also, by suitably cracking the oils this quantity of spirit can be obtained if special shales and cannels are used. Such shales and cannels are exceedingly dear, and the supply very limited; if a carbonisation process to produce motor spirit is to be worked profitably, the ordinary common coals must be used.

On going through Mr. Butterfield's figures, as published in the issue referred to, I find two points which stand out prominently—the small proportion of light volatile hydrocarbons, approximately 2.88 per cent., which were recovered from the hydrocarbons in the coal; and the great volume of water, 66 gallons, produced per ton of coal carbonised. The moisture contained in the coal used was 7.05 per cent., this accounting for 15.8 gallons, leaving 50.2 gallons of liquids, other than tars, which must have been produced by, or during, the carbonisation of the coal.

It is well known that some coals contain approximately from 5 to 6 per cent. of hydrogen, and as high as 12 per



cent. of oxygen; it is, therefore, possible that the hydrogen and oxygen contained in the coal had been converted into water, instead of the hydrogen combining with the carbon to form light oils, suitable for motor spirit. A recent estimate of the various constituents comprising the volatile hydrocarbons contained in these Yorkshire coals gives:—

	Per cent.	Lb.
Carbon .....	18.20 =	407
Oxygen.....	10.50 =	235
Hydrogen .....	5.50 =	123
Nitrogen .....	1.45 =	33
Total .....	35.65 =	798

To enable these oxidised coals to be used for the production of motor spirit requires that the hydrogen shall not combine with the oxygen present, but be allowed to unite with the carbon to produce endothermic hydrocarbons, which have a low temperature of formation.

It is well known that on combustion of hydrocarbon gases with oxygen, the oxygen has a greater affinity for hydrogen than carbon, and in all cases the hydrogen burns before the carbon; also that if an inert gas, such as nitrogen, be present, the action of the affinity of oxygen for hydrogen is considerably diminished.

Acting on this property, of inert gases, preventing the combination of hydrogen and oxygen, a large number of experiments have been made on these oxidised coals by Mr. A. W. Taylor, F.C.S., of Nottingham, resulting in the production of a large volume of light oils, and an increased yield of heavy oils and ammonium sulphate, at the same time producing a firm, hard coke.

The temperature used, in the carbonisation of these oxidised coals, was sufficiently low to allow of the formation of endothermic hydrocarbon molecules, having a specific gravity of 0.7 to 0.8 and specially suitable for motor spirit. The volume of these light oils suitable for motor spirit, obtained from six samples of coals—taken from the Yorkshire, Nottinghamshire, Derbyshire, Leicestershire, Warwickshire and Staffordshire coalfields—averaged 18 gallons per ton, the total of light and heavy oils averaging 40 gallons per ton of coal carbonised.

It is evident from these tests that we have sufficient and suitable coals at home for the production of motor spirit and heavy fuel oils to meet all the demands, without importing foreign products.

A. ROLLASON.

[COPY.]

Office and Laboratory,  
31, Station-street, Nottingham,  
September 1, 1913.

DEAR SIR,—The results of numerous tests, extending over a long period, made by me, using your process on all kinds of oxidised coals, have been most satisfactory, in every case an increase of by-products being obtained, and this was most marked in the case of light oils.

The coals used were the ordinary small coals, containing from 30 to 37 per cent. of volatile matter, from collieries in Yorkshire, Nottinghamshire, Derbyshire, Leicestershire, Warwickshire and Staffordshire. In every instance the evolution of the volatile matters was delayed, until the whole of the water contained in the coal had been driven off, and by this process a large quantity of liquid hydrocarbons, principally light oils volatile between 80 and 115 degrees Cent., and oils volatile between 115 and 250 degrees Cent. were obtained, the quantity in many cases reaching as much as 45 gallons per ton, and averaging 40 gallons of oil per ton of coal carbonised.

In all cases the oils came over separately from the water, and were not contaminated by products of combustion. This process enables the ammonium sulphate and oils to be recovered direct from the gases.—Yours most truly,

A. W. TAYLOR, F.C.S.

**Alleged Coal Monopoly in Pennsylvania.**—By the orders of Mr. McReynolds, the United States Attorney-General, an important suit was filed in the Federal Courts at Philadelphia on Tuesday, in which the Government seeks to compel the dissolution of the so-called Anthracite Trust. The present suit asks the Courts to make an order against the Reading Company to dispose of its stock in the subsidiary companies to persons not at present stockholders or agents.

**Grimsby Coal Exports.**—The official returns of the export of coal from Grimsby during the week ended the 28th ult. showed the following shipments:—Foreign: To Antwerp, 708 tons; Esbjerg, 416; Langesund, 1,622; Ljusne, 1,075; Halmstad, 727; Landsrona, 1,755; Malmo, 1,413; Libau, 4,296; Randers, 376; Christiania, 99; Gothenburg, 2,641; Dieppe, 1,088; Hamburg, 1,463; Helsingborg, 1,863; Karrabecksmunde, 775; Skien, 1,117; Sodertelje, 1,158; Solvesberg, 1,329; and Rotterdam, 259; total, 24,000 tons, as compared with 27,837 tons during the corresponding week last year. Coastwise. To Yarmouth, 700 tons; Salcome, 210; and London, 101; total 1,011 tons, compared with 1,313 tons during the corresponding week last year.

## MINING AND OTHER NOTES.

The public examination in bankruptcy of John O. Scott, coal contractor, trading as John O. Scott and Co., was opened at Newcastle last week, before Mr. F. W. Dendy, the registrar. The debtor's liabilities were returned at £27,000 19s. 6d., owing to one unsecured creditor, the Chemin de Fer de Paris et d'Orleans, and the assets as nil, the failure being attributed to losses on coal contracts and freights. Debtor said he commenced business in 1890 as a colliery proprietor and shipowner, in partnership with his brother. In 1906 they commenced business as coal exporters, and in 1907 purchased the business of C. A. Blom and Co. for £12,000. In January 1911 a company called C. A. Blom and Co. was formed to acquire the business, and witness was appointed managing director. In October 1912 a liquidator was appointed. The partnership had been dissolved between debtor and his brother in 1910, but £6,988 was still owing to the latter. In addition to his own deficiency, debtor admitted there was a deficiency of £200,000 on Blom's which was practically his also. He also admitted that the whole claim of the petitioning creditors, taking in their claim against Blom's, was about £60,000. The examination was adjourned until October.

Mr. Arthur Keen, presiding over the annual meeting of the shareholders of Messrs. Guest, Keen and Nettlefolds Limited, said that during the 12 months their wages bill was by far the largest they had ever paid, amounting to close on £1,750,000. At the moment there was a distinct lull in the state of trade, and experience had taught them that after a period of good trade they must expect a considerable falling off. The effect of this would be felt in selling prices long before they could get the commensurate relief in their costs. With regard to wages, they could not foretell what might happen on this item. More wages and shorter hours were being urged for, and it was beyond question that they had to contend with conditions never anticipated when the company was formed 13 years ago. Many permanent charges had been put upon them of which the increased cost could not be given in figures. Others could be accurately stated. The company's share of the contributions to the National Health Insurance fund, quite apart from the employees' contributions, amounted to £14,000 for the year. The industries of the country were threatened with nervous depression from over-legislation, which brought on lassitude and loss of energy and enterprise, and if the cause were persisted in might bring a serious breakdown.

Mr. T. C. Renwick is retiring from the management of the Lumley New Winning, one of the Lambton and Hetton Company's group of collieries. Mr. Renwick will not sever his connection with the company, by which he has been employed 25 years. He is a native of the Bellingham district, and started work as a pit lad at the age of nine, 61 years ago.

Two young men were recently charged before the justices at Hamilton with knowingly and wilfully sending to the surface at Knowenobehill Colliery, Cleland, two hutches containing a large excess of dirt or gum, and representing the same to be coal, and did thus fraudulently obtain the sum of 2s. 3d. Mr. J. B. Ritchie, writer, Hamilton, objected to the relevancy of the complaint, in respect that there was no legal percentage of dirt laid down as constituting a common law offence. He had yet to know how much dirt put into a hutch rendered the filler of the hutch liable to a criminal charge. It was a question of circumstances or of fact for a jury entirely, because there was no law on the subject. The justices dismissed the agent's objection.

Sir J. S. Randles, presiding at the annual meeting of the Workington Iron and Steel Company, said the principal item of their capital expenditure during the 12 months had been in connection with the turbo-generating plant. It was brought to their notice that something like 5,000-horse power was being wasted in the form of exhaust steam that was capable of doing useful work through their main and auxiliary engines. The putting down of the plant had involved a large sum of money, but if they might judge of the capabilities of the plant by what it had done during the short time it had been at work and by noting what similar plants had accomplished elsewhere, it looked like quite realising expectations and enabling them to wipe out a great part of their coal bill, and so to manufacture at a considerably low cost. It would effect economies of great value in other directions as well as in the reduction of consumption of coal, and would assist them to produce cheaply during periods of depression when they came along. The remainder of the capital expenditure was principally connected with the colliery at Lowca. He was afraid they had not quite finished the capital expenditure there. They had taken up 49,500 shares in the Harrington Coke Ovens Limited at par. If they were not wanting to keep them for the sake of their interests in the coke ovens, they could realise a very handsome profit on their sale. They had, of course, no intention of doing so. They were face to face in the present year with a possibility of a lower range of prices, but he thought that, with the reduced cost of raw materials and the reductions which would come under their sliding scale arrangements affecting wages, the reduction in prices would be got over without any very serious trouble or without having to ask the men who were not on the sliding scale to accept lower wages.

It is thought a way of providing against the serious shortage of houses for those employed at the new pit at Askern has been found. Owing to the delay in sinking operations at Thorne there is a surplus of houses. It is understood that the colliery company is considering the expediency of housing some of the Askern miners in the empty dwellings at Thorne and Stainforth, the idea being to carry the men to and from their work in motor char-a-banc. Between 50 and 60 houses would by this means be immediately available, and it is more than likely the project will be carried out.

A most destructive fire occurred in the Consett district on Thursday of last week, destroying a valuable industrial property and doing damage to the extent of £7,000. The premises are known as the Washer Works, and are situated at Templetown, about half-a-mile from Consett. The industry carried on is that of separating the clinker from the coke breeze, and the works belong to the Crown Coke Company, who have been employed for some time past in dealing with large heaps of refuse from the Consett Works. The efforts of the fire brigade prevented the flames from spreading to the oil stores, wherein was stored several hundred gallons of oil. Locomotives from the Consett works removed the loaded trucks of coke standing on the line in the vicinity of the fire, although many trucks were damaged.

At Haltwhistle Police-court, last week, the Coanwood Coal Company was summoned for being in possession of an unjust weighing machine. A fine of 10s. and costs was imposed.

The seventh annual report of the Rotherham Ambulance Division of the Yorkshire Collieries Ambulance League shows that there are eight centres. Three hundred and eighteen men were prepared for examination, and 276 passed. The numbers last year were 267 and 242 respectively. Nearly one-third of the students this year have been men employed at the coal face. The percentage of this class of men at the classes is increasing year by year. Over 1,800 men in the division have now received some instruction in ambulance work since the inauguration of the league. Two ladies' first aid and nursing classes, under the regulations of the St. John Ambulance Association, are being held in the division, and are receiving the financial support of the committee. In order to encourage the younger members at the classes, the committee have again awarded a medal to the best first-year man at each class. The medal given for the largest percentage of colliers and trammers presented at the examination has been won by Mr. J. Parkin, the hon. secretary of the Woodhouse class.

Although they had negotiated in the matter of a site with the Swansea Council, it is stated that the British Mannesmann Tube Company have abandoned their project of extending their works at Landore, and that the firm intend establishing works in Trafford Park, Manchester. The present works at Landore will be continued.

A fire occurred on the night of the 28th ult. at Cossall Colliery, near Ilkeston, in a building used for the manufacture of patent briquettes. The power-house and machinery house were badly damaged.

A 2,000,000 dols. contract for the erection of coaling plants on the Panama Canal has been awarded to Augustus Smith and the Hunt Construction Company of New York, the lowest tenderers.

About 3 o'clock on the 29th ult. a fire occurred at the extensive ironworks belonging to Messrs. James Dunlop and Co. Limited, situated on the north bank of the Clyde, near Cambuslang. The loss, which is estimated at £1,000, is covered by insurance.

Mr. John Barr, of Young's Oil Company's Shale Mines, Broxburn, has invented an ingenious "headpiece" for gas testing lamps. Its construction is claimed to make it an utter impossibility for the thinnest layer of gas next the roof to escape detection. He has also devised a very simply constructed flame adjuster, actuated from the bottom of the oil vessel, which can speedily convert a large flame into a small gas-testing flame and vice versa, without requiring to lower or raise the wick with a pricker. A fireman's lamp of the Davis' A.I. make, which was fitted with the above-mentioned attachments, has been subjected to severe tests alongside other up-to-date lamps, and the results have been most satisfactory. The lamp has been submitted to mining experts for further tests previous to it being put forward for adoption.

The Yorkshire section of the Association of Mining Electrical Engineers of Great Britain visited the works of the Phoenix Dynamo Manufacturing Company Limited, in Bradford, on Saturday. In the works of the Phoenix Company there is a large explosion chamber, and very interesting experiments were carried out in an endeavour to reproduce actual underground conditions. The Professor of Mining at Sheffield University, in proposing a vote of thanks to the company, voiced the desire for greater co-operation between the mining engineer and the electrical manufacturers. In replying, Mr. Pybus, managing director, admitted that the best points of design were suggested by the man below ground. The commercial element, he thought, was too powerful in buying plant, and the practical colliery engineer had far too little say in matters often involving human lives. Dr. Pohl, of the Phoenix Company, in reply to a suggestion from the secretary that he should give popular



on electricity in the various mining centres, pointed out how difficult it was to make the subject even partially understood. He promised, however, to consider the suggestion, the members of the association feeling that every worker in a mine should have some knowledge of the great force which was so powerful a factor in colliery work.

Progress is at last being made with the scheme to extend the borough boundaries of Doncaster. At a recent meeting of the Rural District Council a letter was read from the town clerk of Doncaster, who wrote it was proposed to accomplish the extension by adding the urban districts of Wheatley and Balby with Hexthorpe, and the township of Carr House and Elmfield, the last named being a portion of the rural district of Doncaster. It was suggested the Town Council should consist of 36 instead of 24 members, and that a rearrangement of the wards should be made, so as to make all the new wards geographically convenient and similar in size. The assets and liabilities of the present part of the added areas would be lumped together and belong to, and be undertaken by, the enlarged borough. These were the main proposals which would be put in a draft order. The matter was referred to committee.

Messrs. Leggate and Sons, the colliery proprietors who are working the coal under the hospital feu at Wishaw, have given intimation to the local Town Council of their intention to now extract the coal directly underneath the building. The Council have been requested to say whether they desire any of the coal reserved for support.

Members of the Midland branch of the National Association of Colliery Managers on Wednesday afternoon, August 27, paid a visit, by permission of Mr. J. T. Todd, general manager to the A and B Winning collieries at Blackwell, owned by the Blackwell Colliery Company Limited. Much interest was taken in the inspection of the surface plant at the B Winning Colliery, including the new by-product coke ovens. With the exception of the exhausters, the whole of the by-product plant was made in England. It has been in operation since January of this year, and is producing about 1,600 tons of coke per week with sulphate of ammonia, tar and ammonia liquor. At the close of the inspection tea was provided by the colliery company for the visitors in the Boys' Brigade Drill Hall. Subsequently the chair was taken by Mr. J. Strachan, president of the branch, and a hearty vote of thanks was passed to the colliery company and to Mr. Todd, on the proposition of Major W. Eaton Walker, general manager of the Clifton Colliery, seconded by Mr. W. H. Goodwin, manager of the Swanwick Colliery. In replying to the vote of thanks, Mr. Todd stated that he was quite satisfied with the results obtained by the by-product plant. The company had in contemplation the erection of a benzol plant at an early date.

It is reported that preparations are being made with a view to the early construction of the Hadfield light railway in the Doncaster district, the powers for which were obtained by the Lancashire and Yorkshire and North-Eastern railway companies some four years ago. This railway will link up the Dsarne Valley line and other railways converging at Bessecarr, with the existing Isle of Axholme Railway running over Hatfield Moor. The proposed line is estimated to cost about £64,300, and will run close to the new Cantley Colliery, which will probably be about midway between this line and the South Yorkshire Joint Railway. It will also run near the colliery, which it is expected at some time will be opened up on Lord Allerton's estate. Now that the prospect for the new colliery at Arncliffe is materialising it is expected that the construction of this railway will not be much longer delayed.

For the week ending August 23 a new record in coal winding was set up at Brodsworth Colliery, the amount of coal wound being 21,589 tons. This is the largest amount that has been drawn out in one week in this colliery.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—J. Kirk and J. Hirst, carrying on business as stone merchants and quarry owners, at Stalybridge, under the style of Kirk and Hirst; J. Fuller and J. Kimber, carrying on business as mining and general agents, at Philpot-lane, Eastcheap, under the style of James Fuller and Co.; B. J. Ackerley, the elder, and B. J. Ackerley, the younger, carrying on business as tin-plate brokers and agents, at Chapel-street, Liverpool, under the style of B. J. Ackerley and Co.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, August 26, 1913, is as follows:—Abo, 188 tons; Antwerp, 155; Amsterdam, 2,525; Arendal, 743; Bandholm, 1,212; Bilbao, 1,640; Bona, 100; Bremen, 2,092; Buenos Ayres, 4,541; Christiania, 1,864; Copenhagen, 393; Charente, 981; Cronstadt, 18,070; Drontheim, 298; Dahlsbruk, 1,752; Degerhamn, 1,801; Drammen, 206; Delfzyl, 1,356; Ghent, 497; Gothenburg, 1,118; Guernsey, 721; Genoa, 2,875; Hamburg, 6,183; Helsingfors, 1,732; Harlingen, 911; Kalmar, 1,104; Libau, 368; Landskrona, 1,435; Marseilles, 496; Naples, 597; Rotterdam, 5,420; Stockholm, 713; Stettin, 1,005; St. Petersburg, 10,627; Tonsberg, 4,671; Tuborg, 1,172; total, 97,559 tons; corresponding period of 1912, 100,000 tons.

## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Peculiar Conditions of the Industry Coaltrimmers Stop Saturday Afternoons—Loss in Shipments of Half a Million Tons—Serious Effect on Colliery Working—No Change in the Wage Rate—Finances of the Federation—Colliery Developments in the Avon Valley—Interesting Facts as to Increase in Wages and in Cost of Living—Where the Miners have "Scored"—Cost of Production Doubled in the Coalfield.**

Coal trade conditions in this district are peculiarly interesting just now, involving probabilities which occasion—(on the one hand) much disquiet, yet (on the other hand) much satisfaction. From the Labour point of view, the Saturday afternoon stoppage of shipments combines with the demand for banksmen's increase of wages, and with the foreshadowed attempt to raise the minimum, to create uneasiness. From the trading point of view, the conclusion of heavy contracts at a material advance of prices betokens a prolongation of the period of satisfactory returns; although that anticipation is modified by the fact that a very large addition to outputs—at the rate of several millions of tons per annum—is steadily being attained, and must bring its consequence in an adverse influence upon prices ultimately. For the present, however, the outlook is favourable. Yet it has always to be remembered that the coal trade is pre-eminently one in which the little more or the little less (in the matter of supplies) has hugely disproportionate effect on prices: a little excess occasioning reductions far beyond the relative difference, whilst a little shortage keeps up prices to an equally unrelated extent.

The Cardiff coaltrimmers at a mass meeting on Sunday decided to re-affirm their determination that they would cease work at one o'clock on Saturdays, commencing to-morrow (September 6). There had been expectation that negotiations which were in progress for several days would have brought about a compromise similar to those of the Tyne and the Humber; but these negotiations have proved to be unsuccessful. There were nearly two thousand trimmers and tippers of Cardiff, Penarth and Barry present in a joint meeting on Sunday; and the decision they arrived at has the active sympathy of their fellows at Swansea and the other ports on the Channel. The president reported that the shippers on the Trimming Board had proposed to have a nominal stoppage at one o'clock on Saturday with a shilling per hour as overtime between one and two o'clock, and 9d. per hour overtime between two and five. The men, however, rejected this proposal, and did not submit any counter proposal, such as the employers invited.

A separate meeting of the tippers was held, and it was reported that the Cardiff Company had offered them 9d. per hour per man to work on from two to five, the old working hours to be maintained. But the meeting unanimously decided to reject the offer; and they went into a joint meeting with the trimmers and united with them in passing the resolution to re-affirm the decision for stoppage.

Comment in commercial circles upon the decision of the trimmers and tippers as to their half-day has been general; and it is altogether adverse. Col. Denniss, general manager of the Cardiff Docks and Railway, points out that it will be most serious if the port be placed in a less advantageous position than the Tyne; and that if trade be diverted, then the trimmers and tippers would suffer seriously themselves, as well as shipowners and merchants. At the present time only a small proportion of trimmers and tippers were required to work regularly on Saturday afternoons; and most of them could take a holiday whenever they cared.

Colliery representatives, of course, dwell generally upon the fact that the stoppage of Saturday shipments will mean a serious shortage of empty wagons for Monday. From the shipowners' side, observation is made that it will be very hard indeed upon the owner to have his vessel held up over the week-end when, if the men worked only a very short time longer, it would be enabled to get away. Other comment is to the effect that whilst the decision of the trimmers' union is absolute, there are, nevertheless, always plenty of men ready to work on Saturday afternoons; that there is no desire to force any man to work who wishes to stop; but what is desired is that there should be liberty for those who wish to work. These men would get the advantage of additional earnings; the docks would be benefited as well as the shipowner, and everyone else.

The prosperity of the coal trade in South Wales (especially the good prospects for the immediate future) prevents any notice being given for change in the wage rate, September 1 being the date upon which either side should have given notice. The men cannot claim any increase, because they are already being paid at the maximum—namely, 60 per cent. above the standard; and the employers are not (for the reason stated) able to make any claim for reduction. Gossip among the men was to the effect that were it not for the operation of the minimum, they would have been entitled to an advance of 5 per cent. on the standard.

The very satisfactory condition of the coal market is manifest in the fixtures of contracts, these having two special points of interest at the present time—first, that the contract prices for next year will be at from 9d. to 1s. per ton higher; and secondly, that a larger proportion of the output has been sold under contract—more than 50 per cent. having been thus dealt with, a much higher proportion than ordinarily rules.

The general circumstances of the labour market are of singular interest, and they have a distinct bearing upon the outlook in the coal trade, for events move very rapidly at the present time. The action of certain other unions which are endeavouring to bring the labourers into association with the skilled men in each particular industry emphasises the contention of the Federation leaders that only one union should deal with the coal industry; and it sustains their action of regarding as "non-unionists" those who are members of other unions, and have not joined the Federation.

The idea is that when in 1915 the existing agreements all over the country come to a termination, the Miners' Federation of Great Britain will act as a unity in relation to wage and other questions, and that there will be negotiation under control of a central organisation rather than that the separate districts should negotiate independently.

The national policy is being formulated, each district putting forward its ideas, and the discussion upon local circumstances and their relation to other districts is very keen. One idea—generally favoured—is that the minimum rates shall be forced to a higher level (as to which it will be remembered that some of the South Wales leaders have suggested the fixing of 50 per cent. as their minimum above the standard, instead of the present 35 per cent.). Therefore, whilst the outlook in respect of prices is good, the same cannot be said of the prospects in regard to labour.

It was stated at a meeting of Rhondda colliers on Monday by the miners' agent that negotiations for price lists at collieries would have to be concluded before October 1, otherwise the schedule applicable to new seams and pits would be put into operation in accordance with the decision of the conference which was held in Cardiff.

Between 60 and 70 brakesmen on the Barry Railway stopped work, demanding an improvement of their conditions; but the reply of the management has been that they must go through the ordinary course, utilising the Conciliation Board machinery, and this is the view of other grades of workmen, for they decided not to come out on strike with the brakesmen. The men subsequently returned to work, and the matter will go through the usual channels of negotiation.

In the course of a speech at Abersychan, Mr. Tom Richards, M.P., secretary of the South Wales Federation, gave some particulars as to the finances of his organisation during the past 14 years. He said the total amount received had been £900,393, and the expenditure had been: Strike pay, £569,051; litigation, £25,000; contributions to the Miners' Federation of Great Britain, £62,781; payment to aged and unemployed workmen, £39,609; Parliamentary representation, £22,480.

Strong appeals are being made at the present time to the miners that they will ballot in favour of political action by the Federation, and one argument is that a farthing a week from every trade unionist in the country will provide a fund sufficient to return 100 Labour members to Parliament, and at the same time also to return and maintain 10,000 Labour representatives upon the different local authorities.

The Minimum Wage Sub-committee has had before it a list of cases concerning whom the workmen's representatives submitted that Lord St. Aldwyn's award has not applied. The men's representatives therefore suggested that these workers should be classified and the minimum rates of wages be fixed. Among them are bottom cutters, sheavemen, pulley-men, underground banksmen, &c. From the owners' side an undertaking was given that information should be secured from the collieries in order that accurate information would be available before the next meeting of the sub-committee.

The joint sub-committee also dealt with the wages and hours of banksmen, definite instructions having been given by the Federation executive that the workmen should put forward proposals as to the hours, number of shifts, &c. The owners presented counter-proposals that the workmen's representatives were not then in a position to deal with.

During a meeting on Monday at Porth, one of the men's leaders said that an offer had been made to adopt the nine and a-half hours' shift, the employers suggesting this as a counter proposal to the eight hours demanded by the men. The latter had asked for a minimum wage of 4s. 3d. per day, plus percentages; this to be on the basis of an eight-hour shift. He said that what was aimed at was a reduction of the hours and an increase in the wages of the lower-paid men; and they were determined to resist any proposal for reducing wages of any among them. As the employers had rejected their proposals, he thought there would have to be a conference of banksmen to consider the whole matter.

With regard to the demand for 15 per cent. advance in the wages of surface workmen, Mr. Frank Hodges, one of the miners' agents, speaking at the monthly meeting of the Garw district, said that the matter would now have to be taken up by the Miners' Federation of Great Britain. The coalowners were insisting upon the Conciliation Board agreement, which precluded the surfacemen from getting an advance in wages until the expiration of the agreement; but the workmen's representatives looked upon that agreement as having been terminated by the national strike last



year. He declared that the Federation as a whole would fight for the surface-workers, even though it meant a national stoppage.

The Enginemens and Stokers' Association has decided upon the principle of union with the Miners' Federation, and the ballot of the members is now being taken, and will be concluded within a week. Where separate lodges of the association now exist, they will continue, but no new lodges will be formed, the workmen of those sections being included with the miners in the Federation lodge.

In the Avon valley, which is behind Port Talbot, considerable colliery development is in progress; and during the past five years both trade and population have nearly trebled. The outlook is very promising. New collieries have been opened out, chief among them that at Glyncoerrwg; and it is now stated that Messrs. R. Gibb and Co., of the Glenavon collieries, have secured an option upon land between Cymmer Glen and Glyncoerrwg, and have commenced sinking about half-a-mile from Cymmer. Ultimately about 1,500 more men will, it is expected, find employment in this new district.

Mr. D. A. Thomas, head of the Cambrian Combine, speaking at a meeting of the Fernhill Colliery Company, referred to the demands of the men, and expressed his opinion that there was no likelihood of a serious or prolonged strike in the South Wales coalfield for 12 months. Nevertheless, trade might be hindered by other troubles at the railways or ports. The demand of the South Wales Federation for an advance of 15 per cent. in wages of surfacemen was, he said, a contravention of the Conciliation Board agreement, and the coalowners were unanimous in deciding to resist that demand. They would not entertain it at all. The agreement had been entered into after prolonged discussion by both sides, and the employers maintained that, if collective bargaining between employers and trade unions was to continue, the agreements, once entered into, must be kept; for if agreements were not kept, they had better not be made. Only by *force majeure* would their determination to resist be removed.

Mr. Thomas added that the president of the South Wales Federation had endeavoured to justify the demand on the ground that the cost of living had increased enormously. But the Board of Trade report on the cost of living and the increase of wages had excluded altogether those engaged in agricultural and colliery work; and whilst the report proved that the cost of living had increased, the South Wales colliery workers' wages had increased by twice as much as the increase in the cost of living. The average rate of wages in 1896 was 11 per cent. on the standard of 1879, and in 1905 it was 31½ per cent. on the standard of 1879. To-day the wage rate was 60 per cent. above that standard. In fact, in South Wales at the present time wages were about 44 per cent. higher than they were in 1896, and 21 or 22 per cent. higher than in 1905. The Board of Trade returns showed that the cost of living had been increased about 25 per cent. since 1896, and about 11 per cent. since 1905; and this showed conclusively that the rate of wages in South Wales had increased twice as rapidly as the cost of living when compared with 1896 or 1905.

One further important point Mr. Thomas made—namely, that the hours of labour had considerably fallen. The average wage of all employed above and below ground was about £2 per week; and if they took the colliers alone the average wage would be over 50s.—or something over 1s. an hour for every hour worked. Proceeding, Mr. Thomas said that the new Acts of Parliament had considerably added to the cost of mining; and in the case of collieries where the margin of profit was small, or where they were being worked at a loss, the increased cost was of very great importance. During the last 25 years the cost of production of South Wales steam coal had nearly doubled. Legislators seemed to have an impression that cost of production was a matter for shareholders; but inasmuch as it was the consumer who ultimately paid, and as coal supplied the motive power of industry, every consumer was affected. The new Mines Regulation Act was a serious matter, involving the country in another increased cost of several millions per annum; and it was altogether too soon to say what the result of that Act would be.

With regard to the ratio between increased cost of living and increase of wages gained by South Wales colliers, an independent estimate leads to a conclusion similar to that of Mr. Thomas. During the period covered by the Board of Trade report—1905 to 1912—the percentage on the standard of wages had risen from 31½ per cent. to 57½ per cent. (whilst at the present time it is at the maximum—namely, 60 per cent. above). Seeing that the increase in the cost of living is set by the Board of Trade at anything between 10 and 13·7 per cent., according to the items that are taken into account, the conclusion cannot be avoided that the South Wales collier is to-day much better off. He has gained an additional 30 per cent. on his standard; and even after making all allowances, the advantage in point of income at the present time cannot be less than 10 to 12 per cent.

Upon another point it is necessary to insist, in order that the Board of Trade report should not be regarded as correctly indicating the conditions of the South Wales miner: The Board of Trade includes the cost of coal to wage-earners generally; but the South Wales collier gets his coal at a specially low rate, in accordance with the custom of the district, being supplied from the colliery; and, therefore, increased coal price, which has affected other wage-earners, does not apply in his case.

## LABOUR AND WAGES.

### North of England.

In his monthly circular to the Durham Miners' Association, Dr. J. Wilson, M.P., refers in detail to the recent Miners' Federation conference. In reference to surfacemen's wages, he says it was the most important question on the agenda, and one which may land them in complications, except they enter into negotiations with reason, and avoid as far as possible rash threats. There can be no legitimate objection to any effort which can be made to raise wages, but there are many difficulties in the way, which will have to be reckoned with. Among those, it must be remembered that in very many of the districts the miners' associations do not include the surfacemen in their membership, and their wages are very varied. So far as the former of these is concerned, the counties of Northumberland and Durham are unique. From their formation they have maintained the same uniform membership, and their roll of members includes a large majority of the surfacemen. In Durham the owners had reminded them that they gave on December 31, 1912, what was equal to 12 per cent. on the surfacemen's wages in the shape of 2d. on the basis, increasing it from 2s. 10d. to 3s., and giving them a special 3 per cent. to uniform the county percentage above the standard.

Mr. W. Straker's first monthly circular to the Northumberland miners, in succession to Mr. Burt's circular, which was discontinued two months ago, was issued to the lodges on Saturday. Writing on the subject of surfacemen's wages, Mr. Straker says the Northumberland owners have promised to hold a meeting to consider the matter.

The wages committee of the Northumberland Miners' Association have issued a report with reference to the last meeting with the coalowners, at which wages were advanced by 3½ per cent. The men originally asked for a rise of 7½ per cent. and subsequently reduced this to 5 per cent. The owners declined to increase their offer, and pointed out that the men's representatives had raised their claim on the relationship of wages to prices during the last few years; they, however, pointed out that in their opinion it was unreasonable for them to do so, as, owing to the increased cost of production caused by the Eight Hours Act, the Minimum Wage Act, the National Insurance Act, and the new Mines Act, this relationship could no longer be maintained. The report concludes: "As it was quite apparent the owners had made up their minds not to pay the same rate of wages in relation to prices as were paid during the latter years of the last conciliation board, and as we had no umpire to appeal to, we informed them we would accept the 3½ per cent., but not because we thought it was what we were entitled to, but because of our own weakness to demand more. Just previous to replying to our case, Mr. Taylor said he desired to express his own mind on the unsatisfactory method of settling wages which we had had since the abolition of the conciliation board. He therefore suggested that greater efforts should be made to set up some machinery—preferably another conciliation board. We said we were quite willing to meet them again for the purpose of discussing the question, but it must be understood that any conciliation board would have to recognise a bottom beneath which percentage on wages must not go. Mr. Taylor said they were willing to recognise a minimum percentage, although not what we had previously asked."

A deputation from the Northumberland Colliery Mechanics' Association was granted an interview by the coalowners on Saturday to further consider a code of working rules. Some considerable discussion took place, and the owners agreed to forward an answer in due course.

Easington Colliery, East Durham, was again idle on Wednesday and Thursday of last week on the cage load question. Operations were resumed on the previous Monday after a fortnight's strike, the men returning to their employment under protest that 60 was too many to ride in the cage in one batch. The cause of the latest dispute is the question of 90 men ascending in one batch. Only 60 men are being required to descend, but 90 men are asked to ascend. It is understood to be the contention of the management that as 60 men rode down and 90 up before the recent stoppage, and that as alterations were made to the engine brakes to remove the objections of the men in regard to safety, the same numbers ought to ride now as rode previously. The men resumed work on Friday, after a ballot. The whole question of the cage loads is now in the hands of the masters' and men's associations.

### Federated Area.

Close upon 400 men and surface workers employed at the Bankhall Collieries, Burnley, who came out on strike on Wednesday, August 27, resumed work on the following Friday, the grievance, respecting working conditions, having been settled in the meantime.

As the result of the arbitration proceedings which have taken place at Nottingham over the interpretation of part of Judge Stanger's minimum wage award, the majority of the miners' demands have been granted. The parties immediately concerned were the Newstead Colliery Company, the Stanton Coal and Iron Company, and the Pinxton Colliery Company on the one side, and the Notts Miners' Association on the other. The companies were paying their stonemen, rippers, and timberers 6s. 6d. per day at the Newstead, Teversall, and Stanton Hill pits. This was the rate for the datallers (chargemen) who came under Class 2 of Table 1 of the award. The men contended that they came under Class 8, which applies to stonemen, rippers, getters-out by contract, and timbermen, and in which the minimum is 7s. The horsekeepers at the Pinxton Colliery claimed that they should come under Class 18 of Table 2, which

awards 4s. 8d. to the head men, whereas they were receiving 4s. 5d. under Class 19. When the parties could not settle their differences, Mr. A. M. Williams was appointed arbitrator, and by his award he has placed the stonemen, rippers, and timberers in Class 8. The horse-keepers, Mr. Williams decided, must remain in Class 19, on which basis the Pinxton Company is already paying.

After stopping work at the Dinnington Main Colliery for two days, the boys, who came out on the allegation of a number of grievances, decided to resume, the management having agreed to investigate matters. The strike at one time assumed a rather serious aspect, and police protection had to be sought for Mr. J. Searston, the manager.

### Miners' Federation of Great Britain

The Miners' Federation of Great Britain on the 29th ult. issued instructions for a ballot of members to be taken on September 9, 10 and 11 on a resolution approving of the furtherance of political objects as an object of the Federation. The ballot is to test the feeling of the miners as to the desirability of adopting Part 2 of the Trade Union Act, 1912, passed for the purpose of getting over the difficulty created by the Osborne judgment. For the purpose of the Act, the Miners' Federation of Great Britain will represent the miners, and a bare majority of the total membership of the Federation will be sufficient to enable the various associations comprising the Federation legally to establish the fund.

### Trades Union Congress.

The 46th meeting of the Trades Union Congress was opened at Manchester on Monday, under the presidency of Mr. W. J. Davis (Brassworkers). There were 557 delegates present, representing 206 societies and 2,232,446 trade unionists. The President, in his address, dealt with Parliamentary representation, the co-operative movement, the state of trade, and the eight hours question. The Parliamentary Committee's report, which was afterwards presented, showed that majorities had been obtained in ballots on the eight hours question, with a verdict in favour of negotiation, and failing that a refusal to work overtime.

On Tuesday exception was taken by Mr. R. Smillie (Miners' Federation) to a minute of the Joint Board—representing the Parliamentary Committee of the Congress, the General Federation of Trade Unions, and the Labour Party—in regard to a difference which had arisen between the Cumberland Miners and the National Amalgamated Union of Labour in connection with the organising of surfacemen.—Mr. Smillie said the Joint Board had not been appointed by the Congress, and was absolutely unconstitutional. In the minute regret was expressed at the action of the Miners' Federation in refusing to send representatives to the meeting of the Joint Board. He would like to know what right the Joint Board had to put such an expression of opinion on record when the Miners' Federation had from the very beginning declined to recognise the Joint Board's authority. The minute, however, was adopted. Resolutions were also adopted in favour of the nationalisation of railways and an eight hours day.

At the Wednesday session opinion was much divided on the following resolution:—"That in the opinion of Congress rates of wages, the regulation of hours, and other conditions embodied in agreements of a local, district, or national character, voluntarily entered into between trade unions as representing the workers and the representatives of employers in a given industry, should be legally enforceable on all persons employing labour in that industry."

A resolution was carried calling attention to the "vital importance of the ballot that is being taken under the Trades Union Act, 1913, which will determine whether political activities shall form a part of the objects and functions of their trade societies."

### Forest of Dean.

Mr. Martin H. Perkins, president of the Forest of Dean Miners' Association, in a speech made at Cinderford on Monday night, said the Union executive had been closely engaged recently negotiating with the Associated Coalowners, who were urged to grant the workmen an advance in wages. They only asked 5 per cent. increase, and he was sorry to have to make the announcement that the request had been refused.

Mr. G. H. Rowlinson, the local agent, in his speech, said the minimum wage agreement in the Forest had come to an end by notice issued from the men's side, and he did not approve of a renewal unless all the men were in the association. He was glad to report that for some weeks they had been gaining 100 new members every week.

## THE TIE-PLATE TRADE

### Liverpool.

Prices are, on the whole, well maintained, but business is slow and mainly of the hand-to-mouth description. Spot lots continue to change hands at low figures, 14 × 20 cokes, for instance, being offered freely for prompt delivery at 13s. Makers' quotations for shipment over the rest of the year may be called:—Coke tins; I C 14 × 20 (112 sh. 108 lb.), 13s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 6d. to 26s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 7½d. to 13s. 9d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 7½d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 7½d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 6d. per box; I C squares and odd sizes, 13s. 6d. to 13s. 7½d. basis for approved specifications. Ternes are quiet at 23s. 3d. for I C 28 × 20. Charcoal tins are in moderate request and are quoted at 15s. 6d. basis and upwards according to tinning. Cokewasters are in quiet but steady demand. Quotations:—C W 14 × 20, 12s. 3d. per box; C W 28 × 20, 25s. 6d. per box; C W 14 × 18½, 11s. 7½d. per box; C W 20 × 10, 15s. 9d. per box—all f.o.b. Wales, less 4 per cent.



## COAL, IRON AND ENGINEERING COMPANIES.

**Big Four Syndicate Limited.**—This private company has been registered, with a capital of £15,000 in £1 shares, to enter into an agreement with Norman Leonard Birkett, and to carry on the business of coal and iron masters, &c. Signatories: W. Nilpreca, 20, Copthall avenue, E.C.; H. J. Stephens, 12, Cedar-avenue, Walthamstow; and Gilbert W. Jardine, 13, Barnes-street, Commercial-road, E. First directors: Norman Leonard Birkett (managing director), and Charles Munday.

**Bolckow, Vaughan and Co. Limited.**—The directors recommend a final dividend of 7½ per cent. on the ordinary shares, making 10 per cent. for the past year, writing £35,211 off cost of extensions and £160,000 off capital account, and carrying forward £149,153.

**Climax Rock-drill and Engineering Works Limited.**—This private company has been registered, with a capital of £60,000 in £1 shares, to enter into an agreement with William Charles Stephens, carrying on business as R. Stephens and Son, and to carry on the business of electrical and mechanical engineers, manufacturers of and dealers in electrical and other machinery and appliances, toolmakers, brassfounders, metal workers and iron and steel converters, &c. Signatories: A. E. Clutterbuck, 37, Lawrence-road, South Ealing, W., and H. Evans, 16a, Ivydale-road, S.E. Qualification of directors (not yet appointed), 300 shares.

**Clyde Tube Company (Birmingham) Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to enter into an agreement with George Austin and to carry on business as manufacturers of and dealers in brass and copper tubes, metals and machinery, &c. First directors: G. Austin and B. M. Austin, both of Highfield, Trafalgar-road, Moseley, Birmingham. Qualification, £20. Remuneration, £5 per annum. Registered office, 285-287, Brearley-street, Birmingham.

**Fowler (John) and Co. (Sydney) Limited.**—This private company has been registered, with a capital of £20,000 in £10 shares, to acquire the business of John Fowler and Co. (Leeds) Limited, carried on at Sydney, New South Wales, and to carry on the business of mechanical and general engineers, iron and brass foundries, metal workers, makers of and dealers in steam engines, boilers, &c. First directors: Robert Henry Fowler, Alfred Fowler, and William McIntosh, all residing at 113, Cannon-street, E.C. Registered offices: 113, Cannon-street, E.C.

**Harrington Coke Ovens Limited.**—The directors have declared a final dividend of 10 per cent., making 25 per cent. for the year ended June 30, 1913.

**Jones, Burton and Co. Limited.**—This private company has been registered with a capital of £15,000 in £1 shares, to acquire and take over as a going concern the business now carried on at Liverpool, under the style of Jones, Burton and Co., and to carry on the business of mechanical, electrical, consulting and inspecting engineers, manufacturers of and dealers in railway, electric, manufacturing and other plant, machinery and apparatus, &c. Signatories: G. L. Burton and R. F. Clinton, both of 19, Castle-street, Liverpool. Qualification of directors, not yet appointed, 100 shares.

**Lincoln Wagon and Engine Company Limited.**—The directors announce an interim dividend at the rate of 13 per cent. per annum, free of income-tax.

**Measures Brothers Limited.**—In the matter of Measures Brothers Limited, of Southwark, S.E., and elsewhere, the Senior Official Receiver has now issued a report to the creditors. It appears that the debenture holders have so far only had 12s. 6d. in the £, but it is stated a further dividend may be paid at some future date. The goodwill of the business, which for many years was returned in the balance-sheets at £80,000, was sold by the liquidator for £1,855, while the freehold and leasehold premises have so far realised £3,511, although in the balance-sheets they were regularly returned at £32,986. Some of the property bought by the company in 1882 for £17,000 is apparently unsalable at anything like that figure. The unsecured creditors and shareholders will not receive any dividend, as there is an amount of £240 owing to the Board of Trade in respect of administration. The salaries paid for direction were always excessive, and towards the end of its career the carrying on of the company was made financially impossible. During the course of the winding-up, questions of alleged misfeasance by the directors in paying out dividends from capital were considered by the Official Receiver, but no proceedings were recommended. Opinion of counsel was subsequently obtained by direction of the Court in the debenture action, which, in substance, confirmed the Official Receiver's view, and the suggested claims were not, therefore, pursued any further. Investigations into the dealings of the managing director with the company led to criminal proceedings against him, in which he was convicted and sentenced to a term of imprisonment. He had since died.

**Ocean Coal and Wilsons Limited.**—The directors announce an interim dividend on the ordinary shares of 12 per cent. per annum, free of tax.

**Penrikyber Navigation Colliery Company Limited.**—The directors have declared an interim dividend of 10 per cent. per annum on the ordinary shares.

**Sheepbridge Coal and Iron Company Limited.**—The directors have decided to recommend a final dividend of 10 per cent., less income-tax, making a total distribution of 20 per cent. for the past year on all shares.

**Steel Developments Company Limited.**—The directors have declared an interim dividend at the rate of 10 per cent. per annum for the half-year ended June 30.

**Stewarts and Lloyds Limited.**—The directors have declared the following interim dividends for the half-year ended June 30, 1913, viz.:—At the rate of 6 per cent. per annum on the preference shares; at the rate of 10 per cent. annum on the preferred ordinary shares, to be paid on September 26.

**Summerlee Iron Company Limited.**—The accounts for the year ended May 31 show an available sum, including interest brought forward and after deduction of interim dividend, of £6,662 on the preference and ordinary shares, of which the directors recommend further dividend of 10 per cent. on the preference shares and 25 per cent. on the ordinary shares, leaving £6,662 to be carried

**Tatlow (Walter) Limited.**—This private company has been registered, with a capital of £3,000 in £1 shares, to enter into an agreement with Arthur Joseph Adams, and to carry on the business of ironfounders, mechanical and electrical engineers, and manufacturers of agricultural implements and other machinery, tool makers, brass foundries, metal workers, and iron and steel converters, &c. First directors: Walter Tatlow, Shelbourne, Styvechale-avenue, Coventry; and Arthur Joseph Adams, 28, Allesley Old-road, Coventry (both permanent).

**Wath Main Colliery Company Limited.**—The directors have paid a further interim dividend of 2s. per share on the ordinary shares, equal to 10 per cent. actual. In June last an interim of 1s. 6d. per share was paid, making with the present dividend 17½ per cent. actual on account of the present year.

The *London Gazette* announces that the following companies have been struck off the register and dissolved:—Anthracite Agency and Distribution Company Limited; Bentilee Colliery Company Limited; Bristol Wallsend Collieries Limited; Graiesley Foundry Company Limited; Lafayette Coal Company (Société Anon. des Charbonnages Lafayette) Limited; Natal Coal Trust Limited; Ormesby Metallic Brick Company Limited; Parcocha Iron Ore and Railway Company Limited; Sadouna Iron Ore Company Limited; Sussex Iron Ore Company Limited; Vulcan Dynamo and Motor Company Limited.

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

**CHELLENHAM, SEPTEMBER 20.**—Tenders are invited for the supply of 300 tons of small steam coal for boiler purposes to be delivered into the coal store at Tewkesbury pumping station during the four months ending February 28 next. Delivery may be made by either water or rail. Sealed tenders, endorsed "Tender for Coal," to be sent to the undersigned not later than September 20. No tender form issued. The lowest or any tender will not necessarily be accepted. J. S. Pickering, borough engineer, Municipal Offices, Cheltenham.

## Abstracts of Contracts Open.

**BARRY, SEPTEMBER 10.**—Best house, steam, and nut coal, for the Urban District Council. Particulars from Mr. J. C. Pardoe, surveyor, Public Offices, Barry.

**CAIRO (EGYPT), SEPTEMBER 15.**—Coal tenders are invited by the Egyptian State Railways and Telegraphs Departments for the supply and delivery of (1) 50,000 metric tons of North Country colliery screened steam coal, and 5,000 metric tons of Scotch colliery screened steam coal; (2) 385,000 or 120,000 metric tons of Welsh colliery screened steam coal; and (3) timber. Copies of the specifications, containing forms of tender, from Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, London, S.W.\*

**CARNARVON.**—Coal, for the Education Committee. Forms from E. R. Davies, secretary of education, County Education offices, Carnarvon.

**CHESTER, SEPTEMBER 11.**—Coal and coke, for the Administrative Sub-Committee for the Chester Union Area. Forms from Mr. J. H. Howard, acting clerk to the sub-committee, County Education Offices, City-road, Chester.

**CROYDON, SEPTEMBER 25.**—Coal and coke, for the Croydon Rural District Council. Forms from Mr. E. J. Gowen, clerk, Council Offices, Katherine-street, Croydon.

**DOUGLAS (I.O.M.), SEPTEMBER 15.**—Good steam coal, double screened, suitable for the engines of the cable tramway, for the Corporation. Sealed tenders to Mr. A. Robertson, town clerk, Town Hall.

**DOWNPATRICK, SEPTEMBER 13.**—About 260 tons of screened coal, for the Guardians. Tenders to Mr. R. L. Morrow, clerk of Union, Down Union.

**GILLINGHAM, SEPTEMBER 13.**—Coal and coke for the Education Committee. Forms from Mr. Andrew Johns, secretary, 4, Gardiner-street, Gillingham, Kent.

**HALKIRK (SCOTLAND), SEPTEMBER 15.**—About 30 tons of best English coal (equal to Harton) for the Thurso Combination Poorhouse Committee. Tenders to Mr. Alf. R. Anslow, Governor, Halkirk.

**HASTINGS, SEPTEMBER 9.**—About 1,400 tons of Welsh steam coal, for the Corporation. Forms from Mr. P. H. Palmer, M.I.C.E., borough engineer, Town Hall, Hastings.

**LONDON, SEPTEMBER 9.**—Gas coal, for the Holborn Guardians. Forms from Mr. J. Allan Battersby, clerk to the Guardians, Holborn Union Offices, 53, Clerkenwell-road, E.C.

**NEWPORT (I.W.), SEPTEMBER 11.**—Fuel, for the Isle of Wight County Council. Particulars from Mr. J. Dufton, clerk, County Council Offices, Newport, I.W.

**OLDHAM, SEPTEMBER 17.**—Steam coal for the Corporation (Electricity Committee). Forms on application to Mr. S. Wilmott Newington, Electricity Offices, Oldham.

**STROKESTOWN (IRELAND), SEPTEMBER 12.**—About 40 tons of best Irish, English or Scotch coal, free from slack, for the Guardians. Tenders to Mr. Thomas Murray, clerk of Union.

\* The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &amp;c.

**ALEXANDRIA (EGYPT), SEPTEMBER 30.**—Oils, &c.—H.M. Consul-General at Alexandria (Mr. D. A. Cameron, C.M.G.) reports that tenders are invited by the Municipality of Alexandria for the supply of various articles required for the use of the Service du Nettoyement during 1913-14, including oils and colours, wood, steel and iron bars, angle iron, bolts and nuts, screws, rivets, brooms, buckles, wire, &c.\*

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

**BANDON, SEPTEMBER 13.**—Sinking.—For sinking a well and the erection of a pump therein at Convent Hill, Bandon, for the Bandon Rural District Council, in accordance with specification which may be seen at the Council Room at the Workhouse.

**DARTFORD, SEPTEMBER 16.**—Boiler, &c.—Erection at the Electricity Works, Dartford, for the Urban District Council:—(a) Water-tube boiler, economiser, fan, steel chimney and accessories; (b) inverted rotaries, transformers, switchboard and cabling. Further information can be obtained on application to Mr. J. D. Pember, the electrical engineer, Electricity Works, Dartford.

**EDINBURGH, SEPTEMBER 22.**—Turbines.—For the Corporation, two mixed pressure steam turbines and direct-current generating plant, each set to be of 1,500 kw. capacity. Specification, form of tender from the engineer, Dewar-place, Edinburgh, on payment of a deposit of £2 2s. (returnable).

**HONG KONG (CHINA), OCTOBER 1.**—Pumping Engines.—Government of Hong Kong invite tenders for the supply of two vertical, rotative, steam pumping engines, capacity of each 3 million gallons per day on a lift of about 400 ft., together with boilers, auxiliary plant, pipe work, &c., to be erected at the Tytam Tuk Water Supply Works, Hong Kong. Specification and form of tender obtainable at the office of the Crown Agents for the Colonies, Whitehall-gardens, London, S.W., on payment of deposit of £1 (returnable).

**LONDON, SEPTEMBER 24.**—Coal-hauling Plant.—For the Hammersmith Borough Council:—(a) Automatic weighing machine; (b) coal hoppers and tank; (c) dredger and water-pump; (d) weldless steel pipes and connections; (e) travelling jib crane and track; (f) endless belt conveyors. Specifications and forms of tender can be obtained from Mr. G. G. Bell, engineer and manager, 85, Fulham Palace-road, Hammersmith, London, W., upon payment of £10 10s. (returnable).

**LONDON, SEPTEMBER 10.**—Steel Rails, &c.—For the supply of steel bull-headed rails and fishplates, for the directors of the East Indian Railway Company, as per specification, to be seen at the company's offices on payment of £1 1s. Tenders to Mr. C. W. Young, secretary, Nicholas-lane, London, E.C.

**MELBOURNE (AUSTRALIA), OCTOBER 8.**—Rails, &c.—For the supply and delivery of the following rails and fishplates, for the Agent-General for Victoria, Australia (alternative tenders): (Contract No. 25005) approximately 27,079 tons of 80 lb. steel rails; (contract No. 25005) approximately 2,215 tons of steel fishplates for 80 lb. steel rails. Specifications and forms of tender obtainable at the offices of the consulting engineers, John Coates and Co. Limited, 25, Victoria-street, Westminster, London, S.W.

**SANDBACH (CHESHIRE), SEPTEMBER 10.**—Cast Iron Pipes, &c.—For the supply of about 1,750 yards of 2 in. and 1,600 yards of 3 in. cast iron pipes and specials. Plans and specifications on application to the engineer, Mr. W. Woodley Wyatt, Whitchurch, Salop.

**SOUTHAMPTON, SEPTEMBER 8.**—Boiler.—Supply, delivery and erection of a boiler at the electricity supply station, Western Shore, Southampton, for the Corporation. Specification and any further particulars obtainable from the borough electrical engineer, Southampton.

**Pit Villages of South Yorkshire.**—Strong statements concerning the condition of some of the pit villages of South Yorkshire which have recently come into being were made at last week's meeting of the Adwick-le-Street Parish Council, and the Doncaster Rural District Council were severely taken to task. Dr. Ashforth, who is a member of the Adwick Parish Council, brought up the condition of Highfields, which is a sort of extension of the Woodlands model village for the accommodation of miners employed at the Brodsworth Colliery. He declared that against one road the colliery company were making up ground with refuse from ashpits, and that objectionable matter had been found among it. It was stated this condition had been rectified.—Dr. Mackay, another member, declared that the pit village of Highfields was an abomination and a blot upon civilisation. The blame lay entirely with the Doncaster Rural District Council, and not with the colliery company. It was not right that people should be compelled to live in a place where none of the colliery officials would live for a week. There was more infectious disease of all kinds in Highfields than any place he knew. There were cases of typhoid fever and an epidemic of enteritis, there being hardly a house where children were free from the latter, which was epidemic diarrhoea. All this was due to the insanitary condition of the place, which should be swept away. The Rural District Council of Doncaster had authority to stop it. As it was, everything was put into the ashpits. There was not a single bath in Highfields, except in the Co-operative buildings. As a result, they had several cases of scabies, and it was impossible to treat these skin diseases. Those affected could not get better if they were unable to wash themselves, and so it spread from child to child. The lavatories at the school also wanted altering. He moved that water-closets be erected and connected with the permanent sewerage system near by. The ashpits should also be done away with.—Mr. Lazenby stated that when the objections were seen, Sir Arthur Markham decided that all houses built afterwards should be remedied.—Dr. Mackay replied that he did not blame Sir Arthur Markham, but the Rural District Council for passing the plans.—The chairman (Mr. J. W. Lane) said the colliery company should be compelled to put baths in the miners' houses.—Dr. Mackay alleged that to save the cost of a few drains a row of houses in one street had been built the wrong way about. He moved that the Doncaster Rural District Council be asked not to pass plans for houses without a bath, and that the County Council be asked to build permanent lavatories at the school. Also that a request be sent to the Doncaster Rural District Council to instruct their medical officer, Dr. Dunne, to make a special examination and inspection of Highfields and report.—The resolution was adopted. It was reported that on the Bentley-road the houses had been without water from Saturday night until Tuesday morning. Mr. Sheldon thought the Doncaster Rural District Council was playing with them, and it was quite time they appealed to some higher authority.—It was decided to make representations on the matter, also to ask that the registrar of births, marriages and deaths be compelled to live in the centre of the district, which now has a population of 9,000.



## THE FREIGHT MARKET.

At the north-east coast, outward chartering is hampered by lack of ready tonnage, and, with a good demand for handy vessels, rates are rising. Coasting business has been done at from 3s. 6d. to 3s. 7½d. to London from the Tyne, and from 3s. 10½d. to 4s. 3d. to Hamburg. The Baltic is quoted at from 5s. to 5s. 3d. to Cronstadt. The Bay has Bordeaux at from 5s. 10½d. to 6s. 3d. The Mediterranean shows Genoa at from 8s. 6d. to 8s. 9d. At South Wales, Mediterranean rates rule very firm, with an upward tendency. South America freights are strong. Coasting business is more active, at rather higher figures. The Clyde is quiet, at about late rates. The Humber market is quiet, at steady rates. Homewards, a normal amount of chartering has been done. Odessa advises report a quiet market at the Black Sea, grain arrivals being disappointing. There is an abundance of ready tonnage, which is subject to some detention. Rates, therefore, are favouring charterers. At the Azof and Danube the enquiry is said to be improving. Mediterranean and ore trades are firm. The Baltic is steady. America is weaker, through the scarcity of maize and cotton cargoes. Grain and timber tonnage is only in limited demand. The River Plate is slow, and tends to fall.

Tyne to Bordeaux, 3,500, 5s. 10½d.; 3,500, 6s., from Dunston; 2,900, 6s. 3d.; Bilbao, 1,600, 7s. 9d. coal, 9s. 9d. coke; Bandholm, 700, 6s.; Catania, 2,400, 9s. 6d.; Constantinople, 3,800, 9s. 6d.; Cronstadt, 2,700, 5s.; 4,300, 5s. 3d.; 3,800, 5s.; 3,500, 5s. 3d.; Calais, 1,800, 4s. 6d.; Elsinore, 1,250, 5s. 6d.; Fécamp, 700, 5s. 6d.; Genoa, 5,000, 8s. 6d.; 3,400, 8s. 6d.; 6,100, 8s. 9d.; Gêfle, 2,400, 5s. 6d.; Hamburg, 1,300, 4s. 3d.; 2,700, 3s. 10½d.; 1,500, 4s.; Königsberg, 2,300, 5s. 4½d.; 600; Kotka, 1,400, 6s.; Lisbon, 2,000, 8s. 3d.; 300; Las Palmas, 4,500, 8s. 9d., September; London, 1,500, 3s. 7½d.; 1,800, 3s. 6d.; Memel, 1,700, 4s. 9d.; 800; 2,000, 4s. 10½d.; Novorossisk, 4,500, 9s.; Odense, 1,600, 5s. 9d.; Port Said, 4,200, 9s.; Reval, 2,750, 5s. 1½d.; Rochefort, 2,300, 6s. 3d.; Rouen, 1,700, 5s.; St. Nazaire, 2,700, 6s. 1½d.; 6s. 1½d., from Dunston; Savona, 5,000, 8s. 6d.; 3,400, 8s. 6d.; Sundswall, 2,100, 5s. 3d.; Stockholm, 4,500, 6s., 500; 1,800, 5s. 3d., 400; 2,400, 5s. 6d.; St. Petersburg, 2,600, 5s. 3d., 500; Santos, sail, 20s. 3d.; Teneriffe, 8s. 9d., September.

Cardiff to Alicante, 1,200, 9s.; Algiers, 3,500, 9½ fr.; 4,000, 10 fr.; 3,500, 10 fr.; Bermuda, 2,700, 10s. 9d.; 2,800, 10s. 6d.; Brest, 1,300, 4s. 3d.; Bizerta, 3,000, 9½ fr., September 15; Barcelona, 4,600, 9s. 6d.; 4,300, 9s. 6d., September 8; Caen, 1,900, 4s. 9d.; Catania, 9s. 3d., 400; Cronstadt, 1,600, 6s.; 3,000, 6s. 1½d.; Carthage, 2,500, 8s. 9d., September 10; 3,200, 8s. 9d.; Campana, 20s. 6d.; Calais, 1,150, 4s. 9d.; 1,900, 5s.; Charente, 1,300, 7½ fr.; Constantinople, 3,500, 9s. 6d.; Depots, 670, 4s.; Devonport, 2,300, 2s. 6d., Admiralty; Dieppe, 2,200, 5s.; 2,200, 4s. 7½d.; Djibouti, 12s. 10½d., September; Galatz and/or Braila, 10s. 6d., September 1-10; Grimsby, 800, 3s. 10½d.; Gibraltar, 2,800, 8s. 3d.; Genoa, 4,800, 8s. 9d.; handy size, 9s. 6d., reported.; 2,600, 9s. 6d.; Havre, 2,300, 4s. 4½d.; 2,100, 5s.; 1,350, 5s. 3d.; 3,400, 5s. 1½d., September 8; Honfleur, 1,500, 5s. 3d.; Kilindini, Zanzibar and Seychelles, three ports discharge, 5,300, 21s., fuel, Admiralty; Lisbon, 2,300, 7s. 3d., 500; Las Palmas, 3,800, 9s.; La Pallice, 1,200, 7½ fr.; Monte Video, 5,100, 18s. 6d., mid-Sept.; 3,500, 21s., fuel, Sept. 10; Marseilles, 6,500, 10½ fr., Sept. 7; Messina, 9s. 3d., 400; 3,300, 10s., 400; Madeira, 2,300, 10s. 6d.; Malta, 4,500, 7s. 9d., September 9; Nice, 2,200, 10s. 9d.; Oporto, 1,650, 8s. 3d.; Port Said, 6,300, 8s. 6d., September 8; 5,200, 8s. 6d.; 4,700, 9s.; Palermo, 5,000, 9s. 3d., 400; Piræus, 3,600, 8s. 6d.; Rio de Janeiro, 6,600, 16s. 6d.; 5,000, 16s. 9d.; Rosario, 21s., September; Rouen, 950, 5s. 7½d.; Sables, 1,500, 6½ fr.; Sicily, 4,500, 9s. 3d., 400, 10d.; St. Malo, 1,700, 5s. 1½d.; 650, 5s. 4½d.; St. Brieux, 500, 5s. 9d.; St. Servan, 640, 5s. 4½d.; 1,000, 5s. 3d.; Sheerness, 670, 4s. 7½d.; Toulon, 3,600, 10½ fr., f.d.; 8,600, 10½ fr.; Teneriffe, 3,800, 9s.; Villa Constitution, 20s. 6d.; Vigo, 900, 8s.; Valencia, 2,700, 8s. 3d., 400, free, tax, September 10; West Coast South America, 23s., fuel.

Swansea to Caen, 1,200, 5s.; Rouen, 1,050, 5s. 9d.; 2,200, 5s. 6d.; 1,200, 5s. 6d.; Helsingfors, 1,200, 7s.; 7s. coal; 7s. 9d. fuel; Alicante, 1,300, 9s.; Bordeaux, 1,700, 8 fr.; 1,850, 8 fr. coal, 8½ fr. fuel; Alexandria, 4,000, 9s. coal, 9s. 9d. fuel; Granville, 5s. 3d.; Gefle, 6s. 9d.; Volo, 4,000, 10s. coal, 10s. 9d. fuel; La Pallice, 2,600, 7½ fr.; 2,600, 7½ fr.; Oran, 2,500, 11 fr. coal, 12 fr. fuel, 400; Honfleur, 550, 5s. 3d.; Guernsey, 450, 4s. 9d.; Genoa, 9s.; Savona, 9s.; Trouville, 750, 5s. 6d.

Blyth to Cronstadt, 4,500, 5s. 6d.; 3,800, 5s.; Reval, 3,200, 5s. 4½d.; 2,700, 5s. 1½d.; Stubbekjøbing, 700, 6s. 3d.; Carthage, 1,200, 11s. 4½d.; Sundswall, 2,200, 5s. 6d.; Memel, 2,000, 4s. 10½d.

Hull and Thames to Rio de Janeiro and Santos, 5,300, 24s., cement, &c., September.

Llanelli to Dieppe, 650, 5s.

Grangemouth to Genoa, 3,100, 8s. 6d.; Punta Arenas, sail, 24s. 6d.

Hull to Rökkola, 1,200, 6s.; Cronstadt, 3,500, 5s. 1½d.; 2,500, 5s. 6d.; 2,000, 5s. 6d.; 3,000, 5s. 1½d.; Reval, 2,300, 5s. 1½d.; Porto Vecchio, 3,800, 8s. 9d.; Libau, 2,500, 5s. 3d.; St. Petersburg, 2,800, 5s. 7½d., 800; Randers, 800, 6s. Port Talbot to Ibcuy, 4,200, 22s.; Messina, 3,200, 10s.; Genoa, 2,800, 8s. 9d.; 9s.; Savona, 9s.; La Pallice, 1,200, 7½ fr.; Calais, 1,350, 5s. 3d.

Britonferry to St. Brieux, 520, 6s.

Newport to Genoa, 4,700, 8s. 9d.; Gibraltar, 2,800, 8s. 3d.; Savona, 4,700, 8s. 9d.; Spezzia, 4,700, 8s. 9d.; Cadiz, 9s. 6d.; Algiers, 4,100, 11 fr.

Burryport to St. Brieux, 520, 6s.

Glasgow to Buenos Ayres, 19s. 7½d., September 10-30; Cronstadt, 1,700, 5s. 3d.; Bayonne, 2,400, 8½ fr.

Thames to Natal, sail, 20s., cement.

Wales to Callao, sail, 20s.

Seaham Harbour to Nakskov, 1,200, 6s.

Immingham to Cronstadt, 5,500, 5s.; Pernau, 1,600, 5s. 4½d. Goole to London, 1,450, 4s.; Bruges, 900, 4s. 6d. Forth to Sundsvall, 1,950, 5s. 6d.; St. Petersburg, 3,000, 5s. 9d.

Tees to Gefle, 1,000, coke, 8s. 6d.

Emden to Algiers, 3,000, 9½ fr.

Clyde to Buenos Ayres, 19s. 7½d.

Grimsby to Stockholm, 2,400, 5s. 6d.; Gefle, 2,400, 5s. 6d. Wear to Santos, sail, 21s., 200, October.

Liverpool to Sydney and Newcastle, N.S.W., sail, 16s.

Hartlepool to Genoa, 3,700, 8s. 9d.; 4,800, 8s. 6d. coal, 10s. 6d. coke; Hamburg, 3,000, 3s. 10½d.

Rotterdam to La Rochelle, 2,400, 5s. 6d., September 30;

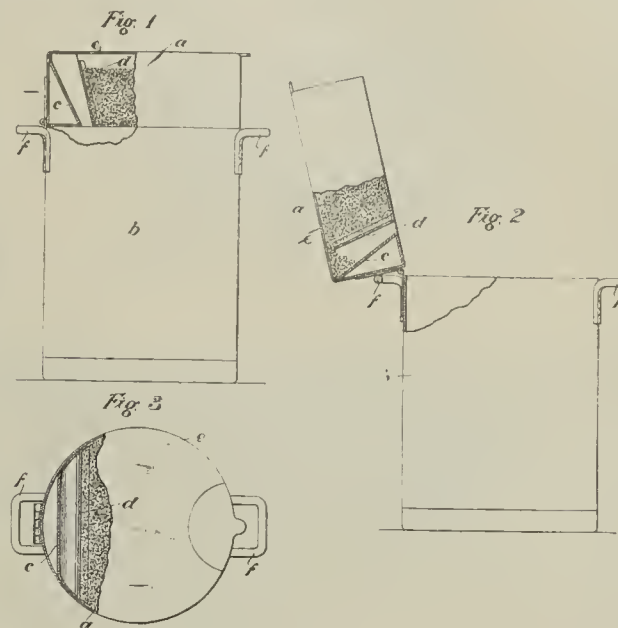
Bilbao, 4,200, 5s. 3d., Sept. 15; Marseilles, 4,000, 9½ fr.; 5,000, 9½ fr., 600, 9½ fr., 900, 300 tons coke same freight, Sept. 8; Honfleur, 1,750, 4s. 9d.; Chantenay, 2,400, 5s. 9d., 600, 5s. 6d., 900; Leghorn, 5,200, 8s. 4½d. steam coals, 9s. 1½d. fuel, 10s. 4½d. fuel.

Homeward charters:—Azof, 4,700, Rotterdam 13s. 6d., Antwerp, Emden or Weser 13s. 9d., Hamburg, 14s., 3d. less barley, mid-September; 4,100, 14s. 9d. n.c. or any, 15s. 3d. Hamburg, Sept.; 3,400, 15s. n.c. or any, 15s. 6d. Hamburg, Sept. 25-Oct. 25; 5,300, Rotterdam 13s. 3d., Antwerp, Emden or Weser 13s. 6d., Hamburg 13s. 9d., 3d. less barley, ppt; Nicolaieff or Odessa, 6,200, Rotterdam 12s. 3d., Hamburg 12s. 9d., 3d. less barley, September 10; Kherson or Nicolaieff, 3,600, 14s. n.c. or any, 14s. 3d. Hamburg, September 8; 4,100 max, 13s. 9d. n.c. or any, 14s. 3d. Hamburg, mid-September; 4,200, 14s. n.c. or any, 14s. 3d. Hamburg, ppt; Sulina, 5,700, London, 11s. 9d., 3d. less barley, September 5; 4,400, L.H.A.R. 11s. 9d., Hamburg 12s. 3d., 3d. less barley, option Sulina and Kustendje 3d. more, September 10; Bombay, 3,403 net, Barrow, 23s., ore, September; 4,776 net, Hull and Antwerp, 24s. on d.w., option Dunkirk same rate, September; 24s. on d.w. Hull and Tees, option Dunkirk same rate, September; 6,000, Mostyn Deep, 23s., October; Kurrachee, 2,020 net, Hull 19s. 4½d., option Marseilles and Hull 19s. 9d., September; 2,326 net, United Kingdom-Continent, 19s. p.p., September; 5,400, 18s. 9d. p.p., 19s. 9d. France, September-October; San Lorenzo, 5,500, 10 per cent., Continent, 17s. 6d. o.c., less 6d., October 25-November 15; 5,300, 10 per cent., United Kingdom-Continent, 18s. o.c., less 6d., September 25-October 10; 5,500, 10 per cent., 18s. 9d. o.c., less 6d., September 10-30; 5,500, 10 per cent., 17s. 6d. o.c., less 6d., less 6d. further if p.p., October; 19s. 6d. o.c.; 4,400, 10 per cent., North Spain, 20s. 6d. one port, 20s. 9d. two ports, 21s. three ports, September; Baltimore, 24,000 qrs., 10 per cent., Bordeaux, 3s., September; 14,000 qrs., 10 per cent., Brest, 3s. 6d., September; Jacobstadt, 700 fathoms, Swansea, 43s. per intaken fathom, piled props; Savannah, &c., 2,829 net, United Kingdom-Continent, 42s. 6d. one port, 43s. 9d. two ports, Havre 1s. 3d. extra, mid-September; 37s. 6d., Liverpool or Bremen; 50s., 750 tons general cargo, balance cotton; West Australia, sail, 32s. 6d., United Kingdom-Continent, grain, January; time charter, States and Brazil trade, 5s., two round trips, delivery and re-delivery States, September; time charter, Transatlantic trade, 5s., two round trips, delivery Continent, redelivery United Kingdom-Continent, via States; 5s. 6d., one trip, delivery Gulf, redelivery United Kingdom-Continent; 5s. 3d., one or two trips, delivery and redelivery United Kingdom-Continent, via States; Herring Cove, 60s., West Britain or East Ireland, September; Poti, 5,300, Antwerp or Rotterdam, 14s. 3d., ppt.; Vladivostok, 3,148 net, Hull and Hamburg, 30s. 6d., October; Carthage, 4,000, Middlesbrough, 7s. f.d., ppt.; Malgrat (Barcelona), 3,300, Rotterdam, 7s. 3d., f.d., ppt.; New York, 28c., Hong Kong, November; time charter, Trans-Pacific trade, 5s. 3d., seven or nine months, option 11 or 13 months, delivery and redelivery New South Wales, October; 4s. 6d., one trip, delivery North Pacific, redelivery China, Japan or Philippines; time charter, Baltic trade, about 4,420 d.w., £1,200, one round trip, delivery at port of discharge, Baltime charter; Gulf timber port, 1,200 stds., River Plate; 167s. 6d., October; 1,100 stds., 10 per cent., 170s., September; 2,246 net, 167s. 6d., October; 825 stds., 10 per cent., Genoa and Catania, 14s. 3d., October-November; 1,150 stds., 10 per cent., Holland and one port, East Coast United Kingdom, 115s., Holland and two ports East Coast United Kingdom 116s. 3d., September-October; Kherson, Nicolaieff or Odessa, 5,200, London or Rotterdam 11s. 6d., Emden or Weser 11s. 9d., Hamburg 12s., with 3d. less barley, ppt.; Saigon, 3,267 net, Marseilles, Havre, Dunkirk, Hamburg, or Liverpool, 29s. one port, 30s. two ports, rice, 1s. extra maize, option 3,000 tons rice meal 2s. 6d. extra, October; Japan, 5,000-5,500, Colombo, 9s., October; La Palaise, 3,400, Barrow 8s. 9d., mid-September; 4,000, 8s. 9d., ppt.; Rivadesella, 1,000, Middlesbrough, 6s. 9d., ppt.; North Pacific, 2,895 net, United Kingdom-Continent, two ports to two, 42s. 6d., general cargo, September; 37s. 6d., United Kingdom-Continent; time charter, Mediterranean trade, 4s. 9d., one round trip, delivery Tyne, re-delivery United Kingdom-Continent; Wilmington, 37s. 6d., Liverpool or Bremen; Mauritius, 10 annas, Bombay; Nicolaieff, 5,800, Genoa or Marseilles, 12 fr., ppt.; Rangoon, 3,217 net, United Kingdom-Continent, 27s. o.c., 26s. 6d. if Holland, October.

**The Fatal Accidents Custom in Durham.**—An important case came before the Durham County Police-court last week, when Wm. Keers was summoned by Messrs. Bolckow, Vaughan and Co., owners of Deanbank Colliery, Ferryhill, for an offence under the Employers' and Workmen's Act, at Ferryhill. Mr. Robinson prosecuted, and Mr. Heath defended.—Mr. Robinson said the case had been brought as a test case. Defendant was the chairman of the Deanbank Lodge of the Durham Miners' Association, and the sum of 5s. was claimed from him for absentsing himself from work. The facts were that on June 24 an employee of the defendants named Guy, who was employed as a scrubber at the by-product ovens, was accidentally electrocuted. The following morning the men laid the colliery idle by absentsing themselves from work. It was an acknowledged custom that when a man was killed in a mine the colliery was laid idle, but the facts of the present case were different. The man was engaged at the benzol tank, which is situated 162 yards from the shaft. An agreement had been entered into between the owners and the men's representatives which was to the effect that the accident must occur within 100 yards of the shaft before the men could lay the pit idle.—Mr. Crawford, manager, produced the agreement. Questioned by Mr. Heath as to whether it was not the custom when one of the collieries was laid idle for the men in the other two collieries to cease work, witness said that point had nothing to do with the present case.—Mr. Heslop, assistant secretary of the Durham Coalowners' Association, said the agreement was signed by the owners' and men's associations. No custom could affect the strict rules laid down in the agreement. The county agreement abrogated the local customs.—Mr. Heath submitted that it was an established custom to lay the colliery idle in the case of a fatal accident, and argued that the agreement did not sweep away the customs. There was a well-established custom at the time the agreement was signed, and the agreement recognised the custom.—The magistrates ordered the defendant to pay the damage claimed, 5s.

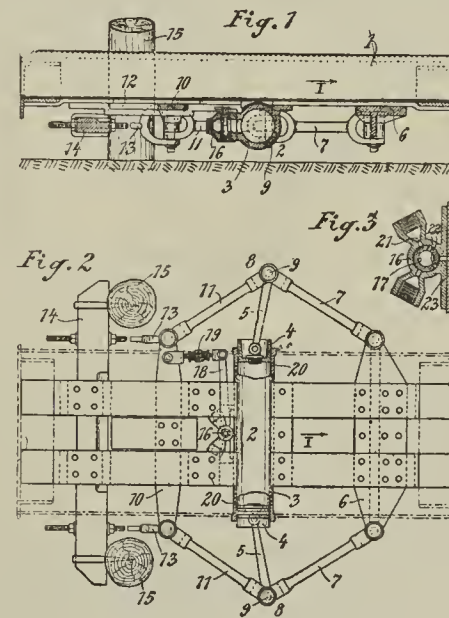
## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

7280 (1913). *Sanitary Convenience for Mines.* H. Morgan, 7, Nelson-road, Dudley.—Relates to sanitary conveniences of that type comprising a pan or receptacle for the excretions. According to the present invention the body part consists of a single pan or receptacle only, the lid being directly hinged to the said receptacle whilst the latter, together with the



said lid, is formed entirely from metal. The body part is moreover rendered readily portable by the provision of handles, one of which is arranged to form a stop for the lid when in its raised position. Fig. 1 shows a sectional elevation, the lid or cover being closed; fig. 2 is a similar view with the lid raised; fig. 3 shows a top-side plan, with the lid closed and partly in section. (Two claims.)

7890 (1913). *Improvements in or relating to Conveyors.* H. Flottmann, of Kaiser-Wilhelmstrasse 12, Bochum, Germany.—Relates to conveyors of the "jig" type, such as are used underground in mines. The object of the invention is to facilitate the transportation of the conveyor, with its actuating mechanism. To this end the actuating motor is fixed to the conveyor and so arranged that it can actuate the conveyor by operating against some fixed abutment, the body of the motor, of course, moving with the conveyor.

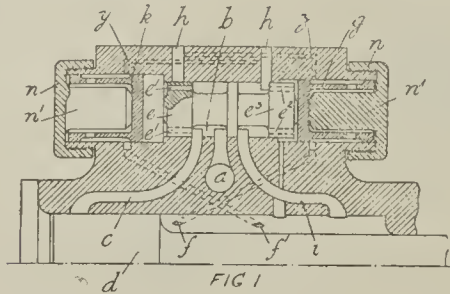


The most convenient arrangement of the motor is, in general, at the underside of the conveyor, and in most cases it is necessary or desirable to make the arrangement in such a way that the normal height of the conveyor is not materially increased, and that the weight of the conveyor, with the motor, is also kept within certain limits. Fig. 1 is a side elevation, in section, and fig. 2 a sectional plan view wherein the conveyor trough is only indicated by dot and dash lines; fig. 3 is a section of a motor valve forming part of the apparatus. (Three claims.)

8320 (1913). *Improvements in Valve Apparatus for Percussive Rock-drills and the like.* G. Rayner, of Grange Farm House, Carterknowle - road, Abbeydale, Sheffield.—An improvement or modification of the invention described in former application for a Patent No. 19424 dated August 24, 1912, which relates to valve mechanism in which the valve has three collars or pistons which provide two annular recesses or chambers, the middle collar serving in one construction to divert the supply of motive fluid to each end of the cylinder alternately and in another construction to control the exhaust and the end collars serving to control the exhaust outlets in one construction, and in another construction to control the inlets, the end collars or the ends of the valvechest being provided with separate plungers which move independently of the valve and which invention had for its object the provision of separate plungers or auxiliary pistons formed with a larger area than the valve collars and working in correspondingly enlarged ends of the valve chest communicating with the main cylinder by means of passages

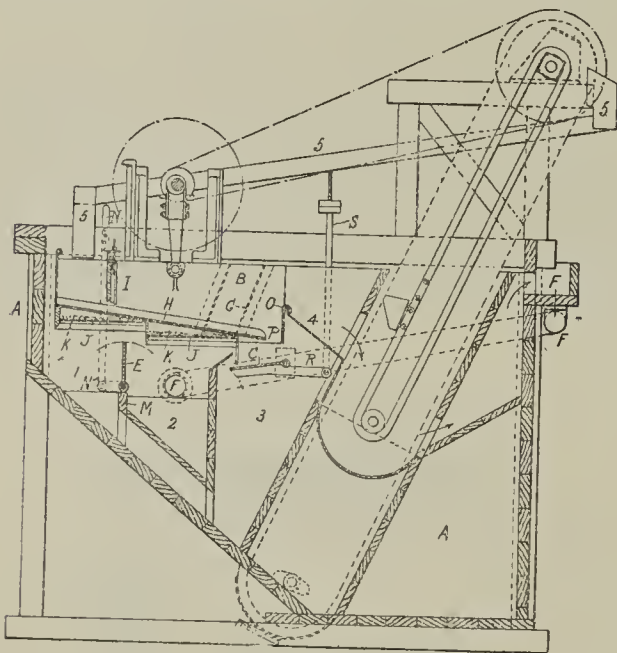


completely uncovered and covered by the main piston—the collars of the valve and in some cases the middle collar also being formed with ports to permit of the motive fluid passing freely to the ends of the valve in order to lock the valve in position or to exhaust air from the valve ends according to the position of the main valve; such ports also permitting the motive fluid to return the auxiliary pistons or plungers to their original position. The present invention consists of a special form of construction of the



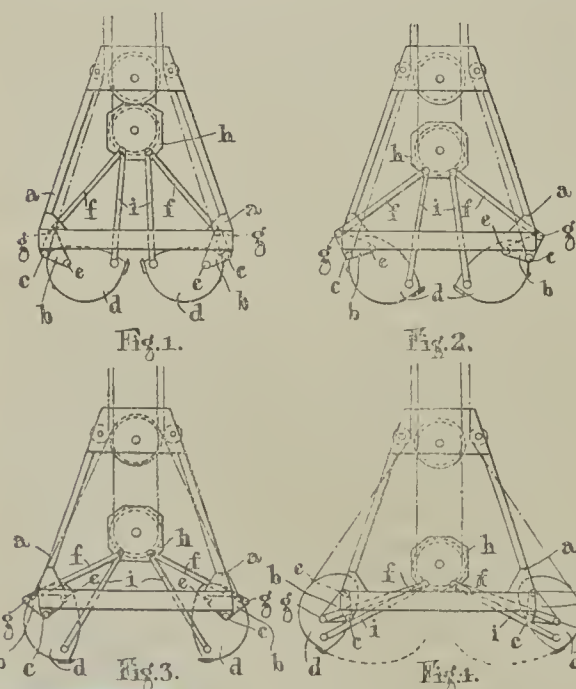
auxiliary pistons or plungers and of the provision of suitable ports for the escape to the atmosphere of any reasonable leakage of the motive fluid due to wear, thereby preventing fluttering or chattering of the auxiliary pistons or plungers. The accompanying drawing is a longitudinal section of a valve apparatus provided with hollow auxiliary pistons wherein the supply of motive fluid is controlled by the middle collar of the valve. (Two claims.)

9126 (1913). *Improved Fine Coal and Ore Separator*. J. M. Draper, of Falcon Ironworks, Falcon-street, Oldham.—Consists essentially in constructing the separator box with an upper or primary perforated bottom and a lower or secondary perforated bottom separated therefrom by an intervening space constituting a chamber the floor of which is covered with a layer of stone chips or similar material 2 or 3 inches in depth, but which does not fill the chamber, so



that under the rising and falling action in the water such chips are capable of displacement and exercise an opening and closing valvular action over the perforations of the secondary bottom upon which they rest. A suitable manner of carrying the invention into effect is illustrated in the accompanying drawing as applied to a coal separator or washer, in which a jiggling movement is imparted to the box in which the material is treated. (Nine claims.)

9324 (1913). *Improvements in Grabs*. J. Pohlig-Aktien Gesellschaft, of Cöln-Zollstock, Germany, and P. Volkenborn, of Leostrasse 37, Cöln-Ehrenfeld, Germany.—Relates to

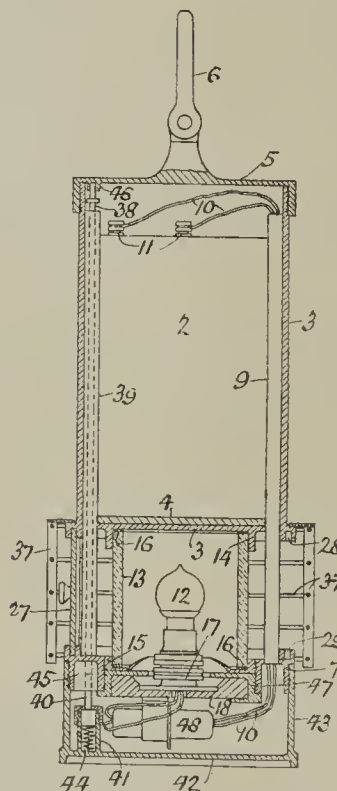


devices for automatically raising loose or heavy material. According to the invention the axis of rotation of the bucket is not fixed as is usual but is

arranged in a swinging lever mounted on the grab frame so that it is possible to move the axis of rotation of the bucket in a vertical direction. This possibility is utilised in that the point of rotation is moved upwards during the opening movement of the bucket and downwards during the closing movement, so that by this arrangement the path which the closing mechanism must take in order to cause the rotation of the bucket is shortened, while at the same time a favourable grabbing curve is given to the operating edges of the buckets. Figs. 1 to 4 illustrate one convenient construction of device in four different positions assumed during the cycle of operations. (Two claims.)

10203 (1912). *Improvements in Explosive Compounds*. G. W. Davies, of Mortimer-terrace, Wellington, New Zealand.—Relates to that class of explosive compounds used especially for blasting purposes, and the object is to produce an explosive mixture without the use of heat. A liquid solution of aniline resinate in aniline is mixed with oxidising salts without heating in any manner to obtain the proper admixture. It is claimed that the above solution of aniline resinate, when mixed with potassium chlorate in the proportion of one part by weight of aniline resinate solution to six parts by weight of the chlorate, will produce an explosive. The combustible may be added to the oxidising salt at any time by causing the charge of oxidising salt, in a suitable container, to be soaked or mixed in the fluid combustible until saturated by the required amount to obtain the proper detonation. When desired, the chlorates may be substituted by metallic nitrates, or by mixtures of nitrates with the chlorates, or by mixture of the nitrates and chlorates with any other salt or oxides, or by any other oxides or salts or mixtures of these that will not react with the aforesaid combustible under ordinary temperatures and conditions. Another example of a suitable explosive within the scope of the invention is as follows:—A solution of aniline resinate in aniline in such proportions as will still be liquid at freezing point Fahr. with chlorate of potassium in the proportion of 1 part of the dissolved aniline resinate to 7 parts of the chlorate. (Two claims.)

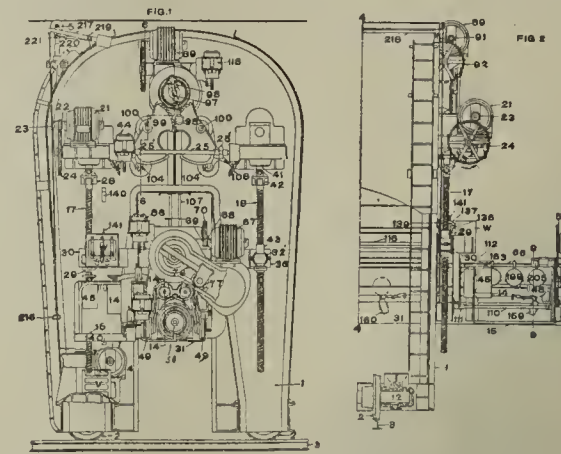
14385 (1912) *Improvements in Miners' Safety Lamps of the Electric Type*. J. L. Hudson, of 103, Douglas-terrace, Newcastle-on-Tyne.—Comprises improvements in locking devices and in improved means for mounting a movable reflector or shade. According to the invention the upper end of the bolt engages a socket in a cap screwed to the upper end of the casing and traverses a tube inside the casing, said bolt being in direct contact with a guard



mounted in a lower cover screwed on to a gallery supported below the casing and pressed upwardly by a spring into contact with the bolt, the spring tending to hold the guard in an aperture in the gallery so that on withdrawal of said guard by a magnet the same is released from said aperture and allows the bolt to fall by gravity out of the socket in the cap. The bolt and guard when in operation thus lock both the cap and lower cover to the casing. A lamp constructed according to this invention is illustrated in the accompanying drawing in section. (Three claims.)

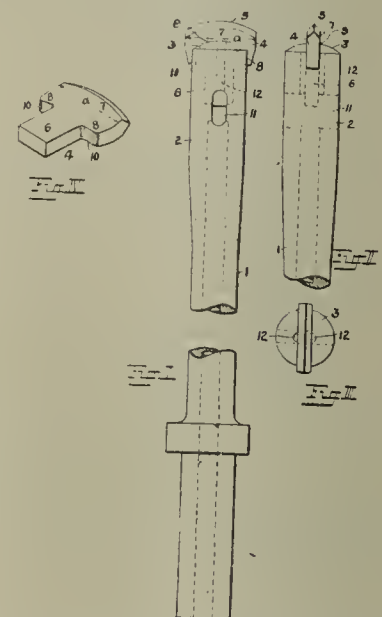
17855 (1912). *Improvements in Machines for Charging and Discharging Gas Retorts*. W. E. Lake, of the firm of Haseltine, Lake and Co., 7 and 8, Southampton-buildings, London. (Communication from the Riter-Conley Manufacturing Company, 15, Exchange-place, Jersey City, New Jersey, U.S.A.)—Relates to apparatus or machines for charging and discharging horizontally arranged gas retorts of the kind in which the scoops for charging the retorts are raised and lowered on screws by a motor to bring them opposite the retort to be charged. The retorts are charged and discharged by electrically-operated scoops, which are charged with fuel from a hopper, raised and lowered on screws, and brought into position for charging and discharging the retorts by means of electric motors. Fig. 1 is an

elevation of the side of the machine farthest removed from the retort bench herein called an end elevation. Fig. 2 is a



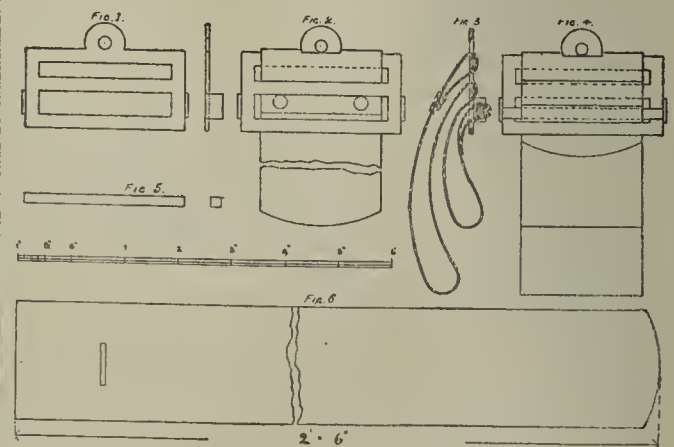
side elevation of the portion of the machine farthest removed from the retort benches. (Nine claims.)

18443 (1912). *Improvements in Percussive Rock-drilling Tools*. G. A. Chalkley, of the Knights Deep Goldmining Company Limited, Germiston, Transvaal, Union of South Africa.—Has reference to percussive rock-drilling tools for use particularly with rock-drilling machines of the hammer type and to rock-drilling tools having a thin detachable cutting blade. The present invention consists in a construction by which all free play between the blade and the holder may be eliminated. The invention comprises a holder formed with a longitudinal slot and a thin blade, the



thickness of which does not increase rearwardly, positioned in said slot, said blade consisting of a forward part wider than the diameter of the holder and a rear shank narrower than said diameter, the slot correspondingly consisting of a forward portion extending wholly across the holder and providing rotative engagement for the forward portion of the blade, and a rear portion wholly enclosed within the holder and receiving the blade shank for frictional engagement against separation. (Two claims.)

18542 (1912). *Adjustable Cable Sling or Suspender*. E. A. F. Smith, of Vine House, Ystalyfera, Glamorganshire.—Adjustable cable sling or suspender for carrying two cables consists of a three-bar metal buckle fig. 1 on drawings herewith, a length of square wood fig. 5, the strength of which is governed by the weight of cables to be suspended and the distance apart of the slings along the line of such cables. A length of rot-proof webbing or other serviceable material, fig. 6, of suitable width, length and strength, and



a wire hook or clasp for hanging the buckle up on to posts or wire as the case may be. In fig. 2 one end of the webbing is shown fastened around the top bar of the buckle, and in figs. 3 and 4 the method of slinging the cables and the piece of wood in position which locks the loose end of the webbing until such piece of wood is broken by an excessive weight falling on to the cables so suspended; then the cables, through the lock being destroyed, would fall to the ground. (One claim.)

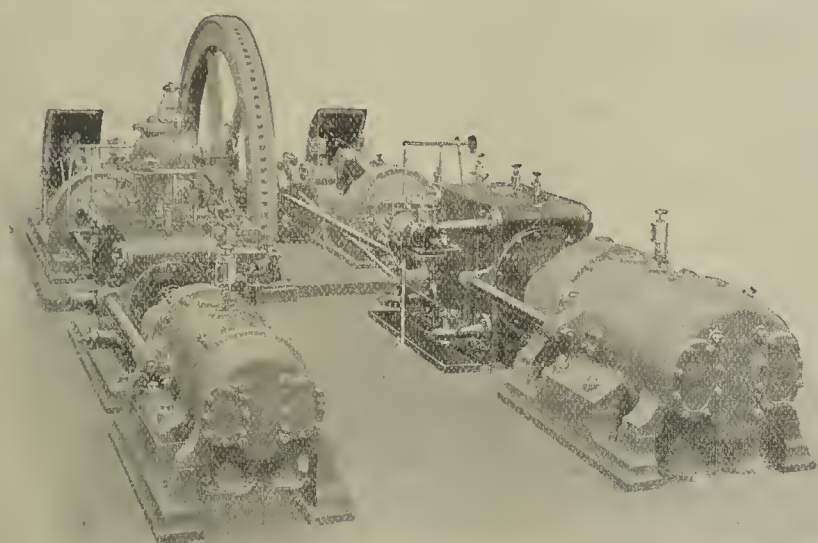
18614 (1912). *Improvements in "Riders" for Steadying "Bowls" or "Kibbles" in Pit Shafts*. E. A. Davies, "Oaklands," Church Village, Glamorgan, and J. F. Barker,



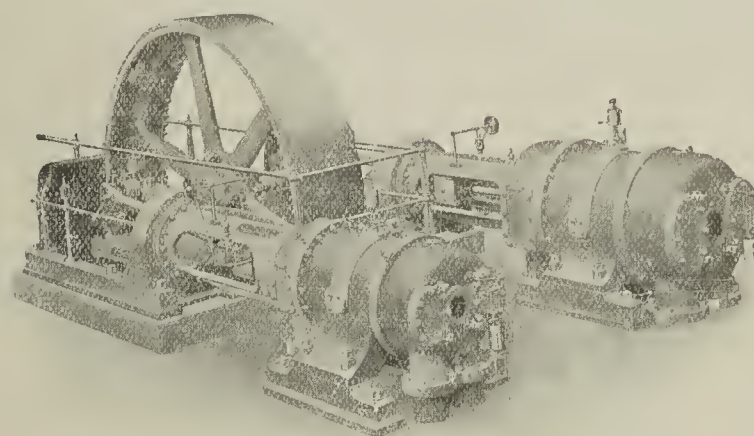
# WALKER BROS. (WIGAN) L<sup>TD</sup>

Pagefield Ironworks, WIGAN.

New Broad Street House, LONDON.



Pair Compound Corliss Steam Two Stage Air Compressing Engines.



Pair Two Stage Air Compressing Engines for Belt Drive.

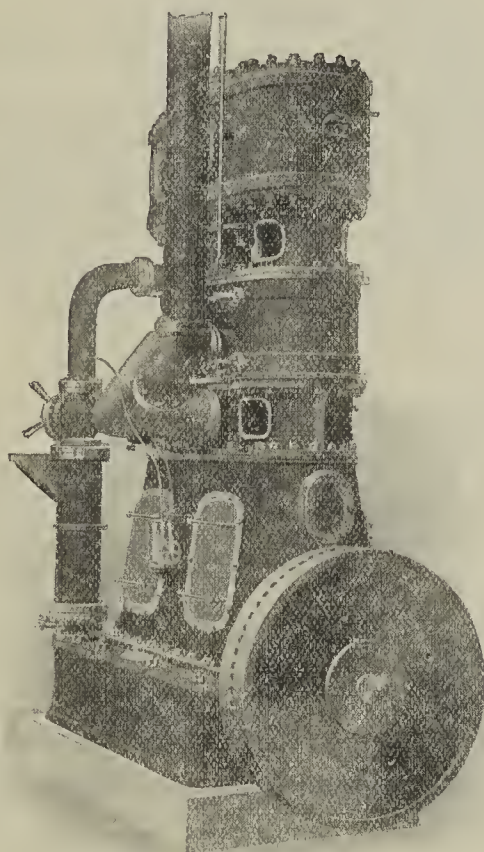
## AIR COMPRESSING AND BLOWING ENGINES.

Disc Valves to Recent Patents  
now applied to, or on order for  
Engines indicating over 90,000 H.P.

Raising Total Output to  
450,000 I.H.P.

Patent Unloading Device for Power  
Driven Plants.

Simple Design with Sensitive Control.



Vertical Air Compressors of the Quick Revolution Type.

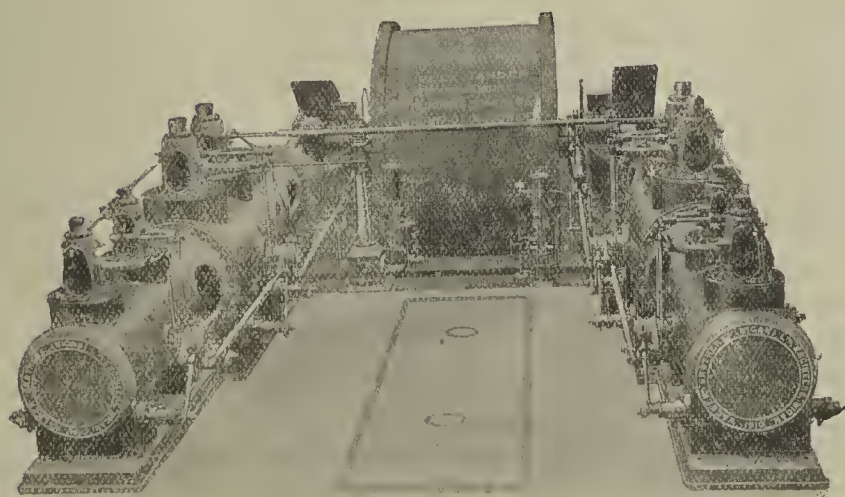
## "INDESTRUCTIBLE" TYPE MINE VENTILATING FANS,

suitable for

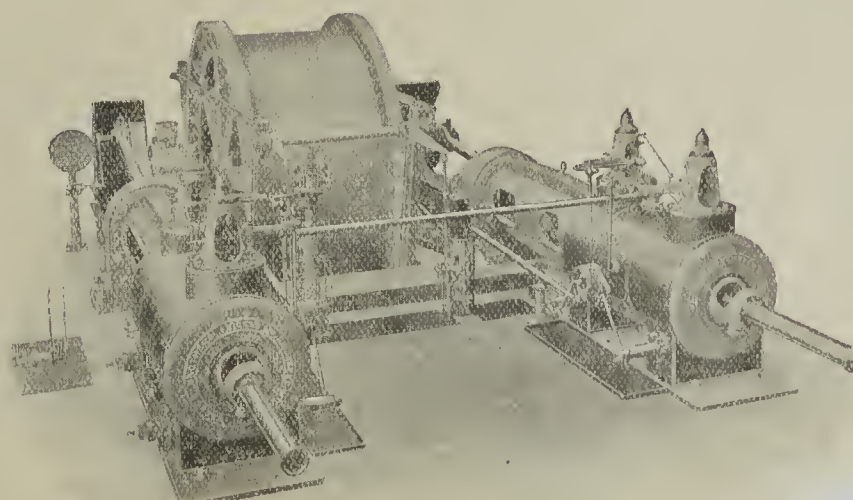
Steam or Motor  
Drive.

Capacity of Installations at Work or on  
Order,  
90,000,000 cubic feet per minute.

Easy Means for  
Reversing Air Current.



Twin Tandem Compound Winding Engines.

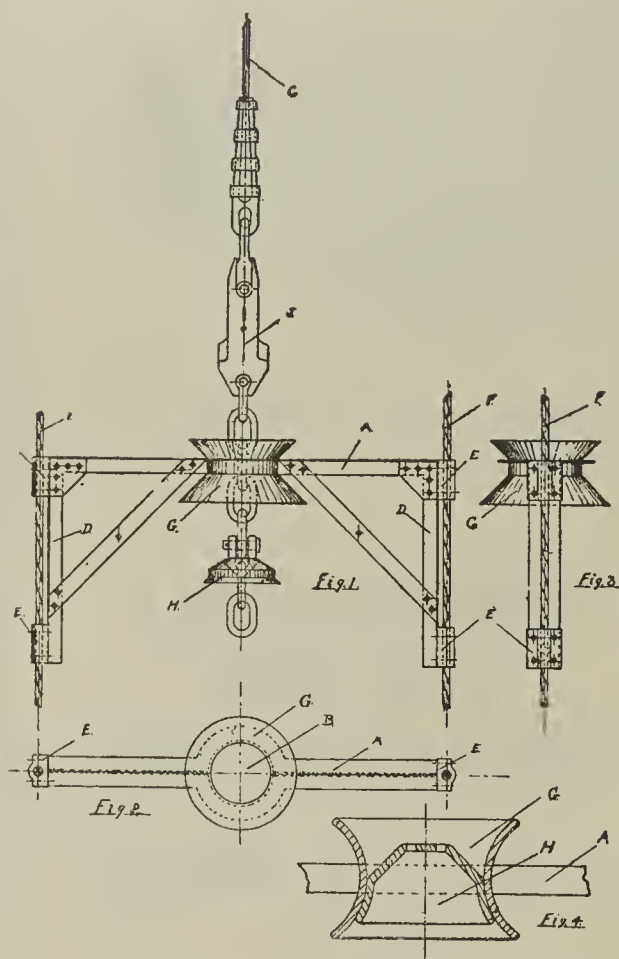


Horizontal Winding Engines with Non-Compound Cylinders.

WINDING, HAULING AND GENERAL MINING MACHINERY.



Hatfield-road, Ipswich, Suffolk.—The accompanying drawing shows as a representative example this invention adapted to a rider. Fig. 1 is a front elevation of a rider. Fig. 2 is a plan view. Fig. 3 is an elevation. Fig. 4 is a modification of a detail. When the "bowk" or "kibble" or other loads are being raised, lowered, or suspended in the pit shafts, the load is prevented from swaying out of the vertical line by means of the rider, having legs D, provided with shoes, or brasses E, encircling the guide ropes F, which are fixed at the top and near to the bottom of the pit shafts in any suitable manner. The weight of the rider is supported by means of the carrier cone H, which is fixed to the hoisting or winding rope C, or its attachments, and at any convenient position thereon. The hoisting or winding rope C is prevented from swaying in the hole B of the horizontal member A, by means of the carrier cone H, which fits into the lower and partly into the centre portion of the double cone-shaped piece G. When the load is being lowered in the pit shaft, and is approaching near to the bottom of same, the rider is arrested and brought to rest by any



suitable means, such as "landing" on the "malling stage," and the load proceeding to the pit bottom. The carrier cone H, being fixed to the winding or hoisting rope C, disengages itself from the rider and the safety or detaching hook J, is guided down through the hole B of the rider by means of the bell mouth or top portion of the double cone-shaped piece G, which is above the horizontal member A. The carrier cone H, together with the detaching hook J, and its attachments continues on downwards to the bottom of the pit shafts. The object of the bottom portion of the double cone-shaped piece G, is to guide the safety or detaching hook J, together with its attachments, through the hole B of the rider, when the latter is at rest near to the pit bottom, and the load is being raised, as in the commencement of hoisting, when the safety or detaching hook J together with its attachments has passed upwards through the hole B of the rider, the carrier cone H engages with the bottom portion of the double cone-shaped piece G, and also fits partly into the centre portion of the hole B of the rider, and carries the rider up the pit shaft. (Four claims.)

**Kent Bunker Coal.**—The following reports have been received with respect to 20 tons screened nuts from the Beresford seam put on board the Norwegian s.s. "Herdis" for bunkering purposes:—Dover, August 22, 1913.—Dear Sirs,—Referring to the bunker coals you delivered to the s.s. "Herdis"—20 tons small nuts from Snowdown Colliery, I beg to state that we, the undersigned, tried the coal first in donkey boiler, and then in main boiler for getting steam, and have to report that the coal has shown itself to be an excellent steam coal for this steamer. Although the coal is small nuts as we asked for, as soon as it goes into the fire it cakes together, and provides a very strong heat; some slight smoke is shown when the coal is put in the furnace, but this immediately passes away and continues smokeless. From residue point of view, this coal gives very little slag and ashes, and considerably less than from east coast coal we usually get on board this steamer. We consider after this trial that the coal is more economical than the usual Welsh bunker coal we get from Bristol Channel ports. We usually take 12 hours to get steam on main boiler, but with Snowdown coal we got steam in much less time, and with less consumption of coal.—Yours faithfully, (signed) Y. Webe (master), J. N. Tongstad (chief engineer).—Blyth, August 24, 1913.—Dear Sirs,—Please inform shippers of my bunker coals in Dover that the coals proved to be very good coals indeed, no trouble whatever in keeping steam, and very little ashes. The consumption was very much less, too, than with any other coal we had on board. We made the run from Dover to Blyth in 24 hours, which proves the coals to be good.—Yours faithfully, (signed) Y. Webe, master, s.s. "Herdis."

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

19223. Colliery picking belts. G. Norton.  
19229. Electrolytes for the electro-deposition of zinc. S. O. Cowper-Coles.  
19239. Extraction of metals from their ores and oxides. H. J. Rees and Metals Extraction Corporation Limited.  
19276. Wire-drawing apparatus. W. Frese.  
19277. Process and apparatus for the subsequent treatment of drawn or rolled wires. W. Frese.  
19280. Combined steam superheater and feed-water heater. G. Gillies.  
19286. Plug and clamps for ripping top purposes in fiery mines and the like without use of powder. G. Vranich.  
19301. Ore-reducing machines. H. Wade. (Copper Process Company, United States.)  
19302. Ore concentrators. J. Weatherby.  
19315. Rotary moulding and compression machines. V. Karbowski.  
19334. Superheaters. H. A. Stenning and Schmidt Superheating Company (1910) Limited.  
19378. Apparatus for controlling the supply of fuel to steam boiler or other furnaces. Fine Cotton Spinners' and Doublers' Association Limited and J. Baron.  
19428. Drills, bits and like appliances for boring in earth, rock and the like. W. H. Wakfer and S. Peck.  
19450. Apparatus for condensing steam. D. B. Morison.  
19453. Gauges for use in connection with cutters of machines for cutting coal and the like. Mavor and Coulson Limited and J. M. Martin.  
19472. Steam superheaters. E. A. Bolton and T. F. Gray.  
19480. Centrifugal pumps. Siemen Brothers Dynamo Works Limited. (Siemens Schuckertwerke, G.m.b.H., Germany.)  
19499. Manufacture or production of gas from coal or other carbonaceous matter. W. Bottomley, W. W. Gleave and the United Alkali Company Limited.  
19516. Elastic fluid turbines. British Thomson-Houston Company Limited. (C. G. Curtis, United States.)  
19542. Double rope grabs or the like. W. Midgley.  
19559. Retort furnaces. J. Moeller.  
19570. Rotary compressors, exhausters, blowers and similar apparatus. A. Sang.  
19591. Gas-producing devices. J. I. Lloyd.  
19614. Apparatus for signalling in mine and like shafts. E. L. Milward and O. J. Davis.  
19625. Shackle and pin. W. J. Pitt.  
19635. Automatic haulage clip and connected mechanism for aerial ropeways. C. A. Meatchem.  
19672. Combined reciprocating engine and turbine power installations. R. S. Portheim and J. Turnbull.  
19677. Manufacture of ammonia. W. M. Williams.  
19687. Production of light hydrocarbons from heavy hydrocarbons. S. R. Illingworth.

### Complete Specifications Accepted.

To be published on September 18, 1913.

1912.

19490. Combustion of gaseous fuel. McCourt, Radiant-Heating Limited, and Schnabel.  
19921. Means for fixing electrical and other fittings to concrete and ferro-concrete and like structures. Taylor and Pinney.  
20074. Apparatus for converting mineral oil into volatile spirit. New Oil Refining Process Limited, and Neilson.  
20075. Apparatus for converting mineral oil into volatile spirit. New Oil Refining Process Limited, and Neilson.  
20978. Sludge or like elevators. Coombs and Whitehead.  
21237. Eye-guards for pit ponies. Millar.  
21859. Transfer of material by a series of pivoted buckets. Read.  
21917. Portable electric lamps. Hartmann and Braun Akt.-Ges.  
24267. Still for the distillation of ammoniacal liquor or other fluids. Pettigrew.  
26248. Construction of haulage clips and the like. Seeley and Wood.  
28435. Compressing and exhausting apparatus with oscillating blades or vanes. McIntosh.  
29133. Automatic couplers and safety indicators therefor for railway vehicles and the like. Boonzaier.  
29539. Reversible steam turbines. Gibbs.

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406. Centrifugal fans. Davidson.  
1841. Fluid-pressure turbines. Snyder.  
2313. Means for heating and purifying feed-water for boilers. Belorussoff.  
2489. Furnaces particularly applicable for metal heating and metallurgical purposes. Hill.  
3035. Process for the gasification of fuels especially those of a fine-grained nature. Timm.  
3115. Miners' lamps. Baldwin.  
4141. Method of and apparatus for ascertaining the proportion of oxygen in a gaseous mixture. Calafat y Leon.  
4264. Luffing cranes. Hildred and R. Waygood and Co.  
4274. Suspension or traction ropeways. Schweinburg.  
6018. Piling plates for scrap furnaces. Heron.  
6874. Roller chutes for bricks. Eschke.  
6917. Automatic charging apparatus for furnaces. Chemische Industrie Akt.-Ges. and Singer.  
8474. Crucible and melting-pot furnaces. Tooth.  
8658. Devices for measuring or regulating the quantity of fluid forced by a centrifugal compressor, pump, or the like. Keller.  
8977. Valve mechanism for elastic fluid turbines. Warwick Machinery Company (1908). (General Electric Company).  
9597. Manufacture of primary explosives. Calvet.  
9799. Centrifugal pumps. Hansen.  
13276. Furnaces. Thomas.  
13596. Rotary pump. Brettell. (Wernicke-Hatcher Pump Company).

13761. Means for compensating aneroid barometers for temperature variations. R. Fuess vorm. J. G. Greiner, jun., and Geissler (Firm of).  
16711. Optical pyrometers. Lagoutte.

**Complete Specifications open to Public Inspection before Acceptance.**  
1913.

17939. Automatically controlling the speed of rolling mills and other metal-working devices. Clark.  
18270. Process for converting fine coal into marketable fuel. Evans.  
18572. Centrifugal pumps. Siemens-Schuckertwerke.

## GOVERNMENT PUBLICATIONS.

**\*\* Any of the following publications may be obtained on application to this office at the price named post free.**

Consular Reports, &c.: Trade of South Africa for 1912 [Cd. 7023], 7d.; Somaliland, 1912-1913, 2d.; Turkey, Trade of Beirut and the Coast of Syria, 4d.; France, Madagascar, 1912, 4d.; Hong Kong, 1912, 5d.

**MINES AND QUARRIES REPORTS FOR 1912:** South Wales District, No. 7, 10½d.; Newcastle District, 6d.; Yorkshire and North Midland District, 1s. 7d.; Liverpool and North Wales District, 7d.; Midland and Southern District, 1s. 6d.

Boiler Reports: Water-tube Boiler at Llanbradell Colliery, Glamorgan (No. 2234), 5½d.

Bankruptcy (Scotland) Act, 1s.

Bankruptcy Proceedings Account, 1d.

Companies' Consolidation Act, 1908: Account, 1912-13, 1d.

PRICES OF EXPORTED COAL: Return, 2½d.

Pauperism: Statement for July, 1½d.

East Kent Light Railways: Extension Order, 1½d.

Education (Scotland): Reports, &c., Issued in 1912-13, 8s. 8d.

Factory Form, No. 26, 1½d.

Report of the Government Chemist for the Year Ending March 31, 1913 [Cd. 7001], 4d.

## PUBLICATIONS RECEIVED.

DEPARTMENT OF MINES, NEW SOUTH WALES, MINERAL RESOURCES No. 17. Maps.

ANNUAL REPORT OF THE MINISTER OF MINES, 1912, BRITISH COLUMBIA. Victoria, B.C.: W. H. Cullin.

GAS TESTING AND AIR MEASUREMENT. By Charles Chandley. London: Methuen and Co. 1s. 6d.

OIL. By W. Antrobus. Manchester and London: John Heywood Limited. 3s. 6d.

THE CLASSIFICATION OF THE PUBLIC LANDS. U. S. Geol. Survey, Bulletin 537. By Geo. Otis Smith and others. Washington: Government Printing Office.

"The Mining Magazine" (Vol. 9, No. 2), August, price 1s.; "The Journal of the American Peat Society" (Vol. 6, No. 3), July, price 1½dols.; "Mine and Quarry" (Vol. 7, No. 4), July-August; "Bulletin Mensuel de la Société Industrielle du Nord de la France" (No. 195), August; "Cassier's Magazine" (Vol. 44, No. 3), September, price 1s.

**Huge Locomotives for the Natal Coal Traffic.**—There has recently been completed by Messrs. Robert Stephenson and Company Limited, of Darlington, the first of 20 powerful locomotives, which they have on order for the South African railways. These engines are intended for service in hauling traffic from the Natal coalfield, and they represent the heaviest locomotives which have ever been built by Messrs. Stephenson. Each of these 20 locomotives has the 4-8-2 wheel arrangement, the leading bogie wheels being 2 ft. 4½ in., the trailing bogie wheels 2 ft. 9 in., and the coupled wheels 4 ft. 6 in. diameter. The fixed wheel base is 12 ft. 9 in. and the total wheelbase 30 ft. 7 in. The cylinders are 22 in. diameter with a piston stroke of 26 in., and the total heating surface is 2,360 square feet, to which the tubes contribute 2,211'96 square feet and the firebox 149 square feet. The superheating surface is 503'04 square feet and the grate area 36 square feet. The mean effective pressure at 75 per cent. of the boiler pressure amounts to 36,375 lb. In working order the engine weighs 69 tons 10 cwt., of which 14 tons 8 cwt. are on the front bogie, 64 tons 8 cwt. on the coupled wheels, and 10 tons 14 cwt. on the rear bogie. The maximum axle load is 16 tons 3 cwt. The tender, carried upon two four-wheeled bogies having wheels 2 ft. 9½ in. diameter, has a fuel space of 400 cubic feet, and a capacity for 4,250 gallons of water. The total wheelbase of the tender is 16 ft. 9 in., and the weight in working order 50 tons 7 cwt., whilst the total wheelbase of engine and tender is 56 ft. 11½ in., the total length over buffers 66 ft. 5½ in. and the weight 139 tons 17 cwt. The maximum width is 8 ft. 10 in. and the maximum height 12 ft. 7½ in. These engines, built for the standard South African gauge (3 ft. 6 in.), are fitted with the Schmidt superheater steam reversing gear, Hasler speed indicator, Walschaert's valve gear, two No. 10 injectors, and steam brake on engine and vacuum brake on the tender, and have been built to the designs of Mr. D. A. Hendrie, chief mechanical engineer of the South African Railways, and under the supervision and to the inspection of Mr. H. G. Humby, consulting engineer to the High Commissioner for the Union of South Africa.



# THE COLLIERY GUARDIAN

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VOL. CVI.

FRIDAY, SEPTEMBER 12, 1913.

No. 2750.

## APPROVED SAFETY LAMPS FOR MINES.

A Safety Lamps Order [No.] 886] dated the 26th August, 1913, has been made by the Secretary of State under section 33 of the Coal Mines Act, 1911 (1 & 2 Geo. 5, c. 50), approving certain types of safety lamps for use in mines to which the Act applies, and consolidating the previous Orders of 14th January, 13th March, 18th April, 3rd May and 27th June, 1913. He now approves, until further notice, for use in all mines to which the Act applies, the types of safety lamps named and described in the Schedule to this Order, subject in each case to the conditions specified in the Schedule.

The list of approved safety lamps is as follows:—

### I.—Flame Safety Lamps Approved for General Use.

Manufacturer.	Name of lamp.
1. Ackroyd and Best Ltd. ...	Hailwood, Nos. 01 and 01 S Hailwood, No. 02
2. Best's Safety Lamps Ltd.	Best's Excelsior, No. 1
3. Joseph Cooke and Son .....	J.C.B., Nos. 19 and 22
4. Cremer Lamp and Engineering Co. Ltd.	Cremer, No. 11
5. John Davis and Son (Derby) Ltd.	No. 1, Davis-Marsic Davis-Marstry Davis-Marstry No. 2, Davis-Kirkby No. 1 B, Davis - Marsty-Loose No. 5, Davis-Thornley No. 8, Davis-Thornbury Nos. 1 and 2 Nos. 4 and 4 A Deflector No. 5 J.C.M.
6. Richard Johnson, Clapham and Morris Ltd.	Nos. 1, 1 A and 2 "J.M.S." No. 1
7. James Laidler and Sons ...	N.
8. John Mills and Sons .....	N.
9. J. H. Naylor .....	Bifold Burner Marsaut Marsaut "A" and "C" Marsaut "B" and "D"
10. Patterson and Co. ....	Types A 1 and A 3 Type B 1
11. Protector Lamp and Lighting Co. Ltd.	Prestwich Patent Protector No. 176, Oil
12. J. H. Rothwell and Co. ...	"A" "C"
13. W. E. Teale and Co. Ltd....	"B," "D" and "E" Protector, No. 1 Protector, No. 2 Standard Bonneted Marsaut, No. 4 Protector No. 3 and Standard Deflector Marsaut No. 5
14. E. Thomas and Williams Ltd.	Cambrian, Nos. 1 and 3 Cambrian Deflector, No. 15

### II.—Flame Safety Lamps Approved for Use by Officials only.

1. Ackroyd and Best Ltd.....	Hailwood No. 01 A Hailwood Nos. 06 and F 1
2. Cremer Lamp & Engineering Co. Ltd.	No. 11 A
3. John Davis and Son (Derby) Ltd.	No. 11, Davis-Beacatorh No. 3, Davis-Boss No. 6, Davis-Alumthorn No. 7, Davis-Diabl No. 3 C. Davis-Bossygy.
4. Richard Johnson, Clapham and Morris Ltd.	No. 3 and No. 6
5. James Laidler and Sons ...	No. 2 A. "J.M.S." No. 2
6. John Mills and Sons .....	N. "J.M.S." No. 3
7. J. H. Naylor .....	N.
8. Patterson and Co. ....	Bifold Burner Marsaut (for officials) Marsaut "A 1" and "B 2" Marsaut "E"
9. Protector Lamp and Lighting Co. Ltd.	Types A 2, A 4, and B 2 Type D 1
10. W. E. Teale and Co. Ltd....	"Prestwich Patent Protector, A"
11. E. Thomas and Williams Ltd.	Standard Bonneted Marsaut, No. 4 A Cambrian No. 1 A Cambrian Improved Fireman's, No. 21

### III.—Electric Safety Lamps Approved for General Use.

1. "Ceag" Electric Safety Lamp Co.	"Ceag"
2. W. E. Gray .....	Gray-Sussmann, Nos. 3 and 4
3. Oldham and Son .....	Oldham
4. Wolf Safety Lamp Co. ....	Wolf Alkaline Wolf Lead

### IV.—Electric Safety Lamps Approved for Use by Officials or for Special Purposes only.

1. Float Electric Co. Ltd. ....	Float Patent
2. Oldham and Son .....	Oldham "Emergency" "Oldham" Shaft and Roadway.

## V.—Approved Safety Lamp Glasses.

We give the terms of the schedule below in a somewhat abbreviated form.

### Part I.—Flame Safety Lamps Approved for General Use.

#### The Hailwood Lamps No. 01 and No. 01 S.

The Hailwood lamps Nos. 01 and 01 S., the general designs of which are shown in fig. 1, are flame, oil lamps with air inlet holes through the middle ring. They consist of the following essential parts:—

(1.) *Bonnet or shield* of seamless or riveted steel with a separate securely fastened crown. In the case of the *Hailwood Lamp No. 01* the bonnet is fixed and is riveted to the middle ring. In the case of the *Hailwood Lamp No. 01 S.* the bonnet is of the "screw-off" type, and is riveted to a *brass bonnet ring* screwed to the middle ring and securely locked thereto by means of a sliding pillar, held in position by the oil vessel. Furnished with outlet holes round the top; provided that the bottoms of the outlet holes are not below the top of the outer gauze; and furnished also or not with stamped air-admission indentations as shown in fig. 1, forming narrow slots not more than  $\frac{1}{16}$  in. in depth, so arranged as to prevent a horizontal current from impinging directly against the gauze. Fitted or not with a deflector ring, with or without a baffle ring.

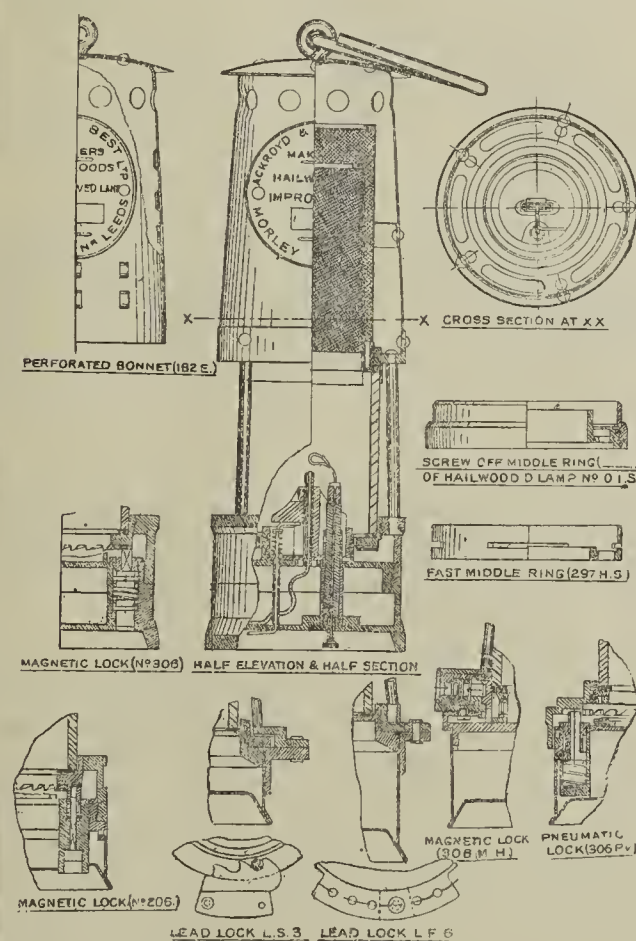


FIG. 1.

(2.) *Middle ring*, of brass, steel, or iron; provided with vertical air-inlet holes of total area not exceeding 1.3 square inches, with or without additional horizontal slots, of total area not more than 0.5 square inch, the gauze being protected from a direct horizontal current by a baffle ring formed by the prolongation of the inner flange of the middle ring, or by a wide flange on the gauze ring.

*Pillars*, of brass, steel, or iron, four or more (with or without an additional sliding pillar), fitted or not with securely fastened pillar guards, so arranged that a straight line touching the exterior part of adjacent pillars or guards does not touch the glass. Provided that lamps now in use fitted with four pillars and not fulfilling the foregoing requirement may continue to be used until January 1, 1916.

*Bush or Bottom Ring*, of brass, steel, or iron.

(3.) *Gauzes* of not less than 28 S.W.G. steel or best charcoal annealed iron wire, 784 meshes to the square inch, with secure flame-tight double-folded lap seams, or single fold seams secured by iron strips, formed to fit flanges of the inner and outer base rings, and so secured to the same by punch indentations as to make strong and flame-tight joints.

	Internal dimensions.	Outer gauze.	Inner gauze.
Height from shoulder of the base ring .....		$3\frac{3}{8}$ in. $\pm \frac{1}{4}$ in.	$3\frac{5}{8}$ in. $\pm \frac{1}{4}$ in. (or $3\frac{3}{8}$ in. $\pm \frac{1}{4}$ in.)
Diameter at top .....		$1\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.	$1\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.
Diameter at bottom .....		2 in. $\pm \frac{1}{8}$ in.	$1\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.

Provided that the lamp may be fitted with a Mueseler chimney and horizontal gauze in place of the inner

gauze, the horizontal gauze forming a secure and flame-tight joint with the Mueseler chimney and the dimensions of the latter being as follows:—

	Inches.
Height above horizontal gauze not less than	$3\frac{1}{8}$
Height below horizontal gauze not less than	$1\frac{1}{8}$
Diameter at top not greater than	$1\frac{1}{8}$
Diameter at bottom not greater than	$1\frac{1}{2}$

Provided also that the lamp may be fitted with a single gauze of the dimensions of either gauze given above (with or without a gauze cap) until 1st January, 1914, or in the case of lamps in use on 1st January, 1913, until 1st January, 1916; provided that the top of the gauze (without a gauze cap) is not less than  $\frac{3}{16}$  in. below the bottom of the outlet holes of the bonnet.

The arrangement of the gauzes is such that if the glass-retaining ring is screwed home in the absence of the gauzes, the bolt of the magnetic or pneumatic lock cannot engage the ratchet teeth of the retaining ring, thus preventing the lamp from being locked and ensuring that the lamp shall not be put together without gauzes.

Provided that this approval also covers lamps at present in use and new lamps brought into use before 1st July, 1914, fitted with gauzes and locks which do not fulfil the foregoing condition.

(4.) *Glass*, of an approved type, cylindrical in form, and within the dimension limits and bearing one of the size marks specified below, and furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring.

External diameter .....	$56\frac{3}{4}$ mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height .....	67 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	$56\frac{3}{4}$ -67 or A.B.1.

(5.) *Glass-retaining Ring*, of brass, furnished with a left-handed screw thread, and also with ratchet teeth to engage the bolt of the magnetic lock when so fitted. Provided that for lamps fitted with lead-rivet locks the

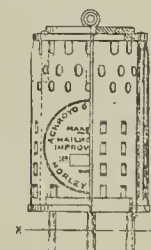


FIG. 2.

threads may be right-handed; provided also that the clearance between the glass-retaining ring and oil vessel, when the lamp is locked, is such that it shall not be possible, under reasonable working conditions, to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) *Oil Vessel*.—A casting of brass, or of stamped steel or brass, with a securely fastened brass top; of capacity sufficient to provide the required light for the required time. Fitted with a flat  $\frac{7}{16}$  to  $\frac{1}{2}$  inch burner, and provided or not with a porcelain body, and with or without electric igniter of the type shown in fig. 1 so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

### (7.) Locking Devices.—One or other of the following:—

- A magnetic lock of one of the types shown in fig. 1, so constructed that the bolt can be withdrawn only by a powerful electro-magnet.
- A compressed-air lock of the type shown in fig. 1, so constructed that the bolt can be withdrawn only by a powerful jet of compressed air.
- A lead-rivet lock of one of the types shown in fig. 1.

### (8.) Reflector.—The lamp may be fitted with a removable reflector.

The lamps must have been made at the works of Messrs. Ackroyd and Best Limited at Morley, near Leeds.

#### The Hailwood Lamp, No. 02.

This lamp, the general design of the upper portion of which is shown in fig. 2, is a modification of the Hailwood Lamp No. 01, and is similar to it in all but the following respects:—

(1.) *The Crown* is of brass, iron or steel, and is supported by five pillars of brass, steel or iron.

(2.) *The Bonnet* is of sheet steel or iron, strapped round the pillars, secured by rivets, and lying close



inst the middle ring. With outlet openings round the top, so arranged that the bottoms of the openings do not come below the top of the outer gauze. Furnished with stamped air-inlet indentations, as shown in fig. 2, forming narrow slots not more than  $\frac{1}{16}$  in. in depth, so arranged as to prevent a horizontal current from impinging directly against the gauze.

(3.) *The Middle Ring* is furnished with vertical air-inlet holes of total area not exceeding 0.45 square inch.

(4.) *Gauzes*.—The lamp is fitted with double gauzes of the construction, arrangement, and dimensions described for the Hailwood lamp No. 0 1.

#### Best's "Excelsior" Lamp No. 1.

This lamp, the general design of which is shown in fig. 3, is a double-gauze, flame, oil lamp, with the air-feed through horizontal holes in the middle ring, protected by a baffle ring formed by the continuation of the bonnet. It consists of the following essential parts:—

(1.) *Bonnet or Shield* of seamless steel with a separate securely-riveted crown, furnished with outlet holes immediately below the crown; provided that the bottom of the holes shall not be less than  $\frac{3}{16}$  in. above the top of the outer gauze.

(2.) *Bonnet or Middle Ring* of brass, steel or iron, riveted to bonnet and provided with horizontal air-inlet holes equally spaced round the periphery and of total area not greater than 1.0 square inch.

Provided that the inlet holes are protected by a baffle ring formed by the continuation of the bonnet to a distance below the bottom of the inlet holes.

*Pillars* of steel or iron, four or more, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom Ring* of brass, steel or iron.

(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with secure flame-tight lap seams, strengthened with metal strips down the side, each gauze formed to fit flanges of the outside and inside base rings, and so secured to the same by rivets or by being spun on as to make strong and flame-tight joints. The arrangement of the gauzes is that shown in fig. 3, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without the gauzes; moreover, the action of screwing home the

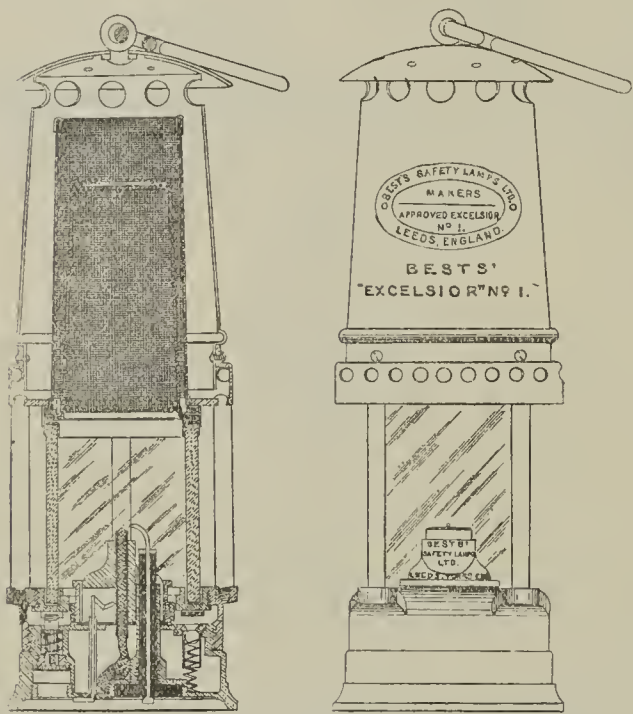


FIG. 3.

glass retaining ring in the absence of the gauzes raises the ratchet teeth of the retaining ring above the locking bolt and prevents the lamp from being locked.

Internal dimensions.	Outer gauze.	Inner gauze.
Height from the shoulder of the base ring	4 $\frac{1}{4}$ in. $\pm$ $\frac{1}{8}$ in.	3 $\frac{1}{2}$ in. $\pm$ $\frac{1}{8}$ in.
Diameter at top	1 $\frac{1}{2}$ in. $\pm$ $\frac{1}{8}$ in.	1 $\frac{1}{2}$ in. $\pm$ $\frac{1}{8}$ in.
Diameter at bottom	1 $\frac{1}{8}$ in. $\pm$ $\frac{1}{8}$ in.	1 $\frac{1}{2}$ in. $\pm$ $\frac{1}{8}$ in.

(4.) *Glass*, of an approved type, furnished or not, in addition, with metal rings fitting on the ends of the glass.

External diameter	57 mm. { +0 mm. -1 mm.
Height	67 mm. $\pm$ $\frac{1}{4}$ mm.
Size mark	57-67

(5.) *Glass Retaining Ring*, of brass, furnished with a left-handed screw thread, and with ratchet teeth to engage the bolt of the magnetic lock; furnished also with a stop ring, as shown in fig. 3, to prevent the retaining ring from being screwed home too far.

(6.) *Oil Vessel*.—A casting of brass of capacity sufficient to provide the required light for the required time, fitted with a flat  $\frac{1}{16}$ -inch burner, and provided or not with a porcelain body and with an electric igniter, of the type shown in fig. 3.

(7.) *Locking Device*.—A magnetic lock of the type shown in fig. 3.

(8.) *Reflector*.—The lamp may be fitted with a removable reflector. The lamp must have been made at the works of Messrs. Best's Safety Lamps Limited, at Providence Works, Park-lane Mills, Leeds, Yorkshire.

#### The J.C.B. Lamps Nos. 19 and 22.

The J.C.B. Lamps Nos. 19 and 22, the general designs of which are shown in fig. 4, are double-gauze, flame, oil lamp, with air-feed through the middle ring. They consist of the following essential parts:—

(1.) *Bonnet or Shield* of riveted steel, with a separate securely riveted crown. Furnished with outlet holes immediately below the crown; provided that the bottoms of the outlet holes are not below the top of the outer gauze. Fitted or not with a baffle ring.

In the case of the J.C.B. Lamp No. 19 the bonnet is riveted to lugs on the middle ring.

In the case of the J.C.B. Lamp No. 22 the bonnet is riveted to a brass bonnet ring of the type shown in fig. 4, which is screwed to the middle ring and locked thereto by a sliding pillar kept in position by the oil vessel.

(2.) *Middle Rings*, of brass, furnished—

(i.) In the case of the J.C.B. Lamp No. 19, with vertical air-inlet holes of total area not exceeding 1.0 square inch, or with vertical air-inlet holes of total area not exceeding 0.5 square inch, combined with horizontal air-inlet slots between the middle ring and the bonnet of total area not exceeding 1.5 square inches.

(ii.) In the case of the J.C.B. Lamp No. 22, with vertical air-inlet holes of total area not exceeding 0.7 square inch, combined with horizontal air-inlet slots of total area not exceeding 1.2 square inches.

In each case the slots are protected by a baffle ring formed by the inner flange of the middle ring or bonnet ring as shown in fig. 4.

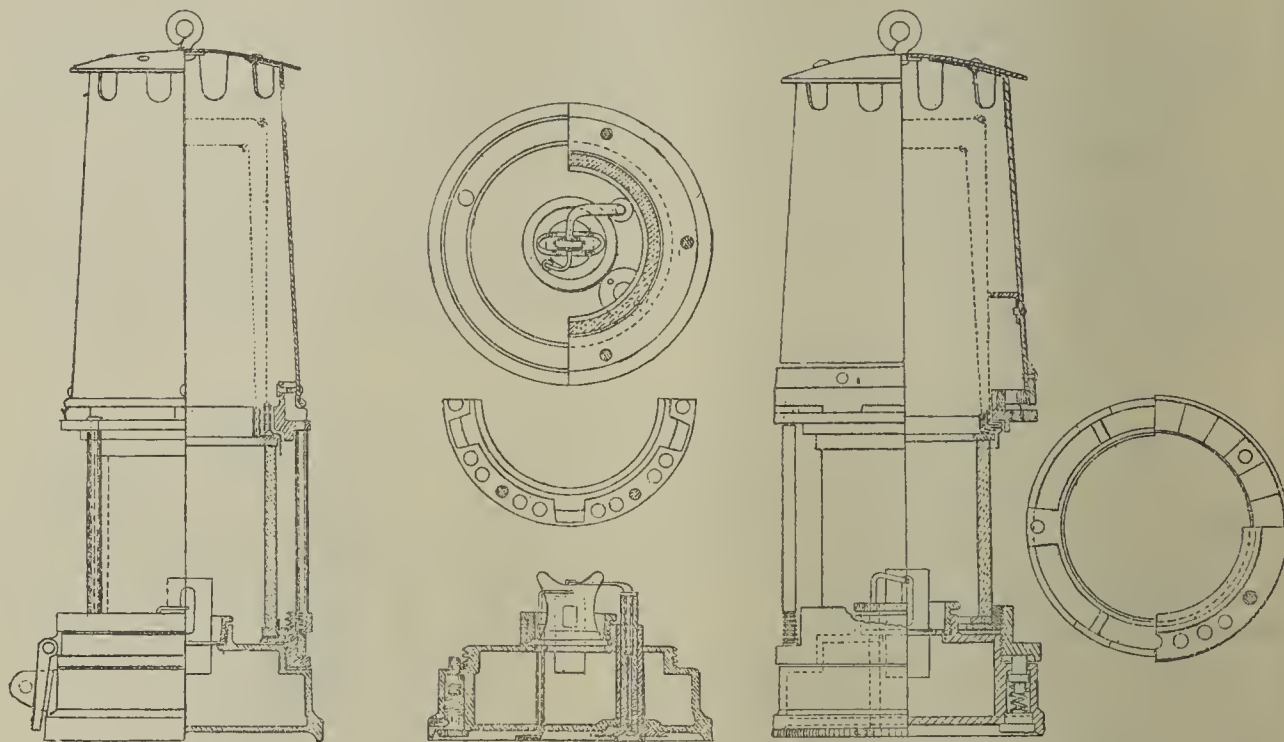


FIG. 4.

*Pillars*, of brass, steel, or iron; 5, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass. Provided that lamps now in use having four pillars (all fixed) not complying with the foregoing requirement may continue to be used until 1st January, 1916.

*Bottom or Lock Ring*, of brass, iron, or steel.

(3.) *Gauzes*, of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with double-folded lap seams, formed to fit flanges of the inner and outer base rings, and so secured to the same by punch indentations or by being spun on as to make strong and flame-tight joints. The arrangement of the gauzes is that shown in the drawing of the No. 22 lamp, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without the gauzes; provided that this specification also covers lamps now in use and new lamps brought into use before 1st July 1914, having the arrangement of gauzes shown in the drawing of the No. 19 lamp.

Internal dimensions.	Outer gauze.	Inner gauze.
Height from the shoulder of the base ring	4 in. $\pm$ $\frac{1}{8}$ in.	3 $\frac{1}{2}$ in. $\pm$ $\frac{1}{8}$ in.
Diameter at top	2 in. $\pm$ $\frac{1}{8}$ in.	1 $\frac{1}{2}$ in. $\pm$ $\frac{1}{8}$ in.
Diameter at bottom	2 in. $\pm$ $\frac{1}{8}$ in.	1 $\frac{1}{2}$ in. $\pm$ $\frac{1}{8}$ in.

(4.) *Glass*, of an approved type, fitted or not with additional loose brass end-rings.

External diameter	63 mm. { +0 mm. -1 mm.
Height	60 mm. $\pm$ $\frac{1}{4}$ mm.
Size mark	63-60

Provided that the lamp may also be made to take glasses of the following dimensions:—

External diameter	58 mm. { +0 mm. or 57 mm. -1 mm.
Height	58 mm. $\pm$ $\frac{1}{4}$ mm. or 58 mm. $\pm$ $\frac{1}{4}$ mm.
Size mark	58-58 or 57-58

(5.) *Glass Retaining Ring*, of brass, screw-threaded to fit the bottom ring; provided that the clearance between the glass retaining ring and the oil vessel shall not be so great as to make it possible under reasonable working conditions to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) *Oil Vessel*, of brass, a solid casting, or a casting with the bottom of brass or iron securely soldered, of capacity sufficient to provide the required light for the required time; fitted with a flat  $\frac{1}{16}$  to  $\frac{7}{16}$ -inch burner, with or without a porcelain body; provided or not with an electric igniter of the type shown in fig. 4.

(7.) *Locking Device*.—One or other of the following:—

- A magnetic lock of the type shown in fig. 4.
- A lead-rivet lock with a hasp or lug secured to the bottom ring or to a pillar, and a staple or lug securely soldered to the oil vessel; or an efficient screw bolt secured in the locked position by a lead rivet.

(8.) *Reflector*.—The lamps may be fitted with a removable reflector.

The lamps must have been made at the works of Messrs. Joseph Cooke and Son, at 203, Lawley-street, Birmingham.

#### The Cremer Lamp No. 11.

The Cremer lamp, No. 11, the general design of which is shown in fig. 5, is a double-gauze, flame, spirit, or oil lamp, with air feed through vertical and horizontal holes in the middle ring, and, in addition, in the case of the bottom-fed lamps, through slots situated below the glass, protected by double gauzes. It consists of the following essential parts:—

(1.) *Bonnet or Shield* of stamped steel with an additional securely fastened steel or brass crown. Furnished with outlet holes immediately below the crown; provided that the bottoms of the holes are not less than  $\frac{3}{16}$  in. above the top of the outer gauze.

(2.) *Middle Ring*, of brass riveted to bonnet, provided with vertical air inlet holes of total area not greater than 0.3 square inch, and with additional horizontal slots of total area not greater than 0.75 square inch,

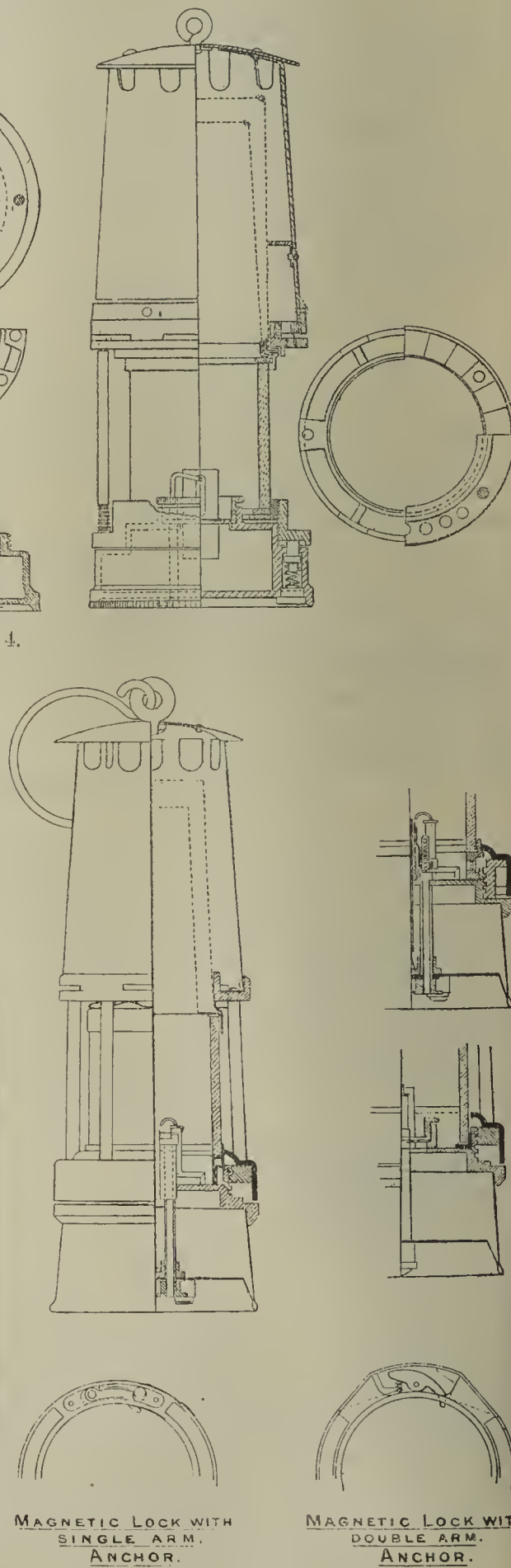


FIG. 5.

protected by a baffle ring formed by the inner flange of the middle ring as shown in fig. 5.

*Pillars*, of brass; 5, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom Ring*, of brass, of one or other of the types shown in fig. 5, with a flanged ring forming a baffle against a horizontal current entering the air admission slots.



(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with double-folded lap seams, formed to fit flanges of the inner and outer base rings, and so secured to the same by punch indentations or rivets as to make strong and flame-tight joints. The arrangement of the gauzes in the lamp is that shown in fig. 5, and is such that they form the seating necessary to hold the glass firmly in position, thus preventing the possibility of the lamp being put together without them.

Internal Dimensions.	Outer gauze.	Inner gauze.
Height from shoulder of hoop.....	4 in. $\pm \frac{1}{4}$ in.	3 $\frac{5}{8}$ in. $\pm \frac{1}{4}$ in.
Diameter at top .....	1 $\frac{3}{8}$ in. $\pm \frac{1}{8}$ in.	1 $\frac{1}{4}$ in. $\pm \frac{1}{8}$ in.
Diameter at bottom .....	2 $\frac{1}{8}$ in. $\pm \frac{1}{8}$ in.	1 $\frac{9}{16}$ in. $\pm \frac{1}{8}$ in.

(4.) *Glass*, of an approved type:—

Dimensions.	When air admission ring is used.	When air admission ring is not used.
External diameter 59 mm	$\begin{cases} + 0 \text{ mm} \\ - 1 \text{ mm} \end{cases}$	59 mm $\begin{cases} + 0 \text{ mm} \\ - 1 \text{ mm} \end{cases}$
Height.....	60 mm $\pm \frac{1}{4}$ mm	73 mm $\pm \frac{1}{4}$ mm
Size mark .....	59-60	59-73

(5.) *Glass Retaining and Air Admission Ring*.—The lamp may be fitted with one or other of the following:

- (a) A combined glass retaining and air admission ring, of either of the types shown in fig. 5, with 6 slots, protected by double securely fastened brass gauzes of not less than 28 S.W.G., 784 meshes to the square inch, the total area of the slots being not greater than 0.75 square inch.
- (b) A plain brass ring with a seating in the oil vessel screening the air admission holes.

(6.) *Spirit or Oil Vessel* of stamped steel, with a securely fastened brass screwed ring to fit the bottom ring, with slots cut in the threads to engage the pawl of the magnetic lock, the vessel being of capacity sufficient to provide the required light for the required time. Fitted with a flat  $\frac{7}{16}$  to  $\frac{5}{8}$  inch burner; and with or without a thumb-screw wick adjuster and an electric igniter of the type shown in fig. 5.

- (7.) *Locking Device*.—One or other of the following:—
- (i.) A magnetic lock of one or other of the types shown in fig. 5.
  - (ii.) A lead rivet lock with a lug cast on the bottom ring, and a second lug securely soldered to the oil vessel.

The lamp must have been made at the works of the Gremer Lamp and Engineering Company Limited, at 32, York-place, Leeds.

No. 1 Lamp.	$\begin{cases} \text{The Davis-Marsic.} \\ \text{The Davis-Marstry.} \\ \text{The Davis-Marstryrn.} \end{cases}$
No. 2 Lamp.	$\begin{cases} \text{The Davis-Kirkby.} \end{cases}$

These lamps, the general designs of which are shown in fig. 6, are double gauze, flame, oil lamps, with air-feed through vertical holes in the middle ring. Each consists of the following essential parts:—

(1.) *Bonnet or Shield* of riveted steel, with a separate securely fastened crown, or of pressed steel, the bonnet and crown being in one piece. Furnished with outlet holes immediately below the crown, provided that the bottoms of the holes are not less than  $\frac{3}{16}$ -inch above the top of the outer gauze.

Furnished or not with a deflector, with or without a baffle ring.

(2.) *Middle or Bonnet Ring* of brass, riveted to the bonnet, furnished with vertical air inlet holes of total area not exceeding 1.6 square inches.

*Pillars*; of brass, steel or iron, 5, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom or Lock Ring*, of brass, provided with ratchet teeth to take the bolt of the magnetic lock when so fitted.

(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch with double folded lap seams, strengthened by a steel liner, formed to fit flanges of the inner and outer base rings, and so secured to the same by punch indentations as to make strong and flame-tight joints.

The arrangement of the gauzes is one of the arrangements shown in fig. 6, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without a gauze.

*Internal Dimensions for the Davis-Marsic, Davis-Marstry, and Davis-Marstryrn Lamps.*

	Outer gauze.	Inner gauze.
Height from shoulder of hoop .....	4 in. $\pm \frac{1}{4}$ in.	3 $\frac{5}{8}$ in. $\pm \frac{1}{4}$ in.
Diameter at top .....	1 $\frac{3}{8}$ in. $\pm \frac{1}{8}$ in.	1 $\frac{1}{4}$ in. $\pm \frac{1}{8}$ in.
Diameter at bottom .....	2 in. $\pm \frac{1}{8}$ in.	1 $\frac{7}{8}$ in. $\pm \frac{1}{8}$ in.

*Internal Dimensions for the Davis-Kirkby Lamp.*

	Outer gauze.	Inner gauze.
Height from shoulder of hoop .....	4 $\frac{3}{8}$ in. $\pm \frac{1}{4}$ in.	4 $\frac{1}{4}$ in. $\pm \frac{1}{4}$ in.
Diameter at top .....	2 in. $\pm \frac{1}{8}$ in.	1 $\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.
Diameter at bottom.....	2 in. $\pm \frac{1}{8}$ in.	1 $\frac{5}{8}$ in. $\pm \frac{1}{8}$ in.

Provided that the lamp may be fitted with a Mueseler chimney and horizontal gauze in place of the inner gauze; the horizontal gauze forming a secure and flame-tight joint with the Mueseler chimney, and the dimensions of the latter being as follow:—

Height of chimney above horizontal gauze, not less than 3 $\frac{1}{4}$  in.;  
Height of chimney below horizontal gauze, not less than  $\frac{1}{2}$  in.;  
Diameter of chimney at top, not more than  $\frac{1}{2}$  in.;  
Diameter of chimney at bottom, not more than 1 $\frac{1}{4}$  in.

(4.) *Glass*, of an approved type. Fitted or not with loose brass end-rings.

External diameter ..	58 $\frac{1}{4}$ mm. $\begin{cases} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{cases}$
Height .....	60 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	58 $\frac{1}{4}$ -60 or SIVAD. 1.

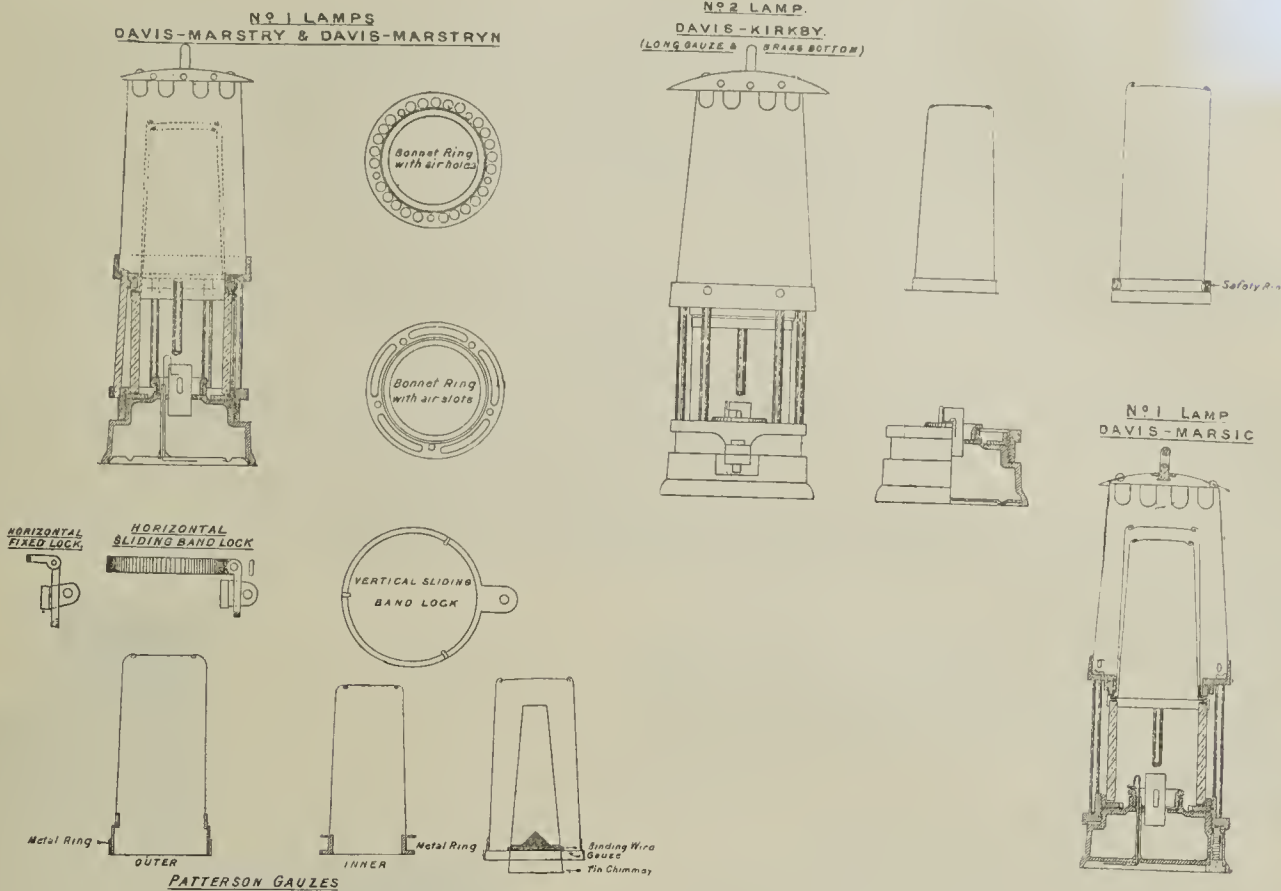


FIG. 6.

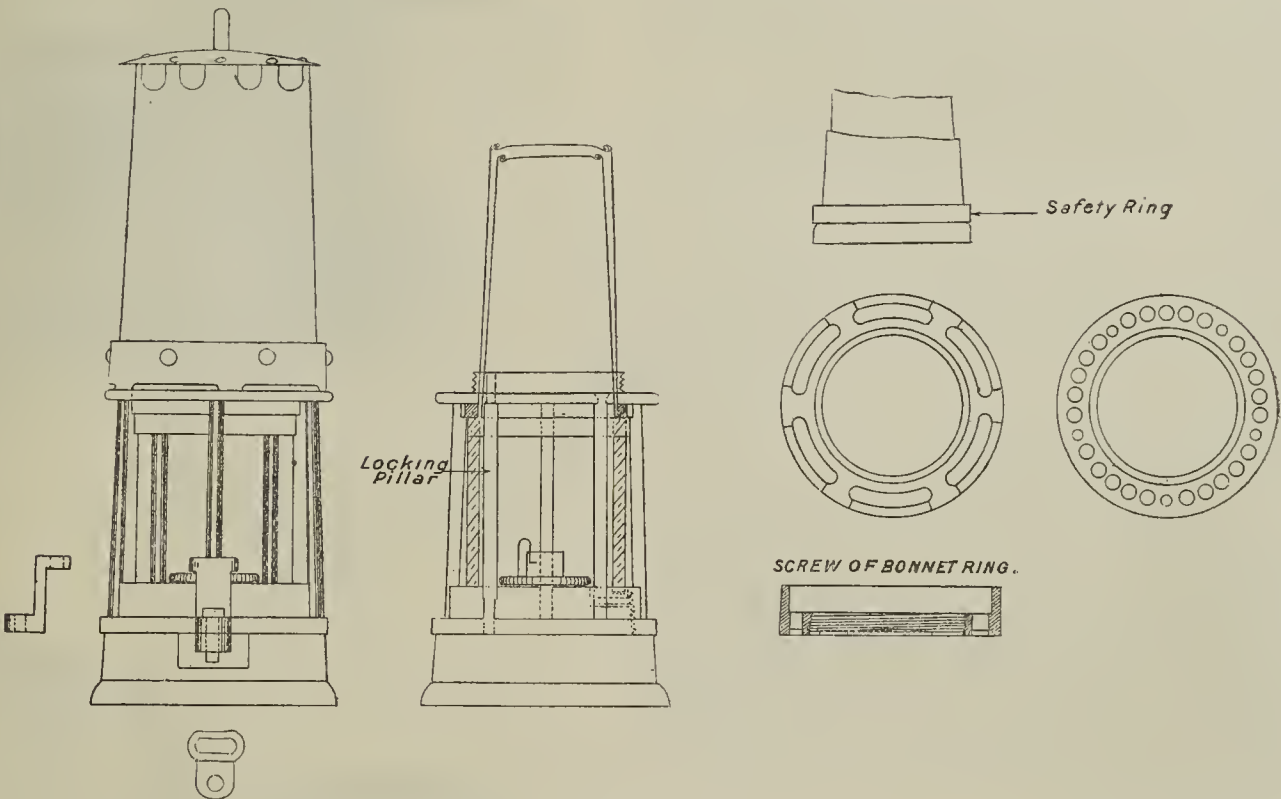


FIG. 7.

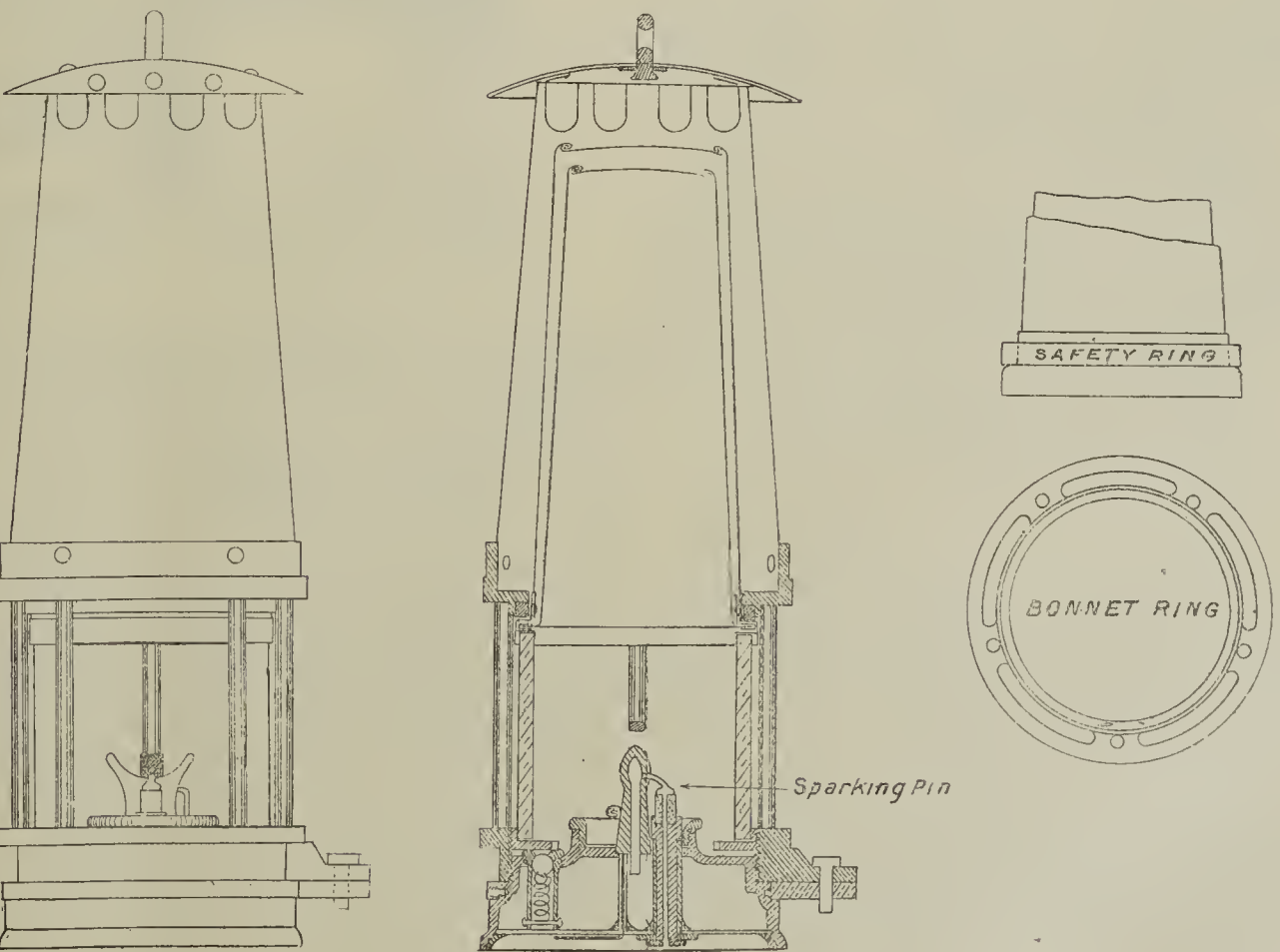


FIG. 8.

(5.) *Glass Retaining Ring*, of brass, screw-threaded to fit the bottom ring. Provided that the clearance between the bottom of the glass retaining ring and the top of the oil vessel shall not be so great as to make it possible, under reasonable working conditions, to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) *Oil Vessel*.—A solid casting of brass or with a securely soldered brass bottom; of capacity sufficient to provide the required light for the required time; fitted with a flat  $\frac{1}{2}$  in. burner; with or without a porcelain body; furnished or not with an electric igniter of the type shown in fig. 8, so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.







# THE DISTILLATION OF TAR IN METALLURGICAL PRACTICE.\*

By GEVERS-ORBAN (Liège).

A metallurgist should make his own coke. Formerly coke ovens were situated near the collieries; at the present time their proper place is in the ironworks, as the by-products of coking are required in the works. These are :—

1. The coke-oven gas, which supplies the metallurgist with cheap motive power.
2. These gases likewise supply an ideal fuel for the open-hearth furnaces.
3. The coke-oven tar is readily converted into steelworks tar for use in converter linings.
4. The distillation of the tar furnishes the oils required in the heating or reheating, annealing and hardening furnaces; and
5. The distillation of the tar furnishes a cheap binder for the agglomeration of oredust into briquettes.

**Importance of the Tar Question.**—If the metallurgist makes his own coke, in the proportion of 1 ton of coke for each ton of pig iron, he will make for each ton of pig iron about 100 lb. of tar, which is at present worth 1s. 8d. This is a factor not to be despised in connection with the cost price of the pig iron.

**The Utilisation of the Tar.**—The treatment of the tar is carried out wholly in distilleries. Hitherto these have been costly, inconvenient, and dangerous plants requiring the services of a special staff. A distillery for

large blades, fixed to a horizontal shaft, plunge into the bath and expose thin layers of the tar to the oxidising and evaporating action of a brisk current of air. When the tar has reached the front part of the boiler it has become a pitch at a temperature of 200 degs. to 250 degs. Cent., according as it is desired to obtain a moister or a drier pitch, whereas, in the ordinary retorts, the temperature exceeds 360 degs. Cent.

The pitch trickles from the retort, by gravity, continuously through a spiral cooler, and attains a temperature of 90 degs. Cent. either in the pitch tanks, tank-waggons, or in some sort of mould. At the Bonne-Fortune works, as the illustrations show, the tar undergoes, in addition, a preliminary oxidation by means of a current of ozonised air in an ozonising chamber. This additional oxidation is applied with the sole object of increasing the yield of pitch, as the works have been specially built to supply pitch for a coal-briquetting plant.

**Advantages Realised by the Cava Process.**—The advantages realised in the Cava process over the distillation in ordinary retorts are threefold.

1. The operation is continuous, that is to say, the tar enters continuously at one end of the boiler, and the pitch flows continuously from the other end, while the oils of distillation pass off continuously through a spiral

mechanical energy expended in driving off the carbon vapours has to be supplied by the furnace. The result of the low temperature involved is a low coal consumption, diminished wear in the retort boiler, and reduced danger of fire during the distillation.

3. The air current, by circulating within the boiler, effects an oxidation which increases the proportion of the bituminous products, and consequently increases to the extent of 25 per cent. the binding qualities of the pitch, which thereby acquires greater commercial value, as, for example, for the briquetting of coaldust or oredust.

As the result of those three advantages a Cava distillery with a capacity of 6,000 tons of tar per annum costs only £2,400, while an ordinary distillery would cost from £6,000 to £8,000.

The Bonne-Fortune distillery shown in the diagrams and illustrations given herewith only occupies a building 6 metres wide, 6.50 metres in length, and 7 metres in height. Such a distillery would form a simple and profitable adjunct to every coke-oven plant.

**Special Application of the Process to Metallurgy.**—The Cava retort boiler lends itself readily to the preparation of pitch for steelworks uses. For this purpose, the apparatus is worked for a bigger output and a lower temperature, so as to remove only the ammoniacal liquors and the lightest by-products, while the problem of briquetting blastfurnace ores presents itself in a new light by the adoption of the process.

This briquetting can certainly be carried out with ordinary pitch, but the latter cannot be used, as it is too expensive, and also because too large quantities have to be employed. Dr. Weiskopf, in a report to the Bergmannstag of Vienna in September 1912 showed that at Walsun (Westphalia) and at Frankfurt-on-Maine good results had been obtained with cellulose pitch (Zellpech), but that this pitch was too costly and too scarce on the market. Now, Cava pitch, which possesses 25 per cent. higher binding properties than any other pitch, and can be obtained at but little cost from coke works, appears specially suitable for the agglomeration of fine ores. It also possesses the property of forming a homogeneous mixture with one-third its weight of lime sludge, while this mixture has the same binding properties as Cava pitch, is even less expensive, and introduces into the blastfurnaces a valuable fluxing agent.

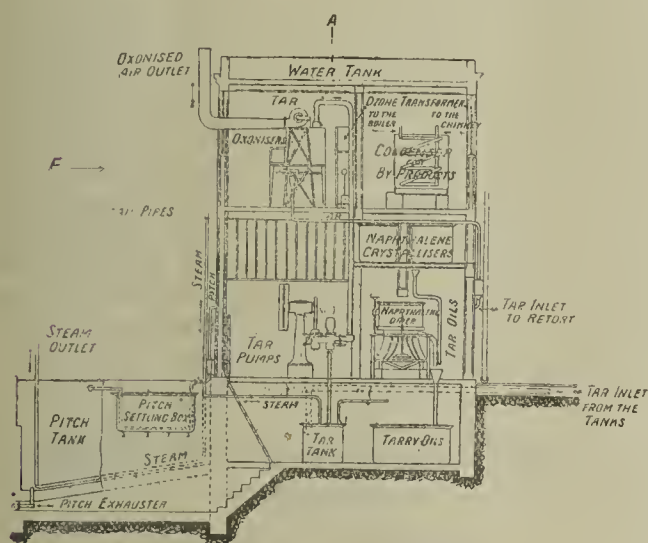


FIG. 1.

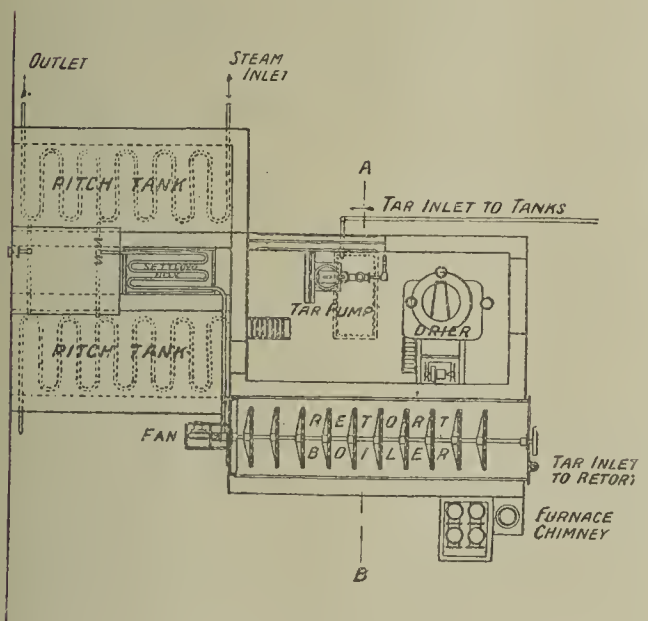


FIG. 2.

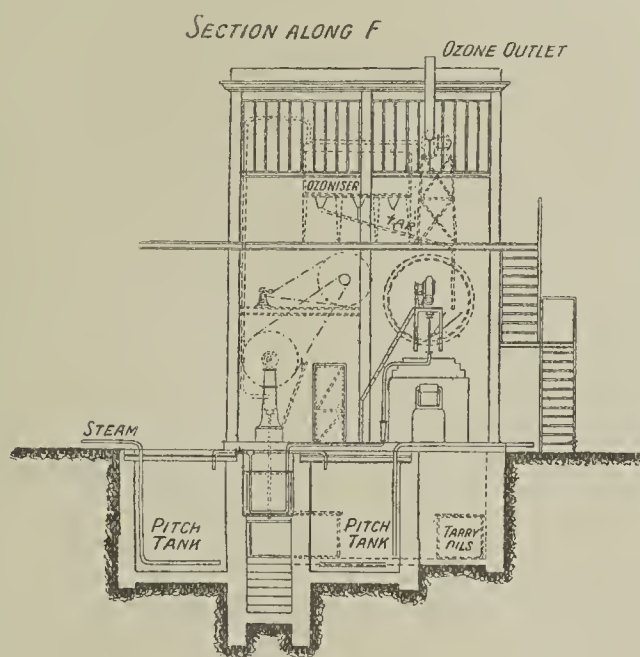


FIG. 3.

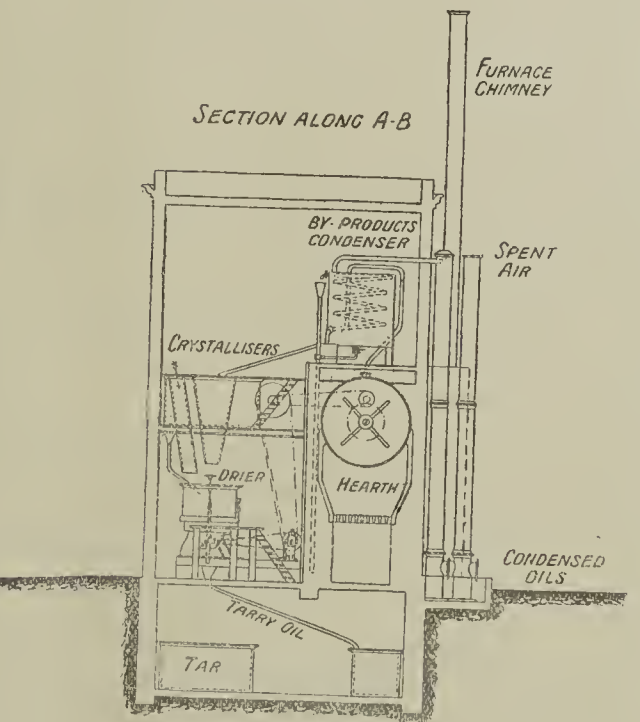


FIG. 4.

dealing with 6,000 tons of tar is estimated by the engineer, Mr. Schneider,† of Cologne, as costing £6,000 to instal, a figure which Mattar‡ and Lünge and Kohler§ regard as an under-estimate.

In these circumstances it is not surprising that coke manufacturers at the present day seldom concern themselves with the distillation of their own tars. Now, however, since January 1 of the present year the Cava process, in operation at the Espérance Bonne-Fortune Collieries, at Montegnée, Liège, supplies a simplified means of dealing with the tar question.

At the Bonne-Fortune works, which are capable of dealing with 24 tons daily, or 8,000 tons per annum, the tar enters at one end of a horizontal boiler retort 6 m. in length and 1.50 m. in diameter, which is half filled. Within this boiler the tar slowly travels, becoming gradually heated during its journey forward, while

placed on top of the boiler. The temperature in every part of the boiler and throughout the mass remains therefore constant, and the wear of the boiler is insignificant, whereas the ordinary retorts wear rapidly owing to the high and fluctuating temperatures to which they are subjected.

The efficiency of the boiler is three times as high as that of an ordinary retort of the same capacity, as it need never be emptied nor refilled nor re-heated after having cooled down. Considerably less labour is also required owing to these causes.

2. In the Cava boiler distillation is, as a matter of fact, superseded by evaporation—that is to say, the air current sweeps over the large moving surfaces covered with tar, and carries off from them the lighter products. This evaporation takes place at a much lower temperature than the distillation, and, further, the vapours are carried away mechanically by the air-current, whereas in the ordinary process of distillation the

**Hospital Accommodation in the South Yorkshire Coalfield.**—The urgent demand which exists for more hospital accommodation in the new and rapidly developing coalfield of South Yorkshire was emphasised on Sunday last, when the second annual hospital demonstration took place at Maltby, near Doncaster. It was presided over by the Earl of Scarborough, whose Yorkshire residence is at Sandbeck Park, near at hand, and who in the course of a somewhat lengthy and earnest address generously offered to build and equip a hospital for the Maltby district, so as to relieve the pressure upon the hospitals of Doncaster and Rotherham, to which Maltby patients have now to be taken. His lordship said that a few years ago, before the new coalfields began to be opened up, there were two hospitals available, one in Doncaster and one in Rotherham, which served the needs of those towns and the agricultural district. But things had greatly changed. It was now calculated when all the new pits were in full work they would have an increase of 150,000 people in the district. What had been done to meet this extraordinary development? A cottage hospital was established some years ago for the two older collieries of Denaby and Cadeby, and it was doing very good work. More recently still a cottage hospital had been erected at South Elmsall for the Frickley colliery. But absolutely nothing had been done for all the remaining new collieries. Whilst to-day they had great difficulty in meeting the demands made upon them, a year hence it would be impossible for them to do so. The Insurance Act was not making matters any easier for hospitals. To his mind the right course was for each centre to try and provide for itself.—Mr. G. W. Roberts gave some statistics concerning the Rotherham hospital, and expressed the opinion that even if a hospital was erected at Maltby there would still be necessity to use the Doncaster and Rotherham institutions for the treatment of the more serious cases.—Mr. F. Hall, M.P., asked the meeting to seriously consider Lord Scarborough's offer. He knew there was a feeling springing up at some of the large collieries, which were situated a long way from the towns, in favour of cottage hospitals. But if these were provided, the need for a parent institution like those of Doncaster and Rotherham would still exist. Maltby could maintain a hospital if it tried, and he had no fear but that the men he represented would do their part. If the Insurance Act stopped subscriptions from flowing into the hospitals the only thing to do was to nationalise them, which he predicted would come some day.—A very hearty vote of thanks was accorded Lord Scarborough for presiding. His lordship's offer has been received with great pleasure, and a committee has been appointed to consider it. Twelve beds are suggested. To keep such an institution going it is computed £700 per annum would be required. The employees at the colliery are quite willing to contribute their 1d. per week.

\* A paper read before the Iron and Steel Institute at Brussels.

† Journal für Gasbeleuchtung, 1909, p. 917.

‡ Ibid., p. 1048.

§ Lünge and Kohler, Die Industrie des Steinkohlenteers, 1912, p. 498.



**SOUTH WALES INSTITUTE OF ENGINEERS.****General Meeting at Ghent.**

A general meeting of the South Wales Institute of Engineers was held at Ghent on Monday, September 1. Mr. W. STEWART, senior vice-president, occupying the chair in the absence of Dr. W. N. Atkinson, H.M.I.M., the president. A number of members of the Association des Ingénieurs sortis des Ecoles Spéciales de Gand were in attendance at the meeting, which took place at the Salle des Fêtes in the Exhibition Grounds.

The following were elected members of the institute:—Prof. F. Bacon, University College, Cardiff; Mr. R. J. Bennett, Ogmore Vale; Mr. John Davies, Cardiff; Mr. J. W. Evans, Llanwrda, Carmarthenshire; Mr. T. W. Gray, Porth, Glam.; and Mr. Sydney Noel, Cardiff.

At the outset of the proceedings, the CHAIRMAN spoke in acknowledgment of the services rendered to the institute visitors by M. Demeulemeester, secretary of the local association, in assisting in the arrangements for their tour in Belgium.

**Underground Conveying.**

Discussion was opened on Mr. MAJOR's paper, describing the various types of machines conveying coal underground.

The CHAIRMAN said the paper was one of those valuable practical contributions to their literature which justified the existence of the institute and helped so much the scientific development of the South Wales coalfield.

Called upon by the Chairman to reply to the discussion of his paper at a previous meeting,

Mr. SAM MAJOR said Mr. Stewart and other members had referred to the difficulty in many South Wales seams of packing the gob. This was a real difficulty, and one in which clean seams that were flat or at low inclination were at a disadvantage relatively to steep seams. Mr. Yanagati's was a useful contribution to the discussion. There were few men who had a wider acquaintance with machine-mining practice than that gentleman, who had been in Europe for nearly 18 months on behalf of his principals, devoting his whole time to the investigation of mining methods. That gentleman's suggestion that conveyors might be designed to go round corners was a very interesting one; and no doubt if the problem of working conveyors on crooked or stepped faces were satisfactorily solved, such a machine would find a large field of usefulness. Mr. Walton's successful experience of face conveying entitled him to speak with authority. The conditions he described were certainly favourable to the continuously discharging conveyor, and after two years' successful working it would be difficult for any other type to supplant it. Mr. Walton appeared to overstate the advantage of the full length conveyor as a reservoir of coal. No doubt the capacity of the conveyor allowed the fillers to continue their work during brief stoppages of the conveyor, but this did not prevent the fillers from being affected by such irregularities as were illustrated by the diagrams in the paper. Mr. Walton's remarks upon the roof were interesting, because in the light of his experience he considered that there were not many roofs over longwall faces where conveyors might not be safely employed. This opinion appeared to have special value to South Wales, because Mr. Walton had successfully dealt with the problem of a seam with a very strong roof and a soft floor. Mr. George Hann had referred to the necessity for double roads as one of the chief difficulties in South Wales. This was undoubtedly the case under existing conditions. In this connection, it was interesting to note that a new system of laying out the workings had been introduced and applied for the principal purpose of avoiding such high costs of road maintenance as were frequent in South Wales. The results to date of this new method were entirely satisfactory, and there was good prospect of the system referred to affording much relief in relation to road maintenance under South Wales conditions. He did not feel at liberty at this stage to say more on this subject, inasmuch as the gentleman to whom he alluded was engaged upon a paper embodying his method and a record of the observed results. Mr. Westgarth Brown's very clear exposition of the peculiar character of the roof difficulties in South Wales was very helpful, and it showed how the problem was complicated by the necessity in many seams of tightly packing the roof. Mr. Roblings' remarks raised a number of interesting matters, and were encouraging as a South Wales record of successful conveying and control of the particular roof concern. A point to be noted was the influence of the increased output due to

was got by these machines—a result that would be a distinct national loss. The coal to which he specially referred was the thin seams in the Forest of Dean. Here nearly all large coal was made, but it came down in large slabs; and the problem was how to get these from a seam only 15 in. thick. Some thought there would have to be devised some kind of conveyor consisting of a flat plate, the coal to be shoved on to this by means of bars, and hauled by endless ropes. The coal from the seam which was only 15 in. in height must be got out in large slabs.

Mr. T. EVENS recalled experience of coal-cutters as far back as 1863 or 1864, when the late Mr. James Barrow had some at work at Maesteg.

Mr. J. FOX TALLIS enquired if any member had experience of putting coal on a long conveyor for taking down a distance of from 60 to 100 yards, and if so, what arrangements he made with the colliers for cutting and filling the coal. The great difficulty in South Wales was to get a number of men to work together and share the money amongst themselves. He believed there was a great future for the coal-cutter in South Wales if the workmen would only fall into line and help the officials. The discussion was adjourned.

**Machine Mining in the South Wales Coalfield.**

Consideration was next given to the paper on this subject by Messrs. G. D. BRIDGE and W. E. JAYNE.

Mr. MORGAN REES said the joint authors concluded their paper with the remark: "Obviously what is required is a special cutting tool for South Wales coals." In his opinion, what was required in South Wales was operators of experience. The absence of such operators meant that the cost of maintenance of these machines, due to their being badly treated, was ruinous. He believed that in Scotland, on the other hand, the cost of repairs and renewals was reasonable because the services of competent men were available. Another disadvantage from which South Wales suffered in this respect was the fact that it was so far distant from the makers of the machines, with the result that great delay was caused in getting spare parts, and their cost was increased. So long as the cost of spare parts remained at the present high level, coal-cutters in South Wales would make little progress. In his own experience, the cost of spare parts alone, without depreciation of machinery, worked out at more than 4d. per ton of coal output. He was referring to electrical coal-cutters. At the time they were introduced there was no compressed-air coal-cutter made small enough for the seam that had to be worked.

The CHAIRMAN said he had been using a couple of the Major machines for some years, and his experience in the matter of maintenance was not that of Mr. Morgan Rees.

Mr. T. H. DEAKIN agreed with Mr. Rees as to the high cost of repairs. It was of no use putting a machine to do all kinds of work. Certain sets of conditions suited one type of machine and did not suit another.

The discussion was adjourned.

**Sinking and Equipping of Bedwas Colliery.**

The paper of Mr. E. L. HANN on this subject next came under review.

Mr. J. FOX TALLIS said the paper brought sinking operations right up to date, and must prove of great value to engineers developing colliery property either in the South Wales coalfield or any other colliery district. One feature of the paper was the record kept of the cost of coal used during the whole of the sinking operations; and the comparison on this head between Bedwas and Penallta demonstrated the economy effected in laying out plant before starting to sink. The adoption of the mixed-pressure turbine must have saved a considerable quantity of coal in driving all the small plant during the operations. With regard to guides on the sinking pits, the information furnished in the paper was most useful, and if it could be supplemented by other members they might succeed in bringing influence to bear upon H.M. inspectors which would result in more leniency being shown when applications for exemptions under the recent Mines Act were made. He noticed that Mr. Hann had installed induced draught for the boilers. He should like to know why this was done in preference to a chimney. Another very good feature was the fan engine being arranged to be driven by steam or electricity. The author did not say anything as to the arrangements for reversing the air-current, in order to comply with the Mines Act; and information on this head would be appreciated. He was disappointed that Mr. Hann had come to the conclusion that ferro-concrete was not suitable for use in underground work. He (the speaker) had thought it would be the means of providing cheap and effective arches for protecting some of their bad places, but he appreciated the author's point that

where it was subject to a heavy squeeze the cost of repair was so high that it was not deemed advisable to introduce it at Bedwas. Nevertheless, more evidence was needed on the point.

Mr. W. D. WIGHT desired to pay his tribute to the excellence of the paper of Mr. E. L. Hann. He said he was specially impressed with the plans, and they were greatly indebted to the author for giving members of the institute the full benefit of them. A point that must have struck most of them on reading the paper was that the owners of this colliery and their advisers, who had had exceptional opportunities of judging the best method of using power in collieries, should have stuck to steam as the main motive power, and depended upon the mixed pressure turbine for the auxiliary power, and for obtaining the economy which was always desirable in such cases. Other persons had been contending that they should establish a power station, and do the whole of the work by electricity. Coming from the quarter from which the paper emanated, it was a notable circumstance that the putting up of a power station to provide all the needed power at a colliery was not here deemed the most economical method. The fact that the same surface arrangements had been adopted at Bedwas as were installed at Penallta showed that they had proved satisfactory. Certainly the various engines had been concentrated as much as possible with a view to not only saving cost in steam pipes but also preventing loss in carrying the exhaust steam to the Rateau accumulator and then using it in the mixed-pressure turbine. With regard to the cracking of the arches in the North Pit, was not this possibly due to the putting in of what might be considered a somewhat elastic packing? He believed the arches ought to be filled with solid masonry. However, time would tell; and as the South Pit arches had only recently been built, the members would be glad to hear about them later on from Mr. Hann. The point was important.

The discussion was adjourned, and Mr. D. E. ROBERTS' paper on "Mechanical Puddling Developments" was held over for lack of time, members being due at a reception by the Burgomaster of Ghent.

**INDUSTRIAL AGREEMENTS IN THE COAL TRADE.**

(Continued from page 490).

**The Federated Area.**

On January 21, 1913, evidence was given by Mr. F. J. Jones, the president of the Mining Association of Great Britain, and chairman of the Conciliation Board for the Coal Trade of the Federated Districts of England and North Wales, he being accompanied by Mr. Parker Rhodes, the secretary of the South Yorkshire Coal-owners' Association. The federated districts referred to embrace the whole of the English coalfields with the exception of Northumberland, Durham, Cumberland, Forest of Dean, and the Bristol and Radstock districts, the production of the area in 1911 amounting to 118,500,000 tons, and the number of persons employed in the same year being 463,619.

At the outset, Mr. Jones summarised the history of the wages question in the above area. Prior to 1894, he said, there was no Conciliation Board, wages being fixed between the coalowners and the men in the different districts independently of each other. Before 1893 some meetings took place between representatives of the owners and of the Miners' Federation of Great Britain for the discussion of wages questions, but there was no organised representation on the part of the coalowners covering the area, nor any recognised method of settling disputes. Mr. Jones next referred to the demand for a reduction in wages made by the owners in 1893, and the strike that followed. The men returned to work on the old terms, subject to the formation of a Conciliation Board, and that Board was still in operation. When the Board was instituted, both parties were unwilling to give the outside chairman the powers of an arbitrator to fix the rate of wages, but it was felt that unless there was some determining authority to settle questions upon which they differed the Board would be reduced to the level of a debating society, and it was ultimately decided that if the chairman's power was limited to giving a casting vote, that would avoid what neither party was prepared to admit—compulsory arbitration. It was further thought that this method would tend to secure conciliation, as it would make the parties more careful in the proposals which they made. The first Board expired in 1896, when the parties were unable to agree to its continuance, and between 1896 and 1898 there was no board. In September 1898 the Board was re-established on the old lines for a period of two years from January 1, 1899. It was renewed in 1900 for a further period of three

Mr. H. DEAKIN said there would be millions of tons of coal in the South Wales coalfield left behind unless it



years from January 1901, and several renewals had been made since, the latest being until March 31, 1915.

Witness handed in a print of the rules of procedure. The powers of the Board were limited to regulating the general rate of wages between a maximum and a minimum, and it had no power to deal with any other question. They commenced in 1898 with a minimum of 30 per cent. and a maximum of 45 per cent. above the 1888 standard, which had since been increased to 50 and 65 per cent. respectively. As to powers of the independent chairman, witness said Lord James suggested that, instead of limiting the power of the outside chairman absolutely to giving him a casting vote only on the proposals submitted to him, he should be entitled to refer the matter back for the consideration of the parties, either with or without any recommendation. That suggestion was accepted, and the power had been exercised once by Lord James. Wages had been advanced by the Board since 1898 on 12 occasions, and had been reduced on five occasions. On the renewal of the Board in 1903, an alteration was made in the rules to the effect that advances or reductions should never exceed 5 per cent. at any one time.

Witness said that upon all occasions when a decision of the Board had been given it had been carried out by both sides. On one occasion, in September 1909, Mr. Enoch Edwards, the vice-chairman, urged that, although both sides practically admitted that the owners were entitled to a reduction, if a reduction were made the existing unrest amongst the men would be accentuated. The owners agreed to adopt this course, on the condition that no application for an advance should be made until the selling price exceeded 7s. 10-21d. by such amount as should have recouped the owners for the disadvantage they should have incurred by the payment of the existing rate of wages during the period the selling price was less than 7s. 10-21d.; further, that no notice should be given to terminate the Board until the selling price had recovered to, and continued at, an amount which the Board, or, in the case of the difference, the outside chairman, should decide to be sufficient to recoup the owners as mentioned. The selling price never reached 7s. 10-21d. until the beginning of 1912. A general strike then occurred, and at its conclusion prices advanced, but the wages continued up to 50 per cent. above the 1888 rate. In June of that year the men's representatives applied for an advance of 5 per cent. on the ground that the owners had then been sufficiently recouped. The parties were unable to agree, and Lord Coleridge, who had succeeded Lord James as outside chairman, was called in; he suggested further consideration, and on October 31 an agreement was come to by the Board, continuing it until March 1915, fixing a maximum of 65 per cent. and a minimum of 50 per cent., and giving a 5 per cent. advance in wages. On January 6, 1913, a further advance of 5 per cent. was conceded, bringing wages up to the maximum.

Mr. Jones said that, in his opinion, the Board had been of very great advantage to the trade—it had prevented many stoppages of work, and he should regret its discontinuance. There were, of course, other matters of difference, but these were dealt with in the different districts, in different ways. Thus, in South Yorkshire, since June 1890, machinery had been in operation, consisting of a standing joint committee. No written rules of procedure were in operation, and their absence had not so far impaired the usefulness of the committee. When a dispute arose at a colliery, it was understood that the workmen concerned and the the management must first use every endeavour to come to an agreement, failing which the matter was referred to the committee. If the latter failed to agree, the dispute was referred to two representatives each of the workmen and owners, each side choosing its own representatives. If no settlement followed, an umpire was chosen by agreement, his decision being final. By this means a considerable number of disputes had been satisfactorily adjusted. There were definite methods of dealing with disputes in Lancashire, West Yorkshire, Derbyshire and Nottinghamshire, pretty much on the same lines, except that they did not carry the matter as far as an umpire. In the other districts no specific machinery existed. Negotiations took place, when a difference arose, between the representatives of the workmen and the employers, and they settled fairly amicably on the whole. No difficulty was made, so far as he was aware, throughout the Federated area as to meeting the representatives of the workmen, and they had long recognised the principle of collective bargaining. When important differences arose, in witness's experience, the workmen affected, failing an agreement, terminated their employment by the proper notice, but there were many questions of a minor character where, unfortunately,

the men stopped work without notice, or without the authority of their representatives.

Mr. Jones believed that many of these difficulties might be settled if time were given for reasonable consideration of them between the representatives of the men and the management. It appeared to result from an absence of discipline, which, if collective bargaining was to be maintained, ought certainly to exist, and it would strengthen the hands of both employers and workmen who were desirous of fairly meeting and settling any legitimate grievances if no stoppage of work were permissible until there had been an opportunity for the cause of the trouble to be investigated. With reference to larger disputes and those of an organised character, the period of notice under contract of service was not sufficient for a full investigation of the differences, and he would approve, therefore, of the suggestion, if a practical scheme could be devised, that there should be no stoppage of work for a period during which time there should be a conference of both sides to consider the matter in dispute. In case the parties should fail to agree, he was inclined to think it would be desirable that they should again meet in the presence of an agreed independent chairman, who should make a pronouncement upon the dispute. If, however, after such a discussion and pronouncement, the parties were still unable to agree, he confessed that he saw no other course except to fight. If the parties agreed that the questions in dispute should be submitted to an outside authority, his decision should be binding upon both parties; he was unable to see in what way, however, if either side objected to carry it out, they could be compelled to do so, except by withholding assistance, pecuniary or otherwise. If the decision was part of a conciliation scheme there should be some provision that the decision should not extend beyond some limited period so as to give the dissatisfied party the opportunity of having it revised at no very distant date. Conditions might alter, affecting either one side or the other, that might make the arrangement very burdensome. He suggested that the period should not be shorter than three years nor longer than five years. He suggested three years in order to promote stability in the trade.

Witness thought there would be considerable difficulty in making the association or trade union liable in damages if their members did not carry out an agreement. He would only go so far as to withhold support, and would make it illegal for strike pay to be paid under certain circumstances. Equally he would withhold support from the coalowner. Witness added that he did not know of a single case where an employer had broken away from an agreement. If an individual employer in their district persisted in refusing to carry out an agreement they could, under the constitution deed of their local association, refuse to continue payment of the money to which he would otherwise be entitled; also, he believed, they could forfeit his interest in the common fund.

The general effect of the establishment of the Conciliation Board, Mr. Jones thought, had been to decrease the number of strikes. Most of the men in South Yorkshire were in the union, but he did not know what punishment could be meted out to non-union men; he did not agree with the proposition that disputes had generally been created by the non-union element. The owners' association exercised no control to see that the men were in a union, but he believed that good organisation on both sides was conducive to peace. It was an advantage that wages fluctuations should not be too large.

Witness acquiesced in the view that voluntary agreements should be treated exactly as a legal contract, but he doubted whether it could be carried out with large bodies of men, except by withholding support, as suggested. He was against any legal compulsion. Referring to the strike in 1912, witness thought there would be a difference of opinion as to whether it was a breach of agreement or not. He was questioned at length by Sir Hugh Bell as to result of the reduction waived by the owners in 1909, and asserted that, notwithstanding the intervention of the strike, the owners had since recovered what they lost on that occasion. Referring next to the last award made by the Board, Mr. Jones said they had no power to alter the awards of the chairmen under the Minimum Wage Act, but they were wishful to give the men who, under that Act, were receiving the minimum wage, something in respect of the advance which they were giving to the other men, and accordingly made a recommendation to that effect. Witness added that when he advocated a period of between three and five years, he referred to the Conciliation Board; with regard to local arrangements, he agreed with the proposition that they should not be revised under a period of three months, or even longer. As a rule, where a settlement was reached on such questions, it lasted for a year or two, or perhaps longer. He also thought there should be no readjustments of wages at shorter intervals than three months.

(To be continued).

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### THE ILLUMINATING POWER OF SAFETY LAMPS.

SIR,—We feel we cannot let the criticism on our recent letter, written by your correspondent, Mr. W. Maurice, pass without comment. In his last sentence he claims the right to manufacture and sell the "Cremer" lamp, the patent rights of which stand in the sole name of our director, R. Cremer, Esq., who has leased these rights to us.

The title to these rights can be proved by examination of the Patent Office records, and, as we have already warned Mr. Maurice privately against making this claim, we should be glad if you would allow us the opportunity of doing so again through your paper.

R. LAMBERT WOOSNAM, Manager,  
The Cremer Lamp and Engineering  
Company Limited.  
32, York-place,  
Leeds, September 2, 1913.

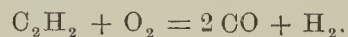
### LOW-TEMPERATURE CARBONISATION.

SIR,—In your issue of the 5th inst. under the above heading, there are several inaccurate statements.

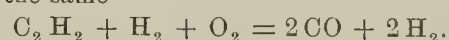
Mr. A. Rollason refers to shales and cannel as being rare and dear. The fact, however, is that cannel coal is now, in many parts, quite unsaleable, and thousands of tons of it are left in the goaves every year in this country. The monograph on "The Coal Resources of the World," presented last month at the Twelfth International Geological Congress, in Toronto, puts the world's reserve of brown coals at 3,000,000 millions of tons. It is evident, therefore, if one can get a better yield of petrol from brown coal or cannel, there is plenty of raw material.

"It is well known that on combustion of hydrocarbon gases with oxygen, the oxygen has a greater affinity for hydrogen than carbon, and in all cases the hydrogen burns before the carbon."

This statement is quite incorrect, although it must be noted that it was generally believed about 25 years ago. It has long been proved to be quite wrong. If equal molecules of ethylene and oxygen are exploded, the result is not water and carbon, but carbon monoxide and hydrogen—



Even if the ethylene is mixed with free hydrogen, the result is the same—



Other hydrocarbons act in the same way, and this is one reason why there is always carbon monoxide in the mine air after an explosion.

In the combustion of hydrocarbons there is no selective combustion of carbon or of hydrogen, but in many cases there appears to be, and, judging merely by the final products, there is; but it is always the carbon and not the hydrogen which "grubs" the oxygen first.

A very good account of the combustion of hydrocarbons is to be found in section v. of Prof. Bone's pamphlet, "Report on Gaseous Combustion," presented to the British Association in Sheffield, 1910.

In the low-temperature carbonisation of coals rich in oxygen, the first portions of the gases given off contain large quantities of carbon dioxide and carbon monoxide.

Chemical Laboratory,  
The University of Liverpool,  
September 7, 1913.  
JOHN HARGER.

### EMERGENCY RESCUE APPARATUS.

SIR,—With reference to Mr. H. Milner's letter in your issue of the 5th inst., I would say that my communication of July 28 last did not refer to the "Salvator" apparatus, but to a smaller apparatus which we make, and which weighs, complete, including oxygen cylinder, &c., only 10 lb.

R. H. DAVIS, Director,  
Neptune Works, Lambeth,  
September 10, 1913.  
Siebe, Gorman and  
Co. Limited.

### TO CORRESPONDENTS.

Fuses and Authorised Shot-firers.

ENQUIRER—Our answer, we think, meets your point. Section 1 (e) of the Explosives in Coal Mines Order, May 21, 1912, requires that in all mines the persons authorised to be in the possession of detonators shall be persons specially authorised in writing by the manager. Section 5, which contains the requirement that persons shall be not qualified to act as shotfirers whose wages depend on the amount of mineral to be gotten, refers only to mines in which permitted explosives are required to be used, and not to naked light mines.—Ed. C.G.



## THE COAL AND IRON TRADES.

THURSDAY, SEPTEMBER 11.

## Scotland.—Western District.

## COAL.

There has been a strong demand during the week, and the brisk conditions experienced in the west of Scotland for some time were well maintained. The best quality of ells continues in large demand, and the cheaper qualities are also in good request. Heavy bookings of the shipping qualities of splint coal are reported, and the ordinary sorts are moving off in considerable quantities, both on home and export account. Navigation coals are well taken up, and there is no sign of slackening in demand. Treble nuts command most attention in smalls, although doubles are considerably firmer since last report, while singles also show a little improvement. Owing to colder weather conditions the demand for household coal was more active, and prices firmer. Shipments during the week amounted to 111,227 tons, compared with 102,937 in the preceding week and 100,691 in the corresponding week of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	11/9 to 13/	12/6 to 14/
Ell .....	12/6 to 13/	12/6 to 13/
Splint .....	12/9 to 15/6	12/6 to 15/6
Treble nuts .....	13/3 to 13/9	13/ to 13/6
Double do. ....	12/6 to 12/9	12/6 to 12/9
Single do. ....	11/ to 11/3	11/ to 11/3

## IRON.

The general condition of the iron trade is practically unchanged since last report. There has been very little improvement in position, and business has been decidedly poor. Time and again evidences of improved conditions have been abroad, only to be dispelled by some unforeseen occurrence, either at home or abroad, interfering with the upward progress. It is true that some branches of the trade are comparatively busy, but, on the other hand, others are practically idle. The recent reduction in prices is now beginning to have some effect, particularly in the black sheet and galvanised sheet branches of the trade. Black sheet makers are busy, business having shown a satisfactory expansion, and orders have come to hand in large enough volume to keep the mills producing heavy gauges, and also the plant making thin gauges fully employed. In the malleable iron trade, however, the reduction in prices has had little or no effect. Some of the works remain closed, with little immediate prospect of a restart. Bar mills are quiet, and the low prices of Belgian bars are cutting out home makers very largely in various foreign markets. The Glasgow pig iron warrant market appears to be returning to a state of inactivity. Even with the continuance of support from London, and the revival in business experienced a week ago, prices have been dropping on an average about 2d. per day, while the turnover is decreasing likewise day by day. Makers took advantage of the sharp rise in prices to sell freely, but generally speaking business with consumers has shown no improvement for some considerable period. Cleveland iron sold at 55s. 9d. per ton cash, 56s. 3d. one month, and 56s. 9d. three months. Transactions also took place at 55s. 10d. per ton 18 days. Prices of Scotch makers' iron, with the exception of one or two brands, are unchanged. Monkland is quoted f.a.s. at Glasgow, No. 1, 68s., No. 3, 66s. 6d.; Govan, No. 1, 66s., No. 3, 64s. 6d.; Clyde, No. 1, 74s., No. 3, 69s.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 74s. 6d., Nos. 3, 69s. 6d.; Glengarnock, at Ardrossan, No. 1, 74s. 6d., No. 3, 69s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 69s., No. 3, 68s.; Dalmellington, at Ayr, No. 1, 70s., No. 3, 68s.; Shotts, at Leith, No. 1, 74s. 6d., No. 3, 69s. 6d.; Carron, at Grangemouth, No. 1, 75s., No. 3, 70s. per ton. Scotch hematite is quoted 72s. for delivery at west of Scotland steelworks. The imports of pig iron into Grangemouth from Middlesbrough and district during the week amounted to 8,872 tons. There are 88 furnaces in blast in Scotland—35 making ordinary, 48 hematite, and five basic iron.

## Scotland.—Eastern District.

## COAL.

The coal trade of the Lothians is now in a fairly satisfactory condition, a manifest improvement being noticeable in the last two weeks. Collieries are extremely busy, and are well supplied with orders, the demand for steam coal being heavy, while smalls are in much greater request. There is now no lack of labour at the pits—miners who left the district during the strike are returning in fair numbers. Prices are practically unchanged.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/ to 13/3	13/ to 13/3
Secondary qualities .....	12/ to 12/3	12/ to 12/3
Treble nuts .....	13/6 to 14/	13/ to 13/6
Double do. ....	12/6 to 12/9	12/6 to 12/9
Single do. ....	11/ to 11/6	11/3 to 11/6

Business in the Fife coal trade is very active, and collieries are finding it difficult to supply the heavy demand. Treble and double nuts are being well cleared at recent firm prices. There have been large shipments of the various classes of round coal, mostly under contract. Shipments, although not up to last week, are practically normal, and amount to 113,344 tons, compared with 124,965 in the preceding week and 115,451 in the corresponding week of last year.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/6 to 17/	16/6 to 17/
Unscreened do. ....	14/6 to 15/	14/6 to 15/
Fine steam coal .....	14/3 to 14/6	14/3 to 14/6
Do. ....	11/9 to 12/	11/9 to 12/
Do. ....	14/3 to 14/6	14/3 to 14/6
Do. ....	12/6 to 13/	12/6 to 13/
Do. ....	11/ to 11/6	11/ to 11/6

The total shipments from Scottish ports during the week reach the total of 333,710 tons, compared with 358,740 in the previous week and 346,471 tons in the corresponding week of last year. For the year to date the aggregate shipments are 11,145,866 tons, an increase of 878,179 tons compared with the same period last year.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 116,673 tons of coal and 3,350 tons of coke were despatched from Tyne Dock, a decrease of 10,182 tons of coal and an increase of 1,517 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 58,067 tons of coal and 3,046 tons of coke, a decrease of 14,825 tons of coal and an increase of 443 tons of coke. The Blyth shipments aggregated 96,300 tons of coal and coke, a decrease of 10,530 tons. Further details with reference to the Russian State Railways' requirements of steam coals for delivery to Black Sea ports up to the end of the year indicate that orders for about 450,000 tons of British coals have been placed with Russian merchants. The great bulk of this coal is still to be purchased in the markets of this country, and it is believed that the bulk of the requirements will be taken from Yorkshire and this district. Up till now, about 100,000 tons of Northumbrian and 100,000 tons of Yorkshire coals appear to have been arranged for. This business is, of course, in addition to the 130,000 tons of British coals which Russian merchants have contracted to supply to the Vladikavkaz Railways for shipment to Novorossisk. The Russian State Railways contract for 250,000 tons of steams for delivery to Reval, Riga and Libau over the last three months of the year is still pending, so that, altogether, there is a quantity of close upon 1,000,000 tons of British steams to be arranged for and shipped to Russia over the rest of this year, an undertaking which should spell continued prosperity to the steam coal trade, and, also, to the outward freight market, for the Black Sea business alone will absorb fully 100 steamers. Quantities of Tyne gas primes—stated to aggregate 20,000 tons—are said to have been sold by producers over next year at 13s. per ton, f.o.b., a price regarded as very satisfactory. A large quantity of coking primes for similar delivery has been sold at 17s. per ton, c.i.f. Hamburg, or about 13s. f.o.b. About 25,000 tons of ordinary unscreened Durham bunkers for 1914 delivery have realised 11s. 9d. per ton, f.o.b. Some 60,000 tons of Durham gas bests for shipment to Genoa in monthly quantities over next year have been sold at 20s. 3d. per ton, c.i.f. The Danish State Railways are enquiring for 80,000 tons of steam coals for delivery over 12 months for the marine and mechanical departments. Tenders are due in on September 16. For best Blyth steams delivered over next year, 12s. 9d. per ton, f.o.b., is being offered. The collieries, however, are holding out for 13s. Steam coal contracts at present in negotiation include:—80,000 tons for the Norwegian State Railways, and 50,000 tons for the Egyptian State Railways. There is a very general increase in selling values of fuel for prompt shipment, consequent on the healthy outlook of the market. F.o.b. quotations have varied as follows on the week:—Best steams, Blyths, are from 4½d. to 6d. dearer; Tyne seconds, 3d. higher; unscreened, stronger; smalls, Blyths, 3d. increased; specials, 6d. advanced; gas bests, firmer; seconds, 3d. more; specials, similarly improved; unscreened bunkers, Durhams, 3d. to 6d. dearer; coking coal, weaker; and gas coke, 3d. to 6d. up. Other descriptions of fuel are unaltered. Loading turns are again lengthening out, and are becoming congested. The output of coals is being fully taken up. Coal shippers are faced with a new anxiety in the shape of a threatened strike of Tyne tugboatmen for higher wages and increased overtime rates. The stoppage is due to take place on Saturday next, and its shadow is already responsible for the diversion of tonnage from the river. Some perturbation is expressed by the collieries, for large vessels cannot be moved about the river without the aid of tugs, and the withdrawal of towage facilities would be very awkward indeed.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	15/	14/6 to 14/7½
Do. Tynes (Bowers, &c.) .....	15/ to 15/3	15/ to 15/3
Secondary, Blyths .....	13/	13/
Do. Tynes (Hastings or West Hartleys) .....	13/ to 13/6	13/3
Unscreened .....	11/9 to 12/6	11/6 to 12/6
Small, Blyths .....	8/6 to 8/9	8/6
Do. Tynes .....	7/6	7/6
Do. specials .....	9/6 to 9/9	9/6 to 9/3
Other sorts:—		
Smithies .....	14/	14/
Best gas coals (New Pelton or Holmside) ..	15/	14/9 to 15/
Secondary gas coals (Pelaw Main or similar) ..	13/9 to 14/3	13/6 to 14/
Special gas coals .....	15/3 to 15/6	15/ to 15/3
Unscreened bunkers, Durhams ..	13/ to 14/3	12/9 to 13/9
Do. do. Northumbrians ..	12/ to 13/	12/ to 13/
Coking coals .....	13/6 to 14/	13/9 to 14/
Do. smalls .....	13/6	13/6
House coals .....	15/6	15/6
Coke, foundry .....	18/ to 20/	18/ to 20/
Do. blast-furnace .....	17/6	17/6
Do. gas .....	17/ to 17/9	16/6 to 17/6

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 104,110 tons of coal and 485 tons of coke, as compared with 96,795 tons of coal and no coke for the corresponding period of 1912, being an increase of 7,315 tons of coal and 485 tons of coke. The coal market has an improved tone. The heavy bookings for account of the South Russian Railroad Administration and the fuller supply of tonnage has had a beneficial result. Sellers are not now so anxious to dispose of their holdings and, although coal supplies are ample, the general feeling of holders is one of security, there being a

good forward enquiry for all descriptions of fuel. It is estimated that 500,000 to 600,000 tons of coal will have to be supplied to the Black Sea ports between now and January. In addition to this new business there is an enquiry on the market for 160,000 tons of steam coal for shipment to the Baltic ports for the Northern Russian Railways—shipment before January next—then 50,000 tons of North-country coal is required for the Egyptian State Railways. All this is bound to have a stiffening effect upon the market. The Danish State Railways are also enquiring for 90,000 tons of steam coal—shipment over 12 months. For shipment over next year, the sale of 20,000 tons of best Durham gas is reported at 13s. f.o.b. Coking coals are not quite so strong. Gas coal prices tend upward, bunker coals are in better demand, and prices are firmer; coke is unchanged. Current quotations are about as follows:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/6
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	16/6	16/6
Ordinary do. ....	15/9	16/
Other sorts:—		
Lambton screened .....	15/6	15/6
South Hetton do. ....	15/4½	15/3
Lambton unscreened .....	13/9	13/9
South Hetton do. ....	13/9	13/9
Do. treble nuts ..	16/9	16/9
Coking coals unscreened ..	13/9	14/
Do. smalls .....	13/6	13/9
Smithies .....	15/3	14/6
Peas and nuts .....	17/	17/
Best bunkers .....	14/3	14/3
Ordinary bunkers ..	13/6	13/9
Coke:—		
Foundry coke .....	20/6	19/6
Blast-furnace coke (dlvrd. Teesside furnaces) .....	19/	19/
Gas coke .....	16/6 to 17/	17/

The freight market is fairly firm. Recent fixtures include:—Coasting: London 3s. 9d., Havre 4s. 9d., Rouen 5s. 3d., Dieppe 5s. 6d., Hamburg 4s. 9d. Bay: Bordeaux 6s. 6d., Rochefort 6s. 6d. Baltic: Cronstadt 5s. 9d., Stockholm 5s. 6d., Malmo 5s. 6d., Fairwater 5s. 6d. Mediterranean: Genoa 9s. 6d., Port Said 9s., Marseilles 9s., Alexandria 9s. 6d., Odessa 9s. 6d., Sulina 10s., Las Palmas 9s., Bahia Blanca 22s.

## Middlesbrough-on-Teess.

## COAL.

A rather improving tone is the feature of the fuel market. Enquiries both for early and forward delivery are on a fairly large scale, and a good deal of sound business is passing. Deliveries of gas coal are now rather heavy, and are increasing. Best Durham gas coal is selling at 15s.; seconds are 14s.; and up to 16s. is quoted for specials. Bunker coal is well taken up. Ordinary Durhams run from 13s. to 13s. 3d. f.o.b.; superiors 14s. to 14s. 3d.; and specials 15s. to 15s. 3d. Household coals show an upward movement. Prices at present range from 15s. 6d. to 15s. 9d. Coking coal is in good request at 13s. 6d. to 14s. All descriptions of coke are in good demand. Furnace kinds are in heavy local consumption, and with make a little below what it has been, values are, if anything, rather stronger. The general market quotations for average blastfurnace qualities delivered at Teesside works is 18s. Best foundry coke is in the neighbourhood of 19s. 6d., and gashouse coke is round about 16s. 6d.

## IRON.

The Cleveland iron market continues quiet, with very little business passing. Contrary to expectations, values of iron are steadily falling, and the general situation is not satisfactory. As is usual at this time of the year, the demand for pig iron is heavy, and prices show an upward tendency. It is very difficult to account for the lack of movement. No. 3 g.m.b. Cleveland pig iron is quoted at 55s. 3d. f.o.b., whilst No. 1 is 57s. 9d.; No. 4 foundry, 54s. 9d.; No. 4 forge, 54s. 6d.; and mottled and white iron each 54s. 3d. All the foregoing quotations were for early delivery. East coast hematite and pig values show a further drop. Mixed numbers are put at 67s. 6d. for both early and forward delivery. There is little passing in foreign ore, but market rates remain on the basis of 20s. ex-ship Tees for best rubio. Dealers have reported that the mineowners in Spain continue to take a very fine stand, and as they are well placed are not likely to give way. Freights Bilbao-Middlesbrough stand at 5s. 6d. Coke was somewhat firmer, with a heavy local consumption. Average blastfurnace kinds are 18s. delivered at the works. Stocks of Cleveland pig iron continue to be steadily drawn upon, the withdrawals so far this month amounting to 5,036 tons, the amount of iron in store standing at 179,749 tons—all of which is No. 3 iron, with the exception of 43 tons of other kinds of iron deliverable as standard. Shipments of pig iron are in a fairly good scale, the total clearances amounting to date this month to 35,409 tons. There is little new to report regarding manufactured iron and steel. A drop in prices is anticipated.

## South-West Lancashire.

## COAL.

The household trade is showing its first sign of more animation. Otherwise, there is nothing new to note. Prices remain as previously reported. Fair supplies of screened coal are going into consumption for forge and manufacturing purposes, although these are not equal in extent to the takings of a few months ago. Open sale enquiry for bunkering fuel continues quiet. Contract requirements, however, are about average and absorb the great bulk of the available supplies, which, of course, are materially affected by the continuance of the strike at the Haydock and Golborne collieries. Quotations are fairly steady at about 13s. 6d. f.o.b. for ordinary grades of Lancashire steam coals, and up to 14s. to 14s. 3d. f.o.b. for the best descriptions. The coastwise and cross-Channel trade is interfered with by the trouble in Dublin, but otherwise good deliveries are being made all round. In slacks, the beginning of the end is at hand with regard to holiday stoppages in the manufacturing towns, and consequently requirements are distinctly on the increase. In addition to this, the withdrawal from



the market, through the dispute named above, of a considerable tonnage per week has a steadying effect, and there is a better tone generally noticeable in small fuel.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	16/3	16/3
Do. (f.o.b. Garston, net) .....	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/6 to 14/3	13/6 to 14/3
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

### South Lancashire and Cheshire.

#### COAL.

The Manchester Coal Exchange was well attended on Tuesday. There is not much improvement visible yet in house coal. Furnace coal continues in good demand and there is a satisfactory business being done in shipping coal. Slack is moving away more briskly, now that the annual holidays are coming to an end. In cases there are slight concessions made in price to clear off loaded wagons. Generally, prices all round are unchanged and are as follow:—

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

#### IRON.

Trade remains very quiet in this district and the attendance on 'Change in Manchester was very poor. Good foundry iron has been sold at 60s. delivered Manchester, but although founders are well off for orders, still they are not getting that amount of new enquiry they would like. Forges are working short time. Prices are without alteration—viz., bars: £8 for Crown, £7 10s. second quality, hoops £8 7s. 6d. Steel works are working from hand to mouth. The foreigner has put his price up for billets, but a large quantity has been sold at very low prices. English price remains at £5 5s. for soft. The bar mills are fairly busy. Low prices have been quoted for bars—chiefly from forges who buy foreign billets and roll them down into bars. Textile engineers are fairly busy. The heavy engineers are not getting the amount of enquiry they would like. Wagon works are well employed.

### Yorkshire and Derbyshire.

#### Leeds.

#### COAL.

There was only a moderate attendance of members on the Yorkshire Coal Exchange on Tuesday, but business, on the whole, was satisfactory. Apart from broken time caused by the Doncaster races, the pits have worked fairly well, and will have averaged fully four days this week. Stocks have not been increased, as the demand for house coal has more than maintained the improvement noted last week. The supply of empty wagons has been fairly liberal, although in one or two cases ground stocking had to be resorted to owing to scarcity of wagons. There was again rather more enquiry for works fuel, chiefly for the Lancashire district.

**House Coal.**—As anticipated in our last report, lowest summer prices in London have been withdrawn, and in consequence many collieries producing high-class house coal have issued revised lists. The very best qualities of Haigh Moor and Silkstone have been sold on the London market this week at 15s. per ton at the pit, and some of the pits are quite a fortnight behind with deliveries of these sorts. There has been a general firming up of list quotations. The demand from the south coast and the Thames wharves still runs chiefly on the lower qualities, Stanley Main house, Silkstone house, and similar sorts selling readily. Freight is pretty firm, and there is a scarcity of small sailing craft. In the West Riding markets there is more animation in the retail trade and merchants are fairly well occupied. There is a growing demand for good quality house nuts, and also for washed house nuts. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

**Gas Coal.**—There are numerous complaints of arrears in deliveries ex contracts, and the pits, although working full time, have no difficulty in disposing of the entire output. Very few new contracts remain unsettled, but there is some little buying in the open market, where spot lots can be obtained on favourable terms. Considerable quantities of rough unscreened gas coal are still being sent to the Continent via the Humber ports.

**Manufacturing Fuel.**—Most of the special prices recently quoted have been withdrawn, and matters are assuming a more normal position in this branch of the trade. The Lancashire demand has improved appreciably, and better supplies are also going into the Bradford and heavy woollen districts. The drop in the price of coking slack has also been arrested, and it is considered likely that an upward movement may be made before the end of the month.

**Washed Furnace Coke.**—The tone is a little better, and stocks show some reduction. Buyers are coming forward more readily to place short-term contracts where possible at present prices. An unusually large tonnage is being taken into the Frodingham district, and also for the Leeds iron and steel works. The demand from the Midlands is still unsatisfactory.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected .....	14/6 to 15/	14/6
Wallsend & London best .....	13/6 to 14/	13/6 to 14/
Silkstone best .....	13/9 to 14/6	13/6 to 14/6
Do. house .....	12/6 to 13/	12/3 to 12/9
House nuts .....	11/6 to 12/	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best .....	16/6 to 17/6	16/6 to 17/6
Silkstone best .....	15/6 to 16/6	15/6 to 16/6
Do. house .....	14/9 to 15/6	14/9 to 15/6
Other qualities .....	14/3 to 14/9	14/3 to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 12/	11/ to 12/
Unscreened gas coal .....	10/ to 10/6	10/6 to 11/
Other sorts:—		
Prices at pit:		
Washed nuts .....	11/3 to 11/9	11/3 to 11/9
Large double-screened engine nuts .....	10/3 to 10/9	10/3 to 10/9
Small nuts .....	10/ to 10/6	10/ to 10/6
Rough unscreened engine coal .....	10/ to 10/6	10/ to 10/6
Best rough slacks .....	8/ to 8/6	8/ to 8/6
Small do. ....	7/ to 7/6	7/ to 7/6
Coking smalls .....	7/ to 7/6	7/ to 7/6
Coke:—		
Price at ovens:		
Furnace coke .....	12/6 to 13/	12/6 to 13/

### Barnsley.

#### COAL.

As expected, the output at the collieries has been very greatly reduced during the week, owing to the absence of a large number of miners in consequence of the Doncaster race week. For the same reason the railway traffic has been practically held up, except in some cases where direct access has been obtainable to the Humber. Generally, however, there has not been a great deal of disappointment to buyers who took the precaution to lay in stocks as far as possible during the preceding week. The export trade, so far as steam coal is concerned, is again passing through a period of test. The extra tonnage which is being sought to be placed on behalf of Russia has stiffened the position considerably, from a coalowners' point of view, and they are not disposed to make any concessions to secure the extra trade, in the belief that the surplus coal available is so slight that their ideas of prices will have to be complied with in the current market. Particularly so is this the case with regard to best large steams, which are being so extensively taken for home consumption. Other classes of steam coal continue to again strengthen, although buyers recognise the fact that the production is continually increasing. With the resumption of more fuller working in the textile districts there has been a stronger demand for most classes of small coal, but the stocks on hand at collieries are such that prices have shown no change. The supply of steam nuts, however, is not so large as a few weeks back and the reduced output during the present week will, no doubt, have considerable effect in regard to stocks. Producers of gas coal continue to find full working necessary to keep up with contract deliveries, whilst there continues to be brisk buying on behalf of the Continent and South America. In regard to house coal, colliery owners are beginning to feel the effect of a rush of orders, owing to the scare which has been aroused amongst the public. Although it was generally understood in this district that prices would not increase until the first week of next month, it is possible that the advance will be made earlier in the hope of checking the rush for coal, which obviously can only injure the normal demand during the winter season. Present quotations remain very strong—as quoted last week. Business in regard to coke continues to be peculiar and, in spite of the efforts to reduce the output, stocks are still accumulating and buyers are reluctant to fix up contracts beyond a few months. Consequently, prices lack strength, but the position has not weakened during the week.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	15/	15/
Best Barnsley softs .....	14/3 to 14/6	14/3 to 14/6
Secondary do. ....	11/ to 13/6	11/ to 13/6
Best house nuts .....	13/ to 13/3	13/ to 13/3
Secondary do. ....	11/ to 13/	11/ to 13/
Steam coals:—		
Best hard coals .....	13/3	13/3 to 13/6
Secondary do. ....	12/ to 12/3	12/ to 12/3
Best washed nuts .....	11/6 to 12/	11/6 to 12/
Secondary do. ....	10/9 to 11/	10/9 to 11/
Best slack .....	8/ to 8/9	8/ to 8/9
Rough do. ....	6/6 to 7/6	6/6 to 7/6
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/6 to 12/	11/6 to 12/
Gas nuts .....	12/ to 12/9	12/ to 12/9
Furnace coke .....	12/6 to 13/	12/6 to 13/

### Hull.

#### COAL.

The Humber coal market has been fairly active during the week, steam hards being in good request for export. The easier tendency of a week ago seems to have been checked under the influence of Russian buying, though it is not certain to what extent South Russian purchases are being made in the southern coalfield. On general account, however, there is a good demand, and prices are steadily maintained at last week's values. For small coals and rough slack there is little or no demand. The collieries are overstocked with this class of coal, and prices are only moderately steady at last week's quotations. Unscreened gas coal is lower on the week. There is a fairly large quantity of coal going for shipment, but nothing abnormal; hence loading conditions are good. In the freight market there has been a general rise in rates, largely owing to the shortage of tonnage and the strong demand there is on the Tyne. Baltic rates have advanced to 5s. 6d. to 5s. 9d. Cronstadt, while as much as 6s. is reported to have been paid for a handy sized steamer for Petersburg. Immingham to Pernau has been done to-day at 5s. 4½d. for a prompt steamer, and 9s. 9d. for a large vessel to carry 5,000 tons to Odessa has

been repeated. The trimmors and tippers ceased work at 6 o'clock on Saturday and resumed work at six o'clock on Monday morning. Six or seven vessels were delayed over the week-end. Exporters resent very strongly the action of the men in going back on the agreement entered into only a few weeks ago. The following are the approximate prices for prompt shipment f.o.b. Hull:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	16/ to 16/3	16/ to 16/3
Washed double-screened nuts .....	13/3 to 13/6	13/3 to 13/6
Unwashed double-screened nuts .....	12/9 to 13/	12/9 to 13/
Washed single-screened nuts .....	13/	13/
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls .....	10/3 to 10/6	10/3 to 10/6
Unwashed smalls .....	9/3 to 9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys .....	13/6	13/6
Rough slack .....	10/3 to 10/6	10/3 to 10/6
Pea slack .....	9/	9/
Best Silkstone screened gas coal .....	13/3 to 13/6	13/3 to 13/6
Best Silkstone unscreened gas coal .....	12/ to 12/6	12/6
Derbyshire:—		
Best steam hards (Hull) .....	15/6	15/6
Do. (Grimsby) .....	15/	15/
Derbyshire nuts (doubles) .....	13/	13/
Derbyshire nuts (doubles) (Grimsby) .....	12/9	12/9
Derbyshire large nuts .....	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards .....	15/6	15/6
Do. do. (Grimsby) .....	15/	15/

The returns of the export trade show that during August, taking the Humber as a whole, there was a largely increased shipment to foreign countries. Hull, Grimsby and Goole all exhibit decreases of 11,963 tons, 12,138 tons and 5,553 tons respectively, but the falling off is more than counterbalanced by the big increase in the foreign exports from the new King's Dock at Immingham, leaving the net increase for the Humber ports in August 89,613 tons. The following are the returns of exports, exclusive of bunkers, to foreign ports for August, and for the eight months of the present year, together with the totals in the corresponding period of last year:—

	August.		Eight months, Jan.-Aug.	
	1913.	1912.	1913.	1912.
	Tons.	Tons.	Tons.	Tons.
Hull .....	414,297	426,262	2,964,665	2,158,645
Grimsby .....	106,369	118,507	754,524	766,684
Goole .....	102,096	107,649	846,563	646,700
Immingham .....	209,022	89,753	1,017,137	325,125
Totals .....	831,784	742,171	5,582,889	3,897,154

The coastwise shipments from Hull show a large expansion, the total sent London and coastwise in August being 143,247 tons as against only 85,414 tons in August last year. The increase was due almost solely to the takings of London, to which port 125,310 tons were sent, as compared with 41,842 tons in August last year.

### Chesterfield.

#### COAL.

There is an improvement in the demand for house coal and orders are coming to hand freely. Prices are being advanced in various districts and the movement will, no doubt, become general very shortly. Now that the holiday season is rapidly drawing to a close, more activity is apparent in the market for fuel for manufacturing purposes, and a busy period is looked forward to. The large steel works of Sheffield are full of orders, and cobbles and nuts suitable for steelmaking are in great request. The demand for slack for boiler firing is recovering, and deliveries to Lancashire, for the cotton industry, will soon be on the same heavy scale as was the case before the mills stopped for the annual wakes. Prices are also now showing a tendency to improve. Stocks continue low. Steam coal for locomotive use is in steady request. The tone of the steam coal market is strong, owing to the extraordinary demand that is made for fuel for the Russian railways, amounting it is stated, to half a million tons. As the coal is to be shipped between now and January next, considerable briskness will be witnessed during a period of the year that, so far as steam coal is concerned, is usually characterised by extreme quietude. It is not improbable that, in the course of the next few weeks, prices of steam coal will become dearer. Much depends upon the position of the freight market. Cobbles continue to be much wanted for near Continental ports. Washed fuel is in steady request. The coke market is still in a sluggish condition, without any prospect of early improvement.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

#### IRON.

The demand for pig iron is poor, and buyers show no disposition to buy for forward delivery. They are content to purchase merely from hand to mouth. While it cannot be said that the finished iron trade is any worse, matters cannot be said to be such as to hold out any prospect of an early improvement. Old orders are rapidly being worked off and new work is difficult to secure.

### Nottingham.

#### COAL.

As the month advances the coal trade in Nottinghamshire is commencing to show an autumnal activity, the weather of the past week being of a character that is calculated to



business. In the branch for domestic fuel there is a tone, as both local merchants and those in charge of the depots are having more enquiries, and sales are increasing. On some qualities an advance of one shilling per ton has been made by several merchants who have also raised prices sixpence on other kinds. At the time of writing, however, owners have not made a general advance, though it is probable this will be done ere the month closes. The steam coal market has made a satisfactory showing during the week. It has about recovered the position held previous to the recent lull. Best qualities are continuing in good demand, and seconds are in better request, but inferior smalls are going out of hand quietly. There is a fair trade in gas fuel, and prices are firm. The slack market is showing some irregularity, and there is a tendency to offer cheap lots with a view to keeping down stocks. Coke is in quiet request.

## Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	13/ to 13/6	13/ to 13/6
Good house coals.....	11/6 to 12/6	11/ to 12/6
Secondary do. ....	10/6 to 11/	10/ to 11/
Best hard coals .....	12/ to 12/6	12/ to 12/6
Secondary do. ....	10/6 to 11/6	10/6 to 11/6
Slacks (best hards).....	8/3 to 8/6	8/3 to 8/6
Do. (seconds) .....	7/6 to 8/	7/5 to 8/
Do. (soft).....	7/3 to 8/	7/3 to 8/

## Leicestershire.

## COAL.

There is every indication that this district has entered on a busy season. Whilst there is a very good amount of business already placed there is a decided tendency on the part of buyers to operate. The prevailing conditions are sufficiently good as to necessitate an enlarged output, and the collieries generally are well employed, and stocks are very much reduced. Deliveries are very considerable. Local merchants are becoming gradually busier, and are anticipating a further development. Household coals have been more enquired for, and some further increase in the demand is looked for. All descriptions of households are becoming more wanted. In steam coals there is no particular alteration. They continue as they have been for some time past in very good demand, and from all appearances these coals will be wanted for some time to come. The quotations current are all very firm, and the general tendency is towards further firmness. The collieries all round have put up their rates to a shilling maximum over those lately quoted.

## South Staffordshire, North Worcestershire and Warwickshire.

## Hednesford.

## COAL.

Business in connection with the coal trade of the Cannock Chase district is, on the whole, fairly satisfactory, and a good winter's trade is generally expected. Orders are plentiful for most qualities of coal, and many of the collieries are working full time. The improvement in the house coal trade is being well maintained. The enquiry for coal for manufacturing purposes has undergone very little change since last report. Railway sales are fairly brisk and business is improving at the landsale depots.

## Birmingham

## COAL.

The market has undergone no change on the week. The pits are doing nearly full time and recent reports of further advances have brought about an expansion of purchasing by householders. A cold snap is all that is wanted to make trade move rapidly. Prices:—

## Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep .....	16/6	16/6
Do. best shallow .....	14/6	14/6
Do. seconds do. ....	13/	13/
Best hard .....	14/6	14/6
Forge coal.....	11/	11/
Slack .....	8/	8/
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked .....		
cobs .....	13/6	13/6
Best hard spires .....	15/	15/
Forge (steam) .....	10/6	10/6
D.S. nuts (steam) .....	9/6	9/6
Small (do.) .....	8/6	8/6

## IRON.

While a little more activity is observable in some branches, the market was still devoid of enterprise. Trade is steady, but except in the galvanised sheet branch, forward buying is purely nominal. Recent enquiries have not yielded the amount of business that was anticipated; perhaps the fact that sellers are not inclined to give way further has something to do with it. To do so, they declare, would involve a loss. Galvanised sheet makers are a bright exception to the general rule. They find customers willing to contract forward further than they are prepared to go. Some customers are willing to purchase up to the end of March next year, producers won't go further than the end of the year. They are of opinion that prices will advance, and have made an abortive attempt in that direction already. But the £11 minimum at Liverpool is unshakable, rising to £11 10s., according to order. Black sheets are in a shade better request, but competition is keen and is strong from South Wales, and the output will have to expand considerably before values are bettered. Makers of best bars do not find any increase of business, though they are kept well employed. For merchant bars there is a little better, and the outlook is more encouraging. Prices remain at £7 10s. to £7 12s. 6d., for pig iron £7 1s. 6d., and for bolt iron £7. Belgian

material is coming in against sales made some time ago at £5 15s. to £6 a ton delivered, net cash; local prices are subject to 2½ per cent. Puddled bars sell at £4 17s. 6d. Gas strip is unchanged at £7 10s. to £7 12s. 6d., and steel strip at £7 10s. to £8, with £7 15s. a good middle figure. Pig iron is firmer without being notably dearer. Smelters decline to give way further, and realising this consumers are inclined to enter into negotiations. Sales have been more numerous during the week and prices will probably begin to move upward. Business in the steel trade does not expand much. Continental bars and billets vary from £4 10s. to £4 15s. compared with the English price of £5 to £5 5s. for Bessemer and Siemens qualities respectively. In a few special cases lots have been obtained at £4 17s. 6d.

## Forest of Dean.

## Lydney.

## COAL.

There is not such a brisk enquiry for house coals now as was experienced during the latter part of August, but trade is very good and orders for both rail and shipping are coming to hand regularly and in fair bulk. All the pits are on full time. It is more than likely that the middle of the month will see an advance in prices, and a corresponding increase in the men's wages. The owners are considering this question during the week. Slack coals take a lot of selling, and the rough quality at 8s. is in poor request. The steam coal trade is not in a flourishing condition. Very low prices are being accepted for spot lots, and selling prices altogether are very unsettled.

Later.—The prices of house coal have been advanced 1s. from Monday next.

## Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	16/6	16/6
Forest .....	15/6	15/6
Rubble .....	15/9	15/9
Nuts .....	14/	14/
Rough slack .....	8/	8/
Steam coal:—		
Large .....	12/ to 13/	13/
Small .....	9/ to 10/6	10/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

## Devon, Cornwall, and South Coast.

## Plymouth.

## COAL.

Messrs. W. Wade and Son report that there has been only a slight revival as yet in the wholesale demand for current shipments of coal. Rather higher prices are being asked at some of the chief coal ports, but this is counterbalanced by a reduction in prices and pressure for business in other colliery districts. Buyers feel very confused by these unusual variations. Freights are somewhat firmer from the east coast, but not in any marked degree from the west coast.

Wireless Telephony in the Pit.—At the Dinnington Main Colliery, South Yorkshire, a wireless system of telephony, for which a good deal is claimed, has just been installed. The managing director, Mr. Maurice Deacon, has been the means of its introduction into this country. This system is the invention of Herr J. H. Reinecke, of Bochum, Westphalia, who has himself fixed it up in the Dinnington pit. At two points in the mine instruments have been fixed—one in the transformer house near the bottom of the shaft, the other 1,000 yards in-by. They were fixed up in less than 24 hours after being taken down, and interesting conversations have been carried on between them by Mr. A. Thompson, agent of the colliery, Mr. Searston, manager, and others. The value of the wireless in case of disaster would, it is believed, be great, for by reason of a portable telephone miners entombed would be able to indicate their whereabouts. Describing the apparatus, Mr. Searston said the instruments were *fac-similes* of those used in ordinary telephony. The battery was of the dry-cell type, and had a life of three years. A portable instrument was also provided, and weighed a little over 20 lb. The instruments were fixed up like an ordinary telephone, but, in lieu of the connections being made from one to the other by means of wires *en route*, two wires were connected from each instrument to some metallic substance buried in the ground; or they could be attached to ordinary tramway rails, water pipes, or any similar convenient metallic substance, or connection could be made to an iron plug inserted in a hole bored into the roof. The cost is said to be cheaper than the ordinary telephone system. Only 20 yards of wire are necessary for communication between the two instruments at Dinnington, and the great advantage is that the portable apparatus affords means of communication from any part of the mine to fixed stations either at the pit bottom or on the surface. All the operator has to do is to attach the two wires of the apparatus to any metallic substance at hand, ring up and give his message. It is even possible to send a message from the cage as it travels down or up the shaft. Conversation can be carried on with the manager in his office or with any part of the surface as the cage is in motion. It is claimed that the apparatus will probably revolutionise the system of signalling in deep mines, and as evidence of the interest it is arousing, it may be stated it has already been inspected by representatives of the General Post Office, War Office, and Admiralty.

## THE WELSH COAL AND IRON TRADES.

THURSDAY, SEPTEMBER 11.

## North Wales.

## Wrexham.

## COAL.

There is little change in the coal trade of this district during the past week. All the collieries are working fairly good time, and the general demand for the various grades of fuel is improving, though but slowly. There are numbers of quotations for house coal, and the prices asked are satisfactory from the coalowners' point of view. Good supplies have been taken by the railway companies on account of contracts. There is a large tonnage sold from this locality for the locomotive trade, as the fuel appears to suit the requirements of the companies, and is used very largely on the biggest engines for the passenger service of several railways. The steel and iron works of North Wales continue to be working well, and these works take a fairly large tonnage also. There is also a good demand for the cheaper slow-burning qualities for the brickburning trade. The demand for shipment coal is up to the average, and the prices realised are little varied from those obtained at the Mersey ports last week. Nuts and slack are fairly well sold, and the prices realised are satisfactory. The average prices for the different grades at the time of writing are as follow:—

Prices at pit f.o.r. :—	Current prices.	Last week's prices.
Best house coal .....	15/ to 16/	15/ to 16/
Secondary do. ....	14/ to 15/	14/ to 15/
Steam coal .....	12/6 to 13/	12/6 to 13/6
Gas coal .....	13/ to 14/	13/ to 14/
Bunkers.....	12/ to 12/6	12/ to 12/6
Nuts .....	11/ to 11/6	11/ to 11/6
Slack .....	6/6 to 8/6	6/6 to 8/6
Gas coke (at works) .....	13/4 to 15/	15/ to 16/8
Prices landsale:—		
Best house coal .....	17/6 to 18/4	17/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

## Monmouthshire, South Wales, &amp;c.

## Newport.

## COAL.

The steam coal trade continues for the present in an unsatisfactory condition, weakness and uncertainty permeating the market. For prompt shipment, terms are quite a matter of arrangement, and collieries are competing to secure orders which will enable them to keep going. For forward bookings a better spirit has been engendered by the brisker chartering, a good deal of tonnage having been fixed this week. If continued this will bring about a healthier feeling as stocks get depleted. At the present moment, however, it must be admitted that enquiry is none too promising, buyers seeming to prefer waiting in the hope of seeing still further reductions in values. Outputs have been fully maintained, and stocks have accumulated to an extent which congests traffic considerably. Pitwood supplies have not come to hand sufficiently to meet current requirements, values firming up in consequence. Good fir now fetches around 22s. 3d. ex-ship.

Prices f.o.b. cash 30 days, less 2½ per cent.

Steam coals:—	Current prices.	Last week's prices.
Best Black Vein large ...	17/ to 17/6	17/3 to 17/6
Western-valleys, ordinary	16/3 to 16/9	16/9 to 17/
Best Eastern-valleys .....	15/9 to 16/	16/ to 16/6
Secondary do. ....	15/3 to 15/6	15/9 to 16/
Best small coals .....	7/9 to 8/	8/3 to 8/6
Secondary do. ....	7/3 to 7/6	7/3 to 7/9
Inferior do. ....	6/9 to 7/	6/9 to 7/
Screenings .....	8/	8/6
Through coals .....	13/ to 13/3	13/ to 13/6
Best washed nuts .....	14/ to 14/6	14/3 to 14/6
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/6 to 20/	19/6 to 20/6
Furnace coke .....	22/ to 23/	22/ to 23/
Foundry coke .....	26/ to 27/	26/ to 27/

## IRON.

There is no great alteration to report in the local conditions of the iron and steel trades, the position remaining very quiet. At bar mills work is reported to be much the same as last week, and there is no likelihood of it improving until there has been a material alteration in the tinplate trade. Imports of foreign bars for the week total about 7,000 tons, and prices of these, too, show little alteration. The rail department continues well employed, with values steady. There is little improvement to report in the pig iron market, where fresh business is scarce, but buying generally cannot keep off this market much longer. Quotations show no material alteration on the week. In the tinplate department matters remain very much as a week ago, prices remaining steady. Following may be taken as latest approximate values:—Steel rails: heavy sections £6 10s. to £6 15s., light £6 15s. to £7; tinplate bars: Bessemer steel £4 16s. 3d., Siemens £4 16s. 3d. to £4 17s. 6d.; tinplates 20 × 14: Bessemer primes, 13s. 3d., Siemens 13s. 3d.; pig iron: Welsh hematite, 74s. to 75s.

## Cardiff.

## COAL.

Although but little business is doing, the tone of the market is good. Charterings last week reached a more satisfactory total, amounting practically to 340,000 tons, or an increase of about 132,000 tons as compared with the preceding six days. In one day alone vessels were taken up with a registered tonnage of 104,000. This has had the effect of stiffening the market, but the charterings for the preceding few weeks had been considerably below the average, and also below what was required to ensure full work at the collieries. The result of the extra tonnage arranged for is that sellers are more firm in their quotations, notwithstanding the fact that buyers are still holding off with the object of bearing down prices, not only for the



immediate future, but also with the object of influencing quotations for next year. The contracting period is now approaching, but although there are a good many enquiries about for 1914, they are at present of what may be termed a tentative character, the ideas of both buyers and sellers being considerably divergent. Sellers continue to hold very optimistic views with regard to the future, and are sanguine that on the average the contracts over next year will be at an increase of anything between 1s. and 1s. 6d. per ton over the prices obtained for this season's shipments. As a matter of fact there is good reason for believing that business has already been done at an advance of 1s. 3d. per ton. As far as current business is concerned, there is some difficulty in obtaining what are really the prices paid, as it all depends upon the question of how collieries are sold, and what amount of tonnage they have on stem. Some of the best collieries are still firmly quoting 21s. net, and show no disposition to modify this figure, the reason, of course, being that they are well sold, and are practically independent for the moment of the market. There is no doubt that there is, comparatively speaking, but a small quantity of coal to be obtained from the best collieries for this and next month, and it is this circumstance which makes them so exceedingly firm in their quotations. As far, however, as middlemen are concerned, they are prepared to accept rather less sums, as they are under the necessity of taking their month's supplies whenever the collieries are in a position to deliver them. But those buyers who entered into contracts last autumn at say 18s. 3d. or even 18s. less 2½ per cent., are now reaping handsome profits when they are able to obtain anything between 20s. and 20s. 6d. net. This explains the difficulty in ascertaining what is really the current price for coal, as there are so many factors to be taken into account, the principal one being whether the quotations are obtained direct from the collieries or from middlemen who hold coal purchased last autumn for delivery over the present year. In second class coals there appears to be a slight weakening in price. Superior Admiralty sorts are 19s. to 19s. 6d. and ordinary seconds 18s. 3d. to 18s. 9d. The Great Indian Peninsula Railway will, it is said, be shortly in the market for 100,000 to 150,000 tons, but as a rule they do not take the best Admiralty qualities. This contract, combined with the unusually large purchases which are being made on Russian account, is sure to have a firming effect on the market. It is reported that merchants in Russia have undertaken to deliver to the railways of that country 450,000 tons of coal, of which more than half has already been brought from Northumbrian and Yorkshire collieries. This total, however, by no means represents the whole of the business either directly placed or in process of negotiation. Indeed, for the southern and northern Russian railways and other consuming interests it is estimated that about three-quarters of a million tons will be required. Such large exports are bound to affect our own markets, particularly as regards second-grade coals. It is entirely new business, for hitherto the Russians have been able to supply themselves either with oil or with minerals from their own coalfields. It will also have the effect of causing a scarcity of tonnage, although not to the extent which some anticipated, as, against whatever shortage may be experienced, there will be liberated a very considerable quantity of Greek tonnage which has been held up during the war. Other enquiries which are in the market include 97,000 of best locomotive coal for the Norwegian State Railways, 135,000 metric tons of shipping and locomotive coal for the Danish State Railways, and 355,000 or 120,000 metric tons of Welsh steam coals for the Egyptian State Railways. What effect this boom in the coal trade will have on wages it is difficult to say. The action of the coal trimmers in stopping work at 1 o'clock last Saturday afternoon at all the Welsh ports seems to have passed off without much friction. There is very little change in the small coal market. Prices for some descriptions have been on the easy side, but at the time of writing there was an improving tendency, although good cargo qualities were still to be had at 7s. 6d. per ton, and even under for prompt shipment. Bunkering qualities

Prices f.o.b. Cardiff (except where otherwise stated).		
	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	20/6 to 21/	20/6 to 21/
Superior seconds .....	19/ to 19/6	19/6 to 20/
Ordinary do. ....	18/3 to 18/9	18/6 to 19/
Best bunker smalls .....	10/3 to 10/6	10/6 to 10/9
Best ordinaries .....	9/9	10/
Cargo qualities .....	7/3 to 7/6	7/9 to 8/3
Inferior smalls .....	6/9	7/6
Best dry coals .....	18/ to 19/	18/6 to 19/
Ordinary dries .....	15/9 to 16/6	16/3 to 16/9
Best washed nuts .....	16/	16/
Seconds .....	15/	15/
Best washed peas .....	14/	14/
Seconds .....	13/	13/
Dock screenings .....	11/6 to 11/9	11/9
Monmouthshire—		
Black Veins .....	17/6 to 17/9	17/6 to 17/9
Western-valleys .....	17/ to 17/3	17/ to 17/3
Eastern-valleys .....	16/3 to 16/6	16/6 to 16/9
Inferior do. ....	15/6 to 15/9	15/9 to 16/
Bituminous coals:—		
Best house coals (at pit)	20/6	20/6
Second qualities (at pit)	18/	17/9 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/	17/6
Through-and-through...	14/9 to 15/	15/
Small .....	12/6	12/3 to 12/6
No. 2 Rhondda—		
Large .....	13/ to 13/6	12/6 to 13/
Through-and-through...	11/3	11/
Small .....	7/9 to 8/	8/3 to 8/6
Best patent fuel .....	22/6	22/6
Seconds .....	19/6 to 20/6	20/ to 21/
Special foundry coko .....	30/	30/
Ordinary do. ....	24/ to 25/	25/ to 27/
Furnace coke .....	20/	17/6 to 18/
Pitwood (ex-ship) .....	22/ to 22/3	22/3

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

are 10s. 3d. to 10s. 6d. The demand for Monmouthshire coals keeps very quiet. Tonnage arrivals over the week were better, but there is room for much improvement in this respect. Black Veins are 17s. 6d. to 17s. 9d.; Western Valleys, 17s. to 17s. 3d.; and best Eastern Valleys, 16s. 3d. to 16s. 6d. f.o.b., Cardiff. Fancy house coals are still selling at 20s. 6d., but second qualities are 3d. dearer, being quoted at 18s. For No. 3 Rhondda large bituminous coals it is difficult to get 17s. No. 2 qualities are very irregular, some collieries quoting 13s. 3d. to 13s. 6d., whilst others are accepting as low as 12s. 6d. Shipments of patent fuel for the week amounted to 37,382 tons, of which the Crown Company loaded 11,699 tons, Swansea 22,433 tons, and Newport 3,200 tons. There is no change in prices. Amongst the enquiries on contract account is one from the Chilean Government for 50,000 tons for delivery over next year. Special foundry coke is 30s., and ordinary qualities 24s. to 25s. Pitwood is 22s. to 22s. 3d.

IRON.

There is but little change in the tin-plate trade. Receipts and shipments are pretty evenly balanced, and stocks therefore continue at about the same level as last week. Owing to the high price of tin, and the firmness of bars, makers are now holding out for 13s. 3d. for 14 x 20 cokes, and 13s. 7½d. for 18½ x 14 oil sizes, but these prices are 1½d. above buyers' ideas. The competition by American makers is more severe than ever. According to Lord Glantawe, the exports have not been so unsatisfactory for several years; but this was accounted for chiefly by the falling off to Roumania, which during the last eight months had been about 30,000 tons. In August the reduction was 4,600 tons. To America, however, the exports for the second quarter of the year amounted to 10,863 tons, as against 391 tons in the corresponding period of last year. Imports of tin-plate bars last week were very small, and Welsh makers adhered very firmly to their quotations of £4 16s. 3d. for Siemens bars and £4 15s. for Bessemer bars. Owing to the depression in the tin-plate trade some of the steelworks are only rolling two or three days per week. In the galvanised sheet trade there is no material change. No improvement is noticeable in the demand, and prices continue at about £11 for 24-gauge corrugateds. The increase in the exports in August only amounted to about 2,000 tons, but for the eight months of the year it was no less than 95,800 tons. The dispute among the Cardiff ironmoulders has been settled. The lads employed at the Cwmfelin Tin-plate Works, Swansea, have gone on strike for an advance of 6d. per day in their wages, and as a consequence about 200 tin-house men are thrown out of employment. Welsh pig iron is 72s. to 73s. 6d. free on trucks. New steel crop ends are 62s. 6d. f.o.t.

Swansea.

COAL.

The trade of the port last week was fairly satisfactory, although the returns were down compared with the preceding period. The coal trade was rather slow, but patent fuel was very brisk, the shipments together totalling 100,511 tons. There was a good attendance on 'Change this morning, and a very quiet tone was in evidence on the anthracite coal market. Tonnage supplies were very poor and sellers were thus considerably handicapped. Swansea Valley large was freely offered for immediate delivery at reduced figures, with the exception of Genoa option brands, which were steady. Red Vein large was steady at last quotations, but machine-made nuts and cobbles were slightly easier. There was not so good a demand for rubbly culm and duff and values were again marked down. In the steam coal market there was little business doing and this department closed easy.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/6
Secondary do. ....	19/6 to 20/6	19/6 to 20/6
Big Vein large (less 2½ per cent.) .....	17/ to 18/6	17/6 to 18/9
Red Vein large do. ....	12/9 to 14/6	12/9 to 14/6
Machine-made cobbles (net) .....	21/6 to 23/	21/6 to 23/
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 26/	23/6 to 26/
German do. do. ....	23/6 to 26/	23/6 to 26/
Beans (net) .....	16/6 to 19/	16/6 to 19/
Machine-made large peas (net) .....	12/ to 13/6	12/ to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	6/9 to 7/	6/9 to 7/
Duff (net) .....	5/ to 5/6	5/6 to 6/
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	16/ to 17/	16/ to 17/
Bunkers do. ....	11/6 to 12/6	11/6 to 12/6
Small do. ....	8/ to 9/	8/6 to 9/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) .....	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

IRON.

There was a more hopeful feeling regarding the tin-plate trade, and during the week over 100 tin-plate and sheet-rolling mills were operating. Several of the mills at the Morriston Works were working under the average number of hours. The iron and steel trades were quiet, but a little better than in the week previous. There was some improvement in the trade at the Duffryn Steel Works, Morriston. Employment was good at the Mannesmann Works, and the engineering works and foundries were busy. The shipments of tin-plates were 85,730 boxes, receipts from works 85,555 boxes and stocks in the dock warehouses and vans 321,720 boxes.

Llanelli.

COAL.

The coal trade of the district is in a fairly satisfactory condition and for most kinds there is an improving demand at prices which are slightly better. But there is not the firmness in the market which was expected there would be

for the time of the year. That there will be an improvement the colliery people have not much doubt, and if tonnage comes along plentifully soon, there will be a change for the better almost immediately. The inland trade is still rather weak except for the horticultural kinds, and collieries have all they can do to meet the demand. Malting large is also in good request. The machine made sorts, rubbly culm and duff, are as last reported. The steam and bituminous qualities are not moving very briskly, and owing to the depression in the manufacturing trade, the prospects are none too bright for the immediate future. Prices this week are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	20/6 to 22/6	20/ to 22/
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	17/6 to 18/6	17/ to 18/
Red Vein do. ....	13/6 to 14/6	12/6 to 13/
Machine-made cobbles ...	19/6 to 20/6	19/6 to 20/
German nuts .....	23/ to 24/	23/ to 24/
French do. ....	23/ to 24/	23/ to 24/
Paris do. ....	23/ to 24/	23/ to 24/
Machine-made beans .....	20/ to 21/	19/ to 21/
Do peas .....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	7/ to 7/3	7/ to 7/3
Duff .....	5/6 to 7/	5/6 to 7/
Other sorts:—		
Large steam coal .....	17/ to 18/	17/ to 18/
Through-and-through ...	11/6 to 12/	11/6 to 12/
Small .....	9/6 to 10/	9/ to 10/
Bituminous small coal ...	11/ to 12/	11/ to 12/

**Institution of Mining Engineers.**—The twenty-fourth annual general meeting of the members of the Institution of Mining Engineers will be held at Manchester, on Wednesday, September 24, 1913, at 10.30 a.m., in the Lord Mayor's Parlour, Town Hall, Manchester. The members and their lady friends will dine together on Wednesday, September 24, at the Midland Hotel, Manchester, at 7 p.m. A lecture on "Explosion Experiments at Eskmeals," by Prof. H. B. Dixon, M.A., Ph.D., F.R.S., and a reception of the members and their lady friends by Sir Thomas H. Holland, K.C.I.E., F.R.S., the president of the Manchester Geological and Mining Society, and Lady Holland, will be held at the University, Manchester, on the evening of Thursday, September 25. Arrangements have been made for visits to places of interest, to works and collieries, and for other excursions, on September 24, 25 and 26. The following papers will be read, or taken as read:—"A Method of Measuring Goaf Temperatures," by T. F. Winmill, B.A. (Oxon), B.Sc. (Lond.); "The Absorption of Oxygen by Coal," by T. F. Winmill, B.A. (Oxon), B.Sc. (Lond.); "Dust Problems in Mines and their Solution," by Hermann Belger, M.A., and A. Owen Jones; "Further Researches in the Microscopical Examination of Coal, especially in Relation to Spontaneous Combustion," by James Lomax. The following papers, which have already appeared in the *Transactions*, will be open for discussion:—"Recent Methods of the Application of Stonedust in Mines," by W. E. Garforth, LL.D., M.Inst.C.E.; "The Reopening of Norton Colliery with Self-contained Breathing Apparatus after an Explosion," by J. R. L. Allott; "The Slow Oxidation of Coaldust and its Thermal Value," by F. E. E. Lamplough, M.A., and A. Muriel Hill, B.Sc.; "Insulated and Bare Copper and Aluminium Cables for the Transmission of Electrical Energy, with Special Reference to Mining Work," by B. Welbourn.

**Home Office Prosecutions at Hamilton.**—In Hamilton Sheriff Court, on Friday last, two important prosecutions under the Coal Mines Act were called. In the first, Robert Wilson Dron, mining engineer, Bearsden, and James Dalglish, colliery manager, Manse-road, Motherwell, were the parties charged, the former being agent and the latter manager of Dalzell and Broomside Colliery, Motherwell, occupied by the Wishaw Coal Company. The complaint libels 12 different offences between March 15 and April 16 last. These refer to (1) the condition of the cages; (2) the condition of the refuge holes in the main haulage road; (3) failure to mark refuge holes with a distinctive number; (4) failure to have the proper number of refuge holes in certain seams in No. 1 and No. 2 pits of the colliery; (5) failure to mark distinctively refuge holes in the side dook haulage road, and placing across entrance to these signal wires, thus impeding ingress; (6) failure to provide proper means of egress to certain engine houses at the colliery; (7) failed to have certain fuses in the distributing box forming part of the electrical apparatus in No. 2 pit so protected and enclosed as to prevent contact by persons; (8) failed to cover with insulated material a number of unarmoured cables; (9) failed to have properly secured by some non-conducting and readily breakable material certain cables; (10) in certain seams in No. 2 pit failed to take adequate precautions to prevent the signal wires getting attached to the cables therein; (11) failed to have an earth conductor at the gate-end box in the blackband seam of No. 2 pit; and (12) failed to have a flexible cable for the portable apparatus in the pony level. In the second prosecution, James McNeil, colliery electrician, Wishaw, is charged with eight offences, all relating to alleged defects in the electrical apparatus and equipment of the colliery for which he is responsible. Before the respondents were asked to plead, the Fiscal agreed to an adjournment of the cases so as to permit a discussion on certain pleas dealing with the relevancy of the charges.







geographical section. The fuel question was introduced by Prof. Burstall, and a discussion took place in the section devoted to economic science and statistics on copartnership and trade unionism.

The Scottish coalowners have made application for a meeting of the Coal Conciliation Board for Scotland to consider a claim for a reduction of 18<sup>3</sup>/<sub>4</sub> per cent. in miners' wages. The wages in the Scottish coalfield are at present 87<sup>1</sup>/<sub>2</sub> per cent. above the basis wage.

The Lancashire coalowners and miners' representatives have arranged for a joint meeting to be held in Manchester on Monday to consider the wages of surfacemen employed in the county.

It is announced that the official enquiry under section 83 into the disaster at Cadder pit will be held in the Justiciary Court-buildings, Glasgow, on 22nd inst. Sir Henry Cunynghame, K.C.B., will preside.

Negotiations for the acquirement of the Whitehaven Collieries have just been completed, and a new company formed, as a result of which important developments will shortly be undertaken.

The Home Secretary gives notice that on September 4, 1913, he made regulations under section 77 (3) of the Coal Mines Act, 1911, as to procedure and costs of references in regard to the cost of maintenance of washing and drying accommodation and facilities.

The Home Secretary has made an Order under Section 61 of the Coal Mines Act, 1911, entitled "The Explosives in Mines Order of the 1st September, 1913," consolidating with amendments the previous orders regulating the supply, use and storage of explosives in mines to which the Act applies.

COALMINES INSPECTION IN 1912.

WE believe that our readers will find the supplement containing abstracts of the reports of H.M. inspectors of mines for 1912, which is printed with this issue, of more than usual interest. These reports are still eight in number, as separate reports have this year been issued for the Durham and Newcastle districts, and the contemplated amalgamation of the Liverpool and Manchester districts, which will see the completion of the new inspection scheme initiated even before the passing of the Coal Mines Act of 1911, has not yet taken place; on the other hand, the impress of that Act is to be seen at many points in the reports, and there is much fresh information available—one of the best features of the new legislation.

It is the purpose of this article to epitomise such points as these for the guidance of the reader, rather than to comment at any length upon the general results disclosed by the reports.

STATISTICS OF OUTPUT.

At the outset it may be stated that the cessation of work on the minimum wage question in the early months of last year invalidates comparisons with its predecessors, as regards both the fundamental factors of output and accidents. Especially is this the case in regard to the returns of average output and the death rates; for whilst the national strike caused a material reduction in output, and possibly a sensible decrease in accidents, the numbers employed have, on an average basis, remained normal.

It remains further to be stated that the reduction in output is less than is indicated by the figures, owing to the discontinuance of the practice, formerly observed by some owners in making their returns, of including the dirt raised with the coal.

The amount of dirt thus included, which would have been returned as coal in former years, is estimated at 2,267,789 tons, leaving a gross decrease in the output as compared with 1911 of 9,207,772 tons of coal. The practice of returning the gross raisings seems to have been much more prevalent in Scotland and the North of England, as the estimated deduction in the three northern districts was as follows:—Scotland, 513,564 tons; Newcastle, 608,201 tons; Durham, 418,507 tons. This change, of course, affects to a slight degree a comparison not only of the average selling prices returned, but also of the average *per capita* returns of output and the accident death-rates where computed on the basis of the production.

For the first time the district reports contain statistics relating to the value of the output. These have not appeared in former years, and the figures given in the general reports have been largely a matter of guesswork. Under the Coal Mines Act, however, these particulars are compulsory. In the circumstances it may be of interest to give the following table of average values of coal raised:—

District.	1913. s. d.
Scotland .....	8 4/8
Newcastle .....	9 2/04
Durham .....	8 11/07
Yorks and North Midland .....	8 0/3
Manchester and Ireland:—	
N. and E. Lancs. ....	9 8/11
Ireland .....	11 1/8
Liverpool and North Wales .....	8 11/1
South Wales .....	11 1/5
Midland and Southern .....	8 4/9

The average output of mineral under the Coal Mines Act in 1912 was 311 tons per person employed underground, a decrease of 20 tons on the preceding year—a palpable consequence of the strike, assisted no doubt by other causes. The average reaches its highest in Scotland (382 tons), Durham (339 tons) and Yorkshire and North Midland (334 tons), and its lowest in Ireland (146 tons).

ACCIDENTS IN 1912.

As already inferred, there was a decline in the number of accidents last year, but the number of deaths increased. There were 61 fewer fatal accidents, and 11 more deaths—an apparent anomaly, for which the Cadeby explosion may be held responsible, the deaths from explosions of firedamp and coaldust increasing from 36 to 124; there is a decline under all other heads below ground.

Of course, the influence of the strike has to be borne in mind, although it would be interesting to have details of the accidents occurring in the few weeks immediately following its conclusion; owing to the dangerous condition of the roadways and workings at such a time, the liability to accidents from falls of roof and side is greatly increased, and several of the inspectors make a reservation on this account.

For the reasons already stated, there is no real satisfaction to be derived from the fact that the death-rate per 1,000 persons employed both below ground and above and below ground combined were the lowest on record. The rate on the latter basis was 1.17, as against 1.19 in 1911. When, however, the output is taken into consideration, it is found that 4.67 lives were lost per 1,000,000 tons of mineral raised, as against 4.42 in 1911, which in a measure bears out the fact noted at the end of the last paragraph. What we really need is some formula that will combine the numbers employed and the output in relation to accidents; otherwise it is possible to arrive at unjust comparisons, owing to variations in the intensity of work and the conditions of labour.

COAL-CUTTING MACHINERY.

Though not new this year, we anticipate the issue of Part II. by giving the following tables showing the extent to which coal-cutting machinery was employed:—

MECHANICAL COAL-CUTTERS EMPLOYED IN THE UNITED KINGDOM IN 1912.

Kind of machine.	Sect-land.	New-castle.	Durham	Yorks and N. Midland.	Man-chester and Ireland.	Liver-pool and N. Wales.	South Wales.	Midland and Southern.	Total.	Total in 1911.
Driven by electricity—										
Disc .....	392	24	23	143	—	7	7	27	623	471
Bar .....	177	12	20	63	6	12	37	18	345	307
Chain .....	12	14	14	84	3	4	4	13	148	215
Percussive .....	9	—	2	—	—	1	2	—	14	4
Rotary heading .....	3	1	—	—	—	—	—	—	4	1
Total .....	593	51	59	290	9	24	50	58	1,134	998
Driven by compressed air—										
Disc .....	142	37	16	168	36	62	6	13	480	325
Bar .....	5	—	12	45	6	14	34	7	123	84
Chain .....	1	—	4	20	2	—	1	6	34	156
Percussive .....	29	267	57	78	106	48	21	60	666	575
Rotary heading .....	1	—	1	—	—	—	2	3	7	8
Total .....	178	304	90	311	150	124	64	89	1,310	1,148
Total in 1912 .....	771	355	149	601	159	148	114	147	2,444	—
Total in 1911 .....	676	310	138	511	137	138	113	123	—	2,146

NUMBER OF MACHINES, MOTIVE POWER EMPLOYED, AND QUANTITY OF MINERAL OBTAINED BY THEIR USE IN THE VARIOUS INSPECTION DISTRICTS IN 1912.

District.	Mines using machines.	No. of machines.	Mineral obtained by		Total.	Per-centage of total output.	No. of conveyors at coal face.	Mineral obtained, 1911.
			Elec-tricity.	Com-pressed air.				
			Tons.	Tons.	Tons.			Tons.
Scotland .....	—*	771	6,357,103	1,385,367	7,742,470	17.5	101	6,970,646
Newcastle .....	53	355	574,705	1,172,258	1,746,963	6.2	37	1,648,163
Durham .....	36	149	488,855	439,493	928,348	3.0	20	886,018
York and N. Midland ..	135	601	3,045,927	3,167,314	6,213,241	9.4	51	5,648,582
Manchester and Ireland	42	159	64,550	477,827	542,377	5.1	6	470,217
Liverpool and N. Wales..	—*	148	251,299	1,019,345	1,270,645	7.9	5	1,182,828
South Wales .....	45	114	335,721	256,803	592,529	1.1	47	723,481
Midland and Southern ...	52	147	753,465	484,100	1,237,565	4.5	1	1,137,411
Total in 1912 .....	—	2,444	11,871,625	8,402,513	20,274,138	7.4	268	—
Total in 1911 .....	471	2,146	10,931,631	7,735,715	18,667,346	6.5	326	18,667,346

\* No particulars.



cannot be said that the use of machinery increases at anything like the rate at which some people thought it would prior to the passing of the Eight Hours Act, of which it was officially regarded as one of the chief mitigations. The decline in the number of coal face conveyors is surprising, when we recall the advertisement which these appliances have received during the past few years. It is almost entirely accounted for by the decline in the use of conveyors in the Manchester and Ireland district from 79 to 6, which may possibly be an error, as Mr. GERRARD makes no comment on the fact.

A CENSUS OF PIT PONIES.

We now have for the first time a record of the number of horses in use below ground, the summarised returns being shown in the accompanying table A.

The inspectors generally find that the treatment of animals leaves little to be desired; it cannot be said, however, that the above figures leave no scope for improvement. It is possible that opinions may differ as to what constitutes ill-treatment, but the total number of cases reported for the kingdom, and notably the total for the Yorkshire and North Midland division, is disappointing, especially when it is remembered that other cases may be hidden in other columns of the table. Almost without exception, the inspectors comment on the difficulty that has been experienced in devising a suitable type of head guard for ponies.

ELECTRICITY IN MINES.

It is satisfactory to find that, notwithstanding the great strides that electricity has made as the hand-servant of the mining engineer, very few accidents are traceable to its use. Last year only seven deaths below ground and four on the surface were attributable to it, and for several of these arrant carelessness was responsible. The total is short of that for the previous year by two.

In other words, there was one death for every 46,000-horse power in use. This calculation is rendered possible by the interesting return of aggregate horse-power of electricity in use at mines now made for the first time. The information under this head has been collected in the accompanying table B.

It will be seen that nearly half the collieries in the United Kingdom are now equipped with electricity to some extent, though possibly in some of these the installation does not proceed beyond signalling or lighting. There are some striking facts disclosed by the figures—as, for example, the extensive adoption of electricity for winding, haulage, and pumping in South Wales, the large horse-power of portable machinery in the Scottish mines, and the application of electricity for coal-washing and screening in the Yorkshire and North Midland division.

SAFETY LAMPS AND EXPLOSIVES.

It is not possible to compile complete statistics from the district reports in regard to the safety lamps in use, but it appears that 749,174 lamps were in service last year, as compared with 723,934 in 1911. Although still a small proportion of the total, the electric portable lamp has made great progress, 10,729 being in use last year, as against 4,298 in 1911 and 2,055 in 1910. There were 19,651 lamps equipped with internal igniters, as against 12,842 in 1911.

The following particulars have been taken out in regard to the use of explosives:—

	1913.	1912.
Quantity of explosives used.....lb.	23,380,056	24,341,006
Estimated number of shots fired—		
By electricity .....	19,529,211	19,433,908
By fuses .....	12,441,102	11,961,192
By other .....	10,579,665	12,812,407
Total number of missfires recorded is	44,391	
not much reliance is to be placed on these figures, with regard to the use of explosives.		

TABLE A.

District.	No. used.	Number died (exclusive of those required to be destroyed).			Number required to be destroyed.			Number of cases of injury or ill-treatment reported to manager, exclusive of cases included in columns (2) and (5).		
		From injury by accident.	From disease.	Total.	In consequence of injury.	In consequence of disease.*	Total.	Injury.	Ill-treatment.	Total.
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Scotland .....	5,304	45	89	134	130	52	182	244	7	251
Newcastle .....	12,639	200	121	321	194	357	551	1,104	18	1,122
Durham .....	12,645	188	147	335	155	241	396	528	19	547
Yorks and North Midland .....	17,063	520	221	741	441	497	938	2,702	139	2,841
Manchester and Ireland .....	304	3	7	10	6	3	9	10	1	11
Liverpool and North Wales.....	1,579	12	10	22	25	23	48	94	2	96
South Wales .....	15,930	447	289	736	243	319	562	2,479	21	2,500
Midland and Southern .....	6,064	118	56	174	123	125	248	712	30	742
Total .....	71,528	1,533	940	2,473	1,317	1,617	2,934	7,873	237	8,110

\* And old age.

TABLE B.

District.	No. of mines at which electricity was in use.	Aggregate horse-power of electricity in use.											Total on surface and underground.
		On the surface.						Underground.					
		Winding.	Ventila- tion.	Haulage.	Coal washing or screening.	Miscel- laneous.	Total.	Haulage.	Pumping.	Portable machinery.	Miscel- laneous.	Total.	
Scotland	290	1,666	2,363½	2,527	5,513	6,944½	19,014	22,813½	36,143¾	17,367	3,018½	79,343	98,367
Newcastle	111	3,159	4,402½	2,333	3,318	5,511	18,723½	11,361½	13,128½	1,627½	2,309½	28,427	47,150½
Durham	145	2,149	6,224	3,748	6,080	9,409	27,610	15,918	17,988	1,550	700	36,156	63,766
Yorks & N. Midd.	317	657	3,947½	2,088	16,836	18,729	42,257½	24,132	11,880	7,250	2,353	45,615	87,872½
Manchstr. & Irel.	73	110	830	246	1,167	2,052½	4,405½	2,666	3,097¾	234	437	6,434½	10,830
Liverpl. & N. Wales	82	25	1,111½	255	1,304	1,309	4,004½	5,686	4,132½	409	820½	11,048	15,052½
S. Wales	286	16,129½	11,299½	11,696	7,075½	24,711½	70,911½	32,733½	43,638½	926	1,183½	78,481½	149,393
Midd. & Southern	121	—	715	861½	2,276	3,309½	7,162	14,714½	14,309½	1,674	464½	31,162½	38,324½
Total ...	1,425	23,895½	30,893½	23,754½	43,569½	71,975½	194,088½	130,025	144,318½	31,037½	11,286½	316,667½	510,756

THE COAL MINES ACT.

The Coal Mines Act, 1911, came into force on July 1, 1912, and the observations of the inspectors on the six months' experience will be eagerly scanned by colliery managers. Their official position inevitably tends to differentiate the views of the inspectors, both as to the merits and the interpretation of the Act, from those held by owners and managers, but they can at least sympathise with the latter as to the enormous burden of labour and worry that has been entailed by it, for it is a burden that the inspectors have had to bear themselves. All the reports testify to the difficulties that have been experienced by managers in their efforts to conform to the requirements of the Act—difficulties that have been greatly increased by the strike of last year and the subsequent shortage of engineering material.

Taking the various headings under which the inspectors have reported, we find that up to the close of the year 45,722 firemen's certificates had been granted, 20,624 of these being full certificates; the figures, however, cannot be taken as complete.

During the latter part of the year many samples of mine air were taken by the inspectorate, and the results cannot be regarded as other than satisfactory. Thus in the Durham district, the highest percentages of marsh gas and carbon dioxide found by analysis were 0.82 and 0.98 per cent. respectively, or well inside the requirements of the Act. It is probable that the conditions in many mines are a great deal better than the managers themselves have thought.

It is not a surprising matter to find that the workmen are making little use of their increased facilities for inspection; but in this matter it is perhaps fair to wait another year. It is too early also to obtain any definite particulars in

regard to the provision of overwinding appliances and arrangements for reversing the ventilation, as even where the installations have been completed some time must elapse before any useful experience can be derived from their employment.

Trade Summary.

The London coal trade for the past week has been very variable. Public prices advanced 1s. per ton on Saturday last on all kinds except stove coal, which only advanced 6d. Colliery prices have also advanced 6d. per ton since then for house coal qualities, but the demand has slackened off, and buying has been restricted almost exclusively to the factors and merchants having loaded wagons on hand at cheaper prices. Colliery orders are absolutely neglected, but pit prices remain firm, as many of the collieries have considerable arrears to make up. Steam coals remain steady, but smalls of all kinds are very weak. Bakers' nuts and kitcheners cobbles are receiving more attention.

At Newcastle there is a general increase in selling values of fuel for prompt shipment, and the outlook of the market is healthy.

The tone of the Durham coal trade has improved, tonnage having been heavily booked. Coking coals are hardly so strong.

The Lancashire house coal trade begins to show more animation. Rather less screened manufacturing coal is going out and bunker requirements are light. More slacks are being taken up.

There has been a fair demand for house coal in West Yorkshire and rather more works fuel is going into circulation.

The Doncaster Race week has interfered with coal-getting in South Yorkshire, but the tone of the market is good.

Derbyshire house coal is selling more freely, and manufacturing sorts are in more active request.

The tone of the market at Cardiff is good, and heavy chartering has served to stiffen prices. Sellers are optimistic. Secondary steam coals are rather weaker. Small coal is unchanged. Monmouthshire coals are quiet.

The Scottish coal trade continues active in all branches, prices having a firmer tendency.

The will of the Duke of Sutherland, who died on June 27, aged 61, has now been proved. He left unsettled estate valued for probate at £1,220,905, of which the net personalty amounts to £654,989.



## LABOUR AND WAGES.

## North of England.

Among proposals that are to come before the forthcoming annual meeting of the Northumberland Deputies' Association are suggestions that wages should be increased 6d. per shift in view of the extra duties imposed by the new Mines Act; that the basis wage be raised 1s.; that steps be taken to obtain an upstanding wage; and that the association affiliate with the Miners' Federation.

## Federated Area.

As a protest against being required to draw timber, close upon 150 employees of the Buxton Lime Firms at their Whaley Bridge collieries struck work last Thursday week. A similar stoppage occurred at the same pits a couple of years ago.

A joint conference of representatives of the Lancashire Coalowners' Association and of the Lancashire and Cheshire Miners' Federation will be held in Manchester on Monday next, the 15th inst., to consider the wages of the surface workers in Lancashire and Cheshire. Increases all round are being sought.

The strike of 6,000 miners at Messrs. R. Evans and Co.'s extensive collieries in the Haydock and Golborne districts in Southern Lancashire has now entered upon its fifth week. The number of non-unionists has now been reduced to about a dozen.

## Scotland.

Arrangements are being made for the holding of a meeting of the Scottish Coal Trade Conciliation Board to consider an application by the coalowners for a reduction in the wages of miners to the extent of 18½ per cent. on the basis of rates prevailing in 1888. This is equivalent to about 9d. per day. Since the fixing of a minimum wage for miners last year, the ordinary rates of pay have been altered on several occasions. In June last the men entered a claim for an increase of 25 per cent. on basis rates, which was equal to about 1s. per day. The Conciliation Board failed to agree with regard to this claim, and the matter went to arbitration. Lord Hunter, who acted as arbitrator, decided that the men were entitled to an advance of 12½ per cent., or 6d. a day. A few months later an application was made by the coalowners for a reduction of 12½ per cent., but this claim was afterwards withdrawn, and in November an advance of 6½ per cent. on the 1888 basis was conceded to the men. Further meetings of the Conciliation Board were held in January and February of the present year to consider a claim by the miners for an increase of wages and a counter-claim by the coalowners for a decrease. In this instance Sheriff Glegg was called in to decide a point of procedure as to whether it was competent for the employers to lodge a claim for a reduction while a claim by the men for an increase was before the Board. The sheriff decided that it was competent for both claims to go before the Board in due course. The men's application was disposed of first, and Lord Balfour of Burleigh, who acted as arbitrator, awarded the men an advance of 12½ per cent. The employers' application came before the Board, but no alteration was made on the rates fixed by Lord Balfour. The most recent advance in the miners' wages was made in June last, when Sheriff A. O. M. Mackenzie, to whom a further application by the men was submitted, decided that they were entitled to an increase of 12½ per cent. on basis rates, or 6d. per day, leaving wages 87½ per cent. above standard.

At the last monthly meeting of the executive board of the Fife and Kinross Miners' Association the question of the system of weekly pays at double-shifted pits was the subject of a long discussion. Up to the present, it was stated, the employers in Fife, Kinross, and Clackmannan had refused to give the miners at their double-shifted collieries the same terms as had been granted elsewhere. Three alternatives were discussed by the board. The first was a strike of the men at the collieries affected; the second, a five-days-a-week policy; and the third, that the fortnightly idle day be held at all the collieries on Monday, instead of Saturday. The board unanimously passed a resolution by which the general body of the members were recommended meantime to raise their contributions to the association funds from 3½d. per week to 6d. per week. This proposal, it was pointed out, was made in order to bring the association into line with the other miners' organisations in Scotland, which already, in almost every case, are paying the increased contribution.

At the instigation of the Lanarkshire Miners' County Union, Kenmuir Colliery, near Newton, Cambuslang, and Kenmuirhill Colliery, both owned by the Glasgow Coal Company, were thrown idle on Monday on the non-union question. It was stated that the five-day policy was not being observed, as a number of miners were at work on the "idle day," Saturday, and the management are to be asked to put an end to the practice of miners filling coal on Saturdays.

## Iron, Steel, and Engineering Trades.

Not the least important event of the Trade Union Congress week was the formation of a federation of the trade unions connected with the iron and steel industry of the United Kingdom. Under the presidency of Mr. A. Henderson, M.P., a largely attended meeting of delegates met in the Milton Hall, Manchester, where the draft rules of the Federation were thoroughly overhauled and officers appointed. Mr. J. Gavin (Glasgow) was elected president, Mr. G. Beadle (Darlington) vice-president, Mr. Ivor Gwynne (Swansea) treasurer, and Mr. James Cox (Darlington) general secretary. The trustees are Messrs. W. Pugh (Swansea), W. C. Griffiths (Stockton), and A. Haddow (Glasgow). The Federation begins with a membership of some 35,000 members. From the speeches it would appear that the three-shift system of eight hours, with a minimum rate of wages for the lesser skilled workmen connected with the manufacture of iron and steel, will receive very early attention.

## Trade Unions' Congress.

At the concluding sessions of the Trade Unions' Congress at Manchester, on Friday and Saturday, a number of resolutions were summarily disposed of. A resolution protesting against fining was carried unanimously, as was one claiming that trade unions should be entrusted with the administration of the unemployment part of the Insurance Act. The Parliamentary Committee were instructed to appoint a deputation to wait upon the Prime Minister to urge the necessity for a Bill to compel employers to pay all their workers for all statutory holidays. A card vote was challenged by a small section of the dock labourers on a resolution demanding the nationalisation of mines, minerals, railways and lands. The result was: For, 1,944,000; against, 43,000. On the motion of Mr. D. Gilmour (Scottish Miners' Federation), a resolution was carried calling for legislation to prevent employers from evicting workmen from their homes during any trade dispute. He said that if employers again adopted that method of fighting, instructions would be given to the miners' officials to stop every pit in Great Britain.

## THE BY-PRODUCTS TRADE.

**Tar Products.**—The market keeps steady and prices are well maintained as a whole. Benzols and pitch keep firm. Carbolic is perhaps the weakest product. There is not much change in naphthas, while creosote is quietly steady. Nearest values are:—

Benzols, 90's .....	1/1½
Do. 50's .....	1/11½
Do. 90's North .....	1/1
Do. 50's North .....	1/11 to 1/11½
Toluol .....	1/11½
Carbolic acid, crude (60 per cent.) .....	1/2½ to 1/4
Do. crystals (40 per cent.) .....	4/4½
Solvent naphtha (as in quality and package) ...	9/9½
Crude ditto (in bulk) .....	5/5½
Creosote (for ordinary qualities) .....	3/3
Pitch (f.o.b. east coast) .....	45/ to 46/
Do. (f.a.s. west coast) .....	43/6 to 45/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—Firmness is the leading characteristic of the market in all positions. There is a satisfactory enquiry for future delivery and the persistent withdrawal of any official quotation at Beckton is an indirect indication of the prospects of a rising market. Closing prompt prices are:—

London (ordinary makes) .....	£12/10
Beckton (certain terms) .....	—
Liverpool .....	£13/5
Hull .....	£13/3/9
Middlesbrough .....	£13/2/6
Scotch ports .....	£13/5 to £13/10
Nitrate of soda (ordinary) per cwt. ...	10/9

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—J. J. MacW. Dunbar and H. Harvey, carrying on business as tin and other metalliferous miners, smelters, and refiners, under the name of the Stannaries Mining and Smelting Company, in respect of lands at Trevinnicks St. Kew and Grogley Mocr, St. Breock, Cornwall; S. A. Ball and W. Horton, carrying on business as engineers at Stratford-upon-Avon, under the style of Ball and Horton; C. W. Outram and F. A. Harris, carrying on business as iron and steel merchants at School-road, Sheffield, under the style of C. W. Outram and Co.

**New Mines and Quarries Forms.**—Section 88 (1) (b) of the Coal Mines Act, 1912, requires the owner, agent or manager of every mine to supply *gratis* to each person employed in or about a mine a book containing the parts of the Abstract and General Regulations prescribed as affecting him, and also to supply a copy at a price not exceeding 1d. to any such person applying for it at the pay office of the mine. The Home Office now gives notice of the publication of the following new pamphlets:

No.	Title.
55.	Coal Mines Act, 1911. The Abstract, the General Regulations, and the Explosives in Coal Mines Order. (For officials superior to firemen, examiners or deputies.)
56.	Coal Mines Act, 1911. The parts of the Abstract and General Regulations required to be supplied to:
57.	Mechanical engineers.
58.	Firemen, examiners and deputies.
59.	Electricians and assistant electricians.
60.	Winding enginemmen.
61.	Banksmen.
62.	Onsetters.
63.	Horsekeepers and drivers in charge of horses.
64.	Boiler minders.
65.	Persons in charge of ventilating machines.
66.	Shot-firers.
67.	Underground workmen in "naked light" mines.
68.	Underground workmen in "safety lamp" mines.
69.	Surface workmen.
70.	Persons employed in sinking operations.
71.	Haulage enginemmen and persons employed in hauling operations.

Nos. 57, 66, 67 and 69 conclude with extracts from the Explosives in Coal Mines Order of September 1, 1913.

No. 58 concludes with a memorandum on the Electricity Regulations.

No. 65 commences with the Explosives in Coal Mines Order.

No. 62 commences with the Third Schedule to the Coal Mines Act, 1911.

These may be obtained from the Government sales agents or through this office, at the price of 1d. each or 3s. per 100, plus the cost of postage.

## THE IRISH COAL TRADE

THURSDAY, SEPTEMBER 11.

## Dublin.

Since the lock-out of coal carters and labourers belonging to the Transport Union, which took place last week, business with the local merchants is practically at a standstill, and the same applies to work on the quays. The larger firms have plenty of orders coming in, but cannot undertake to deliver the coal until some settlement is arrived at with the men. Two or three of the small importers who are not associated with the larger merchants are making deliveries as usual, and have put up their prices 7s. and 8s. per ton, in consequence of which the bellmen are now charging 3s. per sack of 10 st. weight. Some of the industrial firms have taken the precaution to secure large stocks in order to tide over the continuance of the present struggle, and as there are large reserve stocks in the city coal yards, it is not anticipated that the ordinary prices will be affected by the present labour troubles. There is no change in quotations, viz.:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best kitchen, 24s.; Orrell slack, 21s.; steam coals from 21s. to 22s. per ton delivered; best coke, 23s. per ton. Irish coals at Wolfhill (Queen's County) are:—Best large coal, 20s. per ton; best household, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth; steam coals for contracts, 17s. 6d. per ton. It is stated that the proprietor of these collieries has commenced operations at an adjoining pit at Firoda which has not been worked for many years, and it is proposed to bring a number of miners from the Scotch and Welsh pits to train the local men. The import trade is suffering to some extent owing to the present situation, as the sailings of the vessels of one large firm of shippers are suspended. The coaling vessels arriving during the past week amounted to 47, as compared with 56 the week previously, chiefly from Garston, Workington, Newport, Liverpool, Llanelly, Preston, Cardiff and Ellesmere Port. The total quantity of coal discharged upon the quays was 22,000 tons.

## Belfast.

There is an improved demand in this port for all qualities, but more particularly for house coals, as these classes have been advanced at the English collieries and it is expected that local prices may shortly respond. Trade with the Scottish ports is active and there is, upon the whole, a plentiful supply. There is no change so far in any of the quotations. City prices are:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current rates ex-quay:—Arley house coal, 24s. per ton; Scotch household, 20s. 6d.; Scotch steam coal, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s.; English steam slack, 17s. per ton delivered. Cargoes arriving during the week were chiefly from Girvan, Garston, West Bank, Ayr, Glasgow, Lydney, Maryport, Preston, Ardrossan, Troon, Neath Abbey, Cardiff, Point of Aire, and Ellesmere Port. From 17th to 30th August the total number of colliers entering the harbour was 104.

## OBITUARY.

The death took place on Saturday, at his residence, Hatfield House, Wakefield, of Mr. Harry Plews, clerk to the local bench of magistrates, at the age of 57. At the time of his death Mr. Plews was chairman of the Yorkshire Railway Wagon Company Limited.

The death has taken place, after a long illness, of Mr. William Morgan, Danygraig, Briton Ferry, at the age of 60. Deceased was the works manager of the Briton Ferry Steel Company Limited, and had been under the company since its inception 25 years ago, previous to which he was mechanic at the Millbrook Works, Landore, and the Bryn Wilach Colliery, under Messrs. Vivian and Sons. He had also been consulting engineer of the Llanelly Steel Company Limited.

The death has taken place at Blackpool of Mr. Richard Milligan, coal merchant, of Pudsey, near Leeds. The deceased gentleman was in his 56th year and had been residing at Blackpool for about a month with his wife. A short time ago he contracted a cold. This developed into bronchitis and pneumonia and resulted in the death of Mr. Milligan. Mr. Milligan was the first coal dealer in Pudsey to sell coal by the bag. The business will be carried on by his partner (Mr. Helm) and his son.

Mr. John Stewart Simpson, senior partner in the Whitehaven Colliery Company, died at his residence, Ellerbeck, Harrington, on Friday morning, in his 80th year. Before he came to West Cumberland, Mr. Simpson was in partnership with his brother, Mr. Alex. Simpson, as mining and civil engineers. He came to Harrington to manage the ironworks there of Messrs. Bain, Blair and Patterson; and later the late Sir James Bain took him into partnership, in the concern of which Mr. Simpson remained a partner, until five years ago he sold out to the Combine. He and the late Wm. Fletcher were the original promoters of the Moresby Coal Company, and he was chairman of the company up till the time of his death. He became one of the partners of the Whitehaven Colliery Company when it was leased in 1888. Mr. J. D. Barnes is now the only surviving partner of the company. Mr. Simpson was sinking a coal pit at Mill Hill, but owing to troubled ground and unforeseen difficulties, and the small area of the royalty, the enterprise was abandoned about a year ago. Mr. Simpson has been closely identified with the business life of West Cumberland for close on half a century. He was managing partner in the Harrington Ironworks and Collieries, and it is something to his credit that during the whole of his connection with that concern these works never stood idle (except during a short time while the Dnrham strike lasted) for nearly 40 years, and the Harrington brand of pig iron was known the world over and always commanded top price and a ready sale. He was also largely interested in the iron ore and limestone industry, and it is generally conceded that having a command of nearly all the raw material necessary for manufacture of their wares was the great secret of the success of their undertaking. Mr. Simpson was largely responsible for this, and he was the pioneer of the Cumberland coke industry, which he established at Lowca. Mr. Simpson leaves no family, his wife and only son having predeceased him some time ago.



## CONTINENTAL MINING NOTES.

## Austria.

*Official Wholesale Coal Prices, Vienna Exchange.*—Pilsen large coal, 33.20 kronen per ton in truck loads, ex Franz-Josefs Bahnhof. Ostrau-Dombrau-Karwin coals: Large 30.31 kr., cubes 29.60-30.60 kr., nuts 29.30 kr., small 23.23-20 kr., washed smithy coals 30.30-50 kr., coke 38-40 kr. per ton net cash, ex shutes Nordbahnhof. Rossitz-Zbeschau-Oslawan coals: Best washed smithy coals, coarse or fine, 30.50-31.50 kr., coke 30.30-20 kr. per ton, ex Nordbahnhof or Staatsbahnhof. Upper Silesian coals: Best large or cubes 32.30-33.10 kr., intermediate large or cubes 31.50-32.30 kr., seconds large or cubes 26.70-27.80 kr., best nuts I. 32.70-33.50 kr., II. 29.60-30.10 kr., best smalls 23.50-24 kr., seconds 22.50-23 kr. per ton net cash, ex shutes Nordbahnhof. In truck loads: Best large or cubes 30.70-31.50 kr., nuts 31.10-31.70 kr. per ton, ex Nordbahnhof. Gas coke from the Vienna Gasworks, 32.40-34 kr. per ton ex works. Lignite: Dux large 21.70-23.20 kr., Brūx or Dux cubes 21.70-23.20 kr., nuts 21.20-22.70 kr., Mariaschein cubes 23.70-25.20 kr., nuts 23.20-24.70 kr. per ton, ex Franz-Josefs or Nordwest Bahnhof.

## Germany.

*Coal Market in South Germany.*—In general the situation remains good. Although there is little new business doing in industrial coals, consumers are taking their contracted quantities in nearly every case, and middlemen are doing the same. The house coal trade is good without being particularly brisk. The position is strengthened by the fact that the water-borne supplies arriving are not so large as anticipated, so that the bulk can be sent out at once, this being particularly the case with house coal. Large nuts are in good request, and the demand for broken coke is improving. Lignite briquettes, however, are only going off slowly. The river is in good condition, and as craft can be fully loaded freights are easier.

*Ruhr Coal Market.*—Though the distribution continues to decline and the iron industry in particular is taking smaller supplies of fuel, business is by no means bad. The volume of traffic, though smaller than last year, is still very considerable, and a revival may be expected for next month unless a scarcity of railway wagons intervenes. The coke market is not in a very promising condition, and as the demand has for some time failed to reach the output figures, stocks are growing, especially at the cokeries which make exclusively for sale. There is little fresh in the export trade, Holland and France taking about their usual quantities, though Belgium has been buying more largely, whilst the extensive shipments to South Germany have in part to be stocked, owing to the slackening in the demand.

*Coal Market in Upper Silesia.*—Though there is no marked change in the iron industry, the coal trade keeps satisfactory, and the pits are able to dispose of their entire output, so that when the autumn trade gets into full swing it will be difficult to meet the demand. Even now, in spite of all endeavours on the part of the mineowners, there are numerous complaints of delay in getting fuel supplies, and matters will become more serious when the scarcity of railway wagons sets in. Austria-Hungary is buying more largely since the pits there have raised their prices, and the requirements of Russian Poland cannot be satisfied in view of the needs of consumers in the home market. Coking coals are in very active request and cannot be raised quickly enough, and the enquiries for gas coal are increasing. The whole production of blastfurnace and foundry coke is taken up at once and deliveries are getting in arrears.

## THE TIE-PLATE TRADE

## Liverpool.

Business has been very dull the last few days. Unless matters soon improve, more mills will have to close down, as the output certainly exceeds the demand just now and stocks are accumulating. Current quotations range as follows:—Coke tins; I C 14 × 20 (112 sh. 108 lb.), 13s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 6d. to 26s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 7½d. to 13s. 9d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 7½d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 7½d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 3d. per box; I C squares and odd sizes, 13s. 6d. to 13s. 9d. basis for usual specifications. Charcoal tins rule quietly steady at 15s. 6d. basis and upwards according to tinning. Ternes are easy at 23s. 3d. to 23s. 6d. for I C 28 × 20. Coke wasters are in moderate request and are quoted:—C W 14 × 20, 12s. 3d. per box; C W 28 × 20, 25s. 6d. per box; C W 14 × 18½, 11s. 6d. per box; C W 20 × 10, 15s. 9d. per box—all f.o.b. Wales, less 4 per cent.

The resignation of Mr. T. Y. Greener, J.P., of West Lodge, Crook, from the position of chief agent to Messrs. Pease and Partners Limited, an appointment he has held with distinction for 22 years is announced. He succeeded Alderman Thomas Douglas, J.P., of Darlington, who held the position for many years. Mr. Greener has accepted the position of agent to Messrs. Hedley Brothers, and so have the right of their collieries in the South Moor and Craghead districts of West Stanley.

## THE LONDON COAL TRADE.

THURSDAY, SEPTEMBER 11.

The London coal trade for the past week has been very variable. The anticipation of an advance in the public advertised prices stimulated the demand, and a fair amount of buying was noticeable, but the bulk of the purchases were with the factors who had the remainder of the special summer sales to dispose of. The colliery representatives had very little opportunity of securing current orders, for the underselling was most marked, and only a small proportion of the market orders were available for colliery use. Factors and merchants who had loaded wagons in stock have been busy clearing off the coal standing at the best prices offering, but in every case considerably less than the ordinary list prices issued by the collieries. The restriction of the output from various causes has also greatly retarded deliveries during the past few weeks, and has led to an accumulation of orders at the colliery end, especially for house coal, which will take some little time to clear, but these are principally the balance of orders booked when the demand was weak, and the arrangements were stipulated to extend over July and August. Contractors also who were somewhat slow in the early summer months are naturally anxious to get all the coal forward before the winter price begins on October 1 next. The expected advance in the public prices took place on Saturday last, when all qualities were advanced 1s. per ton except stove coals, which were advanced 6d. This is the first advance this year from the lowest summer prices, and is somewhat late as compared with the previous year. In 1912 the advances were:—1s. per ton on stove coal August 17, 1s. per ton on kitchen coal and all lower qualities August 24, 1s. per ton advance on all qualities September 3, and a further 1s. per ton advance on September 14. The present advance brings the public prices to:—Best Wallsend, 29s.; best Silkstone, 23s.; new Silkstone, 27s.; Derby brights, 27s.; best kitchen, 26s. 6d.; stove coals, 22s. The advance was followed by a general advance in colliery prices, but since the issue of the price lists the flow of orders has undoubtedly been checked, and on Wednesday's market some of the merchants were complaining that others had not advanced in conjunction with the settlement on Friday last. The weather also had turned milder and looked more settled, so that the trade was distinctly slow, and the improved buying experienced in the week previous has altogether disappeared. The seaborne market has still very little on offer, and the prices continue at 21s. 6d. for best Wallsend, and 20s. 6d. for seconds, but a firmer tone was noticeable, and more enquiries were on foot. Thirty-one cargoes were reported as arriving in the river for Monday's market, and eight for Wednesday's, but as all were bespoke or under contract no actual selling price was announced. The reports of the iron and steel market, and the somewhat drooping tendency in prices lately, has had a depressing influence on steam coal and foundry coke prices for forward sales, but the factories along the Thames-side all continue busy, so that manufacturing qualities are still in good demand. Best hard steam coals are exceptionally firm. Second qualities are somewhat weaker. Bakers' nuts and kitchen cobbles have also received more attention lately, and the winter demand shows every prospect of being good. Very little Yorkshire coal is available for the London market, and all pit prices are firm. Smallers are the heaviest drug on the market. The over-production whilst so many collieries have been working full time, and the lessened requirements of the electric lighting and gas companies during the summer months, has led to a complete standstill in regard to these qualities, and prices have suffered considerably. The outlook is beginning to be more reassuring. Buyers are, however, keeping off the market.

## Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/6	13/6
Do. nuts .....	11/6	12/6
Birley cube Silkstone .....	12/6	12/
Do. branch coal .....	16/	15/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	13/6	12/6
West Riding Silkstone .....	13/	12/
Kiveton Park Hazel .....	14/6	13/
Do. cobbles .....	14/6	13/
Do. nuts .....	14/	12/
Do. hard steam .....	13/	11/
New Sharlston Wallsend .....	15/	15/
Wharfedale Silkstone coal .....	13/6	14/
Do. Plockton Main .....	13/6	13/6
Do. Athersley house coal .....	13/	11/6
Newton Chambers best Silkstone .....	17/	15/
Do. Grange best Silkstone .....	15/6	14/
Do. Hesley Silkstone .....	14/	13/
Do. Rockingham selected .....	14/	13/6
Do. Rockingham Silkstone .....	13/6	13/
<b>Derbyshire.</b>		
Wingfield Manor best .....	12/6	12/
Do. large nuts .....	12/3	11/9
Do. small nuts .....	10/	9/6
Do. kitchen coal .....	10/6	8/6
West Hallam Kilburn brights .....	12/6	12/
Do. do. nuts .....	12/3	11/9
Do. London brights .....	11/	10/
Do. bright nuts .....	11/	9/9
Do. small nuts .....	10/	9/6
Manners Kilburn brights .....	12/6	11/6
Do. do. nuts .....	12/	11/
Shipley do. brights .....	13/	11/6
Do. do. nuts .....	12/6	11/
Mapperley brights .....	12/6	11/6
Do. hard steam .....	11/6	10/9
Cossall Kilburn brights .....	12/6	11/6
Do. do. nuts .....	12/	11/
Trowell Moor brights .....	12/6	11/
Do. do. nuts .....	12/	10/9
Grassmoor Main coal .....	13/	12/6
Do. Tupton .....	11/6	11/
Do. do. nuts .....	11/6	12/

	Current prices.	Last week's prices.
<b>Derbyshire—(cont).</b>		
Clay Cross Main coal .....	13/	12/6
Do. do. cubes .....	13/	12/
Do. special Derbys .....	12/	11/9
Do. house coal .....	11/6	11/
Pilsley best blackshale .....	13/	12/6
Do. deep house coal .....	11/6	10/6
Do. hard screened cobbles .....	11/	10/
Hardwick best Silkstone .....	13/	12/6
Do. Cavendish brights .....	12/6	11/6
Do. cubes .....	12/6	11/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/6	12/
Do. small hards .....	12/6	11/
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	12/
Do. cobbles .....	13/	12/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/6	14/
Bestwood hard steam coal .....	13/	12/
Do. bright cobbles .....	11/9	11/3
Hucknall Torkard main hards .....	12/9	12/3
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. ....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/6	12/
Do. hard steam .....	11/6	10/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/9
<b>Warwickshire.</b>		
Griff large steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	10/9	11/
Do. loco Two Yard hards .....	14/6	14/
Do. Ryder nuts .....	11/3	11/6
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	10/9	11/
Haunchwood steam .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	10/9	11/
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	10/9	11/
Exhall Ell coalspires .....	12/9	12/6
Do. brights .....	11/6	—
Do. large steam coal .....	10/9	10/9
Do. best screened cobbles .....	11/	—
Do. large nuts .....	11/	—
<b>Leicestershire.</b>		
Snibston steam .....	10/	10/6
Do. cobbles .....	10/6	10/3
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/6
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	18/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	12/	10/
Do. large nuts .....	11/6	10/
Do. bakers' nuts .....	11/0	9/6
Do. Main nuts .....	10/6	10/
Do. hards .....	10/6	9/6
Granville New Pit cobbles .....	11/	11/6
Do. Old Pit cobbles .....	11/	10/6
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/	13/6
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	13/	14/
Silverdale best .....	13/	15/
Do. cobbles .....	12/9	14/
Apedale best .....	13/	13/6
Do. seconds .....	12/9	13/
Podmore Hall best .....	13/	13/6
Do. seconds .....	12/6	13/
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London		
Do. brights .....	11/	13/
Do. shallow one way .....	11/	12/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	10/9	11/
Coppice deep coal .....	13/	13/
Do. cobbles .....	12/6	12/
Do. one way .....	10/6	12/
Do. shallow coal .....	13/	12/
Cannock Chase deep main .....	17/	17/
Do. Deep kitchen cobbles .....	12/	12/
Do. best shallow main .....	14/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/6	11/

**Grimsby Coal Exports.**—The following is the official return of the quantity of coal exported from Grimsby during the week ended the 4th inst.:—Foreign: To Ahus, 1,440 tons; Esbjerg, 344; Libau, 2,611; Moss, 450; Ystad, 2,185; Bogesne, 356; Riga, 1,691; Trelleborg, 4,627; Westervik, 614; Antwerp, 556; Hamburg, 1,554; Gothenburg, 2,187; Rotterdam, 256; Dieppe, 707; and Malmo, 1,351; total, 20,929 tons. Coastal: To Southwold 30, and Gravesend 500; total, 530 tons. Last year during the corresponding period the exports were 24,746 tons foreign and 862 tons coastal.



THE MANUFACTURE OF COKE IN BELGIUM.\*  
By Baron EVENCE COPPÉE, Brussels.  
(Continued from page 489.)

Quite recently an improvement has been effected in the utilisation of gas in gas engines by extracting the waste heat from the burnt gases expelled from the cylinders of gas engines. These gases leave the engine at a temperature in the neighbourhood of 500 degs. Cent., and they are made to pass through steam boilers of appropriate design. In this way it has been found possible to raise about 2 lb. of steam per horse-power hour developed by the gas engine, which is equivalent to an increase of about 13 per cent. on the power developed.

Another important use for the surplus gas from coke ovens is for heating metallurgical furnaces, and in particular Siemens open-hearth furnaces. The surplus gas from a battery of regenerative ovens coking 100,000 tons of coal per annum is sufficient to heat a Siemens furnace producing 100 tons of steel per day.

One of the latest and probably the most profitable development, however, in the use of this surplus gas is its application to town lighting. The transport of gas under pressure has been so perfected that it now presents scarcely greater difficulties than the transport of water. Moreover, since the old type of batwing burner has now been almost entirely superseded by incandescent burners, the candle-power of the gas supply is of little importance, and the calorific power is the only point that need be taken into consideration. The ordinary surplus gas obtained from coke ovens scarcely reaches a high enough standard, however, in this respect.

Practically speaking, we may say that for town-lighting purposes a gas should have a calorific power of at least 560 British thermal units per cubic foot. Coke-oven gas is very seldom as rich as this, and would require to be carburetted by means of benzol or mineral oil in order to bring it up to the required calorific power. In order to avoid the expense of carburetting, the more usual process is to fractionate the gas evolved from the ovens. By dividing the gas evolved from the ovens into these two parts, it is possible to use the rich portion for town lighting, while the other portion is used for heating the ovens, and any surplus can be used for power production in gas engines or other suitable purpose. The proportion of the lighting gas to the whole will depend entirely upon the quality of the coal. At our ovens at Ressaix, for instance, we are coking what would be called a poor coal as judged by English standards, containing as it does only 18 to 19 per cent. of volatile matter, and under 9,400 cubic feet of gas per ton. The amount of rich gas of 560 British thermal units and upwards, suitable for town lighting, is rather more than 4,050 cubic feet per ton, or about 43 per cent. of the whole. The results obtained in this field show conclusively that the production of lighting gas can be carried on simultaneously with the production of metallurgical coke, and we may expect to see very large developments on these lines in the near future.

America and Germany were the first countries to take up this question to any large extent, and at the present day Germany has no less than 45 towns or communes which are wholly or partly supplied with lighting gas derived from coke ovens. We are also taking up the question in this country, and arrangements have already been made for lighting Liège, Ghent, Mons, Ostend, one of the suburbs of Brussels, and other places with coke-oven gas.

The following table (A) has been drawn up with the view of showing the cost of a ton of coke at various stages in the development of coke ovens. I have in each case assumed that the plant is working in Belgium and producing about 1,500 tons of coke per week from coal of about 20 per cent. volatile matter, calculated as being worth 9s. 6d. per ton delivered at the ovens, wages and other expenses being taken as equal in each case. In calculating the figures in the table it has been assumed that the surplus could be sold for town lighting at a price equivalent to 8d. per 1,000 cubic feet after deducting the cost of purifying.

The carbonisation of coal, which was at one time carried out with the sole object of producing coke and perhaps, incidentally, steam, is now accompanied by the production of other products of great value, and one might really say that in a modern coking plant where the surplus gas is sold for town lighting or used for power production, the coke is no longer, properly speaking, the principal product manufactured.

It is impossible to speak of coke ovens without referring to the question of by-product recovery. Lack of space and the nature of this paper make it impossible to speak at any length on this subject. Much has been

TABLE A.									
Per ton of coke.		Beehive oven.		Non-by-product retort oven.		Waste heat by-product oven.		Regenerative by-product oven.	
Yield of coke .....		68 per cent.		77 per cent.		0·80 per cent.		80 per cent.	
Cost of coal .....		s. d. 14 1		s. d. 12 6		s. d. 12 0		s. d. 12 0	
Wages, upkeep, sinking fund and general expenses .....		1 11		1 6		1 8½		1 9	
		16 0		14 0		13 8½		13 9	
		Hot gases not used for steam raising		Using hot gases for steam raising.					
Less—Value of by-products.									
Value of steam .....		1 7		1 7		1 2½			
Value of surplus gas—									
(a) for lighting .....								3 7½	
(b) for power .....									
Profit on by-products .....						2 5		2 5	
Cost price of 1 ton of coke .....		16 0		14 5		10 1		7 8½	
								2 5	
								8 11	

said and written as to the relative merits of the wet and direct processes, and I do not propose here to attempt to compare them; but in my opinion neither possesses any advantage of real importance over the other, and the position may be most fairly summarised by saying that each process has certain advantages not possessed by the other, and that the choice of one rather than the other is a matter of the local conditions under which the plant has to work.

There are other processes which have been proposed for the recovery of ammonia, quite distinct in their character from the processes referred to. These have not yet attained a practical stage, but they are interesting to note, since they show promise of effecting considerable economy in the cost of manufacture of sulphate of ammonia, if and when the difficulties which have so far prevented them from passing out of the experimental stage have been successfully overcome. The Feld and Burkheiser processes, for example, have been designed to do away with the necessity for using sulphuric acid. Though, as I have just said, certain practical difficulties have so far prevented these processes from being successfully carried out on a manufacturing scale, there are grounds for hoping that the difficulties will ultimately be overcome and the processes brought to successful application.

Before finally leaving the subject of by-product recovery, I must say a few words about another process proposed by Dr. Häusser for the production of nitric acid and artificial nitrates from coke-oven gas. The details of the process are at present being worked out the main idea being to oxidise nitrogen in an excess of oxygen under pressure produced by the explosion of a gaseous mixture of which coke-oven gas is one of the constituents. I mention this process with a view of showing the possibilities of constant development in the future, and when we review the great strides that have been made in chemical science in the last few decades, it is impossible to predict any limit to future progress.

The question has often been raised as to whether the extension of by-product recovery may not ultimately defeat its own ends by putting on the market such increasing quantities of by-products that the supply, may ultimately reach or possibly overtake the demand, and thus force down the prices of these by-products. A careful study of what has happened in this respect in the past, however, shows that there is very little danger of this being the case. Taking sulphate of ammonia as being the principal by-product, we find that the total world production of sulphate in 1900 was about 450,000 tons; by 1908 this had increased to 880,000 tons, while in 1912 the total production was 1,300,000 tons, the increase for the last four years being 10, 13, 7 and 10·6 per cent. on the preceding year.

The following table shows the total production of sulphate in the years 1908 and 1912 of the five principal sulphate-producing countries, and also the amounts of sulphate used in those countries in the same years:—

	Production.		Consumption.	
	1908.	1912.	1908.	1912.
Germany.....	313,000 ...	492,000 ...	291,000 ...	425,000
England .....	321,000 ...	379,000 ...	83,000 ...	88,000
United States...	80,000 ...	160,000 ...	199,000 ...	218,000
France.....	49,000 ...	69,000 ...	80,000 ...	90,000
Belgium .....	29,000 ...	44,000 ...	40,000 ...	46,000

It will be seen that the United States, France and Belgium consume more sulphate than they produce; Germany consumes 84 per cent. of her very large production, whilst in England the consumption is only 24 per cent. of the production. There is plenty of room in some of the above countries, especially in England and France, for extension of the use of sulphate of ammonia.

What has been attained in Belgium will no doubt be realised in the other countries, and, moreover, the use of sulphate is constantly extending into new areas.

The position is much the same with reference to tar, for which new uses continue to be found. Apart from the fact that it is the starting-point of the great aniline colour industry, it is an excellent liquid fuel, although hitherto it has not been largely employed in this respect. Furthermore, recent trials have proved its extreme suitability for use in Diesel engines. It is also increasingly used for tarring roads. The consumption of pitch for briquette making increases considerably from year to year, whilst apart from their use for creosoting and preserving timber, the increased use of internal-combustion engines will result in an increased demand for these oils as fuel, especially for marine work, on account of the great advantages of liquid fuel in respect to stowage and handling and higher thermal efficiency.

As for benzol, we are at this moment beginning to see it being very largely used for motor traction, and there is undoubtedly a great future before it in this respect. We have, then, in my opinion, every encouragement to look forward to the future with nothing but confidence as far as by-products are concerned.

MINING AND OTHER NOTES.

Messrs. Yeadon, Son and Co., of Leeds, have recently forwarded a large complete briquette plant to one of the leading railway companies in India for the purpose of converting their native Indian coal into briquettes suitable for consumption on their locomotives.

With reference to the paragraph published in last week's *Colliery Guardian* to the effect that the Mid-Cannock Colliery estate has been secured by Messrs. William Harrison Limited, of the Brownhills Collieries, and that the pits are to be re-opened at the earliest possible opportunity, it is now stated that the orders for the machinery are being placed, and the operations are to be pushed forward with all speed. The seams which will be mined will be the valuable Deep, Shallow, Yard, Bass, and probably one or two other kinds. They extend for a considerable distance and, as a good deal of land has been recently added to the estate, the bounds of the Mid-Cannock Colliery of to-day far exceed those of 30 years ago. The estate reaches from Churchbridge on the one hand to Blackfords Corner, Chads Moor, on the other. It goes to Calving's Hill, behind Cannock Market Hall, to Cemetery-road, Cannock. In another direction it strikes out as far as the Four Crosses (Hatherton), Longford-lane and the Watling-street being also embraced. Coincident with these developments at Mid-Cannock, considerable extensions are being carried out at the Great Wyrley sinkings of Messrs. Harrisons Limited. The carrying out of the scheme will involve the demolition of a couple of comparatively new residences erected for colliery officials, the erection of a commodious suite of colliery offices, and the probable removal of the head offices and staff of the company from Brownhills to Great Wyrley. All these developments are closely related to the early construction of the Cannock Chase light railway to link up the local coalfields with the Wolverhampton district. Owing to the continued development of the Cannock Chase coalfields, the question of railway transit is becoming an exceedingly vital one, and without the new line it would be impossible to cope with the coal traffic.

Following the recent Royal visit to Lancashire, the Pilkington Tile and Pottery Company, of Clifton Junction, near Manchester, which is allied with the Clifton and Kersley Coal Company, have received an intimation that the King has been pleased to authorise them to describe their productions as "Royal Lancastrian-pottery."

The members of the North of England branch of the National Association of Colliery Managers visited on Friday, September 5, the Ashington and Ellington Collieries, at the invitation of the Ashington Coal Company Limited. Ellington Colliery was first inspected. The colliery, which is situated about five miles to the north of Blyth, has at present two shafts in operation—Betty Pit and No. 2 Pit—and sinking operations are at present in progress in a third shaft—No. 3 Pit. At the Betty Pit sinking was commenced

\* From a paper read before the Iron and Steel Institute, September 1913.



June 7, 1909, and the High Main seam was reached on November 30, at a depth of 41 fathoms 4 ft. 6 in. The thickness of the seam is 2 ft. 7½ in. The Yard seam, reached on December 28 at a depth of 67 fathoms 5 ft. 7½ in., is 3 ft. 5½ in. thick. The total depth of the shaft is 69 fathoms 5 ft. At No. 2 Shaft, sinking was commenced on July 19, 1909, and the High Main seam reached on March 23, 1910, the Yard seam on July 4, 1910, and the Three-Quarter seam on January 27, 1912. The total depth of the shaft is 92 fathoms 3 ft. No. 3 Shaft, to be used as a ventilating and pumping shaft, is 15 ft. in diameter. Sinking operations were commenced on January 6 of this year. The High seam was reached on May 29 and the Yard seam on August 30. It is proposed to sink this to the depth of No. 2 Shaft. Noteworthy features at Ellington include the screening plant, the compressed air installation, the pumping apparatus, the haulage arrangements, &c. After visiting Ellington, the party was entertained to luncheon at the Portland Arms, Ashington, by the Ashington Coal Company. "Success to the Company" was proposed by Mr. Mark Ford, of Washington, and Mr. Ridley Warham suitably responded. After luncheon, the party visited Ashington Colliery, one of the four owned by the company, whose daily output reaches 9,000 tons. At Ashington, 4,500 tons of coal are got out each day. The company employs 9,000 persons and the collieries support a local population of over 30,000 people. Many interesting features, to which the attention of visitors was called, included the power station, the mixed pressure turbo-alternator, the brickworks, the compressing plant, the mixed pressure turbo-compressor and the screening plant.

The Argenta Cup, at a representative competition at Blackpool, has been secured by the Earl of Ellesmere's ambulance corps of Walkden, near Manchester, they heading the list with 336 points, Horwich coming second with 331 points. In addition, each member of the team was the recipient of a pretty timepiece.

A correspondent says, following the example of Messrs. Andrew Knowles and Sons Limited, who have recently adopted electrical haulage at certain of their collieries in the Pendlebury and Pendleton districts, near Manchester, it is stated that other leading coalowners in south and south-east Lancashire are obtaining prices for having similar installations put down in their pits.

The intimation has now been officially made that Sir Henry Cunynghame, K.C.B., has been appointed by the Home Secretary, under section 83 of the Coal Mines Act, 1911, to hold an enquiry into the causes and circumstances attending the recent disaster at Cadder Pit. The enquiry, which is expected to extend over several days, will be opened in the Justiciary Courthouse, Glasgow, on Monday, 22nd inst.

Mr. James Curley, oversman, Craigend Colliery, Polmont, Stirlingshire, has been presented with a gold Albert and appendage, together with a gold brooch for Mrs. Curley, on the occasion of his leaving to fill a similar position with the Fenton Colliery Company, Stoke-on-Trent.

Eighty men and boys employed at Hucknall No. 2 Colliery, Notts, have received a month's notice. The area of working is being gradually reduced, as the Top Hard seam is getting exhausted. When the same seam was closed at No. 1 Colliery, about six years ago, the late Mr. J. E. Ellis, being desirous of keeping the men employed, transferred them to No. 2, where double shifts were worked. The management has decided to revert to the single shift system as and from October 1, and as this would cause a superfluity of employees, the directors have had to give men notice.

A protest has been signed by the presidents of a number of representative associations in Liverpool and Manchester against the proposal for making expenses consequent on strikes a subject of insurance to be effected partly by owners and partly by shippers.

A correspondent learns that the Four-foot mine at Lord Ellesmere's No. 1 Pit at Mosley Common Collieries, Tyldesley, is now being opened out in the direction of Boothstown and Astley, and increased quantities of coal are now being got out of that mine.

The officials and workmen at Auchenbeg Colliery, Lesmahagon, have presented Mr. John Law, oversman, with a handsome roll-top writing desk, suitably inscribed, in view of his appointment to a similar position in Swinhill Colliery.

Messrs. Yeadon, Son and Co., Leeds, have received an order to supply a complete briquette plant to one of the leading lumber firms in Canada for converting their sawdust into briquettes suitable for steam and household consumption. This order is the result of successful experiments carried out by Messrs. Yeadon with this material in this country.

A special meeting of the Electric Supply Committee of the Birmingham City Council was held on Tuesday for the purpose of considering the tenders for the supply of coal to the department for the year commencing October 1. The total amount of coal required for the twelve months was 205,000 tons, and the aggregate amount of coal offered in the tenders was 1,451,000 tons. The committee eventually accepted contracts at an average price which was more favourable than last year. Twelve months ago the quantity of coal contracted for was 160,000 tons, so that the quantity exceeded this year by 45,000 tons.

The recent removal of Mr. J. Bingley from the management of the Mansfield Colliery at Forest Town to the position of agent to the Bolsover Colliery Company has been marked by a handsome testimonial from the officials, men and boys. The gifts consisted of a completely equipped dressing case each for Mr. and Mrs. Bingley, and also a handsome drawing-room suite.

Mr. Thomas Wain, of Dee Banks, Chester, manager for Messrs. Higginbottom and Co., Royal Liver Building, Liverpool, has been elected to a seat on the board of directors of the New Haden Collieries, Limited, Cheadle, Stoke-on-Trent. Mr. Wain's connection with these collieries extends over a period of twelve years, and he will still retain his position in association with Messrs. Higginbottom. Mr. Wain is the youngest son of the late Mr. J. R. Wain, who for many years was managing director of the Chatterley-Whitfield Collieries, North Staffordshire.

The Pumpheerston Oil Company are erecting several new blocks of workmen's houses at Tarbrax to accommodate the increased number of workmen required at the pits and mines. They are also preparing to build over 100 new houses at Seafeld for the accommodation of their miners at Brieche Pits.

The sinking of the new colliery at Dullatur, near Kilsyth, was commenced within the last twelve months by the Baton Collieries Limited, 53, Bothwell-street, Glasgow, who are also the owners of extensive collieries in the parish of Shotts. It is situated on the estate of Cumbernauld, a short distance to the east of Dullatur Station. Two large shafts have been sunk to a depth of about 50 fathoms, and have cut through two workable seams of coal, the analysis of which shows it to be quite equal to the best Welsh navigation steam coal. From the colliery, coal is expected to be put on the market within the next two weeks. It is interesting to note that the colliery is the first in Scotland which conforms to the new Coal Mines Act, the screening plant being erected about 80 yards from the shafts. A large number of men will be employed at the pit, and this naturally will add greatly to the prosperity alike of Cumbernauld, Dullatur and the neighbourhood.

In connection with the University of Leeds there are departments of mining, electrical, civil, and mechanical engineering, and coal gas, fuel and metallurgy. The next session begins on September 30, on which day the entrance examination will be held.

While operations were proceeding in connection with the excavation of Port Seton East Basin Harbour a seam of coal was struck, it is stated. When this harbour was constructed many years ago a similar seam was unearthed, and hundreds of tons of coal were excavated.

The special committee appointed by the council of the Newcastle Chamber of Commerce has presented a report in which attention is drawn to the difficulties attending the service of documents, taking of evidence, affidavits and the execution of judgment and arbitration awards. In regard to the last a German judgment award cannot be executed in England as such; and English judgment awards are not acknowledged in Germany. It is highly desirable in the interests of litigants in both countries to make judgment awards more easily enforceable in the respective countries. As regards arbitration awards no real difficulties seem to exist.

We learn that Messrs. W. Bardill and Co., engineers, and specialists in mining machinery, late of St. Peter's Gate, Nottingham, having purchased the business, plant and patterns of the Eagle works, Popham-street, Nottingham, lately occupied by Messrs. H. Savage and Sons, millwrights and woodworking machinists (established since 1850), are transferring their offices to the new address, and are there concentrating their merchant and manufacturing business. Mr. W. Bardill, M.I.M.E., will also continue his practice as consulting engineer at the new address.

Negotiations for the acquisition of the Whitehaven Collieries has been completed, says our correspondent, and a new company has been formed. As a result important developments will shortly be undertaken. The collieries are the property of the Earl of Lonsdale, and were leased in 1888 to a company of which Sir James Bain was the head. There are in all three mines—William, Wellington, and Ladysmith, and the new company contemplate sinking a new shaft south of the Wellington pit. It has also been decided to erect an installation of by-product ovens at the Ladysmith Colliery, which will be the biggest plant put down at once in Cumberland. The development will be of immense importance to the iron industry of West Cumberland, as it will help to make it self-contained in point of coke supply.

The annual shield competition of colliery ambulance teams representing the Cannock Chase centre of the St. John Ambulance Association was held at Walsall Arboretum on Saturday. There was an excellent demonstration of ambulance work, in which 13 teams took part. The display was followed by a meeting in the assembly room of Walsall Town Hall, at which Mr. T. H. Bailey presided, and Mrs. Berry, the wife of Dr. Martin Berry, Bloxwich, handed the shield to the winning team. The results of the competition were as follow:—1, Holly Bank No. 1 team; 2, Holly Bank No. 2 team; 3, Cannock and Leacroft No. 1 team; 4, Cannock and Rugeley, Cannock Wood mine No. 1; 5, Cannock Chase No. 1.

## NEW EXPLOSIVES ORDER.

### Important Alterations.

The Home Secretary has just made an Order under section 61 of the Coal Mines Act, 1911, entitled "The Explosives in Coal Mines Order of the 1st September, 1913," consolidating with amendments the previous Orders regulating the supply, use and storage of explosives in mines to which the Act applies.

In the following are outlined the variations in the new Order from the original Order of May 21, 1912, which was subsequently modified by an Order issued on October 15, 1912.

### Detonators.

Clause 1 (e) (i.) now reads:—

Detonators shall be under the control of the manager of the mine, or some person or persons specially appointed in writing by the manager for the purpose, and shall be issued only to shot-firers appointed in pursuance of Clause 6 of this Order or (in mines to which Part II. of this Order does not apply) to officials specially authorised in writing by the manager.

### Direction of Shot-holes.

Clause 2 (d) now reads:—

(d) Before any shot is charged the direction of the hole shall "where possible" be "distinctly" marked on the roof or other convenient place;

the words quoted being new.

### The Use of Squibs.

Clause 2 (f) has been altered to read as follows:—

No shot shall be fired in any mine except by means of an efficient magneto-electrical apparatus or by means of a fuze complying with the conditions and ignited in the manner specified in the Fourth Schedule hereto.

Provided that in a coalmine or part of a coalmine in which the use of safety lamps is not required and to which Part II. of this Order does not apply, and in any mine not being a coalmine, shots may be fired by means of squibs of the character specified in the Fifth Schedule hereto, subject to the following conditions:—

(a.) Squibs shall not be taken into the mine except in a suitable metal case, separate from any other explosive, and shall be kept in the case until about to be used for the firing of a shot.

(b.) No person shall shorten, bend or untwist the slow match or touch, or light it except at the extreme outer end, or in any other way expedite its burning.

(c.) No person shall relight a touch which has died out or been extinguished.

No person shall take into a mine or have in his possession any squib other than a squib of the character specified in the Fifth Schedule.

### Following Shotfiring.

The following is new:—

(g.) The person firing the shot shall, after the shot has been fired, make a careful examination of the place and see that it is safe in all respects.

### Electrical Shotfiring Apparatus.

Paragraph (g) becomes paragraph (h); what was formerly paragraph (h) now reads:—

(i.) Every electrical firing apparatus shall be provided with a push button, and with a removable handle which shall not be placed in position until the shot is required to be fired, and which shall be removed as soon as a shot has been fired. The removable handle shall at all times remain in the personal custody of the authorised person whilst on duty. For the push button there may be substituted an arrangement by which the firing contact is automatically made at the end of the travel of the handle and on the release of the handle is automatically broken.

### Missfires.

Clause 3 (a) reads (the new words being indicated):—

(a.) The person firing the shot shall not approach or allow anyone to approach the shot-hole until an interval has elapsed of not less than 10 minutes in the case of shots fired by electricity "or by a squib," and not less than an hour in the case of shots fired by other means;

and (d):—

(d.) If the shot was fired electrically, he "shall before approaching the shot-hole" disconnect the cable and the removable handle from the firing apparatus and shall examine the cable and connections for any defect.

There is the following new clause at the end of Part I. (General Provisions):—

4. The foregoing provisions of Clause 2 (c) as to the removal of any part of the stemming and the pulling out of detonator leads, and of Clause 3 as to the miss-fired shots, shall not apply in cases in which an exemption has been granted by the Secretary of State on the ground that an appliance is used which enables the detonator to be removed with safety after the shot-hole has been charged.

This advances the numbers of the subsequent clauses by one each.

Clause 6 (formerly 5) (a) reads now as follows:—

(a.) A competent person (in this Order called a shot-firer) shall be appointed in writing by the manager of the mine for the purpose of firing shots. No person shall be so appointed if his wages depend on the amount of mineral to be gotten, and no person "unless he is employed in a mine in which inflammable gas is unknown" shall be qualified to be appointed or to be a shot-firer unless he has obtained the like certificates as to his ability to make accurate



tests for inflammable gas and as to his eyesight as are required by section 15 of the Act in the case of firemen, examiners or deputies, and the provisions as to such certificates shall so far as applicable have effect as if incorporated in this Order.

#### Firing in the Coal.

In Clause 6 (formerly Clause 5), which refers to mines in which permitted explosives are to be used, there is an alteration in paragraph (i) (e), which now is:—

(e.) No shot shall be fired in coal unless the coal has been holed to a depth greater than the depth of the shot-hole. This provision shall not apply to any anthracite mine or to any mine which may be exempted by the inspector of the division on the ground that, by reason of the character of the coal or the inclination of the seam, holing would be impracticable or dangerous.

#### Examination before Firing Shots.

Subclause (ii) is new as regards the concluding sentence:—

(ii.) No shot shall be fired unless the shot-firer has examined with a locked safety lamp or other apparatus approved for the purpose by the Secretary of State the place where the shot is to be fired and all contiguous accessible places within a radius of 20 yards from the place, and has found them clear of inflammable gas. [This requirement shall not apply to mines in which inflammable gas is unknown.]

#### Shotfiring in Haulage Roads and Intakes.

Clause 7 (formerly Clause 6) now reads as follows, the latter portion being new:—

7. In the main haulage roads and main intake airways and any place immediately contiguous thereto in any coalmine which is not naturally wet throughout—

(a) No explosive shall be used other than a permitted explosive as hereinafter defined, and in accordance with the conditions prescribed by Clause 6 of this Order;

(b) No shot shall be fired without the special permission in writing of the manager or under-manager;

(c) No shot shall be fired unless the workmen have been removed from the seam in which the shot is to be fired, and from all seams communicating with the shaft on the same level, except the men engaged in firing the shot, and in addition such other persons, not exceeding the number hereinafter specified, as are necessarily employed in attending to the ventilating furnaces, steam boilers, engines, machinery, winding or ventilating apparatus, signals or horses, or in inspecting the mine:

In mines in which the total number of persons employed below ground does not exceed 500 ... 10

In mines in which the total number of persons employed below ground does not exceed 1,000 ... 20

In mines in which the total number of persons employed below ground exceeds 1,000 ... 30

Provided that in mines where mechanical power or gravity is used for the purpose of hauling mineral from the face, and the movement of the strata renders it necessary to maintain the height of the roads by ripping, the foregoing provision relating to the removal of workmen shall not apply to men who may remain in the mine for the purpose of carrying on the ripping within such distance of the face as may be fixed by the manager with the approval of the inspector of the division, or for the purpose of repairs.

#### Sinking Operations.

Clause 8 (formerly Clause 7) (d) now reads:—

(d.) After a shot has been fired the charge-man shall not allow any person to descend until he has "descended, accompanied if necessary by not more than two other persons, and has" examined the place and found it to be safe in all respects. If the place is one in which inflammable gas has been found, or is likely to be found, the examination shall be made with a locked safety lamp "of a type which will indicate the presence of such gas."

#### Publication.

Clause 10 (formerly Clause 9) has been altered to read:—

10. A copy of this Order (with the exception of the First, Second, and Third Schedules) shall be supplied to every shot-firer, and shall also be kept posted up in some conspicuous place at or near the mine where it may be conveniently read or seen by the persons employed.

#### Permitted Explosives.

The first part of—

Clause 11 (formerly Clause 10) now reads:—

11. In this Order—

The term "permitted explosives" means (a) the explosives named and defined in the First Schedule hereto, and (b) for a period of five years from 1st January, 1914, the non-detonating explosives named and defined in the Second Schedule hereto.]

Provided that the use of the explosives named and defined in the Second Schedule is permitted only for the purpose of bringing down coal (whether by shots placed in the coal or by shots placed in the stratum immediately above or below the coal), and only in the following class of mines—that is, mines which are not liable to blowers or sudden outbursts of firedamp and in which firedamp does not exist in the coal at a pressure which makes the use of such explosives dangerous and in which the dust on the floor, roof and sides of the roads is either naturally so largely composed of incombustible matter as not to be dangerous or has been rendered so by artificial means. If any question arises as to whether a mine is a mine of the aforesaid class or not, the decision of the inspector of the division shall be final, subject to an appeal to the Chief Inspector of Mines.

Provided further, as regard the explosives named and described in either the First or Second Schedule, that

where the composition, quality, or character of any explosive is defined in those Schedules, any article alleged to be such explosive which differs therefrom in composition, quality or character whether by reason of deterioration or otherwise, shall not be deemed to be the explosive so defined; but an owner, agent or manager shall not be responsible for the composition, quality or character of an explosive, if he shows that he has in good faith obtained a written certificate from the maker of the explosive that it complies with the terms of the schedules, and that he has taken all reasonable means to prevent deterioration of the explosive while stored.

The following is a list of the explosives named and defined in the \*First and Second Schedules:—

#### FIRST SCHEDULE.

Ajax	Melling powder
Ammonite, No. 2	Neonal
Bellite, No. 2	Nitro-densite
Bellite, No. 4	Pit-ite, No. 2
Britonite, No. 2	Stanford powder
Cambrite	Super-excellite
Dreadnought powder	Superite
Dynobel	Super-kolax
Essex powder	Syndite
Haylite, No. 1	Tutol, No. 2
Kentite	Uplees powder
Kynarkite	Westfalite, No. 3

#### SECOND SCHEDULE.

Bobbinite.

#### FOURTH SCHEDULE.

The fuse shall consist of a core of gunpowder, protected by not less than two coverings of thread or by not less than three coverings of thread and one of tape or gntta percha. The fuse shall be of such quality that the time of burning of the fuse shall not vary more than 10 seconds above or below the rate of 90 seconds for every yard of fuse. The fuse shall be ignited by means of an igniter contained in a tube which when attached to the fuse forms a completely closed chamber or, in the case of a mine or part of a mine in which the use of safety lamps is not required, the fuse may be ignited by means of a naked light subject to the conditions that in such mine or part of a mine no person while charging a shot-hole or handling any explosive not contained in a securely closed case or canister shall smoke or allow any naked light to be within a distance of 4 ft. of the shot-hole or explosive, and before a light is brought near to the hole for the purpose of firing the shot all other explosive shall be removed from the neighbourhood of the shot-hole.

#### FIFTH SCHEDULE.

(a.) A squib consisting of a tube of paper or other suitable material, coated externally with a solution of silicate of soda or other suitable solution, which will keep it in shape, protect it from damp and prevent it from smouldering, filled with gunpowder and having one end closed by a plug and the other end closed by being twisted, such twisted end being coated with sulphur or treated with saltpetre.

(b.) The Brook squib, consisting of a tube or case of non-smouldering paper, filled with slow burning fuze composition, primed and capped with touch paper at one end; the other end being fitted with a length of quick-match enclosed in a tube of non-smouldering paper, which is secured in position by string tied round the end of the fuze case.

Provided that in every case the squib shall have been manufactured at an explosives factory licensed by the Secretary of State, and that the time of burning of the squib when tested at the factory (which test whenever so required by one of H.M. inspectors of explosives shall be carried out by, or in the presence of, such inspector) shall not vary more than 15 seconds above or below 75 seconds.

\* The use of the explosives on the old "Permitted List" is allowed up to December 31, 1913, only.

#### NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**All the Ports Stopped on Saturday Afternoon—Abortive Efforts to Avert Coal-trimmers' Cessation of Work—What is the Surfacemen's Demand for 15 per cent. advance? Is it 15 upon Present Wage, 15 on the Standard, 15 upon Former Wage, or What?—Striking Utterance by Mr. D. A. Thomas upon Labour's Share of Colliery Income—Curious Divergencies in Shipment Returns—Recovering from Effects of the Strike.**

The Trimming Board (which represents merchants and shipowners, &c., as well as coal-trimmers) met in Cardiff on Tuesday; and as the trimmers and tippers did stop work at one o'clock on Saturday last, according to their previous resolution, the proceedings were of great importance. It has been estimated that the difference in total of shipments, occasioned by this lessening of work time, will amount to half a-million of tons weekly: but, whatever the actual amount, the absolute refusal to work on, even at overtime rates, as well as the barring out of casual trimmers (the "hobblers"), who would in all probability readily undertake the duty, is a most serious hindrance to trade.

At Tuesday's meeting terms were again offered by the employers; but their precise nature will not be disclosed until tomorrow's meeting of the coal-trimmers' executive—afterwards to be submitted to a mass meeting on Sunday.

All the coal ports on the Bristol Channel are affected, from Newport to Swansea.

Sir Griffith Thomas, presiding at the meeting of Swansea Harbour Trust, on Monday, referred to the trimmers' stoppage, and said that he thought the new procedure was very much against the prosperity, not only of the Bristol Channel, but also of the British Isles, for their shippers had to contend with competition from Germany and other countries, where such rules were not in force. He was surprised that the men of this district should take such a step, when it had been arranged at the north-eastern and Scotch ports that work would be carried on during Saturdays in order to finish vessels and work empties for Monday mornings. It must be evident to thinking persons that if shipowners could obtain terms for getting their vessels away better from other ports than from Wales, the decision of the men would be very disastrous to Wales.

In Swansea, especially, he said, they had always considered it an advantage to be nearer the sea, so that ships arriving on Friday or Saturday morning might have every chance of reaching destinations in France or on the British coast on Mondays. He trusted the authorities in this part of Wales would see to it that their ports were not put to a disadvantage as compared with those in the north-east. Some time ago an arrangement was come to in Swansea with regard to Saturday work at the coal tips—namely, that where there was any chance of completing steamers in time to sail on Saturday's tide, work should continue till the vessel was finished; and that arrangement had operated very well.

The claims of the surfacemen to 15 per cent. advance are being brought forward in the separate meetings of the men, and, apparently, utilised as a general argument for strengthening the trade union organisation; but some of the arguments adduced and statements made are such as to challenge contradiction. The claim that the men are entitled to 15 per cent. advance has been based upon an allegation as to decrease in the purchasing power of their wages; yet investigation of the facts shows that whilst there has undoubtedly been a decrease in the purchasing power of money, due to increase in the price of what the men have to buy, there has been more than a corresponding increase in their wages. Indeed, it has been estimated that they are now at least 10 per cent. better off in purchasing power, as has been previously stated in this column. Nevertheless, the allegation is being persistently repeated in every direction, and the men are led to believe that they are entitled to increase of wages because of a decrease in purchasing power.

Largely, of course, opposition to the demand for 15 per cent. in South Wales is based upon the fact that the men have entered into an agreement (which still has a substantial period to run), and that until the termination of that agreement it is not fair, but is an actual violation of its terms, to make a demand for increase. Some of the leaders have pointed out, as against this contention, that there is a provision whereby, through "mutual arrangement," owners and workmen may vary the terms of the agreement, and this, of course, is the fact. But, apart from mutual arrangement—and the opposition of the employers extinguishes even the anticipation of "mutual" arrangement—no progress can be made until the termination of the agreement. The employers do not challenge the right of the men to make an application. What is challenged is that there is no right to the concession.

Then, again, some curious points arise as to the nature of the demand. Is it 15 per cent. upon the present wage rate, or a demand for an additional 15 per cent. upon the standard?—which is a very different thing. To realise the muddle of the moment, it is necessary to hark back a little.

The conference which was held at Swansea resolved that an endeavour should be made to secure for all adult surface workers a minimum wage of 5s. per day. Even then it was pointed out that the different conditions of the several coalfields made a uniform rate impracticable. In South Wales, banksmen demanded 7s. per day, and 5s. for labourers. Since then the Federation has varied its decision, and passed a resolution that steps should be taken to secure for the whole country an immediate increase of 15 per cent. on the rate of wages prevailing in the early part of last year, in respect of surfacemen. But confusion came into the demand, because it was not clear whether what the men ask for is 15 per cent. on the wages of 18 months ago, or 15 per cent. on the standard, or 5s. per day as a minimum.

Since the date specified there have been increases in the different coalfields, and the day wages of the surfacemen are already close upon the 15 per cent. increase which was demanded, and therefore the new demand would seem to be for a still further advance—really for an alteration of the standard. If this be the real design it means a good deal more than is yet allowed to become known, because an alteration of the standard would mean the alteration of every future percentage. For instance, 60 per cent. upon a standard of 4s. would mean 2s. 5d., whereas 60 per cent. upon a standard 15 per cent. higher would mean 2s. 9d.; and so *pro rata*.

How far this demand for the 15 per cent. will be pressed remains to be seen; but all the considerations affecting the question (and they are many—only one or two being indicated here) lead to the conclusion that whilst the demand may be used as an argument it is improbable that either the South Wales Federation or the Miners' Federation of Great Britain will push it to an extreme.



Upon this question of the wage-rate Mr. D. A. Thomas (Cambrian Combine) made a striking statement which has provoked much comment. At the opening of the Miners' Institute at Blaenrhondda, he pointed out that for every shilling capital received, labour received eight shillings; and said he did not think that capital had enough.

Mr. Leonard Llewellyn, general manager, stated at the same meeting, in regard to the Fernhill and North Dunraven Collieries, that since these had been taken over in 1910 there had not been a single day's stoppage for disputes. The output had been increased from 400,000 tons to 700,000, and would soon reach 800,000. The number of men employed had increased from 1,500 to 2,300, and the wages showed an increase of 74 per cent. in the aggregate, whilst the increase in the number of men was only 46 per cent.

The new institute has been erected by the workmen at a cost of £1,300, the furniture entailing an additional £250. The cost has been raised by poundage on the men's wages, and the directors of the company contributed 250 guineas.—It was stated at the meeting that shortly a garden village scheme would be initiated, and that at an early date there would be a large number of houses close to the institute.

Mr. T. Richards, M.P., secretary of the South Wales Federation, said at Abercarn on Monday that the Minimum Wage Act had benefited the men to the extent of half-a-million a year in wages; and he believed the industry could stand a higher wage and a shorter day than at present. Some of the coalowners were alarmed because he had commenced preaching this; but when he read of the high dividends paid, he came to the conclusion that the employers were securing a lot of money they ought never to have got.

The executive of the colliery enginemen and stokers met in Cardiff to make arrangements for balloting the members upon the proposed amalgamation with the Miners' Federation. According to the rules of the association, dissolution of the organisation cannot take place unless desired by two-thirds of the members. A draft of the amalgamation scheme is being distributed, and the ballot returns are to be in hand within the next month.

The relations between colliery enginemen and stokers and the South Wales Miners' Federation, notwithstanding agreement by the leaders on both sides, are not precisely of that amicable character which the published understanding would lead observers to suppose. At a meeting of the Ynyshir section of enginemen and stokers on Saturday, a speaker, reporting upon the proceedings of the joint committee, stated that representatives of the association had been told that the terms put forward had to be accepted *en bloc*, or other means would be found to compel them to come over. He entered his protest against this mode of procedure, and pointed out that a scheme amended in certain respects would stand a better chance of acceptance. Whilst the Federation was engaged in these negotiations with the Association of the Colliery Enginemen and Stokers, it was at present seeking no amalgamation with the Winding Enginemen's Society; and in view of this fact the Ynyshir branch of the Enginemen and Stokers' Association decided not to accept the terms offered by the Miners' Federation.

It is significant of the rapid development of South Wales that at Llanelly (to which a charter of incorporation has recently been granted) the Great Western Railway project a large scheme of extension of the railway station, operations to commence almost immediately. In addition there will be an increase of accommodation at the goods depot, notwithstanding that increase was made at a comparatively recent rate. This new work at Llanelly is only one further incident in the continual extension of South Wales trade and industry.

The shipment returns for August show a curious contrast between Cardiff and the other South Wales ports, for while the Swansea Trustees on Monday had a statement that coal, coke and patent fuel showed an increase (as compared with the corresponding period) of no less than 58,000 tons, Cardiff shows a decrease of over a quarter of a million tons, chiefly in the shipments abroad.

The white shirt parade has been in operation in the Cwmavon Valley this week in connection with the strike at Cynon Colliery, which has lasted for the past three or four months, affecting 600 men. It arose because of some extra work having been done by men who were attending to the ventilation and pumping. Fortunately, beyond the scene, there was no personal injury to the men in disfavour.

The singular strike at Garnant persists, being now in its seventh week, and having arisen upon the men's demand for suspension of an official as to whom they allege that he had a lighted lamp unlocked in his possession. The Federation has granted £350 in support of the strikers, and lodges in the district are also contributing.

A significant change is in progress as between the American and the Welsh tin-plate trade. It was shown at a meeting of Swansea Harbour Trustees that a drop in the off in Welsh exports was due to the Balkan tin-plate and now come figures from the United States which manifest a material lessening of the competitive American exports. During the second quarter of this

year—April-June—American exports of tin andterne plate were 18,861 tons as contrasted with 30,447 tons in the corresponding period of 1912, a decrease of over 60 per cent. The Americans caught the Canadian trade last year because the coal strike here prevented Welsh makers from sending supplies; but evidently they are not holding it. Moreover, and still more interesting, Welsh exports to the United States, which were practically nil during April to June 1912 (being only 391 tons because of the strike disturbance), were this year, during the corresponding period, no less than 10,863 tons, so that American exports are lessened 60 per cent., while the imports of Welsh plates into the States marks a great revival.

### CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

#### Abstracts of Contracts Open.

BARRY, SEPTEMBER 24.—Gas coal (up to 20,000 tons), for the Urban District Council. Further particulars from Mr. T. E. Franklin, engineer and manager, Gasworks, Barry.

BRADFORD, SEPTEMBER 16.—Engine coal and house coal to the Bradford Royal Infirmary, for the Board of Management. Tenders to Mr. J. J. Barron, secretary-superintendent.

BRADFORD, SEPTEMBER 20.—House coal, nuts coal and firelighters, for the Corporation. Forms obtained at the Education Office, Town Hall.

BROMSGROVE, SEPTEMBER 15.—Coal and coke, for the Higher Education Committee. Tenders to Mr. J. Lloyd, correspondent, Education Office, Bromsgrove.

BROMSGROVE (STOURBRIDGE-ROAD), OCTOBER 6.—Coal and coke to the secondary school, Stourbridge-road, for the Managing Committee. Tenders to Mr. J. Lloyd, correspondent.

CAIRO (EGYPT), SEPTEMBER 15.—Coal tenders are invited by the Egyptian State Railways and Telegraphs Departments for the supply and delivery of (1) 50,000 metric tons of North Country colliery screened steam coal, and 5,000 metric tons of Scotch colliery screened steam coal; (2) 385,000 or 120,000 metric tons of Welsh colliery screened steam coal; and (3) timber. Copies of the specifications, containing forms of tender, from Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, London, S.W.\*

CHEL TENHAM, SEPTEMBER 20.—About 300 tons of small steam coal for boiler purposes. Tenders to Mr. J. S. Pickering, borough engineer, Municipal Offices, Cheltenham.

CROYDON, SEPTEMBER 25.—Coal and coke, for the Croydon Rural District Council. Forms from Mr. E. J. Gowen, clerk, Council Offices, Katherine-street, Croydon.

DOUGLAS (I.O.M.), SEPTEMBER 15.—Good steam coal, double screened, suitable for the engines of the cable tramway, for the Corporation. Sealed tenders to Mr. A. Robertson, town clerk, Town Hall.

GLOUCESTER, SEPTEMBER 18.—Rough slack steam coal, Welsh smokeless, and Staffordshire house coal, for the Corporation. Forms from the city surveyor, Guild Hall, Gloucester.

GOOLE, SEPTEMBER 17.—Coal, for the Goole Education Sub-committee. Particulars may be had on application to Mr. E. L. Harrap, West Riding Education Offices, Goole.

GRIMSBY, SEPTEMBER 16.—About 260 tons of house coal, 100 tons of steam coal, and 400 tons of the best gashouse coke, more or less, for the Corporation. Tenders to Mr. Douglas Chandler, clerk to the Education Authority, Education Offices, Grimsby.

HALKIRK (SCOTLAND), SEPTEMBER 15.—About 30 tons of best English coal (equal to Harton) for the Thurso Combination Poorhouse Committee. Tenders to Mr. Alf. R. Anslow, Governor, Halkirk.

HEMEL HEMPSTEAD, SEPTEMBER 15.—Coal and coke, for the Education Committee. Forms from Mr. L. Smeathman, clerk to the committee, Town Hall, Hemel Hempstead.

LONDON, SEPTEMBER 16.—The Commercial Gas Company invite tenders for 20,000 tons of coke. Tenders addressed to the engineer and general manager.

LONDON, SEPTEMBER 17.—About 130 tons of household coal to the Bolingbroke Hospital (Incorporated), Wandsworth Common, S.W., for the Governors. Tenders to the secretary.

MALDON, SEPTEMBER 30.—Steam and anthracite coal to the Southminster and Purlough Waterworks, for the Rural District Council. Forms from Mr. Wm. Almond, surveyor to the Council, 6, Market-hill, Maldon, Essex.

MANCHESTER, SEPTEMBER 19.—About 750 tons nutty slack coal, 30 tons house coal, for the Chorlton and Manchester Joint Workhouse Committee. Forms obtainable at the Poor Law Offices, New Bridge-street, Manchester.

OLDHAM, SEPTEMBER 17.—Steam coal for the Corporation (Electricity Committee). Forms on application to Mr. S. Wilmott Newington, Electricity Offices, Oldham.

PENTRE (RHONDDA), SEPTEMBER 22.—Coal, for the Rhondda Education Committee. Forms from Mr. T. W. Berry, director of education, Council Offices, Pentre, Rhondda.

SEDGLEY, SEPTEMBER 22.—Thick coal and coke, for the Staffordshire Education Committee. Tenders to Mr. T. J. Howitt, clerk, Council schools, Sedgley.

SLEAFORD, SEPTEMBER 25.—Best hard steam coal, for Sleaford Urban District Council. Particulars from the electrical engineer, Mr. W. H. Wilson.

SOUTHEND-ON-SEA, SEPTEMBER 27.—Coal, for the Corporation. Forms from Mr. E. J. Elford, M.I.C.E., borough surveyor, Southend-on-Sea.

STOCKTON-ON-TEES, SEPTEMBER 22.—Treble-screened coals, for the Education Committee. Tenders to Mr. James

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

Twoedy, secretary, Education Offices, 32, Dovecot-street, Stockton-on-Tees.

SUTTON (SURREY), SEPTEMBER 15.—Coal and coke, for the Surrey Education Committee. Forms from Mr. R. H. Knight, education officer, Public Hall, Sutton, Surrey.

TUNBRIDGE WELLS, SEPTEMBER 18.—About 1,000 tons of the best large smokeless Welsh steam coal, for the Corporation. Forms from Mr. W. C. Cripps, town clerk, Town Hall, Tunbridge Wells.

WANSTEAD, SEPTEMBER 24.—Coal (35 tons, more or less) and coke (30 chaldrons, more or less), for the Urban District Council. Forms on application to the clerk at the Council Offices.

WARRINGTON, SEPTEMBER 15.—About 45 tons per week of good firing slack, for the Corporation. Tenders addressed "The Chairman, Sanitary Works Committee, Town Hall, Warrington."

The date given is the latest upon which tenders can be received.

### CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ALEXANDRIA (EGYPT), SEPTEMBER 30.—Oils, &c.—H.M. Consul-General at Alexandria (Mr. D. A. Cameron, C.M.G.) reports that tenders are invited by the Municipality of Alexandria for the supply of various articles required for the use of the Service du Nettoyement during 1913-14, including oils and colours, wood, steel and iron bars, angle iron, bolts and nuts, screws, rivets, brooms, buckles, wire, &c.\*

DARTFORD, SEPTEMBER 16.—Boiler, &c.—Erection at the Electricity Works, Dartford, for the Urban District Council:—(a) Water-tube boiler, economiser, fan, steel chimney and accessories; (b) inverted rotaries, transformers, switchboard and cabling. Further information can be obtained on application to Mr. J. D. Pember, the electrical engineer, Electricity Works, Dartford.

DUNDEE, SEPTEMBER 22.—Gas Plant.—Gas compressing plant for high pressure distribution, spigot and faucet steel mains, for the Gas Commissioners. Forms from Mr. Alex. Yuill, engineer and manager, Gas Works, Dundee.

DUNDEE, SEPTEMBER 22.—Retort Plant.—Erection of vertical retort plant and telpher conveying plant at the Dundee Gas Works, for the Corporation. Forms from Mr. Alex. Yuill, engineer and manager, Gas Works, Dundee.

EDINBURGH, SEPTEMBER 22.—Turbines.—For the Corporation, two mixed pressure steam turbines and direct-current generating plant, each set to be of 1,500 kw. capacity. Specification, form of tender from the engineer, Dewar-place, Edinburgh, on payment of a deposit of £2 2s. (returnable).

HONG KONG (CHINA), OCTOBER 1.—Pumping Engines.—Government of Hong Kong invite tenders for the supply of two vertical, rotative, steam pumping engines, capacity of each 3 million gallons per day on a lift of about 400 ft., together with boilers, auxiliary plant, pipe work, &c., to be erected at the Tytam Tuk Water Supply Works, Hong Kong. Specification and form of tender obtainable at the office of the Crown Agents for the Colonies, Whitehall-gardens, London, S.W., on payment of deposit of £1 (returnable).

LEICESTER, SEPTEMBER 30.—Turbine, &c.—Erection at the generating stations of the following plant, for the Corporation:—(a) One high-pressure steam turbine, direct-coupled to one 3,000-kw., 3-phase alternator, together with condensing plant, high and low tension switchboards, rotary converters, &c.; (b) two water-tube boilers, together with fuel economiser, and the necessary steam feed, blow-off, and drain pipes, &c. Forms from Mr. T. R. Smith, borough electrical engineer, on payment of a deposit of £2 (returnable).

LONDON, SEPTEMBER 24.—Coal-hauling Plant.—For the Hammersmith Borough Council:—(a) Automatic weighing machine; (b) coal hoppers and tank; (c) dredger and water-pump; (d) weldless steel pipes and connections; (e) travelling jib crane and track; (f) endless belt conveyors. Specifications and forms of tender can be obtained from Mr. G. G. Bell, engineer and manager, 85, Fulham Palace-road, Hammersmith, London, W., upon payment of £10 10s. (returnable).

LONDON, OCTOBER 23.—Water-softening Plant, &c.—Supplying and fixing water softener and purifying plant at the Infirmary, Lower-road, Rotherhithe, S.E., for the Bermondsey Guardians, according to the specification of Mr. A. H. Newman, F.R.I.B.A., &c. Specification, containing full particulars on deposit of £10 (returnable), from Mr. E. Pitts Fenton, clerk, 283, Tooley-street, S.E.

MELBOURNE (AUSTRALIA), OCTOBER 8.—Rails, &c.—For the supply and delivery of the following rails and fishplates, for the Agent-General for Victoria, Australia (alternative tenders): (Contract No. 25005) approximately 27,079 tons of 80 lb. steel rails; (contract No. 25005) approximately 2,215 tons of steel fishplates for 80 lb. steel rails. Specifications and forms of tender obtainable at the offices of the consulting engineers, John Coates and Co. Limited, 25, Victoria-street, Westminster, London, S.W.

SCOTSWOOD-ON-TYNE, SEPTEMBER 15.—Shaft Sinking.—For the sinking and walling of a circular shaft at West Denton Colliery, Scotswood-on-Tyne, finished size 12 ft. diameter, to an approximate depth of 60 fathoms. Further particulars obtainable on application.

SHEERNESS, OCTOBER 6.—Air-compressor.—Erection of an air-compressor with receiver and air pipes, ram pumping engine, suction and delivery pipes, air vessel meter, &c.; also for the subsequent provision and erection of a surface condenser, stand-by compressor, and stand-by ram pumping engine, at Trinity-road pumping station, for the Urban District Council. Particulars from Mr. F. W. S. Stanton, civil engineer, 3, Victoria-street, Westminster, S.W., on deposit of £2 2s. (returnable).

SHEFFIELD, OCTOBER 6.—Steel and Iron Work.—For the steel and iron work in connection with the extension of the Grimesthorpe Works, for the directors of the Sheffield United Gaslight Company. Forms from Mr. J. W. Morrison, M.Inst.C.E., at the company's offices, Commercial-street, Sheffield.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.



EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During August and the first eight months of 1911, 1912 and 1913.

To			August, 1913.				August.							
			Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
			Tons.	£	Tons.	£	Tons.	£	1911.	1912.	1913.	1911.	1912.	1913.
Russia .....			124,904	81,178	42,740	29,238	602,150	449,039	467,521	674,546	769,794	258,485	436,875	559,455
Sweden .....			82,174	49,266	24,435	15,729	272,866	189,701	362,992	510,549	379,475	188,378	305,842	254,696
Norway .....			44,635	22,785	10,564	6,613	99,688	68,273	115,881	208,641	154,887	60,878	117,623	97,671
Denmark .....			55,141	33,017	75,558	50,980	117,747	81,485	205,304	282,101	248,746	102,246	167,223	165,482
Germany .....			309,657	176,221	288,627	168,577	199,893	132,892	766,955	866,437	798,177	347,880	454,715	477,690
Netherlands .....			84,535	51,516	43,017	28,260	41,310	28,495	189,322	183,044	168,862	90,918	102,731	108,271
Belgium .....			60,154	29,410	43,377	28,060	44,601	30,414	140,321	130,629	148,132	60,809	65,435	87,884
France .....			394,804	209,008	246,413	151,806	305,161	235,053	820,081	862,099	946,378	424,941	497,473	595,867
Portugal, Azores, and Madeira .....			15,869	9,590	6,876	4,647	73,179	58,527	94,699	108,438	95,924	60,735	72,175	72,764
Spain and Canaries .....			42,472	26,162	87,653	55,708	129,722	106,878	206,231	264,492	259,847	123,510	172,203	188,748
Italy .....			112,029	52,048	176,309	112,754	377,280	305,446	816,647	850,129	665,618	474,269	553,115	470,248
Austria-Hungary .....			12,979	7,029	21,101	13,624	30,206	22,626	84,869	83,855	64,286	42,294	49,793	43,279
Greece .....			3,115	3,088	16,515	9,573	16,450	15,775	72,441	81,612	36,080	38,994	53,089	28,436
Turkey .....			2,626	2,792	2,002	1,340	20,159	18,150	31,750	45,155	24,787	21,145	32,187	22,282
Egypt .....			24,188	13,100	27,607	18,495	145,001	115,374	313,365	363,314	196,796	187,458	243,497	146,969
Algeria .....			26,123	14,986	45,351	28,261	45,280	36,008	78,742	88,723	116,754	44,010	53,316	79,255
United States of America.....			—	—	—	—	49	60	49	140	49	89	161	60
Chile .....			280	339	—	—	20,759	16,481	36,492	38,863	21,039	28,206	31,181	16,870
Brazil .....			8,383	6,465	—	—	103,121	93,033	143,277	145,284	111,504	104,125	116,007	99,498
Uruguay .....			6,902	5,577	—	—	65,104	56,624	56,713	91,892	72,006	44,196	75,653	62,201
Argentine Republic.....			9,777	8,436	3,412	2,218	277,552	233,423	196,959	312,387	290,741	138,410	240,651	244,077
Gibraltar .....			5,765	3,086	9,709	5,921	13,687	10,765	16,891	18,604	29,161	9,310	13,051	19,772
Malta .....			10,018	6,063	5,991	3,819	23,283	18,821	40,361	35,832	39,292	24,295	25,186	28,703
British South Africa .....			314	364	—	—	11,957	10,162	8,333	2,334	12,271	5,690	1,488	10,526
„ India .....			339	310	29	23	9,689	8,325	10,078	9,614	10,057	4,967	7,171	8,658
Straits Settlements .....			1,874	2,339	—	—	7,100	6,057	408	635	8,974	627	931	8,396
Ceylon .....			—	—	—	—	7,037	6,333	16,376	12,795	7,037	12,082	9,993	6,333
Other countries.....			18,497	15,013	12,785	7,851	111,206	91,470	164,465	185,531	142,488	114,530	132,382	114,334
Total {	Anthracite.....	116,174	83,421	—	—	115,416	100,878	178,138	255,260	231,590	133,123	201,943	184,299	
	Steam .....	1,071,447	579,263	268,969	165,011	2,857,393	2,206,799	4,017,823	4,688,550	4,197,809	2,269,995	3,004,827	2,951,073	
	Gas .....	90,167	51,413	780,605	491,619	91,802	65,123	866,934	1,044,002	962,574	416,094	563,246	608,155	
	Household .....	39,077	24,968	127	86	98,171	66,859	144,636	189,420	137,375	74,474	111,680	91,913	
	Other sorts .....	140,689	90,173	140,670	86,781	8,455	6,031	249,992	280,443	289,814	119,791	149,456	182,985	
Total .....			1,457,554	829,238	1,190,371	743,497	3,171,237	2,445,690	5,457,523	6,457,675	5,819,162	3,013,477	4,031,152	4,018,425
Total (August 1912) .....			1,507,738	768,555	1,224,966	653,769	3,724,971	2,608,828	—	—	—	—	—	—
Total (August 1911) .....			1,231,003	544,573	1,119,666	535,171	3,106,854	1,933,733	—	—	—	—	—	—
Coke .....			—	—	—	—	—	—	72,084	108,948	113,423	54,367	93,525	101,988
Manufactured fuel .....			—	—	—	—	—	—	136,689	163,030	140,278	96,031	126,210	121,968
Total of coal, coke & manufactured fuel			—	—	—	—	—	—	5,666,296	6,729,653	6,072,863	3,163,875	4,250,887	4,242,381
First eight months of 1913.									First eight months.					
Total {	Anthracite.....	898,412	623,319	339	339	1,035,929	913,771	1,544,885	1,533,475	1,934,680	1,154,778	1,214,551	1,537,429	
	Steam .....	8,550,900	4,696,653	2,413,718	1,501,470	24,323,744	18,771,581	30,445,732	28,370,605	35,288,362	17,548,033	18,266,855	24,969,704	
	Gas .....	654,738	362,414	6,151,112	3,713,266	781,704	550,111	6,825,566	6,791,847	7,587,554	3,317,830	3,574,407	4,625,791	
	Household .....	333,978	204,852	2,046	1,438	824,787	552,251	974,102	991,688	1,160,811	508,561	585,976	758,541	
	Other sorts .....	1,055,889	659,355	1,220,236	747,827	73,076	51,342	2,040,755	1,985,249	2,349,201	974,289	1,056,251	1,458,524	
Total .....			11,493,917	6,546,593	9,787,451	5,964,340	27,039,240	20,839,056	41,831,040	39,672,864	48,320,608	23,503,491	24,698,040	33,349,989
Total for eight months of 1912 ...			8,975,650	4,396,928	8,454,039	4,447,980	22,243,175	15,853,132	—	—	—	—	—	—
Total for eight months of 1911 ...			9,400,570	4,152,604	8,611,309	4,134,926	23,819,161	15,215,961	—	—	—	—	—	—
Coke .....			—	—	—	—	—	—	617,294	583,034	712,698	469,682	470,506	686,363
Manufactured fuel .....			—	—	—	—	—	—	1,117,783	990,258	1,363,324	774,487	767,791	1,165,114
Total of coal, coke & manufactured fuel			—	—	—	—	—	—	43,566,117	41,246,156	50,396,630	24,747,660	25,936,337	35,201,466

COAL, IRON AND ENGINEERING COMPANIES.

**Brades Metal Company Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on business as manufacturers of washers, nuts and bolts, &c. First directors: Thomas Shaw, Brades House, Oldbury; Samuel Wood, The Woodlands, Dudley-road, Oldbury; Harry Wood, Hazlehurst, Dudley-road, Oldbury; and Fred Screen, Bancroft House, Dudley-road, Oldbury. Registered office: Brades House, Brades-road, Oldbury.

**Burnyeat, Brown and Co. Limited.**—The report of the directors states that the net profit for the year is £146,853 14s. 7d., making, with the amount brought forward from June 30, 1912, £36,443 6s. 5d.—£183,297 1s. The following interest and dividends have been paid:—One half-year's interest on debentures at 5 per cent. paid December 30, 1912, £1,500; one half-year's interest on debentures at 5 per cent. paid June 30, 1913, £1,500; one half-year's dividend on preference shares at 6 per cent. paid December 30, 1912, £1,800; one half-year's dividend on preference shares at 6 per cent. paid June 30, 1913, £1,800; interim dividend (7½ per cent.) on ordinary shares paid December 30, 1912, £18,000—£24,600, leaving a balance of £158,697 1s. The directors recommend the payment of a final dividend of 17½ per cent. (making 25 per cent. for the year), free of income-tax, £42,000; adding to reserve (making reserve account £100,000), £40,000; placing to reserve for new coal washery, coke ovens, and by-product plant, £40,000—£122,000, and carrying forward £36,697 1s. The directors, after careful consideration, have deemed it advantageous to join the United National Collieries Limited, in the erection of a coal washing, coking and by-product plant at Risca, to be worked on joint account between the two companies. The directors deeply regret to report the death of their colleague, Mr. Hugh Watts. Mr. John Arthur Jones, of Cardiff, has been elected to the vacancy on the board.

**Cammell, Laird and Co. Limited.**—A meeting of the 4½ per cent. and 5 per cent. debenture shareholders was held on the 4th inst. at Sheffield to consider provisional arrangements for replacing the first debentures, which mature at the end of this year, by a similar amount, £500,000, of first mortgage debenture stock. Owing to there not being a quorum, an informal meeting was held to

discuss the directors' proposals. Mr. W. L. Hichens, who presided, stated that under the 4½ per cent. and 5 per cent. trust deeds the directors had the power to reissue by way of borrowing or otherwise to the extent of £500,000; and when the 4½ per cent. and 5 per cent. holders took up their stock, it was on the explicit understanding that when the 4½ per cent. debentures fell due they would be renewed as a first charge. The directors also wanted to be able to put in a proviso that these new debentures should be redeemable at 103, instead of at 100, as at present. Although he could give them no definite figures respecting the present working year, it will probably be no worse than the previous year, when their profits were £145,000. A debenture shareholder declared that the directors' intention to increase by £5,000 a year the interest on outstanding 4½ per cent. debentures to the prejudice of subsequent debenture loans was a breach of commercial morality. All that the trust deeds originally meant was that the directors were entitled to renew £500,000 at 4½ per cent. It was arranged to call a formal meeting of the debenture shareholders for September 25.

**Dalmellington Iron Company Limited.**—The report of the directors for the year ending June 30, 1913, states that the gross profit shown is £52,416, and adding the balance from last year, £5,761, gives a total of £58,177. Out of this there has been written off for depreciation and redemption £19,336, leaving a balance of £38,841. Deducting dividends already paid—on the preference shares for the year £6,500, and on the ordinary shares an interim dividend of 2½ per cent. £4,875, there remains for disposal £27,466, from which it is proposed to place to general reserve fund £7,000, and pay a final dividend on the ordinary shares at 7½ per cent., making 10 per cent. for the year, free of tax, and to carry forward to next year £5,841. A sum of £4,914 has also been added to the investment in Consols, raising the par value to £20,000, which has been written down to £70 per cent., and gives a sum in security of preference dividends of £14,000.

**East Kent Colliery Company Limited.**—Circulars have been issued to the shareholders of the East Kent Colliery Company, the East Kent Contract and Financial Company, the Kent Coal Concessions, the Sondage Syndicate and the South-Eastern Coalfield Extension offering preferential allotment in an issue made by the first-named company,

which owns the Tilmanstone Colliery, of £150,000 10 per cent. first mortgage debentures at par. These debentures will be secured by a floating first charge upon the assets of the company, and it is provided that the interest is to be reduced to 7½ per cent. as soon as the net profits amount to sufficient to pay 10 per cent. upon the preferred share capital. The issue forms part of a total of £200,000, the remaining £50,000 being earmarked as security for the company's indebtedness to the East Kent Contract and Financial Company and allied concerns. Out of the proceeds £50,000 is also repaid to the allied companies in cash, a further £50,000 goes to wipe out a bank overdraft, and £15,000 is assigned for part payment of trade accounts, leaving a further £9,000 trade liabilities to be subsequently dealt with. Of the remainder, £24,000 is allotted for the provision of working equipment and £5,000 for working capital. It is stated that there are now three shafts at the colliery down to the Five-feet seam, from which a considerable quantity of coal has been raised.

**Edinburgh Collieries Company Limited.**—The directors have decided to pay an interim dividend at the rate of 5 per cent. per annum on the ordinary shares. The directors have not considered it prudent to pay a larger dividend on the ordinary shares in view of the Leith Dock strike, which seriously prejudiced the Lothian coal trade.

**Elliott's Metal Company Limited.**—The report of the directors for the 16 months ended July 31, 1913, to be presented at the meeting in Birmingham on the 16th inst., states that after paying debenture interest and other first charges there remains a profit of £40,742, to which must be added £2,286 brought forward from last year, making a total of £43,028, which the directors propose to appropriate as under:—To a dividend at the rate of 5 per cent. per annum for 16 months on the preference shares (of which an interim dividend amounting to £1,775 has already been paid), £4,733; to a dividend at the rate of 7½ per cent. per annum for 16 months on the ordinary shares, subject to income-tax (of which an interim dividend amounting to £6,075 has already been paid), £16,200; to reserve fund, £20,000; to carry forward, £2,095.

**Eureka Patent Gas Engine Starter Company Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire from John Butler Willison



ad. . . . . t Phibbs Matthews the benefit of an invention improvements in self-starting devices for gas . . . . . for internal combustion engines, and to enter into agreement with John Butler Willison and Robert P. Matthews; also to carry on business as mechanical and electrical engineers, manufacturers of machinery, tool makers, iron and brass founders, metal workers, &c. First directors: J. B. Willison, Chatsworth-terrace, Rusholme, Manchester, and Robert P. Matthews, Ivyhurst, 62, Alexander-road South, Manchester.

G. O. Accumulator Limited.—This private company has been registered, with a capital of £250 in 1s. shares, to carry on any electrical, manufacturing, mining, or metallurgical business, and also the business of mineowners, &c. Signatories: Robert Warner and Edward Brooker, both of 10, Walbrook, E.C.

Harvey (H. A.) and Co. Limited.—The report of the Official Receiver upon the affairs of the company has been issued. The company was formed in August 1911, with a capital of £50,000, to take over a business of mechanical engineers and contractors, carried on by Messrs. H. A. Harvey and Co. The registered office was at Norfolk House, Laurence Pountney-hill, E.C. Mr. H. E. Burgess states that the accounts filed under the liquidation show gross liabilities £8,813, assets valued at £4,095 and a deficiency of £27,856 with regard to contributors. The company was promoted by Messrs. Harvey and Lee, and the purchase price of £7,000 was satisfied by the allotment of 5,000 £1 preference and 40,000 1s. ordinary shares. In November 1911 the directors promoted a company to take over the businesses of the two subsidiary companies and to acquire several patents belonging to the company. About the same time a report was issued to the shareholders in which the prospects of the company were described in very extravagant terms, and in which its income during the following three years was estimated at £173,300. That estimate, in the opinion of the Official Receiver, was entirely imaginary and without basis. Debentures for £4,800 were created last spring, and in May the Court appointed a receiver on behalf of the bondholders. The failure of the company is due, in the Official Receiver's opinion, to selling under cost, excessive expenditure for directors' fees and salaries, and also to general bad management. Mr. W. A. Henderson, C.A., 3, Fenchurch-street, E.C., has been appointed as liquidator of the company, with a committee of inspection.

Heiton (Thomas) and Co. Limited.—Including £4,819 brought forward, the profit for the year ended July was £17,266. The directors recommend a dividend of 5 per cent. on the ordinary shares, place £5,500 to plant and premises, &c. account, and carry forward £5 26s.

Ibbotson Brothers and Co. Limited.—The directors recommend a final dividend of 6s. per share, making 10 per cent., tax free, for the year ended June 30, and carrying forward £22,857, against £19,115 brought into the account.

Insoles Limited.—Subscriptions have this week been invited for 60,000 £1 ordinary shares at 23s. 6d. in the above company. The company, which has a capital of £37,500 in 5 per cent. debentures, £60,000 in 6 per cent. cumulative preference shares, and £180,000 in ordinary shares, own the Cymmer Collieries in the Rhondda Valley, the output of which is over 800,000 tons per annum.

Lambert Bros. Limited.—Dividend of 10 per cent. and bonus of 5 per cent. on the ordinary shares.

Liverpool Electric Welding Company Limited.—This private company has been registered, with a capital of £1,000 in £1 shares (700 £5 per cent. cumulative preference shares), to carry on the business of electric welders, &c. First directors: Wilhem Alex. Max Wachsmith, 28, Madelaine-street, Liverpool; Evan Jones, 53, Beaconsfield-street, Liverpool; and Henry Woods, 31, Patterdale-road, Liverpool. Registered office: 16, Seaton-buildings, 17, Water-street, Liverpool.

Lothian Coal Company Limited.—The report for the year ended May 31 last states that the profit and loss account, after providing for the maintenance of works and all current charges, shows a credit balance of £38,557, which, with the balance from last year of £4,304, makes £42,861. The directors recommend writing off for depreciation £10,000, placing to the credit of the reserve fund £8,000, and paying a dividend at the rate of 5 per cent. to the ordinary shareholders, carrying to next year £4,511. Except for a fortnight's stoppage of output at the Lady Victoria pit, caused by an accident in the shaft, there has been no serious interruption of work throughout the year. There have, however, been minor interruptions from time to time, caused by an inadequate service of railway wagons. The demand for coal has been good, and the price obtained for it has been such as to enable the directors to meet the high cost of production and to recommend, for the first time since 1909, the payment of a dividend to the ordinary shareholders. In consequence of new Board of Trade regulations, a number of the company's wagons have had to be reconstructed and others withdrawn altogether from the traffic on the main lines. To take the place of the latter, 233 new wagons will be purchased. The payment of the new and the reconstruction of the old wagons will be spread over a period of five years. The profit for the year from the Dean Tavern is £1,641, and after deducting debit balance carried forward, £329, donations to band and various village clubs, £537, and to account of building of institute, £300, there is at credit of profit and loss account £475.

Midvale Steel Company of Philadelphia and London Limited.—This private company has been registered, with a capital of £12,000 in £1 shares, to carry on the business of engineers, ironfounders, ironmasters, steelmakers, converters and casters, brassfounders, metal workers, tool-makers and machinery builders, &c. First directors: C. J. Harrah, J. F. Sullivan, E. Harrah, A. Petre and W. P. Barba, all of Nicstown, Philadelphia, Pennsylvania, U.S.A.

Onslow Syndicate Limited.—This private company has been registered, with a capital of £4,500 (10,000 ordinary shares of 1s. each, and 4,000 preference shares of £1 each), to enter into an agreement with James Thame, and to carry on business as machinery makers, engineers and millwrights, &c. First directors: Sydney Fawns and James Thame. Registered office, 9, Laurence Pountney Hill, Cannon-street, E.C.

Onslow and Kew Collieries Coal and Iron Company Limited.—The directors have decided to recommend the payment of a dividend of 10 per cent. on the ordinary shares, and a dividend at the rate of 6 per cent. per share on the preference and second preference shares, and a dividend at the rate of 10 per cent. per share on the third preference shares.

COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of August 1913, compared with the corresponding month of 1912.\*

Port.	August 1913.		August 1912.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle .....	958,977	25,211	935,705	28,927	23,272	—	—	3,716
North Shields .....	72,234	363	103,317	711	—	31,083	—	348
South Shields .....	103,505	399	131,137	47	—	27,632	352	—
Sunderland .....	243,651	1,589	317,298	5,987	—	73,647	—	4,398
West Hartlepool .....	93,095	429	142,737	2,153	—	49,642	—	1,724
Goole .....	102,096	1,398	107,649	2,307	—	5,553	—	909
Blyth .....	355,420	964	373,381	230	—	17,961	734	—
Newport .....	376,298	150	330,297	979	46,001	—	—	829
Liverpool .....	30,544	1,952	45,718	1,414	—	15,174	538	—
Methil .....	226,140	97	241,680	—	—	15,540	97	—
Glasgow .....	153,827	3,113	218,001	3,068	—	64,174	45	—
Kirkcaldy .....	8,539	—	9,732	—	—	1,193	—	—
Burntisland .....	150,657	75	201,775	370	—	51,118	—	295
Cardiff .....	1,348,206	6,228	1,580,926	8,090	—	232,720	—	1,862
Borrowstoness .....	4,423	321	69,429	227	—	27,001	94	—
Llanelli .....	22,312	—	9,253	—	13,059	—	—	—
Middlesbrough .....	2,023	1,242	1,570	1,343	453	—	—	101
Seaham .....	86,141	56	86,405	—	—	264	56	—
Swansea .....	309,653	1,163	306,722	567	2,931	—	596	—
Granton .....	2,641	328	10,276	1,003	—	7,635	—	675
Port Talbot .....	145,510	529	141,278	347	4,232	—	182	—
Alloa .....	10,580	—	14,365	—	—	3,785	—	—
Grangemouth .....	154,576	6,276	160,013	12,779	—	5,437	—	6,503
Neath .....	—	—	9,750	—	—	9,750	—	—
Hull .....	477,284	11,551	522,901	2,319	—	45,617	9,232	—
Amble .....	34,874	—	38,060	—	—	3,186	—	—
Troon .....	11,658	—	10,599	—	1,059	—	—	—
Grimsby .....	106,369	748	118,507	203	—	12,138	545	—
Ayr .....	6,561	—	4,654	—	1,907	—	—	—
Greenock .....	—	—	447	—	—	447	—	—
Leith .....	60,027	198	151,786	—	—	91,759	198	—
Ardrossan .....	7,744	—	2,939	—	4,805	—	—	—
Stockton .....	—	—	—	—	—	—	—	—

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.\*

Port.	August 1912.		August 1913.		Port.	August 1912.		August 1913.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle .....	400,360	705	390,139	657	Ayr .....	68,499	10	59,757	—
North Shields .....	—	—	—	—	Irvine .....	3,881	—	6,058	—
South Shields .....	2,820	—	220	—	Alloa .....	5,139	—	1,892	—
Blyth .....	18,155	—	12,905	—	Whitehaven .....	21,615	—	14,787	—
Amble .....	7,344	—	4,007	—	Liverpool .....	166,654	—	155,554	172
Sunderland .....	118,053	—	104,870	—	Grimsby .....	4,065	—	2,898	—
Seaham .....	169,933	—	73,745	—	Granton .....	8,957	—	8,871	—
Hartlepool .....	37,615	—	43,570	—	Borrowstoness .....	14,443	6	26,008	—
Stockton .....	—	—	—	20	Burntisland .....	44,756	—	20,045	—
Middlesbro' .....	—	250	—	110	Kirkcaldy .....	2,391	—	4,126	—
Hull .....	85,414	—	143,247	—	Methil .....	23,854	—	33,181	—
Goole .....	110,085	—	122,246	—	Port Talbot .....	13,464	50 p.f.	8,722	525 pf.
Swansea .....	29,939	350	36,866	—	Glasgow .....	41,874	865	29,631	490
Cardiff .....	245,549	60	219,611	110 c. 320 p.f.	Grangemouth .....	17,387	650	7,238	45
Llanelli .....	4,312	—	4,199	—	Greenock .....	1,386	4	—	—
Newport .....	53,929	—	62,450	—	Neath .....	9,771	—	—	—
Troon .....	22,193	—	15,576	—	Leith .....	7,802	17	5,124	—
Ardrossan .....	5,038	—	7,118	—					

\* From Browne's Export List.

annum on the ordinary shares; they also recommend that the capital expenditure for the year be written off out of profits, that £30,000 be added to the reserve fund and the balances carried forward to the next account.

Powell Duffryn Steam Coal Company Limited.—The directors have declared an interim dividend of 10 per cent. for the half-year ending June 30 last on the ordinary shares, free of tax, and at the rate of 6 per cent. per annum for the half-year ending June 30 last on the preference shares, payable forthwith.

Sheffield Twist Drill Company Limited.—This private company has been registered, with a capital of £10,000 in £1 shares (3,000 cumulative preference shares), to acquire the whole or part of an invention relating to improvements of machines for fluting and similar purposes, and to manufacture and deal in twist and other drills; also all appliances and tools, &c. First directors: E. Cecil Strong, Saltergate-lane, Bamford, Derbyshire, and James Arthur Robinson, 57, Southgrove-road, Sheffield.

Smith (C.) and Son (Godalming) Limited.—This private company has been registered, with a capital of £12,000 in £1 shares, to acquire the business of Charles John Smith, of Godalming, Surrey, trading as C. Smith and Son, and to enter into an agreement with C. J. Smith, also to carry on the business of engineers, mineowners, miners, coal and iron masters, &c. First directors: C. J. Smith, Godalming, Surrey, and F. England, 122, Victoria-street, S.W.

Staveley Coal and Iron Company Limited.—The fiftieth annual report of the directors for the year ended June 30 last states that, after providing for depreciation, debenture interest and the dividend on the preference shares, the net profit for the year was £341,994 12s. 2d., which, with the balance brought forward, gives a total of £418,878 19s. 3d. Out of this an interim dividend of 1s. 6d. per share on the fully-paid shares and 1s. 1½d. per share on the partly-paid shares was paid on February 10, 1913; and the directors recommend a final dividend of 2s. 6d. per share on the fully-paid shares and 1s. 10½d. per share on the part-paid shares, and a jubilee bonus of 1s. per share on the fully-paid shares and 9d. per share on the part-paid shares. The arrangement under which the Yorkshire Main Colliery is now worked as a separate company has proved to be very satisfactory from the point of view of management. The mining difficulties, which have been very great at this colliery, are gradually being surmounted, and the output of coal increased. The quality of the coal is excellent. At the Devonshire works the plant has been employed continuously throughout the year, and the working of the coke ovens, sulphate of ammonia, tar distillation, benzol and sulphuric acid plants has been attended with satisfactory results. The directors have acquired and are now developing an additional ironstone field in Northamptonshire, from which it is hoped that considerable supplies of iron ore will be

obtained for many years. The whole of the plant and machinery has been maintained in good working order at the various collieries and ironworks. The directors regret to report the decease of Sir Charles Stoddart, who had been on the board since 1904. Mr. Charles E. Rhodes has been appointed by the board to succeed him, subject to the confirmation of the shareholders.

Sugden (William) Limited.—This private company has been registered, with a capital of £5,000 in £10 shares, to carry on the business of coal merchants, colliery agents, and manufacturers of patent fuel; ironmongers, iron and steel forgers, copper-smiths, iron and brass founders, and dealers in agricultural implements, &c. First directors: James William Sugden, Stockbridge, near Keighley. Registered office: Fleece-street, Keighley, Yorkshire.

Swansea Wagon Company Limited.—The report for the year to June 30 last states that a long-standing dispute with the Gloucester Wagon Company Limited has been brought to a satisfactory conclusion. The lease of the works has been surrendered, and the company has accordingly been relieved of a serious obligation to repair, part of the arrangement being that the sub-lease of the works has been cancelled, the company receiving £250 in settlement. The profit and loss account has a credit balance of £538. The directors recommend a dividend of 1s. per share, free of income tax, which will leave £52 to be carried forward. Eighty-three obsolete wagons are being broken up at a loss of £1,826. The directors contemplate reducing the share capital so as to extinguish the loss on the old Swansea works of £11,750.

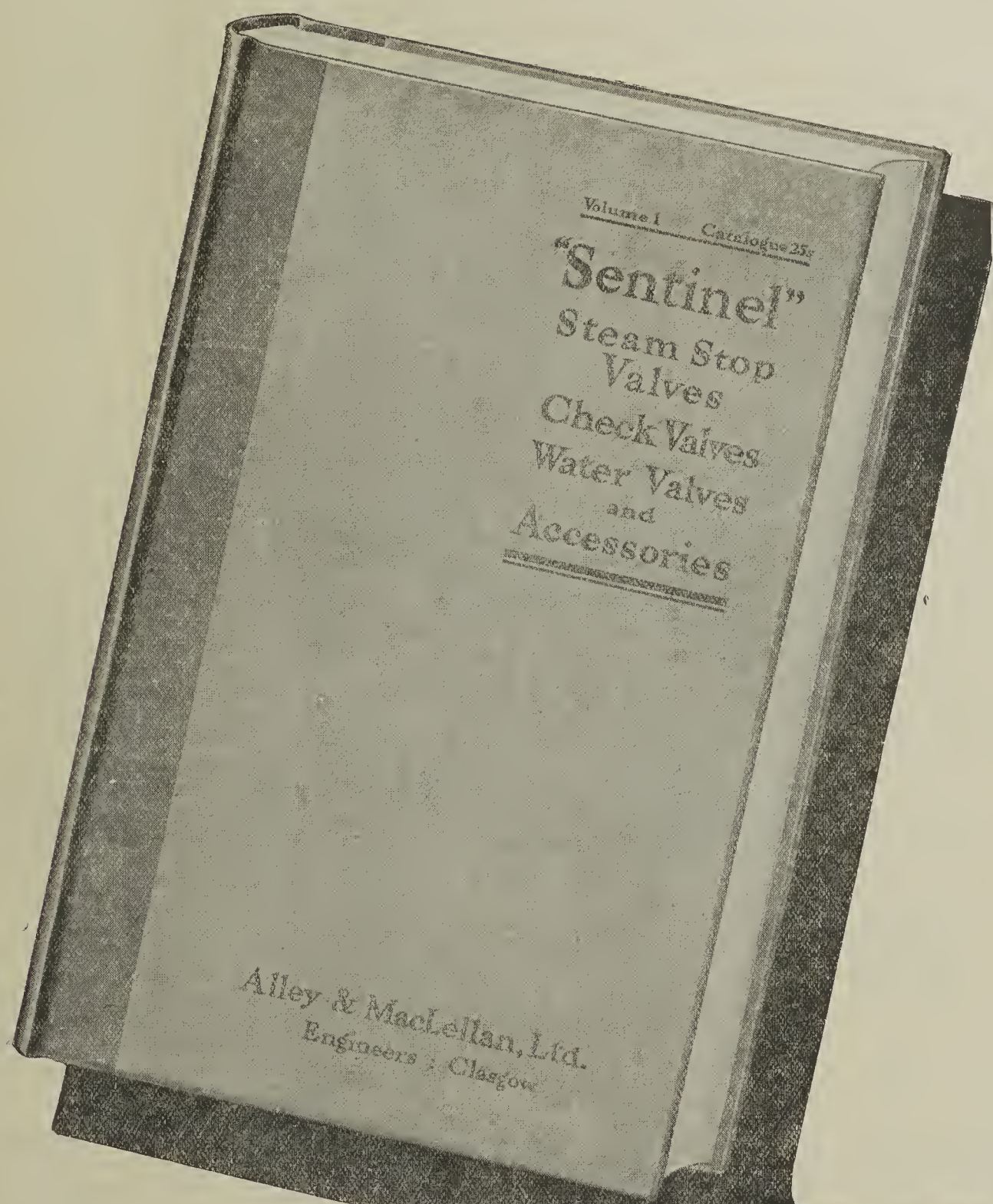
Ward (M. and A.) Limited.—This private company has been registered, with a capital of £1,500 in £1 shares (100 5 per cent. cumulative preference), to acquire and take over as a going concern the businesses now carried on at New Brighton, Chester, by Chas. Bernard French, under the style of "M. and A. Ward," and by N. T. C. Richardson, under the style of "N. Richardson," and to enter into an agreement with C. B. French and N. T. C. Richardson; also to carry on business of colliery proprietors, coal merchants and contractors, and dealers in all kinds of fuel. First directors, N. T. C. Richardson and J. C. Mondel, both of 64, Queensway, Wallasey. Registered office, Station Yard, New Brighton, Chester.

The Backworth Coal Company have been successful, after three years' work in sinking at Benton Square, in reaching the Yard seam at a depth of 107 fathoms. The coal here is found to be of the same excellent quality as the company is working at the Blue Bell Pit, Shiremoor. It is stated to be the intention of the Coal Company to erect a new colliery village, such houses as are at present in the district being very old and not in the best of condition.



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## THE FREIGHT MARKET.

There has been a fair amount of activity in the outward market this week. On the north-east coast, coasting business has been done at about 3s. 9d. to London from the Tyne, and 4s. 3d. to Hamburg. The Baltic is based on from 5s. 6d. to 5s. 9d. to Cronstadt, and the Bay on 6s. 1½d. to Bordeaux. The Mediterranean is firmer, at from 9s. to 9s. 6d. to Genoa. At South Wales, chartering is moderately busy. The Mediterranean market is firm for prompt boats. The River Plate and Brazils are steady. Late figures are generally well maintained for all directions. The Clyde is dull and featureless, and there is little doing at the Humber. Homewards, Odessa advices report that tonnage is still ample, but that owners are holding out for fully recent rates. The tone is, if anything, steadier. The principal demand is for end September-early October loading. The Eastern demand for tonnage is slow, and rates are unaltered. The Mediterranean and ore trades are steady. The Baltic is firm. America and the River Plate are strongly held for recent figures.

Tyne to Alexandria, 4,000, 9s. 6d.; Algiers, 3,300, 7s. 9d., 600; Abo, 650, 6s. 6d.; Barcelona, 2,800, 10s.; 3,200, 9s. 9d.; Bahia Blanca, 22s., September 15; Bordeaux, 2,900, 6s. 1½d.; Cronstadt, 2,600, 5s. 9d.; 5,200, 5s. 6d.; 3,300, 5s. 9d.; Civita Vecchia, 4,600, 10s.; Dieppe, 560, 5s. 6d.; 1,000, 5s. 6d.; Fairwater, 1,300, 5s. 6d.; Genoa, 5,500, 9s. 6d., river loading; 3,500, 9s. 3d.; 3,000, 9s. 3d.; 6,100, 9s. 3d.; 4,800, 9s. 3d.; 2,200, 9s. 6d.; 3,900, 9s.; 5,200, 9s. 1½d., from Dunston; Gibraltar, 2,300, 8s. 6d.; Havre, 1,200, 4s. 9d., from Dunston; 2,200, 4s. 9d., from Dunston; Hamburg, 2,200, 4s. 3d., from Dunston; 1,600, 4s. 4½d., from Dunston; 1,600, 4s. 3d.; Las Palmas, 5,700, 9s.; 4,000, 8s. 9d.; Lisbon, 2,800, 7s. 9d., 300; London, 2,800, 3s. 9d.; Marseilles, 3,600, 9s., 600; 3,300, 9s., from Dunston; 3,500, 9s.; 3,700, 8s. 9d., 600, from Dunston; Malta, 4,700, 7s. 9d., two loading places; Mariager, 1,000, 6s.; Memel, 3,200, 4s. 10½d., 800; Norrköping, 2,100, 4s. 6d.; Naples, 3,900, 9s., 700, from Dunston; Odessa, 5,000, 9s. 6d., September; 8,400, 9s. 6d.; Port Said, 5,000, 9s., from Dunston; 6,800, 9s.; 6,300, 8s. 9d.; Rouen, 2,000, 5s. 3d.; Rochefort, 3,400, 6s. 6d.; Reval, 1,200, coke, 9s.; Rokkola, 1,400, 6s. 6d.; St. Petersburg, 2,500, 5s. 10½d.; 2,500, 5s. 9d.; 3,750, 5s. 9d.; Stockholm, 2,500, 5s. 6d.; St. Brieux, 600, 7s. 6d.; Savona, 3,900, 9s.; Venice, 4,000, 10s. 9d.; Wasa, 1,500, 6s. 6d.; Zeebrugge, 1,800, 3s. 6d.

Cardiff to Alexandria, 6,200, 9s. 4½d., 500; 6,300, 9s. 3d.; 5,300, 9s. 3d.; 5,300, 9s. 4½d.; 6,000, 9s.; 5,300, 9s., 500, September 15; Almeria, 2,100, 9s. 9d.; Algiers, 4,000, 11 fr.; 4,700, 10½ fr.; 4,100, 10½ fr.; 4,000, 10½ fr., September 15; 3,100, 10½ fr.; Ancona, 4,800, 10s. 9d.; Bordeaux, 2,200, 8½ fr.; 2,900, 8 fr.; 1,800, 7½ fr.; Brest, 2,400, 5s. 6d.; 4,800, 5s. 6d.; Belfast, 550, 4s.; Bari, 3,000, 11s. 3d., 350; Barcelona, 5,400, 9s. 9d., September 15; Cronstadt, 2,300, 6s. 6d.; 3,600, 6s. 1½d.; 3,500, 6s. 10½d.; 2,700, 6s. 10½d.; 1,600, 6s. 9d., September 15; 4,400, 7s., September 20; Calais, 1,400, 5s.; Christiania, 750, 6s. 6d.; Colombo, 5,700, 12s. 6d.; 6,000, 13s. 6d., September 23; 13s. 3d., October 15; Caen, 2,000, 5s. 1½d.; Cape Verdes, 4,700, 10s. 3d.; Civita Vecchia, 5,000, 10s. 3d., 400; 3,800, 10s. 3d., 400; Catania, 2,700, 10s.; Devonport, 2,200, 3s., Admiralty; 2,900, ditto, ditto; 1,700, ditto, ditto; 1,750, 3s. 1½d.; 2,000, 3s. 1½d.; Genoa, 5,000, 9s. 3d.; 6,000, 9s. 3d.; 5,000, 9s. 6d.; 4,500, 9s. 3d.; 5,700, 9s. 3d., September 20; 6,300, 8s. 9d.; Havre, 650, 5s. 6d.; Islands, 3,000, 9s. 3d., September 16; Leghorn, 4,000, 9s. 9d., 500; 5,800, 9s. 9d., 500; 5,000, 9s. 3d.; 4,200, 9s. 3d., Genoa terms; 5,600, 9s. 3d., 800; Lisbon, 1,900, 7s. 10½d., 350; 2,300, 7s. 10½d.; 2,600, 7s. 7½d.; 4,000, 7s. 6d., 400, early October; Las Palmas, 3,000, 9s. 3d., September; La Rochelle, 2,800, 7½ fr.; Marseilles, 7,500, 11½ fr.; 7,000, 11½ fr.; 5,500, 11½ fr.; 3,300, 11½ fr.; Madeira, 10s. 6d.; 4,600, 9s. 6d.; Messina, 2,700, 10s.; Malta, 2,600, 7s. 9d., September 17; 5,200, 7s. 6d., September 15; 4,300, 6s. 9d., Admiralty; Monte Video, 19s. 6d., September 15, reported; 6,000, 19s. 6d.; Naples, 4,000, 9s. 9d., 500; 5,800, 9s. 9d., 500; 5,800, 9s. 3d.; 5,000, 9s. 3d.; 4,000, 9s., 1,000; Nantes, 1,400, 7½ fr.; 2,400, 7½ fr.; 1,350, 7½ fr.; Nieudiep, 1,400, 5s. 4½d., September 15; Oporto, 1,600, 8s. 6d., 300; 8s. 3d., 500, 8s. 6d., 300; 900, 8s. 3d.; 900, 8s. 6d.; Port Said, 6,600, 9s., September 15; 6,400, 9s.; 5,000, 9s.; 5,000, 9s. 6d.; Perim, 12s. 9d., September 15; Pembroke, 250, 3s. 3d.; Palermo, 2,700, 10s.; Rio de Janeiro, 5,500, 18s. 3d., 300; 16s. 9d., 300, September 18; 6,000, 18s., September; 6,000, 18s. 3d.; 6,300, 18s. 1½d., October 1; River Plate, 6,200, 21s.; 5,000, 20s. 3d.; 5,500, 20s. 3d.; Rouen, 1,000, 5s. 9d.; Rosario, 5,000, 22s., end September; Reggio, 3,000, 10s. 9d., 350; Santos, 5,500, 19s. 6d., 500, mid-Sept.; Savona, 6,300, 8s. 9d.; 4,200, 9s. 3d., Genoa terms; Spezzia, 4,200, 9s. 3d., Genoa terms; Salerno, 2,600, 10s. 9d., 400; Sheerness, 600, 4s. 6d.; Sicily, 4,700, 10s., 400; Santander, 1,900, 5s. 6d., Sept. 14; St. Nazaire, 1,900, 7½ fr.; Syracuse, 3,000, 10s. 9d., 300; St. Servan, 1,350, 5s. 3d.; Simonstown, 5,300, 15s. 9d., Sept. 22, Admiralty; Torre Annunziata, 5,000, 10s. 3d., 400; 3,800, 10s. 3d., 400; Toulon, 5,500, 11½ fr., 400, f.d.; Trieste, 5,000, 10s. 6d.; 6,500, 10s. 6d., Sept. 18; Venice, 4,800, 10s. 9d.; 4,400, 11s. 3d.; Vigo, 1,500, 7s. 6d.; Valencia, 2,000, 9s. 4½d.; 300, fuel, free tax and one peseta.

Newport to Marseilles, 4,700, 11½ fr.; 5,300, 11½ fr.; Genoa, 6,000, 9s. 3d.; 5,500, 9s. 6d.; Bahia Blanca, 19s. 7½d., Sept.; 6,000, 19s. 9d., Sept. 29; Ibiyau, 22s., Sept. 16-30; Reggio, 3,000, 9s. 9d.; Naples, 4,000, 9s., 1,000; Buenos Ayres, 6,000, 20s. 6d., Sept. 20; Civita Vecchia, 3,500, 10s. 6d., coal, 11s. 3d., fuel; Trieste, 5,000, 10s. 6d.; 6,500, 10s. 6d.; Algiers, 3,100, 10½ fr.; Lisbon, 4,000, 7s. 6d.; 3,000, 7s. 7½d.; Porto Empedocle, 2,500, 10s. 9d.; Cronstadt, 4,700, 7s. 3d.; Rio de Janeiro, 6,300, 18s. 1½d.

Swansea to Civita Vecchia, 4,600, 10s. 6d., 500; Marseilles, 2,800, 12½ fr.; 2,800, 12 fr., 800; Genoa, 3,300, 9s. 7½d.; Stettin, 3,000, 5s. 6d., 500; St. Malo, 1,100, 5s. 1½d.; Rouen, 2,200, 5s. 9d.; 1,800, 6s.; 1,200, 5s. 9d.; Dieppe, 850, 5s. 4½d.; Civita Vecchia, 3,600, 10s. 6d.; Huelva, 1,900, 8s. 3d., September 15; La Rochelle, 2,200, 7½ fr.; Calais, 1,000, 5s. 3d.; 1,500, 5s.; Caen, 700, 5s. 6d.; Granville, 500, 5s. 6d.; Venice, 11s. 6d., 400; La Pallice, 1,800, 8 fr.; Boulogne, 1,000, 5s. 3d.; St. Nazaire, 8½ fr.; Pillau, 1,000, 7s.

Blyth to Cronstadt, 2,600, 5s. 9d.; Odessa, 840, 9s. 6d., 5,900, 9s. 3d.; Malmö, 1,800, 5s. 6d.; Stockholm, 2,400, 5s. 6d.; Kiel, 1,900, 5s. 9d.; Sundsvall, 1,900, 5s. 7½d.; Leningrad, 2,400, 5s. 1½d.; St. Petersburg, 3,700, 5s. 9d.

St. Petersburg, 2,000, 5s. 6d.; Sulina, 6,000, 10s.; 2,800, 6s. 6d.; 2,900, 6s. 1½d.; Hamburg, 3,000, 10s. 6d.; 2,900, 6s. 6d., 500; Dieppe, 1,000, 5s. 6d.; 1,000, 5s. 6d., 500.

Hull to Buenos Ayres, 19s., 250, 19s. 3d., 200; Odessa, 4,500, 9s. 9d.; Cronstadt, 3,600, 5s. 6d.; Reval, 3,200, 5s. 4½d.; Randers, 800, 6s.; Port Said, 9s.; Malmö, 1,500, 5s. 6d.; Libau, 2,800, 5s. 1½d.; 2,900, 5s. 4½d.; Odessa, 6,600, 9s. 9d.; Genoa, 5,000, 9s. 3d.; 2,500, 9s. 9d.; Stettin, 3,000, 5s. 6d.

East Norway (one or two places) to Buenos Ayres, sail, 18s. 3d., free Boca dues, granite setts.

Glasgow to Genoa, 9s. 3d.; Rio de Janeiro, sail, 17s. 9d.

Garston to Fremantle, sail, 17s., superphosphates.

King's Dynn to Libau, 1,600, 5s. 7½d.

Port Talbot to Genoa, 2,400, 9s. 9d.; 2,200, 9s. 6d.; Rouen, 1,500, 5s. 9d.

Partington to Barcelona, 10s.

Grangemouth to Monte Video, 19s. 6d.

Hartlepool to St. Nazaire, 2,900, 6s. 3d., Trignac terms; Landsrona, 2,800, 5s. 3d.; Fredericia, 2,000, 5s. 9d.

Fife port to Kiel, 1,600, 6s.

Goole to Cherbourg, 750, 6s.; Boulogne, 1,100, 5s.

Immingham to Perna, 2,400, 5s. 4½d.

Burryport to Malmö, 750, 7s.

Llanelli to Caen, 700, 5s. 4½d.

Wales to Monte Video, sail, 15s. 6d.; Buenos Ayres, sail, 15s. 6d.; Rio de Janeiro, sail, 15s. 6d.

Ardrossan to Rio de Janeiro, sail, 16s. 6d.

Rotterdam to Bordeaux, 3,600, 6s. steam coals, 6s. 9d. fuel; 2,600, ditto, ditto, September 17; Barcelona, 4,200, 9s. 6d.; 3,000, 9s. 6d.; St. Nazaire, 2,950, 6s., Trignac terms.

Neath Abbey to Havre, 600, 5s. 9d.

Homeward charters:—Kherson, Nicolaieff or Odessa, 7,200, Rotterdam, 12s., 3d. less barley, September 15-30;

20,000 qrs., 10 per cent., 400, 14s. 9d. n.o. or any, 15s. 3d. Hamburg, September 15-31; 6,200, Rotterdam, 12s. 6d.,

London, Hull, Antwerp or Weser 12s. 9d., Hamburg 13s., 3d. less barley up to half cargo, 2,600 tons barley

guaranteed, ppt.; 5,600, Rotterdam 12s. 6d., Hamburg 13s.,

September 28; 4,500, 14s. 3d. n.c. or any, 14s. 9d. Hamburg,

September 25; 5,700, Rotterdam 12s. 9d., London, Antwerp,

Emden or Weser 13s., Hamburg 13s. 3d., 3d. less barley,

October 5-25; 7,600, London or Rotterdam 13s., Hamburg

or Weser 13s. 6d., 3d. less barley, September 15-25; Nico-

laieff or Odessa, 6,200, London or Rotterdam 12s. 6d.,

Antwerp, Emden or Weser 12s. 9d., Hamburg 13s., 3d. less

barley, September 15-30; Azof, 4,800, Genoa or Marseilles,

13 fr., end September; 4,500, 15s. n.o. or any, 15s. 6d.

Hamburg, September 25-October 10; 4,300 max. 15s. n.c. or

any, 15s. 6d. Hamburg, 3d. extra two loading, option South

Russia, 3d. less barley, September-October; Eupatoria,

3,600, 15s. n.c. or any, 15s. 6d. Hamburg, ppt.; Calcutta,

2,402 net, Bremen and or Hamburg, about 29s. 4d. one port,

29s. 10½d. both ports, jute, September; New York, 2,878

net, Philippines and Japan, three ports, 32s. 6d., rails, &c.,

ppt.; 27c, Hong Kong, 27½c Whampoa; Aden, Rs. 6,

Calcutta, salt, October-November; Buenos Ayres or La

Plata, 4,200, 10 per cent., United Kingdom-Continent, 15s.

o.c.; no reduction direct, ppt.; San Lorenzo, 4,700, 10 per

cent., United Kingdom-Continent; 17s. 6d. o.c., less 6d.,

September; 4,500, 10 per cent., 17s. 6d. o.c., less 6d.,

October 1-25; 4,700, 10 per cent. 17s., o.c. less 6d., October;

Bilbao, 3,600, Rotterdam, 5s. 3d., ppt.; 3,600, Oslebshausen,

5s. 9d., ppt.; 3,600, Barrow, 5s. 1½d., ppt.; time charter,

States and West Coast trade, 5s. 0½d. one round trip,

delivery New York; time charter, Brazil and River Plate

trade, 5s. one round trip, delivery and redelivery United

Kingdom-Continent; time charter, States and West Indies,

5s. one trip, delivery Cuba, redelivery North of Hatteras;

Seville, 8s. 3d., Glasgow; Odessa or Novorossisk, 5,600,

London, Hull or Rotterdam 12s. 6d., Hamburg 13s., with

1,500 tons heavy guaranteed, ppt.; Novorossisk, 6,400,

Rotterdam 12s. 3d., Antwerp 12s. 6d., Hamburg 12s. 9d., no

reduction barley, 2,500 tons barley, ppt.; Sulina, 5,800,

Rotterdam 11s. 9d., Antwerp 12s., Hamburg 12s. 3d., ppt.;

4,400, Rotterdam 12s., Antwerp or Hull 12s. 3d., September 20-

October 10; 5,900, Rotterdam 12s. 3d., Antwerp 12s. 6d.,

ppt.; Bombay, 6,000, Garston, 22s., ore, October; nitrate

ports, 5,000, United Kingdom-Continent, or United States,

29s. 6d., December; 5,400-5,700, 30s., with options, November-

December; time charter, fruit trade, 1,000 d.w.; £450, four

months from September; time charter, Baltic and White

Sea trades, 600 stds., 12 months from December, £600 per

month; Skadowsk and Kherson, 4,400, Rotterdam 13s.,

Antwerp 13s. 6d., ppt.; Poti, 4,600-5,600, Maryport 17s.,

Westoll's terms, October-November; Sulina, 5,200, Rotter-

dam 12s., Antwerp 12s. 3d., Hamburg 12s. 6d., September-

October; 6,700, Rotterdam 12s. 6d., London, Hull, or

Antwerp 12s. 9d., Hamburg 13s., Liverpool, Glasgow, or

Leith 13s. 3d., 3d. less barley, October-November; Saigon,

6,600, Hull or Hamburg, 31s. 3d., rice meal, September-

October; 6,000, Liverpool, 29s. 6d., rice meal, October;

Kurrachee, 2,413 net, United Kingdom-Continent, p.p.,

18s. 7½d., September-October; New York, 1,686 net, Medi-

terranean and Black Sea, four ports, basis 23½ c., one port,

September-October; 3,309 net, Chingkiang and or Shanghai,

28 c., October; San Lorenzo, 4,600, 10 per cent., United

Kingdom-Continent, 18s. o.c., less 6d., October 15-November

1; Santander, 3,100, Rotterdam, 5s. 3d., ppt.; Huelva, 5,000,

Mobile; 10s. 9d., ppt.; St. Petersburg, 5,000, Rotterdam

1s. 5½d., London 1s. 6½d., wheat basis, September; nitrate

ports, sail, 21s., Melbourne; Bunbury, sail, 52s. 6d., United

Kingdom-Continent, less 1s. 3d. direct, option Buenos Ayres

52s. 6d.; time charter, Transatlantic trade, 6s., one trip,

delivery Pensacola, re-delivery United Kingdom-Continent;

time charter, Baltic trade, about 1,360 d.w., including about

470 stds., £630 one trip, delivery port of discharge, Baltimore

charter.

As a result of investigations that have recently been

made, an important colliery enterprise will shortly be

entered upon in the neighbourhood of Riddings Junction,

on the Netherby estate, Cumberland. A concession to work

coal on the estate has been granted by Sir Robert Graham

to Mr. R. W. Tweedy, formerly of Carlisle, but now of

London, and on Monday last Mr. Tweedy visited the neigh-

bourhood with Dr. Cadman. As a result of the visit it is

mentioned that boring operations will be commenced at

once, and that in the near future six or eight collieries will

be established. Preliminary steps have already been taken

for the formation of a company, of which Mr. Tweedy will

be one of the directors, to work the collieries. It is believed

that there is an abundance of coal in the district that has

been surveyed, which is not far from the coalfield at

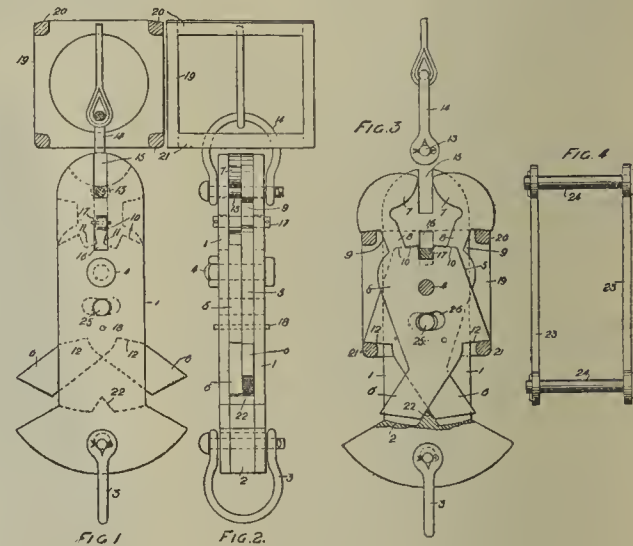
Canonbie, and if the anticipations of the promoters are

realised employment will be provided for many hundreds of

men, to the great advantage of the neighbourhood.

## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

18687 (1912). *Improvements in Means for Preventing Accidents due to Overwinding of Mine Cages and the like.* B. Harris, of 8, Mountain-row, Blaenllecha, Ferndale, Glamorganshire, South Wales.—Relates to that type of apparatus comprising two rocking levers shaped at their upper ends to co-act with and engage a shackle on the cage winding rope, said levers being pivoted side by side between two side plates connected at their lower ends by a distancing block, and each having a vertical slot through which the said shackle passes. According to this invention, there is provided at the mouth of the mine a stationary frame comprising two end plates connected by two upper and two lower horizontal cross members between which the winding rope passes, and against the lower members of which the outwardly-inclined portions of

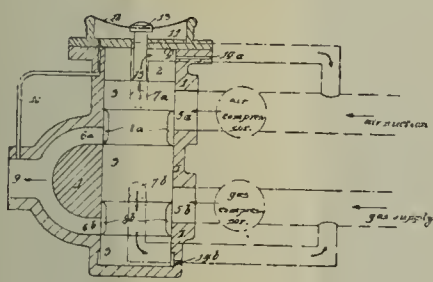


the levers contact when an overwind occurs, said levers then engaging the cross members to support the apparatus and the cage, and in order to more securely retain the apparatus each lever is provided with a tooth upon opposite edges, the tooth on one edge being near the top of the lever to engage one of the upper members of the frame, while the tooth on the other edge of the lever is near the lower end thereof and engages one of the lower members of the



through the line W W of fig. 1 showing the Y-bolt and clamp. (Nine claims.)

19841 (1912). *An Improved Method of and Apparatus for Producing Gas Mixture.* W. Osthoff, of Düppelerstrasse 20, Barmen, Germany.—Relates to a method of and apparatus for producing gas mixture of uniform composition and constant working pressure from separately compressed fluids, and the feature of the invention resides in the fact that a single regulating member is used for controlling the pressure of and the supply drawn from the several compressors, the mixing of the gases, the service pressure of the mixture and the return flow of the separate unused fluids, and that said single regulating member is operated by the pressure of the mixture. The gases in excess of the quantity for constantly producing fresh mixture return separately to the corresponding compressor. The sum of the delivery passage into the mixing chamber and the return conduit for each fluid and the delivery of the corresponding compressor for every change in load remains constant for every connected charging device. It is, however, not necessary that the pressure and the delivery of the separate delivery devices or the several fluids should amongst themselves be like each other. On the other hand, however, it will be clear that the pressure of the mixture produced will be of the same or of lower pressure than the separate gas. The construction is shown in fig. 1, which represents a vertical section of a suitable contrivance

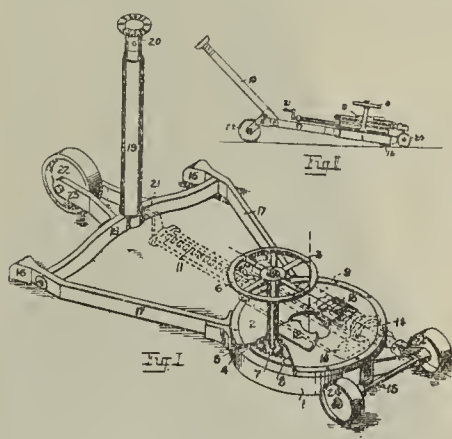


showing the connections leading to the compressors. The whole volume of air produced by the air compressor is delivered through the passages 5<sup>a</sup>, 8<sup>a</sup>, and 6<sup>a</sup> into the mixing chamber 9 and the whole volume of gas delivered by the gas compressor is forced through the channels 5<sup>b</sup>, 8<sup>b</sup> and 6<sup>b</sup> into the mixing chamber 9 in which an intimate mixture of gas and air takes place by reason of the strong current of the supplies. The area of the channel 6<sup>a</sup> is exactly equal to the area of the return passage 7<sup>a</sup>, and the same is also the case with the channels 6<sup>b</sup> and 7<sup>b</sup>. Should the delivered charge be larger than is required for consumption, the superfluous mixture will flow through the pipe 10 into the chamber 11 and force the plunger valve 3 upwards, and in consequence thereof the channels 6<sup>a</sup> and 6<sup>b</sup> will be gradually closed while the return passages 7<sup>a</sup> and 7<sup>b</sup> open to an equal extent. Finally, when the consumption of mixture ceases entirely, the channels 6<sup>a</sup> and 6<sup>b</sup> will be fully closed, while the passages 7<sup>a</sup> and 7<sup>b</sup> will be fully open so that the entire volumes of gas and air will be separately returned into the compressors. (Four claims.)

20900 (1912). *Improvements in the Treatment of Gases from Coke Ovens and of like Gases and the Recovery of Products therefrom.* W. H. Coleman, of 3, Redclyffe-road, Withington, Manchester.—Relates to improvements in the treatment by ferrous sulphate. The gases are passed through and treated in a suitable scrubber or washer which preferably possesses several compartments. The washing or scrubbing is effected by a ferrous sulphate solution which is fed into the gas outlet end of the scrubber in the neutral condition, and is pumped or caused to flow in any other suitable way through the scrubber from compartment to compartment from the gas outlet end to the gas inlet end in such quantities and at such a rate that whilst an excess of neutral ferrous sulphate solution is maintained at the gas outlet end to ensure the recovery of the last traces of ammonia, the liquor at the gas inlet end of the apparatus is completely saturated with ammonia as a result of the addition of ammonia and sulphuretted hydrogen to the stream of gases at that end, so that the whole of the sulphuric acid of the ferrous sulphate is combined as ammonium sulphate, and the iron of the ferrous sulphate is in the form of precipitated ferrous sulphide mixed with complex iron, and iron and ammonium cyanogen compounds, formed from the cyanogen in the gas under treatment. The maintenance of either or both such excesses is ensured by the addition to the scrubber of liquor or gases produced or evolved in subsequent stages of the process. The muddy liquid leaving the washer is treated directly with steam to render the soluble cyanogen compounds insoluble, and to drive off the excess of ammonia and sulphuretted hydrogen which may then be led back to the stream of gases entering the scrubber. The muddy liquid left after this treatment is filter pressed for separation of its solid contents, and marketable ammonium sulphate is recovered from the liquid as known, as, for example, by boiling it down. The press cakes are treated with sulphuric acid in quantity slightly less than would be required to decompose the whole of the ferrous sulphide so that a neutral solution of ferrous sulphate is obtained, which, after any required filtration or settlement for the removal of any ferrous sulphide it may contain and insoluble iron cyanide compounds is returned for re-use in the scrubber, and sulphuretted hydrogen is

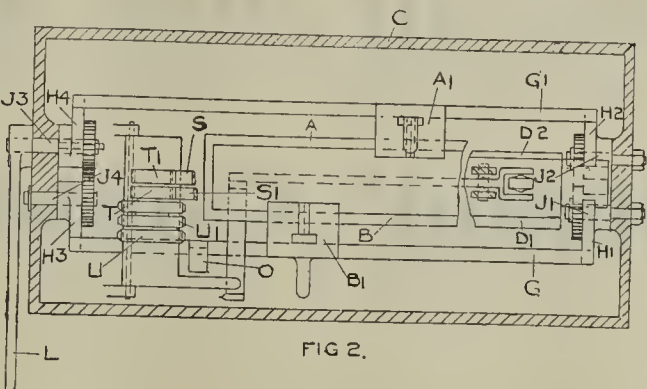
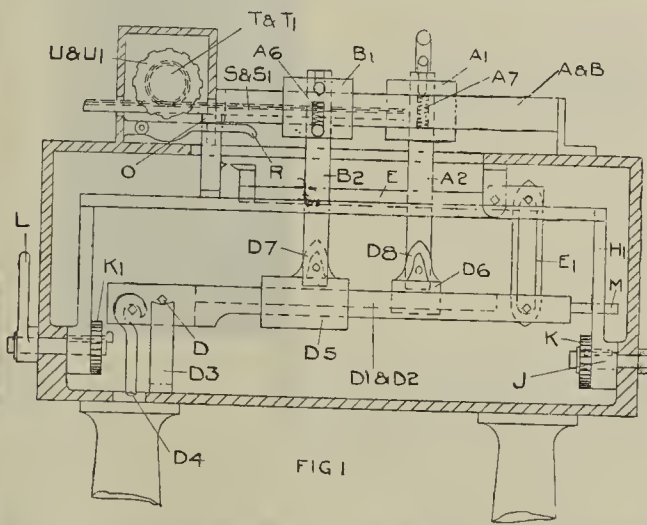
evolved. After the filter press cakes have been treated with sulphuric acid, the resulting mud is treated with an excess of sulphuric acid to drive off any remaining sulphuretted hydrogen. The resulting mud which now consists chiefly of insoluble iron cyanogen compounds is filtered and the filtrate is washed to remove any traces of soluble iron and ammonium compounds. It can then be worked up into commercial cyanogen products in any known way. The acid liquor or washings can be used up in the treatment of further filter press cakes. The tar should be extracted as far as possible from the gases before they enter the scrubber as its presence interferes with subsequent processes, as for example filter pressing. (Seven claims.)

21535 (1912). *Improvements in Mountings for Percussive Coal-cutters and the like.* W. Mauss, of Commercial Exchange-building, Johannesburg, Transvaal, South Africa.—Relates to improvements in the construction of mountings for percussive coal-cutters and the like of the kind in which the percussive machine is arranged for rotation about a vertical axis and is mounted radially to said axis. According to the invention, the mounting comprises a frame carrying a rotatable member constructed to carry the percussive



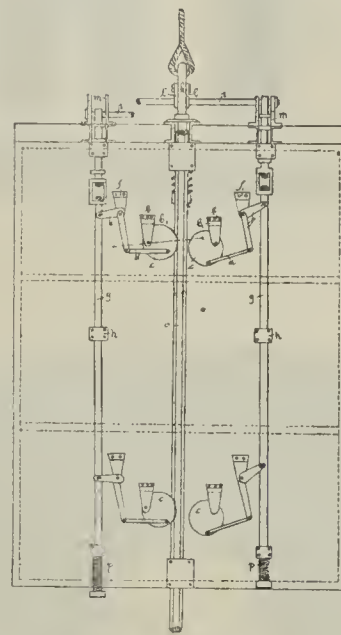
machine, said frame having front and rear feet and a vertical extensible pillar positioned between the front and rear feet and at such a distance from the axis of rotation as to enable the rear end of the percussive machine to clear it. The invention also consists in such a mounting constructed to eliminate looseness or play between the stationary and rotating parts. The invention further consists in such a mounting arranged for ready portability. Fig. 1 is a projected view of the device; and fig. 2 is a side elevation showing it ready for moving. (Five claims.)

21668 (1912). *Improvements in Weight Recording Devices for Weighing Machines.* S. Denison, Hunslet Foundry, Leeds, director of Saml. Denison and Son Limited.—Relates to improvements in or modifications of the invention described in the specification of prior application for patent No. 22484 of 1911. The object is to provide improved means for manipulating from without the enclosed poise-weights along the steelyard to a position to obtain equilibrium. Its novelty consists in operating and positioning concealed



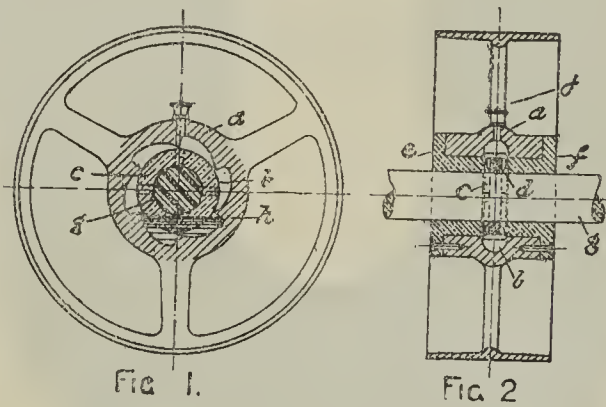
poise-weights along a preferably notched steelyard (also concealed), by the movement of carriages coupled thereto, which travel upon a non-weighing guide bar or bars. The said guide bar or bars, though non-weighing, are notched exactly as the customary steelyard, which notches exactly correspond in pitch with the notches on the concealed steelyard, when such notches are made use of. Fig. 1 is a front elevation, with the casing shown in section; fig. 2 is a plan view. (Two claims.)

23445 (1912). *Gripping or Safety Device for Cages.* F. Gombert-Hafner, Saarbrücken, Germany.—Relates to gripping or safety devices for cages, of the class in which the safety devices are operatively connected with the hoisting cable and the descent of the cage is automatically arrested in the event of the cable breaking, by means of eccentric discs, which are caused by a proper transmission to coact



with the guiding bars of the cage. The object is to provide on the opposite sides of the cage two vertical reciprocating rods, connected with the hoisting cable, and caused to go down under the influence of spiral springs when the cable breaks, the descent of the said vertical rods moving crank levers and connecting rods so as to cause eccentric toothed discs to grip into the guiding bars of the cage. The invention is represented in the annexed drawing. (Two claims.)

24823 (1912). *Improvements in and relating to the Automatic Lubrication of the Bearing Surfaces of Loose Pulleys, Sheaves, Wheels, Axles and the like.* T. T. Hindle, of Eden View, Eckersley-road, Bolton, Lancs.—An annular recess or chamber is arranged, preferably in the centre of the boss or hub of the pulley, wheel or disc. This chamber is constructed in the form of notches, ratchet shaped, to form a reservoir for the lubricant, and also to lift the lubricant when the pulley wheel or the like is rotated. The boss of the pulley may be bushed at each end, the flanges of the bush making an oil-tight joint with the ends of the boss, enabling the lubricant to be retained in the reservoir. A ring is attached to the shaft, axle or the like upon which the bushes rotate; the lower portion of this ring is arranged to be immersed in the lubricant in the annular chamber or



reservoir. When the loose pulley or the like is rotated, the cavities or notches formed in the annular chamber, combined with the centrifugal force, will have the effect of raising the lubricant, whilst the ring which is attached to the meanwhile stationary shaft or axle has the effect of breaking up and distributing the lubricant along suitable channels or oil grooves formed in the bushes or shaft; or when the loose pulley or the like is stationary, and the shaft or axle is rotated, the ring being attached to the shaft will raise will raise the lubricant from the bottom of the annular chamber and distribute the lubricant along the bearing surfaces of the loose pulley or the like. Fig. 1 is a cross-section through the boss of a pulley, showing the ratchet-shaped notches formed in the boss of the pulley; fig. 2 is a transverse section of same. (One claim.)

26014 (1912). *Improvements in or Relating to Trip Gear for Operating the Admission Valves of Steam Engines.* Newton, Bean and Mitchell, of New Works, Dudley Hill, Bradford, Yorkshire, C. Becker, of Belcaro, Ilkley, Yorkshire, and W. Eastwood, of 181, Old-road, Stanningley, Yorkshire.—Relates to admission valve operating gear for horizontal and vertical engines using saturated steam, superheated steam or other fluid, and has for its object to construct improved trip gear suitable for operating vertically working piston valves or drop valves, by means of which the tendency towards sluggish movement when closing will be much less than would be the case if the same valve were operated by the usual forms or constructions of trip gear. Means are provided whereby the closing spring is compressed to its fullest extent whether the cut-off be early or late, and it will be evident that by

(Continued on page 550.)



# **THE RECORD**

# **840**

**square feet in one shift with  
one "Siskol" Coal-Cutter.**

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**INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.**



The OFFICIAL figures recently published by H.M. Home Office show that in the Manchester District, for 1910, there were 152 Coal Cutters, of eleven different types, in use, of which 81, or more than half of the total number, were "SISKOL" machines.

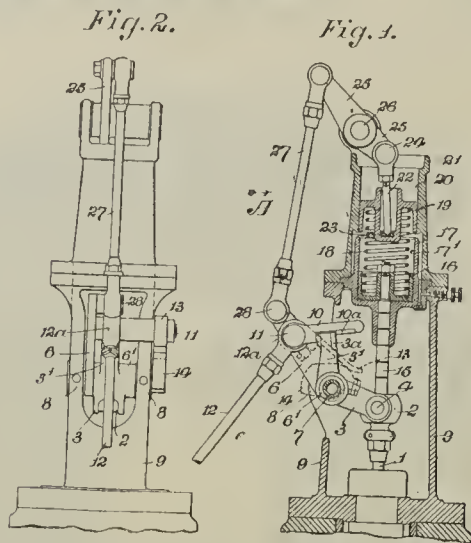
Is any further proof needed as to which is the best Coal Cutter?

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thus commencing the closing of the valve at all times with the full force of the spring operative the tendency to sluggish closing will be minimised. Fig. 1 is a sectional elevation of an admission valve gear, of the type in which a latch engages a valve lifting lever, having the improvements applied thereto; fig. 2 is an elevation looking in the direction of the arrow A, fig. 1. The action is as follows:—In the position shown at fig. 1 the trip latches are engaged and the spring 18 is fully compressed, the valve being in the closed position and at the extreme end of its movement. As the lever 6 swings downwards, the engagement of the latches causes the lever 3, 3', through the cross head 2 to raise the valve spindle and open the valve. As the valve spindle rises the dashpot pistons 16 and 19 and the spring 18 move upwards and keep their relative posi-



tions. When unlatching occurs, through the action of the cam 14 on the tongue 18, the full force of the full compression of the spring 18 is available to start the closing movement of the valve. As the lever 6 moves upwardly again to carry the latch 10 back to engaging position the spring 18 is, through the rod or link 27, lever 25, peg 22, and movable cap or piston 19, fully compressed by the time the latch piece 10<sup>a</sup> has engaged the trip piece 3<sup>a</sup>. The spring is thus fully compressed prior to commencement of the next opening movement of the valve, so that the full force of the spring to commence the closing movement of the valve is available whether the cut off or unlatching takes place early or late or in any position. (Three claims.)

**Home Office, Prosecution at Bishop Auckland.**—On the 8th inst., Matthew H. Kellett, agent for Messrs. Pease and Partners, and Alan L. S. Greenwell, manager of Eldon Colliery, were at Bishop Auckland charged on summonses taken out under the Coal Mines Act by H.M. inspector of mines. The first charge was that they did not provide a certain part of Harry pit, Eldon, in which 10 persons were employed, with two ways of affording egress. It was stated that another road was being made, and Mr. Greenwell, in taking responsibility, said he had unthinkingly transferred some men from a place that had been worked out. He was fined 30s., and the case against Kellett was dismissed. The second charge was of allowing explosives to be taken into the mine, and kept, until about to be used, otherwise than in a secure case or canister. It was alleged that Mr. Charlton, H.M. inspector, saw men with cartridges in their pockets. Mr. Kellett pointed out the great difficulty of colliery owners in meeting the requirements of the Act, and added that the men refused to comply with it, urging that it was the custom of deputies to take in powder. Mr. Greenwell was fined 10s., and Mr. Kellett 25s. The two men were then charged with allowing an iron scraper to be taken into the mine, contrary to regulations. The defence was that the men were responsible. The company had asked the men to comply with the regulations in regard to explosives, and they would buy proper scrapers. The men had not complied, but the company had ordered copper scrapers. Mr. Greenwell was fined 10s., and Mr. Kellett 30s.

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

19697. Production of oils from coal, cannel, and shales. A. Rollason.  
 19731. Limber-pin for mine skips and like vehicles. C. H. Sawyer and J. Bowditch.  
 19734. Apparatus for bending wired sheet metal. E. C. R. Marks. (Charles Henry Stephenson, U.S.)  
 19753. Casing for electric miners' lamps. P. Porscke, E. Klunder, and G. Kellner.  
 19754. Airtight casing for electric miners' lamps. P. Porscke, E. Klunder, and G. Kellner.  
 19769. Internal-combustion turbine engines. W. Engles and W. L. Like.  
 19789. Water-tube boilers. Vulcan-werke Hamburg und Stettin Akt.-Ges.  
 19790. Superheaters. W. J. Mellersh-Jackson. (Power Speciality Co., U.S.)  
 19822. Process and device for increasing the heating surface on steam boilers. C. Hulsmeyer.  
 19841. Automatic tools. J. M. Holman and J. L. Holman.  
 19872. Process of and apparatus for the dry distillation of coal and the like. Ofenbau G.m.b.H.  
 19888. Tubular grinding mills. Fried. Krupp Akt.-Ges. Grusonwerk.  
 19915. Conveyor-head gear. W. L. Spence.  
 19926. Smelting. E. B. Parnell.  
 19930. Turbine. G. J. Stevens and W. E. Clarke.  
 19949. Turbines. Willans and Robinson Limited and J. P. Chillenden.  
 19955. Process and apparatus for recovery of tar from hot distillation gases. W. Strommenger.  
 19963. Automatic couplers for railway carriages, wagons, and the like. G. Johnston.  
 19969. Manufacture of tubes. H. Chadwick.  
 19982. Machine for cutting off metal bars, tubes, and the like. C. H. Clifton and Clifton and Baird Limited.  
 20018. Brickets. T. H. Peters, sen., T. H. Peters, jun., G. L. Tuxford, and C. P. Tuxford.  
 20030. Ambulance wagons. H. Nagel.  
 20077. Process of and means for obtaining phenols from tar oils, applicable also for other similar purposes. A. Pepper.  
 20079. Chain-grate furnaces. E. Bennis.  
 20092. Combustion of combustible mixtures. C. D. McCourt and Boncourt Surface Combustion Limited.  
 20101. Gas-fired furnaces. H. E. Collins and W. F. Collins.  
 20117. Heating-boilers for briquetted fuel, more particularly lignite, peat, or the like. J. E. Pollak. (Streibelwerk G.m.b.H., Germany.)  
 20124. Multiple adjustable spindle drills. J. R. C. August.  
 20140. Jointing, capping, or bonding electric cables, wire ropes, or the like. H. J. Fisher.  
 20145. Gate arrangements for pit-cages, hoists, and the like. C. H. Weaver.  
 20158. Process of and apparatus for dressing ores by means of gas. K. Takeda.  
 20164. Furnaces. J. A. Hope.  
 20177. Oscillating conveyor channels and the like. F. L. Smidth and Co.  
 20180. Hauling or winding engines. R. H. Fowler.  
 20182. Apparatus for conveying and loading coals and similar materials. S. Marshall.  
 20195. Bonding-clamp for metal-sheathed electric wires and cables. W. T. Henley's Telegraph Works Co. Limited, and W. F. Bishop.  
 20196. Rotary pumps, engines or meters. W. H. Utley.

### Complete Specifications Accepted.

To be published on September 25, 1913.  
 1912.

12742. Explosives. Nathan, Rintoul and Baker.  
 12743. Explosives. Nathan, Rintoul and Baker.  
 12745. Explosives. Nathan, Rintoul and Baker.  
 12746. Explosives. Nathan, Rintoul and Baker.  
 13141. Process for the extraction of ammonia and sulphur compounds from gas. Cobb.  
 19675. Clamps for use in raising and lowering well casings and the like. Wilson.  
 19847. Treatment of peat. Whitaker and Wetcarbonizing Limited.  
 19911. Method of burning or calcining low-percentage lime-stones. Von Staszewski.  
 19984. Internal-combustion engines. Allgemeine Elektrizitäts Ges.  
 20000. Pneumatic tools. Curti.  
 20078. Method of and apparatus for draining or freeing coal from water. Simon.  
 20180. Electrolytic pickling of metals. Marino.  
 20615. Gas producers. Bentley and Appleby.  
 20620. Elevating and discharging apparatus. Noelle.  
 21116. Construction of the "Field" tube type steam super-heater. Sanderson.

21423. Stamping machinery for compressing various materials, and more especially coal for cokemaking and the like. Mackinlay and Krueger.  
 22144. Annealing furnaces. Thomas and Davies.  
 24256. Coal and other mine conveying machinery. Douglas.  
 24921. Continuous kilns for burning or firing bricks, tiles or other earthenware, fireclay, or like goods. Bottomley.  
 26251. Bricks for the construction of chimneys and the like. Coke Ovens and By-products Company and Schuster.  
 26590. Colliers. Pasquier.  
 27301. Brakes for railway wagons and the like. Smith, Edwards and Steward.  
 28272. Smoke-box doors of boiler furnaces and the like. Brown.  
 28816. Electric lamps for mines. Joris.  
 29897. Process for simultaneously oxidising and evaporating hydrocarbons. Soc. Anon. "Cava."  
 1913.

2546. Safety-signalling apparatus for use in mines. Close.  
 6556. Apparatus for loading ships and for discharging cargo therefrom. Nicolaidis.  
 7113. Hydraulic ram pumps. Rohr.  
 8583. Explosives. Bostaph.  
 8847. Cores for foundry use. Steegh, and Steegh and Esser (Firm of).  
 9359. Trucks. Taylor.  
 10982. Engine valves. Aborn.  
 12819. Trucks. Meacham and Perkins.  
 13694. Method of igniting and unlocking miners' safety lamps. Gordon and Wright.

### Complete Specifications open to Public Inspection before Acceptance.

1913.

19558. Furnace efficiency meters. Blonck.

## GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named **post free**.

Consular Reports: Cuba, 1911-12, 4½d.; Switzerland, 1912, 3½d.; Denmark, Faroe Islands, 1912, 5d.; China, Tientsin, 3½d.; China, Hangchow, 4½d.; Greece, Piræus, 3d.; Japan, Kobe, 7d.; Egypt, Port Said, 10½d.

Special Report on the Trade Boards Act Provisional Orders Bill, 8½d.

Companies' Twenty-second Report for 1912, 1s. 8d.

COAL MINES ACT, 1911: General Regulations re Underground Workmen in Naked Light Mines, 1d., or 3s. 6d. per 100.

State Railways, British Possessions and Foreign Countries: Return, 9½d.

Trade and Navigation Returns for August, 1s. 9d.

## PUBLICATIONS RECEIVED.

"Transactions of the Mining Institute of Scotland" (Vol. 35, Part 5); "The Journal of the American Peat Society" (Vol. 6, No. 3), price 1½dols.; "The I.C.S. Student" (Vol. 5, No. 9), September, price 2d.; "Printers' Ink" (Vol. 5, No. 127), price 6d.; "Report of the Department of Public Works, New South Wales, for the Year Ended June 30, 1912," price 5s.; "The Journal of the West of Scotland Iron and Steel Institute" (Vol. 20, Nos. 6 and 7), March-April.

**Manchester School of Technology.**—At Manchester Municipal School of Technology part-time courses are provided in mining, the courses extending generally from September to the following July. The firemen's course includes Saturday classes in mining, arithmetic and drawing and colliery practice; for under-managers a two-year course is provided; and for managers there are classes in geology, mining law, colliery engineering and practical mine surveying. The lecturers are Messrs. Noah T. Williams, B.Sc., M.I.M.E., and F. P. Mills, M.I.M.E. Course certificates are awarded on application to students completing satisfactorily the work of a course, no part of which forms part of a course leading to the associateship of the school. The University course in mining is conducted at Owens College.

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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY, SEPTEMBER 19, 1913.

No. 2751.

## LIQUID, SOLID AND GASEOUS FUELS FOR POWER PRODUCTION.

Before Section G (Engineering) of the British Association last week, a discussion on this subject was opened by Prof. F. W. BURSTALL, of the Birmingham University, who presented a communication in which he said that it was often assumed that the oil engine in one of its many forms was likely to be the heat engine of the future, and at first sight there was much to be said for this contention. For the heat engine as a thermodynamic machine, oil was immensely superior to either solid or gaseous fuels, because of the high heating value and from the ease in which it can be introduced into the working fluid. After discussing the merits of oil and gas engines, gas turbines and other sources of power, Prof. Burstall said he held the opinion, after mature consideration, that the whole problem of fuel treatment would lie in the direction of heating the coal, peat or lignite in a closed retort—not of necessity under the conditions which are at present forced upon the gasworks, where the primary object was to produce urgent yield of gas on a certain standard laid down by Parliament. If it be granted that the quantity, quality and purity of the gas produced were a secondary matter, the problem of fuel treatment became one of the most fascinating problems which the engineer could encounter.

It had long been known that the quantity and quality of the tar was largely influenced by the temperature at which the fuel was carbonised; the lower the temperature the better were the tars in both yield and composition. The amount of sulphate of ammonia recovered from the gas was only some 25-30 lb. per ton of coal; whereas the amount of nitrogen present in the coal would give about 120 lb. of sulphate of ammonia, in the ordinary process of carbonisation some three-quarters of the nitrogen was left behind in the coke. Under present conditions this could not be avoided, but improvements in this direction were possible. If the gas and tars were withdrawn from the heat directly they were evolved from the coal, a set of products would be obtained of a different composition from those usually obtained. Many of these oils could, after distillation, be employed as fuel oils for power production; both the light oils, such as benzole, pentane and hexane, and the middle oils, while the heavy oils of the anthracene series appeared to be of value for lubricating purposes.

### An Ambitious Scheme.

Prof. Burstall then outlined a scheme of fuel treatment, which, he admitted, was at present wholly beyond the region of practical realisation. The first step was to obtain a coalfield of wide extent yielding a coking coal. It need not be within a short distance of towns, as that would merely modify the means of transmission, the essential point being to obtain a sufficient supply of coal to enable the capital charges to be repaid in a series of years—probably 30. The works would have to be on a large scale to give the economy of working that always resulted from wholesale production, but the carbonisation plant would be placed near the pithead, so that the tubs could discharge direct into the bunkers of the retort charging machines. A convenient size for each plant would be about 2,000 tons per day and there would be some five to six pits operating over quite a large area.

There would be no gain from any point of view in not shipping direct from the pithead the coke and sulphate of ammonia, as these would be ready for market without further treatment. Tar and gas would be taken by pipe lines to suitable points for their future treatment, depending upon geographical consideration. The tar from the whole of the works would be passed through continuous and automatic stills, where the various fractions would be obtained with the least expense. The fractions, after working with acid and soda, would pass to a second set of automatic stills, this process being continued until the pure products ready for market were obtained without the necessity for storage and in the least possible space of time.

As to how far the treatment of residuals should be carried, no definite answer could be given, as it depended

on the current prices, but, on the scale considered, namely, 120,000 to 140,000 gallons of tar per day, it would certainly be advantageous to treat the products to a finish.

### The Complete Utilisation of Coal.

That portion of the gas not required for firing the automatic stills and for colliery purposes generally, would be led to a different point, perhaps many miles from the pithead. This offered no difficulty as regards the power required, the great obstacle being the cost of the pipe line, which might to a large extent be reduced by gas holders at the delivery end, so as to improve the load factor on the pipe line. The gas would be free from tar but would contain the sulphur compounds and would be employed in gas engines for the generation of electricity which would be sent at high voltages not only for the use of the towns but of the railways which are supposed to be entirely electrified. No doubt electrical engineers would look askance at gas engines, not only because of the many failures that had occurred with large engines, but also from the fact that at present some 2,000-horse power was the largest size that could be built, whereas the steam turbine could be constructed to give an output of 20,000 kw. at a low first cost. The gas engine could only compete with the steam turbine when its fuel gas was delivered to it at a price that would, when helped by its high thermal efficiency, enable it to get over its large capital outlay. But, perfect as was the steam turbine as a mechanical machine, its thermal efficiency was half that of its rival, as the cost of the steam delivered to it could not be reduced, there being small margin of improvement possible in the boiler. There were also no by-products, as the whole of those contained in the coal are used to pollute the atmosphere. For these reasons it was quite possible for the gas engine to produce current more cheaply than the turbine, but the price of gas of a calorific value of 500 B.T.U.'s per cubic foot would have to be 4d. per 1,000 cubic feet if coal be taken at 20s. per ton. This would give for each fuel about 125,000 B.T.U.'s per penny, and, taking the gas engine as two and a-half times as efficient as the turbine, this should leave enough margin to compensate for the increased capital outlay. The exhaust gases would be washed so as to extract the sulphuric acid which would be returned to the pit head for the manufacture of sulphate and the washing of the tars, so that all the external material to be purchased would be the soda ash used to neutralise the excess acid. In this manner the whole of the products of the coal would be recovered in a form ready for the market, and if the coke were used as a domestic fuel a smoke-laden atmosphere would be impossible.

### Producer Gas and Ship Propulsion.

Prof. Burstall, passing on to another branch of his subject, said producer gas for power and heating purposes had a large field in front of it, particularly when the factory was distant from the coalfield and also where there was a steady load. In producer gas the whole of the fuel was converted into gas and tar, so that a large quantity of gas (120,000 to 140,000 cubic feet) could be obtained per ton of coal. The ammonia yield was very high, being from 80 to 90 lb. of sulphate per ton. The calorific value of the gas was low (about 140 B.T.U.'s per cubic foot) and the tar was small in quantity and poor in quality, as it was nearly all pitch. The low calorific value and the difficulty of cleaning the gas were serious drawbacks to the transmission over long distances. In South Staffordshire, however, producer gas had been piped over a large area for several years and the undertaking now appeared to be on sound financial basis. The suction producer working on coke or anthracite coal had a very definite position for small plants in remote districts, where it formed a cheap and reliable source of power.

The propulsion of ships by internal combustion engines was one of the most important problems of the near future. The gas engine itself offered no special difficulty, but to instal a producer plant of large size did not appear to be possible, for the following reasons. The space taken by the producer alone was large, and, in addition, there was the cleaning plant. Again, when the

percentage of the poisonous carbon-monoxide was high, 15 to 20 per cent., the plant should be entirely in the open air to prevent risk of gassing. These conditions were most difficult to fulfil, and now that the Diesel motor had proved itself to be suitable for marine propulsion, the more cumbersome and dangerous producer would be discarded.

Taking the question of producer gas as a whole, it would seem as if it would always have a definite use, but only a limited application, more especially in a country like Great Britain, where, in time, it would be possible in almost every part to obtain electricity cheaply in bulk, and when this was the case no other source of power need be considered.

The case of coke ovens really fell into the same class as the retorted gas, the only difference being that to obtain coke capable of carrying the weight of the iron in the blastfurnace, the temperature of carbonisation must be high (12,000 degs. Cent.) and the period long (24 to 30 hours). Thus, the tars were poorer from being more split up, and the cost of repairs to the ovens considerable higher than on a gasworks retort. As hard coke must be made, the place for it was in conjunction with the ordinary plant, so that the by-products might be readily worked up.

In conclusion, Prof. Burstall remarked that there is no real rivalry between gas and electricity when they are viewed from a broad standpoint. Both took their origin from coal and each were capable of doing things that the other could not. The work of the engineer was to consider them both and to see if he could not, by marrying the two together, obtain from the coal more products useful to man than by shutting his eyes to merits in any subject outside his own studies and experiences.

### Discussion.

Mr. W. M. MORDEY said that Prof. Burstall had held out little hope that the gas turbine would be a practical tool in the near future, but there was one solution which occurred to him, viz., the adaptation of the Humphrey gas pump with a water turbine, allowing the water to drive a dynamo. Such a solution would very much simplify the problems now presented by the gas turbine, and provide at the same time a direct means of driving a dynamo by a simple rotating motor.

Dr. J. S. OWENS, dealing with the suggestion of the carbonisation of coal at high temperature in order to get all the possible by-products, said that this produced a coke which was unsuitable for domestic use. Coke would not burn well unless there were a certain amount of volatile matter left in it, and such coke gave a very unpleasant-looking fire. With reference to the loss of nitrates from coal, recent experiments on the deposit in London had shown that the soot and dust falling on a given area measured in three or four places in the city was six times as great as in the suburbs. The total deposit was 500 tons per square mile per annum. On the general question of the utilisation of oil, gas, or solid fuel, we were apt to forget that very much of the prosperity of England depended upon the utilisation of its coal supply, and it seemed to him that we should almost eliminate—except as an academic question—the utilisation of oil other than the oil derived from our own coal, because otherwise we should be cutting our own throats.

Prof. T. HUDSON BEARE said that from what he knew of the work now being done in the direction of using the internal combustion pump with a water turbine, he believed there was a very great future for that type of motor for power purposes. He heartily agreed with Dr. Owens that Great Britain should depend for its power upon its coal resources. The matter had been brought to his attention by a conversation with a shipowner, who had remarked that it was all very well to talk of Diesel engines, but British shipowners wanted to be able to use a fuel which lay at their doors, and that could only be coal. There was, therefore, a great future for an oil fuel, for use on ships, which was primarily derivable from coal.

Prof. BURSTALL, in winding up the discussion, said he had not said anything about the Humphrey pump, because he did not think it could be made in sufficiently



... to warrant any application of the sort suggested. With regard to the coke mentioned by Dr. Owens, he did not wish it to be assumed that the method he had indicated would be the same as was at present employed in gasworks. If the coal were burned in a retort at a temperature of from 800 to 1,000 degs. Cent., and means taken by which the gas and tar were at once removed from the front, they got a substance which was quite unlike gas coke, because gas coke was usually quenched in water, which was quite wrong. If the coke were placed in a closed vessel and cooled by conduction alone, on the Montreal system, a coke would be obtained which would burn perfectly and which gave a very bright and clear fire. The only difficulty with it was that it burned away more quickly than was desirable. It was possible to regulate the products by altering the pressure and temperature inside the retort more than the majority of people were disposed to think, and it really was a question of what happened to be the most valuable product at a particular time. The best results were 14 gallons of tar, from 2 to 2½ gallons of light spirit (suitable for motor car work) and three to four gallons of fuel oils (suitable for Diesel engines), so that a very large proportion of useful substances could be obtained without sacrificing anything.

**The Quality of Locomotive Fuel.**—The recent disaster on the Midland Railway at Aisgill was attributed indirectly to the inability of the enginemen to get up steam, owing to the small size of the coal used. At the Board of Trade enquiry some interesting particulars were given by Sir Guy Granet, the general manager to the company. He admitted that so far as the size of the coal was concerned, it was too small on that night. In that respect it was a bad coal. Heresented, however, the suggestion that it was of an inferior quality, that the contract was made negligently or carelessly, or without proper tests as to whether it was the proper sort of coal for use on the railway, and that it was bought for reasons of economy. The price paid for the coal was 13s. That was 6d. higher than any other coal that the company were purchasing, except Welsh coal. It was 6d. higher than the coal they had always regarded as the best English coal—South Yorkshire—and 1s. 6d. higher than the best Nottinghamshire and Derbyshire coal. This was the first contract made with this particular colliery. The analysis gave the result:—Moisture 2.20, ash 1.92, volatile matter 22.42, fixed carbon 73.46. Sulphur per cent. of coal 0.57; iron per cent. of ash 19.6. Calorific value, British thermal units per pound of coal (to the nearest 50 units) 15,150. This analysis of the Naworth coal actually came out better than that of the very best South Yorkshire coal. The report of the chemist on the analysis was as follows:—“This is a coal of very high calorific value, equal in this respect to the best of the Welsh coals supplied to us. It is low in sulphur, very low in ash and moisture, and better than any of the coals I have examined from the Northumberland (Plenmeller) coalfield.” Afterwards the company had the coal practically tested, and for that purpose they tried it for some days over the section of the line between Carlisle and Leeds. The inspector, in his report on the trials, said the Naworth coal formed a splendid fuel for use on the Carlisle road. It was rather small, and there was not much smoke from it. It formed very little clinker, which was very porous and not in any way adhesive. It was far more durable than either Blackett or South Tyne coal, and could be used without being mixed with South Yorkshire coal. He found when using this mixture the engines did not steam any more freely than when using Naworth coal alone. It was, he said, one of the cleanest coals he had used with locomotives, and burned in the firebox very similarly to the Welsh coal. Thereupon a contract was made with the colliery to supply 300 tons of the coal per week at the price of 13s., and it was stipulated in the correspondence attached to the contract that the coal should be screened through ¾ in. bars so as to prevent any slack. The delivery of this coal began on July 1, and on August 1 a complaint was received at Derby that the coal was giving trouble. An inspector was sent down on August 5 to enquire into the matter (Sunday and Bank Holiday intervening between these dates), and he reported that the coal had not been properly screened and contained a lot of slack. On August 6 the attention of the colliery company was called to the matter. They admitted that it was not right, and agreed to put it right by increasing the space between the bars of the screens and so making the size larger. The deliveries were then continued. Thereafter they had no complaint at all. They had never received a complaint as to the quality of the coal, and assumed, especially as the contract was a new one, and the colliery would be naturally anxious to secure the contract, that the deliveries would in future be kept right. But from the inspection which Sir Guy had caused to be made of the coal which was left on the tenders of the engines on the day of the accidents, he had come to the conclusion quite clearly that on that day, out of that particular wagon which was sent in by the colliery, there was an undue amount of small coal and slack. He did not suggest there was any intentional change by the colliery. They were fixed screens of an old-fashioned type. One could understand that, when a screen became clogged, and slack, instead of getting discharged into the wagon.

## THE DEVELOPMENT OF THE MIDLAND COALFIELDS.\*

By FRED. G. MEACHEM, M.E., F.G.S.

The first meeting of the Association in Birmingham took place in 1839, when local coalmining was in a very crude state. Women were employed in the mines and also boys under 10 years of age, and all worked 12 or more hours per day. It was not until August 10, 1842, that this was put an end to by Act of Parliament—women were no longer allowed to work in the mine under any circumstances, boys under 10 years of age were not allowed to be working below ground, but both women and young boys could work on the surface.

The Coal Mines Regulation Act, 1842, consisted of some 23 clauses; then came the Act of 1860, consisting of 31 clauses, followed by the Act of 1872, which increased the number and also contained a number of special rules. This Act made it compulsory to have a certificated manager in charge of the mine. Then came the Act of 1887, consisting of 60 clauses and schedules; now we have the Coal Mines Act of December 16, 1911, consisting of 127 clauses, four schedules, and we do not yet know how many special rules and regulations, but quite sufficient to find full employment for the ordinary manager. So that since the first meeting of the association great progress has been made with mining legislation, all tending to greater safety and comfort for the worker, and the hours of work below ground are restricted to eight per day. With regard to output, the following table shows the progress made and the present position:—

### OUTPUT OF COAL.

Year.	S. Staffs.	Leicester.	Warwick.	Salop.
1836 .....	No figures available.			
1865 .....	10,000,000	1,150,000	880,850	1,558,500
1886 .....	7,808,177	1,179,452	1,310,192	751,500
1896 .....	8,270,172	1,516,629	2,430,770	720,130
1906 .....	7,207,397	2,316,510	3,936,510	799,834
1912 .....	7,413,552	2,765,102	4,577,758	772,205

At the time of the 1839 meeting the area of the coalfields, which were confined to shallow mines, were, as near as I can ascertain, as shown by the following table:—

	Square miles.
South Staffordshire .....	70
Leicestershire .....	20
Warwickshire .....	10
Salop.....	20
Total .....	120

By the time of the next meeting of the association, September 1865, this area had increased by reason of the discovery of the Cannock Chase coalfield, the Essington deeper coals, the extension of the coalfield over the then eastern boundary fault from Wednesbury to Oldbury. The Shropshire coalfield had been increased by deeper mining, and so had the other fields, so that in 1865 the known coalfields were approximately as follow:—

	Square miles.
South Staffordshire .....	105
Leicestershire .....	25
Warwickshire .....	30
Salop.....	25
Total .....	185

At the time of the next meeting, in 1886, a great move forward had been made. The research work of Sir R. Murchison, Prof. Ramsey, Prof. Hull and the late Henry Johnson had resulted in the finding of the Thick coal at Sandwell in 1874; this was followed by the successful sinking at Hamstead, which was proposed by the late James Slater, Esq., of Darlaston, and his friends the late Mr. Elihu Smallman and Mr. David Peacock, mining engineers. The operations were carried out under the management of Mr. Isaac Meachem. The result of these two proofs added about 96 miles to the South Staffordshire coalfield area. Since that time further proofs have been made around the old coalfield, as at Littleton Colliery, where ten seams containing some 53 ft. of workable coals have been found.

At Colwich two boreholes have been put down, and the deep and shallow coals proved to exist at a depth of 250 yards; this proof is valuable as being the most northerly of the coalfields, and will no doubt lead to a very large extension of the coalfield, and at a comparatively shallow depth, as compared with the depth at which coal is now being worked in the district, another borehole is now being put down about 1½ miles to the north to still further prove these coals.

**The Holly Bank Proof over the Western Boundary Fault.**—The endeavour of the mining engineer to prove the existence of the coal measures to the west of this fault has been most persistent.

The handbook of 1865 describes a scheme for proving the then fault, the proof was made and coals were found which added a large area to the available coal, but which also proved the existence of another and larger downthrow to the west. Much thought has been put into the

\* A paper read before the British Association.

geology of the district, but the actual proof was not made until Mr. J. C. Forrest, M.E., M.I.C.E., the mining engineer to the Holly Bank Colliery Company, conceived the bold idea of driving through the fault into the red measures on the western side, and then sinking a staple pit underground to a depth of some 900 ft.

This unprecedented piece of underground work was safely carried out, and coal was found of good thickness and quality at a depth of over 2,400 ft., thus practically proving the coalfield to the west, which no doubt is continuous, with slight interruptions from the older rock, right away into Shropshire. This opinion has been held by most of our eminent geologists, and those mining engineers who have made geology a part of their mining training. The first actual proof of the existence of thick coal over the western boundary fault (as worked at the Himley collieries) was that made at the Baggeridge Colliery, belonging to the Earl of Dudley, under the superintendence of Mr. Hughes, where the Thick coal was found at a depth of 600 yards; associated with this seam are the other seams of coals and ironstone of the South Staffordshire coalfield.

At Four Ashes, near Calf Heath, between Penkridge and Brewood, a borehole has been put down, and at a depth of 1,700 ft. coal measures were reached and seams of coal found in the 200 ft. of productive coal measures pierced at this depth; unfortunately the boring machinery broke down, and the syndicate having practically spent the subscribed capital the hole was abandoned, but the proof was quite sufficient to show that the upper coals would without doubt be found in the proper sequence.

The next attempt to find the coal in the area over the western fault was made at Claverley, situate in a line drawn between Wolverhampton and Bridgnorth, and about 4 miles east of the latter town. Here the coal measures were met with at 1,800 ft. and six seams of thin coal were met with, but these coal measures to a thickness of 400 ft. contained no workable coal, and the boring passed from the coal measures direct into the silurians. Dr. Gibson, who examined these cores, divides the strata thus:—

	Ft.	
Upper permians .....	185	
Middle „ .....	287	Red sandstone conglomerate.
Lower „ or Keele Group .....	768	Dark red marl
Halesowen sandstone.....	364	and purple ground
Espley Group.....	193	Green grits and purple marls.
Productive coal measures .....	393	Grey rocks and shal and black clods.
Silurians .....	45	

In 1912, another trial was made at Smestow, near Wombourne, by James Moseley, Esq., of Leaton Hall, for whom I acted. Coal measures were entered at 2,200 ft. and seams of coal found, the hole was carried to a depth of 2,800 ft., thus proving 600 ft. of coal measures as against 393 ft. at Claverley, showing that this boring is in the syncline to the east of Claverley.

In the south-eastern side of the South Staffordshire coalfields several boreholes have been put down, under the direction of the late Mr. Henry Johnson, in the neighbourhood of Langley and Warley, with a view of proving the continuation to the south of the Hamstead and Sandwell Thick coal seams; the coals were found, but much disturbed, and it seems that the alteration in the nature of the coals and their deposition, spoken of later, has here taken place.

Near Halesowen, at Coome Wood Colliery, Sir B. Hingley has proved the continuation of the Thick coal in the district at a depth of 200 yards. The Thick coal is divided into two seams by 9 ft. of spoil. This splitting up of the coal seems to be constant, and to take place south of a line drawn through Warley, Cradley and Stourbridge, and it is also to be noted that the whole of the coalfields of Warwickshire, South Staffordshire and Worcestershire have a tendency to deteriorate to the south if the line above mentioned is continued east and west.

In the Shropshire coalfield, around Billingsley, Highley and Kinlet, little work of a positive nature has been done. At Billingsley, a borehole on Priors Moor passed through the attenuated edges of the coal measures, and then passed right into the old red sandstone, thus showing that all along the western side of this coalfield the floor for a considerable distance to the east will be old red measures, until the anticline of silurians met with at Claverley is reached. This anticline, I think, will be found to be precarboniferous and that the coal will abut on it on either sides, the old red floor thinning out eastwards.

The whole of the districts lying between Billingsley, Broseley, Coalbrookdale and Lilleshall and the South Staffordshire coalfield will probably contain productive coal measures, but will be divided by an anticline, already mentioned, of silurians running from Shelsley, in Worcestershire, and passing through Timperley and



under Claverley, where it was found in the boring. This ridge will probably divide the district into two distinct coal synclines with the silurian anticline forming the bank, against which on both sides the productive coal measures will be found. On the eastern side of the South Staffordshire coalfield, both at Aldridge and at Walsall Wood collieries, Mr. W. F. Clarke and Mr. J. C. Peake are endeavouring to cross the eastern boundary fault, and it is most hoped that success will attend their efforts, so that when this is done the united South Staffordshire coalfields will exceed some 480 square miles, less the old coalfield now getting exhausted, leaving some 350 square miles.

*The Warwickshire Coalfield.*—In this coalfield, as already pointed out in the other areas, the best coals lie to the north and decrease towards the south. The whole of the district and the surrounding areas have been mapped by Prof. Dr. Lapworth, and are fully dealt with in his sketch of the geology of the Birmingham district.

Within the last 35 years very great extensions have been made, especially at the Newdegate Colliery, Kingsbury Colliery, and also at the Tunnel Colliery, near Stockingford; at the present time other collieries are being developed, at Binley and Keresley.

As regards the future extension of this coalfield, the western side is most promising, judging from the above proofs, on that side of the syncline, and the proofs on eastern side of the South Staffordshire coalfield, and bearing in mind that the Hamstead workings have proved the coals for more than 1½ miles to the east, it is most probable that productive coal measures will be found between the two coalfields, having its deepest part near Lichfield, Sutton Coldfield and Coleshill.

*The Leicestershire Coalfield.*—This coalfield is shown on the map accompanying the handbook, and is fully described in a final report of the Royal Commission on Coal Supplies, by Prof. Dr. Lapworth and A. Sopwith, Esq., M.E.

This district has steadily extended, until it now occupies a most important position in the Midland coalfield.

The principal extensions have been under the permians and trias, to the south and south-east, some 6 miles under these red measures. A second extension is to the west, beyond Moira and Netherseal, the total area of the field being 84 square miles, and the estimated coal reserves 1,825,458,551.

The four coalfields are now practically known to contain the following areas of productive coal measures :—

	Square miles.
South Staffordshire .....	360
Leicester .....	88
Warwick .....	222
Salop .....	96
Total .....	766

So that after allowing for a fair deduction for faults there remains 10,341 million tons available, and which will meet the demands of the district for the next 500 years, after allowing for ratio of increase, based on that of the last 50 years, but it is most probable that greater economy in the use of fuel, the use of gas and oils of various kinds, that this rate of increase will not be maintained, and thus the life will be extended. As regards the difficulties to be faced the first will be:—

1. Increased capital for the extra depth.
2. Increased underground haulage costs, both as regards capital needed for machinery and cost of conveyance from long distances to the bottom of the shaft.
3. Increased cost in the maintenance of gate roads along which the coal is carried, from the working face to the bottom of the shaft.
4. Increased costs by reason of the increase in wages, such increase being principally caused by increased cost of living, and especially housing, also the demand generally of the worker for better conditions of life all round. This wish on the part of the worker is only the natural result of the better education given, which broadens his outlook on life, and does not tend to prove that contentment is great gain.
5. Increased imperial and local taxation, in the benefits of which all share and which all must help to pay for.
6. And others.

Against this increase may be set probably less royalties; increased production and reduction of dead charges; less fuel used by the consumer, with better results for a given quantity.

As regards the dangers of working the deep mines, I do not think that the fatalities or injuries to men will increase. The mining laws are now turning attention to the workman and making him feel his own responsibility, after the mineowner has provided for the general safety; and as the mining classes, under competent

teachers, are increasing the number of workers who better understand the conditions under which deep mining is conducted, the safety of each individual and of the whole mine will be increased, and accidents lessened.

### THE PRODUCTION OF MOTOR SPIRIT FROM COAL.

By A. ROLLASON and A. W. TAYLOR, F.C.S.,  
of Nottingham.

The carbonisation of coal and the recovery of by-products from them has been carried out at many collieries for a period of years, various new types of ovens replacing the old beehive and other non-recovery ovens. The primary object of these carbonising plants being the manufacture of hard metallurgical coke from the smalls produced in working and handling the coals, the best qualities of coking coals, containing a high percentage of carbon, were used for this purpose, the by-products usually recovered being ammonium sulphate and tar. In many recent plants the fuel oils are recovered, the quantity averaging from 1½ to 3 gallons per ton of coal carbonised.

If the whole production of these light oils was diverted from the chemical industry and utilised for motor use, they would not equal one-tenth of the present demand. The cost of collection and refining of these oils is approximately 6½d. per gallon, the crude oils, without refining, selling at the present time at 7½d. per gallon.

The estimated imports of motor spirit into this country is over 100,000,000 gallons per annum. The question of utilising our coal deposits for the production of this spirit is therefore of national importance, especially if the cost of production is less than the price for which this spirit can be imported.

The advantage of a home production is therefore manifest, preventing inflated prices by combines and stoppage of supplies during war.

In nearly all the coal areas in this country there are large deposits of coal, containing a high percentage of volatile matter, which varies in its chemical constitution according to the extent of decomposition which its constituents have undergone. To the changes in their composition, and the relative percentages of carbon, hydrogen and oxygen, the coal is either non-coking, semi-coking or coking :—

	Carbon. Per cent.	Hydrogen. Per cent.	Oxygen. Per cent.
Non-coking coal ...	75 to 80	4.0 to 5.0	13.0 to 18.0
Semi-coking coal ...	80 to 88	5.0 to 5.5	7.0 to 12.0
Coking coal .....	89 to 91	4.5 to 5.5	4.5 to 5.5

The best coking coals, on carbonisation, do not give off their gases until a high temperature, above 750 degs. Cent., is reached in the retort; at this temperature a large percentage of the liquid hydrocarbons are decomposed into permanent gases. To recover the light oils it is usual to wash the gases and to crack up the tar, by which processes, approximately, 5 to 6 gallons of oils, having a specific gravity of between 0.8 and 0.88, can be obtained per ton of coal carbonised.

In the case of coking coals which are readily fusible at a low temperature, a fused mass is first formed upon the exterior, and this being a bad conductor prevents the heat passing into the charge, and the free escape of the gases, which expand and cause the coke to be in a spongy condition.

The non-coking and semi-coking coals give off their gases at a low temperature, under 500 degs. Cent., and at the early period of carbonising, and owing to their high oxygen content, yield a large volume of liquids, principally water, at the same time depositing uncombined carbon in the amorphous form, thus rendering the coke soft and friable, and in some cases in the powdery form.

It will be seen that we have coals containing the same percentages of volatile matter, behaving differently during carbonisation, the coals low in oxygen requiring a long period of carbonising, and only at high temperatures giving off their gases, the coals high in oxygen giving off their gases at the commencement of carbonising and at a low temperature, thus showing that the volatile matters contained in the coal decompose at varying temperatures, according to the amount of oxidation the coal has undergone.

In the production of motor spirit it is necessary to use a coal for carbonising in which the contained volatile matter becomes decomposed into molecules of the various constituents at a temperature lower than that of the combination of their molecules, forming endothermic hydrocarbons; the semi-coking and non-coking coals are therefore specially suitable on account of a portion of their volatile constituents decomposing at a low temperature.

Several low-temperature carbonising processes exist for the production of coke, or so-called smokeless fuel,

from coal, with the recovery of by-products, the temperature of carbonisation ranging between 400 and 500 degrees Cent. In all these processes the light oils recovered depend on washing the gases and splitting up the tar.

#### EXAMPLES A AND B.\*

	A. Durham coal. (Ravensworth Pelaw.) Per cent.	B. Yorkshire. (Askern.) Per cent.
Moisture in coal .....	1.66	7.05
Vol. hydrocarbons .....	28.92	35.65
Fixed carbon, ash, &c. ....	69.42	57.30
	100.00	100.00

Producing upon carbonisation per ton of coal :—

	A.	B.
Tar .....	14½ gallons.	14½ gallons.
Ammonium sulphate ...	16 lb.	25½ lb.
Acids, water, &c. ....	69 gallons.	66 gallons.
Coke (soft and friable)	80.4 p. cent.	63 per cent.
Gas .....	5,700 cub. ft.	8,120 cubic feet.

In example A the tar on distillation produced 3½ gallons of light oils, in example B 4.27 gallons, distilling below 170 degs. Cent. During carbonisation, in example A, 246 lb., and in example B, 127 lb. of uncombined carbon had been deposited, causing the coke to be soft, and in each case increasing the percentage accordingly.

The low percentage of light hydrocarbon oils recovered, approximately 4.45 per cent. of the quantity of hydrocarbons contained in the coal, compared with the large volume of water, showed that the hydrogen had combined with the oxygen, instead of combining with the carbon, to form gases or hydrocarbon oils.

It is well known that in the burning of hydrocarbon gases, or fuels containing hydrocarbons, with oxygen, that the oxygen having a greater affinity for hydrogen than carbon, the hydrogen burns before the carbon; also if an inert gas be present the affinity of oxygen for hydrogen is considerably diminished. Further, when the products of combustion of one of its elements, such as carbon dioxide, are present, the action of the affinity of oxygen for carbon is also reduced.

Acting on this property of inert gases, preventing the combination of oxygen with hydrogen, and oxygen with carbon, a large number of experiments have been made on coals containing a high percentage of oxygen, resulting in the production of a large volume of motor spirit and an increased yield of heavy oils and ammonium sulphate, at the same time producing a hard firm coke.

A fair average of these coals is, coal dry and ash free :—

	Per cent.
Total carbon .....	80.5
Volatile carbon .....	17.5
Hydrogen .....	5.4
Oxygen .....	11.0

In the experiments above referred to, the coal used was crushed below ¼ in. in diameter, and to the crushed coal was added a percentage of carbon dioxide, contained in finely ground limestone. The addition of the limestone to the coal delayed the decomposition of the volatile constituents and the liberation of the gases until the whole of the water contained in the coal had been driven off.

#### EXAMPLE C.

Yorkshire coal (Askern). Low temperatures 450 degs. Cent. Total liquids recovered after water contained in the coal had been driven off, 51 gallons, consisting of :—

Water formed .....	9 gallons.
Motor spirit (0.7 to 0.78) .....	17½ "
Tar oil and acids .....	9 "
Pitch and tar .....	15½ "
Ammonium sulphate .....	32 lb. "
Coke (hard and dense) .....	60.2 per cent.
Gas .....	9,500 cubic feet.

The addition of basic substances reduced the volume of water by 41½ gallons and increased the yield of oils by 27½ gallons from practically the same coal.

#### EXAMPLE D.

Nottingham Bright softs. Low temperature, 500 degs. Cent.

	Per cent.
Moisture in coal .....	4.99
Volatile hydrocarbons .....	29.78
Fixed carbon, ash, &c. ....	65.23
	100.00

Total liquids recovered after water contained in the coal had been driven off :—

	Without basic substances. 30 gallons.	With basic substances added. 47 gallons.
Consisting of—		
Water formed .....	2½ gallons	2 gallons
Motor spirit (0.8 to 0.88) ..	5½ "	19½ "
Tar oils .....	0	6 "
Acids, tar and pitch .....	22 "	19½ "
Ammonium sulphate .....	28 lb.	28 lb.
Coke (poor quality) .....	65 per cent.	65 per cent.
Gas .....	6,200 cub. ft.	5,500 cub. ft.

The acids, tar and pitch recovered without the basic materials added before carbonisation were watery, mixed together, and of low value. By this process of

\* Tests on these coals by W. J. A. Butterfield, F.I.C. *Car Illustrated*, March 12, 1913.



ment, nearly all the oxidised coals can be used for the production of motor spirit and high-class coke or smokeless fuel.

The coals containing a high percentage of oxygen on carbonisation, do not fuse upon their exterior at a low temperature. On account of their being crushed into a fine state, and to the admixture of fine material containing carbon dioxide, a free passage is provided for the heat into the interior of the charge, and a ready exit for the gases as evolved. The limestone during carbonisation absorbs heat for its decomposition, and whilst decomposing much heat becomes latent in the carbon dioxide evolved. This absorption of heat retards the decomposition of the humus matters in the coal until the contained water is driven off. The temperature now rises until the humus bodies begin to decompose. During their decomposition much water would be formed by the union of the oxygen and hydrogen evolved. The  $\text{CO}_2$  gas introduced limits the union of oxygen and hydrogen to form molecules of water, and the union of oxygen and carbon to form carbon dioxide, but it does not prevent or limit the evolution of hydrocarbon vapours from the decomposing humus.

The contained water is driven off at 105 degs. Cent., the gases were liberated, and water,  $\text{H}_2\text{O}$ , and hydrocarbon vapours of the series  $\text{C}_2\text{H}_2$  were formed at temperatures between 130 and 173 degs. Cent., hydrocarbon vapours of the series  $\text{C}_2\text{H}_4$  were formed at temperatures between 220 and 250 degs. Cent., acids, heavy oils and tar were formed at temperatures between 300 and 450 degs. Cent.

The vapours were given off during carbonisation at the temperature of their formation, and were condensed into products according to their boiling points, and recovered separately.

After the condensation of the oils, tar, &c., from the gases, the latter were passed through a saturator containing a weak solution of sulphuric acid, forming ammonium sulphate crystals, which were dried and ready for sale. The gases were used for heating the retorts, and the coke annealed and converted into a smokeless fuel. In this way a large volume of motor spirit and a valuable fuel was produced, this fuel on burning in open grates giving out as much radiant heat as the original coal. No expensive washing or rectification plant is required in this process.

The average yield of motor spirit and heavy oils, ammonium sulphate and fuel from coals raised in the Midlands, comprising Yorkshire, Nottinghamshire, Derbyshire, Leicestershire, Warwickshire and Staffordshire, was per ton of coal carbonised:—

Motor spirit, 0.75.....	18 gallons.
Tar, acids, &c. ....	22 „
Ammonium sulphate .....	33 lb.
Coke, 60 per cent.	

Assuming a plant to be installed at a colliery having such coals, and carbonising 100 tons per day, 365 days per annum, the capital required would be approximately, £10,000.

The expenses and working costs would be—

Coal, 36,500 tons at 8s. per ton .....	£ 14,600
Carbonising and refining costs for spirit, wages, supervision, stores, general charges, interest at 6 per cent., redemption at 5 per cent., maintenance at 4 per cent., 6s. 8d....	12,166
Total costs per annum .....	26,766

#### CREDIT ACCOUNT.

By sales of 21,900 tons of fuel at 9s. per ton .....	£ 9,855
By sales of 3,850 tons of tar oils, &c., at 40s. ....	7,300
By sales of 446.25 tons of ammonium sulphate at £12 per ton .....	5,355
Balance, being net cost of 657,000 gallons of motor spirit .....	4,256
	26,766

The net works cost being equal to 1.56d. per gallon.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—T. Holden and J. R. Knowles, coal merchants, Helmshore, Lancaster, under the style of Holden and Knowles; N. F. Arveschoug and R. Balmer, carrying on business as brick manufacturers, at Cowpen, near Blyth, Northumberland, under the style of Arveschoug and Balmer.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, September 9, 1913, is as follows:—Antwerp, 756 tons; Amsterdam, 1,028; Abo, 1,232; Alderney, 306; Brazil, 807; Bruges, 918; Bremen, 1,447; Bergen, 100; Christiania, 776; Copenhagen, 981; Cronstadt, 9,764; Drontheim, 358; Drammen, 2,102; Ghent, 1,699; Gefle, 1,526; Harburg, 5,046; Helsingborg, 629; Holmstrand, 103; Hamburg, 4,762; Harlingen, 1,276; Kiel, 1,399; Landsrona, 1,562; Leghorn, 300; Malmo, 1,440; Nordstrand, 112; Nakskov, 1,331; Naples, 742; New York, 11; Nykjobing, 1,973; Oporto, 2,514; Odense, 1,318; Pernau, 1,513; Rotterdam, 6,360; Riga, 1,966; Reval, 3,938; Sark, 285; Stockholm, 628; Stettin, 1,876; Stettin, 178; Tromso, 816; Wasa, 1,383; total, 68,383 tons; corresponding period September 1912, 68,383 tons.

## THE INFLUENCE OF THE PRESENCE OF GAS UPON THE INFLAMMABILITY OF COAL-DUST IN AIR.

By Prof. W. M. THORNTON.

1. A mixture of coaldust and air requires a certain minimum quantity of dust to be in suspension per unit volume of air before flame can travel through it by self-ignition. Its sensitiveness to ignition can be measured by the magnitude of the least electric current which can cause ignition of the cloud. If the current is used to heat a spiral of wire which ignites dust blown over it, and so to start an explosion, it is possible to determine the ignition temperature, but for practical purposes it is more important to know the least current which, when the circuit is broken in a dusty atmosphere, can ignite the cloud by the momentary arc formed.

I have previously shown\* that the presence of even  $\frac{1}{2}$  per cent. of gas has effect in raising the probability of ignition of coaldust in air. Two methods of producing the mixture of dust and air gas were then used. In the first, large quantities of gas and air in any desired percentage mixture were passed through the explosion chamber, which had a long exit tube open at the far end to the air, and at the moment of production of a cloud of dust in it an electric arc was formed by rapidly separating two metal rods making end-to-end contact in the centre of the chamber. In the second series, a cloud of dust was raised in a closed chamber into which a measured quantity of gas had been admitted, and the electric circuit broken after the gas and air had been thoroughly mixed by stirring. On account of the difficulty of obtaining perfect uniformity in the conditions of formation of the cloud, both as to fineness and local density

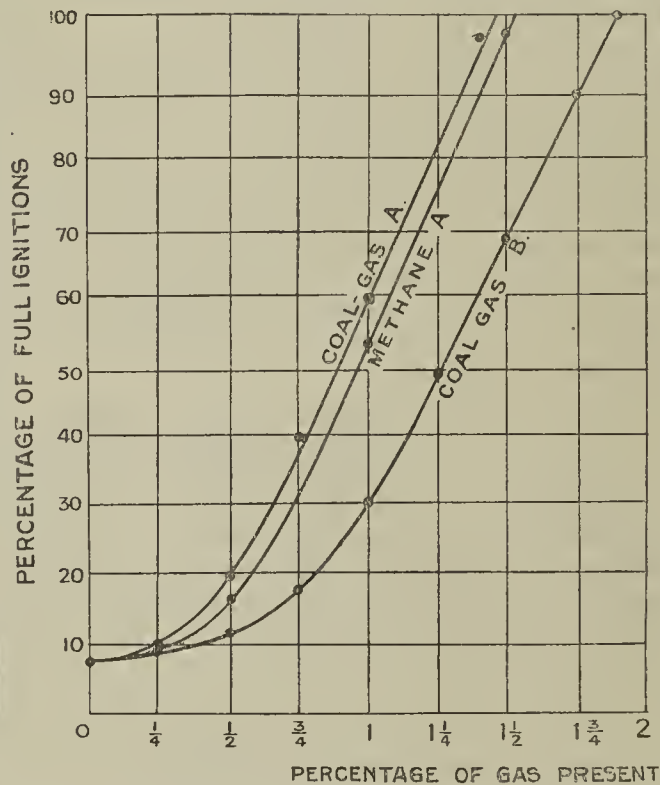


FIG. 1.—INFLUENCE OF GAS ON COALDUST IGNITION. Curves A. In closed explosion chamber. Curve B. With through draught.

at the moment of forming the arc, many trials were made with the same value of electric current in the circuit and the same percentage mixture of gas and air.

The current used in these trials was chosen so that without any gas present five full ignitions in 100 trials were obtained in the explosion chamber, completely filling it with flame, which emerged from the exit tube in the manner of the Altofts explosions. It was necessary to choose such a value of the current to give a positive indication, for if one had been taken which failed to ignite the dust it would have been more difficult to tell the percentage at which the gas began to have effect. The influence of the gas was gauged in both the above series by the increase in the number of full ignitions obtained as the percentage of gas in the explosion chamber was raised. The results were, therefore, comparative. They depended to some extent upon the nature and fineness of the dust—in this case screens dust from the Ouston E pit of the Birtley Coal Company—and upon the magnitude and nature of the current broken. Their chief interest was in the proof which they gave of the great rise in the influence of gas as it approaches a 2 per cent. mixture. At this value a full ignition was obtained at every trial, as shown by the curves of fig. 1 taken from the above paper.

2. The present paper is an account of experiments made to find the least current which will ignite a mixture of dust and gas, the percentage of gas in this case being kept constant in the successive trials whilst the circuit is broken with different currents flowing.

\* *Proc. Assoc. Min. Elec. Engineers*, vol. 3, 1911-2, pp. 220-42.

The second of the above methods of observation was used, the explosion vessel being closed by a flap valve at one side, which prevented air entering during the mixing, and yielded to pressure from within. The conditions of actual ignition in a pit are more closely copied by this than by the through-draught method, and since the result of enclosure is to increase the probability of full ignition, it is necessary to take this in preference to the former to cover possible risks

#### Coal Gas.

On account of the large quantities of gas required coal gas was first used, though it is now possible to express the effect of the gas alone in terms of mixtures with methane or pit gas with fair approximation. Having also, through the kindness of Mr. M. H. Kellett, of Eldon, Co. Durham, two samples of pit gas drawn from a gassy seam by driving a pipe to a depth of 10 ft. into the coal from the face, the trials were repeated at the typical pressure of 480 volts continuous current, and an experimental comparison can thus be made of the influence of the different gases. The results obtained with Newcastle coal gas are given in the following table and in fig. 2:—

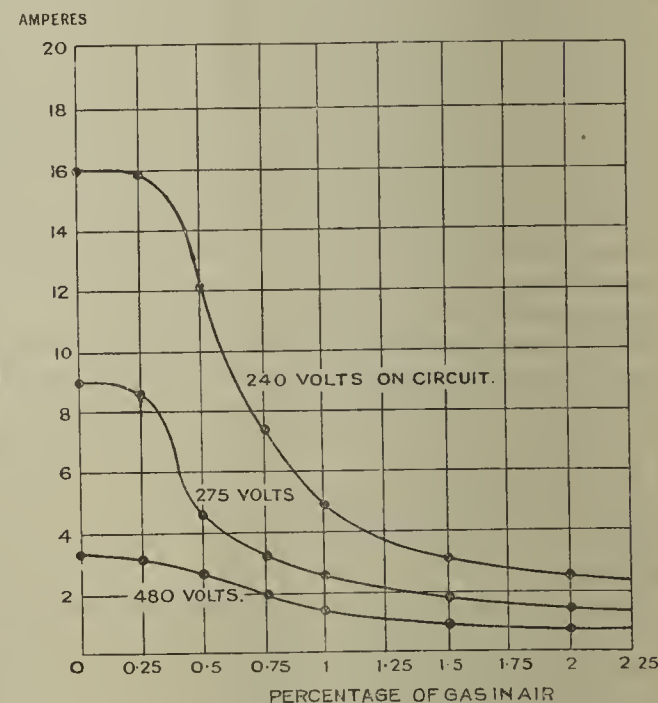


FIG. 2.—LEAST IGNITING CURRENTS FOR CLOUDS OF COALDUST IN AIR WITH COAL GAS PRESENT.

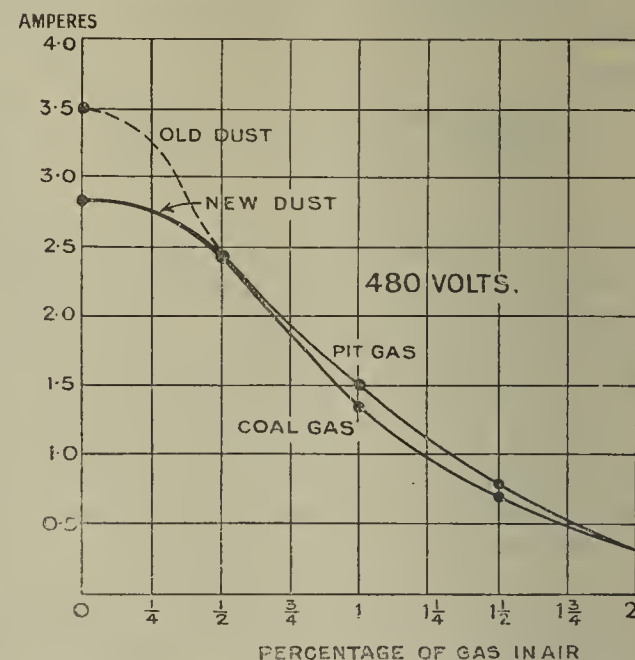


FIG. 3.—COMPARISON OF THE INFLUENCE OF PIT GAS AND COAL GAS ON THE LEAST IGNITING CURRENTS OF COALDUST IN AIR.

TABLE I.—LEAST CONTINUOUS CURRENT TO IGNITE A CLOUD OF COALDUST RAISED IN MIXTURES OF COAL GAS AND AIR.

Percentage of gas in air.	Voltage.		
	240 Ampères.	275 Ampères.	480 Ampères.
0.0	16.0	9.0	3.5
0.5	12.0	9.0	3.0
0.75	7.5	4.0	—
1.0	4.75	2.5	1.5
1.5	3.4	1.8	1.0
2.0	2.7	1.5	0.8

There is at each of the three voltages a definite relation between the least igniting current and the percentage of gas. The height of each curve is the least current which at the given voltage and percentage of gas causes a full ignition, and it is seen from the figure that  $\frac{1}{2}$  per cent. of gas has little or no effect in forwarding ignition, though with more than this there is a rapid increase in sensitiveness. The same result is obtained with pit gas.

#### Natural Pit Gas.

Since about a cubic foot of the pure gas is required to find three points on the curve of fig. 3, it was not



possible with the available supply to find the curve for more than one voltage; 480 volts was chosen, as closer to the practical conditions in the pit than 240. The pit gas experiments were made a year later than those with coal gas, and I have to thank Mr. Philip Kirkup for a further supply of coaldust from the same source as before. It may be of interest to note that with the previous dust the current at 480 volts which gave no ignition was 3.5 amperes, and that in the present case the least current for the dust alone without any gas present is 2.8 amperes at 480 volts. The general agreement between these currents supports the use of the least igniting current as a reliable index of the nature of the dust used, the present dust being fresher and somewhat finer than the old. The values obtained were as follows:—

Voltage 480 throughout.	
Percentage of pit gas in air .....	0 ... 1 ... 1½ ... 2
Least igniting current in amperes .....	2.8 ... 2.4 ... 1.6 ... 0.7 ... 0.50

Comparing these with the coal gas curves of fig. 2, it is seen that coal gas has slightly more effect in helping the ignition of the dust than pit gas. The ratio of the currents, coal gas to pit gas, is 0.9 at 1 per cent. This may be compared with the ratio of the percentage of ignitions of coal gas A to methane A in fig. 1, which is 0.92. Above 2 per cent. and below ½ per cent. there is no difference between the influence of the gases.

#### The Mechanism of Ignition.

With regard to the mechanism of ignition it will be agreed that so long as there are molecules of gas present these, however few their number, must be burnt in a general flame, and their heat of combustion will be added to that of the dust. The spacing between the dust particles is, of course, much greater than between the molecules of gas even in a ½ per cent. mixture. The effect of the combustion of the dust is rather to provide in each particle a centre of heat which burns the gas. The igniting gas forms a bridge between the dust particles, and the heat transmitted is sufficient to produce a full explosion by the aid of a quantity of gas

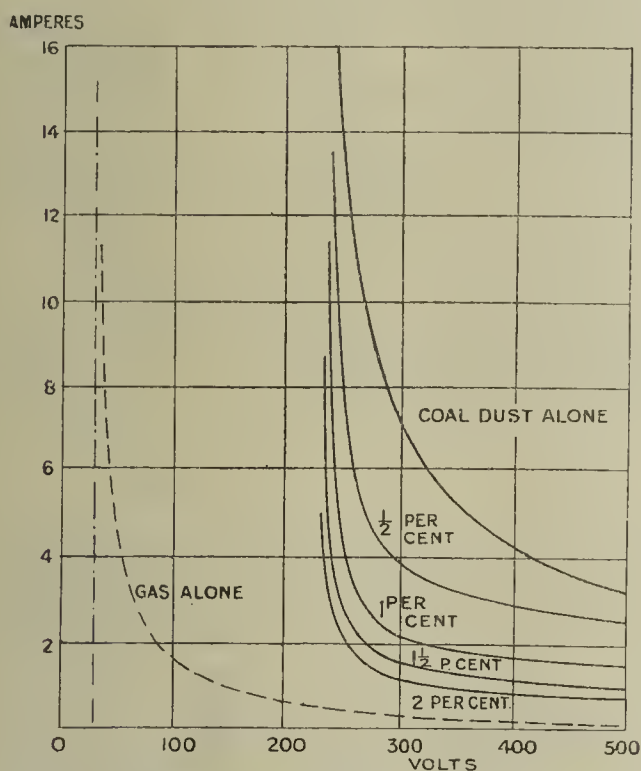


FIG. 4.—RELATION BETWEEN VOLTAGE AND LEAST IGNITING CURRENT COALDUST WITH GAS PRESENT.

which could not in itself be exploded. In connection with this point Mr. James Ashworth has stated, in a letter in the *Iron and Coal Trades Review* of May 23, 1913, that a single gauze safety lamp may be quite sound in a 4.50 per cent. atmosphere of firedamp for practically any length of time, but that if there is only as much coaldust present as may be found suspended in the return airway, the gauze becomes overheated by the added local combustion of the dust and breaks down. This is the opposite in method of the case under examination in the paper, in which a small quantity of gas makes the dust more easily inflammable; but the principle is the same in both cases—that is, that the heat of combustion of the one is added to that of the other. The effect of dust upon a safety lamp in causing it to overheat is relatively greater than that of gas in increasing the risk of ignition of a dust cloud, because the mass of dust carried in an air-current has a greater total heat of combustion than the small percentage of gas under consideration.

Another view of the results which brings out several significant points is obtained by drawing the curves to a voltage base line as in fig. 4. There is now seen to be a voltage (about 200 in this case) below which ignition of clouds of dust, even with 2 per cent. of gas present, is exceedingly difficult. The nest of curves is symmetrical about a line drawn through this point on the

base and through the nearest point on the “no-gas” curve. This would therefore appear to be about the highest voltage which may be regarded as relatively safe in a gassy and dusty atmosphere where the percentage of gas is not above 2, and where very large open flashes are not possible.

Although the gas has so great an influence in forwarding the combustion, it is very clear that the dust is still the dominant factor in the explosions, for the set of curves fits symmetrically under that in which no gas is present. This could not occur if the gas were the more important, for the zero voltage of the characteristic voltage-current curves for gases alone is about 25; and if the gas were the more effective, these curves should be symmetrical to that voltage as an axis, and this is not the case. The gas must be regarded as the auxiliary, not as the principal, in the ignition of the combined mixture of gas and dust at low percentages.

3. The question arises whether the effect is proportional to the calorific value of the gas or to the velocity with which it can be ionised—that is, put into a state in which a large number of molecules become electrically charged.

It has been shown in fig. 1 that substituting methane for coal gas lowered the probability of ignition in the ratio 0.92 in from ½ to 2 per cent. of gas; but the heat of combustion of methane is greater than that of coal gas, being 13,250 compared with 11,450 calories per gramme. The percentages of gas given in the paper are of volume, not of mass, and since the usual density of coal gas is only about 0.8 that of methane, there should be a still greater difference in the heats of combustion in a given volume. If, then, the effect depended chiefly upon the heat added by the gas to that of the burning dust, we should expect that methane would have increased, and not diminished, the liability to ignition. I have, however, shown elsewhere\* that coal gas is more readily ignited by a momentary electric arc than methane, and both in a manner which suggests that the real agent in starting a gas explosion is direct ionisation, or splitting off the electrical charges in a molecule by collision with the

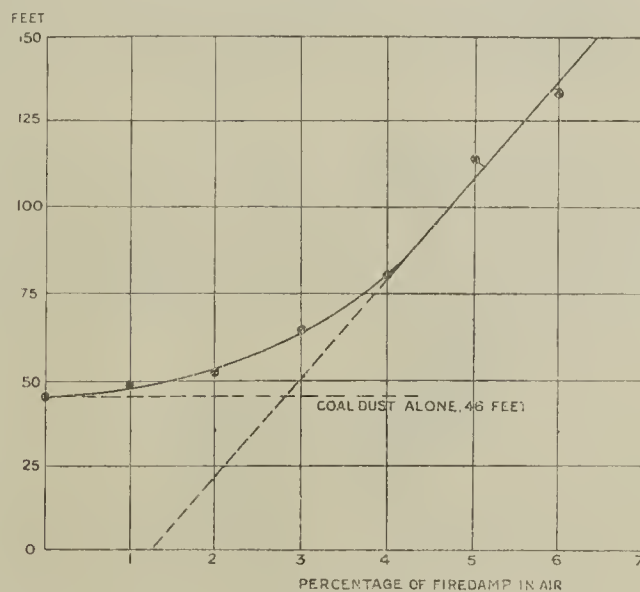


FIG. 5.—LENGTH OF FLAME OF COALDUST IGNITIONS WITH FIREDAMP PRESENT.

Prussian Firedamp Commission, *Trans. Min. Inst.* 1887, vol. 37, Abs. p. 80.

charges shot out from the spark. At these low percentages, the mixture is too weak for explosion of gas to be set up by ionisation from the spark, but, since ionisation is probably the essential factor in gaseous ignition, it is possible to regard it as the accelerating agent in the gas-dust explosion. Such a view would explain why coaldust is somewhat more readily ignited in coal gas than in methane mixtures of the same percentage strength.

This view receives support from the results of the Prussian Firedamp Commission of 1886; fig. 5 is drawn from the experimental results given in the abstract, p. 80 *Trans. Min. Inst.*, vol. 37, 1887. The gas—in this case pit gas—began to have influence at low percentages, and above 4 per cent. the length of the flame was proportional to the percentage of gas present. Producing the upper part of the curve downward, it cuts the zero line at about 1½ per cent. This is the point always found by producing backwards the continuous-current ignition curves of methane and pit gas, and that it is found here shows that above 4 per cent. the explosion had all the features of a gas explosion somewhat helped by dust. Between 4 per cent. and zero there is an even transition, until at low percentages the explosion is a dust ignition helped by gas.

\* “On the Ignition of Coal Gas and Methane by Momentary Electric Arcs.” *Trans. Inst. Min. Engineers*, vol. 44, part 1, pp. 145-74. The present paper was read before the British Association, September, 1913.

## APPROVED SAFETY LAMPS FOR MINES.\*

(Continued from page 526).

Messrs. Richard Johnson, Clapham, and Morris's  
Nos. 1 and 2 Lamps.

### Part I.—Flame Safety Lamps Approved for General Use.

(Continued.)

Each of these lamps, the general designs of which are shown in fig. 9, is a double-gauze, flame, oil lamp, with air-feed through vertical holes in the middle ring. Each consists of the following essential parts:—

(1.) *Bonnet or Shield* of riveted steel, with a separate securely fastened crown. Furnished with outlet holes immediately below the crown; provided that the bottom of the holes shall not be below the top of the outer gauze. Fitted or not with a deflector. In the case of the *No. 1 Lamp* the bonnet is fixed and riveted to the middle ring. In the case of the *No. 2 Lamp* the bonnet is of the screw-off type; it is riveted to a brass bonnet ring which is screw-threaded to fit the pillar ring, and locked thereto by a sliding pillar held in position by the oil vessel.

(2.) *Middle or Pillar Ring* of brass, with vertical inlet holes of total area not greater than 1 square inch; provided or not with additional air-inlet holes, protected by a baffling of total area not greater than 0.6 square inch.

*Pillars*, of brass, steel or iron, 5, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom or Lock Ring* of brass.

(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with flame-tight, steel

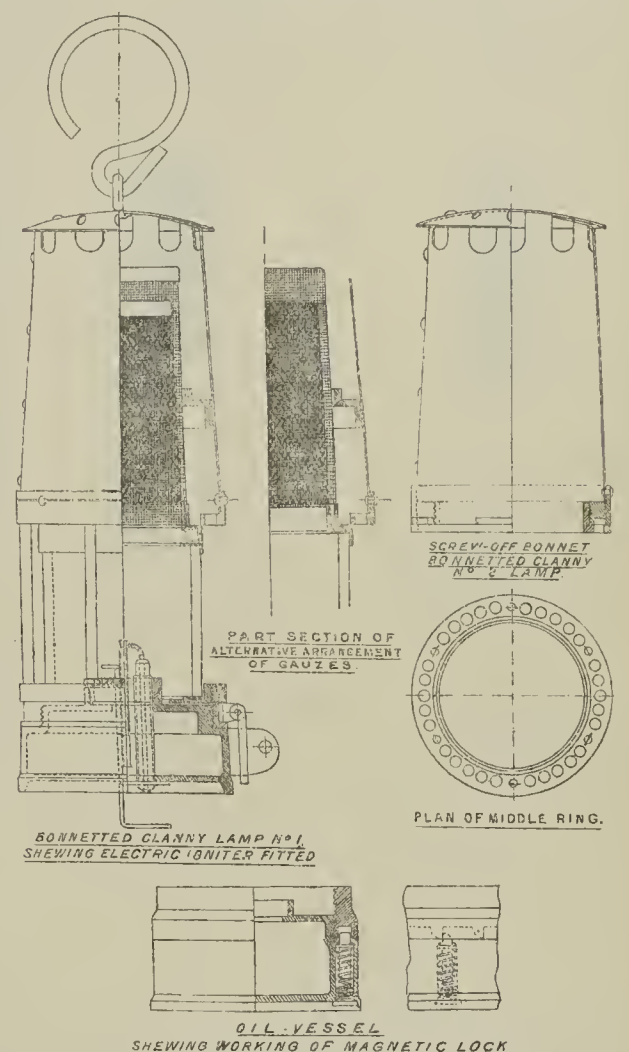


FIG. 9.—No. 1 AND No. 2 LAMPS.  
(Johnson, Clapham and Morris.)

protected seams, formed to fit flanges of the inner and outer base rings, and so secured to the same by punch indentations or rivets, or with a ring securely spun on to the gauze flange, as to make strong and flame-tight joints. The arrangement of the gauzes in the lamp is that shown in fig. 9, and is such that the inner gauze can pass up the centre of the middle ring, whilst the outer gauze ring forms the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without the gauzes: provided that this approval also covers lamps now in use and new lamps brought into use before July 1, 1914, having the arrangement of gauzes shown in the drawing on fig. 9, marked “Part Section of Alternative Arrangement of Gauzes.”

	Internal dimensions	Outer gauze.	Inner gauze.
Height from shoulder of the base ring.....	4½ in. ± ¼ in. ...	3½ in. ± ¼ in.	3½ in. ± ¼ in.
Diameter at top.....	1½ in. ± ¼ in. ...	1½ in. ± ¼ in.	1½ in. ± ¼ in.
Diameter at bottom ...	2½ in. ± ½ in. ...	1½ in. ± ¼ in.	1½ in. ± ¼ in.

(4.) *Glass*, of an approved type.

External diameter .....	57 mm. { + 0 mm. - 1 mm.
Height .....	57 mm. ± ¼ mm.
Size mark .....	57-57 or J.C.M. 4.

Provided that the lamp may also be made to take glasses of the following dimensions:—

	External diameter.	Height.	Size mark.
(1.) 60 mm. {	+ 0 mm. - 1 mm.	57 mm. ± ¼ mm.	60-57 or J.C.M. 7.
(2.) 63½ mm. {	+ 0 mm. - 1 mm.	60 mm. ± ¼ mm.	63½-60 or J.C.M. 6.
(3.) 57 mm. {	+ 0 mm. - 1 mm.	60 mm. ± ¼ mm.	57-60 or J.C.M. 5.

\* From the Order dated August 26, 1913. [No. 886.]



(5.) *Retaining Ring* of brass furnished with a flange to take the bottom ring: provided that the clearance between the bottom of the ring and the top of the oil vessel shall not be so great as to make it possible, under reasonable working conditions, to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) *Oil Vessel*.—A casting of brass of capacity sufficient to provide the required light for the required time, as specified; fitted with a flat  $\frac{7}{16}$  to  $\frac{1}{2}$  inch burner, with or without a porcelain body, protected when the fuel is paraffin by a metallic shield of the type shown in fig. 9, or with a bifold burner taking two round wicks about  $\frac{3}{16}$  in. in diameter; provided or not with an electric igniter of the type shown in fig. 9, and with a winding wick adjuster; both so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(7.) *Locking Devices*.—One or other of the following:—

- A magnetic lock of the type shown in fig. 9.
- A lead-riev lock with a hinge or lug securely fastened to the bottom ring by a sliding band or otherwise, and a staple or lug securely soldered to the oil vessel.

(8.) *Reflector*.—The lamps may be fitted with a removable reflector.

The lamps must have been made at the works of Messrs. Richard Johnson, Clapham and Morris Limited, at Newton Heath, Manchester.

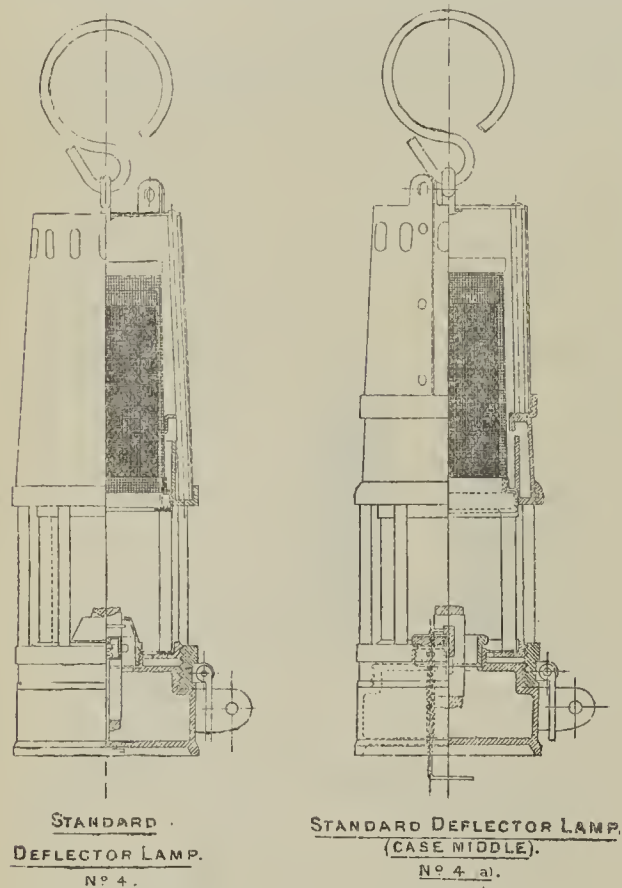


FIG. 10.—No. 4 AND No. 4A DEFLECTOR LAMPS.  
(Johnson, Clapham and Morris.)

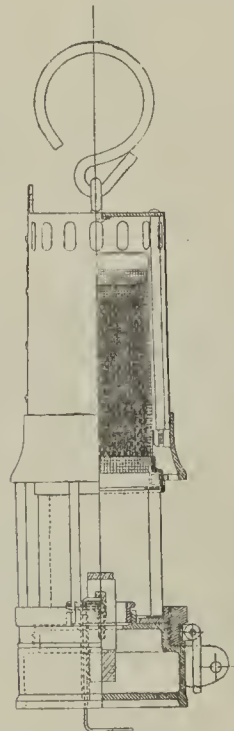


FIG. 11.—No. 5 "J.C.M." LAMP.  
(Johnson, Clapham and Morris.)

#### Nos. 4 and 4 (a) Deflector Lamps.

These lamps, the general designs of which are shown in fig. 10, are modifications of the No. 1 lamp, and are similar to it in all but the following respects:—

- The *Bonnet* is removable and is locked to the crown by the lead-riev lock.
- The *Crown* is of brass and is supported by three steel or iron pillars.

The No. 4 Lamp the pillars are fitted as shown in fig. 10.

The No. 4 (a) Lamp the middle ring and the crown are in one piece, as shown in fig. 10.

The lamps have been made at the works of Messrs. Richard Johnson, Clapham and Morris Limited.

#### The No. 5 J.C.M. Lamp.

The No. 5 J.C.M. Lamp, the general design of which is shown in fig. 11, is a modification of the No. 1 Lamp, and is similar to it in all but the following respects:—

- The *Bonnet* is removable, and is locked to the crown by a lead-riev lock.
- The *Crown* is of brass supported by three steel or iron pillars.
- The *Middle Ring* has a prolonged outer flange, and is fitted with internal lugs to carry the upper pillars, as shown in fig. 11.

The lamp must have been made at the works of Messrs. Richard Johnson, Clapham and Morris Limited.

#### The Laidler Lamps Nos. 1, 1A and 2.

Each of these lamps, the general design of which is shown in fig. 12, is a double gauze, flame, oil lamp, with air-feed through vertical holes in the middle ring. Each consists of the following essential parts:—

- Bonnet or Shield* of riveted steel, with a separate securely fastened crown. Furnished with outlet holes immediately below the crown; provided that the bottoms of the holes are not less than  $\frac{5}{16}$  in. above the top of the outer gauze. Furnished or not with a deflector, with or without a baffle ring.
- Middle Ring* of brass, riveted to the bonnet, furnished with vertical air inlet holes of total area not exceeding 1 square inch.

*Pillars*, of brass, steel or iron, 5, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom Ring* of brass, provided with ratchet teeth to take the bolt of the magnetic lock when so fitted.

(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with double-folded lap seams, formed to fit flanges of the inner and outer base rings, and so secured to the same by punch indentations as to make strong and flame-tight joints. The arrangement of the gauzes is that shown in fig. 12, and is such that the gauze rings form the seating necessary to hold

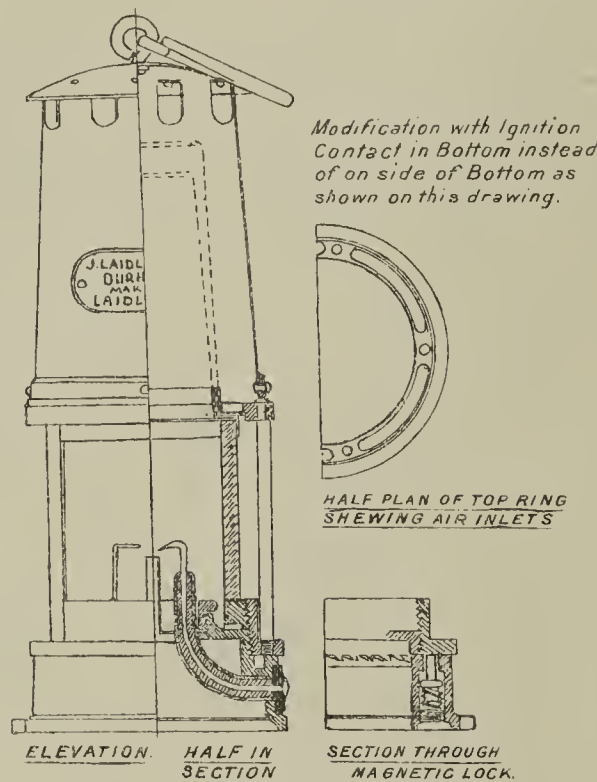


FIG. 12.—LAIDLER LAMP NO. 1.  
(Laidler and Sons.)

the glass firmly in position when the retaining ring is screwed home, thus preventing the lamp from being put together without the gauzes.

#### Internal Dimensions for the No. 1 and No. 1A Lamps.

	Outer gauze.	Inner gauze.
Height from shoulder of hoop	3½ in. ± ¼ in.	3 in. ± ¼ in.
Diameter at top	1½ in. ± ¼ in.	1½ in. ± ¼ in.
Diameter at bottom	1½ in. ± ¼ in.	1½ in. ± ¼ in.

#### Internal Dimensions for the No. 2 Lamp.

	Outer gauze.	Inner gauze.
Height from shoulder of hoop	3 in. ± ¼ in.	2½ in. ± ¼ in.
Diameter at top	1½ in. ± ¼ in.	1½ in. ± ¼ in.
Diameter at bottom	1½ in. ± ¼ in.	1½ in. ± ¼ in.

(4.) *Glass* of an approved type: Furnished in every case with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring.

#### Dimensions for the No. 1 Lamp.

External diameter	57 mm.	{ + 0 mm. - 1 mm.
Height	60 mm.	± ¼ mm.
Size mark	57-60	

#### Dimensions for the No. 1A Lamp.

External diameter	57 mm.	{ + 0 mm. - 1 mm.
Height	67 mm.	± ¼ mm.
Size mark	57-67	

#### Dimensions for the No. 2 Lamp.

External diameter	53 mm.	{ + 0 mm. - 1 mm.
Height	60 mm.	± ¼ mm.
Size mark	53-60	

(5.) *Glass Retaining Ring* of brass, screw-threaded to fit the bottom ring: provided that the clearance between the bottom of the glass retaining ring and the top of the oil vessel shall not be so great as to make it possible, under reasonable working conditions, to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) *Oil Vessel* of brass, of capacity sufficient to provide the required light for the required time, as specified in paragraph 9 below; fitted with a flat  $\frac{1}{2}$  in. burner and with or without an electric igniter of the type shown in fig. 12, so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(7.) *Locking Devices*.—One or other of the following:—

- A magnetic lock of the type shown in fig. 12.
- A lead-riev lock with a hasp or lug securely fastened to the bottom ring or to a pillar, and a staple or lug securely soldered to the oil vessel.

(8.) *Reflector*.—The lamps may be fitted with a removable reflector.

The lamps must have been made at the works of Messrs. James James Laidler and Sons, at New Elvet Durham.

#### The "J.M.S." No. 1 Lamp.

The "J.M.S." No. 1 Lamp, the general design of which is shown in fig. 13, is a double-gauze, flame, spirit or oil lamp, with air-feed through vertical holes in the middle ring. It consists of the following essential parts:—

- Bonnet or Shield* of riveted steel, with a separate securely fastened crown; or of seamless steel, the bonnet and crown being in one piece. Furnished with outlet holes round the top: provided that the bottoms of the outlet holes do not come below the top of the outer gauze.
- Middle Ring* of brass, furnished with vertical air inlet holes of total area not greater than 1 square inch.

*Pillars*, of brass, steel or iron, four or more (fixed), so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom or Lock Ring*, of brass, furnished with indentations to take the bolt of the magnetic lock when so fitted.

(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with double folded lap seams, formed to fit flanges of the inner and outer base rings, and so secured to the same by punch indentations or by rivets as to make strong and flame-tight joints. The arrangement of the gauzes in the lamp is that shown in fig. 13, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the lamp from being put together without a gauze.

	Outer gauze.	Inner gauze.
Height	3½ in. ± ¼ in.	3½ in. ± ¼ in.
Outside diameter at top	1½ in. ± ¼ in.	1½ in. ± ¼ in.
Outside diameter at bottom above ring	2 in. ± ¼ in.	1½ in. ± ¼ in.

(4.) *Glass* of an approved type: Furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring.

External diameter	58 mm.	{ + 0 mm. - 1 mm.
Height	67 mm.	± ¼ mm.
Size mark	58-67 or J.M.S. 1.	

Provided that the lamp may also be made to take a glass of the following dimensions:—

External diameter	58 mm.	{ + 0 mm. - 1 mm.
Height	60 mm.	± ¼ mm.
Size mark	58-60 or J.M.S. 2.	

(5.) *Glass Retaining Ring*, of brass, screw-threaded to fit the bottom ring, or a plain flanged ring resting in a seating in the oil vessel. Provided that the clearance

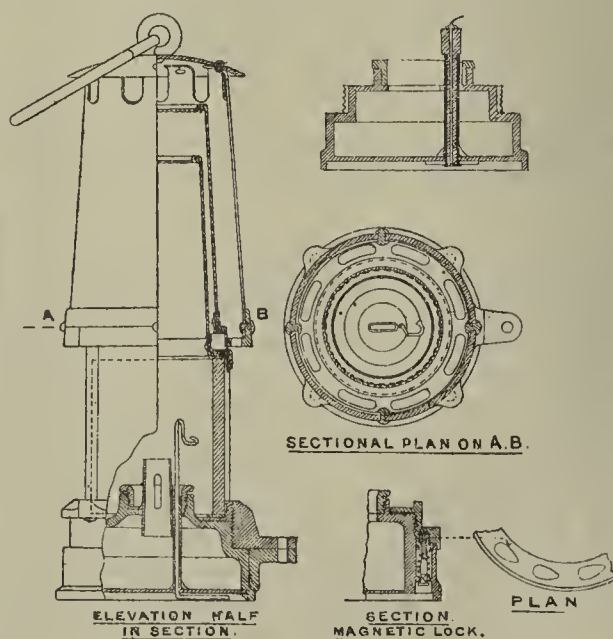


FIG. 13.—THE "J.M.S." No. 1 LAMP.  
(Mills and Sons.)

between the retaining ring and the oil vessel shall not be so great as to make it possible, under reasonable working conditions, to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) *Oil or Spirit Vessel* of brass, of capacity sufficient to provide the required light for the required time, as specified: provided with suitable absorbent material when the fuel is spirit: furnished with a round  $\frac{3}{16}$  in. spirit burner, or with a flat  $\frac{5}{16}$  to  $\frac{1}{2}$  inch oil burner, fitted or not with a porcelain body: furnished also or not with an electric igniter of the type shown in fig. 13.



- (7.) *Locking Devices*.—One or other of the following :—
- A magnetic lock of the type shown in fig. 13, the bottom ring being fitted with a flange which projects over the top of the oil vessel to prevent the bolt from being tampered with.
  - A lead-rivet lock with a hinge or lug securely fastened to the bottom ring or to a pillar, and a staple or lug securely soldered to the oil vessel, or a lug with two or more holes cast on or securely soldered to the oil vessel.

The lamp must have been made at the works of Messrs. John Mills and Sons, at Walkergate, Newcastle-on-Tyne.

(To be continued).

### THE "P.P." SAFETY SHOT-FIRING APPLIANCE.

In connection with the new provision in the Explosives in Coal Mines Order (Clause 4) enabling the detonators to be removed after a shot has misfired, where an exemption has been granted by the Secretary of State, we have received copies of the following correspondence from the "P.P." Safety Shot-firing Appliance Company Limited :—

[COPIES.]

Home Office, Whitehall,  
September 10, 1913.

GENTLEMEN,—With reference to your letter of August 8 last, and previous correspondence on the subject of the "P.P." safety shot-firing appliance, I am directed by the Secretary of State to inform you that after careful consideration of the report which has been made to him on the trial of the apparatus at Bishop Middleham Quarry, and of the results of the experiments which have been carried out

case of shots in which the appliance named and described in the schedule hereto is used in the manner specified in the schedule.

(Signed) R. McKenna,  
One of His Majesty's Principal  
Secretaries of State.

Whitehall, September 1, 1913.

#### Schedule.

##### The "P.P." Safety Shot-firing Appliance.

The appliance consists of a hollow graduated tube through which passes an inner solid rod with a detachable spike, all of brass, copper alloy or metal other than iron or steel. The rod can be held in position in the tube by means of a catch.

Detonators used in connection with appliance are electric detonators, and are enclosed in a shield of copper or copper alloy in such a manner that any tension placed upon the detonator leads is borne by the shield and not by the detonator. The shield has two light springs, which are bent outwards before insertion into a shot-hole.

An illustration of the appliance and of the detonator shields used in connection therewith is shown in the accompanying plate, together with diagrams explanatory of their use.

##### Method of Use.

The appliance, with the spike inserted in and lying along the wrapper of the cartridge, is placed in the shot-hole as in fig. 1. The depth is noted, and the hole is rammed. The inner rod and the spike are then withdrawn (fig. 2). The shielded detonator with the springs bent outwards is, by means of the inner rod, inserted through the tube into the priming cartridge. The inner rod and then the tube are withdrawn, and the mouth of the shot-hole closed with a

FIG. 1.—APPLIANCE WITH EXPLOSIVE IN SHOT-HOLE, READY FOR RAMMING.

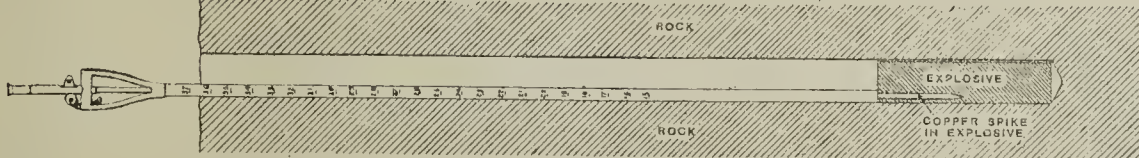


FIG. 2.—SHOT-HOLE RAMMED TO WITHIN 4 INCHES OF MOUTH, INTERNAL ROD AND SPIKE WITHDRAWN, LEAVING CLEAR PASSAGE THROUGH HOLLOW TUBE INTO EXPLOSIVE.

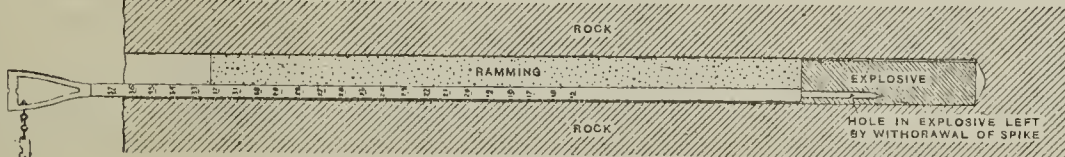


FIG. 3.—SHOT-HOLE AFTER INSERTION OF LOADED DETONATOR SHIELD, WITHDRAWAL OF APPLIANCE, AND COMPLETION OF RAMMING, SHOT NOW READY FOR FIRING.

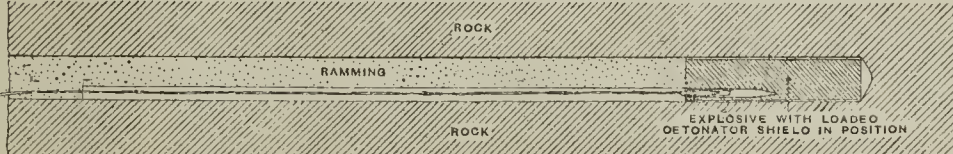


FIG. 4.—LOADED DETONATOR SHIELD



FIG. 5.  
INTERNAL ROD  
SHOWING POSITION  
OF SPIKE.

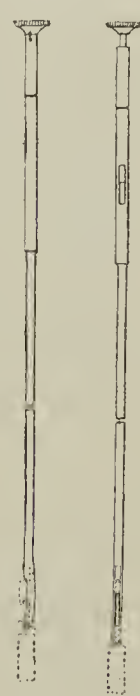
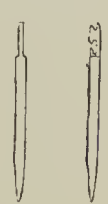


FIG. 6.  
COPPER SPIKE



with it at the Home Office testing station at Rotherham, he has decided to permit its use in coalmines.

The following clause has accordingly been inserted in the Explosives in Coal Mines Order of September 1, viz.:—"The foregoing provisions of clause 2 (c) of the Order as to the removal of any part of the stemming and the pulling out of detonator leads, and of clause 3 as to miss-fired shots, shall not apply in cases in which an exemption has been granted by the Secretary of State on the ground that an appliance is used which enables the detonator to be removed with safety after the shot has been charged;" and the Secretary of State has granted an exemption in pursuance of this clause in the case of shots in which the "P.P." appliance is used. A copy of the Order of exemption is enclosed.

The Secretary of State desires it clearly to be understood that every specimen of the appliance which is introduced into coalmines must be of the design shown in the drawings attached to the Order, and must conform in all respects to the specification and be used in the manner described in the schedule. In the event of your deciding to make any modification in the apparatus which would affect the specification or drawings attached to the Order it will be necessary for you to submit the modification for the approval of the Secretary of State before it can be introduced into coalmines.

The Explosives in Coal Mines Order is now in the press, and will be issued at the beginning of next week to the Government sale agents, Messrs. Wyman and Sons Limited, Fetter-lane, London, E.C.

I am, Gentlemen, your obedient servant,  
(Signed) E. BLACKWELL.

In pursuance of Clause 4 of the Explosives in Coal Mines Order of September 1, 1913, I hereby grant an exemption from the provisions of the Order prohibiting the removal of any part of the stemming and the pulling out of detonator leads, and as to the treatment of miss-fired shots, in the

plug of stemming (fig. 3). The detonator leads left protruding from the hole are secured to the firing cable.

In the event of a miss-fire, after waiting the statutory time and disconnecting the cable and removable handle from the firing apparatus, the shielded detonator may be withdrawn by a pull on the firing cable, the springs of the shield being made sufficiently light to way.

The shot-hole may now be approached and a fresh shielded detonator inserted by first placing the complete appliance in the shot-hole up to the correct depth and then proceeding as described above.

**Colliery Electricians and their Duties.**—In the Hamilton Sheriff Court, on Friday last, rather a nice point was raised before Sheriff Hay Shennan in reference to the statutory duties of colliery electricians. The matter arose in connection with a prosecution at the instance of the Home Office against James McNeil, colliery electrician, Wishaw, who was charged with permitting defects in the electrical apparatus and equipment of Dalzell and Broomside Colliery, Motherwell. Mr. Nicol F. Cameron, writer, Glasgow, who appeared along with the respondent, submitted that the first seven of the eight charges formulated were irrelevant. The duties of an electrician under the special rules were the examination of apparatus, the examination and testing of new apparatus, and the keeping of a log book. There was nothing in the rules about supplying anything. In the complaint there was reference to four fuses which respondent was charged with having failed to see properly constructed and installed, and he was also alleged to have failed to keep certain coverings, with conductors and flexible wires, properly secured. The Fiscal said that if Mr. Cameron's interpretation of the rules was correct, the whole tenor of the Act was to be disregarded, as according to the view now submitted the electrician was a nonentity at a pit. The electrician, he held, had to discharge his duties in accordance with the whole Electrical Rules, and not merely a section of them.—Sheriff Shennan said he would reserve judgment on the point raised; and in respect of the eighth charge he fixed Friday, 26th inst., as a diet for proof.

### INDIAN AND COLONIAL NOTES.

#### India.

**Railways in India.**—A Blue-book [Cd. 6890] issued this week contains the administration report on the railways of India for the year 1912. It shows that during the 12 months 668 miles of line were opened to traffic, bringing the total mileage open up to 33,484 miles. At the end of 1912 there were 2,455 miles of line sanctioned or under construction. The financial result to the State of the working of the railways was a net gain of Rs.823 33 lakhs (£5.49 million). The report mentions that during the year the total output of coal from the collieries of India and Burma amounted to 14.71 million tons, as compared with 12.72 million tons in 1911; while the imports of coal from the United Kingdom fell from 245.04 thousand tons to 144.80 thousand tons. The average rate for all descriptions of goods carried per ton per mile was 4.66 pies, or just under ½d. Referring to the problem of congestion, which was the subject of frequent communications between the Government of India and the commercial community during the year, the report says:—"Generally speaking it may be said that, while the traffic carried in the cold weather of 1912-13 was even heavier than that of the corresponding period in the previous year, the congestion was far less acute, and with a vigorous prosecution of the existing railway policy there are good grounds to hope that a marked and progressive improvement will now be visible in each successive year."

Mr. Robert W. Strachan, personal assistant to the superintendent of transportation, Bengal-Nagpur Railway, Calcutta, has received the appointment of district traffic superintendent of the Great Indian Peninsular Railway at Nagpur.

#### Africa.

**Natal Coal Trust.**—Protests by the public against the so-called Natal Coal Trust led the Secretary for Mines to enquire into it last year, and the following are the conclusions reached by him as given in his annual report:—"It must be realised by persons who are afraid of what they call a coal trust in the country that the present combine contains only ten of the Natal collieries; that at least five other collieries are not in the combine, and in some respects have interests entirely divergent; and that the whole of these collieries represent less than 50 per cent. of the total output of South Africa. The large and important Transvaal industry, which produced in 1912 4,750,000 tons to the total of 2,760,000 tons of Natal, is selling its coal cheaper than the Natal industry can do, is a rival so far as obtaining an overseas market is concerned, and in other respects has interests diametrically opposed to those of the Natal industry. Until, therefore, there are some symptoms that the Coalowners' Association of the Transvaal and a combination of the whole 21 colliery companies of Natal are arranging to work with common objects and on a common understanding, it is too soon to talk of a general coal trust."

#### New Zealand.

The Prime Minister has introduced an Arbitration Bill rendering the worker who is bound by an award and who participates in an illegal strike liable to a penalty of £10, and the employer, who is similarly bound, and who illegally locks out his workmen, liable to a fine of £500. A trade union is also made liable if a majority of its members participate in an illegal strike, and the Court may cancel its registration. In the case of industries outside the Conciliation and Arbitration Act a secret ballot must be taken and notice must be given before a strike is declared; otherwise the men are liable to the same penalties as in the case of an illegal strike. The employers are similarly bound.



## THE COAL AND IRON TRADES.

THURSDAY, SEPTEMBER 18.

## Scotland.—Western District.

## COAL.

Business in the coal trade of the west of Scotland continues extremely active, and prices remain firm. There is not likely to be any reaction while the present supply of tonnage is maintained. Owing to colder weather the demand for household coal is much heavier, and prices are now from 6d. to 1s. higher than those current during August. A brisk demand is being experienced for both export and home consumption, and the position all round is very satisfactory. All classes of coal share in the general activity. All qualities of ell coal are heavily booked, with prices showing an upward tendency. There is a pressing demand for best quality splint coal, which has now been unobtainable for over two weeks. Navigation qualities and steams are also heavily booked, and merchants are finding it difficult to cover requirements in the former. In smalls, trebles and doubles are in strong request, but singles are somewhat easier. Shipments from Glasgow are unusually large, and totalled 92,332 tons (with foreign shipments bulking largely), Bowling 266, Greenock 3,135, Ardrossan 3,111, Troon 7,894, Irvine 2,333, and Ayr 16,534—total 125,605 tons, compared with 111,227 tons in the previous week and 106,396 tons in the corresponding period of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	12/ to 13/6	11/9 to 13/
Ell .....	13/3	12/6 to 13/
Splint .....	12/9 to 15/6	12/9 to 15/6
Treble nuts .....	13/3 to 13/9	13/3 to 13/9
Double do. ....	12/6 to 13/	12/6 to 12/9
Single do. ....	11/ to 11/3	11/ to 11/3

## IRON.

Business in the Glasgow pig iron warrant market has steadily decreased, and is now in practically the same position as it was three weeks ago. The total turnover during the week did not exceed 10,000 tons, and in the absence of buyers prices have gradually receded, and show a drop of 1s. 5d. per ton on the week. Some extra orders have been placed on Continental account owing to the reduction in prices, but business with home consumers is comparatively idle. As the costs of production are out of proportion to the prices obtainable, the tendency has been to reduce the output, and already two furnaces in Scotland making hæmatite have been blown out. Prices of Cleveland warrants dropped from 55s. 9d. to 54s. 4d. cash, 56s. to 54s. 8½d. one month, and 56s. 6d. to 55s. 0½d. three months. Transactions were also recorded at 55s. 18 days. The number of furnaces in blast in Scotland is 86, compared with 88 in the previous week and 88 in the corresponding week of last year. The imports of pig iron into Grangemouth from Middlesbrough and district during the week amounted to 13,507 tons. Prices of Scotch makers' iron show a decline of 6d. per ton all round. Monkland is quoted f.a.s. at Glasgow, No. 1, 68s., No. 3, 66s. 6d.; Govan, No. 1, 66s., No. 3, 64s. 6d.; Carnbroe, No. 1, 71s. 6d., No. 3, 67s. 6d.; Clyde, No. 1, 73s. 6d., No. 3, 68s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 74s., Nos. 3, 69s.; Glengarnock, at Ardrossan, No. 1, 74s., No. 3, 69s.; Eglinton, at Ardrossan or Troon, No. 1, 68s. 6d., No. 3, 67s. 6d.; Dalmellington, at Ayr, No. 1, 69s. 6d., No. 3, 67s. 6d.; Shotts, at Leith, No. 1, 74s., No. 3, 69s.; Carron, at Grangemouth, No. 1, 74s. 6d., No. 3, 69s. 6d. per ton. Scotch hæmatite is quoted 71s. per ton for delivery at west of Scotland steelworks. In the manufactured branches of the trade business in some directions is somewhat improved. Black sheet makers are actively employed both in the heavy and thin gauge departments, and there is also a very good demand for galvanised sheet. The position of the malleable iron trade is practically unchanged, and in this branch no great benefit has been derived from the reduction in prices. Little fresh business is being placed even at current prices, which are based on £7 10s. less 5 per cent. for local delivery, and the present export prices do not permit home makers to successfully compete with Continental makers. Makers of wrought iron and steel tubes are in much the same position, and in this branch also there is plenty of room for improvement.

## Scotland.—Eastern District.

## COAL.

Collieries in the Lothians, although not quite so busy as in the previous week, are nevertheless well employed. The general demand is a trifle weaker, but trebles and doubles still hold their own, and are being well cleared at firm prices.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/	13/ to 13/3
Secondary qualities .....	11/9 to 12/3	12/ to 12/3
Treble nuts .....	13/9 to 14/	13/6 to 14/
Double do. ....	12/6 to 12/9	12/6 to 12/9
Single do. ....	11/ to 11/6	11/ to 11/6

Business in the Fife coal trade is extremely brisk, and all qualities share in a heavy demand, and collieries are still being pressed for deliveries. Best navigation coal is in strong request at firm rates, and the demand for washed treble and double nuts is most urgent. These qualities are being well cleared at steady prices. There is a good supply of tonnage at the port, and no difficulty is being experienced in covering requirements. The production of the collieries. The week were at Burntisland 44,190 tons, Chalmers 205, Tayport 788, Alloa 2,241, Wemyss 599 tons—total 115,795 tons, compared with 113,341 in the previous week and 104,228 in the last year.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	16/6 to 17/	16/6 to 17/
Unscreened do. ....	14/6 to 15/	14/6 to 15/
First-class steam coal.....	14/3 to 14/6	14/3 to 14/6
Third-class do. ....	11/9 to 12/	11/9 to 12/
Treble nuts .....	14/3 to 14/6	14/3 to 14/6
Double do. ....	12/6 to 13/	12/6 to 13/
Single do. ....	11/ to 11/6	11/ to 11/6

The total shipments from Scottish ports during the week reached 340,489 tons, compared with 333,710 in the previous week and 312,585 tons in the corresponding week of last year. For the year to date the aggregate shipments total 11,486,355 tons, an increase of 896,086 tons over the corresponding period of 1912.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 139,021 tons of coal and 1,344 tons of coke were despatched from Tyne Dock, a decrease of 5,077 tons of coal and an increase of 222 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 67,976 tons of coal and 2,116 tons of coke, a decrease of 667 tons of coal and 494 tons of coke. The Blyth shipments totalled 91,288 tons of coal and coke, a decrease of 3,018 tons. Tenders have been forwarded in respect of the following important steam coal contracts:—50,000 tons for the Egyptian State Railways; 80,000 tons for the Norwegian State Railways; 80,000 tons for the Danish State Railways; and up to 250,000 tons for the northern State Railways of Russia. The Egyptian and Russian railways want their supplies from October to January; the Norwegian and Danish departments asked for tenders of coal for shipment over next year. It is stated that the Norwegian railways are making counter offers for supplies up to the end of the present year and are likely to defer allotment of their contract for next year's requirements. The Russian railways are reported to be likely to postpone allotment also. As to the Danish contract, it is stated that best Blyths have been offered at 19s. 3d. per ton, c.i.f. Korsoer, or about 13s. 9d., f.o.b., but that the Westphalian Syndicate, which secured the bulk of the order last year, is offering coal considerably cheaper than are local tenderers. It is probable, therefore, that the bulk of the order will again go to Germany. The Gothenburg Gasworks have contracted for 20,000 tons of Durham gas specials for shipment in monthly quantities over next year at 18s. 3d. per ton, c.i.f., or about 13s. 3d., f.o.b. The Malmo Gasworks invite tenders of 30,000 tons of Durham gas bests for 1914 delivery. Some 30,000 tons of Durham best unscreened bunkers have been sold for next year's delivery at 13s. per ton, f.o.b., and 12,000 tons of Tyne steam seconds for similar shipment at 11s. 9d., f.o.b. The Tyne tugboatmen's strike, which commenced last Saturday, is not making such a great deal of difference as was expected. Large vessels have been able to enter and move about in the river under their own steam, and it would seem that, with skilful handling, there is little risk attending these operations. It must not, of course, be forgotten that, thus far, the weather has been very favourable to such unassisted manœuvring. The arrival of shipping is somewhat short, many owners having ordered their vessels elsewhere for cargoes and bunkers. The local coal market is very quiet this week, both producers and buyers being favourable to holding off until the settlement is announced of the big contracts at present in negotiation. These contracts will, of course, have much bearing on next year's prices. Prompt business is of small dimensions. Steam coals are easier. F.o.b. quotations for prompt shipment have varied as follows:—Best Blyth steams are 3d. cheaper; Tynes, stronger; seconds, Blyths, weaker; Tynes, easier; unscreened, inclined to fall; Blyth smalls, 3d. reduced; specials, ditto; gas seconds, ditto; unscreened bunkers, Durhams, 6d. fallen; Northumbrians, similarly cheapened. Other descriptions of fuel are unaltered.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	14/6	15/
Do. Tynes (Bowers, &c.) .....	15/	15/ to 15/3
Secondary, Blyths .....	12/ to 12/6	13/
Do. Tynes (Hastings or West Hartleys) .....	11/6 to 12/6	13/ to 13/6
Unscreened .....	10/ to 11/	11/9 to 12/6
Small, Blyths .....	8/3	8/6 to 8/9
Do. Tynes .....	7/	7/6
Do. specials .....	9/3	9/6 to 9/9
Other sorts:—		
Smithies .....	14/	14/
Best gas coals (New Pelton or Holmside) ...	15/	15/
Secondary gas coals (Pelaw Main or similar) .....	13/9 to 14/	13/9 to 14/3
Special gas coals .....	15/3 to 15/6	15/3 to 15/6
Unscreened bunkers, Durhams .....	12/9 to 13/6	13/ to 14/3
Do. do. Northumbrians .....	10/6 to 11/6	12/ to 13/
Coking coals.....	13/6 to 14/	13/6 to 14/
Do. smalls .....	13/6	13/6
House coals .....	15/6	15/6
Coke, foundry .....	18/ to 20/	18/ to 20/
Do. blast-furnace.....	17/6	17/6
Do. gas .....	17/ to 17/9	17/ to 17/9

LATER.—Russian State Railways are reported to have allotted contracts for supply of steam coals to Baltic ports up to the end of the year as follows:—126,000 tons to Westphalia, at under 20s. per ton delivered; 35,000 tons, Northumberland, at 21s.; and 15,000 tons, Yorkshire, price not stated. Another report says the whole order has gone to Westphalia. The Norwegian State Railways order for steam coal supplies up to the end of the year has been divided between Derbyshire and Yorkshire, price not stated. News is still lacking as to Danish State

Railways contract, but little doubt is now entertained that it will revert mainly to Westphalia. The Berlin Gasworks have contracted with local firms for the supply of 400,000 tons of Durham gas coals over next year at prices leaving about 12s. 6d. per ton f.o.b. for bests and 11s. 6d. for seconds. In consequence of these adverse allotments prompt coal prices have undergone the following reductions:—Best Blyth steams, 3d.; Tynes, 3d.; Blyth seconds, 6d. to 1s.; Tynes, 3d. to 1s. 3d.; unscreened, 1s. 6d.; Blyth smalls, 3d.; Tynes, 6d.; gas seconds, 3d.; specials, 3d.; Durham bunkers, 3d.; Northumberlands, 1s. These are recorded in the table of prices.

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 98,540 tons of coal and 1,725 tons of coke, as compared with 111,555 tons of coal and 505 tons of coke for the corresponding period of 1912, being a decrease of 13,015 tons of coal and an increase of 1,220 tons of coke. The coal market practically retains all its late firmness. So far the strike of the tugboatmen on the Tyne has not affected the position—as there is a fair number of boats on turn—but buyers are now holding off in the hope of securing cheaper coal as a possible result of restricted shipments, no doubt a continuance of the strike will certainly interfere with the movement of boats and necessarily weaken the coal market for prompt shipment. Forward there is a good enquiry. A contract has been placed for the supply of 25,000 tons of ordinary Durham bunkers over next year at 11s. 9d. f.o.b. The Gothenburg Gas Company have contracted, it is said, for Londonderry coal at 18s. 3d. per ton, c.i.f., about 18,000 tons are to be delivered this year, and about 20,000 tons from January 1914 to January 1915. The Malmo Gas Works are enquiring for 30,000 tons of coal for delivery over next year. Gas coals are steady, households are in better demand, coking coals are easier, bunkers are a trifle better, coke is unchanged. Current quotations are about as follow:

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/3	15/6
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	16/6	16/6
Ordinary do. ....	16/	15/9
Other sorts:—		
Lambton screened .....	15/6	15/6
South Hetton do. ....	15/3	15/4½
Lambton unscreened .....	13/9	13/9
South Hetton do. ....	13/9	13/9
Do. treble nuts .....	16/9	16/9
Coking coals unscreened...	13/6	13/9
Do. smalls .....	13/3	13/6
Smithies .....	15/6	15/3
Peas and nuts .....	17/	17/
Best bunkers .....	14/3	14/3
Ordinary bunkers ..	13/9	13/6
Coke:—		
Foundry coke .....	20/	20/6
Blast-furnace coke (dlvrd. Teesside furnaces) .....	19/	19/
Gas coke .....	17/	16/6 to 17/

The freight market is steady. Recent fixtures include:—Coasting: London 3s. 9d., Havre 5s. 3d., Hamburg 4s. 3d. Bay: St. Nazaire 7s. 3d., Charente 7s. 6d., Seville 9s. 6d. Baltic: Cronstadt 6s. 1½d., G-ffe 5s. 9d., Riga 5s. 3d., Revel 5s. 6d. Mediterranean: Genoa 9s. 4½d., Naples 9s. 6d., Constantinople 10s. 6d., Piræus 8s. 10½d., Algiers 7s. 10½d., Leghorn 10s., Ancona 10s. 6d.

## Middlesbrough-on-Tees.

## COAL.

The fuel trade is steady, with a fair amount of business passing. Deliveries of gas coal are now on a heavy and improving scale and values are firm. Best Durham gas coal is 15s. and seconds 14s., whilst up to 16s. is paid for special kinds. Bunker coal is in good demand. Ordinary Durhams are in the neighbourhood of 13s. 3d. f.o.b., superiors are 14s. to 14s. 3d., and specials 15s. to 15s. 3d. An upward tendency in household coal is noticeable. Quotations now range from 15s. 6d. to 15s. 9d. Coking coal is well taken up and prices run from 13s. 6d. to 14s. Demand for all descriptions of coke is good. Local requirements are heavy, and to meet them some fairly large sales have been made at varying prices, according to quality. The generally-recognised value of average blastfurnace coke, delivered at Teesside works, is from 17s. 6d. to 18s. 3d., but some buyers endeavour to do business at less. A small business has been done in every inferior furnace coal at below 16s. Best foundry coke runs from 19s. 6d. to 20s. f.o.b., and gashouse coke is in the neighbourhood of 16s. 6d.

## IRON.

The pig iron market has settled down and a general impression prevails that prices have touched bottom. As a consequence, buyers are now coming forward rather better and negotiations are in progress to provide for the much-delayed autumn requirements. Producers of pig iron complain that values of raw material are dear. Certainly they have been well upheld, while pig iron prices have been falling, but even now it can hardly be said that ore and coke quotations are much out of proportion to the values of pig iron. Buyers report that they have this week purchased No. 3 g.m.b. Cleveland pig at 54s. 9d., Cleveland pig at 54s. 9d. f.o.b., but 54s. 10½d. has also been paid and many sellers will not quote below 55s., whilst No. 1 is 57s. 6d., No. 4 foundry 54s. 4½d., No. 4 forge 54s., and mottled and white iron each 53s. 9d. These quotations are all for early delivery, but round about the same figures would probably be accepted for delivery over the autumn season. No fewer than five producers have sold mixed numbers of east coast hæmatite to Sheffield consumers at 66s., and buyers as a rule will not now offer above that figure, but most sellers put the price at 66s. 6d. for either early or forward delivery, and the latter may be regarded as the general market quotation. Dealers in foreign ore continue to take a firm stand and point out that they are obliged to do so owing to the mine-owners abroad declaring that they will make no concessions. Nominally, market rates are still based on 20s. ex-ship for rubio of 50 per cent. quality. In the various branches of the manufactured iron and steel industries there are no new features of moment. Manufacturers are kept generally well



employed on running contracts, but new orders are scarce. Quotations all round are unaltered. Further reductions, however, would cause no surprise.

South-West Lancashire.  
COAL.

The household trade is improving daily and in some of the better qualities there is in many cases pressure for supplies. Prices remain without change. The demand for screened coal for forges and manufacturers' purposes, although fair, is not as good as in the earlier part of the year. Labour troubles have prevented the shipment of normal quantities for bunkering fuel, steamers being held up at Manchester in consequence of the strike there, and shipments also restricted through the Dublin strike. Fresh complications were caused also by the stoppage of work on the part of the men at several of the Liverpool goods stations and tips and at Partington tips. Largely owing to the reduced shipments there is a tendency for coal to accumulate, and for prompt shipment prices are somewhat easier, ranging from 13s. 3d., f.o.b., for ordinary grades of screened Lancashire steam coals to 14s., f.o.b. for the best qualities. With regard to shipments of household fuel, coastwise and cross Channel, with the exception of Dublin, which is suffering from labour trouble, shipments are brisk and prices firm. There is an improved consumption of slack, as mills are all getting on to regular work and the consumption is more nearly balancing the output. Then again, the strike at Golborne and Haydock collieries continues, and this takes a considerable amount of slack out of the market.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	16/3	16/3
Do. (f.o.b. Garston, net) .....	16/6 to 17/	16/6 to 17/
Medium .....	14/6	14/6
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	12/3	12/3
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal.....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/3 to 14/	13/6 to 14/3
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

South Lancashire and Cheshire.  
COAL.

The Manchester Coal Exchange was well attended on Tuesday. House coal is in rather better demand as the days are getting cooler and shorter. Furnace coal continues to meet with steady enquiry, and shipping coal is in fair call. Slack is brisk and prices are steady at list rates. The following are the present prices.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	16/6 to 17/	16/6 to 17/
Medium .....	15/3 to 16/	15/3 to 16/
Common .....	12/6 to 13/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack.....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

IRON.

A very quiet market here, perhaps a little more buying going on, but there is not much confidence in the market. Pig iron continues lifeless, 60s. might be taken as the price for good foundry iron. Forges are moderately busy, the associated prices have not been altered. In steel rolling mills there is perhaps more employment, and a little more confidence that things cannot go much lower—five guineas represents the price of soft billets, and £7 5s. bars. Strikes here are upsetting everything again.

Yorkshire and Derbyshire.

Leeds.

COAL.

The attendance at Tuesday's market showed a considerable improvement on the past few weeks. Business was fairly brisk in most departments, although there was a considerable amount of manufacturing fuel on offer, which did not meet with a ready sale. The pits have worked five days this week and siding stocks have not been increased. There was some pressure for deliveries of house coal for the local markets, as merchants anticipate an advance of 1s. per ton from October 1. The supply of wagons has been satisfactory, but on account of the congestion caused by Doncaster races last week there are complaints of delay in the transit of loaded trucks.

House Coal.—Although the effect of the advance on the London market has been to reduce the demand from the public, merchants and factors have taken full supplies of coal from this district. There is a considerable scarcity of the very best qualities, some of the collieries being quite a fortnight behind with deliveries. All special prices have been withdrawn and the collieries are very firm for both London and the eastern and southern counties. There has been a falling off in the demand from the south coast, but prices are maintained, as an early improvement is expected. Freight rates are a shade easier this week, but the scarcity of small tonnage is still marked. In the West Riding markets merchants are fully employed, as the public are buying readily, chiefly for stocking. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 16s. to 17s.; Silkstone house, 15s. to 16s.; other qualities, 13s. to 14s. 6d.

Gas Coal.—There is a progressive increase in the demand for gas coal and the pits have difficulty in keeping up with contract deliveries. Very little coal is on offer in the open market, the occasional parcels being sold realising full contract figures. One or two late contracts are reported to

have been fixed up at the 1s. advance. Stocks at the pits are practically non-existent and gas nuts are exceptionally scarce.

Manufacturing Fuel.—The output is still slightly in excess of market requirements and occasional spot lots are to be met with at special prices. Forward business, however, is pretty firm, as producers think that the lull in the demand is only temporary. A big tonnage is being consumed in the Bradford and Huddersfield districts, but the demand in the heavy woollen district has fallen off to a considerable extent during the past few weeks.

Washed Furnace Coke.—Prices of this commodity are no better and range from 12s. 6d. to 13s. per ton at the oven for washed patent oven coke. One or two new batteries of ovens in the South Yorkshire district are expected to come into operation at an early date. Unless there should be a marked improvement in the iron and steel trade, it is expected that prices will not improve—at all events for some time to come.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	14/6 to 15/	14/6 to 15/
Wallsend & London best	13/6 to 14/	13/6 to 14/
Silkstone best .....	13/9 to 14/6	13/9 to 14/6
Do. house .....	12/6 to 13/	12/6 to 13/
House nuts .....	11/6 to 12/	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best.....	16/6 to 17/6	16/6 to 17/6
Silkstone best .....	15/6 to 16/6	15/6 to 16/6
Do. house .....	15/ to 15/6	14/9 to 15/6
Other qualities.....	14/6 to 15/	14/3 to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 12/	11/ to 12/
Unscreened gas coal ...	10/ to 10/6	10/6 to 11/
Other sorts:—		
Prices at pit:		
Washed nuts .....	11/ to 11/9	11/3 to 11/9
Large double-screened engine nuts .....	10/ to 10/9	10/3 to 10/9
Small nuts .....	9/9 to 10/6	10/ to 10/6
Rough unscreened engine coal .....	10/ to 10/6	10/ to 10/6
Best rough slacks .....	8/ to 8/6	8/ to 8/6
Small do. ....	7/ to 7/6	7/ to 7/6
Coking smalls .....	7/ to 7/6	7/ to 7/6
Coke:—		
Price at ovens:		
Furnace coke .....	12/6 to 13/	12/6 to 13/

Barnsley.

COAL.

Business is in a very unsettled state this week, and at the local market on Wednesday there was a good deal of apprehension shown with regard to the traffic facilities. The dislocation caused during the previous week, owing to the Doncaster races, will take some time to overcome, and the tonnage standing on the rails is of an exceptionally large character. In addition to this trouble come labour disputes in the Lancashire district, which has had the result not only of holding up traffic which had already left the collieries, but the refusal of the railway companies to accept any further deliveries. How long this state of things will continue is entirely a matter for conjecture, but already some collieries are finding it a difficult matter to keep working, as the sidings are already fairly congested. For the moment, districts which can be more easily reached will perhaps benefit by obtaining supplies at lower prices, but, generally speaking, values all round remain of a firm description. The steam coal section is particularly firm, in the expectation that a large proportion of the extra coal required by Russia will be taken from this district. The best quality is in very good request, and sellers not having a big quantity of surplus coal to deal with are able to demand prices more in accordance with their own ideas. Secondary descriptions also continue to again strengthen, and, so far as the present month is concerned, there does not seem to be much prospect of prices weakening. In respect to all descriptions of small manufacturing fuel, the consumption is reported to be gradually increasing, particularly for the cotton districts, although the restricted use of slacks for coke making continues to be experienced. A better enquiry is met with for steam nuts, values of which have an upward tendency, and, no doubt when the stocks of slacks at the collieries have been disposed of, prices will also harden. The demand for gas coal on contract account is more than perhaps the collieries can supply, and there is practically no fuel on offer for current sales, but where this is possible rather higher prices have to be paid. The demand for house coal continues to be brisk and orders are not fully met, the enquiry for the best class of coal being very strong, especially for London and the eastern counties, where stocks are being laid in in view of the advance which will be made on October 1, if not earlier. There does not appear to be anything abnormal in the amount of business which is being done with West Yorkshire districts and nearer markets. Though there continues to be a strong demand for coke, smelters will only buy on a small scale, and the restricted output is adequate. With little forward demand values continue to be of a weak character.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	15/	15/
Best Barnsley softs.....	14/3 to 14/6	14/3 to 14/6
Secondary do. ....	11/6 to 13/6	11/ to 13/6
Best house nuts .....	13/ to 13/3	13/ to 13/3
Secondary do. ....	11/ to 13/	11/ to 13/
Steam coals:—		
Best hard coals .....	13/3	13/3
Secondary do. ....	12/ to 12/3	12/ to 12/3
Best washed nuts .....	11/6 to 12/	11/6 to 12/
Secondary do. ....	10/9 to 11/	10/9 to 11/
Best slack.....	8/ to 8/9	8/ to 8/9
Rough do. ....	6/6 to 7/6	6/6 to 7/6
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/6 to 12/	11/6 to 12/
Gas nuts .....	12/ to 12/9	12/ to 12/9
Furnace coke .....	12/6 to 13/	12/6 to 13/

Hull.

COAL.

The tone of the Humber coal market is firm and signs of usual end-of-season activity are not wanting. The export demand is strong and a good deal of business is in progress, prices of steam coal being fully maintained. South Yorkshires are quoted at the same figure as last week, but the firmness of the market is also shown by the advance in the prices of Derbyshire and Nottingham best steams. Secondary sorts are also a good market, and smalls and slack seem inclined to recover from the recent depression. The shipments from Hull are not more than normal, though a good deal of activity is reported at the new dock at Immingham. The freight market is on the upward grade and as much as 6s. has been paid Hull to Cronstadt, owners refusing to look at anything under 5s. 10½d. For Riga 6s. 3d. has been given for September loading, and other Baltic ports are proportionately higher. Tonnage for the carrying of coal under the South Russian contracts continues to be taken up, the rate varying from 10s. Hull to Odessa down to 9s., which sum has been paid for a steamer to load 5,500 tons at Immingham, the contract stipulating a daily delivery of 1,000 tons at port of discharge. Loading conditions on the Humber generally are good. The coal trimmers, as in the previous week, ceased work on Saturday at one o'clock, but negotiations are in progress which, it is hoped, will result in the time for Saturday loading being extended to cover at least all vessels on tidal sail. The following are the approximate prices for prompt shipment f.o.b. at Hull, &c.

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards.....	16/ to 16/3	16/ to 16/3
Washed double-screened nuts .....	13/3 to 13/6	13/3 to 13/6
Unwashed double-screened nuts .....	12/9 to 13/	12/9 to 13/
Washed single-screened nuts .....	13/	13/
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls.....	10/3 to 10/6	10/3 to 10/6
Unwashed smalls.....	9/3 to 9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys .....	13/6	13/6
Rough slack .....	10/3 to 10/6	10/3 to 10/6
Pea slack .....	9/	9/
Best Silkstone screened gas coal.....	13/3 to 13/6	13/3 to 13/6
Best Silkstone unscreened gas coal.....	12/ to 12/6	12/ to 12/6
Derbyshire:—		
Best steam hards (Hull) .....	16/	15/6
Do. (Grimsby) .....	15/6	15/
Derbyshire nuts (doubles) .....	13/	13/
Derbyshire nuts (doubles) (Grimsby).....	12/9	12/9
Derbyshire large nuts ...	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	16/	15/6
Do. do. (Grimsby) .....	15/6	15/

Chesterfield.

COAL.

There is a distinct improvement in the demand for house coal, and orders are more numerous than they have been for many months. Prices are hardening, and a general advance may take place even before October 1. There is a more active demand for fuel for industrial purposes, and, with the holiday season now virtually ended, a greater volume of business is to be expected in this department. Cobbles and nuts for gas producers continue in great request, and are likely to be freely ordered for some time to come. Prices are unchanged but firm. Slack for boiler firing is in much brisker demand since the full resumption of work in the Lancashire cotton mills after the recent annual wakes. There is also a good enquiry for this class of fuel for forward delivery and contracts are being renewed at advanced prices. Stocks of slack at the collieries are very low indeed. Steam coal for locomotive use is in active demand and prices are exceedingly firm. The export trade is in a satisfactory condition. The large quantity of steam coal which is now being ordered from this country for the Russian railways is having a strengthening effect upon the market, and the present active condition of things is likely to continue throughout the winter months. It is believed that this state of activity, during what is usually a dull period of the year, will have an important bearing upon prices for next season's business, which will, in all probability, remain at this year's level. Prices of best Derbyshire hards are very firm at 15s. 6d. to 15s. 9d. per ton, delivered free alongside steamer at Grimsby for current shipment. There is not, however, much free coal available, as practically the whole output is already disposed of on contract. A strong demand is experienced for cobbles for shipment to near Continental ports, and nuts are this week in slightly better request. There is a well-sustained demand for washed nuts and washed slack. There is no change to be recorded in the coke market, which continues in a depressed condition. At present, there does not seem to be any prospect of an improvement. Coking fuel is in good demand.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	14/6	14/6
Secondary do. ....	12/6	12/6
Cobbles .....	12/	12/
Nuts .....	11/	11/
Slack .....	9/	9/

IRON.

The iron trade is exceeding quiet, and buyers of pig iron show no inclination to make contracts for forward delivery, being satisfied to purchase only sufficient to satisfy their immediate requirements. This is pretty much the same policy that is adopted by users of finished iron, with the result that the works have only partly filled order books, and are unable to keep their plant fully occupied.



Nottingham.

COAL.

During the past week more activity has characterised the coal trade in Nottinghamshire, and there is every prospect of a busy period ahead. Business is regarded as satisfactory, and given favourable weather a decided improvement is confidently anticipated. For household fuel orders are on the increase, better-class qualities being in good demand, and in some cases advances of from 6d. to 1s. per ton are being made. Second-class sorts are at present only selling moderately, and the same remark applies to household smalls, but an early improvement in both these qualities is expected towards the end of the month, when prices will undoubtedly have an upward tendency. While for the time being a fair business is being done in steam coal, the position is hardly up to that of a year ago, when the general trade of the country was perhaps in a better condition. Nevertheless, manufacturing firms are taking good supplies on contract account, and the weight of fuel being sent away for shipment is about up to the average. Small steams are in improving demand. The market is such that values are being maintained. Gas fuel is going out of hand more freely, and owners have no difficulty in obtaining late rates. In regard to slacks, there is a lack of buoyancy throughout, and prices are showing an easier tendency in consequences of increasing stocks.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	13/ to 13/6	13/ to 13/6
Good house coals.....	12/ to 12/6	11/6 to 12/6
Secondary do.....	10/6 to 11/	10/6 to 11/
Best hard coals .....	12/ to 12/6	12/ to 12/6
Secondary do. ....	10/6 to 11/6	10/6 to 11/6
Slacks (best hards).....	8/3 to 8/6	8/3 to 8/6
Do. (seconds) .....	7/ to 8/	7/6 to 8/
Do. (soft).....	7/ to 8/	7/3 to 8/

Leicestershire.

COAL.

The aspect of business in this district inspires much confidence. There is a continuous demand, and also a very heavy amount of business on hand. The collieries are all busily employed, and are enabled to work what is practically a full week. Deliveries are heavy, and stocks generally are being reduced to a very small amount. The enquiry is good all round. Household coals of all sorts are wanted, and there is a revival in the enquiry for the smaller kinds. Steam coals are in very good request, and show no signs of a decline in the demand. In fact, all round the business doing gives hopes of a very good season. The local merchants are doing more business, and there is little doubt that in the next few weeks their turnover will be considerably increased. The current quotations are firmly held, and there is no indication of any probable decline for some time to come. Any business is as a rule only entertained at the full list rates.

South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

COAL.

The condition of the coal trade of the Cannock Chase district has undergone very little change since last report, but there are indications that the collieries here will have a very busy time during the coming winter. Some of the collieries at present are working practically full time, and have a fair number of orders on hand. The demand for coal for household purposes is steadily improving, but there is no material change in the enquiry for manufacturing sorts. Canal sales are fairly satisfactory, and there is a slight improvement in business at the landsale depots. It is feared that the railway strike will interfere with railway sales for a few days.

Birmingham

COAL.

Trade is disorganised by the railway strike, and one immediate result is a temporary advance in household coal to the consumer. Merchants have to provide supplies from stock, which will have to be replaced at higher rates. Apart from the strike, conditions are quite healthy and a good autumn trade is looked forward to.

Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep .....	16/6	16/6
Do. best shallow .....	14/6	14/6
Do. seconds do. ....	13/	13/
Best hard .....	14/6	14/6
Forge coal.....	11/	11/
Slack .....	8/	8/
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked .....		
cobs .....	13/6	13/6
Best hard spires .....	15/	15/
Forge (steam) .....	10/6	10/6
D.S. nuts (steam) .....	9/6	9/6
Small (do.) .....	8/6	8/6

IRON.

The shadow of the railway strike hung over the market. So far the effects on the distribution of material have not caused a lot of inconvenience, but a day or two will make a big difference. This new trouble has come at an unfortunate moment. A more hopeful feeling was beginning to take hold of the market after a period of depression. Everything is again in a condition of uncertainty. For the time being, the trade position might be described as steady, but probably two-thirds of it goes through the hands of the railway. There is a great deal of activity in this branch, and prices are hardening. Thus for small orders £12 is being asked for ordinary quotations range, as before, from

£11 up to £11 10s. Black sheets for galvanising sell more freely at £8 to £8 2s. 6d., delivered in the district, and for merchant sheets 2s. 6d. more has to be paid. The bar trade mends slowly. Marked bar firms are kept going fairly well on orders for early delivery, but there is no forward buying. For merchant bars £7 10s. is probably the best price going. Puddled bars, which, at the beginning of the year, were quoted at £6, are down to £4 12s. 6d. to £4 15s., which, it is affirmed, is an unprofitable level. A considerable drop in wages will, it is expected, be shown in the next ascertainment of the Wages Board, due soon. Employers will welcome the relief, because they have been hit rather badly by the fact that the slump came at a time when wages were unusually high. In the matter of pig iron, since the slump six or seven furnaces in the area which supplies the Birmingham market have been blown in. Through this curtailment of production stocks have been somewhat reduced, and with consumption tending to broaden, smelters are hopeful of something like a normal level being reached by quarter-day three weeks hence. South Staffordshire iron has stood the strain better than district brands. Current quotations are: Northamptonshire forge, 52s. to 53s.; Derbyshire 54s. to 55s.; Staffordshire common, 51s. to 52s., part-mine, 53s. and upwards. North Staffordshire pigs are in very good request. Forge qualities make 53s. to 54s. and foundry about 56s. The higher qualities maintain their position uncommonly well. For foundry iron there is a brisk demand, particularly for the machinery trade. Wherever possible, manufacturers are resorting to canal or team for delivery, and the latter adds to the cost. Considerable quantities of material are being held up in the railway yards. Business in steel is quiet but fairly steady. New business is difficult to obtain except at prices in buyers' favour.

Forest of Dean.

Lydney.

COAL.

House coal prices were advanced 1s. per ton on Monday last. The collieries, for the most part, are still managing six days' work and stocks are much below the average for the period of the year. The seaborne branch of the trade especially, is exhibiting a firm tone and a satisfactory number of vessels are loaded week by week. Orders from the inland districts are coming steadily to hand, but there is room for much expansion yet. Rough slack is reduced 6d. per ton to 7s. 6d. this week. Steam coals are not so eagerly sought after just now, but the collieries are all making good time.

Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	16/6
Forest .....	16/6	15/6
Rubble .....	16/9	15/9
Nuts .....	15/	14/
Rough slack .....	7/6	8/
Steam coal:—		
Large .....	13/	12/ to 13/
Small .....	9/6 to 10/	9/ to 10/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

Explosions in Coalmines.—In connection with the British Association meeting, which was held at Birmingham from September 10 to 17, Sir Henry Cunynghame, K.C.B., delivered the first of the popular lectures which have for many years been a feature of the association's meetings. In this he gave an account in quite simple language of mine explosions, their causes, and the means that are available to prevent their occurrence. As is always the case at these lectures, the audience was not presumed to have any knowledge of the particular subject being discussed, and in this case Sir Henry worked upon the basis that his audience knew nothing of the methods of working coalmines, or, at any rate, that it had no more than an elementary knowledge of the scientific principles upon which these methods depend. Consequently, it followed that a good deal of the lecture was of an elementary character, which included short explanations of the various methods of getting coal, considerably helped by models, diagrams, and lantern slides. The nature of the gases found in mines was explained, and the explosive nature of methane demonstrated, in conjunction with the apparatus used at Eskmeals to determine the quantities necessary to make air explosive, was shown. The modern theories of mine explosions—namely, that death has been found to be due not much to violence, still less to suffocation, but almost entirely to poisonous carbon-monoxide, was gone into, and the following remedies suggested for mine explosions:—(1.) Regulations as to the use of naked lights, electricity and blasting. (2.) Wetting the coal. In this case Sir Henry agreed that there is a difficulty in carrying it out, but added that it is nevertheless effective, and still will probably have to be extensively used. (3.) Incombustible dust. Having dealt with the old views of gases, and pointed out that gases are now known to consist of swarms of colliding molecules which behave as though they are tiny, hard, elastic balls, the lecturer referred to the proposal by Mr. Garforth and others to use incombustible dust to prevent coaldust explosions, and described the various sorts of incombustible dusts, such as bicarbonate of soda, shale and flus-dust, and concluded his lecture by a description of the experimental methods being used at Eskmeals to test the inflammability of coaldusts, the effect of various sorts of incombustible dusts, and the experiments which have been made to discover the proper method of using incombustible dust in coalmines.

THE WELSH COAL AND IRON TRADES.

THURSDAY, SEPTEMBER 18.

North Wales.

COAL.

The coal market this past week has been somewhat of an irregular character, and on the whole prices have had a lowering tendency for some classes of fuel. Most of the collieries continue to be short of empty wagons in which to load their output, which is causing them to have to work short time. In regard to house coal, there is a slightly better demand, though prices are not much higher as yet, and buyers of spot lots have been able to secure same on advantageous terms to themselves. There is a steady demand for gas coal, but as practically all this goes away under contract there is no fluctuation in prices. Steam coal for industrial purposes is in moderate demand, but for railway companies' locomotive coal the demand will be affected by the Liverpool strike, and so will the demand for fuel for shipment, unless a speedy settlement is come to. Nuts, as usual, are well sold, but there is not such a good demand for slack, and in some sidings may be seen accumulations of this commodity; consequently coalowners are offering at low figures for immediate delivery. The gas coke trade is unaltered either in price or output. The current prices at the moment of writing are as follow:—

Prices at pit f.o.r. :—	Current prices.	Last week's prices.
Best house coal .....	15/ to 16/	15/ to 16/
Secondary do. ....	14/ to 15/	14/ to 15/
Steam coal .....	12/6 to 12/9	12/6 to 13/
Gas coal .....	13/ to 13/9	13/ to 14/
Bunkers.....	12/ to 12/6	12/ to 12/6
Nuts .....	11/ to 11/9	11/ to 11/6
Slack .....	6/ to 7/9	6/6 to 8/6
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 18/4	17/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

Monmouthshire, South Wales, &c.

Newport.

COAL.

There has been a complete absence of any noticeable features from this week's coal market, business dragging along in a slow and uncertain manner. With tonnage arrivals hardly up to expectations there has been no improvement in the demand for prompt coals, while for forward business buyers continue to adopt the holding-off policy, but up to now there has been no further weakening of values this week to justify their reluctance to purchase. There are abundant supplies of coal available, stocks both at docks and collieries being exceedingly heavy just now, but it remains to be seen whether or not sellers have reached their minimum for the present. If anything, there is rather more demand for smalls than for any other coals. The depression in the iron trade has now been reflected upon the coke department, where values have materially receded. Pitwood rules a shade easier at 21s. 9d. to 22s. 3d. for good wood ex ship. In the outward freight market, business which was a few days ago fairly active has more recently been extremely quiet, with rates steady for all directions.

Prices f.o.b. cash 30 days, less 2½ per cent.

Steam coals:—	Current prices.	Last week's prices.
Best Black Vein large ...	17/ to 17/6	17/ to 17/6
Western-valleys, ordinary	16/ to 16/6	16/3 to 16/9
Best Eastern-valleys .....	15/9 to 16/	15/9 to 16/
Secondary do. ....	15/3 to 15/6	15/3 to 15/6
Best small coals .....	7/9 to 8/	7/9 to 8/
Secondary do. ....	7/3 to 7/6	7/3 to 7/6
Inferior do. ....	6/9 to 7/	6/9 to 7/
Screenings .....	8/	8/
Through coals .....	13/ to 13/3	13/ to 13/3
Best washed nuts .....	14/ to 14/6	14/ to 14/6
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/6 to 20/	19/6 to 20/
Furnace coke .....	21/ to 21/6	22/ to 23/
Foundry coke .....	24/ to 26/	26/ to 27/

IRON.

There are very few fresh features to report since last week in the conditions of the local iron and steel trades. Not a great deal of new business is being put through, and generally speaking prices remain nominally as last quoted. Bar mills are again well engaged, but only small orders are coming along in this department. Specifications are coming along rather more freely, while quotations show no change. Imports of foreign bars for the week total 5 500 tons, and for these, too, prices show no alteration. Rail mills continue well engaged, and there is now more enquiry on the market than has been for the past few weeks. Quotations are firm at last quoted values. At blastfurnaces business is inclined to slow down, but quotations remain fairly strong at last figures. The tin-plate trade seems rather better, enquiries are coming along more freely, and a welcome improvement is hopefully anticipated. Although officially there is no change in quotations the trend of values is slightly upwards. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tin-plate bars: Bessemer £4 16s. 3d., Sismens £4 16s. 3d. to £4 17s. 6d. Tin-plates: Bessemer primes, 20 × 14, 13s. 3d.; Siemens primes, 20 × 14, 13s. 3d. Pig iron: Welsh hematite, 74s., 75s., delivered locally. Finished black plate, £9 15s. to £10 per ton.

Cardiff.

COAL.

This market is at present in rather an unsettled state. Another campaign is proceeding on the non-unionist question, but it is not anticipated that there will be any serious stoppages. Much more serious, however, is the attitude taken by the coal tippers and trimmers in reference to the Saturday one o'clock closing. Needless to say, the



decision is causing considerable inconvenience. Many vessels had so far advanced their loading by noon on Saturday that it only required a continuance of work for a short time longer to enable them to get away on that day's tide, but all appeals to the men to go on were in vain. What makes matters worse is that in some cases collieries were unable to get a sufficient number of empty trucks sent up on the Monday morning to ensure full work at the pits, so that the inconvenience was accentuated. One of the leading ship-owners of the Cardiff Docks said the position created by the trimmers was so serious that the question of resistance would have to be very carefully debated. All these matters tend to disturb the equable course of trade. Shipments last week were on a very extensive scale, totalling nearly 410,000 tons. Charterings, too, were also satisfactory, the amount of tonnage taken up being close upon 402,000 tons, which, coming on the top of 340,000 tons chartered during the preceding week, means that collieries are in for a very busy time. Arrivals over the week-end were interfered with by the boisterous weather, and some of the second-grade collieries were so badly off for vessels that they were glad to accept slightly lower prices from buyers who were in a position to undertake prompt loading. For instance, 18s. to 18s. 6d. was as much as sellers could get for ordinary second Admiralties. For superior seconds, 19s. to 19s. 6d. was firmly quoted. The current prices of best Admiralties is round about 20s. 6d. for delivery, both this month and next, and from what can be judged at present, there is little indication of any appreciable reduction for some time, though it is possible that for October-December delivery 20s. would be accepted. At the time of writing, the French commissioners were at Cardiff with the object of adjudicating upon the tenders sent in for 100,000 tons of best steam coals required for the Navy. This coal is to be delivered at Toulon and Bizerta, and as the contracts must be completed within the limits stipulated—namely, one-half during the December quarter, and the other half during the March quarter—it is almost certain to stiffen prices. It is true that outputs are slightly increasing, but nothing like to the extent that one would have thought. A large number of men are evidently still holiday-making, but with the change in the weather there is no doubt that they will speedily return to work. Up to the present very few contracts for next year have been arranged. In addition to the two or three entered into by steamship companies, as previously mentioned, there are rumours that a large quantity of coal of the Griffin-Nantyglo quality has been sold at 16s. 6d., and 20,000 tons of best eastern-valley coal, such as Tirpentyws, at 16s. Notwithstanding, however, the "bearing" tactics that are still being pursued in certain quarters, sellers are very optimistic in their views, and even some buyers are rapidly coming to the conclusion that higher prices will have to be paid over next year than for the present year. In the small coal market there is no material change. Bunkerings are still selling at 10s. to 10s. 3d., and cargo qualities at 7s. to 7s. 6d. per ton. The market for Monmouthshire coals is not quite so strong, Black Veins offering at 17s. to 17s. 3d., western-valleys 16s. 6d. to 16s. 9d., and best eastern-valleys at 16s. to 16s. 3d. f.o.b. Cardiff. According to the Custom House returns just to hand, the quantity of coal exported from the Bristol Channel to foreign countries in August was 2,142,151 tons, as against 2,387,934 tons in the corresponding month of last year, being a decrease of 245,783 tons. From Cardiff the shipments amounted to 1,342,693 tons, or a decrease of 217,753 tons, whilst from Newport there was a decrease of 43,881 tons, and from Swansea a decrease of 9,923 tons. Port Talbot, however, showed an increase of 4,700 tons. The following is a comparative table of the exports to the principal countries for August last and for the same month of last year:—

	Aug. 1912.	Aug. 1913.
	Tons.	Tons.
Russia .....	53,502	68,835
Sweden .....	30,974	17,603
Norway .....	11,797	8,025
Germany .....	20,511	22,016
Netherlands.....	13,767	11,736
Belgium .....	21,133	35,426
France .....	494,681	549,717
Algeria .....	50,370	68,271
Madagascar .....	5,992	—
Portugal .....	54,869	49,232
Madeira .....	13,280	16,278
Spain .....	88,284	89,578
Canary Islands .....	31,021	47,523
Italy .....	490,145	369,495
Austria-Hungary .....	16,739	23,283
Greece .....	50,319	19,524
Roumania .....	13,185	12,728
Turkey (European) .....	14,760	11,705
" (Asiatic) .....	13,636	10,839
Egypt .....	225,399	139,927
Tunis .....	20,668	4,247
Chili .....	35,050	12,635
Brazil .....	120,787	92,849
Uruguay .....	76,853	55,106
Argentine Republic .....	242,651	244,653
Channel Islands .....	7,294	6,614
Gibraltar .....	17,108	17,825
Malta .....	34,863	29,633
Cape of Good Hope .....	—	11,572
Aden .....	30,491	17,684
British India .....	6,102	8,801
Straits Settlements .....	443	8,726
Ceylon .....	12,795	7,037
West Africa (French) .....	9,770	10,132
" (Portuguese) .....	17,177	13,390
" (British) .....	14,147	11,511

Taking the eight months of the year, an increase is shown of 3,994,932 tons. In house coals there is no change, but bituminous coals, notwithstanding the advent of colder weather, are rather weaker, No. 3 Rhondda large being 16s. 6d. to 17s. and No. 2 ditto 12s. 9d. to 13s. 3d. There is no alteration in patent fuel. Shipments last week amounted to 28,970 tons, of which the Crown Company exported 9,280 tons, other local makers 5,000 tons, and Swansea 14,690 tons. Coke is easier, special foundry being 29s. to 30s., and ordinary ditto 23s. to 25s. Pitwood is weak at 22s.

IRON.

Though there is a better demand for tin-plates, there is still much room for improvement. The percentage of unemployed shows an upward tendency, and owing to lack

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	20/ to 20/6	20/6 to 21/
Superior seconds .....	19/6 to 19/9	19/ to 19/6
Ordinary do. ....	18/ to 18/6	18/3 to 18/9
Best bunker smalls.....	10/ to 10/3	10/3 to 10/6
Best ordinaries.....	9/9 to 10/	9/9
Cargo qualities .....	7/ to 7/6	7/3 to 7/6
Inferior smalls.....	6/3 to 6/9	6/9
Best dry coals .....	18/ to 18/6	18/ to 19/
Ordinary dries .....	15/6 to 16/	15/9 to 16/6
Best washed nuts .....	15/9 to 16/	16/
Seconds .....	14/9 to 15/	15/
Best washed peas .....	13/9 to 14/	14/
Seconds .....	12/9 to 13/	13/
Dock screenings .....	11/6 to 11/9	11/6 to 11/9
Monmouthshire—		
Black Veins .....	17/ to 17/3	17/6 to 17/9
Western-valleys .....	16/6 to 16/9	17/ to 17/3
Eastern-valleys .....	16/ to 16/3	16/3 to 16/6
Inferior do. ....	15/3 to 15/6	15/6 to 15/9
Bituminous coals:—		
Best house coals (at pit)	20/6	20/6
Second qualities (at pit)	18/	18/
No. 3 Rhondda—		
Bituminous large .....	16/6 to 17/	17/
Through-and-through...	14/6	14/9 to 15/
Small .....	12/3 to 12/6	12/6
No. 2 Rhondda—		
Large .....	12/9 to 13/3	13/ to 13/6
Through-and-through...	10/6 to 11/	11/3
Small .....	7/ to 7/6	7/9 to 8/
Best patent fuel .....	22/	22/6
Seconds .....	19/6 to 20/6	19/6 to 20/6
Special foundry coke .....	29/ to 30/	30/
Ordinary do. ....	23/ to 25/	24/ to 25/
Furnace coke .....	20/ to 21/	20/
Pitwood (ex-ship) .....	22/	22/ to 22/3

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

of orders manufacturers are endeavouring to restrict output. Receipts from works during the week were 103,435 boxes, whilst the shipments amounted to only 74,931 boxes, leaving 28,504 boxes to be added to stocks, which now stand at 350,224 boxes. Now that the American Tariff Bill has passed through the Senate, the future is viewed more optimistically. The Bill differs in many respects from that sent up by the House of Representatives, many of the duties having been cut down below the figures originally proposed. It is estimated that the Customs receipts of the country will be reduced by no less than 30 million pounds, a loss which will have to be made up by the imposition of an income tax. The duty on steel bars is reduced from 10 to 6 per cent., and on tin-plates from 20 to 15 per cent. *ad valorem*. In other words, the tariff on tinplates, taking present prices as the basis, will now be 2s. per box as against 5s. 4½d. per box. This should enable Welsh makers to get once more into the United States market, but of course the reduced tariff will possibly make competition in foreign countries more effective. Owing to the continued high price of block tin, prices of tinplates remain very unremunerative; 14 by 20 cokes are selling at 13s. 3d. and oil sizes at 13s. 6d. and 19s. 3d. per box. There has been a large import of steel bars, billets, &c., the total for the week being over 10,000 tons. This, of course, keeps down Welsh tinplate bars, which still remain at from £4 15s. to £4 16s. 3d. The German Syndicate are quoting 88s. for sheet bars. There is very little doing in galvanised sheets and 24-gauge corrugateds are still offering at £11. The rail mills are fairly busy and the exports include over 1,000 tons for Kilindine. Rolling operations have been commenced at the Bynea Steelworks. These works represent the last word in up-to-date equipment, the latest labour-saving appliances having been introduced. The spelter industry continues to flourish and considerable extensions to plant are taking place in various directions. The whole of the Swansea Vale Works have been demolished and new plants are being erected. Part of these works were destroyed by fire a little time ago. There is no change in Welsh pig iron or iron ore.

Swansea.

COAL

The returns last week show the trade of the port was highly favourable. Both the coal and patent fuel trades

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/ to 20/	19/6 to 20/6
Big Vein large (less 2½ per cent.) .....	17/ to 18/	17/ to 18/6
Red Vein large do. ....	12/9 to 14/6	12/9 to 14/6
Machine-made cobbles (net) .....	21/6 to 23/	21/6 to 23/
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 25/6	23/6 to 26/
German do. do. ....	23/6 to 25/6	23/6 to 26/
Beans (net) .....	16/6 to 18/6	16/6 to 19/
Machine-made large peas (net) .....	12/ to 13/6	12/ to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	6/6 to 7/	6/9 to 7/
Duff (net) .....	4/9 to 5/3	5/ to 5/6
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	14/ to 16/	16/ to 17/
Bunkers do. ....	11/3 to 12/3	11/6 to 12/6
Small do. ....	7/9 to 8/6	8/ to 9/
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) .....	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

displayed unusual activity, the shipments amounting to 113,159 tons. There was a good attendance on 'Change this morning, but there was no material alteration to report in the general condition of the anthracite coal market. Swansea Valley large was being more freely offered for immediate delivery at slightly lower figures. Red Vein large, however, was in strong request. Machine-made nuts and cobbles barely held their position, and both rubbly culm and duff were easier. Beans showed a marked decline. In the steam coal market there was no alteration, and all descriptions were easily obtainable at slightly reduced prices.

IRON.

During the past week the iron and steel trades showed a slight improvement. Work, however, was slack at the Cwmfelin Steelworks, owing to the low supply of bars. The tin-plate trade still gave ground for apprehension, the percentage of unemployed showing an upward tendency. Manufacturers were endeavouring to restrict output owing to lack of orders. The weldless tube trade continued good, and there is every indication that this activity will last to the end of the year. Engineering shops were working at full pressure, and foundries were busy. The shipment of tin-plates were 74,931 boxes, receipts from works 103,435 boxes, and stocks in the dock warehouses and vans 350,224 boxes.

Llanelli.

COAL.

There is no further alteration to report in the coal market of the district, and though most collieries are able to put in full work, the trade still lacks firmness. This is chiefly due to the scarcity of tonnage, and the colliery people are being much handicapped by the difficulty in getting boats along. As soon as there is an improvement in this respect, the position will soon get firmer and prices should harden. The unfortunate strikes in various parts of the country is having a detrimental effect on the inland trade, and new business is very slow coming along. Most of the anthracite kinds are going well, especially the large sorts, and prices are being maintained. Steam and bituminous qualities show no improvement whatever, and the prospects are not at all promising.

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	20/6 to 22/6	20/6 to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large.....	17/6 to 18/6	17/6 to 18/6
Red Vein do. ....	13/6 to 14/6	13/6 to 14/6
Machine-made cobbles ...	19/6 to 20/6	19/6 to 20/6
German nuts .....	23/ to 24/	23/ to 24/
French do. ....	23/ to 24/6	23/ to 24/
Paris do. ....	24/ to 25/	23/ to 24/
Machine-made beans .....	20/ to 21/	20/ to 21/
Do peas.....	12/6 to 13/	12/6 to 13/6
Rubbly culm .....	7/ to 7/3	7/ to 7/3
Duff .....	5/6 to 7/	5/6 to 7/
Other sorts:—		
Large steam coal.....	17/ to 18/6	17/ to 18/
Through-and-through ...	11/6 to 12/	11/6 to 12/
Small .....	9/6 to 10/6	9/6 to 10/
Bituminous small coal ...	10/6 to 11/6	11/ to 12/

THE IRISH COAL TRADE.

THURSDAY, SEPTEMBER 18.

Dublin.

There has been no change for the better since last report, the situation being about as unpromising as it possibly can be. There is almost a deadlock in the coal and other traffic at this port, and the principal merchants are still unable to deliver the coal, as the places of the carters who are out have not yet been filled. All the firms affiliated to the Coal Merchants' Association are booking orders as usual at the prices which prevailed before the labour troubles commenced, and it is not anticipated that there will be any advance until the first week in October. The small coal factors—who practically have the trade of the city in their hands at the present time—continue to charge exorbitant prices for their coal, although the leading merchants assert there is nothing to warrant any increase except that they are in a position to deliver the coal, while some of their own customers have to carry out their own orders and convey the coal from the yards themselves. One effect of the strike is an unusually large demand for coke at the gas company's depot, consignments for the country districts being effected by means of the canals, as the boats can be loaded direct from the works. There has been a distinct falling-off in the import trade, the coaling vessels arriving during the past week amounting to 32, as compared with 47 the week previously, chiefly from Garston, Girvan, Maryport, Preston, Newport, Glasgow, Ayr, Partington and Point of Aire. The total quantity of coal discharged upon the quays was 15,200 tons. Quotations of the leading firms in the city are from 24s. to 27s. per ton for house coals; Orrell slack, 21s.; steam coals from 21s. to 22s. per ton. Irish coal in Queen's county from 5s. to 20s. per ton at the pit mouth.

Belfast.

Colder weather has given an impetus to the demand for house coal, and there is a disposition on the part of householders to stock their cellars for winter before the usual advance in prices takes place. Consumption of gas coal is rapidly on the increase, and there is a good business in other classes. All qualities of Scotch coal are in request, both locally and for the inland trade. There is no change in any of the quotations, although 6d. per ton more is being obtained for the better qualities this week. City prices are as follow:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Rates for steam coals, ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam, 18s. 6d. to 20s. per ton. Cargoes arriving during the week were chiefly from Irvine, Workington, Ayr, Garston, Newport, Cardiff, Ellesmere Port, Ardrossan, Maryport, Glasgow, Troon, Partington, Llanelli, Whitehaven, Britonferry, Girvan, West Bank and Lydney.



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(A Classified List appears on page 604.)

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— See Page 609. —

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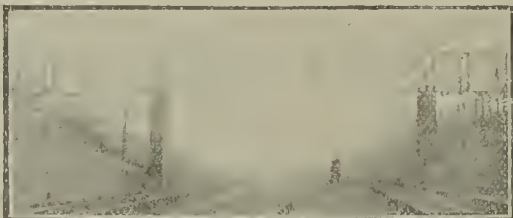
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or TUBING, cheap, 22 ft. diameter; condition equal to new.—Apply, **Box 5382, Colliery Guardian Office**, 30 & 31, FURNIVAL-STREET, HOLBORN, LONDON, E.C.



**Lattice Girder Bridge as per illustration,**  
96 ft. long, 7 ft. by 7 ft. inside, in three lengths, has been across L. & N.W. Railway, FOR SALE.—Apply, **LEAMORE BRICK CO.**, Walsall.

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43, CASTLE STREET, LIVERPOOL,

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**Wanted at once, a Generating Set about**  
60-kw., 220 volt, compound wound, 4/6 poles, D.C.; must be an up-to-date and in good working order.—Apply, **WM. HARRISON LTD.**, Brownhills Collieries, near Walsall.

**For Sale, Motors. —Two Enclosed "Tyne"**  
MOTORS, by Scott & Mountain, 500 volts 30 amps. 970 revs., with switch and fuse case, and Adams starter.—**A. UNDERWOOD**, 3, Queen-street, Cheapside.

**For Sale, Boiler, Portable Loco. Type,**  
25-h.p., by Robey, mounted on W.L. wheels, with fittings and mountings; two pairs of shafts, for 150 lb. steam.—**A. UNDERWOOD**, 3, Queen-street, Cheapside.

**For Sale, Steam Pump, Cameron, direct**  
acting, horizontal, 18 in. steam, 9 in. plunger, 24 in. stroke, by Evans, of Wolverhampton, 7 in. suction and delivery.—**A. UNDERWOOD**, 3, Queen-street, Cheapside.

**For Sale, Pump.—Cameron's Condensing**  
SINKING PUMP, double-acting, by Camerons of U.S.A., 18 in. steam, plunger 12 in., 18 in. stroke, 5 in. suction, 6 in. delivery, footvalve, steam and suction hose.—**A. UNDERWOOD**, 3, Queen-street, Cheapside.

**For Sale, Piping, Steel, 1,800 ft. of 6 in.**  
diameter, loose flanges, and bolts and nuts.—**A. UNDERWOOD**, 3, Queen-street, Cheapside.

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Tubes for Gas, Water, Steam, and Compressed Air.  
Electric Tramway Poles, Pit Props, High Pressure Steam Mains, &c.  
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PIT-TIMBER MERCHANTS,

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SUPPLY ALL KINDS OF COLLIERY TIMBER.

TELEGRAMS—"OSBECKS, NEWCASTLE-ON-TYNE."

\*\* For other Miscellaneous Advertisements see Last White Page.

### Forthcoming Annual Meetings.

Manchester Geological and Mining Society—	October 14, 1913
Institution of Mining Engineers—	Sept. 24, 25 & 26, 1913 (Manchester)
Midland Counties Institution of Engineers,	Sept. 1913
South Staffordshire and Warwickshire Institute of Mining Engineers ...	October 20, 1913

### The Colliery Guardian.

LONDON, FRIDAY, SEPTEMBER 19, 1913.

A heavy agenda has been issued in connection with the annual conference of the Miners' Federation of Great Britain at Scarborough, on October 7. The most important resolutions that have been tabled are those affecting the Mines Act, the Minimum Wage Act, and the basis wage.

The executive council of the South Wales Miners' Federation have decided to send a notice of a further amendment to the Minimum Wage rule under which workmen are required to work five-sixths of their time in order to qualify for the minimum rates of wages.

An examination for first and second class certificates of competency as manager and under-manager of mines will be held on November 25 next, at Edinburgh, Newcastle, Sheffield, Wigan, Cardiff, Birmingham. An examination for certificates of qualification as surveyor of mines will be held at the same places on November 26.

At a meeting of the executive of the Scottish Miners' Federation, Glasgow, on Wednesday, the secretary was instructed to put the whole matter regarding the Scottish miners' wages question before the Federation of Great Britain for consideration of that body. Arrangements have been made for a meeting of the Scottish Coal Trade Conciliation Board, to be held in Glasgow on October 3, to consider the application by the



coalmasters for a reduction in miners' wages to the extent of 18½ per cent. on the 1888 basis.

It is stated in South Wales commercial circles that Mr. D. A. Thomas has acquired colliery properties in West Virginia, one of the principal coalfields on the American continent, and that negotiations now proceeding are likely to lead to the purchase of collieries in Canada.

The allocation of a large portion of the Russian Railway contract to Westphalia, and the simultaneous diversion of other important contracts, have caused a heavy slump on the Newcastle coal market.

On Saturday, September 27, the Wages Committee of the Northumberland Miners' Association will meet the coalowners to discuss the proposed re-establishment of the Conciliation Board for the regulation of wages.

In accordance with the decision of the executive council of the South Wales Miners' Federation, another campaign against the employment of non-unionists is now proceeding.

The Yorkshire miners have decided to seek drastic amendments in the Minimum Wage Act on its expiry.

One of the most important discussions at the British Association meeting at Birmingham this week was one in the chemical section relating to the utilisation of British fuel. A full report appears in this issue.

The annual meeting of the Institution of Mining Engineers will be held in Manchester on Wednesday next.

It is stated that the coalowners intend to appeal against the King's Bench decision that the earnings of workmen for the purpose of the Minimum Wage Act cannot be averaged over more than one pay.

The new General Regulations duly came into force on Monday.

have become more prominent, especially as, before 1850, there was no obligation upon colliery owners to notify the occurrence of accidents of any description. Nevertheless, it is a fact that the bulk of the fatal and non-fatal accidents in mines in this country are due to less obtrusive causes. Amongst these is the danger attendant upon shots which have miss-fired, which still exacts its yearly toll of death and injury.

Legislation for the safety of the workers in mines may be said to have commenced with the Coal Mines Act of 1855, but the subject of miss-fires was not dealt with until the passing of the Coal Mines Regulation Act, 1872, which stated (section 51, General Rule 8 (e)) that "A charge of powder which has missed fire shall not be unrammed." At that time gunpowder was the only explosive used in mines.

The above Act was amended by the Coal Mines Regulation Act, 1887, and the substance of the general rule was expanded as follows:—

Sec. 49, General Rule 12 : (e) "No explosive shall be forcibly pressed into a hole of insufficient size, and when a hole has been charged, the explosive shall not be unrammed, and no hole shall be bored for a charge at a distance of less than 6 in. from any hole where the charge has missed fire."

It will be noticed that now the word "powder" has given place to the general term "explosive."

Besides the General Rules contained in the Act itself, special rules (commencing with the Act of 1855) were to be proposed for each individual mine, and clauses were usually introduced into the codes providing for more or less stringency as regards miss-fires. The subject was fully discussed by the Royal Commission on Mines, who took a considerable amount of evidence upon the dangers of shot-firing. In the course of their enquiry, figures were produced giving the number of accidents in connection with miss-fired shots in coalmines, metalliferous mines and quarries from 1902 to 1907 inclusive. Adding the corresponding figures for the following years up to and including 1912, there were during the whole period of 11 years 491 separate accidents due to miss-fired shots causing 72 deaths and injuring 659 persons.

These numbers in themselves may not appear very large, but when it is remembered that each death and injury probably caused misery and distress to a circle of relatives and dependants, the figures at once assume serious proportions. The Royal Commission were impressed by the importance of the matter. Following the report of the Commission, Parliament introduced into the legislation under the Coal Mines Act, 1911, elaborate regulations regarding miss-fires, but instead of including them in the Act itself, as in the Acts of 1872 and 1887, they were contained in an Explosives in Coal Mines Order dated May 21, 1912, made by the SECRETARY OF STATE in pursuance of the power conferred upon him by section 61 of the Act. This deviation from the method formerly adopted by Parliament has considerable elasticity, advantage of which has recently been taken by the Home Office in order to legalise the use in coalmines of the "P.P." safety shot firing appliance, which previously would have required the passing of a special Act of Parliament instead of merely making an Order.

The appliance in question has been already described in the *Colliery Guardian*,\* and its main feature is that it enables the detonator to be removed with safety after the shot has been charged. After careful consideration of the reports which were made to him on a trial of the apparatus under working conditions lasting

for a period of six months at Bishop Middleham Quarry, in the county of Durham, and of the results of experiments carried out with it at the Home Office testing station at Rotherham the SECRETARY OF STATE has decided to permit its use in coalmines, and to that end has inserted a special additional clause\* in the new Explosives in Coal Mines Order of September 1 and has granted an exemption\* in pursuance of this clause in the case of shots in which the "P.P." appliance is used.

The reports of H.M. inspectors of mines for the year 1912, just issued, give particulars regarding miss-fires in mines under the Coal Mines Act, but the figures can only be taken as rough approximations, as there was no statutory obligation to keep a record of missed shots before the new Mines Act came into force on July 1, 1912. The following is a summary:—

	Number of shots fired.	Number of miss-fires.
Electrically fired .....	19,509,657	22,538
Fuses .....	12,441,102	14,605
Squibs .....	10,579,665	7,248
Total .....	42,530,424	44,391

The proportion of miss-fires in the cases of shots fired electrically and with fuses was about 1½ per 1,000, and in the case of shots fired by squibs about ¾ of 1 per 1,000—the proportion for all shots being about 1 per 1,000.

These figures are exclusive of shots fired in quarries and in metalliferous mines, the total of which is considerable, and 44,391 miss-fired shots in coalmines only, during one year must be a very serious source of danger. If the new safety shot-firing appliance fulfils in practice the promise of its name—and there is little doubt but that it will do so—its introduction will mark the commencement of a new epoch in the annals of mining.

\* See p. 581.

#### Trade Summary.

The London coal trade for the past week has been very slow, especially in the house coal section. Prices are unaltered, but the business doing is very feeble. The recent advance in public prices has caused a good deal of friction, on account of the underselling. Steam coals are firm and smalls (which have been, until recently, a severe drug in the market) are looking up, on account of the industrial unrest. Collieries appear strongly placed and still have arrears to make up, but all wharves and depots are full and the delivery trade is exceptionally quiet.

The market at Newcastle is very quiet, pending the settlement of several big contracts now in negotiation.

The Durham coal trade remains firm and the forward enquiry is good.

Business has been fairly brisk in West Yorkshire, although there is now rather a glut in manufacturing coal. There is some pressure for house coal deliveries.

The Lancashire house coal trade is on the upward grade. Screened forge coal and bunker sorts are in lessened request. More slack is again going into circulation.

In South Yorkshire traffic difficulties are impeding business and the market is unsettled. The consumption of manufacturing coal is expanding.

There is a distinct improvement in the demand for Derbyshire house coal, and prices are hardening. There is also a stronger call for works fuel.

Troubles at the docks have interfered with coal shipments at Cardiff, but the collieries are very busy. Prices for prompt loading are rather lower, but the forward rates are hard. Small coals are unaltered. Monmouthshire coals are scarcely so strong.

Business in Scotland continues very active and prices are firm.

A local correspondent learns that the Earl of Ellesmere is about to have additional plant for the production of benzol and other oils put down at his already extensive battery at his Brackley Collieries, Middle Hulton, near Bolton.

The Swansea Higher Education (Technical) Sub-committee have under consideration a proposal of the Board of South Wales and Monmouthshire School of Mines, Treforest, on the advisability of co-ordinating one complete scheme of mining education throughout the South Wales and Monmouthshire coalfield. To enable this to be done the board propose that arrangements be made for mining courses to be given at two branch centres, one in Swansea and the other in Monmouthshire, to meet the needs of the whole district.

\* *Colliery Guardian*, July 12, 1912, p. 71; March 14, 1913, p. 540; and August 8, 1913, p. 279.

**Safety in Shot-firing.** In legislating for industrial safety, it is a sound principle to forbid dangerous practices when such restriction does not thereby entail undue hardship to the community—or, in other words, when the remedy would not prove worse than the disease. Such restriction must logically be of a tentative nature, based upon the circumstances existing at the time, and with a view to its modification or withdrawal in case it should no longer be needed in order to secure safety.

A safeguard once imposed is generally removed with considerable reluctance, and not without irrefutable evidence that it can be finally dispensed with, however plausible the plea may be. This attitude on the part of the Government is by no means unreasonable, for the responsibility is a great one, and delay possesses considerable attraction.

When, however, means have been devised for securing greater safety, which not only render the existing safeguards unnecessary, but actually incompatible with the new conditions, the circumstances are entirely different, and the situation must be faced with reasonable promptitude.

A situation of this description has recently arisen in the case of the method of dealing with missfires in coalmines.

The introduction into mines of the use of explosives, early in the nineteenth century, necessarily carried with it new sources of danger, the one which first attracted serious attention being the liability of blown-out shots to initiate explosions of firedamp—at that time the danger of coaldust explosions was not contemplated.

It is easy to understand that accidents of a catastrophic character, like explosions, should



## NEW PERMITTED EXPLOSIVES.

The new Explosives in Coal Mines Order, dated September 1, 1913, particulars of which appeared in last week's *Colliery Guardian*, certain new explosives are added to the Permitted List. The composition of these is as follows:—

*Ajax Powder* consists of the following mixture:—

	Parts by weight.	
	Not more than	Not less than
Nitro-glycerine .....	23.5	21.5
Nitro-cotton .....	1	0.5
Tri-nitro-toluol and di-nitro-toluol (together) .....	4	3
Perchlorate of potassium.....	38.5	36.5
Woodmeal (dried at 100 degs. Cent.) ...	11.5	9.5
Oxalate of ammonium .....	26	24
Moisture.....	1.5	—

The explosive is to be used only when contained in a non-waterproofed wrapper of parchment paper; with a detonator or electric detonator of not less strength than that known as No. 6; the greatest weight of the explosive which may be used in any one shothole shall not exceed 12 oz.; and the explosive shall have been made at the works of Nobel's Explosives Company Limited at Ardeer, in the county of Ayr.

*Britonite No. 2* consists of the following mixture:—

	Parts by weight.	
	Not more than	Not less than
Nitroglycerine .....	25	23
Nitrate of potassium.....	32	29
Woodmeal (dried at 100 degs. Cent.) ...	36.5	33.5
Oxalate of ammonium .....	9	7
Moisture.....	5	1.5

The explosive is to be used only when contained in a non-waterproofed wrapper of parchment paper; with not less than a No. 6 detonator; the greatest weight of the explosive which may be used in any one shothole shall not exceed 24 oz.\*; and the explosive shall have been made at the works of the British Explosive Syndicate Limited, at Pitsea, Essex.

*Kynarkite* consists of the following mixture:—

	Parts by weight.	
	Not more than	Not less than
Nitro-glycerine.....	26	24
Nitrate of potassium.....	29	27
Nitrate of barium .....	4	2
Woodmeal (dried at 100 degs. Cent.) ...	36.5	33.5
Oxalate of ammonium .....	6	4
Moisture.....	5.5	2

The explosive is to be used only when contained in a non-waterproofed wrapper of parchment paper; with not less than a No. 6 detonator; the greatest weight of the explosive which may be used in any one shothole shall not exceed 20 oz.; and the explosive shall have been made at the works of Messrs. Kynoch-Arklow Limited, at Ferrybank, Arklow, Wicklow.

*Tutol No. 2* consists of the following mixture:—

	Parts by weight.	
	Not more than	Not less than
Nitro-glycerine .....	26	24
Nitrate of sodium .....	30	28
Chloride of sodium .....	10.5	8.5
Woodmeal (dried at 100 degs. Cent.) ...	34	31
Bicarbonate of sodium .....	0.5	—
Moisture.....	5	2.5

The explosive is to be used only when contained in a non-waterproofed wrapper of parchment paper; with not less than a No. 6 detonator; the greatest weight of the explosive which may be used in any one shothole shall not exceed 22 oz.\*; and the explosive shall have been made at the works of the Westphalia Anhalt Explosive Company at Haltern and Reinsdorf, Germany.

The swing to the ballistic pendulum given by 4 oz. of each of the foregoing explosives (in the First Schedule), compared with a swing of 3.27 in. given by 4 oz. of gelignite, containing 60 per cent. of nitro-glycerine, is as follows:—*Ajax Powder*, 2.69 in.; *Britonite No. 2*, 2.26 in.; *Kynarkite*, 2.21 in.; *Tutol No. 2*, 2.11 in.

## Non-Detonating Explosives.†

*Bobbinite* (first definition) consists of the following mixture:—

	Parts by weight.	
	Not more than	Not less than
Nitrate of potassium.....	65	62
Charcoal .....	19.5	17
Sulphur .....	2.5	1.5
Sulphate of ammonium .....	17	13
Sulphate of copper .....	17	13
Moisture.....	2.5	—

the sulphate of ammonium not to exceed 11 per cent. by weight of the finished explosive.

\* The greatest weight which could be loaded into the gun was submitted for the test.

† The second schedule for a period of five years, ending on January 1, 1914, and to be used only for the purpose of bringing down the coal in certain classes of mines (see 11th Schedule).

*Bobbinite* (second definition) consists of the following mixture:—

	Parts by weight.	
	Not more than	Not less than
Nitrate of potassium.....	66	63
Charcoal .....	20.5	18.5
Sulphur .....	2.5	1.5
Rice or maize starch .....	9	7
Paraffin wax .....	3.5	2.5
Moisture.....	3	—

The explosive is to be used only when (a) each pellet is thoroughly coated with paraffin wax of a melting point of not less than 120 degs. Fahr., or (b) contained in a wrapper of brown paper similar to those tested; have been compressed into a pellet of a density not exceeding (a) 1.42 (first definition), (b) 1.48 (second definition); with an electric fuse containing 5 grains of gunpowder or with other means equally efficient in igniting the explosive, but not with a detonator or electric detonator; and the explosive shall have been made at the Home, Marsh or Oare works of Messrs. Curtis's and Harvey Limited, at Faversham, Kent, or at their works at Roslin, Edinburgh county, or at their works at Glyn Neath, Glamorgan.

## INDUSTRIAL AGREEMENTS IN THE COAL TRADE.

(Continued from page 529).

## Northumberland.

Messrs. T. Taylor and T. E. Jobling (who were accompanied by Mr. Reginald Guthrie) gave evidence on January 21, 1913, in regard to agreements in the Northumberland coal trade. Mr. Taylor said he was acting chairman of the Northumberland Coalowners' Association, which consisted of 28 firms and companies; the output of the association in 1911 was 13,626,295 tons, out of 14,682,427 tons for the whole county, and the number employed by members was 53,829 out of 58,295, giving percentages of 93 and 92 per cent. respectively. They had not the slightest difficulty with the remaining 7 and 8 per cent.; they were mainly small landsale collieries, and nearly always followed the lead of the association.

Witness here put in copies of the various wages agreements. He said the present association, which was formerly known as the Steam Collieries Defence Association, commenced negotiations with the men in 1872, and relations had continued up to the present time. Various methods of settling the county rates of wages had been in operation, including direct negotiation between the associations, arbitration, sliding scales, and conciliation boards. Of the last named there had been two, the first formed in May 1894, and terminating in December 1896, whilst the second board was established in December 1899, and terminated in August 1911. At present there was no board. The operations of both boards were confined to determining the amount of advances and reductions in the county rates of wages, other matters affecting the general hours and conditions of labour being dealt with through direct negotiations between the associations concerned. There were various local matters upon which agreements had been made. The joint committee was a body constituted for the purpose of dealing with disputes arising at individual collieries, and not affecting the county generally. Since the stoppage in the previous year, the committee had been in abeyance, but it was now again in existence. The committee was constituted on almost exactly similar lines as that existing in Durham. The Conciliation Board consisted of 15 members appointed by each side, the meetings were held quarterly and were presided over by an independent chairman, who made an award in the event of the parties being unable to agree. It was thought, in the first instance, better that the Board should meet every quarter rather than await a request for an alteration in wages, as that arrangement gave rise to much less unrest. There was a quarterly ascertainment of selling prices.

Witness said their general experience was that these large agreements had been almost invariably carried out and non-compliance had been discouraged by the associations; strike pay had been withheld, and the men's union had reasoned with the men and in every possible way had tried to make peace. In 1910, however, when the Eight Hours Act came into operation, they had a very grave departure from the principle. On that occasion the Miners' Association endeavoured to induce their members to return to work under the conditions of the agreement that had been arrived at, but after a time, while continuing to urge a resumption of work, agreed to pay strike pay to those who were refusing to carry out the terms of the agreement. There had been many instances where the workmen at individual collieries had declined to act in accordance

with the agreements and arrangements, either local or general, and had struck work. The Owners' Association was of opinion that unions or associations of workmen and employers entering into agreements or bound by awards resulting from the operation of such agreements should be made pecuniarily responsible for damages caused by them or their members requiring conditions of employment different from those provided by the agreements or awards. Although difficult, he thought some scheme could be devised to carry out such a principle. The association did not suggest that non-members should be required to observe the conditions laid down by the association, which, owing to the different circumstances prevailing at non-associated collieries, might not be applicable to them.

Witness said that there was no separate method of referring to an outsider for his decision any question other than wages, but they had never found any difficulty in settling such questions by discussion. As to wages, he thought that in recent years they had had more frequently to take the decision of the chairman.

As to the process of recovering compensation, witness said in the majority of cases there would be no legal question; the almost universal case was that in which the men left work without notice, and that was clearly illegal. Any disputed case, he thought, might be left to an independent chairman of high position. That, so far as it went, would be compulsory arbitration, but the dispute would have to arise with regard to a voluntary agreement. As to the amount of compensation, each case would have to be decided on its merits. It should have a certain relation to the loss sustained; it certainly should not be a nominal penalty, as their principal hope was that such a clause would have a great effect in preventing stoppages and promoting discipline. As to how the union should penalise the offenders, he preferred to leave that to them. Mr. Taylor was asked if he would refuse to employ men who, for disciplinary purposes, had been expelled from the union. He said he would not like to refuse employment to a man. If a man asked for employment now, they did not enquire whether he was a member of the union or not, and, in fact, on one or two occasions they had resisted attempts to force men into the union. Speaking for himself, he was very strongly in favour of a strong union amongst the men. He should have great hope that the union would be able to deal with their men without expelling them.

Witness mentioned that the enginemens and other smaller classes of labour were separately organised in Northumberland, and said he personally would just as soon see them all together as in Durham, but he did not go so far as to say that individual unions should not be allowed to make separate arrangements.

As to the responsibility of the employers, witness said they had never yet had an instance of anyone who had refused to be guided by the interpretation of the association of the agreements into which he had entered, but they had no accumulated funds which could be drawn upon; they would be prepared, however, to revise their rules so as to enable them to pay for a member who broke an agreement, if such a method as that suggested became law or were agreed to.

Catechised as to the four methods of adjusting wages that had been tried in Northumberland, witness said arbitration was not persevered with for long; by arbitration they meant when there was a dispute on a particular occasion some one was called specially to settle that dispute; it was not a continuous method, and it was abandoned in favour of the sliding scale.

Witness said that although the discontinuance of the Conciliation Board had not affected their friendly relations, he would much prefer to have it in existence; it was a question of conditions, not of principle. He would not object to matters in dispute being referred, during the non-existence of the Board, to the Industrial Council or any other tribunal, so long as neither party was forced to the reference. Speaking for the owners, he thought they would probably prefer an arbitration meeting with one man sitting as chairman; he thought the men would also prefer such a course. As to the re-establishment of the Conciliation Board, he thought they would prefer not to have advice or assistance from outside for the present.

In answer to further questions, witness said that in one case at Wallsend there was a certain number of men expelled from the union because they would not carry out the requests of the union; but he had not the facts of the case exactly in mind; the colliery was on strike, and when a colliery was on strike they never employed the strikers at other collieries. Afterwards they would be absorbed, the men being readmitted to the union.

Witness said that personally he should not be inclined to favour a clause providing for the statutory enforcement of agreements.



Mr. Jobling said he agreed entirely with Mr. Taylor's evidence; he held a strong view that they should not coerce men either into the union or out of the union. He should always hesitate to refuse employment to a man.

(To be continued.)

## CONTINENTAL MINING NOTES.

### Belgium.

A company, with a capital of 1,700,000 fr., has been formed in Brussels to work collieries at Fenyes and Golecz, in Hungary. The directors are MM. Gustav Kimpian, chief of the communal service of forests at Terego, Hungary; Edouard Gombos and Berenez Techlar, both of Buda-Pesth; and Dr. Stephan von Brazza, Under-Secretary of State for Finances at Buda-Pesth.

Exports and imports during the first seven months of the year have been as follows:—

	Imports.		Exports.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	4,621,004	5,218,869	2,877,604	2,885,460
Coke .....	530,775	689,902	551,414	619,776
Briquettes ..	247,119	274,135	379,947	348,697

From Great Britain 1,398,403 tons of coal were imported, as against 926,368 tons in the corresponding period of last year; and from Germany 3,006,086 tons of coal, 617,582 tons of coke, and 267,822 tons of briquettes, as against 2,659,650 tons of coal, 481,535 tons of coke, and 227,608 tons of briquettes last year.

### France.

Exports and imports in the first seven months of this year were as under:—

	Imports.		Exports.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	8,713,200	10,777,100	1,206,397	779,428
Coke .....	1,550,900	1,911,100	104,307	132,736
Briquettes ..	632,300	633,900	121,192	120,299

From Great Britain there were imported 6,623,900 tons of coal, as against 4,766,200 tons; from Germany 1,913,400 tons of coal, 1,585,500 tons of coke, and 118,500 tons of briquettes, as against 1,874,600 tons of coal, 1,294,400 tons of coke, and 123,800 tons of briquettes; and from Belgium 2,062,400 tons of coal, 278,000 tons of coke, and 373,000 tons of briquettes, as against 1,929,000 tons of coal, 223,200 tons of coke, and 382,000 tons of briquettes in the same period of last year.

### Germany.

At the meeting of the Rhenish-Westphalian Syndicate, on the 11th inst., it was decided that the existing basis prices of blastfurnace coke and coking coals should be maintained until the end of the year, when the matter will again be considered. The "participation" during October remains 95 per cent. for coal, and 85 per cent. for briquettes, whilst that for coke is lowered from 75 to 65 per cent.

Output Returns for July.—The following shows the returns of output in July and the seven months ended therewith:—

	July.		January-July.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	15,779,105	17,198,013	100,485,485	110,776,039
Lignite .....	6,645,181	7,508,542	46,075,323	49,408,700
Coke .....	2,412,316	2,727,079	16,166,998	18,671,317
Coal briquettes ..	436,765	524,140	2,975,528	3,403,124
Lignite do ..	1,611,677	1,905,921	10,735,368	12,209,736

The exports and imports in the seven months may be summarised as follows (included in the total being the equivalent in coke and briquettes):—

	Coal. Tons.	Lignite. Tons.
Imports, 1912.....	5,845,312	4,336,453
"    1913.....	6,545,174	4,259,920
Exports, 1912.....	23,024,668	677,295
"    1913.....	25,776,595	1,129,685
Consumption, 1912 ..	83,306,129	49,734,481
"    1913 ..	91,544,618	52,538,935

Coal Market in Upper Silesia.—The traffic returns for August show a total of 315,350 wagons, or 14,259 more than for the corresponding month of last year, an increase which affords an accurate idea of the favourable condition of the market. In fact, delivery specifications are so large that the pits cannot give prompt delivery in all cases, and arrears are common. Since the busy season is now commencing, there is no fear of business slackening, although no doubt many large stocks are being laid in in anticipation of the scarcity of wagons later on. The Convention has decided to raise the price of large coal by 50 pfennigs per ton from December 1 next, and this example has been followed by the State mines, which at first declined to entertain this proposition. The business in the various kinds of fuel remains as before, coking coals being in special demand, so that the pits cannot supply the cokeries fast enough; and, owing to the scarcity of skilled labour, the output cannot be increased in any grade to a sufficient extent to enable stocks to be formed. The export trade maintains its high level, the market conditions in Austria-Hungary being highly favourable, whilst the demands of Russian Poland cannot be satisfied. The remoter districts and the capital also continue to be very receptive. The coke situation is likewise flourishing, ironmasters com-

plaining that the deliveries of blast-furnace coke are insufficient for their needs. Broken coke is receiving increased attention.

Ruhr Coal Market.—The conditions as regards distribution may still be considered fairly satisfactory. Consumers appear to be hurrying to cover their requirements in good time, fearing delay in getting delivery when the customary autumn scarcity of railway wagons sets in. Consequently, the volume of traffic shows very little signs of falling off. The Syndicate has decided to make no change in the output percentage for coal, coke and briquettes during October. Owing to the favourable state of the river, it has been possible to send larger consignments to South Germany, and fill almost the whole of the available storage space there. This will have an unfavourable effect on the winter trade, since there will be no need to fear any scarcity of fuel. In industrial coals the decline in the demand is only slight up to the present, whilst on the other hand there is naturally more interest being displayed in house and gas coals. Coking coals, however, are going off badly, and the coke trade is declining, broken coke being somewhat of a drug, and even blastfurnace and foundry cokes becoming slacker. The export market helps to take up the surplus production, Holland, Belgium, and France maintaining, and even increasing, their purchases, whilst large shipments are being made to the North Sea districts. It is expected that the Syndicate will shortly reduce the price of coke by 1 mark per ton.

Coal Market in South Germany.—The amount of fuel sent out from the transshipment ports is generally satisfactory, though it cannot be denied that business is slackening in many industrial branches and one consumer after another is slightly reducing delivery specifications. The house coal trade is comparatively quiet, the lateness of the harvest and the continuance of warm weather combining to delay the commencement of autumn business. Large nuts are not going off so freely as usual at this time of year, and the same applies to the large grades of broken coke, No. III, being the only one in which there is any difficulty of supplying the demand. Lignite briquettes are having to be put into stock. Gas coke, however, has been scarce of late.

Colliery Result in 1911-12.—The following official statistics relate to the financial results of coal mining undertakings in Germany in 1911-12:—

	Iron and steel works.	Coal mines.	Lignite mines.	Combined mining and metallurgical concerns.
Number of companies ..	50	37	51	36
Share capital (1,000 m.)...	299,817	391,446	246,385	1,143,989
Reserves (1,000 m.) .....	87,785	95,878	52,842	232,013
Companies returning profits.....	43	32	43	32
Total profits (1,000 m.) ..	48,772	43,431	30,305	163,783
Companies returning losses .....	5	5	7	3
Total losses (1,000 m.).....	2,487	4,071	2,562	7,289
Ratio of profits to total capital (including reserves), per cent. ....	11.78	8.26	8.74	11.22
Average dividend, per cent. ....	10.47	9.55	9.88	10.91

Taking the collieries alone, nine companies, representing a total share capital of 85,869,000 marks, paid no dividend; one (1,500,000 marks) between 1 and 2 per cent.; one (2,661,000 marks) between 2 and 3 per cent.; one (744,000 fr.) between 3 and 4 per cent.; one (14,769,000 marks) between 4 and 5 per cent.; one (2,000,000 marks) between 5 and 6 per cent.; three (7,818,000 marks) between 6 and 7 per cent.; two (145,000,000 marks) between 8 and 9 per cent.; two (22,054,000 marks) between 9 and 10 per cent.; one (15,323,000 marks) between 10 and 12 per cent.; four (32,100,000 marks) between 12 and 15 per cent.; four (44,157,000 marks) between 15 and 20 per cent.; one (4,509,000 marks) between 20 and 25 per cent.; two (9,000,000 marks) between 25 and 50 per cent.; and four (3,749,000 marks) over 50 per cent.

## LABOUR AND WAGES.

### North of England.

A notice has been posted at Bertha Colliery, near Maryport, stating that the pit will be idle on Saturdays until further notice, and that pay would be given out on Friday. This action has been taken owing to the continual loss of time by many of the men. It has become habitual for about 70 or 80 underground workers to take Monday as a rest day.

### Federated Area.

The attitude of the Yorkshire Miners' Association towards the Minimum Wage Act was discussed at a meeting of the council at Barnsley on the 15th inst., Mr. Herbert Smith presiding. Mr. J. Wadsworth, M.P., at the close of the meeting, said it had been decided to seek the renewal of the Act, with drastic amendments. Grievances at Hoyland Silkstone Colliery were the subject of discussion, the question of the men tendering notices being raised, and it was decided to adjourn the matter until the next meeting of the executive council. It was decided, in regard to an application by Cleckheaton No. 1 branch, for permission to take a ballot on the question of ceasing work in sympathy with No. 2 branch, that it should go before the district for consideration, the result to be reported to the next executive meeting. It was stated that No. 2 branch had already obtained permission to take a ballot. On the question of the reinstatement of a member who was on the victim

fund, the men at Micklefield Colliery, Leeds, were granted permission to take a ballot to decide if notices should be handed in. In the case of Brooks's Pit, Netherton, the branch was given permission to take a ballot on the question of ceasing work, in order to bring about a settlement of a dispute.

A conference between the Warwickshire Coal Owners and the officials of the Warwickshire Miners' Association was held on the 11th inst. at the Imperial Hotel, Birmingham, under the presidency of Mr. F. A. Morris, to discuss the question of fixing a minimum wage for the winding enginemmen employed in the Warwickshire coalfield. In February 1910 a minimum rate was fixed for the eight hours work. Some men worked in double shifts and some in single shifts, and whilst those on the eight-hour principle thus had a minimum wage guaranteed of 6s. 6d., those on the twelve-hour shifts merely had the time reduced to ten hours without any reduction in wages. Now the hours for winders having been reduced to eight hours all round under the new Mines Act, the question arose as to whether there should not be a reduction in the rate of wages, which with the three recent advances of 5 per cent. had now been brought up to 7s. 3d. for the eight hours. The employers offered 7s. to all winding enginemmen who came under the new Mines Act, but eventually agreed to make the rate 7s. 3d. all round at all pits in the Warwickshire coalfield.

It was announced on Monday that the number of non-unionists at Messrs. R. Evans and Co.'s collieries in the Haydock and Golborne districts near St. Helens had been reduced to half-a-dozen, and there was every likelihood of the strike which has been in progress there for the last five weeks coming to an end this week, as the non-unionists were expected to come into the fold.

It was reported at the beginning of this week that trouble is again threatened at Messrs. A. Knowles and Sons' extensive collieries in the Pendleton and Pendlebury districts in south east Lancashire over the non-unionist question, a number of the men who recently joined the union having seceded.

For the purpose of considering the non-union and surfacemen's wages questions, a meeting of men employed at the Sutton (Brierley Hill) Colliery was held at Sutton-in-Ashfield, on Thursday evening, September 11, when an address was given by Mr. C. Bunfield, secretary of the Notts Miners' Association. He stated that a deputation had waited upon the management to consider the non-union question. One of the difficulties they had to contend with was with the men who came from other collieries and often failed to produce proof of their transfer. Where men could not do this, they would have to be treated as new members, for their association was determined that every man employed in and about a colliery should be a member. On the non-unionist question, a resolution in favour of handing in notices to obtain a satisfactory settlement was carried. With regard to surfacemen's wages, it was decided that application be made to the council of the association to take action.

The Leighswood pit of the Aldridge Colliery Company stopped last week, owing to the men's refusal to work with a certain fireman.

### Scotland.

Before the justices at Hamilton last week, John Brennan, drawer, was charged with having on August 4, at No. 2 Pit, Knowenoblehill Colliery, Cleland, knowingly and wilfully sent to the surface two hutches, the one filled with  $\frac{1}{2}$  cwt. of coal and 9 cwt. of dirt, and the other with  $2\frac{1}{2}$  cwt. of coal and  $7\frac{1}{2}$  cwt. of dirt, pretending that these hutches contained only coal, with the fraudulent intention of obtaining payment for the contents as if they were wholly coal, thus attempting to defraud the company of 2s. 9d., being the amount payable in respect of the said hutches had they been filled with coal. A similar charge was preferred against Martin Rae Brennan, but he failed to appear. The justices convicted and fined accused £5 or 30 days.

A meeting of the Scottish Coal Trade Conciliation Board will be held on October 3 in the North British Station Hotel, Glasgow, for the purpose of considering an application made recently by the coalowners for a reduction of the wages of miners to the extent of 18 $\frac{1}{2}$  per cent. on the basis of rates prevailing in 1888.

At a meeting of the executive of the Scottish Miners at Glasgow, on Wednesday, it was decided to put the whole question of Scottish miners' claims, including the employers' claim for a reduction of 18 $\frac{1}{2}$  per cent., before the Miners' Federation of Great Britain. The secretary reported with regard to the application for an advance of 15 per cent. on surface workers' wages that the employers had replied that they were of opinion the question did not come within the purview of the Conciliation Board.

### Miners' Federation of Great Britain.

The annual conference of the Miners' Federation of Great Britain will be held at Scarborough on October 7 and succeeding days. Among the most prominent, and, perhaps, the most important, items on the agenda are various proposals relative to the minimum wage. The Lancashire and Cheshire Federation propose that at the termination of the present Minimum Wage Act steps be taken to secure its continuance in an amended form. The Midland Federation, on the other hand, put forward the view that the Act has tended to the reduction of standard rates in some places to the minimum rates, and, therefore, propose that definite price-lists should be arranged in all the districts to secure "definite payments for all difficulties arising in working places," and that the executive be authorised to take the necessary steps to ensure this being accomplished. The Scottish Federation have a resolution expressing the opinion that a minimum wage of not less than 7s. per day should be secured for all miners, and that the Federation pledge itself to render the districts every assistance to secure this. The South Wales Federation propose that the conference shall take such action as will secure an



...late amendment of the Minimum Wage Act in following respects:—

"(a) That the provisions of the Act shall apply to all surface workmen employed in the mining industry.

"(b) That the rules in the district awards shall not be applicable to day wagemen.

"(c) That the minimum for colliers and all other pieceworkers shall be ascertained with reference to one week's earnings, entirely disregarding the earnings of all previous and subsequent weeks.

"(d) That in all disputed cases the onus of proof shall be on the employers.

"(e) That the minimum for each grade shall be raised by 6d. per day."

Proposals to secure standards or bases are put forward by the Lancashire and Cheshire Federation to ensure that all future advances should be calculated on a standard of 50 per cent. increase over the present basis. The resolution from the South Wales Federation on the same matter is:—

"That steps be taken to create a new standard rate of wages in connection with the various Conciliation Boards in place of the present obsolete standards of 1877-1879, &c., by merging into the new standard all bonuses and percentages not less than the existing percentage recognised by the present Boards."

The South Wales Federation have three important resolutions on the agenda. The first is the following:—"That the executive council of the Miners' Federation of Great Britain be requested to approach the executive committee of other big trade unions with a view to co-operative action in support of each other's demands." The next is, "That the conference take action to secure the application of the Eight Hours Act to all surface-workers employed in the mining industry"; and the third, that action be taken "to secure that the week of workmen employed by night be considered a week of five shifts, and that the present wages be apportioned thereto."

The Scottish Federation have again on the agenda a resolution recommending five days' work a week, and "that the executive devise means of putting the matter before the men in the several districts of the Federation." It will be remembered that on a ballot being taken some time ago a majority of the men voted in the negative; and what is now proposed is that propaganda work should be instituted with the view of altering the men's views on the subject.

Embodied with the several other resolutions on the agenda are proposals for the amendment of the Workmen's Compensation Act and the Coal Mines Act. In regard to the former, the Midland Federation propose that during incapacity consequent upon an accident a workman should be entitled to the whole of his wages.

#### Iron, Steel, and Engineering Trades.

At a conference between the shipyard employers and the boilermakers' representatives in Edinburgh, on the 10th inst., an arrangement was arrived at with regard to the question of broken and lost time as it affects all the Federated shipbuilding area, and the threatened lock-out has thus been averted.

**Lease of Whitehaven Collieries.**—Our West Cumberland correspondent writes.—For a long time there have been rumours, more or less founded upon the approaching termination of the present lease and upon the dwindling partnership of the present company, as to the future of the Whitehaven Collieries. They were leased in 1888 by the Whitehaven Colliery Company, consisting of the late Sir James Bain, his two sons, Mr. J. D. and J. R. Bain, and Mr. J. S. Simpson, and latterly the late Mr. James was understood to be a partner. In ordinary course the lease would have run until August 1919. But one after another the partners have dropped off through death, and now there is only one left—Mr. J. D. Bain. No doubt in consequence of this precarious state of affairs, negotiations have been going on for some time for a new lease by a new company or syndicate. It has been common report that there were two possibilities—either that the Whitehaven Collieries would be taken by the Workington Iron and Steel Company, or by some of the principal promoters of the combine; or that they would be taken by a new syndicate. It is now stated that the Whitehaven Colliery will be leased by a local syndicate, which will include: Col. J. A. Jackson, Sella Park, Calderbridge; Mr. Myles Kennedy, Stone Cross, Ulverston; Mr. T. F. Butler, Barrow-in-Furness; Mr. H. W. Walker, Lingwell, Seascale; Mr. A. Walker, Oak Lea, Whitehaven; and Mr. R. R. Blair, the general manager. There are said to be others whose names are not disclosed. Since the collieries were leased very great improvements have been effected, and the output of the three pits—William, Wellington, and Croft (or Ladysmith, as the latest shaft there has been called)—has been increased from 250,000 tons a year to 500,000 tons. In one respect the old company failed to take advantage of the developments of science—that is, in regard to coking their small coal by the latest methods, so as to secure all the by-products. They did put up coke ovens to deal with part of the output, but they stuck to an inadequate and old-fashioned plant. The new syndicate have a means of great and rich development in this direction. An installation of by-product coke ovens is proposed to be erected at Ladysmith Pit, which will be the largest plant that has at once been put down in Cumberland. The new ovens are, it is stated, intended to consume all available coking coal from the collieries, and this will be a development of considerable importance to the iron industry of West Cumberland, inasmuch as it will practically make the whole district self-contained as regards coke supply. Other contemplated developments include the sinking of a new shaft at Little Waite, some distance south of Wellington pit, the object of this being to facilitate operations in the Saltown district of the colliery. Upwards of 2,000 hands are employed at the colliery, and it is expected that as a result of the proposed developments this number will be materially increased. This in turn will complicate the housing arrangements at Whitehaven.

#### THE LONDON COAL TRADE.

THURSDAY, SEPTEMBER 18.

The London coal trade during the week has again been very slow. The delivery orders are disappointing, and the dealers' trade is weak. The attendance on the Exchange has been fairly good, and the holiday makers are gradually returning, so that business seems to have a little more life and vitality about it, but orders are still difficult to obtain, and prices uncertain. The bulk of the sales are with the factors still, who are in many cases underselling the collieries. The retail trade is very quiet. Manufacturing qualities are steady, but smalls have been left severely alone. The industrial difficulties led to a little enquiry for this latter quality on Wednesday, but no change in prices were recorded. All pit prices are very firm, and the colliery representatives affirm that the contract engagements and the arrears due to customers from last month will satisfactorily absorb the output for the present. October begins the first of the winter months, when prices, as a rule, advance, and all contracts based upon a summer and winter price begin the advanced prices. The question of the advance in public prices arranged last week has not been allowed to go unchallenged, for during the current week some of the merchants have been severely exercised in their minds as to the wisdom of the advance just now, and in more than one case have lowered the prices to the old level of the summer rates. This has been brought about by the fact that in one case the prices were unaltered at some of the depots, and the fear of losing trade has led to the reduction. The bulk of the merchants criticise this as a most unfortunate policy. The warm weather has undoubtedly had something to do with the proceeding, and its effect on the market generally has lessened the buying. The depots and wharves are all fairly supplied with stocks on the ground, and the further development in this respect is looked upon as impossible, particularly whilst the depot trade is so quiet. The seaborne quotations remain stationary at 21s. 6d. for best Wallsend and 20s. 6d. for seconds, and it is singular that these prices, although merely nominal for many months during the year, have practically been the same for the whole twelve months. The quotations are again returned for the week as above, but Durham coals are not offering and only small parcels of Yorkshire coal. A good enquiry for these coals is reported. Thirty-three vessels have arrived in the Thames for Monday's market and eight for Wednesday, all under contract. For the third year in succession a good deal of industrial unrest is experienced in the autumn. The increasing uncertainty on account of the labour troubles both at Liverpool and Birmingham has lately had a telling effect upon the London traders, and is watched with a very keen interest by all the principal merchants. The present difficulty has only affected the demand for smalls, but should it extend all qualities will be urgently wanted. The difficulty of obtaining suitable steamers for the loading up of the cargoes, and the general interference with the shipping trade, will soon make tonnage scarce. There are fears that the shipments will be restricted if the port labourers are refusing to work, but up to the present the tonnage has been well maintained.

#### Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/	13/6
Do. nuts .....	12/	11/6
Birley cube Silkstone .....	12/6	12/6
Do. branch coal .....	16/	16/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	13/6	13/6
West Riding Silkstone .....	13/	13/
Kiveton Park Hazel .....	13/	14/6
Do. cobbles .....	13/	14/6
Do. nuts .....	12/	14/
Do. hard steam .....	12/	13/
New Sharlston Wallsend .....	15/	15/
Wharfedale Silkstone coal .....	14/6	13/6
Do. Flockton Main .....	15/6	13/6
Do. Athersley house coal .....	12/	13/
Newton Chambers best Silkstone .....	17/	17/
Do. Grange best Silkstone .....	15/6	15/6
Do. Hesley Silkstone .....	14/	14/
Do. Rockingham selected .....	14/	14/
Do. Rockingham Silkstone .....	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best .....	12/6	12/6
Do. large nuts .....	12/3	12/3
Do. small nuts .....	10/	10/
Do. kitchen coal .....	10/6	10/6
West Hallam Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/3	12/3
Do. London brights .....	11/	11/
Do. bright nuts .....	11/	11/
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Shipley do. brights .....	13/	13/
Do. do. nuts .....	12/6	12/6
Mapperley brights .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Cossall Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Trowell Moor brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Grassmoor Main coal .....	13/	13/
Do. Tupton .....	11/6	11/6
Do. do. nuts .....	11/6	11/6

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal .....	13/	13/
Do. do. cubes .....	13/	13/
Do. special Derbys .....	12/	12/
Do. house coal .....	11/6	11/6
Pilsley best blackshale .....	13/	13/
Do. deep house coal .....	11/6	11/6
Do. hard screened cobbles .....	11/	11/
Hardwick best Silkstone .....	13/	13/
Do. Cavendish brights .....	12/6	12/6
Do. cubes .....	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/6	12/6
Do. small hards .....	12/6	12/6
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	13/
Do. cobbles .....	13/	13/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/6	14/6
Bestwood hard steam coal .....	13/	13/
Do. bright cobbles .....	11/9	11/9
Hucknall Torkard main hards .....	12/9	12/9
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. .....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	10/9	10/9
Do. loco Two Yard hards .....	14/6	14/6
Do. Ryder nuts .....	11/3	11/3
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	10/9	10/9
Haunchwood steam .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	10/9	10/9
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	10/9	10/9
Exhall Ell coal spires .....	12/9	12/6
Do. brights .....	11/6	11/6
Do. large steam coal .....	10/9	10/9
Do. best screened cobbles .....	11/	11/
Do. large nuts .....	11/	11/
<b>Leicestershire.</b>		
Snibston steam .....	10/	10/
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	18/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ib stock kibbles .....	9/9	12/
Do. large nuts .....	9/6	11/6
Do. bakers' nuts .....	9/	11/
Do. Main nuts .....	9/6	10/6
Do. hards .....	9/3	10/6
Granville New Pit cobbles .....	11/	11/
Do. Old Pit cobbles .....	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/	13/
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	13/
Silverdale best .....	14/	13/
Do. cobbles .....	13/	12/9
Apedale best .....	13/	13/
Do. seconds .....	12/9	12/9
Podmore Hall best .....	13/	13/
Do. seconds .....	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London .....		
Do. brights .....	11/	11/
Do. shallow one way .....	11/	11/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	10/9	10/9
Coppice deep coal .....	13/6	13/
Do. cobbles .....	13/	12/6
Do. one way .....	11/	10/6
Do. shallow coal .....	13/	13/
Cannock Chase deep main .....	16/	17/
Do. Deep kitchen cobbles .....	11/6	12/
Do. best shallow main .....	13/	14/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/9	11/6

#### From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, September 12.—The seaborne house coal market continued quiet to-day; only small quantities of Yorkshire seconds in craft disposed of. No Durham on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 25.

Monday, September 15.—There was a fair enquiry for Yorkshire seaborne house coal at to-day's market, but the Durham section was quiet, with no cargoes on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 33.

Wednesday, September 17.—The seaborne house coal market was very quiet to-day; no Durham cargoes on offer, and only small lots of second Yorkshire available. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 8.



## THE PROPER UTILISATION OF COAL, AND FUELS DERIVED THEREFROM.

Section B (Chemistry) of the British Association devoted the whole of Monday morning to a discussion on the above subject. There was a very large attendance when Prof. ARMSTRONG made his introductory remarks.

### The Waste of Fuel.

Prof. H. E. Armstrong, F.R.S., said that this question was one of vital importance. We should bring the nation to see that we are hopeless spendthrifts of fuel, and that we must either mend our ways or perish economically at no very distant date. The subject of the conservation of fuel was undoubtedly the most pressing that could be considered by the British Association at the present time. It would matter little what energy was when there was little to dispose of, and if coal became so expensive that we could not use it, the only source of energy he saw in prospect was alcohol. Certain issues ought to be brought prominently before the public. There could be no doubt that the world must, in some way, become more sparing in its supplies of fuel for the sake of posterity. At present we got out of coal gas and various liquid products much nitrogen in the form of ammonia, and a good deal of sulphur, and how to get these to the best advantage, and how to dispose of them to the best advantage was the real question, and it was no easy problem. At the present day, in making gas from coal, the latter was put into a retort and heated, but nobody cared a rap what was got out of it except the quantity of gas. It was pitiful to read the last report of the South Metropolitan Gas Company, lamenting the continued increase in the cost of production on account of the rise in the cost of coal. But the process by which coal gas was made at present was an absolutely barbarous process from the point of view of the chemist. It had not advanced in the slightest since the time of Murdoch in 1802, when gas was first used in Birmingham for lighting up the Soho factory. In the whole course of the gas industry there had been a steady deterioration in quality from the luminating point of view—a criticism which perhaps did not apply to-day with quite the same force as a few years ago on account of the incandescent mantle. Gas production should be associated with coke production in every large town. The use of raw coal should not be allowed, and there should be legislation against it at a very early date. Unless we forced our own hands—as domestic users—by legislation of some kind, we should probably go on burning smoky coal for a long time to come. But the production of ammonia was also held to be desirable on account of the great value of the substance to agriculturists, so that, after all, the coking process must be one of compromise—the method adopted must be one which would give satisfactory yields of various products with reference to the commercial value and use which could be made of each. The decision would not be left to any one single consideration. The liquid products would be to a considerable extent available for use in internal-combustion engines, and the tar for use on roads, and in other ways, and there again compromise would be necessary to get the maximum proportion of really useful products. Tar production was a matter of very great complexity. Benzene was valuable enough, but the unsaturated hydrocarbons which accompanied it in low-temperature distillates gave rise to considerable difficulties when present in any quantity in spirit used for motors, owing to the property they had of not giving condensation easily and giving rise to awkward viscous products. So the chemist came in at every stage, but the chemist worth anything had been excluded from the industry.

### The Chemist and the Engineer.

This was wrong, and this section of the British Association should assert itself. The engineer should be coordinated for a time to the chemist. It was the fact that the engineer had been in command, which had reduced the industry to its present low state in so far as the application of science was concerned. The gas industry had also been an engineering industry, and the chemist had been kept out of the way, of set purpose. The gas engineer knew quite well that his ignorance on the side of the quality of the material would have been made up if the chemist had been allowed to advise. A matter of supreme importance was the absolute need of reversing recent legislation in the gas industry. At a matter of extreme moment was with regard to the methods of burning coal, and, more particularly, burning gas. The gas fire was very inefficient, due again to the fact that it had been left in the hands of the gas engineers, and there had been little advance until recently; but, fortunately, the chemist had come in, owing to the wonderful development due to Prof. Armstrong, we were beginning to understand how gas could be burned with advantage. A great step forward was

to be able to burn our fuel in order to get the full measure of energy out of it, and in the Grove battery, on a small scale, we were now able to get almost all that was theoretically possible. There seemed no reason why the small-scale experiment should not be repeated on a large scale, because it was obvious that there was an enormous margin still available.

In conclusion, he was prepared to advocate that we should nationalise our coal supplies, and that in 50 years, or a century at most, the nation should come into possession of its coal. He would not urge that experiments should be carried out at national expense, but he would tax the coalowners forthwith to provide the necessary amounts—a million a year if necessary—for the purpose of investigation. We were spending enormous sums on sanatoria, but it was not proposed to spend a halfpenny on the conservation of fuel. We had no right to throw the burden on posterity; systematic public effort was required immediately. Too much could not be spent on the question, for the simple reason that there were not very many who were competent to take part in the enquiry, and as many as possible of those should be secured. However, he did not believe we should need to spend such very large sums. We needed, not a Royal Commission—because Royal Commissions were usually farces, and made recommendations only—but a Royal Committee to deal with the problem, to direct operations, to organise the forces which were undoubtedly available, but were not at present operating to the proper extent because they were in no way organised.

### The Distillation Industry.

Dr. G. T. BEILBY, F.R.S., dealt with the application of destructive distillation to raw coal as a means of promoting economy, efficiency and cleanliness in its use for industrial and domestic purposes. The industrial applications of destructive distillation were most naturally classed under three principal divisions, according to the primary product which it was desired to obtain. In the first of these divisions hard coke was the primary product; in the second, illuminating gas; and in the third, paraffin wax and oils. But in spite of the increasing importance of the secondary products, the fact remained that in each division of the industry the primary product must continue to be of the first importance. It followed from this that not only in the selection of the raw material to be distilled, but also in the choice of suitable conditions of distillation, the primary product must still receive the chief consideration. In his selection of raw materials the gas-maker had probably the greatest freedom of choice, for illuminating gas could be made from almost any variety of coal or shale. The choice of the coke-maker was more restricted, for he could only use coking coals that yielded a hard and compact form of coke. The choice of the oil-maker was even more restricted; for him the oil shales of Mid and West Lothian supplied the only suitable material.

In each of these divisions of industry the primary product was being produced to supply the demands of markets which already existed. This was a truism which was apt to be overlooked by enthusiasts who made revolutionary proposals for the handling of the fuel supplies of the nation. These markets at present absorbed the illuminating gas from about 17 million tons of coal per annum, the hard coke from about 16 million tons, and the paraffin products from 3 million tons of shale. In addition, the secondary products from all three divisions found their way into perfectly definite markets. It was clear that if an important revolution in any division of the industry was contemplated, its effect on these existing markets must be carefully considered. If the products were likely to be so altered that new markets would have to be developed for their absorption, this necessity alone might be sufficient to delay the revolutionary change to a very serious extent; at any rate, this possibility must receive serious consideration. The three divisions of the distillation industry were highly-organised, self-contained systems, properly adjusted for the supply of certain definite markets, each being sufficiently elastic to respond to any normal development in the demand for its products. It was now open to us to consider whether the last word had thus been said on the application of the methods of distillation to the raw coal which is used in the United Kingdom. Out of a total home consumption in the neighbourhood of 180 million tons, probably not more than about 35 million tons were subjected to distillation in retorts, ovens and gas-producers. Was there any further proportion of this huge total which, in the light of the best knowledge of to-day, ought to be subjected to the preliminary treatment by distillation before it was used for heating purposes? One of the largest items of the national consumption was the 35 million tons used for domestic heating. As this was

the item which in use produced town smoke in its more unmanageable form, it was naturally turned to as one of the most important fields for reform. What was actually being done in this direction? One was entitled to conclude that the increasing quantity of coal distilled by the gas companies was going towards the replacement of raw coal by gas and coke, and one was confirmed in the belief that the treatment of coal by distillation was one of the most hopeful directions in which to seek for increased economy and efficiency.

### Low Temperature Experiments.

This raised again the previous question, Were we to rest satisfied that in these admirable achievements of the gas engineer (he apologised to Prof. Armstrong for differing from him with regard to the achievements of the gas engineer) the last word had been spoken from the fuel-reformer's point of view? It was now about eight years since Mr. Parker brought forward a scheme for the production of "Coalite." The keynote of the scheme from the chemist's point of view was the conservation of the saturated and allied hydrocarbons in the liquid and gaseous distillate, in contrast to the modern gasworks practice, in which these hydrocarbons are sacrificed to the production of a large volume of poor gas. This policy of conservation had already found its fullest expression in the shale oil industry, in which the chief aim had always been to preserve the maximum quantity of paraffin wax in the distillate; but from the gas engineer's point of view, Mr. Parker's proposal was regarded as revolutionary and hardly worth serious consideration. The proposal, however, contained the germ of a very big idea. Unfortunately, the very bigness of this idea made it a dangerous one to place in the hands of company promoters and financiers who were unprepared to appreciate the industrial and economic conditions which would be encountered in developing it, or to weigh and estimate the soundness or otherwise of the technical equipment and experience from which it was proposed to develop this revolutionary idea. Though he had never had anything to do with the scheme at any stage of its history, he confessed that this big idea fascinated him greatly, though not quite to the extent of obliterating his critical faculty. A fairly extensive experience of low-temperature distillation, as applied to coal as well as to oil shale, led him from the outset to question whether the proposal to distil bituminous coal in long vertical tubes of small diameter would be industrially successful. With the assistance of Mr. H. N. Beilby, and later of Mr. G. Weller also, an experimental enquiry in the possibilities of other methods of distilling coal at a low temperature was carried on in the works of the Cassel Cyanide Company, in Glasgow. By freely exposing small cubes of coal to radiant heat at a temperature of 450 degs. Cent., it was found that the gases were driven off in about an hour. It seemed reasonable, therefore, to conclude that under practical conditions the time of exposure to heat need not exceed one and a-half to two hours. It had been stated in published reports that the time of exposure to heat in the small vertical tubes of Mr. Parker's apparatus was four hours, and at a later stage it was suggested that even this time was not long enough to complete the distillation in the centre of the mass. The object he himself had in view was to devise a form of apparatus in which the coal could be exposed to the action of heat in thin layers. The first practical apparatus consisted of a column heated externally in a gas-fired oven, and fitted internally with a series of sloping shelves. Mechanical arrangements were made for feeding the small coal into the top of the column, and for mechanically jolting the shelves so that the coal passed over the whole series from top to bottom in a sheet 2 to 2½ inches in thickness. The coke was mechanically withdrawn from the bottom of the column. The volatile products of distillation were removed by an exit pipe to suitable condensers and receivers. The performance of this apparatus fully justified expectations as to the rate at which coal could be exhausted of its gases at 400 to 450 degrees. The time required did not exceed the one and a-half hours of the estimate. The further evolution of the apparatus passed through various stages till a unit with a capacity of 15 tons per day was reached.

The mechanical difficulties to be overcome as the scale of operations was increased were serious, and even in its present form he was not perfectly satisfied with the apparatus. Designs were now being prepared for a further step, in which it was hoped to profit by the experience of the past four years. He was, however, satisfied that the principle of exposing coal to heat in thin layers was sound. He was also satisfied that the production of a mechanically perfect apparatus into which small coal was automatically fed, passed through the distilling zone, and finally passed out through a cooling chamber, only required a little more patient step-by-step development. It was obvious that an apparatus



which could be built in units with a capacity of 15 to 20 tons per day, that would work automatically, and no part of which need be exposed to a higher temperature than 450 to 500 degrees, ought to provide an exceedingly economical means for the distillation of coal. But he would not omit to tell the weaknesses, as well as the strength, of this type of apparatus. It would, in its present form, only work smoothly with non-caking coal. If the coal on heating passed through a fusible stage, it was apt to stick to the shelves and to accumulate on them. The working then became irregular, and eventually stopped. Further, the fact that the coal was frequently turned over and dropped from shelf to shelf tended to break it down into small stuff, a good deal of which was no larger than coke breeze. These were both serious, but not fatal, disadvantages. The greater part of the coke from this unit plant had been used in water-gas producers, into which it could be passed while it was still warm and dry. It had thus an initial advantage over gasworks coke, which usually contained 10 to 15 per cent. of water. The use of the low-temperature coke for water-gas making proved quite satisfactory. Its light nature made it necessary to reduce the pressure of the air-blast in the producer, but its freedom from water and its ready inflammability fully compensated for the loss of capacity due to this reduction in the air-blast. A good deal of the low-temperature coke had also been converted into briquettes for domestic fuel. These were easily kindled and kept alight in an ordinary grate, and burned almost without smoke. The experience of numerous householders in Glasgow in the use of this fuel had been most encouraging, and his colleagues were quite satisfied that a steady outlet for a moderately large output could at once be obtained.

#### The Importance of the Coke Product.

Continuing, he said that the hydrocarbon gases from the unit apparatus had hitherto been passed into the general fuel gas system of the works, but regular laboratory tests had been made of the thermal value, petrol contents, &c. The thermal value of the gas reached the high figure of 850 B.T.U. per cubic foot. The liquid tar had been regularly collected and examined, and the results generally confirmed those of other observers. He wished to emphasise that attention had been mainly concentrated on the mechanical development of this method of distillation, and on the production of a domestic or an industrial fuel from the coke. These, in his opinion, were the really fundamental points in the low temperature scheme. If these were not right, then even fancy prices and an unlimited outlet for fuel oil and motor spirit could not save the scheme from failure. In placing these considerations in the forefront of the enquiry, he did not for a moment wish to minimise the importance of the splendid contribution to our national supplies of fuel oil and motor spirit which would result from a general adoption of low temperature distillation.

The apparatus must be in fairly large units, and it must be automatic, and must work with the smoothness and regularity of the best types of automatic stoking machinery, and with the minimum of manual labour or of detailed supervision. The gases and vapours from the distillation must be carefully preserved from loss or damage in the apparatus either through leakage of gas outwards or of air inwards. The necessary heat must be so applied as to cause no deterioration of the material of which the apparatus was constructed, and the heating must, of course, be economical. He was not without hope that ere long an apparatus would be produced, either by his colleagues or by someone else, which would tempt the orthodox gas engineers to give low temperature distillation a serious trial on its merits. The existing gasworks certainly ought to be the natural nursery for the development of this scheme. In conclusion, he mentioned that he had had an encouraging offer to try the apparatus from the head of one of the leading gas companies, but he was quite determined not to allow the apparatus to leave his hands unless and until he was perfectly satisfied that it would do its work in a thoroughly satisfactory way.

#### The Economical Manufacture of Gas.

Dr. H. G. COLMAN said it seemed to him that what was wanted was a proper co-operation between the chemist, the engineer, and the commercial man—all working together to the best of their ability for the good of the concern. Coming to the main point of his remarks, Dr. Colman said that the coal gas industry took at the present time about 16 million tons of coal, or about 6 per cent. of the coal raised in this country, these figures not including the considerable amount of coal exported to other countries for gasmaking purposes. For the production of light in incandescent burners, and for the development of heat, especially at high temperature was required, it was essential

that the gas should have a moderately high calorific power, and be kept as uniform in this respect and in composition as was reasonably practicable, and that it should at the same time consist for the most part of combustible gases with only a moderate amount of inert gases, such as nitrogen and carbon dioxide, which materially lowered the flame temperature attainable. For the production of power the presence of such inert gases was of much less importance in the engine itself, but although the actual cost of manufacture of gas with a high proportion of inert constituents might be cheaper per 1,000 heat units, the increased cost of distributing such dilute gas over large areas to relatively small consumers was prohibitive under ordinary circumstances. The intrinsic luminosity of the gas, formerly its most valuable property, was now only of minor importance, as in the greater part of England probably not more than 5 per cent. of the gas output was used in flat-flame burners, and a still smaller proportion on the Continent. Unfortunately, the various Acts of Parliament controlling the gas undertakings in this country (with a few exceptions) still stipulated the maintenance of an illuminating power standard, ignoring the vastly more important calorific power; abroad, however, little or no notice was now taken of illuminating power, only calorific power being considered. Generally the cost at which the gas was sold by gas undertakings was steadily decreasing, the reduction in cost being due to a large number of different causes. It arose partly from greatly improved technological methods in the manufacture, both on the chemical and engineering sides, partly from economies due to the larger scale on which the operations were carried out, and partly from the increased value of some of the by-products. Further, the adoption of gas for other purposes than lighting had caused a much more uniform demand for gas throughout the year, resulting in a better utilisation of the capital employed, and, in addition, much was due to the better commercial methods adopted in the sale of the gas. The relation of the cost of heat units in the form of coal-gas to their cost in the form of coal had decreased to a greater extent than appeared from the actual reduction in the price of gas. Each successive reduction in the price not only brought about increased consumption for the same objects as before, but also increased the adoption of this form of fuel for fresh uses.

#### Utilisation of the Heat Units.

With modern plant for the manufacture of coal-gas by carbonisation at high temperatures, it was now possible to obtain in regular working some 25 per cent. of the heat units of the coal in the gas produced from it, ready for distribution; 50 per cent., or rather more of the heat units remained as solid fuel in the form of coke available for sale, and about 5 per cent. of the heat units were obtained in the tar, the remaining 20 per cent. being used in the process of manufacture for carbonising the coal and supplying the power required on the works. Actually the tar, though still possessing 5 per cent. of the fuel value of the original coal, was more valuable for other purposes. The price now obtainable was well above its fuel value. In respect to other constituents present in coal, a considerable proportion of the volatile sulphur was obtained in the process in the saleable form of spent oxide, but as regards the nitrogen present in the coal, the results were much less satisfactory, as it had not yet been found possible in the coal-gas manufacture to recover more than about 20 per cent. of the nitrogen present in the coal in the form of ammonia. A small amount of the nitrogen was recovered as cyanide derivatives, and much greater quantities could be recovered if the demand for these products were sufficient. A certain proportion of the public supply of gas consisted of carburetted water-gas—i.e., of a mixture of water-gas and oil-gas. In its manufacture, some 65 per cent. of the heat units of the raw materials employed, coke and oil, was obtained in the form of purified gas, and 4 to 5 per cent. in the form of oil-tar, this again being sold for other than fuel purposes. Even with the best results, only a very small proportion of the energy of the gas was transformed into light, as was also the case with the industrial production of light from all other forms of energy. It was now possible with modern gas-fires to transmit as much as 50 per cent. of the energy of the gas into a room in the desired form of radiant heat, and the consumption for this purpose was rapidly increasing; which was resulting not only in the economy of the fuel supply, but in a marked improvement in the atmosphere of large towns.

The use of coal gas from the public supply in gas engines of moderate and fairly large size was also steadily increasing, in spite of the competition of other forms of gas for the purpose. The use of coal gas for all the purposes mentioned was familiar to all, but its present increasing employment on the large

scale for other industrial purposes was less known. This class of employment, except in small amounts, was in its infancy, but was now progressing very rapidly, and had perhaps been most largely developed in Birmingham and in Sheffield. In the latter town, during 1908 98 large industrial furnaces using coal gas were laid down. Again, in Birmingham, about 750 million cubic feet of gas, or 8 per cent. of the output, was now used for industrial purposes, and the proportion was rapidly increasing. There was also a considerable amount of gas for industrial purposes now being distributed by special mains under a pressure of 12 lb. per square inch, about 70 million cubic feet of such high-pressure gas being now used annually. In many instances, no doubt the actual price paid for gas might be higher than would be paid for coal alone, but this was far more than counterbalanced by the collateral advantages of coal gas. Thus, with the latter, the furnaces could be heated much more rapidly, and the temperatures regulated much more closely, whilst the supply of fuel could be once stopped when operations were concluded; further, the losses of metal by oxidation, the wear and tear of the furnaces and pots were lessened, and their daily output was greatly increased, which considerably diminished the cost of labour in proportion to output. The combined result with such gas-heated plant being a net reduction in the cost of production, and the utilisation of a smaller amount of the nation's fuel supply in the process. This side of gas supply was, as already mentioned, of comparatively recent origin, but it seemed not unlikely that in industrial districts, at any rate, it would be eventually found that the quantity of gas taken for such purposes would equal and perhaps exceed that consumed for all other purposes.

#### Gas Fires.

Mr. H. JAMES YATES confined his remarks to recent progress in gas-fire science. He said it was not always realised that nothing could arise from the combustion of coal gas that did not arise from the combustion of coal, and that therefore any ill-effects associated with the use of the earlier crude gas fires could not be rightly ascribed to the nature of gas-heating, but must be due to some radical fault in the methods of applying it. This being so, the only way to remove the popular prejudice was to remove its cause. First of all, it was clear that the temperature of the convection currents ought to be reduced, so as to effect a corresponding reduction in the moisture-absorbing capacity of the air of the room. The truer remedy must be sought for in increasing the "radiant efficiency" of the fire to the maximum possible with consequent decrease in the amount of "convected" heat. In the gas fires of to-day, radiation had taken the place of convection as the mode of heat-transference principally aimed at in gas-fire design. Having traced the evolution of the modern gas fire, he came next to radiation, to the problem of increasing which much research had been devoted. Progress towards higher radiant efficiency in a fire could be measured only with a reliable method of estimating the latter was available. The present accepted method was that adopted by a joint committee, appointed in 1907 by the Institution of Gas Engineers and the University of Leeds, for investigation of gas fires. This method, which was originally suggested to the committee by Profs. W. Bone and William Stroud, was essentially a radiometer-cum-thermopile method. Various other methods had been suggested, both electrical and calorimetric, but, so far as he was aware, no authoritative verification of their reliability had as yet appeared. Ten years ago even the best deep fires did not afford more than 30 to 33 per cent. of the net heat of combustion of the gas in the form of radiant energy. The effort to secure increased radiation (i.e., a higher percentage of the heat developed by the combustion of a given amount of gas, delivered as radiant energy) had been found, as was to be anticipated, that to advance from these low figures to 45 per cent. was much more expensive than to make a further increase above 45 per cent.

In conclusion, after referring to various constructional charges, he pointed out that the entire change in the construction principle of gas fires has led to an equally great change in the attitude of the medical profession and the public towards the use of gas for heating. As a result, there were to-day upwards of 350,000 gas fires in use in London alone, and there was every indication that each succeeding year would see a further substantial advance in the adoption of this method of domestic heating in preference to the coal grate, which has so long been the chief and almost the only method available for the purpose.

#### Cheap Producer Gas.

Prof. W. A. BONE said that the question of the industrial use of gas was a very big subject, and so many important developments were taking place which whilst well-known in the particular industry concerned



ere not so well known to the general public—viz., the modern methods of utilising blastfurnace gas and coke-gas in connection with iron and steel works. Dr. Polman had referred to the use of high-pressure gas in Birmingham. But whilst such gas might be used economically for a good many comparatively small scale operations, it would still be prohibitive for larger operations, as, for instance, steel-melting furnaces. It is necessary, therefore, to fall back upon the cheap gaseous fuel generated at or near the point at which it is to be used, and so avoid the large cost of distribution. Without entering into the calculations of the relative costs of these gases compared with coal gas at 1s. per thousand feet, it might be said that water gas generated from coke at 12s. per ton, and of 209 Th.U. per cubic foot, cost about 4d. per thousand feet including all charges and depreciation. This cost compared with a cost of 8d. in the case of coal gas. There were various forms of producer gas in which the gas was completely gasified by means of a mixed air and steam blast, and the efficiency of a good plant, in terms of the ratio of the net calorific value of the gas to that of the fuel charged might even be about 75 per cent., and the cost per thousand cubic feet would depend on whether or not the generator was worked under ammonia recovery conditions. He had rather quickly made these calculations, but he had arrived at the conclusion that the cost of generating ammonia recovery producer gas of a net calorific value of 145 Th.U. per cubic foot from coal at 15s. per ton would be 1d. per thousand cubic feet. This would be equivalent to coal gas at 4d. per thousand cubic feet. With ammonia recovery it would be 50 per cent. higher, equivalent to coal gas at 6d. Producer gas until recently, and even now to a very large extent, was used in open-hearth and regenerative furnaces, reheating furnaces, soaking pits, &c., in connection with steel-works; but recent improvements had led to the substitution of producer gas by mixtures of blast furnace gas, coke oven gas, and there were some who went so far as to predict that in a modern steelworks plant the day was not far distant when gas producers would be entirely done away with and the furnaces entirely heated by blast gases from the blast furnaces or coke ovens. Mr. Bone then outlined the work that is being done in this direction by calling attention to the paper by Dr. Houbaer read at the Iron and Steel Institute meeting at Brussels. By this means, he added, it was intended to eliminate altogether the gas producers, except for stand-by purposes, and effect an economy of something like 2 to 3 hundredweight of coal per ton of steel produced.

#### The Composition of Coal.

Dr. R. V. WHEELER, who dealt with the composition of coal, said he assumed that in spite of the encroachments of oil and of gas, and in spite of any new methods of mining, "which might turn coal into fuel without ever seeing the light of day, there would always be a need for coal as a solid fuel for certain operations. The economical use of coal implied the utilisation of each variety to its best advantage, and this argued a knowledge of the characteristics of each variety. In the great class of the bituminous coals there were many varieties, which differed so slightly in appearance as to be indistinguishable from each other. Nor could chemical analysis afford much information respecting the value of the different bituminous coals for different purposes. He proposed, therefore, to give some information regarding the nature of coal, which might lead to an explanation of differences in the nature of varieties of coal, and the small differences that occur in their relative chemical composition. As the result of experiments on the destructive distillation of coal at different temperatures and under different experimental conditions, he had come to the conclusion that all coals fall into two main types of compounds: the one type readily decomposed by heat, and yielding as gaseous decomposition products mainly the hydrocarbons; and the other type decomposed with greater difficulty, and yielding mainly hydrogen and the oxides of carbon. Considering the undoubted vegetable origin of coal, it was natural to assume that cellulose derivatives must have largely entered into its composition. There was, in fact, a considerable justification for assuming that one type of compound found in coal, and the most important type, was a distillation product of the celluloses. This type, from distillation experiments that he had made on dehydrated celluloses—the bodies that Cross and Bevan named some time ago the "pseudo-carbons"—appeared to be "hydrogen-yielding" compounds that required a high temperature—about 750 degs. Cent.—to decompose them freely. Coal was essentially a compound, in which the resin bodies acted as the binding material. This view was supported by the

discovery of Bedson respecting the remarkable solvent action that pyridine had on most coals. The portion of the pyridine extract that was insoluble in chloroform behaved on destructive distillation practically identically with the portion of the original coal that was insoluble in pyridine—i.e., it appeared to consist almost entirely of the cellulose derivatives. He therefore thought that, while pyridine dissolved all the resin bodies, it also dissolved some of the cellulose derivatives. Then, on treatment with chloroform, a complete separation was made. He was strengthened in this belief by the results, obtained by allowing coal to act on a photographic plate in the dark. Russell, some years ago, discovered that resin and all bodies containing resin, acted on a sensitive plate in the dark. He extended his experiments to coals, and found that after a smooth surface of the coal had been laid upon a photographic plate in the dark at a temperature of about 50 degs. Cent. for several hours, the plate, on development, showed a curious structure—parts of the coal had acted on the plate and parts had not. Presumably, it was the resinous constituents that affected the plate, so that here was a ready means of estimating the proportions that the resinous bodies bear to the cellulose derivatives. If this view were correct, and if he was correct in believing that treatment of the coal first with pyridine and then with chloroform separated the resins from the celluloses, then the chloroform extract should act strongly on the plate, and the residue insoluble in chloroform should not act. He had tested this, and had been able to detect what were coking coals and what were non-coking coals.

#### Semi-Coke and Coal Oil.

Dr. R. LESSING said although the actual loss of potential energy in the form of combustible soot might represent only a small, and, in view of the general inefficiency of fuel utilisation, almost negligible portion of the total, its emission with the gases of combustion was a sure indication that the process of combustion was lacking the necessary adjustment, and that other and possibly more serious losses were its natural corollary. Such an adjustment was possibly in industrial fire practice even where bituminous smoke-producing coal was burned, and great strides had been made during the last decade or so, both in the scientific design of furnaces intended for coal-firing, and in the provision of facilities for the control of their working. But, whilst the records of industrial smoke-producers showed a decided improvement, the pollution of the atmosphere by the domestic chimney continues unabated. Signs were not lacking that purveyors of the domestic variety of coal are feeling the pinch of competition by gas, undertakings already very keenly. At the same time, it was not to be expected that gas could replace more than a fraction of the amount of coal used in dwelling places in the near future. It might be useful to consider this proposition in the light of a simple calculation. The absolute calorific value of a certain volume of coal gas was approximately 20 per cent. of the calorific value of the weight of coal from which it had been distilled. It would, therefore, take 5 tons of coal to make a volume of gas equal in heating value to 1 ton of coal, the calories corresponding to the difference of 4 tons being stored in the coke and tar made. Assuming that coal equivalent to only one-tenth of the heating value of the 35 million tons burned in domestic fires be replaced by gas, 17½ million tons would have to be carbonised. Assuming further that the heating value of gas could be utilised with double the efficiency to that of coal, this would still leave 8,750,000 tons of coal to be distilled, which was equal to about one-half of the present annual requirements of gas coal in the 800 odd gasworks of the kingdom. Considering the present rate of expansion of the heating and cooking business of gas undertakings, it was conceivable that this increase of 50 per cent. (leaving gas for lighting and industrial purposes out of consideration) might take place in the course of the next 10 years. It must, however, be borne in mind that the quantity of coal required over and above that intended to be replaced, would be 8,750,000 — 3,500,000 = 5,250,000 tons, to which extent the supply would have to be drawn upon. It was true that some 4,500,000 tons of gas coke would be produced besides the corresponding quantities of tar and ammonia; but whilst there should be no difficulty attached to the sale of the latter, the gas coke was more than likely to prove a drug on the market.

But even if profitable uses could be found, domestic and industrial, and granted such a remarkable growth of the gas consumption as had been assumed (and which seemed not at all unlikely), this would only replace one-tenth of the air-polluting house and kitchen coal. The evil would continue in the case of 90 per cent. of all domestic fuel. Some palliative appeared to lie in the direction of carbonisation of house coal at low temperature—i.e., at a temperature of about 400 to 500 degrees Cent., as compared with that of 1,000

to 1,200 degrees Cent. used in ordinary coal-gas manufacture. A number of processes for low-temperature carbonisation, and schemes for their exploitation, had been brought forward of late, the ill-starred "Coalite" venture being possibly best known to the public. There were some technical reasons which argued against the success of some of these schemes as proposed recently. The increasing demand for liquid fuel induced inventors to concentrate their endeavours on the recovery of the highest possible amount of "coal oil." Whilst endeavours in this direction were perfectly justified, and, if crowned with success, should go a long way towards providing the large amount of fuel oils urgently needed in the near future, the *sine qua non* for the success of this new industry was the possibility of producing the solid residue, which represented about 70 per cent. by weight of the coal employed—in such a form that it was truly superior to the raw coal in every respect. As in the coking industry, the solid residue must be the main product, with gas, tar and ammonia as by-products.

The principal fault which could be found with "semi-coke," as produced under the existing processes, was its bulkiness, which might be up to twice that of the same weight of coal, a fact which occasioned higher rates for freight and greater expenses and inconvenience in handling and storing. A further fault was the higher percentage of ash, which, of course, was concentrated in the residue in any distillation process. This fault could be remedied by coal-washing with the same ease as was done in the manufacture of blastfurnace coke, and the expense entailed by it should be insignificant as compared with the improvement in quality. Once these two conditions were fulfilled, victory should be assured, and the possible profits would be a justification for the fairly large outlay of plant which such an industry required. It had been shown by the most trustworthy observers that a conservative figure for the loss of fuel in form of soot in domestic fires was 6 per cent. This for the annual consumption of house coals meant 6 × 35,000,000 tons of soot. The average percentage of tarry matter in domestic soot had been stated to be about 10 per cent., and he had been able to confirm this figure in tests undertaken on behalf of the Committee for Investigation of Atmospheric Pollution. This gave the appalling figure of 210,000 tons of liquid combustible in soot alone, which, if recovered, would suffice to supply the oil fuel requirements of the Navy, as stated by Mr. Churchill in his recent speech, for a whole year, and would scavenge incidentally the atmosphere of our towns. The "coal oil" recoverable from house coals by low-temperature carbonisation would, at the rate of 20 gallons per ton of coal, total up to the enormous figure of 700,000,000 gallons, or more than 3,000,000 tons per annum. If only a small portion of this valuable and, at present, wasted energy could be saved, the national wealth and comfort would benefit in many ways. Moreover, as soon as methods of catalytic treatment of crude oils were put on a practicable basis—and this might, in all likelihood, be done before very long—they might be applied to convert these oils into materials of similar properties as the natural petroleum oils.

#### Control of Combustion and Mixed Fuels.

Mr. W. H. PATTERSON spoke with regard to the improvement of combustion and blending of coals. In this country, he said, very little was attempted, even by large users of fuel, in controlling their supplies on a scientific basis. It was the great exception to find coal bought on a calorific basis. Steamship and railway companies and large works purchased their coal on specifications which had no scientific basis whatever. Coal ought to be sold, not by the price per ton, but by the price per million heat units; allowance only being made for ash content. The United States Government had estimated that since the introduction of this system into their fuel contracts they had effected a saving on their own purchases of £40,000 per annum. The scientific buying and selling of coal, therefore, implied a determination of the calorific value of a coal by calorimeter. Much ambiguity was caused by statements of calorific value. In the first place, many calorimeters in use gave inaccurate and variable results in the hands of different workers. There was only one instrument for solid and liquid fuels quite reliable, and that was some form of the bomb calorimeter. In the second place, statements of calorific value were sometimes returned net and sometimes gross. In actual and practical burning of coal the combustion was never complete, and, therefore, not perfect. A blending of different coals might improve the combustion, and in this connection he quoted a case. A test was by a method which is the subject of a patent of 1910, and which he had had under investigation for several months. This was essentially the treatment of lump or small coal in water by chlorine. In many cases it led to remarkable



results. Ordinary bituminous coal in water will slowly take up chlorine, this being absorbed by the coal, and not by the water, until the coal is saturated. The amount required for saturation varied for different coals. An average amount was 0.1 per cent. This treated coal was no different in appearance to untreated coal. It seemed to stand exposure to sunlight and weather as well. The chemical analysis on untreated and treated coal was practically identical, as was to be expected, since the latter only differed from the former in that it contained a very small amount of added chlorine. It was remarkable, however, that the treated coal contained appreciably less ash. Treated coal gave the same calorific value as untreated coal when burnt in the bomb calorimeter, but gave a greater production of nitric acid, which result was also worthy of note. If, however, the calorific value was determined by a less perfect form of calorimeter, e.g., the Lewis Thompson calorimeter, a rise in calorific value in favour of the treated fuel was often noticed. In practical burning tests the difference was still more apparent. In a boiler test, for which he was not responsible, an increased evaporation of 25 per cent. was given by treated fuel; in this case a bituminous slack. The treatment seemed to confer on bituminous coal many of the properties usually associated with anthracite. From this bare outline it would seem that the treatment of coal by a minute quantity of chlorine would not be expensive, and seemed simple, but to effect the right degree of treatment was not quite so easy; much seemed to depend on the coal. In view, however, of the enormous quantities of coal which were consumed, and the different ways it could be burnt, the process was capable of a very extended application, at any rate until the time came when we utilised our resources of bituminous coal in a more rational and less wasteful manner by gasification and recovery of by-products, or extraction, by distillation or otherwise, of the valuable substances contained in bituminous or semi-bituminous coal, which were at present only used in producing a wasteful combustion.

Two coals, A and B, gave the following results when analysed :—

	A.	B.
Moisture.....per cent.	10.44	4.08
Ash.....	5.10	3.57
Net calorific value.....cals.	6,524	7,351
Theoretical evaporation—		
Water from and at 212 degs.		
Fahr. ....lb.	12.15	13.69

In a boiler test the following results were obtained :—

	A.	B.
Water evaporated—		
From and at 212 degs. Fahr. ....lb.	8.87	10.56
Time to burn.....hrs. mins.	2.36	4.0
Boiler efficiency from above.....per c.	73.0	77.1

When the two coals were mixed in equal proportions the following results were obtained :—

Pounds of water evaporated.....	10.54
Time to burn in hours and minutes.....	3.45
From which the boiler efficiency is .....	81.6 per cent.

Thus the mixing of the better coal with the worse gave a result practically equivalent to that which would have been obtained if only the better coal had been burnt. They were some examples of mixing coals and obtaining a result better than either of them would give when burnt alone; on the other hand, it was possible that the converse might be true.

General Discussion.

Mr. ARNOLD LUPTON, referring to Prof. Armstrong's remarks on the conservation of energy, said he hoped that there would not be hasty legislation, and that any legislation would be preceded by a very long and careful enquiry. If the scientists of England were allowed to proceed on their own accord we should get the results we desired, and it would be in plenty of time if it were 50 years hence. After all there was no hurry, for there was enough coal to last for 1,000 years at a greater rate of production than the present, and during the hundreds of years that we had been burning coal we had only burned about 3 per cent. of the original quantity. He contended that there was no waste in working coal underground, for the colliery owners extracted that portion of the fuel which it paid best to extract, and left the remainder in the ground for the benefit of posterity, to whom it would be of incalculable value. Another reason tending to economy of fuel on the part of the user was the tendency of the price to go up, and the time would come when coal would only be used for a few special purposes to which other forms of energy are not so applicable. Legislation, however, should not be introduced which would interfere with industry and industrial processes, even if the latter involved the emission of smoke. He wished more had been said on the question of removing sulphur from coal.

Mr. WALTER DIXON said he could confirm Prof. Bone's figure of 1d. per thousand cubic feet of gas under the conditions he mentioned. The whole thing, however, was really an economic one, and

notwithstanding the figures put forward by Prof. Bone as to the cheapness of the manufacture of gas, there were other economic questions which would decide in each particular case.

Prof. T. TURNER agreed with those who held that in spite of the increased use of gaseous fuel, there would always be considerable need for the use of solid fuel. It had seemed to be assumed by some speakers that the only economical way of burning fuel was in a gaseous manner. He took exception to that. With an ordinary furnace, the factors that had to be considered were, first, the weight of fuel to be burned; and, secondly, the composition of the products that left the furnace, and particularly the temperature of the gases emitted. Assuming that the loss of radiation was not excessive, if there was a proper proportion of carbon dioxide in the furnace, no unburned material, and a low temperature of the gases, no other way could produce any higher result than by burning coal. If they took the old puddling furnace, which was very much condemned as being very wasteful, and used the waste heat from it for the raising of steam, a very large ultimate efficiency could be obtained even out of the old process of puddling. He would also like to draw attention to the difference in the way people calculated results when dealing with the gas heating of a room, and, say, the heating of an ingot in a reheating furnace. The object of heating the room was to warm the man in it, and whereas the percentage of heat applied to the room might be very high, the efficiency so far as the man was concerned was very low, perhaps no more than the 2 per cent. as in the case of the ingot; therefore, one was no more economical than the other, and if the same method of calculation was applied to the ingot, a much higher percentage would be obtained.

Mr. J. B. C. KERSHAW asked Dr. Beilby the price at which the fuel which he had referred to had been sold. He, of course, recognised that the process was in an experimental stage, but was it a commercial price? With regard to the high-pressure gas in Birmingham, he asked Dr. Colman at what price this was being sold.

Dr. BEILBY, in answer, said he had been careful to point out, in his account of the work he had been doing in Glasgow, that it had no pretensions to being on a commercial scale. The fuel distributed had been sold at 20s. per ton—quite a nominal price—and he did not think that at that price it paid. Nevertheless, he did not think he had quite reached the stage when he could say exactly the price at which such a fuel could be produced, because it all turned upon having a perfectly-working economical apparatus. With such an apparatus it should be quite possible to handle the fuel at considerably under 1s. per ton. If this could be obtained, then the problem of supplying a satisfactory smokeless domestic fuel at a price which would compare reasonably with the price of raw coal should be capable of being solved.

Dr. COLMAN informed Mr. Kershaw that the price of high-pressure gas in Birmingham was the same as the ordinary gas used for power purposes—viz., 1s. 4d. to 1s. per 1,000 ft., according to the magnitude of consumption.

Dr. BEILBY expressed surprise that nobody had apparently noticed that one of the vices of the gas stoves was that they produced oxides of nitrogen. He had found that the headaches from which he suffered in his own study were caused by oxides of nitrogen, and not CO at all, and a commercial process was now being exploited in which the combustion of these very products was being made use of.

Prof. ARMSTRONG, in winding up the discussion, thought they could congratulate themselves upon having made a very important advance that morning. Dr. Beilby's remarks placed an absolutely different complexion on the question of producing a soft coke that could be burned by ordinary people to give a smokeless fire. He himself had been behind the scenes a good deal in the matter of the production of smokeless coal, and, as Dr. Beilby had said, Mr. Parker's idea was fundamentally sound throughout and from the beginning, but unfortunately it was worked by people who did not understand what they were doing, and who thought they were going to make a lot of money out of it. All he wanted to do was to point out that the nation had a duty to itself to discharge. There was an ethical side, and he wished to call attention to one omission which ought to be repaired. Dr. Beilby had dealt with the problem of the production of the solid fuel of the future. Prof. Bone had given one illustration of the way in which economy might be effected by the use of gas, but Prof. Bone had failed to do that which he ought to have done—i.e., make clear the part that he had played and was playing in the development of gaseous fuel.

BOOK NOTICES.

Radium: Its Production and Uses. By SYDNEY FAWCETT. 5 in. x 7½ in.; 4 ill., 60 p. London: The Mining Journal.

The object of the author is to give a sketch of the history, description, production, treatment and uses of radium. Such a work in a small compass might have been useful, but we have noticed several inaccuracies and misprints, which considerably detract from the value of this book—as, for instance, “ranadium,” “Product” (for “Produits”), and “automatic” for “atomic.”

The Under Dog. Edited by SIDNEY TRIST. 5½ in. x 9 in.; xiv. + 203 pp.; ill. London: Office of the Animals' Guardian.

This volume, edited by the editor of the *Animals' Guardian*, comprises a series of papers by himself and others “on the wrongs suffered by animals at the hands of man.” Mr. Trist is the author of the article on “The Treatment of Pit Ponies.” Beyond paraphrasing the report of the Royal Commission on Mines and reprinting *in extenso* several anonymous letters contributed to the daily Press, he throws little light upon a subject which—strange as it may appear to readers of the *Animals' Guardian*—owners and managers of mines have a deeper interest than anyone else. The theory that the lives of ponies are deliberately wasted in order to squeeze a few more tons of coal out of the mine is supported neither by evidence nor by common sense. In almost every case of cruelty that comes before the magistrates, we find the same cause—the imperfection of human nature. If Mr. Trist and his collaborators can, by precept, do any good, we heartily wish them success; but we are assured that the worst cases are just those which Government inspection would be powerless to circumvent.

OBITUARY.

A document suggesting the form that his obituary notice in a local newspaper should take, was left by Mr. George Enoch Lawton, a well-known North Staffordshire mining engineer, who shot himself in his bedroom at a hotel at Stoke-on-Trent. “Let the *Sentinel* office know,” he wrote to a relative, “that I was a Freemason, P.M. and P. Companion Royal Arch; a director of the Longton Cottage Hospital; hon. treasurer of the North Staffs Institute of Mining Engineers, and played First League football with Stoke for six years, from the age of 16 to 22.” After other information, the letter proceeded: “Started life as pit-boy, earned money sufficient to be articled to Mr. J. R. Hain, Adderley Green Colliery, for three years; surveyor, The Collieries, two years; agent and manager of Harecas Collieries and Lawton Estates, seven years; also acted as agent and manager of Birchenwood Collieries, four years. Mr. Lawton was a widower, and leaves a son in Canada and a daughter aged 13. He asked that his body should be cremated. A verdict of suicide whilst insane was returned at the inquest.

Many in South Ayrshire and mining circles will learn with regret of the death of Mr. David Smith, late general mining manager to the Dalmellington Iron Company Limited. The sad event took place at his residence, Laurelbanks, Dalmellington, on Saturday. He was born at Glassels, on the Craigengillan Estate, 83 years ago. After seven years of rural work he entered the service of the Dalmellington Iron Company when he was nineteen. He held a number of minor positions of trust connected with their mines till 1884, when he was appointed general mining manager, which important post he held till his retirement in 1901. In all he gave the Dalmellington Iron Company 20 years' faithful service. He was a member of the Mining Institute of Scotland for many years and served several terms in the council, besides contributing a number of interesting papers.

The death of Mr. John Gibb Dunlop, late managing director of Messrs. John Brown and Co., shipbuilders and engineers, Clydebank, took place recently at his residence in Crown-terrace, Glasgow. Mr. Dunlop, who was for many years one of the best-known Clyde engineers, belonged to Stirlingshire, where he was born about 67 years ago. Mr. Dunlop had a varied engineering experience, having taken part in producing compound triple-expansion and quadruple expansion engines, and in developing the marine steam turbine. He retired four years ago.

The death has occurred at Newcastle of Col. W. L. Proctor, a well-known Quayside man, who business career was spent with the Harton Coal Company.

The death has occurred of Mr. Alfred England, who was 68 years of age, and resided at Ivy Bank, Bradford road, Birstal, Yorkshire. He was secretary of the West Yorkshire Co-operative Coal Federation Limited, having held that position for about 18 years. For 30 years he was auditor for the Howley Park and Great Finsdale Colliery Company. He leaves one son and two daughters. His funeral at Birstal was very largely attended by representatives of the various bodies with which he had been connected.



# MINING AND OTHER NOTES.

The announcement that the works of the famous engineering firm of J. Aird and Co., Queen Anne's-gate, W., are shortly to be closed down is officially confirmed. The offices at Queen Anne's-gate will pass into other hands, but all contracts entered into, with the exception of one, which it is expected will be finished in 1914, will be completed forthwith. Originally founded by the first John Aird in 1848, the business owes its position in the front rank of the world's contractors chiefly to the first baronet, who died in 1911. The late Sir John Aird left a fortune of over £1,000,000.

Mr. W. Hay, J.P., of Shirebrook, has been appointed general manager to Messrs. Newton, Chambers and Co.'s Collieries, Thorncliffe, near Sheffield. Fourteen years ago Mr. Hay succeeded Professor Lupton as general manager of the Shirebrook Colliery.

Mr. E. Burton, of the Shirebrook Colliery office staff, has been appointed secretary to the Corton Wood Colliery, near Barnsley.

Addressing the 24th general meeting of the Lothian Coal Company Limited, at Edinburgh, Mr. James A. Hood, J.P., said that after some years of depression the year just closed had been one of prosperity. While the preference shareholders had always got their 5 per cent. dividend, the ordinary shareholders, including the 5 per cent. now recommended, would, during the 23 years of the company's existence, have got only 27½ per cent. altogether, or an average of rather less than 1½ per cent. per annum. The amount paid to the preference shareholders was equal to about 2·22d. per ton of output, and the amount recommended to be paid to the ordinary shareholders to about 3·36d.—total 5·58d. While the directors had been able to meet the high cost of production on this occasion, the pinch would be felt when the present tide of prosperity began to recede, of which already there were some indications. The Scottish railway companies had intimated an increase in the rate of carriage on coal as from July 1, 1913, which, if it became established, would be an additional charge on the industry, or on those industries or households to which the coal was supplied. Within the next 12 months the company would come into unencumbered possession of houses costing something like £60,000.

On Saturday evening the council of the National Association of Colliery Managers (Scottish branch) entertained Mr. G. L. Kerr, their former secretary, to a complimentary dinner in Daniel Brown's Limited, Glasgow, in view of his appointment as secretary and treasurer of the Mining Institute of Scotland. Mr. Charles C. Reid, Cowdenbeath (Fife Coal Company), occupied the chair.

Twelve cottages recently erected for the accommodation of some of the aged miners and their wives in the Brandon district were formally opened on Saturday afternoon by Mr. R. L. Weeks, agent for Messrs. Strakers and Love, owners of the local collieries.

The Right Hon. R. C. Munro Ferguson, at the annual opening of the Fife Mining School in Cowdenbeath last week, said they had a splendid opportunity in West Fife for the development of their industry. It was not only a question of taking the greatest possible quantity of coal out of the earth with as little expense and with as little unnecessary labour as possible, it was a question of organising transport by sea and land. He thought they had organised the taking out of coal very well. He did not think they had organised the transport of it to the markets as well. He thought they were much in need of men knowing foreign languages to go abroad and act as agents promoting the sale of their produce. It seemed to him that if they organised their transport system properly they should be able to compete effectively with the foreigners and to get their transport trade much more in their own hands.

For 40 years the common "black-beetle" has lived in myriads in the stables of the Ryhope Coal Company. Mr. Joseph Wilson of Seaham, who has been commissioned by the Colliery Company to stamp out the pests, has now succeeded in his task and the pit is clear of the pest.

An alarming accident occurred at Easington Colliery, East Durham, on Saturday. Some repairs were being effected in the cage machinery when an empty cage, weighing eight tons, fell to the bottom of the shaft, about 1,400 ft., while the free end of the cage rope shot upwards and wrecked the engine house roof. No one was injured.

On Saturday in a new competition, which aroused a considerable interest in the Northern Division of the St. John Ambulance Brigade, a team of the Murton Colliery Division won a handsome trophy offered for competition by Dr. Robert Anderson, of Gateshead.

Every year the Gloucestershire County Council allot a certain sum of money to be expended in furthering mining education in the colliery district of the Forest of Dean. Among the inducements offered to students are a scholarship value £100 per annum for two years, and twelve travelling scholarships of £5 each. The student securing the premier scholarship is entitled to attend a mining college for a term of two years. The examination was conducted by Mr. Donald M. Stuart, on August 27, and the results were made known at a public meeting held in the Town Hall, Cinderford, this week. It was announced that Sydney Brown, of Yorkley, had won the chief scholarship with 240 marks.

Mr. James Haslam, of Bleak House, Clarence-road, Chesterfield, Derbyshire, general secretary of the Derbyshire Miners' Association and M.P. for Chesterfield, who died on July 31, aged 71, left estate of the gross value of £1,966, of which the net personalty has been sworn at £1,941.

Messrs. Platt Brothers, who own extensive textile engineering works—the largest in the world—in Oldham, have had important surface improvements carried out at their collieries at Moston, near Manchester, where new seams are being tapped.

More coke ovens are to be put down and other surface improvements effected at the Earl of Ellesmere's Brackley Collieries, Middle Hulton, near Bolton.

A local correspondent says, amongst many other modern innovations appertaining to the coalmining industry which are being introduced at the Pilkington Coal Company's new collieries at Astley Green in Southern Lancashire, is a system of wireless telephony, which the writer understands, will be the first tried in Lancashire. The experiment will be watched with interest by other coalowners in Lancashire and Cheshire.

The new Coal Mines Act has had the effect of placing on the market many types of overwind and overspeed prevention gear, but in mining circles in Lanarkshire particular interest has been aroused in the invention of a working mechanical engineer, Mr. Wm. Lochhead, who is employed at Ross Collieries, Ferniegair, Hamilton. The gear which he has designed has been styled "The Ross," and has been fitted to the engines at Ross Collieries. An interesting point in connection with the "Ross" patent is that it has been practically all forged in the smithy shop at the colliery under the superintendence of Mr. Lochhead.

The Camp Coal Company, Motherwell, closed on Friday last their two pits in that district, with the exception of two small sections in the Main and Splint coalseams. Over 150 men have, as a result, been thrown out of employment. It is understood, however, that the Wishaw Coal Company have secured a lease of the minerals still unworked, but they do not enter into possession till some time in November.

In connection with the working of the coal in the Townlands Pit, Hamilton Town Council have received a communication from the mining engineers, Messrs. McCreaths and Stevenson, Glasgow, in which the suggestion is made that the Town Council should arrange with Messrs. Archibald Russell and Co., coalmasters, for the extraction of the coal under Burnbank Road, when the minerals in the lands adjoining are being wrought.

In view of the termination of his engagement as manager of No. 7 Pit, Thankerton Colliery, Holytown, Mr. James Buchanan has been presented by the officials and workmen with a gold watch.

The Protector Lamp and Lighting Company Limited, of Eccles, Lancs., ask us to point out that the Prestwich patent protector lamp, included in the list of approved safety lamps appearing in the new Safety Lamp Order, includes both oil and spirit lamps. The No. 176 oil lamp is a separate lamp, which is also approved.

We are informed that Mr. Julius Bradbury has now joined the well known firm of Throtchley and Co. Limited, coal contractors, of Manchester, London, Liverpool, and Newcastle-on-Tyne, as a salesman in their gas coal department. For several years Mr. Bradbury has been identified specially with the gas coal trade, in which he has had long experience, formerly as a colliery commercial manager in Yorkshire (Barnsley district) and of recent years as a representative for London and Manchester gas coal firms. He is well known on the London, Manchester, Leeds and other principal markets, which he has regularly attended.

At the annual meeting of Lamhert Brothers, in London, the chairman, Mr. Newton Dunn, said that the question of oil fuel is undoubtedly a serious matter. Personally, however, he had no fear that oil could be produced in such large quantities that it would—at any rate for many years—take the place of coal. The curious thing was that steamers huilt for oil, and visiting oil centres, used coal.

Five men were killed and many others injured by the fall of a steel chimney across the fish-plate mill at the Workington Iron and Steel Company's Moss Bay iron and steel works at Workington early on Tuesday morning. The chimney, which was 180 ft. in height and 18½ ft. in diameter at the base, stood at the seaward end of the fish-plate mill and the adjoining steelrail mills, and between these mills and the soaking pits and the Bessemer mills on the other side. Without giving any warning, the chimney fell headlong into the fishplate mill, wrecking everything with which its enormous weight came in contact. It snapped the exhaust main of the turbo-generating plant, which stood high above the roof of the mill, rent girders and tie rods asunder, broke the steam pipes, crumpled up the corrugated iron roofing, and brought down tons of ironwork, burying underneath it the rolling plant through which the fishplates pass. What caused its overthrow is not known, but it is supposed to be due to an explosion of gas in the flues. However, there is no evidence of such an explosion. The works, of course, were idle for the day, but the furnaces will be in blast again shortly, and the rail mill is expected to be restarted in a few weeks' time.

At a recent meeting of the council of the Leicestershire Miners' Association, the chairman, as representative of the council of the Whitwick Colliery Disaster Relief Fund Committee, reported that 15 years having now expired since the disaster occurred, the committee, according to the deeds of the fund, proposed to purchase annuities for the widows of 5s. a week for life. It was pointed out that there were two young people, aged 16 and 24, unable to do anything for themselves, and the committee proposed to make ample provision for them.

Ten brigades are now being trained at the Hednesford rescue station, their names and captains being:—East Cannock (Mr. Morris), Aldridge (Mr. Woolley), Old Coppice (Mr. Woollaston), Coppice (Mr. Mason), Littleton (Mr. Ashley), Bloxwich (Mr. Russell), Holly Bank (Mr. Guest), Brereton (Mr. Jones), Cannock and Rugeley (Mr. Ivatt), and Walsall Wood (Mr. Ellis). Forty-four fully-trained rescue men are already available. The aim is to have 300 fully-trained men for the Cannock Chase coalfields. All the collieries in the district, with the exception of one, are now in telephonic communication with the station, the exception being due to the delay of the postal authorities.

The first of the series of steam coal strata has been struck at the Britannia Colliery, of the Powell Duffryn Company, Bargoed. The seam is known as the Elland, and has been reached at a depth of nearly 2,000 ft. It is expected that another six or seven seams will be tapped within the next 100 yards.

## COLLIERY ACCIDENTS.

### Neath.

Mr. Howel Cuthbertson held an inquest on the 28th ult. at Tonna, near Neath, on William Henry Rees, collier, and David Kent, who were found suffocated at the Old Castle Colliery, Tonna, near Neath, on the previous Tuesday afternoon.

John Thomas, collier, said only four men, including Kemp and Rees and the fireman, David Rees John, were working at the level. He had never discovered any fumes there. When the fireman found the men there was no foul air there. They tried to get the hodies out, but could not shift them. He went for assistance, and when he got back there were a lot of colliers from the Bush Colliery trying to get the hodies out. There was foul air there then, which came, he thought, from some old workings. A number of the men who tried to get the hodies out fell around him and were carried out. He thought the men must have got into the airway to examine the place for repairs.

David Rees John, fireman, said he had been acting as fireman for the past two months. He was not a certificated fireman. He kept a fireman's hook, but there were no entries in it of foul air. He had found small quantities of foul air sometimes, but he did not make any entry of them. He went to look for the men because they were a long time coming out, and they wanted to start the petrol engine to pump water out. When he found the men there were some fumes in the place, but he thought they were from the petrol engine. The reason why there was such a lot of foul air there when the men tried to get the hodies out was because the ventilation door was left open. He had examined the working faces that morning (Tuesday), but not the return airway. He started the petrol engine for working the pump at 7 o'clock, and stopped it at 9.30. He was positive that it did not work after. His opinion was that there must have been a fall in the airway, and when the men cleared the fall the fumes of the petrol engine must have worked in and overcome them. Only seven men were employed altogether. Witness had never examined any of the old workings at the colliery.

Dr. J. P. Prell said that the cause of death of both men was suffocation due to carbon-monoxide poisoning.

Mr. Dyer Lewis, H.M. inspector of mines, said carbon-monoxide was a deadly fume caused by the incomplete combustion of certain bodies. This might have been caused by petrol fumes.

A verdict of "Accidental death" was returned.

**New Rescue Stations in Yorkshire.**—With reference to the description of the new central rescue station at Doncaster, which appeared in our issue of September 6, we understand that no contract for the rescue car, which it is proposed to instal in connection with the station, has yet been entered upon, nor has a decision yet been arrived at as to the type of rescue appliance to be adopted at the station. We make this statement, since the language used by our correspondent might be interpreted as indicating that orders had already been placed.

**Kent Coal.**—The secretary of the Kent Collieries Limited has issued a circular to the shareholders stating that the No. 3 Shaft at the company's colliery at Dover, known as the Shakespeare Colliery, has now reached the seam of coal at about 1,275 ft., and connection has been established through that seam with the No. 2 Shaft. Coal cages are being put into one shaft and sinking will be continued in the other as soon as the work consequent upon the arrangements for the shaft landings in the top seam is completed. It will then be possible, the circular adds, to wind coal from this seam, as a matter of ordinary colliery practice, in increasing quantities, until the colliery is fully developed.



## Letters to the Editor.

Editor is not responsible either for the statements made or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### LOW-TEMPERATURE CARBONISATION.

SIR,—Kindly permit me, in reply to Mr. John Harger's letter on the above subject, to state that my remarks on the combustion of hydrocarbons were intended to apply to cases of ordinary combustion, and not explosions; and, in spite of Mr. Harger's correction, I still believe that the chemical affinity of oxygen for hydrogen is greater than its affinity for carbon. If this is not correct, I shall be greatly obliged if Mr. Harger would explain the structure of luminous hydrocarbon flames. Since the heat evolved by the union of two elements is a measure of their affinities, and the heat units given by union of 1 gramme of H with O = 34,000, and the heat units given by union of 1 gramme of C with O = 8,000, I should expect their affinities to be in the same proportion.

In the example given, if two volumes of  $C_2H_2$  had been mixed with three of oxygen, the products of combustion would have been four volumes of  $CO_2$  and two volumes of water, and had the combustion taken place in a jet the usual flame would have been formed, and there would have been no carbon monoxide or free hydrogen.

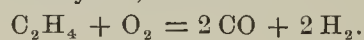
The cannels referred to by me were the Scotch cannels and shales, containing as high as 50 per cent. volatile matters, and not the bastard cannels from the boundaries of coalseams.

A. ROLLASON.

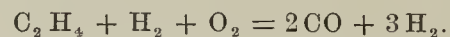
31, Station-street, Nottingham,  
September 13, 1913.

### FORMULA OF ACETYLENE.

SIR,—I notice in your issue of the 12th inst. that your correspondent, Mr. Harger, who is evidently anxious to correct certain inaccurate statements which appeared in your issue of the 5th inst., gives the formula for acetylene in referring to ethylene, and should be as follows:—



And in the case where ethylene is mixed with free hydrogen—



I admit, in the case of acetylene, that the reaction would be of a similar nature, but his statement is worthy of correction for those who are prepared to accept it without question.

D. FERGUSON.

"Balmichael," Stevenston,  
September 15, 1913.

### DEPUTIES' CERTIFICATES, SECTION 15, MINES ACT.

SIR,—It has been several times suggested to the writer that it would be a contravention of the Act if, say, a manager or assistant-manager holding a first-class, or an under-manager holding a second-class certificate, either fired a shot or acted in the course of their round or duties as examiner unless they held the certificate as per section 15 (b) under the Act. The section reads:—"15. (1) A person shall not be qualified to be appointed or to be a fireman, examiner or deputy unless he (a) is the holder of a first or second class certificate of competency," &c. This, in my opinion, clearly indicates that the first and second class certificates do allow the persons named to either fire shots or examine, if they think well, any place in the course of their inspections as manager or under-manager. What is your opinion, please?

September 17, 1913. A THIRTY YEARS' READER.  
[We agree.—ED. C.G.]

### THE TIN-PLATE TRADE

#### Liverpool.

The position is unchanged. Enquiries are fair, but only a hand-to-mouth business is being done, buyers preferring not to commit themselves too far ahead. Makers, on the other hand, are standing to their quotations, which they state do not leave them a margin for profit. Spot lots are being sold cheap here and there, but the following may be taken as about the figures most makers are quoting for approved specifications, delivery over rest of the year:—  
Coke tins: I C 14 × 20 (112 sh. 108 lb.), 13s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 6d. to 26s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 9d. to 13s. 10½d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 9d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 6d. per box; I C squares and odd sizes, 13s. 7½d. to 1s. 9d. basis. Charcoal tins are firm at 15s. 9d. basis and are being sold at 15s. 9d. basis. Coke wasters are in steady demand. Quotations:—C W 14 × 20, 12s. 4½d. per box; 28 × 20, 25s. 9d. per box; C W 14 × 18½, 11s. 6d. per box; 20 × 10, 10s. 6d. per box—all f.o.b. Wales, less 4 per cent.

### NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

Newport's Progress in Coal Trade—Suggested Change in Commercial Practice—Strikes and Notices Affecting Thousands of Men—A Bold Labour Leader's Declaration—Coal-trimmers' Saturday Stoppage: Determined Attitude of the Men—Beneficiaries and their Compensation Money—Great Batch of Summonses Against Colliers—The Miners' Ballot on Political Action—New Seams Struck—Regaining Tin-plate Trade which was Lost during Coal Strike—Mr. D. A. Thomas and American Coal Properties.

The progress of Newport has been conspicuous during the past year, and dock development rendered necessary by the great increase in coal shipments has been in every way successful. For the eight months of the current year the increase is close upon 850,000 tons; and although it has to be remembered that the comparison is with the period of the general coal strike, it nevertheless evidences a conspicuous growth in shipment. Associated with this fact, of course, is the prosperity of the Alexandra Company, who own not only the dock, but also the short length of railway connecting with the Monmouthshire valleys. The proprietors are singularly fortunate in respect of their large area for sidings; and also in the fact that the dock extensions have given them greatly improved access to the sea, with a low-water entrance that must materially influence the direction of traffic to their property.

Another addition to the changes which are taking place in Cardiff commercial work is now being sought. Only a few months ago, collieries commenced to quote net prices, abolishing the practice of 2½ per cent. discount; and this without any alteration in the period of payment. It is now proposed that in Cardiff (and any change would, without a doubt, be followed at the other coal ports on the Bristol Channel), business should be conducted similar to the practice in the north-eastern ports, accounts to become payable in 14 days instead of 30, as at present. To the colliery firms such a change would, of course, be of material advantage; but, on the other hand, the merchants would certainly set up strenuous opposition. Colliery companies are now compelled to pay their men weekly, and would not be unreasonable in asking that the buyers should meet them by a reduction in the period demanded for credit; but the contention of the merchants, on their part, is that they do their foreign business on a basis of 30 days, the period very frequently running into a much longer term, and that if they are to be "brought up short" by the colliery companies, the disadvantage to them would be material.

Seven hundred men have been idle at Coed Ely Colliery, where the hauliers make a claim for working in water; and a number of other stoppages are notified. Coed Ely men resumed work on Tuesday, agreeing that the question should be referred to the Conciliation Board; but labour unrest is widespread, chiefly arising from non-unionism. At Bedwas 700 men have decided to stop unless all the employees join the Federation. On account of the non-unionist difficulty over 1,000 men have come out on strike at the Great Mountain Colliery, Carmarthenshire; and, for the same cause, 800 men have given in notices at Cross Hands Colliery. At the Maritime Colliery, Pontypridd, a thousand men ceased work in protest against 40 non-unionists. Notices of 2,000 men at Abertridwr have expired, but work has not ceased, only a few men remaining outside the organisation.

The death is announced of Councillor Noah Morgan, Penygraig, one of the labour leaders in the Rhondda, who took a principal part in the prolonged Cambrian strike. He was a checkweigher at the Nantgwyn Colliery.

Very few labour leaders have the courage and outspokenness of Mr. J. H. Thomas, M.P., organising secretary of the National Union of Railwaymen. Were similar plain statement and good advice given, clearly and emphatically, in the coalfield, very much trouble might be averted, and the men themselves would be saved from making some costly mistakes. It is just such expressions as that which Mr. Thomas gave utterance to last Sunday as is needed by the trimmers, tipplers, and by colliers at the present time. They are entitled to guidance where they are too often only treated to an echo of their own preconceptions; ill-informed misjudgments. Mr. Thomas warned the railwaymen against the sympathetic strike; and he urged especially the duty of keeping agreements once entered into. If there was to be fair dealing, he said, there must be fair dealing on both sides; and when railwaymen entered into a contract they must keep it both in the spirit and in the letter. Sectional, spasmodic and individual action must inevitably lead to disaster and anarchy in their own ranks. As to one demand, he did not believe that 5 per cent. of those who had spoken and voted for it had given five minutes' thought to what that particular proposal really meant, and men were voting for abolition of the conciliation boards without asking themselves what they were going to substitute.

Something similar in the way of advice and guidance from leaders of workmen in other industries is urgently required at the present time, and it is to be hoped that Mr. Thomas's example will be followed.

Despite an increased offer of overtime pay, the coal-trimmers adhere to their decision to stop work at one o'clock on Saturdays. Mass meetings of the men

were held on Sunday at Cardiff and Barry, and the advanced offer of the shippers was submitted. Originally, the offer was to have a normal stop at one o'clock, with absolute finish at six o'clock, overtime payment at the rate of 1s. per hour to be made for work between one and six o'clock. The amended offer was on the same basis—but the rate was to be 2s. 6d. per hour from four to six o'clock. The men were almost unanimous in rejecting the offer, and were so firm in the determination that they instructed the secretary not to convene any more meetings on the subject. The decision involves all the ports of South Wales, and is contrary to the resolution of the men on the Tyne and at the Scotch ports; thus placing the Bristol Channel at a serious disadvantage, it being estimated that the usual total of shipments reaches to as much as half a million tons during the period which will now be kept idle.

The grave condition of affairs which has been thus established is clearly recognised, especially by ship-owners, who may be penalised by having vessels detained in port for nearly two days, although only an hour or so of additional work would complete the loading and enable them to get away to sea. Collieries will be short of empties on Monday morning, and the ordinary course of business will be deranged—not solely because the trimmers themselves take holiday, but because they will not arrange to meet emergency cases.

Merthyr Guardians discussed, on Saturday, the principle upon which Judge Bryn Roberts apportions compensation to widows and children, and the arrangement for preserving the respective interests of the beneficiaries. His Honour awards "the largest weekly sum for the maintenance of each dependant that the fund at my disposal will admit of for the fund to last until the youngest child attains the age of 14." The difficulty in which the Guardians found themselves was whether an applicant for relief was a destitute person within the meaning of the Poor-law when there was a sum of £350 in the court for the benefit of the persons needing relief; and there was risk of individual guardians being surcharged in respect of cases where legal "destitution" might be considered not to exist. The Public Trustee, in whom was vested £350 for the benefit of a widow and four children, was willing to increase the allowance to such an amount as the Guardians considered adequate. Ultimately, the matter was referred to the Relief Committee. No one seems to have taken the point that the means of the beneficiaries were limited to the weekly amount allowed, whatever the sum held in trust might be, that being inaccessible to the widow and children for meeting their immediate necessities.

No fewer than 183 of the workmen in Loughor Colliery have been summoned by the company for absents themselves from work without notice. Against 125 men the claim of the company was for 30s. each, and against 58 men for 15s. each. A question arose in respect of the sending in of timber; and, when a deputation waited upon him, the manager declared that there was a sufficient supply. The larger number of men stopped for three days, and the 58 stopped in the afternoon and evening shifts. Later, they all returned to work voluntarily.—The case, after being part heard at Swansea, was adjourned for a fortnight. On the resumption of the hearing, last Wednesday, further evidence was given; and at the close of the case the magistrates suggested that the parties should endeavour to come to a settlement. After consultation of the advocates on each side, it was announced that the company had agreed to withdraw the summonses, the men admitting that they were at fault in leaving work without notice, and promising not to repeat the offence.

Great interest is manifested in the ballot upon political action by the Federation; and from several districts has come information that the majority of votes have been cast in favour of such action. The papers go to the headquarters of the Miners' Federation of Great Britain, Manchester, to be counted. The South Wales leaders have been specially active in speeches urging the men to vote in favour.

In the new shaft of Pentwyn Colliery, near Machen, the Big Rock Vein has been struck at a depth of 265 yards, and found to be 4 ft. 9 in. thick, of excellent quality. Sinking will continue to the lower measures.

At the Britannia pit of the Powell Duffryn Company, Rhymney Valley, the Elland seam has been reached at a depth of nearly 2,000 ft.

Discussion with reference to the effect which the reduction of American tariff will have upon the tin-plate trade is of peculiar interest. The new duty will be 2s. a box; so that it ranges from about 12½ to 15 per cent. Welsh makers can deliver at New York a few cents below the price at which American makers are supplying their market; but the 2s. duty will operate as a sufficient barrier. On the other hand, the Canadian market is likely to be re-opened to Wales. It was captured last year by American makers during the English coal strike, when tin-plates could not be obtained from Wales; and they have been selling their product at a loss in attempting to hold to market. The outlook for them in this respect in the future is, however, not at all bright, seeing that the reduction of the tariff on Welsh imports will prevent their obtaining an excessively high price in their home market, in order to recoup themselves for any loss sustained by supplying Canada. Another feature in respect of South Wales



manufacture is that both in the preliminary stage of steel manufacture for the plates, as well as in the actual manufacture of the tin-plate itself, many thousands of pounds have been spent in improving machinery and in laying out works on a more economical scale, so that the cost of manufacture in this respect will in Wales be lessened, and thus the competitive power of the Welsh maker be increased. It is to be noted in regard to the cost of manufacture in America that again there is a strike in tin-plate works, so that the labour troubles which hampered the Trust for so many years appear once more to be breaking out.

Mr. D. A. Thomas, of the Cambrian Combine, is reported to have taken an interest in coal property across the Atlantic; and the report confirms an expectation formed at the time of his recent visits to the United States and Canada. In view of Mr. Thomas's heavy commitments in the South Wales coalfield—where (in addition to Cambrian) he is a director of the great Ebbw Vale concern with its iron and steel works as well as collieries, and is also connected with the Fernhill, Duffryn Rhondda, Cynon, and other properties, as well as with great shipping undertakings, coal depôts in France, and elsewhere—it might have been supposed that the call of the West would have remained unheeded, seeing that he did not need any New World to conquer.

## COAL, IRON AND ENGINEERING COMPANIES.

**Arauco Company Limited.**—The estimated net profits for the half-year ended June 30 amounted to £56,820, as compared with £57,920 in the corresponding period of last year.

**Bell Brothers Limited.**—The directors announce an interim dividend of 4s. 6d. per share on the ordinary shares for the half-year.

**Bellow and Son Limited.**—This private company has been registered, with a capital of £8,000 in £1 shares (4,000 cumulative preference shares), to acquire and take over as a going concern the business now carried on at Leominster, Hereford, under the style of "Bellow and Son," to enter into an agreement with E. A. Bellow, Emily S. Bellow, J. Alice Bellow, E. A. Bellow, E. S. Bellow, and W. Lewis and F. Lewis, and to carry on the business of ironmongers, engineers, ironmasters, ironfounders, steel rollers, steel and iron merchants, and manufacturers and dealers in agricultural implements, &c. First directors: Edward Armstrong Bellow, Wilfred Lewis, Frank Lewis, and Harold J. W. Davis.

**Bolckow, Vaughan and Co. Limited.**—The report for the year ended June 30 states that the profit from all sources available for distribution after providing for depreciation is £255,597, while £136,651 was brought forward. The total expenditure on open-hearth steel furnaces, blast furnaces, exhaust steam turbines, coke ovens, electrical installations, and other plant was £210,249, of which £175,037 has been debited to capital account. The balance of £35,212 is taken from profits. The directors recommend a final dividend of 7½ per cent. on both fully-paid and partly-paid ordinary shares, making with the interim dividend 10 per cent. for the year; they also write £160,000 off capital account, leaving £137,038 to carry forward. The board have decided to recommend that the final dividend shall be paid with income-tax deducted therefrom, and that future dividends shall be dealt with in like manner.

**Brown and Parsons (1913) Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire and take over as a going concern the business of electrical, mechanical and general engineers now carried on by Sydney Hill at 63, Parade, Leamington, Warwick (formerly carried on under the style of "Brown and Parsons Limited"), and to enter into an agreement with Sydney Hill; also to carry on the business of merchants and manufacturers of and dealers in electrical and other machinery and accessories. Registered office, 63, Parade, Leamington, Warwick.

**Contractors Limited.**—This company has been registered, with a capital of £20,000 in 5s. shares, to enter an agreement with Contractors Limited and Herbert Thomson, and to carry on the business of miners and smelters, &c. Minimum cash subscription, £2,500. First directors: Robert John Price, 6, Sussex-mansions, S.W.; George Thomson, 65, London-wall, E.C.; and Henry J. Hadrill, Northwood, Chislehurst, Kent.

**Croatia Lime, Coal and Lignite Company Limited.**—This private company has been registered, with a capital of £400,000 in £1 shares, to enter into an agreement with the Croatia Development Company Limited, Sir John Lister Kaye, and the London and Croatia Syndicate Limited, to acquire mining rights, mines and grounds supposed to contain coal, lignite and other minerals. Minimum cash subscription, £7. Signatories: W. E. Game, 16 Holland-road, Harlesden, N.W.; Sydney M. Waller, The Hut, Woodstock-avenue, Golders Green, N.W.; A. Discombe, 54, Fordingley-road, Maida Hill, W.; A. Gordon, 82, Lugard-road, Peckham, S.E.; and A. M. Waller, W. E. Bonwick and E. C. Henly, all residing at 5, Arundel-street, Strand, W.C.

**Dick, Kerr and Co. Limited.**—The directors recommend a final dividend of 3 per cent. on the 6 per cent. cumulative preference shares.

**Duffryn Rhondda Colliery Company Limited.**—A circular has been issued to the shareholders informing them that the scheme of arrangement for the provision of fresh capital received the sanction of the High Court on July 22. In accordance with the scheme the directors are prepared to receive from shareholders applications for 70,000 shares of £1 each, carrying the right to a fixed cumulative preferential dividend at the rate of £10 per cent. per annum, payable in priority to the dividends on all shares forming a part of the capital for the time being, and with a right in a winding-up to the repayment of capital in priority to all other shares. The minimum subscription upon which the directors will go to allotment is 50,000 shares. Since the commencement of the year, Mr. D. A. Thomas has furnished the capital necessary (about £20,000) for carrying on the concern. The audited accounts from the commencement of the year to June 16 show a loss of £16,581 ls. The directors on a

several guarantee have become liable to the bank for a total amount of £120,000, and do not see their way to incur further obligations on behalf of the company. At the same time, they believe the company possess a most valuable property, which, given time and the expenditure of fresh capital, will eventually prove a highly remunerative undertaking, and they are confirmed in this opinion by the character of the two new seams which have lately been proved. The present difficulties are due mainly to the initial mistake in not sinking the shafts directly down to the steam coal measures, a mistake the new capital will be used to rectify, and also to a series of misfortunes during the past couple of years that were largely beyond the control of the management.

**G. and V. R. Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to enter into an agreement with Arthur George Grice, and to carry on the business of ironfounders, and mechanical and electrical engineers, &c. First managing director: A. G. Grice, 29, Broadway, Westminster, S.W. Remuneration, £100 per annum.

**Holden and Burns Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of coal merchants and dealers in all kinds of patent or manufactured fuel or colliery products, coal agents and colliery proprietors. First directors: Hubert Edward Holden, A. Moses, Ardon Moss, N. Moss and William L. Edwards. Registered office, 124, Uxbridge-road, West Ealing, Middlesex.

**Intermediate Equipments Limited.**—Dividend warrants in respect of the half-year's interest on the 10 per cent. first mortgage debentures of this company have been posted.

**Kayser, Ellison and Co. Limited.**—The accounts show, including the surplus brought forward, a balance of £40,100. After payment of preference and ordinary interim, and placing £5,000 to reserve, giving a total of £92,500 at credit of that fund, there remains an available balance of £23,800. The directors recommend a final dividend of 7s. 6d., making 12½ per cent. for the year, also a bonus of 7s. 6d. per share, carrying forward £8,100.

**Locketts - Merthyr Collieries (1894) Limited.**—The directors have paid interim dividends on the preference shares at the rate of 6 per cent. per annum, on the second preference shares at the rate of 10 per cent. per annum, and on the ordinary shares at the rate of 8 per cent. per annum for the half-year ended August 31, 1913.

**Sadler and Co. Limited.**—The report for the year ended June 30 last states that, including the amount brought forward, £3,469, the available balance of profit is £31,486, which it is recommended should be dealt with as follows:—Interest on debentures and prepaid shares and for income-tax, £4,459; dividend at the rate of 7 per cent. per annum, less income-tax (of which an interim dividend of 3 per cent. was paid on April 10), £11,143; directors' and auditors' fees, £1,000; depreciation of plant, £5,000; to be added to reserve fund (making it £30,000), £5,000; balance to be carried forward, £3,883.

**Scottish Tube Company Limited.**—The directors have resolved that the dividend on the 5 per cent. cumulative preference shares for the half-year ended June 30 last be paid on September 29. No dividend has yet been paid on the ordinary shares of the company, which was formed in July 1911 to amalgamate the business of the bulk of the Scottish tubemakers.

**Simkins and Hadley Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to acquire and take over as a going concern and carry on the business of engineers and metal workers, now carried on by Charles Hadley, Charles Henry Simkins and William Edward Simkins, at Baltic Works, Union-street, Willenhall, Stafford, under the style of Simkins and Hadley. First directors include: C. H. Simkins, County Bridge, Willenhall, and W. D. Hadley, Temple-road, Willenhall. Qualification, £100.

**South-Eastern Coalfield Extension Limited.**—Dividend warrants in respect of the half-year's interest on the 6 per cent. first mortgage debentures of this company have been posted.

**L.K.G. Syndicate Limited.**—This private company has been registered, with a capital of £100 in £1 shares, to carry on the business of dealers in and manufacturers of all kinds of minerals. Signatories: B. B. Kingsford, Whiteholm, Laurse-road, Barnes, S.W.; F. D. M. Gordon, 8, Lombard-street, E.C.

## THE BY-PRODUCTS TRADE.

**Tar Products.**—The market is steady, with a fairly good enquiry. Pitch holds firm and benzols are in good request. Naphthas quiet and carbolic weak. Creosote is unchanged. Nearest values are:—

Benzols, 90's .....	1/1½
Do. 50's .....	1/1½
Do. 90's North .....	1/1
Do. 50's North .....	1/1½
Toluol .....	1/1½
Carbolic acid, crude (60 per cent.) .....	1/2½ to 1/3
Do. crystals (40 per cent.) .....	4/3
Solvent naphtha (as in quality and package) ..	9/9½
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3
Pitch (f.o.b. east coast) .....	45/ to 46/
Do. (f.o.b. west coast) .....	44/ to 45/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—Though the demand is somewhat moderate, the market keeps very firm, and not without justification, considering the general position and the outlook in the forward market. Closing prompt prices are:—

London (ordinary makes) .....	£12/10
Beckton (certain terms) .....	—
Liverpool .....	£13/5 to £13/6/3
Hull .....	£13/3/9
Middlesbrough .....	£13/2/6
Scotch ports .....	£13/8/9 to £13/10
Nitrate of soda (ordinary) per cwt. ...	10/9

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

## THE FREIGHT MARKET.

The outward freight market has been fairly active during the week. On the north-east coast, contrary to expectation, shipping operations have not been very seriously hampered by the strike of Tyne tugboatmen, many vessels having navigated the river under their own steam and, in one or two instances, sailing vessels have penetrated the river under canvas, the wind being favourable. Coasting business is being done at about 3s. 9d., Tyne to London, and from 4s. to 4s. 6d. to Hamburg. The Bay is based on 7s. to St. Nazaire, and the Baltic on from 6s. to 6s. 1½d. to Cronstadt. The Mediterranean has Genoa at from 9s. 3d. to 9s. 4½d. At South Wales, chartering has been moderately brisk. Mediterranean rates are firm. The South American market is steady, and the near trades show some improvement. The Clyde is very dull. The Humber market is firm, with a fair enquiry. Homeward business has been fully as active as usual. The Black Sea is active at steady rates for this and next month's loading. The River Plate is dull and easy. The Mediterranean and ore ports are firm. America is weak, with ample supplies of tonnage. The rice ports are steady.

Tyne to Alicante, 2,100, 10s; Algiers, 2,200, 7s. 10½d.; Ancona, 4,200, 10s. 6d.; Barcelona, 3,800, 9s. 3d.; Cronstadt, 2,000, 6s.; 4,700, 6s.; 1,100, coke, 10s.; 2,000, 6s. 1½d.; Carthage, 1,700, 11s. 6d.; 700 tons coal 11s., 1,000 tons coke 14s.; Constantinople, 10s. 6d.; Genoa, 3,800, 9s. 3d.; 3,300, 9s. 4½d.; Gêze, 2,500, 5s. 9d.; Havre, 1,300, 5s. 3d.; 900, 5s. 3d.; 1,800, 4s. 9d.; Helsingfors, 2,000, 5s. 6d.; 1,100, 5s. 6d.; Hamburg, 1,200, 4s. 1½d.; 2,600, 4s.; 2,500, 4s. 3d.; 1,600, 4s. 9d.; 2,500, 4s. 6d.; 2,500, 4s. 7½d., from Dunston; Las Palmas, 5,400, 8s. 9d.; 4,000, 9s.; 3,600, 9s.; Leghorn, 3,000, 10s.; London, 1,600, 3s. 9d.; Memel, 1,900, 4s. 10½d.; 3,000, 4s. 10½d.; 850, 6s. 6d.; Maesbundsund, 800, 6s. 3d.; Moss, 1,800, 5s. 3d.; Naples, 2,800, 9s. 1½d.; 4,700, 9s. 3d.; 700; Nice, 2,900, 9s. 6d.; Nantes, 1,700, 7s. 3d.; Norrköping, 1,700, 6s.; Odessa, 7,000, 9s. 6d.; 4,500, 10s.; Piræus, 3,300, 8s. 9d.; Palermo, 2,800, 10s. 7½d., 400; Røkkola, 1,200, 6s. 6d.; Reval, 2,900, 5s. 6d., 500; Riga, 2,800, 5s. 3d.; Rouen, 2,500, 5s.; St. Petersburg, 3,200, 6s.; St. Nazaire, 1,700, 7s.; Seville, 3,200, 9s. 3d.; 5,200, 9s. 3d.; 2,200, 9s. 6d.

Cardiff to Aden, 7,000, 12s.; September-October; Ancona, 5,200, 11s.; Algiers, 3,700, 10½ fr.; Bordeaux, 1,900, 8 fr.; 1,850, 7½ fr.; Brest, 1,300, 5s.; 320, 5s.; 1,350, 5s. 6d.; 1,100, 5s. 4½d.; Brodwick Bay, 350, 4s. 9d.; Barcelona, 3,400, 10s., end September; 4,400, 10s.; Brindisi, 3,200, 10s. 6d., 800; 3,200, 10s. 9d.; Buenos Ayres, 5,200-5,600, 22s., fuel, September 25; Cronstadt, 3,600, 7s.; 2,000, 7s. 3d., September 29; 1,700, 7s. 3d.; Cape Verde, 4,700, 10s. 3d.; Calais, 1,900, 4s. 9d.; Chatham, 1,700, 3s. 6d.; Copenhagen, 1,600, 6s.; Catania, 2,800, 10s. 3d.; 2,800, 10s.; Chantenay, 2,000, 8 fr.; 2,800, 7½ fr., 600; Constantinople, 3,800, 10s., September 22; Ferrol, 1,300, 8s. 6d.; Genoa, 3,500, 9s. 6d.; 3,400, 9s. 7½d.; 6,300, 8s. 9d.; 4,200, 9s. 6d.; 7,400, 9s. 3d., September 22; 9s. 6d., September 29; 5,500, 9s. 4½d.; 4,600, 9s. 3d.; 4,800, 9s. 3d., September 22; Hong Kong, 6,000, 16s. 9d., Admiralty; Honfleur, 2,300, 5s. 3d.; 970, 5s. 9d.; Havre Canal, 1,550, 5s. 6d.; Las Palmas, 3,100, 9s. 4½d.; Leghorn, 5,700, 9s. 6d., 500; La Pallice, 2,400, 7½ fr.; 2,700, 7 fr., 2,900, 6-8½ fr.; Lisbon, 3,000, 7s. 7½d.; 2,900, 7s. 3d., 500; La Rochelle, 7½ fr.; Licata, 3,600, 11s. 9d.; Malta, 4,300, 6s. 9d.; Admiralty, 3,500, 6s. 9d. coal, 7s. 6d. fuel, Admiralty; Malaga, 2,100, 9s., free tax; Marans, 1,250, 10 fr.; Monte Video, 5,200, 20s.; Messina, 2,800, 10s. 3d.; 2,800, 10s.; Marseilles, 5,500, 11 fr.; 5,200, 11 fr., September 22; 6,300, 11 fr., September 24; Naples, 5,700, 9s. 6d., 500; 4,400, 9s. 6d.; 4,200, 9s.; 4,600, 9s. 3d., 800; Oran, 2,600, 11 fr.; Oporto, 1,400, 8s., 500; Palma, 1,400, 10s. 6d., 300, free tax; Porto Empedocle, 2,500, 10s. 9d.; 2,800, 11s.; Passages, 1,200, 8s. 6d.; Palermo, 2,800, 10s. 3d.; 2,800, 10s.; Piræus, 3,500, 9s., 600; 9s., September 27; Port Said, 6,400, 9s. 3d.; 4,900-5,100, 9s. 6d.; Rosario, 4,000, 22s. 6d.; 4,800, 22s. 6d., September 22; Rio de Janeiro, 5,400, 18s., end September; 8,000, 18s., September 20; River Plate, 5,600, 22s., fuel, end September; 5,200-5,600, 22s., fuel, September 25; Reval, 2,300, 4s. 9d., net terms; Reggio, 3,500, 10s. 7½d.; Savona, 3,500, 9s. 6d.; 6,300, 8s. 9d.; 4,800, 9s. 3d., September 22; St. Malo, 730, 5s. 7½d.; Spezzia, 4,800, 9s. 3d., September 22; St. Servan, 1,700, 5s. 1½d.; St. Nazaire, 3,000, 7½ fr.; St. Petersburg, 2,100, 7s.; Sabang, 5,000, 13s. 3d., October; Syra, 9s., September 27; Trieste, 5,000, 10s. 6d., 500, 8d.; Taranto, 4,500, 9s. 6d., 6½d.; Tunis, 3,000, 14½ fr. and 15½ fr.; Teneriffe, 3,100, 9s. 4½d.; Venice, 5,200, 11s.; 4,000, 11s. 3d.; Vigo, 1,850, 7s. 9d.; Valencia, 1,250, 10s. 3d.; West Coast South America, 22s., fuel, October-November; Zarate, 22s. 3d.; Zea, 9s., September 27.

Port Talbot to La Pallice, 2,400, 7½ fr.; La Rochelle, 2,600, 8 fr.; Nantes, 3,400, 7½ fr.; Algiers, 3,600, 10½ fr.; Rouen, 1,200, 5s. 6d.

Newport to Naples, 4,400, 9s. 6d.; 4,600, 9s.; 4,000, 9s., 1,000; Genoa, 6,000, 9s. 3d., September 20; Vigo, 1,800, 7s. 9d.; Algiers, 10½ fr.; Bordeaux, 1,850, 7½ fr.; Oran, 2,600, 11 fr.; Ferrol, 1,350, 8s. 6d.; Bahia Blanca, 6,000, 19s. 6d., end September; Bilbao, 1,400, 6s. 9d.; Buenos Ayres, 6,000, 20s. 6d.; 20s., with 1s.; La Plata, 20s., with 1s.; Torre Annunziata, 5,000, 10s. 6d.; Civita Vecchia, 5,000, 10s. 6d.; Marreilles, 4,000, 11½ fr.; Rosario, 4,200, 22s. 6d., September 26; Gibraltar, 1,900, 8s. 3d.; Barcelona, 3,500, 10s.; Gibraltar, 8s. 3d.; Brest, 1,100, 5s. 4½d.

Swansea to Bordeaux, 3,300, 8 fr.; Rouen, 1,200, 6s.; La Rochelle, 2,400, 8 fr.; 1,700, 8 fr.; Chantenay, 2,200, 8 fr.; Leghorn, 1,300, 10s. 6d.; 10s. 6d. coal, 11s. 3d. fuel; Bayonne, 1,200, 8½ fr.; St. Nazaire, 2,200, 8 fr.; Caen, 600, 5s. 6d.; Rouen, 1,700, 6s.; Stettin, 2,000, 5s. 7½d.; Cronstadt, 1,700, 7s. 3d.; St. Petersburg, 1,900, 7s. 1½d.; Stockholm, 1,050, 7s., September 20; St. Nazaire, 2,300, 8 fr.; San Felio, 1,300, 12s.; Marseilles, 3,200, 12½ fr.; St. Malo, 750, 5s. 6d.; Havre, 1,000, 5s. 6d.; Brest, 1,400, 5s. 3d.; Barcelona, 4,500, 9s. 9d.; 3,500, 10s., September 22; Cagliari, 1,800, 10s. 6d. coal, 11s. 3d. fuel; 2,800, ditto, ditto; Nantes, 1,300, 8½ fr.; Calais, 750, 5s. 9d.; Hamburg, 1,200, 4s. 6d.

Blyth to Havre, 950, 5s. 3d.; 1,300, 5s. 3d.; 1,700, 5s. 3d.; Calais, 1,200, 5s. 9d.; Røkkola, 1,200, 6s. 4½d.; 1,200, 6s. 6d.; Memel, 850, 6s. 6d.; Moss, 1,800, 5s. 3d.

Glasgow to Rio de Janeiro, sail, 17s. to 17s. 9d.; Bordeaux, 8½ fr.

Garston to Genoa, 1,800, 9s. 6d., September.

Hartlepool to Barcelona, 10s.; Corunna, 1,600, 7s. 6d., 400; Alexandria, 3,300, 9s. 9d.

Five port to Syra, 9s. 3d.; Piræus, 9s. 3d.; Riga, 2,900, 5s. 9d.; Nakskov, 1,200, 6s. 4½d.

Hull to East Norway, 850, 6s.; St. Petersburg, 2,000, 6s.; Cronstadt, 2,300, 5s. 10½d.; 2,000, 5s. 9d.; Helsingfors,



1,500, 5s. 9d.; Odessa, 5,000, 10s.; Nakskov, 600, 6s. 3d.; Riga, 1,500, 5s. 4½d.; Bilbao, 1,500, 7s.; Kiel, 1,500, 5s. 9d.; Hamburg, 1,500, 5s. 7½d.; Riga, 3,000, end September; Bremen, 2,300, 5s. 6d.; Buenos Ayres, 5,800-6,200, 19s. 9d., 200, September 27; 5,200, 19s. 6d.

Wales to West Coast South America and home to United Kingdom-Continent, sail, 42s. on the round; 85s. wheat, 36s. 3d. wheat-barley.

Wear to Gefle, 2,500, 5s. 9d.; Wyborg, 1,200, 7s.; Riga, 2,700, 5s. 3d.; Charente, 1,700, 7s. 6d., 500.

Leith to Rouen, 900, 6s.

Immingham to Perna, 2,400, 5s. 4½d.; 1,550, 5s. 4½d.; Odessa, 5,400, 9s., 1,000.

Lanelly to Rouen, 700, 6s. 3d.; Calais, 700, 5s. 6d.

Goole to Rouen, 1,100, 5s. 6d.; Boulogne, 1,000, 5s.; London, 1,500, 4s.

Methil to Kotka, 1,800, 5s. 6d.; Cronstadt, 2,900, 6s.

Troon to Genoa, 19s. 3d., Sept.

Weser to Savannah, 9s. 9d., Sept.; Charleston, 10s., Sept.

Burntisland to Genoa, 9s. 6d.; Savona, 9s. 6d.; Leghorn, 9s. 6d.; Kotka, 1,800, 5s. 6d.

Thames to Buenos Ayres, sail, 18s. 6d.

Rotterdam to Adelaide-Wallaroo, sail, 16s.; St. Nazaire, 3,400, 6s.; Trignac terms; Barcelona, 5,000, 9s. 3d., Sept. 24; Dieppe, 1,500, 5s. 3d., end Sept.; Bilbao, 3,500, 5s. 6d.; Bagnoli-Porto Ferrajo, 6,000, 8s. 9d., Sept. 23; Novorossisk, 9s. 7½d., Sept. 25.

Hamburg to Savannah and Wilmington, 7,500, 10s. 3d., Sept.; Charleston and Jacksonville, 5,500, 10s. 6d., Sept.

Forth to North Norway, 2,600, 5s. 6d.

Homeward charters:—Sulina, 6,100, L.H.A.R., 11s. 9d., Hamburg 12s. 3d., 3d. less barley up to half cargo, 600 load, Sept. 25-Oct. 10; 2,600, Belfast, 24s., heavy barley, ppt.; 5,500, Rotterdam 11s. 9d., Hamburg 12s. 3d., 3d. less barley, Oct.; 5,800, Antwerp or Rotterdam 12s. 3d., Hamburg 12s. 9d., 2,000 tons heavy guaranteed, Oct.-Nov.; 5,900, Rotterdam 11s. 9d., London, Hull or Antwerp 12s., Hamburg 12s. 3d., with 3d. less barley up to half cargo, Oct.; 4,200, Bordeaux, Dunkirk range 14s. 6d., Rouen 15s., with options, October; 4,500, 14s. any, 14s. 6d. Hamburg, 15s. Rouen, option Danube 1s. more, ppt.; Danube, 4,000, Marseilles and St. Louis du Rhone, 13½ fr., ppt.; 7,200, L.H.A.R. 13s., Hamburg 13s. 6d., option 1,000 tons general 2s. 6d. extra, September; Azof, 5,000, Bristol Channel or Dublin, 13s. 3d., option 13s. 9d. any direct, September 25-October 10; 6,100, Rotterdam 13s., Antwerp, Emden or Weser 13s. 3d., Hamburg 13s. 6d., 3d. less barley, October 5-25; 21,000 qrs., 10 per cent., 400, 15s. 3d. n.c. or any, 15s. 9d., Hamburg, ppt.; 5,000, Spanish Mediterranean, 14½ fr. one port, 14½ fr. two ports, 15 fr. three, ppt.; 4,900, Rotterdam, 12s. 6d., 3d. less barley, ppt.; 3,850 max., 15s. n.c. or any, 15s. 6d. Hamburg, October 5-25; 20,000 qrs., 10 per cent., 400, 14s. 9d. n.c. or any, 15s. 3d. Hamburg, September 25-October 10; Kherson, 5,800, Rotterdam 12s. 6d., Hamburg 13s., no reduction, September 15-30; 6,400, Rotterdam or London 12s. 6d., Weser 12s. 9d., Hamburg 13s., 3d. less barley, ppt.; Poti, 5,000, Rotterdam, 14s., end September; Kherson, Nicolaieff or Odessa, 6,100, London or Rotterdam 12s. 3d., 3d. less barley, ppt.; 20,000 qrs., 10 per cent., 400, 14s. 1½d. n.c. or any, 14s. 7½d. Hamburg, September; 3,900, 14s. 3d. n.c. ppt.; 5,200, London or Rotterdam 12s. 6d., Hull, Antwerp or Weser 12s. 9d., Hamburg 13s., 3d. less barley, September; 5,000, 10 per cent., Moss and Christiania, 15s. 3d., early October; 5,600, Rotterdam 12s. 3d., Hamburg 12s. 9d., 3d. less barley, September-October; 7,400, London or Rotterdam 12s. 6d., Hamburg 13s., two ports loading, 3d. less barley, ppt.; Danube, Sulina, Kustendle, two ports loading, 2,300, Tripoli coast, one or two ports, 18 fr. per 1,000 kilogs. oats, 15 working days, October 15; New York, 1,981 net, Marseilles 3s. 10½d., Sicily 4s., October; Pensacola, 2,158 net, Marseilles or Cette, 22s., pitch, September; Kherson, Horli, Skadowsk, Theodosia or Novorossisk, 3,200, Rotterdam, 12s., no reduction, ppt.; Port Said, 5,000, Calcutta, 10s. 3d., salt, October; Sydney, N.S.W., sail, 32s. 6d., United Kingdom-Continent; nitrate ports, sail, 25s. 9d., United Kingdom-Continent; Fremantle or Albany, sail, 33s., United Kingdom-Continent; time charter, States and West Indies, 4s., one trip, delivery Turks Island, re-delivery Gulf, via Honduras; time charter, Transatlantic trade, 6s. 6d. one trip, delivery Hampton Roads, re-delivery Mediterranean; 8,800, 5s. 9d., one trip, delivery Gulf, re-delivery United Kingdom-Continent; West Australia, 31s. 6d. Kurrachee, 32s. Bombay, 33s. both ports; Kherson and Odessa, 7,600, Hamburg, 12s. 6d., ppt.; Newcastle, N.S.W., 2,695 net, West Coast South America, 25s., October; Fremantle, sail, 33s., United Kingdom-Continent; 29s., Cape, time charter, trans-Pacific trade; 4s. 9d., one trip, delivery Portland (Or.) or Puget Sound, re-delivery China and Japan; Baltimore, 13s., Marseilles, coal, October; 2,080 net, Lisbon or Oporto, 3s. 3d., September; 2,100 net, Bayonne, 3s. 3d., October; Huelva, 10s. 3d. Mobile or Pensacola; 4,100, Rotterdam, 8s., f.d., ppt.; Gulf timber port, 900 stds., Calais or Wisbech, 122s. 6d., October; Kurrachee, 18s. 9d., U.K.-Cont., less 1 percent.; Campbelltown, 1,350 stds., U.K.-Cont., 56s. 3d.; Nicolaieff, 7,800, London or Rotterdam 12s. 3d., Hamburg 12s. 9d., 3d. less barley, ppt.; Nicolaieff or Odessa, 6,900, Rotterdam 12s. 3d., Hamburg 13s. 9d., 3d. less barley, ppt.; 6,000, London or Rotterdam 12s. 6d., Hull, Antwerp or Weser 12s. 9d., Hamburg 13s., 3d. less barley, ppt.; Batoum, 4,500, Rotterdam 14s., Antwerp 14s. 3d., ppt.; Eupatoria Coast, 14 fr., Marseilles, ppt.; San Lorenzo, 5,400, 10 per cent., United Kingdom-Continent, 14s. 6d. o.c., less 3d. further if p.p., October; San Francisco, 3,139 net, United Kingdom-Continent, 37s. 6d., September-October; Nicolaieff, Skadowsk, Novorossisk or Theodosia, 5,100, Denmark, basis 15s. one port, September; Odessa, 6,000, Rotterdam-Antwerp, 12s. 3d., no reduction, barley, ppt.; 4,700, Rotterdam, 11s. 9d., option Kherson and Odessa 3d. more, ppt.; Nicolaieff, Odessa, Novorossisk or Theodosia, 7,000, Rotterdam 12s., Weser 12s. 3d., Hamburg 12s. 6d., 3d. less barley, October 1-25; Bombay, 5,750, Barrow, 21s. 3d., ore, October; New York or Philadelphia, 25 c., Chinkiang and/or Shanghai, October; Virginia, 5,500, Genoa or Naples, 11s. 6d., September; Smyrna, 2,750, London or Leith 15s., option Hull 14s. 6d., two-thirds grain, October 1-15; Santander, 2,000, Middlesbrough, 6s. 3d., ppt.; time charter, West Coast South American trade, about 4s. 9d., and time charter, delivery New York, re-delivery United Kingdom-Continent, 24s., Continent, two ports, option one port, 24s., Continent, one port United Kingdom 3s. extra, and time charter, delivery New York, re-delivery United Kingdom-Continent, 32s. 6d.; Liverpool and Bremen,

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

### Abstracts of Contracts Open.

ABERYSTWYTH, SEPTEMBER 29.—Coal, Deep Cannock or Westminster, and the Ruabon Main coal, and Newport coal, also coke, for the Education Committee. Forms from the clerk, Mr. R. J. Roberts, District Education Office, Aberystwyth.

BANDON, SEPTEMBER 25.—About 400 tons of best double-screened gas coals, free from slack, to the Town Commissioners. Tenders to Mr. J. Coghlan, secretary, Gasworks, Bandon.

BARRY, SEPTEMBER 24.—Gas coal (up to 20,000 tons), for the Urban District Council. Further particulars from Mr. T. E. Franklin, engineer and manager, Gasworks, Barry.

BEXLEYHEATH, SEPTEMBER 29.—Coal and coke, for the Bexley Urban District Council. Forms obtained on application to Mr. W. T. Howse, surveyor, Council Offices, Bexleyheath.

BOURNEMOUTH, SEPTEMBER 22.—Coal and coke, for the Town Council. Forms from the borough engineer (Mr. F. W. Lacey).

BRENTFORD, OCTOBER 4.—About 200 tons (more or less) of Rheola Merthyr coals (large), or other approved steam coal, 65 tons (more or less) of house coal, 100 tons (more or less) of small coal, and 100 tons (more or less) of coke, for the Urban District Council. Forms from Mr. J. W. Croxford, the surveyor, at his office, Clifden House, Boston-road, Brentford.

BROMSGROVE (STOURBRIDGE-ROAD), OCTOBER 6.—Coal and coke to the secondary school, Stourbridge-road, for the Managing Committee. Tenders to Mr. J. Lloyd, correspondent.

CARDIFF, SEPTEMBER 27.—Coal, to the University College of South Wales and Monmouthshire, Cardiff, in conjunction with the Training School of Domestic Arts for South Wales and Monmouthshire, Cardiff. Further particulars may be obtained from Mr. D. J. A. Brown, registrar.

CROYDON, SEPTEMBER 25.—Coal and coke, for the Croydon Rural District Council. Forms from Mr. E. J. Gowen, clerk, Council Offices, Katherine-street, Croydon.

DEAL, OCTOBER 7.—About 20 tons of best household coal, 25 chaldrons of broken coke, and firewood, for the Education Committee. Tenders to Mr. Alfred C. Brown, clerk, Deal.

DUMBARTON, SEPTEMBER 24.—Coals and coke for the School Board. Tenders to Mr. Alex. Roberts, clerk.

FALKIRK, SEPTEMBER 22.—Coals and dross, for the School Board. Tenders to Mr. Gabriel Blane, clerk and treasurer, Garrison-chambers, Vicar-street.

HAREFIELD, SEPTEMBER 23.—About 90 tons of good cobbles coal, free from slate and dust, for the Trustees of the Harefield Pools Coal Charity. Sealed tenders to be sent to the clerk of the Harefield Parish Council.

INVERNESS, OCTOBER 7.—Coal, for the Inverness Burgh School Board. Sealed tenders to be lodged with Mr. W. C. Macbean, 42, Union-street, Inverness, clerk.

KEIGHLEY, SEPTEMBER 23.—Coal, for the Education Committee. Forms supplied on application at the Education Offices.

MALDON, SEPTEMBER 30.—Steam and anthracite coal to the Southminster and Purlough Waterworks, for the Rural District Council. Forms from Mr. Wm. Almond, surveyor to the Council, 6, Market-hill, Maldon, Essex.

NEWPORT (MON.), SEPTEMBER 22.—Coal, for the Corporation. Forms can be obtained from Mr. A. Nicholas Moore, borough electrical engineer, Town Hall, Newport, Mon.

PENTRE (RHONDDA), SEPTEMBER 22.—Coal, for the Rhondda Education Committee. Forms from Mr. T. W. Berry, director of education, Council Offices, Pentre, Rhondda.

POOLE, SEPTEMBER 25.—Coal, coke, and firewood, to the schools in the borough, for the Corporation. Tenders to Mr. Charles Lisby, town clerk, Poole.

ROCHDALE, SEPTEMBER 24.—Coke, to the workhouse, Dearnley, for the Guardians. Tenders to the Union Offices, Townhead, Rochdale.

RUNCORN, SEPTEMBER 25.—Coal and coke, for the Runcorn Rural Administrative Sub-committee for Education. Forms from Mr. Geo. Ashton, clerk to the Sub-committee, 71, High-street, Runcorn.

SEDGLEY, SEPTEMBER 22.—Thick coal and coke, for the Staffordshire Education Committee. Tenders to Mr. T. J. Howitt, clerk, Council schools, Sedgley.

SLEAFORD, SEPTEMBER 25.—Best hard steam coal, for Sleaford Urban District Council. Particulars from the electrical engineer, Mr. W. H. Wilson.

SOUTHEND-ON-SEA, SEPTEMBER 27.—Coal, for the Corporation. Forms from Mr. E. J. Elford, M.I.C.E., borough surveyor, Southend-on-Sea.

STOCKTON-ON-TEES, SEPTEMBER 22.—Treble-screened coals, for the Education Committee. Tenders to Mr. James Tweedy, secretary, Education Offices, 32, Dovecot-street, Stockton-on-Tees.

TONGRES, SEPTEMBER 25.—Coal required by the municipal electric generating station—viz., about 250 tons of small washed anthracite and about 200 tons of semi-bituminous slack. Information at the Secrétariat Communal. Collège des Bourgmestre et Echevins, Tongres, Belgium.

UXBRIDGE, SEPTEMBER 29.—Hard steam Warwickshire coal and yard slack, for the Urban District Council. Tenders to Mr. W. T. Harvey, clerk, 63, High-street, Uxbridge.

WALSALL, OCTOBER 7.—Deep and shallow nuts and coke, for the managers of the Rushall Council Schools. Sealed tenders to Mr. A. H. Lewis, clerk to the managers, 29, Leicester-street, Walsall.

WANSTEAD, SEPTEMBER 24.—Coal (35 tons, more or less) and coke (30 chaldrons, more or less), for the Urban District Council. Forms on application to the clerk at the Council Offices.

WARRINGTON, OCTOBER 3.—Coal, for the Education Committee. Forms from Mr. J. Moore Murray, Director of Education, Education Office, Sankey-street, Warrington.

WOLVERHAMPTON, SEPTEMBER 23.—Coal and slack, for the Corporation, in accordance with forms to be obtained from Mr. George Green, M.Inst.C.E., borough engineer, Town Hall, Wolverhampton.

WOLVERHAMPTON, SEPTEMBER 24.—Coal to the Wolverhampton and Midland Counties' Eye Infirmary, for the Managing Committee. Forms from the secretary.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ALEXANDRIA (EGYPT), SEPTEMBER 30.—Oils, &c.—H.M. Consul-General at Alexandria (Mr. D. A. Cameron, C.M.G.) reports that tenders are invited by the Municipality of Alexandria for the supply of various articles required for the use of the Service du Nettoyement during 1913-14, including oils and colours, wood, steel and iron bars, angle iron, bolts and nuts, screws, rivets, hrooms, buckles, wire, &c.\*

BALROTHRY, SEPTEMBER 24.—Pump and Well Sinking.—For erecting new cast iron pump in existing well at Ballyboghil, and for sinking wells and lining them at Barnageeragh and Lusk, and setting therein cast iron pumps, for the Rural District Council. Copy of specification can be seen at the clerk's office, or on application to the Council's architect, Mr. A. Scott, C.E., 49, Upper O'Connell-street, Dublin.

CORK, SEPTEMBER 28.—Wells and Pumps.—For sinking wells, supplying and erecting pumps, for the Rural District Council, according to plan and specification, which may be inspected at the Boardroom, Cork Workhouse.

DUNDALK, SEPTEMBER 22.—Well, &c.—For (a) the sinking of a well and the erection of a pump therein, at Castle-carragh; and (b) the erection of a fountain, the repairing of water pipes, and the building of manhole, &c., at Ravensdale, for the Rural District Council. Specifications can be seen at the office of Mr. P. R. Finigan, clerk, Council Office, Dundalk Union Workhouse, or at the office of Mr. Cahill, C.E., Francis-street, Dundalk.

DUNDEE, SEPTEMBER 22.—Gas Plant.—Gas compressing plant for high pressure distribution, spigot and faucet steel mains, for the Gas Commissioners. Forms from Mr. Alex. Yuill, engineer and manager, Gas Works, Dundee.

DUNDEE, SEPTEMBER 22.—Retort Plant.—Erection of vertical retort plant and telpor conveying plant at the Dundee Gas Works, for the Corporation. Forms from Mr. Alex. Yuill, engineer and manager, Gas Works, Dundee.

EDINBURGH, SEPTEMBER 22.—Turbines.—For the Corporation, two mixed pressure steam turbines and direct-current generating plant, each set to be of 1,500 kw. capacity. Specification, form of tender from the engineer, Dewar-place, Edinburgh, on payment of a deposit of £2 2s. (returnable).

HONG KONG (CHINA), OCTOBER 1.—Pumping Engines.—Government of Hong Kong invite tenders for the supply of two vertical, rotative, steam pumping engines, capacity of each 3 million gallons per day on a lift of about 400 ft., together with boilers, auxiliary plant, pipe work, &c., to be erected at the Tytam Tuk Water Supply Works, Hong Kong. Specification and form of tender obtainable at the office of the Crown Agents for the Colonies, Whitehall-gardens, London, S.W., on payment of deposit of £1 (returnable).

LEICESTER, SEPTEMBER 30.—Turbine, &c.—Erection at the generating stations of the following plant, for the Corporation:—(a) One high-pressure steam turbine, direct-coupled to one 3,000-kw., 3-phase alternator, together with condensing plant, high and low tension switchboards, rotary converters, &c.; (b) two water-tube boilers, together with fuel economiser, and the necessary steam feed, blow-off, and drain pipes, &c. Forms from Mr. T. R. Smith, borough electrical engineer, on payment of a deposit of £2 (returnable).

LONDON, SEPTEMBER 24.—Coal-hauling Plant.—For the Hammersmith Borough Council:—(a) Automatic weighing machine; (b) coal hoppers and tank; (c) dredger and water-pump; (d) welded steel pipes and connections; (e) travelling jib crane and track; (f) endless belt conveyors. Specifications and forms of tender can be obtained from Mr. G. G. Bell, engineer and manager, 85, Fulham Palace-road, Hammersmith, London, W., upon payment of £10 10s. (returnable).

LONDON, OCTOBER 23.—Water-softening Plant, &c.—Supplying and fixing water softener and purifying plant at the Infirmary, Lower-road, Rotherhithe, S.E., for the Bermondsey Guardians, according to the specification of Mr. A. H. Newman, F.R.I.B.A., &c. Specification, containing full particulars on deposit of £10 (returnable), from Mr. E. Pitts Fenton, clerk, 283, Tooley-street, S.E.

MELBOURNE (AUSTRALIA), OCTOBER 8.—Rails, &c.—For the supply and delivery of the following rails and fishplates, for the Agent-General for Victoria, Australia (alternative tenders): (Contract No. 25005) approximately 27,079 tons of 80 lb. steel rails; (contract No. 25006) approximately 2,215 tons of steel fishplates for 80 lb. steel rails. Specifications and forms of tender obtainable at the offices of the consulting engineers, John Coates and Co. Limited, 25, Victoria-street, Westminster, London, S.W.

MOUNTAIN ASH, SEPTEMBER 30.—Steel Tanks.—Supplying and erecting two circular steel tanks 46 ft. diameter and 20 ft. deep, together with platforms, ladders, &c., for the Urban District Council. Drawings, specification, &c., may be obtained on application to Messrs. Fox, Bateman and Fox, civil engineers, 5, Victoria-street, Westminster, or at the office of the surveyor (Mr. W. G. Thomas), Town Hall, Mountain Ash, on payment of a deposit of £5 (returnable after the contract has been entered into).

PONTYPRIDD, SEPTEMBER 24.—Steel Pipes.—Materials, including lap-welded steel flanged pipes and specials, valves, strainers, charging pump and gearing, air vessels, &c., for the Pontypridd and Rhondda Joint Water Board, Lluest Wen Reservoir (80 in. steel siphon, leap weir and penstocks). Specifications and full particulars obtainable from the Board's engineer, Mr. Ernest W. Terrey, Gelli-wastad-road, Pontypridd.

ROCHDALE, SEPTEMBER 24.—Cast-Iron Pipes.—About 24 yards of 12 in. diameter, 120 yards of 18 in. diameter, and 400 yards of 21 in. diameter cast-iron pipes and specials, for

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.



the Corporation. Plans and specification obtainable at the office of Mr. S. S. Platt, M.Inst.C.E., borough surveyor, Town Hall, Rochdale, on payment of a deposit of £1 (returnable).

SALFORD, SEPTEMBER 29.—*Compound Air Compressor.*—Compound air compressor, to the Corporation (Electricity Department). Specification, &c., from borough electrical engineer, Electricity Works, Frederick-road, Pendleton.

SHEERNESS, OCTOBER 6.—*Air-compressor.*—Erection of an air-compressor with receiver and air pipes, ram pumping engine, suction and delivery pipes, air vessel meter, &c.; also for the subsequent provision and erection of a surface condenser, stand-by compressor, and stand-by ram pumping engine, at Trinity-road pumping station, for the Urban District Council. Particulars from Mr. F. W. S. Stanton, civil engineer, 3, Victoria-street, Westminster, S.W., on deposit of £2 2s. (returnable).

SHEFFIELD, OCTOBER 6.—*Steel and Iron Work.*—For the steel and iron work in connection with the extension of the Grimsthorpe Works, for the directors of the Sheffield United Gaslight Company. Forms from Mr. J. W. Morrison, M.Inst.C.E., at the company's offices, Commercial-street, Sheffield.

OSWESTRY, SEPTEMBER 27.—*Cast Iron Pipes, &c.*—Supply and delivery of 120 tons of cast iron spigot and socket 7 in. diameter water pipes, branches, bends, &c. The Town Council also invite provisional tenders for the supply and delivery of 6,450 ft. lin. of 7 in. diameter solid-drawn weldless steel tubes. Specifications, &c., from Mr. G. William Lacey, C.E., borough and water engineer, Guildhall, Oswestry, on deposit of 1 guinea (returnable).

OSWESTRY, SEPTEMBER 27.—*Steel Pipe Laying.*—Excavation for cartage, laying and jointing of about 2,150 yards lineal of 7 in. diameter cast iron or steel pipes, together with the supply of sluice valves, air-valves, and hatch boxes, &c., and the construction of brick chambers, and other work in connection therewith. Plans, specifications, &c., can be seen on application to Mr. G. William Lacey, C.E., borough and water engineer, Guildhall, Oswestry.

WONTHAGGI (VICTORIA, AUSTRALIA), OCTOBER 1.—*Haulage Engine.*—Tenders are invited by the Victorian Railways Commissioners for the supply and delivery of a haulage engine (mechanical portion only), and a 200-horse power electric motor and equipment, for the State coalmine.\*

WORTHING, SEPTEMBER 29.—*Extension of Plant.*—Erection at the electricity works, Worthing, of one generating set, consisting of a Diesel oil engine and a direct-coupled direct-current generator, for the Corporation. Forms of tender, specification, plans and general conditions can be obtained, on payment of a deposit of £2 2s. (returnable), from Mr. J. Kennedy Allerton, town clerk, Municipal Offices, Worthing.

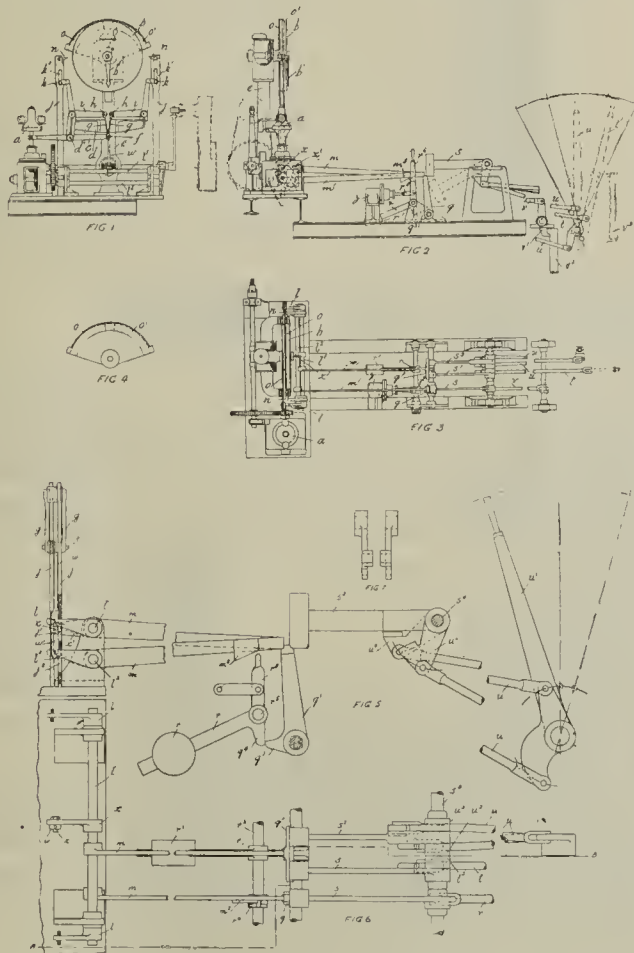
\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

#### Important Case Under the National Insurance Act.

An interesting case under the Insurance Act came before the Kettering magistrates at the Petty Sessions, recently, when the Kettering Iron and Coal Company Limited were summoned for a breach of the National Insurance Act of 1911, for failing to produce to Harry Walton Church, an inspector appointed under the said Act, their wages books upon being required to produce the same, at Rothwell, on April 17, 1913. Further, George Barrett, secretary of the company, was summoned for a breach of the same Act by wilfully obstructing the inspector named in the previous charge, when exercising the powers conferred upon him under sections 1 (b) and (c) at Rothwell on April 17. And Henry James Preston, managing director, was summoned for aiding and abetting the defendant. In opening the case for the Board of Trade, Mr. Read said that the case was the first case under that particular section. A visit was made to the firm in April last, as the Board of Trade thought that the firm had men insurable under Part II. of the Act in their employment. The inspector and the works manager went into the question, after which a long correspondence (which was read in court) took place between the Board of Trade and the firm. Then another visit of inspection was made, and they alleged that the inspector was refused permission to examine the books, which he had a right to do under the Act. The defence was that the firm had not wilfully refused any information to the inspector, and the Board of Trade had a mistaken notion of the principle of the working of the Act. Mr. Preston, in the correspondence, took up the position of asking who was insurable and he would then insure him. Arthur Evelyn Linnell, works manager of the firm, said that the inspector refused to make an appointment; also that he asked only to see the time books, and did not mention the wages books. Mr. Preston said he told Mr. Linnell to tell the inspector that he would see no books in his (witness's) absence, but if he would make an appointment he would be granted every facility. Witness was personally anxious to see the inspector. He had never seen the inspector before he came into court, and would not have known he was an inspector. The reason he did not let him have the books was because he wanted to meet the inspector himself. The chairman said that as this was a first case under the Act the Bench were of opinion that there had been a considerable amount of misunderstanding and a certain amount of feeling in the case. The Bench wanted it to be clearly understood that they intended the law should be enforced, but they had Mr. Preston's assurance that he had no intention of disobeying the law, and, taking all the circumstances into consideration, and this being the first case, the Bench would dismiss the case. They wanted it to be clearly understood, however, that it was not an encouragement to disobey the law, but they dismissed it as it was a first case. The Bench agreed to state a case. The other two cases were not proceeded with.

#### ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

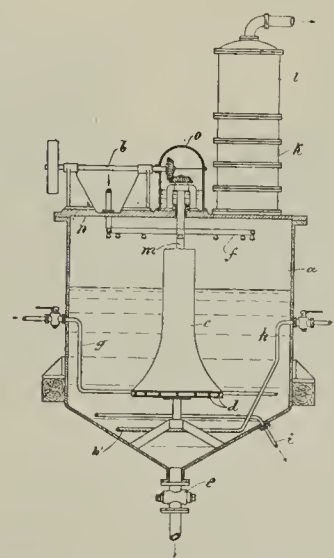
872 (1913). *Improvements in Apparatus and Appliances for Controlling Winding Engines.* J. W. Rose, of Burnside, and E. B. Whalley, of Whitehill, both of Canklow, Rotherham, Yorkshire.—Consists of an improved form of gear, and further, in providing the means, when excessive speed is attained, of automatically cutting off the steam, centring the reversing lever, and after an interval which can be adjusted within wide limits, putting on the brake, thereby avoiding the shock which would be occasioned if these operations took place simultaneously. By the appliances the interval between shutting off steam and putting on the brake may be very easily adjusted. When the cage is near the top or bottom of the shaft, and the engine being under control is moving at a moderate speed, the shutting off of the steam, centring of the reversing lever and putting on the brake are done simultaneously. Fig. 1 is an end elevation of the improved gear; fig. 2 is a side elevation; and fig. 3 is a plan of the same. Fig. 4 is an elevation of the ratchet wheel segments; fig. 5 is a side elevation partly in section (on the line A B fig. 6) to an enlarged scale showing further details of construction; fig. 6 is a plan view of the same; fig. 7 is a front elevation of the cranks employed in connection with the reversing and steam rods. The upper ends of the side rods *jj* are provided with pawls *n n'*, which pawls are free to move in an upward but not in a downward direction. When the speed of the engine is increased, thus causing the governor to rise, the side rods are caused to move inwards and the pawls mounted thereon engage in the teeth of eccentric ratchet wheel segments *o o'*, the teeth of which are made to correspond with any desired number of revolutions of the engine. One ratchet wheel segment *o'*



controls the engine when running clockwise, and a similar one *o'* controls the engine when running counter-clockwise the two being placed together eccentrically on the same shaft as the indicating needle *b'*, which shows the position of the cages in the shaft. The ratchet wheel segments *o o'* are so arranged as to ensure that after the cages have reached a predetermined point in the pit shaft the speed of the engine is gradually reduced until the cages come to rest at the top and bottom of the shaft respectively. Should the engineman neglect to reduce the speed of the engine when the cages are nearing the end of the wind, the side rods *jj* would be drawn towards each other by the action of the levers previously described being operated by the rising of the governor, and one of the pawls *n* or *n'* would engage with the teeth in one of the toothed segments *o* or *o'*, according to the direction in which the engine was running. This action would push one of the side rods *jj* downwards, which in turn would depress the ends of the levers *l l'*, and actuate the shafts *l' l'*, thus raising the ends of the levers *m* and *m'* out of the engagement with the pivoted vertical levers *q q'*. These levers *q* and *q'* would then fall back, releasing the balance weights on the levers *s s'* and *s'*, which would then actuate the steam rod *t*, the reversing rods *u u* and the brake rod *v*. When the cages are at the end of the wind the stop on the segments *o* or *o'* is just touching one of the pawls *n* or *n'*. Any further movement of the cages at once operates the gear and therefore it is impossible for the engineman to start away from the top in the wrong direction. By adjusting the toothed segments circumferentially the cages can be free to be raised or lowered to any predetermined distance beyond the landing before the gear comes into action. Also when putting on new

ropes or recapping the toothed segments can likewise be quickly adjusted. Should the speed of the cages during the wind through any reason become excessive the engine will be automatically brought to rest gradually without any shock in the following manner. The governor rising will depress a rod *w*, pivoted to the lever *c*, by the pin *f*. In the lower end of this rod *w* is formed a vertical slot *w'*, so that at any predetermined speed the top of this slot engages with a pin *x* before the side rods *j* have been brought into action, this pin *x* depresses a lever *x'*, thereby actuating the shaft *l'*, the lever *m*, also the connections between the steam and reversing rods in the same manner as previously described for the overwinding gear, but it does not actuate the brake at the same time because it does not liberate the lever *m'* out of engagement with the lever *q* instantly. The brake is actuated in the following manner. When the weights controlling the levers *s* and *s'* are liberated the adjustable weight *r* is released by the falling of the lever *q*, which in turn causes the shaft *r'* to rotate and thereby move the lever *r'* (on the same shaft) backwards, which lever through a link *r''* moves a perforated piston in an oil cylinder *z*. When this piston reaches the end of its stroke the end of the lever *m'* will be raised by means of the lever *r'*, sliding underneath a wedge shaped projection *m''* on the underside of the lever *m'*. As soon as the end of this lever *m'* is raised the brake comes into action by reason of the lever *q* being released, and thereby allowing the lever *s* to fall, and by adjusting the weight *r* on the lever *r*, the interval between shutting off of the steam and putting on the brake can be regulated, and if required the brake need not be put on until the centring of the reversing lever has brought the engine to rest without any shock. In such a case it is only necessary to put the brake on in order to prevent a cage running back down the shaft. This attachment is equally applicable either to a steam or to a foot brake. The brake lever *v* if connected to a catch lever *v'*, which engages a lever *v''*, weighted at its bottom end and slotted to allow the ordinary brake lever to pass through it, so that the engineman can work the brake by his foot through the lever *v''*, shown in dotted lines, when making a normal wind. When the automatic gear is operated the lever *v'* is released, and being weighted falls and depresses the ordinary brake lever, thereby putting on the brake. The engineman is free to move his rods by means of the hand levers *u*, *t* without in any way affecting the gear. (Two claims.)

3465 (1913). *Improvements in Apparatus for the Purification and Distillation of Benzol.* Dr. H. A. Gasser, of Gneisenaustrasse 35, Wiesbaden, Germany.—Provides an apparatus combining the functions of benzol purifier and distilling apparatus. This apparatus is shown in the annexed drawing in longitudinal section. The action is as follows: After the benzol has been purified in the manner

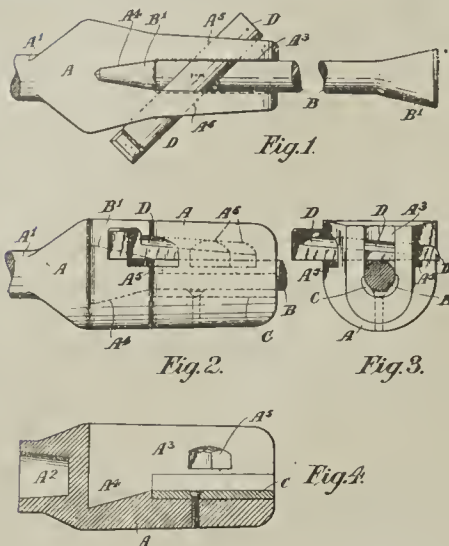


hereinbefore described, the liquid is heated, whereupon distillation commences with the vapour passing through the columns *k* and the return flow cooler arranged on the same. Thereupon fractionation is effected until the products of high boiling point are driven off by means of steam escaping from the heater *h*. The distillation gases are condensed in known manner in the columns of the dephlegmator *h*, and in the return-flow cooler *l*. (Three claims.)

8560 (1913). *An Improved Rock Drill Chuck.* M. T. Taylor, formerly of Mount Chalmers, Queensland, Australia, but now of the Phoenix Mines, near Liskeard, Cornwall, England, and J. F. Gardiner, of Mount Chalmers, Queensland, Australia.—Relates more especially to a chuck for the connection of drill bits to the piston rods of rock drills of the reciprocating percussion type driven by compressed air or any other motive power. The object is to provide an improved chuck affording means of connection of drill bits to the piston rods of rock drills, which drill bits are sharpened at both ends to similar or dissimilar shapes. This is accomplished by providing a chuck which consists of a chuck casing having a longitudinal slot formed therein for the reception of the drill bit and a diagonal keyway cut transversely thereto with a tapered key in the said keyway adapted to bear upon the shank of the bit and hold the same in place. Fig. 1 is a plan of a drill chuck constructed according to this invention, in which the chuck is integra

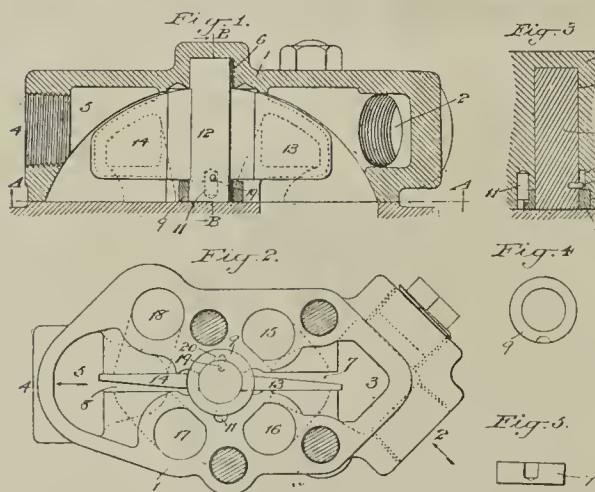


with the piston rod showing the drill bit secured in position. Fig. 2 is a side view, and fig. 3 an end view of the same. Fig. 4 is a central longitudinal section of a chuck with the



bit removed, adapted to be connected to the end of the piston rod. (Four claims.)

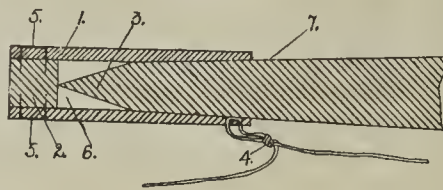
10092 (1913). *Improvements in Percussive Tools*. W. J. Mellersh-Jackson, of 28, Southampton-buildings, London, Middlesex. (Communication from Ingersoll-Rand Company, No. 11, Broadway, Manhattan, New York, U.S.A.)—Relates to that type of valve mechanism in which a winged oscillating valve is employed for controlling the admission and exhaust of the motive fluid which operates the work piston of the tool, a novel mounting being provided for the valve whereby its operation is facilitated and its life prolonged. Fig. 1 is a longitudinal section through the valve chest and seat, the valve being shown in side elevation and its end bushing in section; fig. 2 is a section taken in the plane of the line A—A of fig. 1, looking in the direction of the arrows; fig. 3 is a detail transverse section, taken in the plane of the line B—B of fig. 1, looking in the direction of the arrows; fig. 4 is a plan view of the end bushing; and fig. 5 is a side view of the same. The valve chest 1 is provided with a motive fluid inlet 2 leading to an inlet chamber 3, and a motive fluid outlet 4 leading from an outlet chamber 5. Intermediate the inlet and outlet chambers 3 and 5 is located a cylindrical chamber 6 from which cylindrical chamber slots 7 and 8 lead to the inlet and outlet chambers 3 and 5 respectively. These slots 7 and 8 and the intermediate cylindrical chamber 6, all open through the inner face of the valve chest 1 for permitting the ready assembly and removal of the parts as will hereinafter appear. An end bushing 9 is



seated in the enlargement 10 of the cylindrical chamber 6 at the mouth of said chamber. This end bushing 9 is removable from the valve chest and is locked against rotative movement by means of a pin 11, inserted into a recess formed partly in the outer wall of the end bushing and partly in the walls of the enlargement 10 of the cylindrical chamber 6. A double-winged oscillating valve is located in the valve-chest, the cylindrical body portion 12 of which valve is fitted to the cylindrical chamber 6 in the valve-chest, the inner end of said cylindrical body portion being journaled in the bushing 9. The wing 13 of the valve is located within the slot 7, and the wing 14 of the valve is located within the slot 8. The slots 7 and 8 and the wings 13 and 14 are so shaped with respect to each other that the valve is permitted a slight oscillatory movement for alternately opening and closing communication between the inlet chamber 3 and the inlet passages 15, 16, and for alternately opening and closing communication between the outlet passages 17, 18 and the outlet chamber 5. (Four claims.)

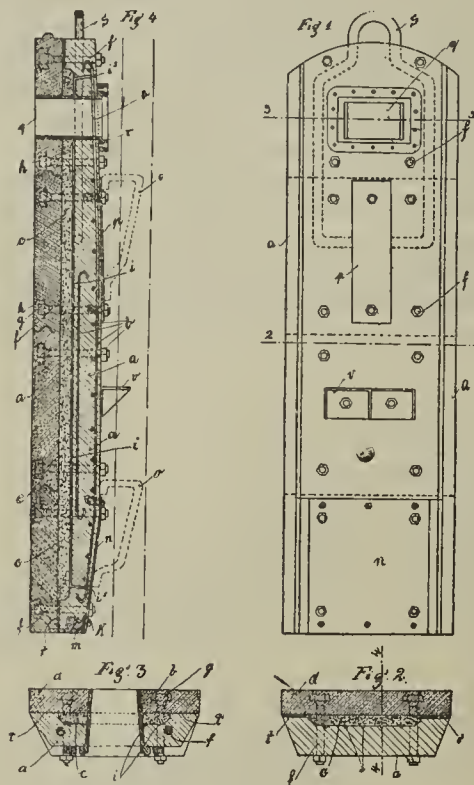
21512 (1912). *Improvements in and Relating to Protectors for the Points of Miners' Pick Blades*. E. Watkins, of Tynewydd, Pentyrch, near Cardiff.—Consists of a tubular sheath of nearly uniform outside diameter, made of somewhat smaller mouth-bore than the part of the blade to be protected, such sheath having one end closed with a cylindrical plug of tenacious resisting material for about one-third of the tube's length. Near the mouth holes may be inserted a cord or tape attached for the purpose of drawing together two protected blades or for

giving the protector an additional attachment to its own blade. The plug is secured in the tube end by passing a number of nails, staples or rivets through the tube wall



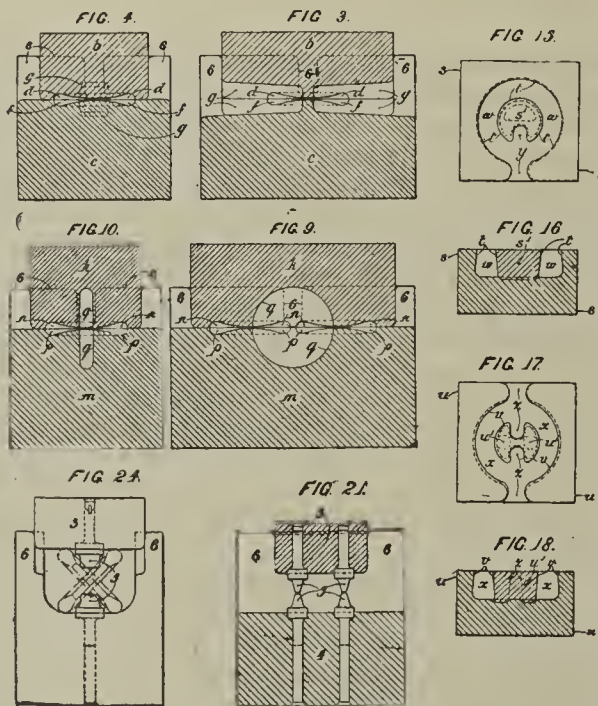
into or through the plug. The accompanying drawing shows in medial longitudinal section the miner's blade point with the protector covering same. (One claim.)

27073 (1912). *Improvements in Doors for Coke or other Ovens or Furnaces*. H. Kickert, of Herringen, near Hamm i/W., Germany.—Consists of a door having an outer wall of concrete, which is provided on the fire side of the door with a heat-insulating layer. This layer may be composed of keiselguhr, "stone wood" or the like, and a wall of renewable grooved and tongued bricks of highly refrac-



tory material may be provided as an inner lining, so that the layer of keiselguhr or the like is enclosed between this inner wall and the outer wall of concrete. Fig. 1 is a front elevation; fig. 2 is a horizontal section on the line 2—2 in fig. 1; fig. 3 is a cross-section on the line 3—3 of fig. 1; fig. 4 is a vertical longitudinal section on the line 4—4 in fig. 2. (Five claims.)

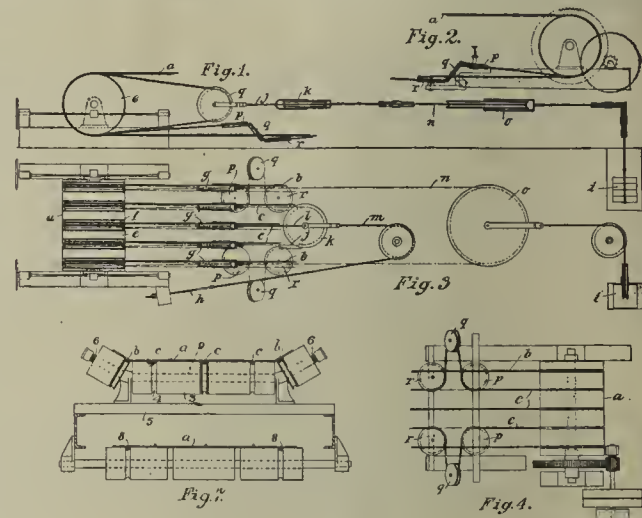
28075 (1912). *A New or Improved Method of, and Means for, Manufacturing Weldless Couplings*. F. Gross, 63, Fern-avenue, Jesmond, Newcastle-upon-Tyne, and A. F. Gross, 12, Clarence-crescent, Whitley Bay, Northumberland.—Relates to improved tools and dies, and method of manufacturing weldless couplings, and more especially weldless couplings for railway wagons, mining tubs and other vehicles. Figs. 3 and 4 are central vertical cross-sections at right angles to each other of the dies or tools used for



the first operation; figs. 9 and 10 are central vertical cross-sections at right angles to each other of the dies or tools used for the second operation; figs. 15 and 16 are a plan and central vertical cross-section of one of the dies or tools, and figs. 17 and 18 are similar views of the other die or tool used for removing the fins or webs within the discs or partially-formed links; and fig. 21 is a central vertical cross-section of the tools used for separating and loosening the adjacent links; fig. 24 is an elevation at right angles to

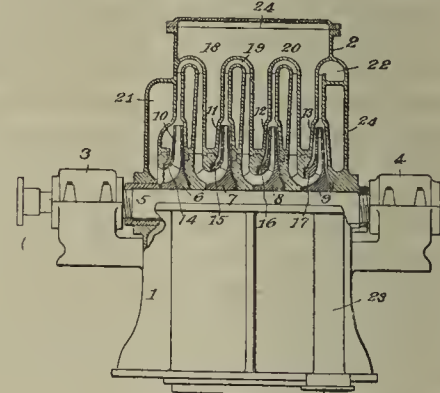
fig. 21, showing the method of separating the adjacent links. (Six claims.)

28508 (1912). *Improvements in or connected with Belt Conveyors*. J. W. White, of R. White and Sons, Widnes.—In the specification of patent No. 28236 of 1907 is described a belt conveyor of the type in which the driving tension is taken by a number of flexible members such as ropes or chains, whilst the load is carried by a belt which lies upon these flexible members. It is to belt conveyors of this type that the present invention relates, and the invention deals more particularly with the means for applying tension to take up the slack of the flexible members. Fig. 1 is a side elevation of one end of a conveyor loop; fig. 2, a side



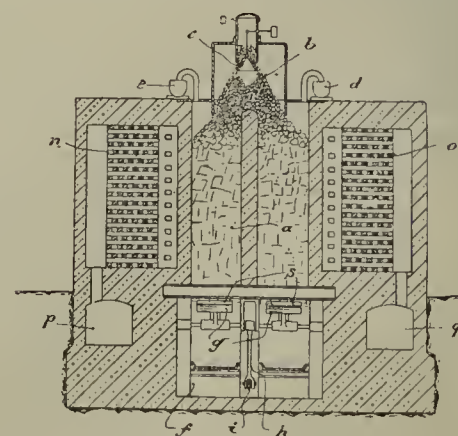
elevation of the other end of the loop, and figs. 3 and 4, plan views corresponding to figs. 1 and 2 respectively; figs. 5 and 6 are side elevation and plan view respectively showing a tensioning device applied at a part of a conveyor loop located at a distance from the end thereof; fig. 7 is a view of an intermediate supporting device for the conveyor. The pulleys are, in the present case, all of the same diameter as indicated in the drawings, and if it is desired to maintain the trough shape of the belt in the immediate neighbourhood of the ends an arrangement such as that indicated in fig. 7 may be employed. This arrangement may also be employed at other points where it is desired to have a trough-shaped belt and have the ropes all at about the same level. (Four claims.)

29077 (1912). *Improvements in Centrifugal Compressors*. W. J. Mellersh-Jackson, of the firm of Haseltine, Lake and Co., 7 and 8, Southampton-buildings, London. (Communication from the Ingersoll-Rand Company, 11, Broadway, New York, U.S.A.)—Relates to multistage turbo compressors and more particularly to the design of the impellers and the blades of such impellers. The exit handles of the



blades are decreased from stage to stage, or in the last stage or stages. This results in a retarding of the air in the later impellers, so that their peripheral orifices and blade width can be of reasonable dimension and the impellers can be of the same or slightly decreasing diameters from stage to stage. A practical embodiment of the invention is shown in the accompanying drawing. (Four claims.)

29371 (1912). *Improvements in Apparatus for Discharging Vertical Retorts*. H. Koppers, Moltkestrasse 29, Essen-Ruhr, Germany.—A vertical gas retort is used so proportioned that its horizontal section is approximately similar to the transverse vertical section of a horizontal coking oven, and



by this means the result is obtained that the cake of coke also has a tendency to divide or split at the centre, directly over the wedge-shaped appliance arranged in the bottom of the retort. In order that this tendency may occur the



BRUSSELS EXHIBITION: "GRAND PRIX."

ROUBAIX EXHIBITION, 1911: GRAND PRIX."

# HOPKINSON-FERRANTI

PATENT

## STOP VALVE

For Steam and High Pressure Water Service.

The GREATEST ADVANCE in VALVE CONSTRUCTION of the TIMES.

### Less Weight, Cost & Leakage.

This Valve has been invented and designed to enable a valve having operative parts of half the ordinary diameter to pass a large amount of steam through a small working part.

#### PRINCIPLE:

Converting the pressure of the fluid into velocity and re-converting the velocity into pressure, thereby passing an amount of steam equal to full carrying capacity of pipe.

#### SELLING POINTS:

Passes the same quantity of steam as a full-bore valve.  
Reduction in cost over ordinary fullway valves.

Considerably less weight.

Seats half diameter of ordinary sluice valve, therefore halves possible leakage.

Reduces vibration in pipes.

Graded opening—no sudden rush of steam in opening.

No bye-passes necessary, thereby saving their cost.

Is not subject to wedging action or mechanical strain.

The discs slide with a flexible pressure upon the seats, thereby preventing cutting and scoring.

When the valve is open the seats are protected from the flowing fluid by the eyepiece.

Always easy to open and close under pressure.

It is an ideal valve for high temperature superheated steam, as there are no cast iron internal working parts.

#### DISCS AND SEATS OF HOPKINSON'S "PLATNAM" METAL.

Suitable with Superheated Steam

UPWARDS OF 9,000 IN USE AT 220 Collieries,  
180 Electric Power Stations. 90 Iron and Steel  
Works, 130 Textile Mills, Turbine Makers, &c., &c.

#### VALVES in STOCK WITH IRON or STEEL CASINGS.

#### Hopkinson's Patent Safety

#### Boiler Mountings & Valves

For High Pressure Superheated Steam, High-class  
Exhaust and Water Sluice Valves for Condensing  
plants, &c., Automatic Exhaust Valves, Reducing  
Valves, Steam Traps, &c., &c.

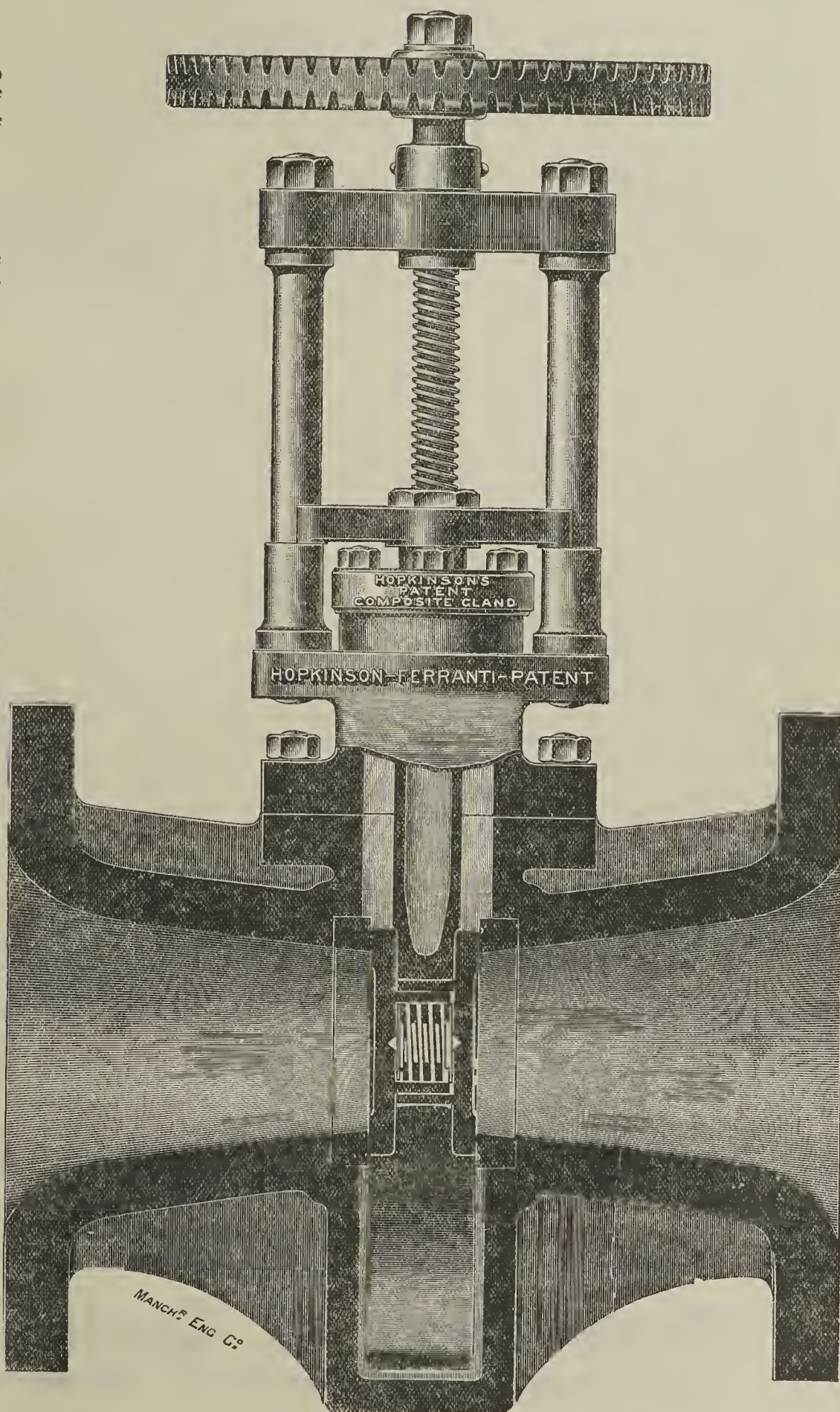
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length of the elongated cross-section must be considerably greater than its width; the proportion of about 5:1 is found very convenient, and certainly the proportion must exceed 2:1. The heating need not be confined to the longer sides, but must be mainly at those sides, or else the coke will not split regularly, parallel with same. The accompanying drawing is a vertical cross-section of a bank of retorts. (Five claims.)

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To be published on October 2, 1913.

1912.

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23561. Hydraulic drilling apparatus. Von Vangel.  
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1913.

10684. Coke ovens. Dr. C. Otto and Co. Ges.  
16599. Regenerative coke ovens. Lecocq.  
18501. Process and apparatus for supplying air and oxygen or the like to independent deep-diving apparatus. H. Drägerwerke und B. Dräger.  
19872. Process of and apparatus for the dry distillation of coal and the like. Ofenbau Ges.  
20177. Oscillating conveyor channels and the like. F. L. Smith and Co.

### PUBLICATIONS RECEIVED.

UNION OF SOUTH AFRICA MINES DEPARTMENT ANNUAL REPORT, PARTS 1 AND 2, FOR 1912. Pretoria: Government Printing and Stationery Office. Price 10s. 6d.

RECORDS OF THE GEOLOGICAL SURVEY OF INDIA, Vol. 43, Part 2. Calcutta: Geological Survey. Price 1 rupee.

"The Journal of the Chemical, Metallurgical and Mining Society of South Africa" (Vol. 14, No. 1), July, price 3s.; "Journal of the South African Institution of Engineers" (Vol. 11, No. 12), July, and (Vol. 12, No. 1), August, price 2s. each; "Bulletin et Comptes Rendus Mensuels de la Société de l'Industrie Minérale" (Tome 4, No. 8), August; "Revista del Ministerio de Obras Publicas—Publication Mensuel" (No. 31), July; "Le Mois Scientifique et Industriel" (No. 168), August, price 2 fr.; "Revue Universelle des Mines et de la Métallurgie" (Tome 3, No. 2); "Annales des Mines" (Tome 4, No. 8); "Engineering Magazine" (Vol. 45, No. 6), September, price 1s.; "Mining Magazine" (Vol. 9, No. 3), September, price 1s.; "Transactions of the Institution of Mining Engineers" (Vol. 45, Part 5).

**Grimsby Coal Exports.**—The export of coal from Grimsby during the week ended on the 12th inst. was shown by the official returns to total 20,152 tons foreign, and 461 tons coastal, as compared with 28,274 and 940 tons respectively during the corresponding week of last year. The shipments were as follow:—To Ahus, 3,102 tons; Antwerp, 721; Christiania, 152; Esbjerg, 107; Flekkefjord, 573; Drammen, 1,150; Dieppe, 1,352; Gothenburg, 2,248; Hamburg, 448; Helsingborg, 695; Herrang, 2,104; Kallundborg, 615; Korsoer, 956; Malmo, 1,933; Rotterdam, 269; Skien, 775; and Stockholm, 2,952. Coastal: To London, 199; and Whitstable, 262.

### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

Railway Accidents for Three Months Ending March 1913, 1s. 4d.

COAL MINES ACT, 1911, ABSTRACTS: (No. 55), Relating to Firemen, Examiners or Deputies; (No. 59), Winding Enginemmen; (No. 63), Boiler Minders; (No. 67), Underground Workmen in Safety Lamp Mines; (No. 68), Surface Workmen; (No. 57), Firemen, Examiners and Deputies; (No. 62), Horsekeepers and Drivers in Charge of Horses; (No. 58), Electricians and Assistant-Electricians; (No. 61), Onsetters; (No. 64), Persons in Charge of Ventilating Machines; (No. 65), Shot-firers; (No. 56), Mechanical Engineers—1d. each, or 3s. 5d. per 100; General Regulations Abstracted in Poster Form, 4d.

Statistical Abstract of British India, 1902-3 to 1911-12, 1s. 7d.

Report on the Trade in Imports and Exports at Irish Ports, December 31, 1912, 1s. 1½d.

Consular and Trade Reports, 1912: Seychelles, 6½d.; Sierra Leone, 4d.; Germany, Bavaria, 1912-13, 5½d.; Cyprus, 1912-13, 5½d.; Falkland Islands, 2d.; Turks and Caicos Islands, 2½d.

Boiler Explosion Report: (No. 2237), Vertical Boiler at Hawksworth, Yorkshire, 2½d.

**Home Office Prosecution in Staffordshire.**—At Old Hill Police Court, on the 10th inst., Messrs. Robert Fellows Limited, proprietors of the Corngreaves Colliery, Cradley Heath, were summoned for unlawfully permitting certain cables in the mine, not being flexible cables for portable apparatus or signalling wires—to wit, cables in the main dip and in a roadway to the right at the foot of the main dip—not to be covered in certain parts with insulating material, contrary to Rule 12 of the Electricity Rules. They were further summoned for unlawfully permitting the live parts of certain electric terminals in the mine—to wit, the switchboard ammeter terminals in the 7-horse power motor house in the main dip—not to be so constructed and installed that they were so protected or enclosed as to prevent accidental contact by persons, contrary to Rule 10 of the Electricity Acts. Two similar summonses were preferred against Isaac Meachem, of Perry Park House, Black Heath, the manager of the colliery. Messrs. Fellows Limited and Mr. Meachem were further summoned under the Factory and Workshops Act for permitting a certain fuse to be in use in the electrical generating station which was not so constructed or so guarded or placed as to prevent danger from arcing or the scattering of hot metal when in operation, contrary to Regulation 5 of the Electricity Regulations. Mr. Hugh Johnstone, divisional inspector of mines, who prosecuted, said on May 27 last Mr. Felton, assistant inspector, visited the pit, in company with Mr. R. Nelson, electrical inspector of mines, and in the course of their examination found a number of defects in the electrical apparatus which might have had serious consequences. As a matter of fact, they discovered 16 bare parts in the cables. They also found that the fuses at the generating station were so constructed as not to prevent danger from arcing or the scattering of hot metal when in operation. Mr. Robert Nelson gave evidence in support of this statement. He said a number of the bare places were due to the removal of lamps, which had been cut away leaving the parts exposed. Most of them had probably been caused by the dropping of some material from the roof. All the defects could be repaired within two hours. For the defence, Mr. Waldron submitted that as Mr. Robert Fellows took no part in the management of the colliery he could not be held responsible. In the case of Mr. Meachem he was not conversant with the Electricity Regulations, that work being delegated by him to a qualified electrician. He contended that the latter was the proper person who should have been proceeded against. After a lengthy hearing the Bench fined Messrs. Fellows Limited £2 and costs for permitting the cables to be exposed, and the other case was dismissed on payment of costs. The cases against Mr. Meachem were dismissed.

## Prevention of Coaldust Explosions.

SIR HENRY CUNYNGHAME, Chairman of Explosions in Mines Committee,  
**RECOMMENDS**

Fifty per cent. Incombustible Dust—**ONE TO ONE**,  
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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

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No. 2752.

## THE ABSORPTION OF OXYGEN BY COAL.

### Part I.\*

By T. F. WINMILL, B.A., B.Sc., Senior Demy, Magdalen College, Oxford; Research Chemist at the Doncaster Coalowners' Laboratory.

The liability of some coals to spontaneous combustion by the absorption of oxygen from the air has been the subject of many experiments, but, so far, it cannot be said that the nature of the action is at all clear. A systematic investigation of the whole subject has been undertaken by the Doncaster Coalowners' Committee, and the following paper gives an account of some preliminary experiments dealing with the rate of absorption of oxygen by coaldust kept at a constant temperature, and carried out in the laboratory recently established by the Doncaster Coalowners' Committee at Bentley Colliery, Doncaster.

The method employed has been to immerse a vessel containing coaldust in a bath kept at a temperature constant to within a few hundredths of a degree, and

(so that there could be no doubt of its oxygen content), and was drawn through the coaldust by a water-aspirator arranged to give a constant flow for any length of time desired. The rate of flow of the air was determined by measuring the time required for a given volume of water to flow from the aspirator, just before the sample was taken.

The specimens of coal used have all been taken from a mine working the Barnsley seam, which is liable to spontaneous combustion. For the experiments described, it is most important that the coal should be quite fresh. A piece taken 2 ft. behind a face which has stood a day may be already partly oxidised. The average interval from the winning of the coal to the time when it was ground and in the experimental vessel has been about two hours. In selecting the coal used, a piece has always been taken from a rapidly advancing face.

The analyses of the air-stream which had passed over the coal were performed as follows:—Two analyses were made on each sample. In the first, the carbon dioxide and oxygen were absorbed, leaving a residue of nitrogen

The results of the above-mentioned analyses give the percentage of oxygen, carbon dioxide, combustible gas and nitrogen in the sample. To determine the amount of oxygen absorbed by the coal, two methods are available. One is to calculate how much oxygen has been associated originally with the nitrogen in the issuing air, and subtract from this the oxygen remaining after the air has passed over the coal. A second method (giving, of course, the same result) is that described below. First, the oxygen percentage is corrected for the dilution produced by the combustible gas and the carbon dioxide taken up from the coal by the air-stream. This

correction has been taken as  $+\frac{p_1 \times p_2}{100}$ .

Where  $p_1$  = percentage of oxygen found by analysis, and  $p_2$  = percentage of combustible gas + percentage of carbon dioxide - 0.03.

The amount of oxygen absorbed per 100 grammes of coal per hour measured in cubic centimetres at 0 deg. Cent. and 760 mm. is then—

FIG. 2.—HARD COAL, BARNSLEY BED.

FIG. 1.—COMPARISON OF VARIOUS PARTS OF BARNSLEY SEAM.

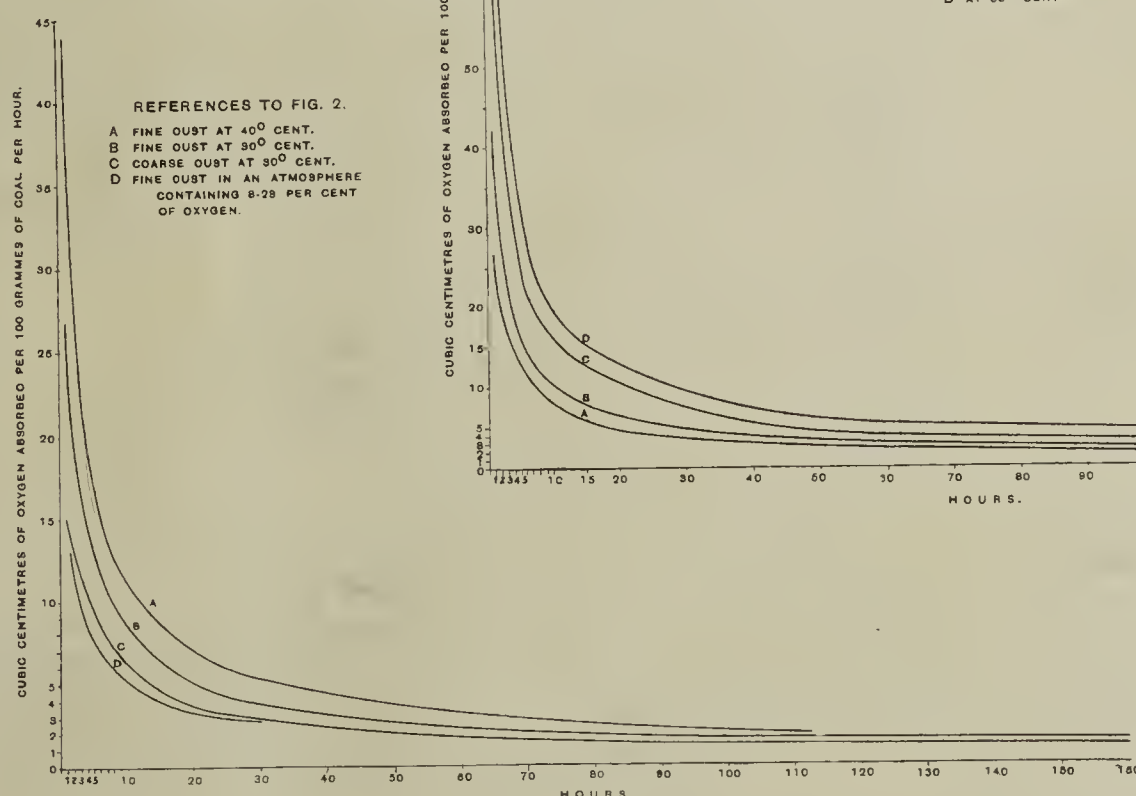
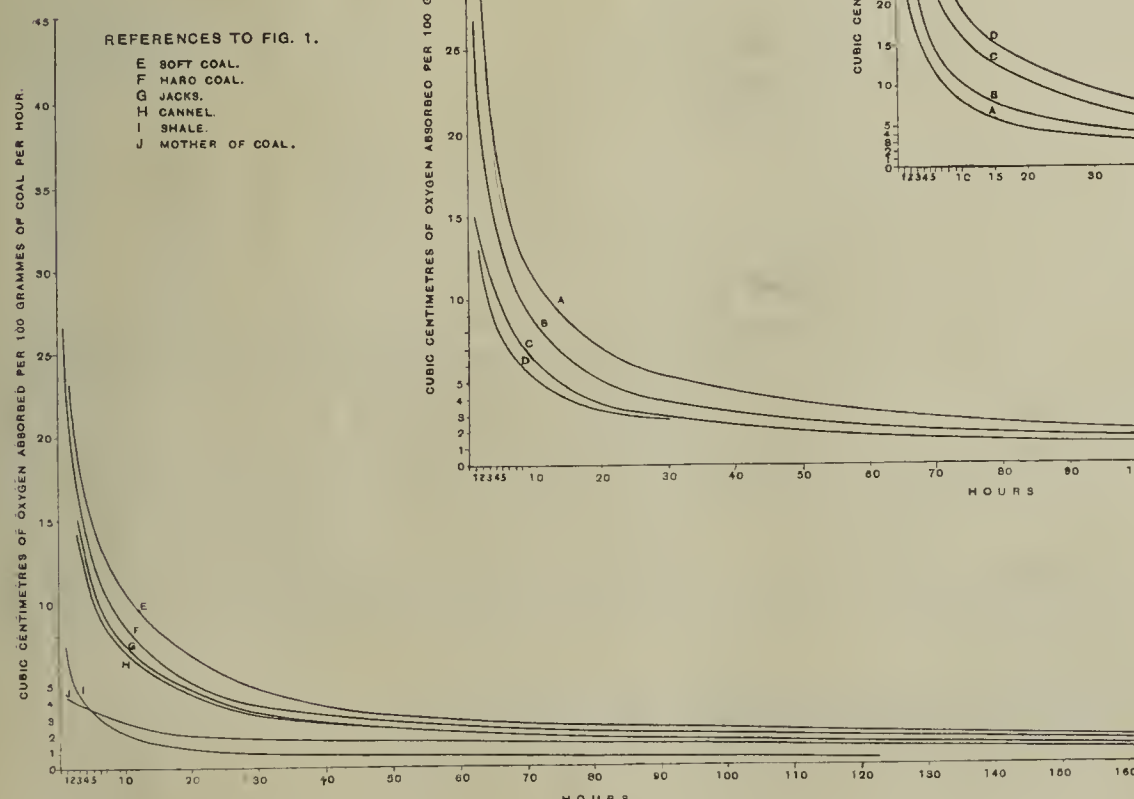
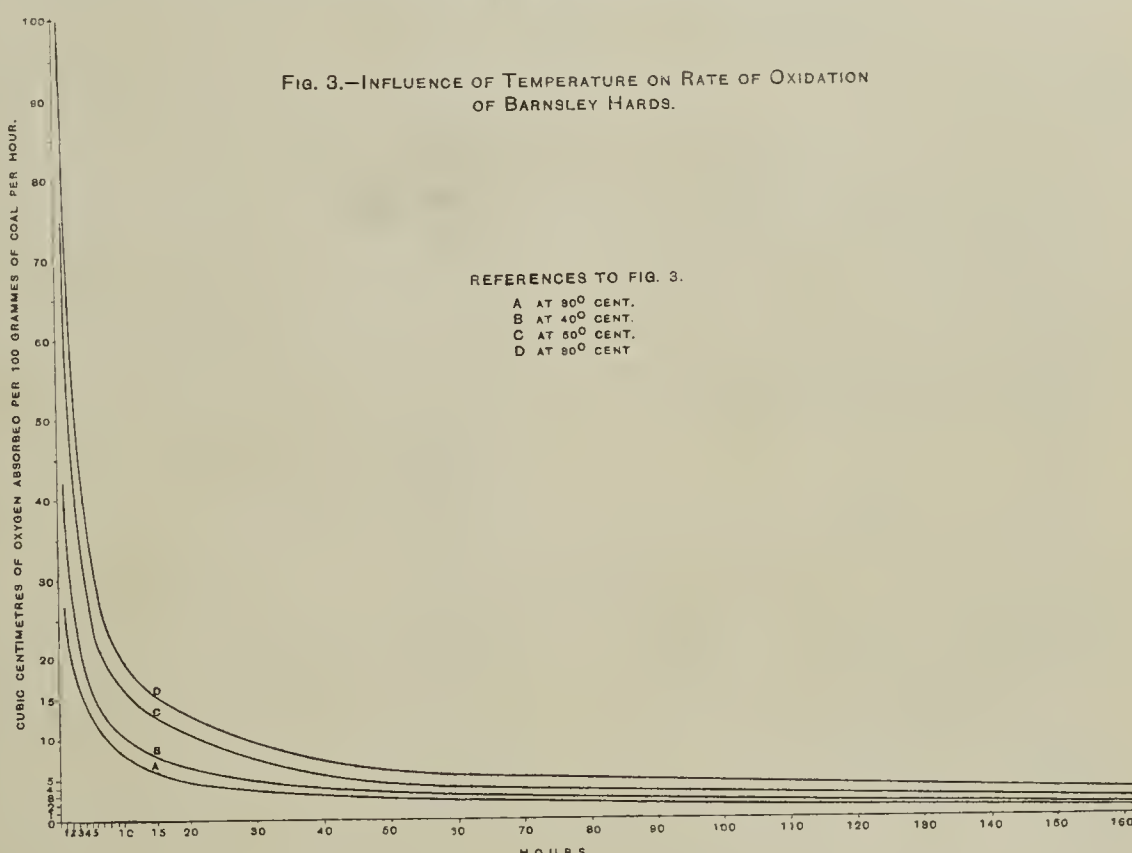


FIG. 3.—INFLUENCE OF TEMPERATURE ON RATE OF OXIDATION OF BARNSLEY HARDS.

REFERENCES TO FIG. 3.

A AT 30° CENT.  
B AT 40° CENT.  
C AT 50° CENT.  
D AT 60° CENT.



to pass a steady stream of air evenly through the whole mass of dust. Much attention has been given to the last point so as to ensure that the air did not find its way through definite channels in the dust, and so fail to ventilate thoroughly the whole. Samples have been taken in the issuing air-streams at intervals and analysed with the laboratory form of the Haldane gas-analysis apparatus. From the results of these analyses the absorption of oxygen can be calculated, as will be shown. The "intake" air was obtained from a pipe passing through the walls of the laboratory into the outside atmosphere

\* From a paper read before the Institution of Mining Engineers, Manchester, September 1913.

and combustible gas. In the second part of the sample the carbon dioxide was absorbed, the combustible gas burnt in the usual way, and the resulting carbon dioxide absorbed; finally, the oxygen was also absorbed. The residue consists of nitrogen. The difference between the residues in the two cases gives the quantity of combustible gas, independently of any assumption as to its chemical nature. It is most important that the analysis should be performed in this way, as, for the estimations of small hydrocarbons, very misleading results may be obtained by determining only the ratio of the contraction on combustion to the carbon dioxide produced by the combustion.

$$R \times \frac{100(P-p)}{79.04} \times \frac{B}{760} \times \frac{273}{T} \times \frac{160}{W};$$

Where—

R = rate of flow of air, in cubic centimetres per hour,

P = percentage of oxygen in the "intake" air,  
p = the corrected percentage of oxygen in the sample,

B = the barometric height, in millimetres,

T = the absolute temperature of the air which has passed over the coal, and

W = the weight of coaldust used in the experiment, in grammes.



four sets of experiments have been carried out,

On the relative rates of oxidation of the various parts of the Barnsley seam.

(b) On the effect on the rate of oxidation of reducing the oxygen content in the intake air.

(c) On the effect of the size of the coaldust particles on the rate of oxidation.

(d) On the effect of temperature on the rate of oxidation.

#### Relative Rates of Oxidation.

As a rule, the following substances occur in this seam, in somewhat varying proportions:—(1) Hard coal, (2) soft coal, (3) cannel coal, (4) jacks, (5) shale and (6) mother of coal. The rates of oxidation of these six substances have been determined at 30 degs. Cent., since this temperature appears to be somewhere near a normal cool goaf temperature for the mine from which the samples were taken.\* The results are plotted as curves (figs. 1, 2 and 3).

The curves plotted from these results show clearly (1) the very rapid oxidation which takes place in the first few hours in freshly got coal, and (2) the fact that this is followed by a much slower absorption which persists for a long time. The similarity of the results for the different parts of the seam is noteworthy. With the exception of those for the mother of coal and the shale, the curves lie very close to one another, showing that there is little difference in the rates of oxidation. The amount of oxygen absorbed is roughly proportional to the content of carbonaceous matter in each substance, as is shown by Table I.

TABLE I.—SHOWING THE RELATION BETWEEN THE AMOUNT OF OXYGEN ABSORBED AND THE CARBONACEOUS MATTER CONTENT.

Substance.	Ash.	Moisture.	Carbonaceous matter.	Oxygen absorbed.
	Per cent.	Per cent.	Per cent.	Cub. cm.
Hard coal	3	6 (about)	90	760
Soft coal	5	6	90	830
Cannel coal	14	6	80	587
Jacks	17	8	75	560
Shale	72	10	18	169

The substance least capable of spontaneous heating is the mother of coal, a charcoal-like substance which often occurs in partings. The oxygen absorption is very small, and the whole curve is flat, in comparison with the steep initial portion shown by the others.

A mathematical analysis of these curves shows that each represents, with a fair degree of accuracy, the sum of two chemical reactions obeying equations:—

$$(1) \quad \log_e \frac{A_1}{X_1} = K_1 T.$$

$$(2) \quad \log_e \frac{A_2}{X_2} = K_2 T.$$

Where  $A_1$  and  $A_2$  and  $K_1$  and  $K_2$  are constants, and  $X_1$  and  $X_2$  are the rates of absorption of oxygen in each of the reactions respectively at a time  $T$ .

Evaluating these constants, the results shown in Table II. are obtained:—

TABLE II.—REACTION CONSTANTS FOR HARD COAL AT 30 DEGS. CENT.

Substance.	$A_1$ .	$A_2$ .	$K_1$ .	$K_2$ .
Hard coal	13.6	4.5	0.117	0.007
Soft coal	17.9	4.6	0.106	0.007
Cannel coal	13.7	3.3	0.108	0.007
Jacks	13.6	3.0	0.106	0.007
Shale	3.4	1.2	0.093	0.009

The above table implies that in the oxidation of coal at 30 degs. Cent. two chemical reactions are taking place: one starting with a rate of absorption of  $A_1$  cubic centimetres per 100 grammes of coal per hour, which falls to a half in about 6 hours, and the other starting at  $A_2$  cubic centimetres per 100 grammes of coal per hour, which falls to a half in about 100 hours. For example, in the case of the "hards," the initial rate of absorption for the rapid reaction is 17.1 cubic centimetres per 100-gramme hour. After 6 hours this becomes  $17.1 \div 2$ , or 8.55 cubic centimetres; and after another 6 hours (a total of 12 hours) the rate is  $8.55 \div 2$ , or 4.27 cubic centimetres. A further 6 hours reduces this to  $4.27 \div 2$ , or 2.13; and so on. The second reaction starts at 5.6 cubic centimetres per 100-gramme hour, and after 100 hours falls to 2.8 cubic centimetres; after 200 hours, to 1.4 cubic centimetres; and so on. The values of  $A_1$  and  $A_2$  represent the rate of absorption at the beginning of the experiment, and the sum of  $A_1$  and  $A_2$  should therefore be a little greater than the first numbers in each of the corresponding tables. As a matter of fact they are always less, and this is due to the fact that the observed rate of absorption at the end of the first hour or so is greater than is required by the equation, owing to several causes. One undoubtedly is the "lag," due to the fact that the "intake" air has not yet had time to ventilate the whole of the coaldust thoroughly; a second cause may be found in subsidiary initial reactions, and absorption of oxygen.

Having found the above equations, it is possible to calculate the rate of oxygen which the coal will

\* Written for on "A Method of Measuring Goaf Air," in this issue.

absorb from the beginning of the experiment until the time when it will absorb no more. Table III. gives the result of this calculation for each of the two reactions. It is not claimed that the figures are rigidly accurate. They are probably all too low by at least 10 per cent., but they represent the first definite information as to the total quantity of oxygen which fresh coal will absorb, when kept at a temperature of 30 degs. Cent.

TABLE III.—QUANTITY OF OXYGEN ABSORBED BY 100 GRAMMES OF FRESH COALDUST.

Substance.	First reaction.	Second reaction.	Sum of two reactions.
	Cubic cm.	Cubic cm.	Cubic cm.
Hard coal	117	642	760
Soft coal	170	660	830
Cannel coal	117	470	587
Jacks	130	430	560
Shale	36	133	169

From this it is clear that there are two factors in the oxidation of these coals: a very rapid reaction, which is soon over, and a slow reaction responsible for the major portion of the oxygen absorption, which continues for a very long time. The first reaction has little to do with the actual firing of the coal. By the end of 48 hours it is only responsible for the absorption of a tenth of a cubic centimetre of oxygen per 100 grammes of coal per hour, and this quantity is rapidly diminishing; in effect, the reaction has practically ceased. Its importance lies in the fact that the absorption of oxygen is so rapid, with a correspondingly rapid heat-production, that under favourable conditions it raises the initial temperature of the coal before the heat can be conducted away. This initial rise in temperature increases the velocity of the slower reaction, and increases also the quantity of oxygen absorbed during that reaction, a point which will be discussed later in dealing with the effect of temperature on the rate of oxidation.

A further point is clear from the table. The closeness of the values of  $K_1$  for each substance tested makes it highly probable that it is a single chemical compound, contained in each of the parts of the seam, which is responsible for the initial rapid reaction. It may well be that this compound is the determining factor between coals liable to spontaneous combustion and those not liable, a point which will be tested in this series of investigations. The identity of the second constant may also show that a second chemical substance is common to all parts of the seam. Since, however,  $K_2$  is so small, this cannot be said with certainty, the more probable explanation being that it represents a group of substances having about the same rate of oxidation common to all parts of the seam.

Tests were made to obtain evidence as to whether pyrites played any considerable part in the oxidations studied. All the samples of coal chosen were free from visible particles of pyrites, but the possibility of the presence of very finely-divided particles still remained. If any had been present and had undergone oxidation, the coaldust should contain sulphate after the experiment. The most careful analysis showed that there was less than 0.01 per cent. of soluble sulphate in the hard coal before oxidation at 30 degs. Cent., and that this quantity had not increased after oxidation. The absence of soluble sulphate was not due to the presence of metals which yield an insoluble sulphate, for an analysis of the ash showed that no such metal was present. It must be concluded, therefore, that pyrites played no part in the oxidations studied. By this it is not meant that pyrites is not a contributory factor to spontaneous combustion, but simply that heating can well occur in the absence of oxidisable pyrites.

A further point which is brought out by the analyses of air which has passed over the coal is the small amount of carbon dioxide that is produced in the oxidation. From the hard coal at 30 degs. Cent. less than 20 cubic centimetres of carbon dioxide is formed during the absorption of 760 cubic centimetres of oxygen.

#### Combustible Gases Evolved During Oxidation.

At 30 degs. Cent. there seems to be no carbon monoxide produced in presence of free oxygen. The combustible gases consist of, first methane, and later small quantities of higher hydrocarbons. Mention has already been made of the method of estimating the complexity of these, and it is desirable to emphasise further that a far more accurate estimation results from determining the ratio—

(1) . . . . . Total contraction after combustion and absorption of resulting carbon dioxide.  
Volume of oxygen required for combustion

than from the usual ratio—

(2) . . . . . Contraction on combustion

Carbon dioxide produced by combustion.

for the following reasons:—

(a) Where the amount of gas is small, two very small quantities are being measured in the second method. An error in measuring one of these quantities is reproduced in measuring the second with a change in sign, that is, if the first measurement is too small, the second is too large, and *vice versa*. This means that, at the very least, the experimental error is doubled in calculating the result.

(b.) Larger quantities are measured in estimating the same volume of combustible gas in the first of the above ratios, thus diminishing the effect of experimental errors. In the following table the ratio is given for the several experiments. It will be noticed that the methane soon comes off, and is in fact nearly all removed by the grinding before being put into the bottle. The value of the ratio total contraction after combustion and absorption of the resulting carbon dioxide to volume of oxygen used for combustion is for—

Methane ( $\text{CH}_4$ )	1.5
Ethane ( $\text{C}_2\text{H}_6$ )	1.3
Propane ( $\text{C}_3\text{H}_8$ )	1.2
Butane ( $\text{C}_4\text{H}_{10}$ )	1.15
Pentane ( $\text{C}_5\text{H}_{12}$ )	1.12

TABLE IV.—RATIO OF TOTAL CONTRACTION ON COMBUSTION AND ABSORPTION OF CARBON DIOXIDE TO OXYGEN USED FOR THE COMBUSTION OF GAS EVOLVED DURING THE OXIDATION OF THE COAL.

Time in hours.	Hard coal in normal air.	Hard coal in air containing 8 per cent. of oxygen.	Soft coal.	Mother of coal.	Cannel coal.	Jacks.	Shale.
2	1.20	1.48	1.27	1.46	1.21	1.24	1.22
4	1.25	1.19	1.27	—	1.21	1.28	1.30
8	1.30	1.21	—	—	1.20	—	—
10	—	—	1.17	1.51	—	1.16	1.1
12	1.23	1.10	1.15	—	—	1.15	—
16	1.19	1.16	1.17	—	1.19	—	—
20	1.18	—	1.17	—	1.18	—	—
24	1.16	1.14	1.2	—	1.14	1.27	—
34	1.15	—	1.2	—	—	1.27	—
44	—	—	1.2	1.5	—	—	—
50	1.17	—	—	1.2	—	1.2	—
56	—	—	—	—	1.2	—	—
66	—	—	1.2	1.15	—	—	—
78	—	—	1.2	—	—	1.15	—

The total quantity of combustible gas given off by 100 grammes of each substance during the oxidation is approximately—

	Cubic centimetres.
Hard coal	37
Soft coal	80
Cannel coal	70
Jacks	75
Shale	12
Mother of coal	30

This quantity is, of course, exclusive of the gas lost in grinding the coal up, a quantity which far exceeds those tabulated above, as can be seen from the table given later for the coarse coaldust.

#### The Effect of a Reduction of the Oxygen Percentage in the Intake Air.

To obtain some idea of the effect of the partial pressure of the oxygen on the rate of absorption, the intake of pure atmosphere air was replaced by a reservoir delivering at constant pressure air containing only 8.28 per cent. of oxygen. The coal used for the experiment was the hards. If the rate of oxidation is proportional to the partial pressure of the oxygen, in this experiment it should be  $\frac{8.28}{20.93}$  of the rate already

given. The observed rate is far greater than this. The steep initial portion of the curve still persists, showing that, even with this low percentage, a sufficiently rapid oxidation takes place in the fresh coal to raise the temperature to a dangerous point. The experiment was not continued long enough to discover whether the rate ultimately fell to  $\frac{8.28}{20.93}$  of that with normal air, but

from the results obtained (Table IV.) it would appear improbable that this would be the case. The experiment, however, shows that any proposal to stop, at any rate, the earlier stages of spontaneous heating by a reduction in the oxygen percentage, short of a total removal of the oxygen, would appear to have no basis in fact.

TABLE V.—HARD COAL. WEIGHT, 136 GRAMMES, PASSING THROUGH A 200-MESH SIEVE; TEMPERATURE, 30 DEGS. CENT. THE INTAKE AIR CONTAINS 8.28 PER CENT. OF OXYGEN.

No. of sample.	Rate of flow of air per hour.	Oxygen.	Carbon dioxide.	Combustible gas.	Hours from start.	Oxygen at 0 deg. Cent. and 760 mm. absorbed by 100 grammes of coal per hour.
	Cubic centimetres.	Per cent.	Per cent.	Per cent.		Cubic centimetres.
1	974	6.09	0.08	1.10	1.75	14.87
2	882	6.96	0.05	0.35	3.75	8.62
3	355	6.11	0.10	0.30	7.75	5.79
4	351	6.52	0.09	0.12	11.75	4.65
5	329	6.66	0.11	0.17	16.25	4.02
6	311	6.84	0.13	0.12	25.0	3.35
7	321	7.17	0.17	—	36.0	2.69

#### Effect of Fineness of Dust.

In all the experiments described so far in this paper, the dust was ground to pass through a 200-mesh sieve. The following experiments were made with coarse dusts:—

(1) Dust passing through a 10-mesh and left on a 30-mesh sieve (Table VI.); and (2) dust passing through a 30-mesh and left on a 60-mesh sieve (Table VII.).

TABLE VI.—HARD COAL. WEIGHT, 250 GRAMMES; TEMPERATURE, 30 DEGS. CENT. THE COLUMN HEADED "R" GIVES THE PERCENTAGE RATIO OF THE OXYGEN ABSORPTION FOR THE COARSE DUST TO THAT FOR THE FINE DUST.

No. of sample.	Rate of flow of air per hour.	Oxygen.	Carbon dioxide.	Combustible gas.	Hours from start.	Oxygen at 0 deg. Cent. and 760 mm. absorbed by 100 grammes of coal per hour.	R. *
	Cubic cm.	Per cent.	Per cent.	Per cent.		Cubic cm.	Per cent.
1	250	6.80	0.20	46.5	1.5	(14)	—
2	909	18.15	0.08	4.72	5.75	8.24	72
3	392	17.19	0.04	4.58	10.5	5.49	69
4	380	18.40	0.05	1.95	21.5	3.92	75
5	373	18.79	0.05	1.39	26.25	3.33	70
6	373	19.14	0.03	1.10	32.5	2.84	75
7	227	18.51	0.07	0.86	44.25	2.44	74
8	221	18.74	0.06	0.89	53.25	2.12	73
9	207	19.10	0.05	0.54	68.5	1.65	70
10	195	19.31	0.05	0.37	93.0	1.41	74
11	165	19.29	0.06	0.32	118.75	1.23	72
12	94	18.74	0.07	0.41	164.75	0.94	72

\* Mean value of R, 72 per cent.



TABLE VII.—HARD COAL. WEIGHT, 200 GRAMMES; TEMPERATURE, 30 DEGS. CENT.

No. of sample.	Rate of flow of air per hour.	Oxygen.	Carbon dioxide.	Combustible gas.	Hours from start.	Oxygen at 0 deg. Cent. and 760 mm. absorbed by 100 grammes of coal per hour.	R.*
	Cubic cm.	Per cent.	Per cent.	Per cent.		Cubic cm.	Per cent.
1	250	9.28	0.12	44	1.5	—	—
2	920	18.75	0.05	2.31	5.75	9.46	85
3	500	18.54	0.04	0.85	10.5	6.62	83
4	496	19.47	0.05	0.50	21.5	4.00	80
5	496	19.82	0.02	0.27	32.5	3.02	80
6	174	18.56	0.06	0.39	53.25	2.37	82
7	174	19.02	0.06	0.39	68.5	1.89	80
8	157	19.30	0.06	0.24	92.5	1.49	78
9	153	19.44	0.09	0.19	116.0	1.31	79
10	125	19.67	0.08	0.26	165.0	0.90	70

\* Mean value of R, 80 per cent.

These tables show that the rate of oxidation is not simply inversely proportional to the size of the particles. The dust used in the first of the above two experiments would, on the whole, only just pass through a 10-mesh sieve. The outer surface of these particles was therefore  $\frac{1}{1000}$ th of that of the fine dust used in the previous experiments. The rate of oxidation, however, instead of being only  $\frac{1}{1000}$ th, or 0.25 per cent., is 72 per cent. This may be because the coal is porous, and the oxygen is therefore able to penetrate into the interior of each particle.

A further experiment was made on the liability to further oxidation of the coarse dust which had undergone oxidation in the first of the experiments quoted above. After that oxidation had proceeded for 165 hours, the coarse dust was then ground to pass through a 200-mesh sieve and re-exposed to air, with the results recorded in Table VIII.

TABLE VIII.—HARD COAL. WEIGHT OF COAL, 150 GRAMMES, PASSING THROUGH A 200-MESH SIEVE. TEMPERATURE, 30 DEGS. CENT.

No. of sample.	Rate of flow of air per hour.	Oxygen.	Carbon dioxide.	Combustible gas.	Hours from start.	Oxygen at 0 deg. Cent. and 760 mm. absorbed by 100 grammes of coal per hour.
	Cubic cm.	Per cent.	Per cent.	Per cent.		Cubic cm.
1	536	19.09	0.16	0.49	1.5	7.39
2	536	19.53	0.11	0.33	3.0	5.65
3	308	19.25	0.10	0.31	5.5	3.90
4	311	19.65	0.10	0.29	9.0	2.98
5	209	19.65	0.07	0.32	21.0	1.92
6	207	19.97	0.06	0.20	32.0	1.50

It is interesting to note that the sum of the two rates for the oxidation in the coarse and the subsequent oxidation of the reground dust is very closely indeed that which would have been found had the dust been ground fine originally, as is shown in Table IX. In other words, as would be expected, the total oxygen absorption is the same whether the dust is ground up very slowly and oxidised at the same time, or whether it is rapidly ground and then oxidised.

TABLE IX.—RATIO OF OXIDATION OF HARD COAL AT DIFFERENT STAGES OF GRINDING.

Hours.	Coarse dust (10-30).	Reground coarse dust.	Sum for coarse + reground.	Dust ground fine in one operation.
1.5	14.4*	7.4	21.8	22.6*
3.0	11.2	5.6	16.8	16.0
5.5	8.4	3.9	12.3	11.8
9.0	6.6	3.0	9.6	8.9
21.0	3.3	1.9	5.8	5.3
32.0	2.9	1.5	4.4	3.9

\* Extrapolated.

**The Effect of Temperature on the Rate of Oxidation.**  
It is important to know how the rate of oxidation varies as the temperature of the coal rises, for a considerable quantity of heat is produced by the absorption of oxygen by coal. After some oxygen has been absorbed, the temperature of the coal will rise, and a new rate of absorption will commence. To understand how the coal goes on heating until it fires ultimately, the "temperature coefficient" of the rate must be known. In all the experiments described in this paper, the temperature of the coal has been kept constant—that is, heat lost by conduction and radiation from the coal has been replaced, but also the heat produced by the oxidation of the coal has been removed. If all the heat produced by the oxidation of the hard coal at 30 degs. Cent. had been retained by the coal, its temperature would have risen to about 106 degs. Cent. (taking Lamp-lough and Hill's figure for the heat produced by the absorption of oxygen), even supposing that the rate of oxidation did not increase as the temperature rose.  
Some experiments on the variation of the rate of oxidation with temperature have been made, and others are now in progress. From the curves figs. 1, 2 and 3, it will be seen that this rate increases greatly with increase of temperature. A full discussion of this increase will be given in a subsequent paper, when more results are available.  
In conclusion, the writer would like to express his thanks to Dr. J. S. Haldane for much valuable advice during the work and to Mr. J. I. Graham for his assistance in a number of the analyses described.

The United States Tariff Conference Committee has decided to place on the free list ferro-manganese, as well as pig and other cheap grades of iron.

SAFETY LAMPS AND BATHS FOR MINERS.

**The New Orders.**  
As already announced in the *Colliery Guardian*, the Home Secretary has recently issued Orders dealing with explosives, safety lamps, and washing and drying accommodation at mines. Details of the first two have already appeared in recent issues.

**Safety Lamps.**  
In regard to the Safety Lamps Order, it may be added that the use of safety lamps which do not conform to an approved type as described in the Order is no longer permissible. It will be necessary for any owner using a lamp of a different type or a lamp which contains variations from an approved type as described in the Order, to substitute lamps of an approved type or to submit the type of lamp he is using for test in accordance with the memorandum published by the Home Office. This should be done without delay. Before an owner submits a type of lamp for test, he should consult the Home Office memorandum. Bonnetless lamps (other than lamps for special purposes) cannot be approved and will not therefore be admitted for testing.

It will be observed that the Order requires that the glasses used in lamps must bear the maker's brand indicated in the specification and must also bear a specified size mark. In several cases makers of approved glasses, pending the settlement of the question of the size marks, manufactured and issued glasses of the approved description bearing the brand mark only. Those glasses will be accepted as complying with the Order.

**General Regulations as to Baths.**  
The regulations have been made in accordance with the recommendations of the Referee appointed to hold an enquiry into the objections to the draft regulations issued by the Home Office, and come into force at once. They do not, however, take effect at any mine until a two-thirds majority of the workmen affected (i.e., underground workers, and workers engaged on the surface in handling tubs, screening, sorting, or washing coal, or loading coal into wagons) ask for provision of washing and drying accommodation; and the following classes of mines are altogether exempt:—(1.) Mines where the total number of workmen affected is less than 100. (2.) Mines held on a lease with an unexpired term of less than 10 years. (3.) Mines which in the opinion of the Secretary of State will be worked out within 10 years.

The regulations were printed in draft form in the *Colliery Guardian* of May 16, 1913. Below we point out the principal alterations.

**Bathing Accommodation and Facilities.**  
(2) It is now provided that a cabinet shall be constructed so as to secure privacy, and having suitable arrangements for "partially" dressing and undressing; the word "partially" having been added.  
(4) As to the construction of the building so as to facilitate cleaning, this is now restricted to the "interior;" (a) all inner surfaces of the building shall be smooth "up to the part from which the roof springs;" and (d) wood shall not be used for the purpose of any inside fittings except seats "and doors leading to the outside."

(6) There are several new provisions in this clause, which now reads as follow:—  
The floor of the building, the cabinets and the inside wall up to height of not less than 7 ft. shall be thoroughly cleansed once every day and the whole building shall be thoroughly cleansed at such fixed times as shall be decided by the committee of management, but at least once in every 10 days. If the accommodation is used by more than one shift of persons during the day, the cabinets shall be cleansed at such intervals during the day as shall be decided by the committee.

**Drying Accommodation and Facilities.**  
(8) It is now permissible to use, instead of a chain, a "cord so treated as to be impervious to moisture."

**Constitution, Powers and Duties of Committee of Management.**  
(9) It is now provided that the committee of management shall continue in office for the term of one year. In the case of death or resignation of any member, the vacancy shall be filled by the party which appointed such member, and the new member shall continue in office until the expiration of the term of office of his predecessor.

(10) The minutes are to be kept "by the secretary, who shall be appointed by the committee and may be paid such remuneration, if any, as the committee decide." Provision is now made that in cases where the parties to whom any question may have been referred fail to agree, it shall be referred "to some person

appointed by the inspector of the division, whose decision shall be final."

(13) The attendant in charge must report cases of insubordination, &c., "in writing" to the Committee.  
(14) This is new, and reads:

The Committee shall insure the building and contents against fire, and also effect insurances against statutory liability imposed upon them in respect of their servants.

(15) (formerly 14) The annual balance sheet is to be "audited by a qualified person."

**Rules as to Procedure. &c., under Sec. 77 (3).**  
These rules prescribe the procedure to be followed in cases in which the owner, after receiving a representation from the workmen under the section, estimates that the cost of maintenance of baths, &c., will exceed the rate per workman specified in the Act.

The rules are as follow:—  
1. If on receipt of a representation in pursuance of subsection (1) of the said section, the owner of the mine estimates that the total cost of maintenance of the accommodation and facilities required by the section and general regulations made thereunder will exceed threepence per week for each workman liable to contribute, he shall within 40 days from the receipt of the representation post a notice to that effect at the pithead together with a copy of the estimates prepared or obtained by him, or a statement of the particulars on which his estimate is based; and unless the representation is withdrawn by a majority, ascertained by ballot, of the workmen employed in the mine to whom the section applies, the question of the estimated total cost of maintenance shall be referred to the arbitrator in pursuance of subsection (3).

2. If the representation is not withdrawn within 20 days, and if no arbitrator is appointed by agreement between the parties within 30 days, of the date on which the aforesaid notice is posted at the pithead, the owner shall make application in writing to the judge of county courts for the district, or in Scotland to the sheriff of the county, to appoint an arbitrator, and shall forward to him copy of the notice aforesaid.

3. The arbitrator when appointed shall at once serve notice on the owner of the time and place fixed by him for the hearing of the reference, and the owner shall at once cause a copy of the notice to be posted at the pithead.

4. The time fixed by the arbitrator for the hearing shall be not less than seven days and not more than twenty-one from the time of his appointment, and the place shall be at the mine, unless the parties otherwise agree.

5. The owner may appear personally or by any agent. The workmen employed in the mine to whom the section applies may appoint any person to represent them at the hearing.

6. At least three days before the hearing of the reference the owners shall furnish the arbitrator and the person appointed by the workmen to represent them at the hearing with copies of the estimates prepared or obtained by him, and if any estimates have been prepared or obtained by the workman, copies shall at least three days before the hearing be furnished to the arbitrator and owner.

7. The arbitrator may examine any persons tendered by the parties as witnesses, and may make such inspection of the mine as he may deem necessary.

Subject to the provisions of these regulations the proceedings at the hearing shall be such as the arbitrator may in his discretion direct.

8. The arbitrator shall communicate his decision in writing to both parties as soon as possible after the hearing.

9. The remuneration of the arbitrator, if he was appointed by agreement between the parties, shall be such sum as may have been agreed between the arbitrator and the parties, or, if he was appointed by the judge or sheriff, shall be a sum of five guineas, together with any expenses necessarily incurred for travelling, or in a case of exceptional difficulty such special fee not exceeding ten guineas as may be fixed by the judge or sheriff. The remuneration of the arbitrator shall be payable by the owner unless the arbitrator is of opinion that the men have acted unreasonably in carrying the matter to arbitration and directs that the whole or any part thereof shall be paid by the men.

A volume containing all the regulations and Orders which have been made under the Coal Mines Act, 1911, is in course of preparation and will be issued shortly.

The contract for the new Lothian Railway to facilitate the traffic between the Lothian coalfields and the Port of Leith has been placed by the North British Railway Company with Hugh Symington and Sons Limited, railway contractors Glasgow. The amount of the contract is £165,000, and the line is to be completed within 18 months.



## MACHINE MINING IN THE SOUTH WALES STEAM COALS.\*

By G. D. BUDGE and W. E. JAYNE.

The conditions existing in the South Wales steam coals are frankly not favourable to machine mining. The difficulty does not lie with the coal-cutter, nor yet with the conveyor; but when they are introduced to work together on the same face, their interests clash, and steps taken to protect one may well form the undoing of the other. A subject with a short, kind roof, which can be broken at will, is favourable to the conveying of machine-cut coal, as a row of hard wood chocks set immediately behind the conveyor seldom fails to break the roof back into the waste, thus taking the weight off the face and leaving a secure piece of roof over the conveyor.

The hard heavy roof, generally overlying the thinner steam coals, cannot be controlled in this way, but there are seams with roofs of this nature which are successfully worked by means of a coal-cutter and conveyor, and the writers wish in the first place to discuss this system of machine mining.

Unfavourable conditions, such as uneven floor and faults not more than 3 ft. in throw, are insignificant and do not present any serious difficulty, but everything depends on the amount of rubbish available to stow the waste. Greater difficulties are met in the working of a seam under 3 ft. in thickness, because the head room is so limited that men have not room to handle rubbish, and short shovels must be used. The work of throwing heavy rubbish beyond the conveyor path into the waste when the space is restricted takes up too much time, and even though a sufficient quantity of rubbish is yielded by a thin seam, either in the form of stone between coals or clod coming down on top of the coal, there are few cases where the output per filler will justify the use of the conveyor, so great is the inconvenience in handling the rubbish. In a thicker seam, the success of the conveyor depends on the proportion that the rubbish handled bears to the coal filled, but there is also the great advantage that the men have room to work.

There is no more desirable subject for a coal-cutter and conveyor than a thin seam with a short, kind roof, but the roof which demands rubbish to stow it makes the success of the conveyor impossible in nearly every case. Of course, it is quite possible to maintain a good face of coal in a clean, thin seam which yields no rubbish, and where no rubbish is brought in from the roads, as the roof can be arrested by timber over the conveyor and coal-cutter paths sufficiently to admit of each day's coal being filled away, provided that the advance of the face is rapid. The trouble, however, is found on the gate-end and tension roads, and more particularly on the gate-end road, where the bottom has to be cut. The chief difficulty in the face will be the roof locking the conveyor at the time when the roof is crushing down.

The following are sections of seams in which a coal-cutter and conveyor can confidently be set to work:—Coal, 1 ft. 8 in.; clod, 1 ft. 8 in.; coal, 1 ft. 10 in. Coal, 1 ft. 3 in.; clod, 1 ft. 3 in.; coal, 2 ft. 3 in. In the first case the undercut is made in the clod, and in the second case in the coal, thus making the subjects identical so far as the quantity of rubbish to be stowed is concerned.

It has been conclusively proved that if the clod in either of the above-mentioned seams became permanently reduced in thickness by 6 in., the conveyors must be taken out. The success of the working seems to be entirely dependent on a waste capable of taking the weight of the roof after it has crushed and broken the timber. First considerations would suggest the withdrawal of the timber, but the slanty nature of the roof makes this impossible, and, although many attempts have been made, it has been found better to let the roof break the timber.

Obviously, in a seam of this kind it is necessary to flat the coal-cutter and conveyor path, and this work should not be left to the fillers, but to men employed on the filling shift for this purpose only. In many cases it is possible to make the same flats serve for both coal-cutting and conveying protection, but where an undercut of 6 ft. is necessary this cannot be done.

The depth of undercut is very difficult to decide, but there is no doubt that the best plan is to keep it within 6 in. of the height of the seam, in which case the coal tends to fall over when a bar is placed behind it, thus reducing pick work to a minimum. In certain cases there is much to be said in favour of a deep undercut of 6 ft., especially if the coal sticks to the top or bottom, or where numerous faults in the seam which delay

the machine; or again, if the machines only cut in one direction for considerations of safety, necessitating turning, probably under roof which will not admit of timber being knocked out. The reserve of coal given by the deep undercut is useful in these cases, and very often in thick seams it pays to adopt this system, and to shift the conveyor every second day, it being impossible to fill the coal in one shift.

The timber must be stronger than is used in ordinary longwall work, and posts 5 ft. 6 in. long should not be less than 6 in. diameter at the thin end. Cogs should not be used except on the roadsides, as they cannot be withdrawn, and only tend to delay the settling down of the roof in the waste.

If the roof is troublesome and tends to break over the conveyor path, it has been found advantageous to cut up thick 13 ft. timber into posts, and set them at intervals of 10 ft. on the waste side of the conveyor path with strong lids on top of them. A support of this kind will hold a piece of roof which has come free at a slant, and will not eventually hold up so great an area of top as a cog when the face advances under new ground and the broken roof is required to settle in the waste.

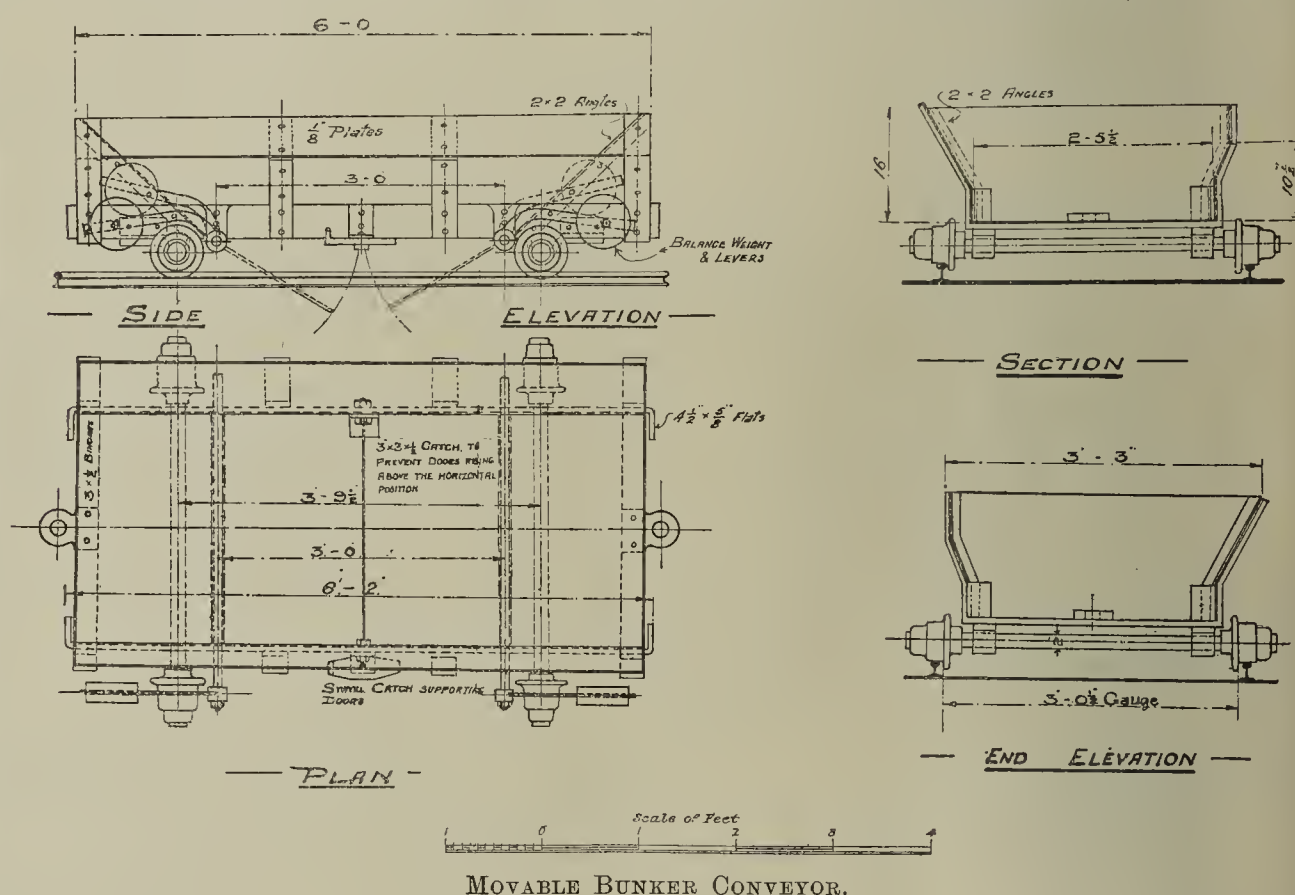
In selecting a conveyor for a seam which will admit of one being used in conjunction with a coal-cutter, the advantages of the intermittent type of conveyor are brought forcibly to notice.

Undulations in the floor of the seam may be frequent, and neither the continuous conveyor nor any rigid intermittent conveyor will work under such conditions. A flexible intermittent conveyor, designed by Mr. Jayne

together with ordinary shackles. The system of haulage of the cars is practically endless rope, with the exception that the rope is attached to the front and rear ends of the journey, and the tension is arranged for by attaching an ordinary Sylvester to the pulley at the end of the face. The maximum rope speed is 350 ft. per minute, reduced by worm gearing from a three-cylinder Brotherhood engine placed if possible in the face with the C pulley in line with its work. The capacity of the conveyor depends on the number of cars used, but with ten cars 220 tons output has been dealt with in eight hours, and it should be mentioned that this quantity could have been increased had there been any coal left to fill.

The ease of shifting this conveyor constitutes one of its chief advantages. The cars are run up to the most suitable place for lifting them across to the new path; the tension is then disconnected, and the rope detached and pulled out on to the roadway. The track, which consists of a light section of T head rails, is taken up and re-laid in the new path and the cars are then lifted over by two men. Meanwhile, another two men are engaged in shifting the engine forward, placing it on the gob side of the new track, with the C pulley parallel to, and as near the track as will allow the cars to pass without touching it. Eighty yards of the conveyor can be shifted and set to work by four men in four hours.

The discharging road is set as near as possible in the centre of the face, and the fillers are divided into two gangs, one on each side of the road. Signalling is most effectually done by means of a whistle carried by the charyman. For discharging purposes the height



MOVABLE BUNKER CONVEYOR.

and illustrated by sketches, has been used successfully in seams yielding sufficient rubbish to arrest the roof; the chief advantages being that the rubbish can be thrown into the waste when the conveyor is discharging, and that besides being capable of running over an uneven floor, the day's work may not be lost if a fall comes on the cars, as the undamaged cars can be disconnected and part of the face worked. Again, if there has been a heavy crush over the coal-cutter path throughout part of the face, it may be impossible to get a straight line for the conveyor. With this type of conveyor it is not absolutely necessary to have a straight line of rails, and on many occasions a day's coal, which would otherwise have been lost, has been obtained owing to the conveyor being capable of taking coal round a fairly sharp curve.

The conveyor consists of a number of small cars mounted on small wheels situated at the extreme ends and having the side and end sheets inclined at an angle of 45 degs. towards the centre. Each car is fitted with a collapsible bottom, consisting of a pair of doors, hinged at each end of the car and overlapping each other in the centre. A swivel catch is provided to keep the doors closed, and when a loaded car is ready for discharging, the swivel is knocked away, thus enabling the weight of the coal to open the doors, which then form a hopper so shaped as to regulate the passing of the coal direct into the tram with a minimum of breakage. Each door is balanced by means of a lever and weight to enable it to be speedily closed, and the whole operation of discharging and closing is so simple that a car containing from 8 to 10 hundredweight can be dealt with in from 3 to 5 seconds. The cars are coupled

necessary from the top of the tram to the bottom of the car when closed is 1 ft. 6 in. The height in the face enables the discharging bridge (which consists merely of two 35 lb. rails) to be raised up about 3 ft., the object of this being to reduce the depth of bottom cut on the road to 1 ft. 6 in.

In a seam where there is a soft bed or some coal underlying it, there is no doubt that this type of conveyor possesses a distinct advantage, as, provided the hard bottom underlying the seam is not broken, the road is less likely to give trouble. Two men are required on the road to unload the cars into trams; the actual unloading could be done with one man, but it is not advisable to have a road wide enough for two trams, or to drive the road into the solid far enough to take two trams on the same road.

It pays better to have the road as narrow as possible, secured by widespread arms and short collars, as heavy side-squeeze has to be contended with.

Many seams that have refused a conveyor are quite amenable to a coal-cutter, provided it is remembered that the natural conditions of working the coal are to a certain extent defied. Thin seams which will not admit of a conveyor being used have been successfully worked by the method now to be described. The distance apart of the stall roads depends altogether on the amount of rubbish to be handled, and the tendency, of course, is to have the stall roads too far apart from the coal fillers' point of view, with the object of ensuring that no rubbish is filled out. It is unfortunate if they are set at more than 12-yard centres in any seam. To ensure good roads the waste must be well stowed, and in consequence of this and of the speed at which the face

\* Paper read before the South Wales Institute of Engineers and published in the Proceedings.



advances, the coal tends to have plenty of work in it, all the conditions assisting it to fall on the cutter as soon as the slip is pierced. The obvious remedy is to place a machine-cut face half on the end of the slip. The span of roof intervening between the waste and the face must very often be a matter of 10 ft., owing to the width of the coal-cutter path, and even though this span can be reduced at times, there will always be a greater extent of roof to hold on timber than in a hand-cut face.

The timbering over this area must be very substantial, and, in consequence, a very badly-balanced distribution of support remains, because as soon as the coal is undercut no really adequate prop can be placed underneath it, and the roof overlying this cut coal has ample opportunity to break. There is little wonder that a break is often found in the roof running in line with the end of each cut, a break in the worst possible position, leaving a strip of roof the width of the cut to be carried on timber. The remedy for this is to reduce the speed of advance of the face. A conveyor demands speedy advance in order to escape from the bad roof it leaves behind, but a machine-cut hand-filled face must be so limited in speed of advance to ensure a gradual distribution of pressure. It is not as a rule advisable to advance the face at a greater speed than 4 yards per week, corresponding to two cuts a week with a 6-ft. undercut and three cuts per week with a 4-ft. undercut.

The props must be set at the required distance from the face to suit the coal-cutter path, and it is imperative that good lids should be used. Unless the roof is very good, flats should be set 5 ft. apart, with a strong post under one end, and having the other notched into the coal from 3 in. to 9 in., depending on the nature of the coal. Speaking generally, the post and flats should not be withdrawn. At all costs, the coal-cutter path, supported at best by flats, must be kept whole, and this is impossible if timber in the vicinity is withdrawn, perhaps liberating a slanty piece of top and drawing the pent-up pressure, admittedly unevenly supported, to the weak point.

Careful experiments are necessary before the position of the cut in a seam is decided. The main objects are to have the greatest possible percentage of large coal, the reduction of pickwork to a minimum, and a reasonable yardage per shift.

In selecting a coal-cutting machine, the question of the weight of the machine is one deserving careful consideration. Where the holing is easy and a deep undercut is not required, a light machine will do the work without undue vibration, and it has the advantage of being easily and expeditiously handled, but where deep heavy work is required, 70 cwt. is not too great a weight for the machine. The seam with hard holing and heavy roof calls for a machine which will not require rubbing posts to guide it, its own weight being sufficient to keep it in to its work and to keep it in line even when an extra hard subject is met by the cutters, thus avoiding the danger of posts being knocked out.

If trouble arises owing to the bottom being soft, no time should be lost in fixing a steel sheet underneath the whole area of the machine, and, indeed, it generally pays to adopt this plan in the case of all the heavier types of coal-cutters, irrespective altogether of the nature of the bottom. A 5-yard rail bolted to the gob-side skid provides the best guarantee for a good line of face, as it is impossible to negotiate corners with an attachment of this kind. There is also the great advantage that, in cases where rubbing posts are used, the guide receives the support of four or five posts instead of two.

A wheel valve is preferable to a cock on a compressed air coal-cutter, as a careless machineman may leave the spanner attached to the cock during a stoppage necessitating attention to the cutters. The stopping and starting is also better regulated by the wheel valve.

In most of the South Wales seams it is unsafe to cut with the trailing bar, disc or chain, and this, of course, seriously affects results.

The best practice is to have the machines following each other at a distance of 70 yards, or closer if necessary, and to flit them back to the starting place after the run is completed. This is not always possible, and much unnecessary labour is expended if the run for each machine is not carefully thought out and arranged for.

It was stated at the beginning of this paper that South Wales steam coals were not favourable subjects to machine mining. A machineman who regularly cuts 150 yards per shift in the Midlands will not average more than 50 yards per shift in a South Wales seam of the same thickness. This is due to the nature of the coal, and particularly to the action of the small coal on the cutters. It is only necessary to examine the cutting surface of the coal to realise the severe work on the cutters, and the small coal made provides no moisture

for lubrication. Coal-cutting in South Wales seams closely approximates to the work of cutting a hard dry piece of timber with a hatchet. A good coal-cutting subject corresponds to fresh moist timber being cut with the same tool. Obviously what is required is a special cutting-tool for South Wales coals.

### INSTITUTION OF MINING ENGINEERS.

#### Annual Meeting in Manchester.

The twenty-fourth annual general meeting of members of the Institution of Mining Engineers was held on Wednesday, in the Town Hall, Manchester. The meeting was described as a record one, not only in point of numbers attending (about 300), but as regards questions for discussion and the interest attaching to the excursions. Dr. W. E. GARFORTH, president of the institution, occupied the chair.

Sir CHARLES BEHRENS (Deputy Lord Mayor) gave the members a very cordial welcome on behalf of the Lord Mayor (Sir Walter Royle), who has been and is still seriously ill. Sir Charles spoke of the importance of the coal industry to a county like Lancashire.

The PRESIDENT thanked Sir Charles Behrens for his cordial reception. He regretted the illness of the Lord Mayor and wished him a speedy recovery. As to the need for a cheap and plentiful supply of fuel, the members of the institution realised the necessity of providing such a cheap supply. In Lancashire many of the thicker seams had been exhausted during the past 100 years, and coalowners had had to resort to new devices for working the thin seams. He was very glad to be able to tell the meeting that within recent years—especially the last decade—they had been able to work many thin seams, and were now raising a larger output of coal per man than hitherto; and as regards safety in the mines, it was much greater now than it was 40 years ago—something like 63 per cent.—through the use of appliances and better methods gained by experience in working coalseams. He believed that they could look forward for many years to come to having a cheap and plentiful supply of fuel. As regards cheapness, there were difficulties with the miners, as the Ship Canal Company were now having with the dockers, but he hoped that the commonsense of employers and workpeople would prevail, and enable the coal industry to maintain its high position in the world. Dr. Garforth concluded by submitting a resolution regretting the illness of the Lord Mayor of Manchester, and expressing thanks for the use of the Lord Mayor's parlour for the meeting of the institution.

Mr. PERCY STRZLECKI (secretary of the institute) stated that Dr. Garforth had been re-elected that morning to the office of president. The list of vice-presidents was as follows:—

Messrs. John Gerrard and Sydney A. Smith, representing the Manchester Geological and Mining Society.

Messrs. J. P. Houfton and W. H. Hepplewhite, representing the Midland Counties Institution of Engineers.

Mr. Walter Hargreaves and Prof. F. W. Hardwick, representing the Midland Institute of Mining, Civil, and Mechanical Engineers.

Messrs. James Barrowman, James Hamilton and William Walker, representing the Mining Institute of Scotland.

Messrs. W. C. Blackett, C. C. Leach, J. H. Merivale, F. R. Simpson, and J. G. Weeks, representing the North of England Institute of Mining and Mechanical Engineers.

Mr. Hugh Johnstone, representing the North Staffordshire Institute of Mining and Mechanical Engineers.

Mr. Alexander Smith, representing the South Staffordshire and Warwickshire Institute of Mining Engineers.

Papers were read by Messrs. WINMILL and LOMAX. These are given elsewhere in this issue. Mr. Lomax's paper on "The Microscopical Examination of Coal" was illustrated by numerous lantern slides.

There was an interesting discussion on Mr. Winmill's paper, in which Mr. F. E. E. LAMPLUGH (Cambridge), Mr. J. D. PATON (Manchester), Mr. W. C. BLACKETT (Durham), Dr. J. HARGER (Liverpool University), Dr. W. N. ATKINSON (Cardiff), Mr. JOHN GERRARD (Manchester), Mr. J. W. FRYAR (Doncaster), Mr. W. M. MACKIE (Leeds), Prof. LOUIS (Newcastle), Mr. W. H. CHAMBERS (Denaby and Cadeby Collieries, Rotherham), Mr. J. T. STOBBS (Stoke) and others took part.

A full report appears next week.

#### Excursions.

The afternoon was given up to excursions (1) to Mather and Platt's engineering works, and (2) to the Pilkington Tile and Pottery Company's Works, Clifton Junction.

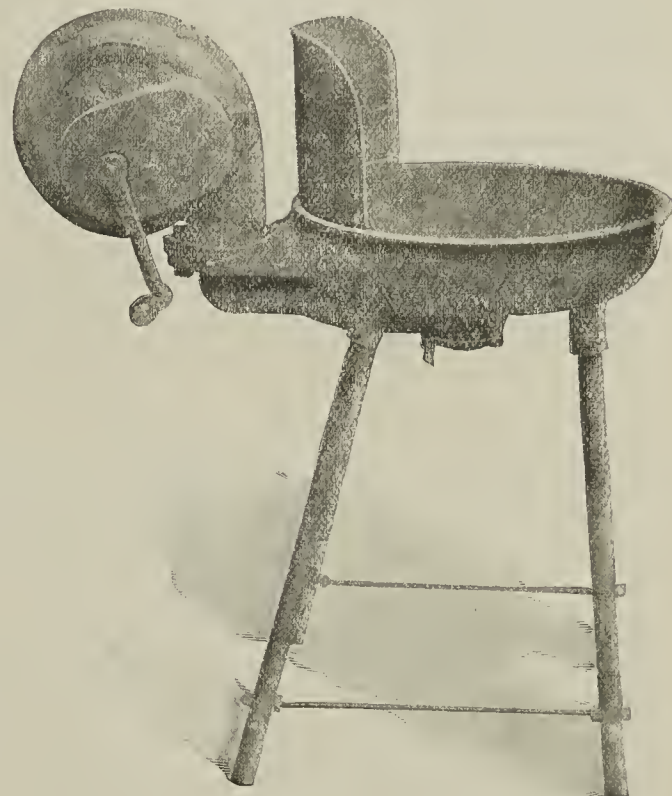
#### Annual Dinner.

The annual dinner was held in the evening at the Midland Hotel. Sir THOS. HOLLAND (president of the Manchester Geological and Mining Society) was in the chair, supported by the president of the institute (Dr. Garforth), Sir Chas. Behrens (Deputy Mayor of Manchester), Sir Alfred Hopkinson (Vice-Chancellor of the Manchester University), Prof. Boyd Dawkins, Prof. Dixon, Mr. John Gerrard, Col. Hollingworth, and others.

#### PORTABLE FAN FORGE.

"Frost's Portable Fan Forge," an illustration of which is given herewith, is a useful accessory in the colliery workshop. It will be seen that it is simple in construction, yet the parts which come in for rough handling are strong and durable.

The working parts are constructed with a view to facility; fitted with machine-cut gearing throughout,



"STANDARD" PORTABLE FAN FORGE (TYPE W.P.).

running in an oil bath, it is capable of manipulation by a boy. The fan blades are made from tempered steel, so enabling the forced draught to be quickly produced with the least possible trouble. It is to be obtained only from Messrs. Albert Frost and Co., Howard-street, Sheffield.

#### South Wales and Monmouthshire School of Mines.—

The calendar of this useful educational authority, whose headquarters are at Treforest, has just been sent to us. The first term commences on October 8, 1913. The staff includes Prof. George Knox, the new principal and director; Mr. John Samuel, assistant director of mining; Mr. Fred H. Downie, senior lecturer in electrical engineering; Mr. Edgar C. Evans, senior lecturer in mining chemistry; Mr. R. James, senior lecturer in mechanical engineering; and Mr. R. Richards, assistant lecturer in mining and geology. In addition, the school has a call upon the services of the technical staff at the University College, Cardiff. The Treforest school represents the first instalment of the scheme set on foot by the South Wales coalowners, and is splendidly equipped in every way. The companies interested have a total output of nearly 20 million tons, and an important feature of the scheme are the facilities afforded to students for gaining practical experience at these collieries. The scheme provides for the attainment of a mining diploma, and its general effect is as follows: The three years' diploma course, which has hitherto been carried out by the University College solely will be discontinued, and in lieu thereof a joint diploma discourse will be given jointly by both institutions, pure science coming within the scope of the Cardiff College and its technical application within that of the Treforest school. In addition, the college have undertaken to put into operation a fourth year or post-diploma course for promising students who desire to specialise, and the coalowners will provide up to five studentships of £50 a year each for that purpose. The joint authorities will also award certificates to mine surveyors, and application has been made to the Home Secretary for the recognition of the joint diploma. The courses of instruction comprise—(1) a three years' full-time mining course of thirty hours per week for a thirty weeks' session; (2) part-time day courses for four years of one day of eight hours per week for mine managers, mechanics, electricians, and chemists; and a three-years course of one day of eight hours per week for mine surveyors; (3) special courses for officials; and (4) a special course for surface foremen. For further particulars, those who may be interested should apply to the secretary, Mr. Hugh M. Ingledew, 4, Mount Stuart-square, Cardiff.



# **FURTHER RESEARCHES IN THE MICROSCOPICAL EXAMINATION OF COAL, ESPECIALLY IN RELATION TO SPONTANEOUS COMBUSTION.\***

By JAMES LOMAX.

Since the publication of the writer's paper on "The Microscopical Examination of Coal, and its Use in Determining the Inflammable Constituents Present therein,"† several papers have appeared in the *Transactions* of the institution relating more or less to the cause of spontaneous combustion and gob fires. Not one of the writers of these papers has, however, taken into consideration what is revealed when a thin slice or preparation of coal is examined with the microscope. A seam of coal, if examined thoroughly, should, like any other organically composed rock, be dissected through its entire thickness, and each band, bed, and lamina considered. This can only be done, as in the case of other rocks, by making thin sections of the seam and subjecting them to a microscopical examination; by this means the form, order, structure, and origin, and in many cases the composition of the various ingredients can be determined with comparative accuracy.

Although much has been written on the origin and composition of coal, many of the writers have ignored the fact that during the last 30 years investigations in fossil botany have made such rapid advance that the form, order and development of the plants of that far-distant date, when the vegetable *débris* which now forms our coalseams was in course of deposition are known. It is also from such investigations that the evolution and development of many of our recent plants can be traced. It is said by some of the writers of these papers that the coal age was an age greatly different from the present one, and that at that time there was an atmosphere far richer in carbon dioxide and more highly charged with watery vapour. As a matter of fact, the structure of the plants of that period shows that there could have been little difference between the carboniferous climate and the present one. Many genera and species of plants of the carboniferous period were quite as highly organised, both in the vegetative and regenerative organs, as those of recent times, the great difference between then and now being that the dominant classes of plants were the Lycopods and Equisetæ (club-mosses and horse-tails), although at that time there were large numbers of plants allied to the recent cycads and conifers (*cycadophytes* and *cordaites*), rivalling in size those of recent times. It is from vegetation such as the above that our coalseams have been derived, mainly from the dropping of the leaves, cortical layers, fruits, &c. That being so, one would expect to find in the coal evidence of their remains, and this we do, especially in a well-prepared section or thin slice. It can also be seen of what is the structure and what is the order, or sequence of deposition, of the various laminae. Sections of coal can be so made that every layer or lamina can be seen to perfection, and the structure and constituents of the coal resolved into definite bodies which can be distinguished one from the other. Thus the various megaspores and microspores can be identified, layers of humic matter formed from leaves made out, resinous and other bodies distinguished as well as the more important structures formed, subsequent to the deposition of the vegetable *débris*.

For the preparation of this paper over 200 sections have been cut and examined microscopically. These sections have been cut from coalseams that are most liable to gob-fires, notably the Doe or Dow from the Bolton district, the Bullhurst and Cockshead from North Staffordshire, the Barnsley Thick bed from Rotherham and Doncaster, and the Lochgelly Splint from Cowdenbeath (Fife). Samples of each bed or band have been cut vertically, and in some cases horizontally, so that the different bands and their constituents can be examined. The paper goes through the various preparations, pointing out their structure and composition. The seams are taken in the order named above, and afterwards compared one with the other, also with one or two seams in which gob-fires are not known, and lastly attention is drawn to various alteration-products found in the coals under examination.

During the last few years many writers have urged that spontaneous combustion is mainly due to the oxidation of pyrites; others have combated that view, and said that pyrites had little to do with the true cause. It depends, however, largely on what is meant by pyrites; if the pyrites is in a massive or crystalline form, the chances are that it has not; but if it is disseminated in small particles throughout the seam, then it probably plays a subsidiary part. During the process of examining the preparations, it has been found that most of the best parts of the seam contain pyrites either in strings, patches, pockets, or crystalline form. This being so, then the best coals should generate heat in a manner similar to inferior coals. This, however, they do not, for thousands of tons of Dow Bottoms, Arley, Silkstone Hards, Trencherbone, and other well-known seams have been stacked without any heating whatever. These coals, of course, do not break up or fall away by weathering; but, on the other hand, if various parts of the same seam, such as the Dow Middles or Tops, be mixed, then heating occurs. This being so, the source of heating is not in the good and hard coals, but in the inferior grades. Stocking of good coals on the surface has been mentioned, because owners and managers do not stock them in the gob, as they do the bad or inferior coal. If coal from the Dow Bottoms be examined, it will be found that it contains little or no foreign matter. It is in every way a humic coal (this statement applies to all the others mentioned as such).

Middles or Tops be examined, a wonderful

difference is seen. Both consist of a number of bands—some good, some bad, and others earthy—often containing fine specks of brown matter mixed up with the other constituents, at present not definable; also numerous fragments of plant tissues in a carbonised condition. The chief bands calling for attention are those similar to the "dog" or "dug" previously mentioned. This, when fresh, is tough and dull black, but when brought into contact with the atmosphere soon begins to oxidise, and breaks up on the surface into small fragments. If these are blown or washed away, oxidation continues until the piece is destroyed. Bands similar to these may supply the source of heating in some seams. If a stack of coal on the surface be examined, it will be found covered with a deposit, unless a shower of rain has lately washed over it, and the same process occurs repeatedly. Heating does make a difference. It is obvious to anyone that an alteration has occurred in this region. The sample was from the nearest point at which the place was made off, and, if it had been possible, the intention was to get to the place where the greatest heat was, but that could not be done. No dearth of evidence of this character could have been found.

The question occurs, how in the event of heat being generated does ignition commence? This heat may be caused in various ways; in the absence of timber it may occur in combination with the resinous bodies. The particular part is split up into innumerable small fragments, some even as fine as dust, which are composed of highly resinous bodies. Naturally, they come into contact with extra-heated material, and then, of course, ignition may occur. These bands and bodies often contain when fresh a large amount of gas, which when the sample is heated is quickly given off, and this may therefore be a contributory source of ignition. Bands, or ribs, of this character are difficult to get rid of, and are bound to be got with the ordinary coal. They cannot be separated or picked out, except with an extraordinary amount of trouble and expense, and they are not objectionable in a steam coal, although they may make a little more ash. They mix with the best parts of a seam as slack, nuts, cobbles, &c., ready in favourable circumstances to generate heat. This description applies exactly to the gob material or to the ungot coal which may have been left for the support of the roof or to be worked later on. In examining the Cockshead Top coal, one is struck with the homogeneous composition of that portion of the seam. This portion of the seam is no doubt a good humic coal—that is, if the sample from which the preparation was cut represents the bulk. There is nothing so far to suggest that heating may be caused in it, although some parts may differ from what is seen in the sample. The Cockshead Middles in appearance are not very different from the Tops. A large number of structures exist which, so far as the writer is aware, have never been recorded before. They are almost invisible to the naked eye, except when they appear in a fairly thick band. In the sample they are disseminated more or less in groups, some few and others thick, and when like the latter they can be easily seen. Their appearance is that of a number of fine grains or particles of pyrites congregated together. The organisms exist both in a pyritised and in an unpyritised condition. As to their origin, one can only make a surmise—they may have been organic bodies, or may have been inorganic, but when closely looked at, their appearance, structure and regularity suggests that they are the remains of some organic bodies of animal origin, but of what nature it is difficult to say. If the preparations are examined they are seen to have a body part from which a number of arms or rays radiate in a manner similar to those of the star-fish. Each ray is seen to be composed of a sort of shell or sarcode more or less of a palisade formation, the central body part being perforated by a canal. In good samples they are, as already mentioned, more like organic than inorganic remains. The writer has taken the liberty of naming them provisionally *Pyritica stellata*. It is found that pyrites take the place of sarcoid matter, partly in some and fully in others, but so far there has not been seen in the samples any sign of oxidation, although under favourable conditions this might take place, especially if the *Pyritica stellata* were in sufficient quantities either in band or in a pocket. The discovery of the above is important, as showing how pyrites may exist in coal in a very minute form.

There is little to say about the Bottom coal of the Cockshead seam; so far as the structure is concerned, it is similar to the Tops and some part of the Middles. The sample appears to show a solid and compact coal, a little more laminated than either of the other two beds; but the great difference is shown when a preparation is cut, when it is found to be more or less broken up by cracks, infilled with some mineral matter, thereby making it into a very soft and fragile coal, which would be easily broken up by weathering, &c. Whether this is so in the bulk, the writer has had no chance of proving; it is the sample alone on which he depends. But in the event of its being so when it is being got, probably a large percentage would be thrown into the gob, and then the chances are that heating would occur.

The Bullhurst (of Bignall Hill Colliery) coal is almost identical with that from the Dow seam of the Bolton district. The tops are similar, the laminated bands of inferior coal are similar, the number and form of the resinous bodies are alike, and the oxidation of some part of the seam is alike. The Hustle is somewhat different from the Mouse-tail of the Dow, although the ground-mass coincides. Pyrites in both seams is not plentiful, although here and there it occurs in pockets in a massive form. When heating takes place it will occur in a like manner to the Dow. The lowest bed in the seam (the Wall coal) is similar to the Dow Bottoms, and hardly need be taken into consideration. In the Bullhurst seam of Birchenwood Colliery gob fires are unknown. The Top coal or Muck coal of this seam

appears to be a fairly good coal, and breaks into small pieces having a conchoidal fracture. It contains many things of interest, including a great variety of vegetable structure. It does not appear to be a coal that would cause heating, except through crushing, and little or no pyrites has been found in the sample. The Rider coal is another bed similar in some respects to the Muck coal, so far as the resinous matter is concerned, there being more bands of dirt or argillaceous matter in it. The Top coal also contains a number of thin dirt bands, but the coal itself contains a large amount of resinous matter. The Bottom coal is similar to the Tops, but seems to have undergone a process whereby in this section it has become more jet-like. The coal is very brittle and fragile, owing probably to its being split up in all directions by very minute veins and cracks. Most of these cracks are filled with some mineral matter, the veins being too faint to be visible to the naked eye. The Birchenwood Bullhurst is a coal which contains very few spores, but, on the other hand, it contains a large amount of resinous matter, and pyrites is common in places in the form of fine particles and strings. It is unlike the Jammage Bullhurst and Dow in not having the dull-looking thin bands which are so common in their upper beds. If the bind or thin ribs of dirt have anything to do with causing heat, then the Birchenwood ought to be as bad as the Jammage. Whether the mode of working the seam makes the difference, the writer does not know; but, as previously mentioned, the bands of inferior coal have not been seen in the sample, and the inference can be drawn from that. The Bullhurst seam at Chatterley-Whitfield Colliery could not have been recognised as such except from its geological horizon. There is no part of the seam that is like the others, the nearest approach being the Bottoms. The canal in the top portion is in structure more like some of the oil shales or boghead coals than a true coal or cannel. These beds have undoubtedly originated in water, as the samples sent contained the remains of fish-teeth, scales, &c. One of the most noticeable features is a band of pyritous matter found in the inferior parting. From this parting downwards the coal alters: just above the Middles it contains a large amount of resinous bodies, but below it there occurs another band. These appear to be particles of an argillaceous nature; underneath are several bands of megaspores (a spore coal). The Middle coal differs much in composition from the above, and the same remark may be applied to the Bottoms. There is in the above seam a variety of constituents, very puzzling, and also very interesting, the geological sequence being as follows:—At the base or first-named portion, there is a bed of humic coal, followed by the Middles, both being to some extent similar to the Bottoms of the Birchenwood and Jammage Bullhurst coal; above these is the Top coal, containing a large number of megaspores, followed by a band containing irregular bodies of an argillaceous nature similar to what is found in many of the oil shales, all being overlain by three beds of shale and cannel. Naturally one searches for an explanation of the above sequence, and in doing so many thoughts and theories crop up, which would be out of place to state here, but at some time in the near future the writer hopes to be able to do so. With regard to the heating matter in the seam, there has been nothing similar to that found in the Dow or Jammage Bullhurst. If pyrites alone had much to do with the initial cause of heating, then there is the band referred to, and if it is a regular band throughout the seam, then it is a portion that is most likely gobbled. Heating should therefore have taken place, but there again is missing the combination which with other suitable constituents causes heating in the other seams already mentioned, and will be noticed in the Barnsley and Lochgelly seams.

The Barnsley Thick Bed samples have not been got from any place, so far as the writer knows, where a gob fire exists; in fact, heating is not known in the workings in which they came from, so that there is no actual proof that the coal represented by the sample could or does cause heating. The Barnsley bed is one from which there is almost as much coal thrown into the gob as is brought to the surface. The seam consists of five distinct beds, the two upper with the dirt band being either left or thrown mostly into the gob. The top portion or Day bed is a soft coal, and is easily broken up either by crushing or by the weight of the strata; it is therefore soon broken down. It consists of fine humic matter. The dirt below is a band similar to the dirt bands from the Dow and Bullhurst, containing a large amount of resinous matter, and in places strings and fine specks of pyrites. This band will always be thrown into the gob; the Bags below is another portion of the seam, parts of which are gobbled. Some parts of the sample show coal of good quality, full of fine humic matter, in which there are large quantities of resinous material. There may be seen fine yellow and brown specks, sometimes massed together, but more often a few together. They vary in size, some being about the size of a millet or mustard-seed, and all more or less globular. Some are found to be completely pyritised like those of *Pyritica stellata* and the globulites already mentioned. They are found in all stages from an unpyritised to a pyritised condition. The Top Softs are full of resinous bodies so often met with in the best coals of the soft variety. The Barnsley Hards are, without doubt, amongst the best of the hard coals in any district of the British area; it is a spore coal (when seen at its best) in every sense of the word. It is composed chiefly of megaspores and microspores; portions of the ground mass may be fine humic matter, but the bulk is from the generative organs of the carboniferous lycopods of that particular age. The megaspores are lying in more or less laminated bands—showing that they have been shed or deposited by a natural sequence, and not by any accidental process of deposition. In the full thickness of the hards (3 ft. or over)

\* Paper read before the Institution of Mining Engineers, Manchester, September 1913.

† *M.E.*, 1911, vol. xlii., page 2.



they gradually increase from the fine humic and resinous matter to the full extent of the spore coal, after which can be traced the gradual decrease of the spores to the fine humic and resinous condition. The bottom portion of the Barnsley bed contains a large amount of resinous matter; also a quantity of "jetonised" wood, some showing the vegetable tissues to perfection. These mostly belong to the gymnosperms and a few to the lycopods, proving the existence during that portion of the carboniferous period of trees similar in character to those of recent times. The constituents of a suspicious character in regard to heating are those in the dirt band below the Day bed and in the Bags in the form of globulites. Other parts, so far as the examination is concerned, need not be taken into consideration, beyond mentioning that there may be something in the Day bed which the writer has not had the opportunity of seeing.

The Lockgelly Splint seam is nearly 18 ft. thick and consists of ten beds, including two of dirt. The chief portion of the seam is the bed from which it gets its name of "Splint" coal; it is essentially a spore coal, some parts being like the Chatterley-Whitfield Bullhurst seam, and approach in appearance to a compact oil parrot or boghead shale, whilst other parts consist of ordinary soft coal. The megaspores are like those of the Barnsley bed, and lie in laminations, which gradually increase or diminish according as the coal becomes a spore or a humic coal. The bulk of the soft coal is composed of fine humic matter containing large quantities of *Ovalites*, and here and there "jetonised" bands. One band of coal, 6 in. thick, differs much from the rest of the sample, as it contains a more or less regular band of globulites. Another thin band of a similar nature was found in the Splint coal. The globulites appear in the coal in a manner similar to those found in the Barnsley bed.

It would take considerable time to discuss the nature and affinities of these globulites, because similar bodies have been found in various formations, but particularly in the coal measures. Sometimes such bodies when crowded together have been named "pisolitic" coal. Similar structures occurred in large and small lenticular masses in a seam of coal at the Wirral Colliery, Cheshire, and are described by Dr. Strahan as "dolomitic" coal.\* Similar bodies have been seen by the writer in chalk, and have been taken to be marcasite, although these have always been pyritised, and, unlike those under discussion, in various stages. The *Pila* of Bertrand and Renault are similar, although much smaller. Whatever their affinity or origin may be, they have, as already mentioned, the power of oxidation under suitable conditions. One important point in the investigations has been particularly noticed—that when the globulites are fully pyritised, oxidation has not taken place. If the edges alone have been pyritised, oxidation has taken place, and in a short time the globulites present a hollow cup-like form. If they have had any great influence in causing heating or gob fires, this is so far only conjecture; the great fact is that they occur, as proved in the cases cited above, and the only means to arrive at the truth one way or the other is to get similar pieces from the gob after heating has taken place, and to note the difference.

\* "On the Passage of a Seam of Coal into a Seam of Dolomite," by Aubrey Strahan, M.A., *Quarterly Journal of the Geological Society of London*, 1901, vol. lvii., p. 297.

### A METHOD OF MEASURING GOAF TEMPERATURES.\*

By T. F. WINMILL, B.A. (Oxon), B.Sc. (Lond.), Senior Demy, Magdalen College, Oxford; Research Chemist at the Doncaster Coalowners' Laboratory.

It becomes important to know, in connection with the consideration of the question of gob fires in mines, what is the normal goaf temperature. If the goaf be absolutely airtight, its temperature should ultimately become that of the undisturbed strata surrounding it. A very small air leak will, however, cause oxidation of the coal left in the goaf and a corresponding rise in temperature. Any easy method of determining these temperatures will, therefore be capable of giving valuable indications as to the tightness of the goaf and hence of the possibility of fires in it.

The only method hitherto available has been to drive in a borehole, to insert therein a maximum thermometer, to plug up the hole, and to leave it in that condition for some time. This method is open to serious objections, both on account of the trouble of putting in a deep borehole, and the possibility of air-leaks and escape of gas that such a proceeding involves. An apparatus has been devised which will allow of a continuous measurement of the goaf temperature in any place, without the necessity for boreholes.

As is well known, the electrical resistance of a metal wire varies considerably with the temperature, and this property is made use of in constructing resistance thermometers. These instruments are very commonly used for accurate temperature measurements, and a simple modification suitable for use in mines is now described and illustrated in the text. The coil is ready made in an hour or so by anyone, even if no previous experience of resistance thermometers is available.

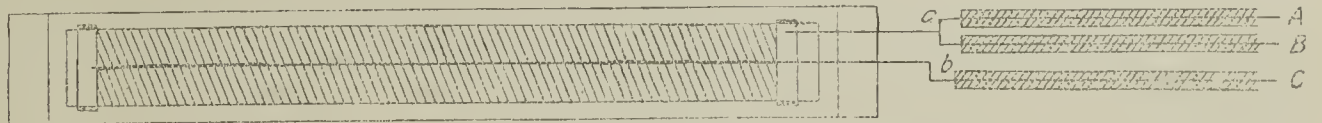
A strip of sheet-mica 1 cm. broad and about 1 mm. thick is bound with two copper collars, made from strips of copper coil. One end of a thin nickel wire,  $\frac{1}{8}$  mm. in diameter, is soldered to one collar, and the wire is then wound on the mica strip and the free end soldered to the other copper collar. For convenience in standardising and subsequent use, so much wire is wound as will give a resistance of 25 ohms at 0 deg. Cent. Two copper leads of No. 14 gauge cotton insulated wire are then

\* A paper read before the Institution of Mining Engineers, Manchester, September 1913.

soldered one to each copper collar, in the position shown. The coil is now wrapped in very thin asbestos paper, in order to insulate it, and slipped into a copper tube, the ends of which are then sealed with any of the usual silicate cements. Long leads must then be fixed to the projecting copper wires at *a* and *b*, so that the coil may be well buried in the goaf. These wires are made most conveniently of three No. 22-gauge copper, twisted together and well insulated. Two leads are fastened to one of the coil terminals, and one lead to the other.

In measuring the resistance from the end of the leads B and C, the resistance of the coil plus the resistance of the leads is obtained; but in measuring the resistance between A and B, the resistance of the leads only is arrived at. Since all the leads are exactly similar, the difference between these two measurements gives the resistance of the coil independently of that of the leads. By this means leads any length desired may be employed. Certainly leads a mile long would offer no difficulties to accurate measurement of the resistance of the coil.

The apparatus is used as follows:—The copper tube is placed in a strong iron tube of about the same length, and then put in the desired position in the open goaf. As the face advances and the goaf closes, the leads are carried forward along the floor, being covered with about 6 inches of sand, so as to prevent them from being cut as the weight comes on. The coil is then permanently in position, and by measuring the resistance at any time the goaf temperature at that point is obtained. Under most favourable conditions the measurements are correct to about  $\frac{1}{10}$  deg. Fahr.; more generally the accuracy is about  $\frac{1}{2}$  deg. Fahr.



INSTRUMENT FOR THE MEASUREMENT OF GOAF TEMPERATURES.

The temperature coefficient of the nickel wire described has been determined from measurements at 0, 25, 60·30, 80·48, 100, 132 and 184 degrees Centigrade, and from these results the following relation is deduced:—

$$R = A + BT + CT^2,$$

Where R = the resistance of the coil, in ohms,  
A, B and C are constants, and  
T = the temperature of the coil, in degrees Centigrade.

For a coil of a resistance of 25 ohms at 0 deg. Cent.—

$$\begin{aligned} A &= 25, \\ B &= 1\cdot128 \times 10^{-1} \text{ and} \\ C &= 1\cdot746 \times 10^{-4} \end{aligned}$$

For a coil of resistance A at 0 deg. Cent., the above constants must be multiplied by A/25.

Table I. gives the resistance and temperature for a coil of 25 ohms at 0 deg. Cent. for intervals of 2 degs. Cent. and 3 degs. Fahr. Intermediate temperatures can be calculated by simple proportion.

TABLE I.—RESISTANCE AND TEMPERATURE FOR A COIL OF 25 OHMS FOR INTERVALS OF 2 DEGS. CENT. AND 3 DEGS. FAHR.

Degs. Cent.	Resistance. Ohms.	Degs. Fahr.	Resistance. Ohms.
0	25	32	25
5	25·57	41	25·57
10	26·14	50	26·14
15	26·73	59	26·73
17	26·97	62	26·93
18	27·09	65	27·13
20	27·32	68	27·32
22	27·57	71	27·53
24	27·81	74	27·73
26	28·05	77	27·93
28	28·30	80	28·13
30	28·54	83	28·34
32	28·79	86	28·54
34	29·04	89	28·75
36	29·29	92	28·95
38	29·54	95	29·16
40	29·79	98	29·37
42	30·04	101	29·58
44	30·30	104	29·79
46	30·56	107	30·00
48	30·81	110	30·21
50	31·07	113	30·43
		116	30·64
		119	30·86
		122	31·07

The apparatus was tested at a rib-side which was being left to divide off a district, and the results are recorded in Table II. The coil is now buried about 50 yards in the goaf.

TABLE II.—RESULTS OF TESTS WITH THE APPARATUS. Resistance.

Date.	Coil and leads.	Leads.	Coil.	Temperature, in degs. Fahr.
Nov. 29, 1912	27·93	0·61	27·32	68
Dec. 13, "	27·91	0·61	27·30	67·8
Jan. 2, 1913	28·84	0·61	28·23	81·5
" 3, "	30·41	2·21	28·28	*82·2
" 10, "	30·21	2·10	28·11	80
" 17, "	30·10	2·09	28·01	79
" 31, "	29·91	2·10	27·81	76
Feb. 11, "	30·07	2·10	27·97	78
" 17, "	30·60	2·12	28·48	85
" 24, "	28·85	0·45	28·40	*84
Mar. 7, "	28·86	0·45	28·41	84
April 7, "	30·64	2·23	28·41	*84

\* Leads lengthened. † Leads cut by a tub.

The low initial temperatures are due to the fact that the rib-side on being left had been well stowed with wet sand. After this sand had dried, the temperature rose to that of the strata, showing that the stowing has been tight and that no air is leaking in.

The temperature in other places in the mine is being determined similarly, and the results will be published later.

### THE CADDER PIT DISASTER.

Home Office Enquiry.

[SPECIALLY REPORTED.]

On Monday, in the Justiciary Court, Glasgow, Sir Henry Cunynghame, K.C.B., opened the enquiry ordered by the Home Office into the circumstances attending the disaster at Cadder Colliery, Bishopbriggs, belonging to the Carron Company, on August 3 and 4, whereby 22 lives were lost. Sir Henry Cunynghame presided at the enquiry, and interested parties were represented as follows:—For the Carron Company—Mr. C. D. Murray, K.C., and the Hon. Wm. Watson, advocate. For the British Miners' Federation and the Lanarkshire Miners' Union—Messrs. Robert Smillie, John Robertson, James Murdoch, all of Hamilton; J. Robson, Miners' Offices, Durham; and G. Barker, Abertillery, Monmouthshire. For relatives and dependants of victims who were members of the Lanarkshire Miners' Union—Messrs. G. Craig Macintyre and J. C. Allan, of Messrs. Hay, Cassels and Frairie, writers, Hamilton. For Michael Macdonald, the only miner who was rescued from the pit—Messrs. Scanlan and Co., writers, Glasgow. For individuals interested in the enquiry—Messrs. Joseph Shaughnessy and Co., writers, Glasgow. For the Scottish Mineowners' Mutual Insurance Association—Mr. W. T. Craig, writer, Glasgow. For the Lanarkshire Coalmasters' Association—Mr. H. P. Macmillan, K.C., and Mr. Laurence Strain, advocate. For the Scottish Colliery Firemen's Association

—Mr. David Wright. For the Home Office—Messrs. Wm. Walker, H.M. Chief Inspector of Mines for the Scotland Division; Messrs. Robert McLaren, J. Masterton, and A. F. Steele, H.M. inspectors of mines, and Mr. Robert Nelson, H.M. electrical inspector of mines.

At the outset of the proceedings, Mr. George Pate, general manager of the Carron Coal Company, addressed the Commissioner, and assured him that the directors and the whole of the officials of the company would give him every assistance in the enquiry in endeavouring to elucidate the facts. He had to express sincere sympathy with the relatives of those workmen, and as an indication of the practical manifestation of that sympathy, he had to say that the directors had decided to provide adequately in the circumstances for the widows and children of the deceased until such time as those dependants in ordinary course would be able to provide for themselves. He had also been asked, and he did it most gladly, to tender the thanks of the directors of the company to those gentlemen who so heroically and willingly assisted on that fatal evening to prevent further loss of life and recover the bodies. In this connection he might mention the names of Mr. Robert McLaren, the senior inspector of mines for Scotland; Mr. James Bain, of the Alloa Coal Company; and Messrs. J. T. Forgie, Neil Munro, Mark Brand, and James Boyd, of Messrs. Wm. Baird and Co. Proceeding, Mr. Pate went on to say that he had to admit at once, as general manager of the company, that it was clearly put to him to see that everything that was possible was done for the preservation of life in the company's large undertakings. Upon him, therefore, personally rested the responsibility, and he had to say that the directors had never on any occasion spared any expense, nor in any way hampered him in the provision of such plant and appliances as he was advised by those who were experts in the various departments might be considered necessary.

Formal evidence in regard to plans having been given, the first important witness called was James Bonnor, district general manager for the Carron Coal Company. There had never previously been any accident of a serious character in connection with Cadder Colliery. Any fires that had occurred underground had not been of any importance, and, indeed, the worst that had happened was where a screen took fire and kindled some of the surroundings. That particular fire took place a little more than six years ago, and since then there had been no fire of any kind, even of a small character. Witness thereafter went on to explain that the quantity of air passing down the main dook brae was from 20,000 to 21,000 cubic feet per minute. In his opinion, that was an adequate quantity of air. Witness explained that he knew nothing whatever of the disaster until Monday, August 4, and then only when the morning newspapers reached him. He was at that time on holiday, and he proceeded at once to Cadder Colliery.

In reply to questions put by Sir Henry, witness pointed out that the roof in certain parts was held up by wooden pillars or "checks," and he admitted that once the flames secured a hold on these "checks" a great quantity of smoke would be created. The mine, in his opinion, was not dusty, or "gassy," and that was evidenced by the fact that naked lights were used. The fire in the pit was not extinguished yet, but he was glad to say it was gradually becoming very much reduced. Witness said he had formed an opinion as to what was the cause of the fire that took



On August 4, when he went down the pit after the fire had been restored to its normal direction, he visited the fire along with some others. He approached the fire as near as he could with safety. It quite appeared to him, from the position of the fire which was raging at that time, that it had originated in the cabin underground. He quite admitted, however, that reversals of the air tended to carry the air particular ways, and make it more uncertain than it otherwise would be to say where a fire originated.

Answering questions put to him by Mr. Smillie, witness said he considered himself as being the person responsible for the establishment of rescue brigades at the colliery. He was quite aware that the Coal Mines Act, 1911, dealt with the formation of rescue brigades and the equipment of these with suitable apparatus. The reason why no equipment was at the time of the disaster to be found in Nos. 15 and 17 Cadder pits was because he considered he was in the hands of the Scottish Coalowners' Association, who, he understood, were negotiating with the Government as to the particular type of apparatus which should be adopted.

Prior to the accident they had not trained a single man in rescue work at Cadder. They had, however, appointed men, and were awaiting further instructions. Under the circumstances, he did not feel that they were bound to carry out the Order with regard to rescue apparatus which came into force in April 1912.

Sir Henry Cunynghame at this stage indicated that he was not going into the whole question of difference between the Home Office and the Coalowners' Association as to the type of equipment necessary, because all he had to do was to enquire into the circumstances of this accident. He was willing, however, to hear any evidence bearing, say, on how far the provision of rescue apparatus might have saved lives in this disaster.

Witness said that in his view there would not have been any chance of saving a life on that night, even although there had been rescue brigades fully equipped in connection with the colliery. Portable breathing apparatus certainly would not have been of the slightest assistance in saving a life. Since the accident four smoke helmets, with complete equipment, had been provided.

The Chairman: What use, might I ask, would a smoke helmet with a bellows be in an accident like this? Would you have gone down this pit with a smoke helmet, and would you have taken a man with you who was trailing a bellows behind him?—I don't think so.

Prof. Charles Latham, Dixon lecturer in mining at Glasgow University, said that certain samples of the air found in the Cadder pit were submitted to him by Mr. Steele, H.M. inspector of mines, for analysis. He analysed the samples for carbon monoxide, and he would produce, for the information of the Commissioner, an official copy of the various analyses he had made. He had no information as to where the samples had been taken.

Archibald Spiers, who was next examined, stated, in reply to Sir Henry Cunynghame, that he was the manager in charge of No. 15 pit, Cadder Colliery, and had been so since December 1910. Witness described in detail the electrical equipment at Nos. 15 and 17 pits, and gave it as his opinion that if the fire had been caused by electricity, it must have been due to something being wrong with the switch panel room. At least, he could form no other opinion, keeping in view the point where he saw the fire. Taking into consideration the whole circumstances of the disaster as he knew them, he did not think they could point to electricity as being the original cause. The practice in the pit was to have a pit bottomer on duty continuously during weekdays. On Sundays, however, they arranged for the fireman to act as pit bottomer. Of course, on these occasions the fireman was not constantly on duty at the pit bottom.

Replying to the Hon. Wm. Watson (for the Carron Company), witness said they had never previously experienced any trouble with the electrical installation in the pit. Further, so far as he knew, the electrical haulage had always been in perfect order.

Medical evidence having been given by Doctors Douglas and Millar, and James McWhinnie, manager at No. 17 Pit having been briefly examined, the enquiry was adjourned till the following day.

#### Tuesday's Proceedings.

When the enquiry was resumed on Tuesday the first witness called was Wm. Owens, who deposed that he was an overman employed at No. 15 pit, Cadder Colliery. He was on the pithead when the men descended the pit at 3 o'clock on the afternoon of Sunday, August 3, when the fire occurred. As the men went down he told them off to their respective posts. Between 7.45 and 7.55 p.m., in the evening, he was informed that the pit was on fire. Immediately on being told of that, he got the engineman, John Marshall, to switch off the electric power. Thereafter he descended the shaft of No. 15 pit along with William and Joseph Brown. At the bottom of the shaft he saw no fire. He pursued a road in an easterly direction for a distance of 45 yards. He did not see the fire until he got to the corner. The fire was raging. The sides were not on fire, being made of stone. The cables were burning, and he could see the right-hand side as he went along. He saw the lighting cables on the roof, but witness was not sure if they were burning or not.

Witness at this stage was asked a series of questions by Sir Henry Cunynghame as to where the men who wrought underground left their clothes, and as to the character of the oil which was used by the miners.

Do you think this fire was caused by some accidental action on the part of a miner who set fire to the timbers, or would you fix the origin upon the electric cables?—It might be due to carelessness on the part of a miner in throwing aside a match or a lighted cigarette in the vicinity of the cabin.

Might the fire not also have been caused by the electric cable?—It might.

If you were asked as an expert miner for an opinion, which would you say was the more likely course?—Speaking as a practical miner, I think it was some carelessness on the part of a miner while trimming his wick.

Witness, in answer to further questions, said that, in his opinion, there was no man more conversant with these roads than the deceased fireman, Reilly; who made the fireman's examination for the men going down the shift on this particular Sunday afternoon. Reilly was also appointed bottomer for that shift on the Sundays. On ordinary weekdays there was a regular bottomer.

Mr. Smillie at this point said that in the questions he proposed to direct to the witness he contemplated showing that whatever the general management might have been, the local management at the colliery was bad.

Sir Henry Cunynghame remarked that it was not altogether his function to go into the whole question of the management of their mines by the Carron Company. He was merely charged with the duty of enquiring into this accident, and, of course, so far as any question of management had any relation to the disaster, that would be quite relevant.

Mr. Smillie observed that the point he wished to emphasise was that Reilly could not be fireman and pit-bottomer at the same time.

Witness said he considered that they could appoint Reilly so to act while he was acting fireman on a repairing shift.

If a bottomer, in terms of the statute, had remained in constant attendance at the pit bottom, could he possibly have seen the fire?—No.

So far as you are aware, and in the circumstances which happened, is it not known that none of those belowground ever got near the pit bottom of No. 15 pit?—Yes.

So that the services of a bottomer were, in point of fact, not required?—Yes.

So far as you are aware, has either you or any official of the Carron Company ever suggested that Reilly was in any respect to blame in not having opened the door and short-circuited the air?—No.

Whether or not that was a prudent thing to do, do you offer no opinion?—No; it depends altogether on circumstances.

Witness added that, from what he saw, the fire was raging most furiously in the vicinity of the small cabin belowground. In connection with this cabin there were wooden walls and furniture.

Have you seen men trimming their wicks in the cabin, and smoking in the vicinity of it?—Yes.

Can you finally suggest any possible way how the electric cables, whether power or lighting, could have caused this fire?—I cannot.

By Mr. Walker, Chief Inspector of Mines—Can you tell me the condition of the wood in the cabin, as to whether it was wet or dry?—It was certainly not very dry. I would not say, however, that it was too wet, as it was not saturated.

Would you be able to strike a match on the wood?—I think one could do that.

John Lawson, winding engineman at No. 17 pit, Cadder Colliery, stated that he took up his duty on the night in question at six o'clock. At half-past six o'clock he noticed that two of the switches which directed the electrical current had both blown out. He tried to adjust the switches again, but he could do nothing with the one operating in No. 15 pit. On the night of the disaster witness was in charge of the electrical generating station. On noticing that something was wrong with the switches, he tried to get into telephonic communication with the cabin and the switch panelroom underground; but although he rang several times, he failed to get any response.

By Mr. Robert Nelson, H.M. electrical inspector of mines—Do you know the leakage detector on the switchboard at No. 17?—Yes.

Was that always switched in, or was it sometimes in and sometimes out?—At times it was in and at other times it was out.

Can you say on the night of August 3 whether it was in or out?—I never noticed.

Edward Michael Flynn, electrician at No. 15 pit, Cadder Colliery, described the electrical apparatus, of which he had been in charge for the past four months, in the pit where the accident occurred. The electrical fittings underground were, he said, arranged on generally satisfactory lines. Since May of the present year there had been no breakage or damage of cables beyond what might have occurred as a result of ordinary methods of working.

Supposing we are told that it had been electricity which

set this pit on fire, what part would you have selected as the weakest point in the electrical system?—I would never have thought of anything going on fire at the switchboard. I honestly did not see that anything would go wrong there.

By Mr. Robert Nelson, H.M. Electrical Inspector of Mines (to witness): If you had continuous sparking from any cable, would that not cause a fire underground?—I would rather not answer that question.

Are you aware of the fact that there are cables presently in contact with the timber?—Yes, but that is since the fire. Before the fire the cables were not in contact with the timber.

How does it come that the leakage detector was sometimes in and sometimes out?—I cannot answer that; I had nothing to do with it.

By Mr. C. D. Murray, K.C.: Witness could say positively that it was only since the fire that the cables had come in contact with the timbers. Further, he had tested the insulation resistance in which the timber came against the cables, and it was absolutely satisfactory.

The enquiry was adjourned.

#### Wednesday's Proceedings.

The first witness called at the resumption on Wednesday was Mr. Brown, whose re-examination by Mr. Robert Smillie was continued from the previous day.

In reply to Mr. Wm. Walker, H.M. inspector of mines, witness admitted that a tool chest was kept in the cabin, but he could not say that any oil was in the chest. It occasionally happened that oil from his flask got on to his clothes.

By Mr. C. W. Murray: Witness got quite close to the fire, and was the first person to see it. One-half of the cabin was burning fiercely, and the other half nearer the pit bottom was not so far advanced, but was also on fire. The fire was fiercest above the cabin, in his opinion. There were no flames except in the roof of the switch panel house, and the fire there was not so fierce as it was in the vicinity of the cabin. When he first went in, the electric cables were hanging in their proper position, but the insulation was ablaze for about 10 yards anyway. In some places the blazing timbers had been so far burned as to fall out of position. The conclusion he came to at the time was that the fire had originated in the cabin, and he did not see anything that would connect it with any defect in the electrical installation underground.

By Sir Henry Cunynghame: There had been no fire in this pit for years and years. Consequently, the knowledge that the men might possess and the degree of preparedness in their minds for an emergency was different in this case from that of a mine where fires were very frequently occurring. He would not expect the men in this mine to have the same experience and knowledge as to the roads to take for getting out as in a mine like Hamstead, where fires were very often occurring.

Robert Dunbar, one of the three miners who succeeded in making good their escape by ascending No. 17 pit, deposed that he was warned by Reilly, the fireman, that smoke was coming down the brae. In the rescue work which was carried out he saw several canaries drop down at the trap door at No. 15 pit. Without the canaries, some of the rescuers might have died, as they (the men) would not have otherwise known when to withdraw. It was the truth to say that in this disaster the canaries had been most useful to them.

By Mr. Smillie: He and those working with him did not know where the seat of the fire was, nor did they at the time realise that it was as bad as it proved to be. He had seen men in the cabin at different times, but he would not commit himself to say that he saw any there or in its vicinity on the day of the fire. Witness was himself at the cabin shortly after starting his shift, and everything then was all right.

By Mr. Wm. Walker: He was not aware that the stores, such as oil and grease for the hutchies, were kept at the pit bottom of No. 15 pit.

By Mr. Murray: The men did not smoke inside the cabin, but they might do so in the vicinity of it. Smoking near the cabin was more common on the day shift than on the afternoon shift. Witness thought it was about half 6 o'clock when Reilly came and gave him warning. He would not definitely say that he could hear the coal-cutting machines running just at that moment, but he heard them immediately before that. Reilly told them that the reek was coming down the brae, and that they had better "clear out to the communication of No. 17." It was on the suggestion of witness that Reilly went on to warn the machinemen. It was quite probable that at that time the machinemen were working. Witness knew the importance of keeping ahead of the smoke if he could, and following the air current. That was one of the reasons which influenced his companions and himself in going round by what was known as "Stewart's level."

By Sir Henry Cunningham: When you saw O'Neill, who was with you, stagger and knock his head, do you remember whether or not the smoke was smarting your eyes?—No, sir. We felt it more in the throat. I could not see any distance in front of him.

Arnold Hughes, electrical engineer to the Carron Company, said he had been in the employment of the company for seven years. There were resident electricians at the



various pits, and his duty was chiefly that of supervision. Electricity was first introduced into No. 15 pit about 14 years ago, and then only for lighting. It was not until 1906 that the company installed electrical power for plant. In the spring of last year a further alteration was made, and armoured power cables introduced to comply with the new Electricity Order. In the opinion of witness, armoured cables were preferable to and much safer than unarmoured cables. He was prepared to say that at the date of the fire the electric lighting circuit was in good order. His last examination of the plant in this pit was made on June 3 last.

In his opinion these electric lighting wires did not give rise to the fire, and he thought it was impossible that they should do so. Tests and experiments had been carried out in his presence by Prof. Burns, Royal Technical College, Glasgow, and Messrs. Alex. Anderson and A. B. Muirhead, electrical engineers, and these satisfied him that there were no defects in the lighting cables. The cables, which had survived the fire, had been subjected to certain insulation tests, and these had proved most satisfactory.

Mr. Nelson, H.M. electrical inspector of mines, at this stage said he had tested the surviving cables, and he frankly admitted that these came up to the standard of requirements.

Dr. W. M. Thornton, professor of electrical engineering in Armstrong College, Newcastle, who was afterwards called, said on September 22 of the present year he made an examination of the electrical plant at No. 15 pit, Cadder Colliery, and his opinion was that the plant, considering that it was a naked light pit, was quite good. Unfortunately, his examination was rather limited because of the condition of the mine at the time of his inspection. So far as the lighting cables in the pit were concerned, he thought it would have been better if these had been armoured. The power cables were of vulcanised bitumen, and he had found recently that bitumen was rather dangerous in certain conditions associated with cables. At a low temperature bitumen gave off methane and at a higher temperature ethane and other inflammable gases.

Has there been any new factor brought to light in the present enquiry into this disaster upon which you wish to express an opinion in so far as it relates to the use of electricity in the mines in future? In the first place, it seems to me that we have evidence now to show that bitumen cables in mines do burn very freely for quite a considerable distance.

Witness, in the course of further examination, said he held to the opinion that the leakage indicators should have been constant. He further held to the view that readings should be taken a little more frequently than they were done, while he considered it would be an advantage if in every pit they could have had automatic out-outs.

The enquiry was then again adjourned.

## OBITUARY.

The death took place on the 19th inst. at Wemyss Memorial Hospital of Mr. Alexander Brown, of the well-known firm of Messrs. A. Brown and Sons, coalmasters, Largs. Mr. Brown underwent an operation about 10 days previously, and gradually lost strength. He was well known throughout the East of Fife, and was held in very high respect. Mr. Brown, who retired from business a few years ago when the firm was dissolved, was 66 years of age, and is survived by his widow, a son, and two daughters.

The death occurred on Monday, at his residence, Hyrst House, Batley, of Mr. Robert Illingworth Critchley, a well-known resident in the heavy woollen district. He was in his seventy-eighth year, and leaves one daughter, Mrs. W. H. Thackrah, of Harrogate. Mr. Critchley was the head of James Critchley and Sons Limited, Batley, and the West End Collieries, Batley, were founded by his father. He was a director of the Soothill Wood Colliery Company Limited; a director of George Lee and Sons Limited, cotton spinners, Staincliffe, Dewsbury; a local director of the London and Lancashire Insurance Company up to a short time ago; a director of the Mirfield Gas Company; a director of the Calder and Hebble Navigation Company, and vice-chairman of the Yorkshire Guarantee and Securities Corporation.

Mr. William Weir, the principal partner of the well-known firm of iron and coal masters, Messrs. William Baird and Co. Limited, died on Sunday morning at his residence Adamton, Monkton, at the advanced age of 87 years. Up till about two years ago, when he was laid aside with illness, Mr. Weir maintained an active interest in the large business conducted by the firm. Born at Drumpark, in the parish of Old Monkland—his mother being an elder sister of the founder of the firm of Messrs. William Baird and Co.—Mr. Weir, besides being chairman of that concern for a number of years, was prominently connected with several public companies. But his main interest in life was the development of Messrs. William Baird and Co.'s business, which during his lifetime grew to huge proportions, with ironworks located at Gartsherrie, Kilwinning, Lugar and Muirkirk, and extensive collieries in the counties of Lanark, Ayr, Stirling, Dumfries and Linlithgow. His landed estates in Ayrshire, Kildonan, and Adamton are of large extent, and he took a keen personal interest in their maintenance. Mr. Weir is survived by his widow.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### LOW-TEMPERATURE CARBONISATION.

SIR,—The points which Mr. A. Rollason mentions in his letter in your issue of the 19th inst. are too wide to be treated fully in a letter, even if you could spare the space; they can be found fully described in most modern text-books of chemistry.

The relative affinity of hydrogen and carbon for oxygen is not measured by the calorific powers he states, but by the calorific power multiplied by the chemical equivalents—

8,080 × 12 = 96,960 for carbon,  
and 29,000 × 2 = 58,000 for hydrogen.

These figures are for the combustion of solid carbon and gaseous hydrogen; for gaseous carbon the figure would be about 136,000 instead of 96,960.

The point about the mode of combustion in ordinary hydrocarbon flames is treated in most text-books, and it is clearly proved that the first action in a Bunsen burner is a combustion to CO and H<sub>2</sub>, whilst in an ordinary hydrocarbon luminous flame there is not sufficient air to burn all the hydrocarbons to CO and H<sub>2</sub> at first, and some are decomposed into carbon, &c., and hydrogen as well. The very fact that there is white hot carbon in a flame shows that, at that point, there can be no water vapour beyond a mere trace, for carbon turns out hydrogen from water at much lower temperatures than a white heat. It is on this principle that water gas and producer gas are made. In a flame it is impossible for hydrogen mixed with either carbon or carbon monoxide to burn to water until they are burning to carbon dioxide, unless the flame is cooled.

I am glad to see Mr. D. Ferguson's correction of the error in the formulae.

I cannot see any connection between the carbonisation of coal and the mode of combustion of hydrocarbons, for, beyond mere traces, there are no hydrocarbons in coal—at least, I have failed to find any evidence of hydrocarbons, and should be very interested to hear of any.

JOHN HARGER.

Chemical Laboratory,  
The University of Liverpool,  
September 22, 1913.

### DEPUTIES' CERTIFICATES.

SIR,—I was rather surprised to read in the *Colliery Guardian* of the 19th inst. your agreement with "A Thirty Years' Reader's" interpretation of section 15 of the Coal Mines Act, 1911, and am afraid the opinion expressed may lead to a wrong impression as to what the Act (not fully quoted by your correspondent) really does say on the matter, and what interpretation the Home Office authorities have given to this section.

May I, first of all, re-quote the Act? Section 15 states:—"A person shall not . . . be qualified to be appointed or to be a fireman, examiner, or deputy unless he

(a) is the holder of a first- or second-class certificate of competency . . . ; and

(b) has obtained a certificate . . . as to his ability to make accurate tests . . . , &c . . ."

In the memorandum *re* firemen's certificates, issued by the Home Office last year, it was stated in paragraph I that no person could be appointed to act as fireman, examiner or deputy, and no person already employed in that capacity could continue to be so employed after January 1, 1913, unless he had obtained a fireman's certificate as required by section 15 of the Coal Mines Act, and that no exception was to be made for persons holding managers' or under-managers' certificates.

If deputies, holding the same certificates as managers or under-managers, were not to be exempt from the necessity of taking the examination for firemen's certificates, if they wished to continue their work, is it reasonable that managers or under-managers should be exempt from the same examination if they wish to perform, even temporarily, a deputy's work?

This view, I think, is supported by the answer given in the House of Commons on October 18, 1912, by Mr. McKenna (reported *Colliery Guardian*, October 25, 1912) as to whether or not a manager, under-manager or other official not holding a fireman's certificate could make an inspection with a view to allowing a man to enter a place to begin work in the absence of the certified fireman.

In this answer it is stated that . . . "Unless the person making the examination is required to hold such a certificate, there would be no guarantee that his eyesight, for instance, was such as to make accurate tests for firedamp. . . ."

I think the Act, and the interpretation of it, as quoted above, only lends itself to the view I have taken.

September 22, 1913.

T. H. S.

[Our agreement was with the suggestion contained in the first paragraph of "A Thirty Years' Reader's" letter, not with his later postulate. We regret that our editorial note should have been ambiguous. The case is, we think, very clearly and correctly put by "T. H. S." Other correspondents please note.—Ed. C. G.]

### THE FACTORY ACT AND MINES.

SIR,—I notice in your last issue, under the heading of "Home Office Prosecution in Staffordshire," that the proprietors and manager of a colliery were summoned under the Factory and Workshops Act, in connection with a fuse in the electrical generating station on the surface.

I believe that most mining engineers are under the impression that this Act does not apply to the surface works at collieries. It is important to know whether this point has been decided, and your report does not show this.

If you or any of your readers can give some definite information on this matter, it will, I feel sure, be appreciated.

T. E. ARMSTRONG.

Department of Applied Science,  
St. George's-square, Sheffield,  
September 22, 1913.

[The Act only applies to the particular premises specified in the Act. The following are the only references to mines:—

#### Sixth Schedule.—List of Factories and Workshops.

##### PART I.—NON-TEXTILE FACTORIES.

(20) "Electrical Stations.—'Electrical stations,' that is to say, any premises or that part of any premises in which electrical energy is generated or transformed for the purpose of supply by way of trade, or for the lighting of any street, public place or public building, or of any hotel or of any railway, mine or other industrial undertaking."

##### PART II.—NON-TEXTILE FACTORIES AND WORKSHOPS.

"(26) Quarries.—'Quarries,' that is to say, any place, not being a mine, in which persons work in getting slate, stone, coprolites, or other minerals.

"(27) Pitbanks.—'Pitbanks,' that is to say, any place above ground adjacent to a shaft of a mine, in which place the employment of women is not regulated by the Coal Mines Regulation Act, 1887, or the Metalliferous Mines Regulation Act, 1872, whether such place does or does not form part of the mine within the meaning of those Acts."—Ed. C. G.]

### TO CORRESPONDENTS.

#### Travelling in Main Airways.

SIMPLETON.—An airway need not at the same time be a travelling way, and there are no regulations as to the dimensions of airways apart from travelling ways.—Ed. C. G.

### THE TIN-PLATE TRADE.

#### Liverpool.

There is very little life in the market just now, transactions being almost entirely for early delivery. Buyers are not disposed to book ahead, although, on the other hand, makers all assert that present prices do not show any margin of profit. Quotations for shipment over rest of the year may be called:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 13s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 9d. to 27s. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 9d. to 13s. 10½d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 7½d. to 13s. 9d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 7½d. to 13s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 6d. to 19s. 9d. per box; I C squares and odd sizes, 13s. 9d. basis for approved specifications. Charcoals are quietly steady at 15s. 9d. and upwards according to tinning. Terns in ordinary finish run 23s. 6d. to 24s. for I C 28 × 20, and are in moderate request. Coke wasters are in fair request. Quotations:—C W 14 × 20, 12s. 4½d. per box; C W 28 × 20, 25s. 9d. per box; C W 20 × 10, 16s. per box; C W 14 × 18½, 11s. 6d. per box—all f.o.b. Wales, less 4 per cent.

Messrs. Yeadon, Son and Co., Leeds, have recently erected one of their briquette plants for the Bradford Corporation at their Esholt Sewage Works. This plant has been specially designed and constructed for treating the sewage by converting it into "ovoid" briquettes. In consequence of the large proportion of grease and oil in this residual, these "ovoids" can be very suitably used as a boiler fuel, or for producing a rich illuminating gas.



THE COAL AND IRON TRADES.

THURSDAY, SEPTEMBER 25.

Scotland.—Western District.

COAL

Trade in the west of Scotland continues to be very satisfactory, and business in all qualities of coal is very active. Collieries are well employed, but outputs are still a little short of normal. The position with regard to splint coal is practically unaltered, the best shipping qualities being heavily booked, while the best brands of ell coal are also in urgent request, with second-class qualities easier. In spite of the high prices being asked for navigation coal, business in this quality is very active and steam coals have also a good share in the general heavy demand. Treble nuts are scarce and some difficulty is being experienced in arranging for prompt shipment, and, doubles, although a trifle easier, are being well cleared. There has been a strong demand for singles, large quantities being booked for export, and prices have an upward tendency. Business in household coal is increasingly active. Trade in this district is in a very healthy condition and promises to continue in this state for some considerable time. The only adverse feature is a threatened scarcity of tonnage, and the labour troubles at Liverpool, Manchester and Dublin have, in this respect, already affected some of the collieries. Shipments for the week total 103,894 tons, compared with 125,605 tons in the previous week and 116,022 tons in the corresponding week of last year. At Glasgow 74,585 tons were shipped, Bowling 163, Greenock 472, Ardrossan 3,286, Troon 7,493, Irvine 1,270, Ayr 16,625 tons. Prices all round are firm and in some directions show an upward tendency.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	12/6 to 14/	12/ to 13/6
Ell .....	13/3	13/3
Splint.....	13/ to 15/6	12/9 to 15/6
Treble nuts .....	13/9	13/3 to 13/9
Double do. ....	13/	12/6 to 13/
Single do. ....	11/6	11/ to 11/3

IRON.

The position of the Glasgow pig iron warrant market has shown an improvement over the preceding week. Owing to large withdrawals from the stores, buyers have been induced to operate more freely and prices have risen about sixpence per ton. There is also an improvement in the shipments of pig iron from Middlesbrough, which might have been more pronounced had there not been a scarcity of tonnage. Cleveland iron closed at 54s. 10½d. cash, compared with 54s. 3d. per ton cash, which was the closing price in the preceding week. There has been a good demand for ordinary iron, consumers buying steadily, and the reduction in the price of hematite is expected to result in increased business. The prices of makers' iron are unchanged from last report. Monkland is quoted f.a.s. at Glasgow, No. 1, 68s., No. 3, 66s. 6d.; Govan, No. 1, 66s., No. 3, 64s. 6d.; Carnbroe, No. 1, 71s. 6d., No. 3, 67s. 6d.; Clyde, No. 1, 73s. 6d., No. 3, 68s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 74s., Nos. 3, 69s.; Glengarnock, at Ardrossan, No. 1, 74s., No. 3, 69s.; Eglinton, at Ardrossan or Troon, No. 1, 68s. 6d., No. 3, 67s. 6d.; Dalmellington, at Ayr, No. 1, 69s. 6d., No. 3, 67s. 6d.; Shotts at Leith, No. 1, 74s., No. 3, 69s.; Carron at Grangemouth, No. 1, 74s. 6d., No. 3, 69s. 6d. per ton; Scotch hematite is quoted 71s. per ton for West of Scotland delivery. In the manufactured branches of the trade business shows little alteration. The export demand is somewhat better, while trade with home consumers continues comparatively idle. Galvanised sheet makers are more active, while black sheet manufacturers have a large number of orders on hand, although in this branch work has been retarded owing to the irregular arrivals of semi-manufactured materials from the Continent. Even in face of the low current prices little fresh business is in the market and makers generally could be much better employed than at present. Buyers anticipate that, owing to the low prices of competitive foreign productions, home prices will be still further reduced.

Scotland.—Eastern District.

COAL.

The position of the trade in the Lothians is satisfactory. The demand for most qualities is well maintained, and the collieries are well employed. Secondary steam coals, which were somewhat inactive, have improved, and are now fairly well booked. Treble, double and single nuts are in good request, and are being well cleared. The shipments for the week amounted to 119,247 tons, compared with 99,089 in the preceding week and 131,455 tons in the corresponding week of last year. At Grangemouth 45,406 tons were cleared, Granton 9,372, Leith 47,779, Bo'ness 16,690 tons. Prices generally remain firm.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal .....	13/	13/
Secondary qualities .....	11/6 to 12/	11/9 to 12/3
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/6 to 12/9	12/6 to 12/9
Single do. ....	11/ to 11/6	11/ to 11/6

Business in the Fife coal trade is very active, and the pressure on the collieries is increasing on account of the approach of the Cronstadt season, which specially affects the large qualities of coal. There has been a considerable demand for all classes of nuts, and prices are firm. Owing to a better demand of tonnage at the ports shipments have been largely from Methil. The clearances were 1,750 tons, Methil 66,223, Charleston 263, 1,720, Dysart 1,762, and Wemyss 1,478 compared with 115,795 in the previous the corresponding week of last year.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	17/	16/6 to 17/
Unscreened do. ....	15/	14/6 to 15/
First-class steam coal.....	14/ to 14/3	14/3 to 14/6
Third-class do. ....	11/6 to 12/	11/9 to 12/
Treble nuts .....	13/9 to 14/3	14/3 to 14/6
Double do. ....	12/6 to 13/	12/6 to 13/
Single do. ....	11/ to 11/3	11/ to 11/6

The total shipments from Scottish ports during the week amounted to 344,083 tons, compared with 340,489 in the preceding week and 375,246 tons in the corresponding week of last year. The total shipments to date, amounting to 11,830,432 tons, show an increase of 864,914 tons over the same period last year.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 136,541 tons of coal and 2,185 tons of coke were despatched from Tyne Dock, a decrease of 9,609 tons of coal and an increase of 1,567 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 56,889 tons of coal and 2,304 tons of coke, a decrease of 3,222 tons of coal and 3,702 tons of coke. The Blyth shipments totalled 93,545 tons of coal and coke, a decrease of 9,831 tons. With further reference to the Norwegian State Railways' contracts for steam coals for delivery up to the end of next year, it appears that allotments in respect of 88,600 tons have been made as follows:—52,100 tons Shireoaks, 20,500 tons Cowdenbeath or Lochgelly, 10,000 tons Sherwood, 2,000 tons Whorlton, 2,000 tons Staveley, and 2,000 tons Nixon's Navigation. It is stated that the whole of the Danish State Railways' requirements of from 80,000 to 90,000 tons of steam coals for delivery over next year are to be drawn from Westphalia. Merchants in this country never regarded this particular item of business with much favour on account of the onerous nature of the contract conditions. There was a considerable amount of dismay in the local market when the news arrived that the Russian State Railways' order for steam coals for shipment to Baltic ports up to the end of the year had gone to Westphalia in almost its entirety. It is now stated that 12,000 tons of best Blyths have been definitely ordered, together with another 23,000 tons of Northumberland or Durham steams, and 15,000 tons of Yorkshire. Westphalia, however, as briefly stated last week, has secured the order for 126,000 tons. Moreover, it is now stated that the Russian merchants who secured the contract for steam coal for delivery to Black Sea ports have the option of delivering Westphalian coal, so that the expected business from that quarter may not materialise. However, hope has been revived by the news that the Riga-Orel Railway wants tenders of 160,000 tons of steams for delivery up to January at Riga, Reval and Libau. Tenders are due in on Saturday of this week. It is also reported that the Russian State Railways require further offers of 500,000 tons of Northumberland, Yorkshire or Scottish coal for delivery at these same ports over next year—but the report is freely doubted. Tyne prime steams have been sold for delivery over the next six months at from 14s. to 14s. 3d. per ton, f.o.b., by the colliery. The Stockholm Breweries are inviting offers of 8,000 tons of steams for delivery over next year, tenders to be in by the end of this month. One of the Indian Railways is enquiring for 120,000 tons of steams for shipment over 12 months from February. This railway has, latterly, been using South African coal, however, and not much hope is entertained that the order will come to this district. The 400,000 tons of Durham gas coal reported last week to have been arranged for by the Berlin Gasworks for delivery over next year have been ordered from five or six local firms, and are to be supplied c.i.f. Berlin as usual, with shipment, at contractors' option, via Hamburg or Stettin. It is stated that collieries have recently sold from 250,000 to 300,000 tons of Durham gas bests for delivery over next year at 13s. per ton, f.o.b., an advance of 6d. per ton on earlier similar business. The collieries are now stated to be declining business for delivery to commence before April next. About 100,000 tons of Wear gas specials for delivery, chiefly from March to December, have been sold at 13s. 6d., f.o.b. Other large quantities of coal for next year's shipment have been sold as follows:—Tyne gas primes as 13s.; Wear gas specials at 13s. 6d.; good gas seconds at 12s. 6d.; several lots of Durham best unscreened bunkers—in parcels of from 20,000 to 30,000 tons—at 13s.; and good ordinary bunkers for shipment to the coaling stations at 12s. 6d., f.o.b. F.o.b. quotations for prompt

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	14/3 to 14/6	14/6
Do. Tynes (Bowers, &c.) .....	15/	15/
Secondary, Blyths .....	12/	12/ to 12/6
Do. Tynes (Hastings or West Hartleys) .....	12/6 to 13/	11/6 to 12/6
Unscreened .....	11/6	10/ to 11/
Small, Blyths .....	8/3 to 8/6	8/3
Do. Tynes .....	6/9 to 7/	7/
Do. specials .....	9/ to 9/6	9/3
Other sorts:—		
Smithies .....	14/	14/
Best gas coals (New Pelton or Holmside) ...	15/	15/
Secondary gas coals (Pelaw Main or similar)	13/9 to 14/	13/9 to 14/
Special gas coals .....	15/6 to 16/	15/3 to 15/6
Unscreened bunkers, Durhams .....	12/6 to 13/6	12/9 to 13/6
Do. do. Northumbrians .....	11/6	10/6 to 11/6
Coking coals.....	13/6 to 14/	13/6 to 14/
Do. smalls .....	13/6	13/6
House coals .....	15/6	15/6
Coke, foundry .....	18/ to 19/	18/ to 20/
Do. blast-furnace.....	17/6	17/6
Do. gas .....	17/ to 18/	17/ to 17/9

shipment have slightly recovered from the slump into which the bad news of last week threw them. Best Blyth steams are easier on the week; Tyne seconds from 3d. to 9d. dearer; Blyth smalls, 3d. cheaper; Tynes, weaker; gas bests, firmer; seconds, 3d. improved; specials, 3d. to 9d. increased; foundry coke, 1s. reduced; and gas coke, 3d. up. Other descriptions of fuel are steady.

Later.—The Egyptian State Railways have contracted for 50,000 tons of north country steams for shipment to Alexandria from October to March. Best Blyths are to be taken at a price which is estimated to leave about 14s. 6d. per ton, f.o.b. The railways have also contracted for 5,000 tons of Scottish best steams for shipment in December. The Malmo Gasworks are reported to have contracted for 30,000 tons of Durham gas coal—New Pelton-Holmside and Londonderry—for shipment over next year at prices stated to allow about 13s., f.o.b., for bests, and 13s. 6d. for specials.

Sunderland.

COAL.

The exports from Sunderland last week amounted to 96,340 tons of coal and 755 tons of coke, as compared with 96,025 tons of coal and 1,250 tons of coke for the corresponding period of 1912, being an increase of 315 tons of coal and a decrease of 495 tons of coke. With fairly ample supplies of coal available from the present up to the end of next month, with less tonnage offering, the market is on the weak side, and holders consequently are inclined to force sales. There are, however, new contract enquiries, which may somewhat stimulate the market. Gas coals are steady. Steam and manufacturing fuel is weak. Coking coals are freely offered. Households are quiet, and bunkers are a trifle cheaper. The Berlin Gasworks have accepted offers for 400,000 tons of Durham gas coals, delivery over next year, on the basis of 12s. 6d. best and 11s. 6d. second qualities. The Northern State Railways of Russia are inviting tenders for 500,000 tons of north country steams over next year, and the Stockholm Breweries are asking for tenders for 8,000 of best steams for delivery over next year. A contract for 250,000 tons of best Durham gas is stated to have been placed for delivery over 1914 at 13s. f.o.b., while 50,000 tons of Wear special gas is reported to have made 13s. 6d. over next year. Quotations are about as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/3	15/3
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	16/6	16/6
Ordinary do. ....	16/	16/
Other sorts:—		
Lambton screened .....	15/3	15/6
South Hetton do. ....	15/	15/3
Lambton unscreened .....	13/6	13/9
South Hetton do. ....	13/3	13/9
Do. treble nuts .....	16/9	16/9
Coking coals unscreened... ..	13/6	13/6
Do. smalls .....	13/3	13/3
Smithies .....	15/6	15/6
Peas and nuts .....	17/	17/
Best bunkers .....	14/	14/3
Ordinary bunkers ..	13/6	13/9
Coke:—		
Foundry coke .....	20/	20/
Blast-furnace coke (divrd. Teesside furnaces) .....	19/3	19/
Gas coke .....	17/3	17/

Tonnage is in fair request, and owing to its scarcity rates are steady all round. Recent fixtures include:—Coasting: London 3s. 7½d., Hamburg 4s., Rouen 5s. 6d. Bay: Bordeaux 7s., Rochefort 7s., La Rochelle 7s., and St. Nazaire 7s. Baltic: Riga 5s. 3d., Reval 5s. 3d., Cronstadt 6s. Mediterranean: Genoa 11s., Torre 9s. 9d., Piræus 9s. 3d., Alexandria 9s. 1½d., Port Said 9s. 6d., Venice 10s. 9d.

Middlesbrough-on-Tees.

COAL.

There is a fair amount of business passing in fuel. Gas coal is in pretty good request, and deliveries are now rather heavy. Best gas coal is put at 15s., and seconds at 14s.; whilst for special sorts up to 16s. is quoted. Some substantial sales of best gas coal are reported to have been made at 13s. for 1914 shipment. A lot of bunker coal is now being taken. Ordinary Durham bunkers run from 12s. 9d. to 13s. f.o.b., superiors 14s. to 14s. 3d., and specials, 15s. to 15s. 3d. There is an improving demand for household coal, and the price ranges from 15s. 6d. to 15s. 9d. The coking coal branch is fairly brisk with prices ranging from 13s. 3d. to 14s. Coke quotations vary very considerably. Local consumption is still heavy notwithstanding the blowing out of blastfurnaces. Medium furnace coke may be put at 18s. delivered at Teesside works, but inferior sorts have been sold at a good deal below that figure. Good foundry coke is reported to be obtainable at round about 18s. f.o.b. Gashouse coke is in the neighbourhood of 17s. 6d.

IRON.

Quietness again rules in the pig iron market, due to some fluctuation in warrant prices, the movements having checked the buying of genuine customers for Cleveland pig. With the removal next week of the two and a-half dollars duty on British pig iron imported to America there is some possibility of sales of Cleveland iron to the States, but when the tariff is abolished Cleveland iron cannot well be sold in the States at values equal to those of American pig. This week sales of No. 3 g.m.b. Cleveland pig have been recorded at 55s. f.o.b., and that is now the general market quotation for the ruling quality, whilst No. 1 is 57s. 6d., No. 4 foundry 54s. 6d., No. 4 forge 54s. 3d., and mottled and white iron each 53s. 9d.—all for early delivery. East coast hematite pig is easy. Mixed numbers are offered by both makers and merchants at 66s. for either early or forward delivery, and at this figure a small business has been recorded. There is nothing passing in foreign ore, and nominally market rates are based on 19s. 6d. to 20s. ex-ship Tees for best rubio. Freight to Bilbao-Middlesbrough are very strong at 5s. 9d. In manufactured iron and steel industries producers keep well employed on running contracts, and a few fairly good orders for rails have been secured, but generally new work is difficult to obtain. Prices are stationary.



South-West Lancashire.  
COAL.

The improvement in the inland household trade named last week continues, and orders are being given very much in excess of what can be promptly dealt with. No doubt this is largely in anticipation of the usual winter advance, which is generally expected to operate from the first of next month, and possibly also fears of railway difficulties may be one of the factors. Screened coal for forge and manufacturing purposes moves away in fair quantities, but not quite to the extent that was the case some short time ago. With regard to shipping, the railway troubles here have been settled for the time being, and as far as the Liverpool area is concerned work is now proceeding upon normal lines. The strike of the Ship Canal men, however, still continues, and in consequence of this work remains at a standstill at the Partington tips, where a considerable quantity of coal is held up. The requirements of bunker coal under contract this week are rather less than usual, and open sale shipments are on the quiet side. Steam coal, if anything, is over plentiful, and while quotations remain much as before—viz., 13s. 3d. to 13s. 6d. f.o.b. for ordinary Lancashire qualities to 14s. f.o.b. for the best—slight concessions could probably be obtained in certain directions for present shipment, the Dublin stoppage to some extent helping to weaken prices. Shipments of household coal for the coastwise and cross-Channel trade, with the exception of Dublin, continue brisk, and merchants are anxious to have supplies more quickly than the collieries can provide them. With the holidays over, and the resumption of steady work at the consuming towns, slack and small fuels generally are gradually recovering their tone, and there is evinced a demand on the part of the buyer to book again forward. Open sale prices are without change. The stoppage at the Haydock and Golborne collieries still continues.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best	16/3	16/3
Do. (f.o.b. Garston, net)	16/6 to 17/	16/6 to 17/
Medium	14/6	14/6
Do. (f.o.b. Garston, net)	15/ to 15/6	15/ to 15/6
Kitchen	12/3	12/3
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.)	13/3 to 14/	13/3 to 14/
Best slack	10/3	10/3
Secondary slack	9/6	9/6
Common do.	9/	9/

South Lancashire and Cheshire.  
COAL.

There was a full attendance on the Coal Exchange on Tuesday last, with a very much improved demand for house coal, due in a great measure to rumours of an approaching advance in the price. Furnace coal and coke are in good demand, and of slacks there is an increasing consumption. All prices are firm at full list rates.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best	16/6 to 17/	16/6 to 17/
Medium	15/3 to 16/	15/3 to 16/
Common	12/6 to 13/	12/6 to 13/
Furnace coal	12/6	12/6
Bunker (f.o.b. Partington)	14/	14/
Best slack	10/ to 10/6	10/ to 10/6
Common slack	9/ to 9/6	9/ to 9/6

IRON.

There is no confidence in the markets here. Foundry iron continues to be offered at 60s., and the foundries themselves are not very busy; they say they have to take very low prices for new work. Forges are moderately employed on bars at £8, second quality £7 10s. Forge pig iron can be bought in the neighbourhood of 55s. Steelworks are rather busier than they have been; they report specifications are coming in more freely. The price of billets is £5 5s., and bars £7 5s. Boilermakers are slack, and prices are very much in buyers' favour. Engineers only moderately busy; this applies both to textile and the heavier class. Wagon builders are working off their orders, and would like to see more enquiries coming forward.

Yorkshire and Derbyshire.

Leeds.

COAL.

The market on Tuesday was attended by a large and thoroughly representative body of traders, local merchants especially being present in good numbers. The announcement was made that pit prices of all descriptions of house coal for the Yorkshire and Lancashire markets were to be advanced 1s. per ton on and from October 1. This decision of the West Yorkshire coalowners was not unexpected, as was anticipated in our last report. There was naturally considerable pressure for prompt supplies and the market in this department was exceptionally firm. Business in other sections of the trade was moderately active, but without special feature. The pits have worked full time and colliery sidings are quite free from stocks of house coal. The supply of wagons is fairly liberal, but there are again numerous complaints with regard to the transit of private wagons.

House Coal.—The business with London and the eastern and southern counties has fallen away to some extent, but this has not affected the position at the pits adversely, as the strong local demand has provided a ready outlet for all the coal raised. Pit prices for London are quite firm and of the top qualities supplies are altogether inadequate. There has been an increased call for house nuts from the distant markets, but other secondary sorts are a shade quieter. The coastwise trade has developed considerably during the past few days, the demand running chiefly on the medium qualities from the Silkstone and similar seams. Freights are steady at about 4s. 3d. Goolle to London, and 4s. Hull to London. In the West Riding markets, merchants are quite unable to cope with the demand from the public, but this is

explained by the desire to obtain supplies before the advance comes into operation. The revised quotations will leave pit prices about as under:—Haigh Moor selected, 18s. 6d. to 19s. 6d.; Wallsend and London best, 17s. 6d. to 18s. 6d.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other sorts, 14s. to 15s. 6d.

Gas Coal.—There is great pressure for supplies from the gas coal pits and some of the contracts are in arrears as regards deliveries. Open market business is limited, as there is scarcely any free coal on offer. Tenders have been sent in this week for the balance of the tonnage required by the Bradford Corporation Gas Committee, and it is said that the prices submitted are as high, if not higher, than the original tenders sent in a few weeks since. It is expected that this authority will buy about 60,000 tons this week-end and thus complete its full requirements for the next 12 months. There are no stocks of gas coal anywhere at the pits.

Manufacturing Fuel.—There is a stronger undertone in the market for factory fuel. Stocks are lighter and the demand has improved. Several large buyers have concluded arrangements for supplies over next year at fully current rates. Coking smalls, although no higher in price, are more in demand. Pit prices generally are steadier than for some weeks past.

Washed Furnace Coke.—Users of patent oven coke are showing a readier disposition to buy, and where makers are prepared to quote forward at the present low prices, there is less difficulty in arranging business. Although 12s. 6d. to 13s. per ton at the ovens is quoted, the bulk of the business passing approximated the latter figure. The Leeds district, Frodingham and the Midlands take the bulk of the locally-produced coke. Stocks in wagons and on the benches show a considerable reduction compared with a month ago.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	15/	14/6 to 15/
Wallsend & London best	14/ to 14/6	13/6 to 14/
Silkstone best	14/ to 14/6	13/9 to 14/6
Do. house	12/6 to 13/6	12/6 to 13/
House nuts	12/ to 12/6	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best	16/6 to 17/6	16/6 to 17/6
Silkstone best	15/6 to 16/6	15/6 to 16/6
Do. house	15/ to 15/6	15/ to 15/6
Other qualities	14/6 to 15/	14/6 to 15/
Gas coal:—		
Prices at pit:		
Screened gas coal	12/ to 12/6	12/ to 12/6
Gas nuts	11/ to 12/	11/ to 12/
Unscreened gas coal	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts	11/ to 11/9	11/ to 11/9
Large double-screened engine nuts	10/ to 10/9	10/ to 10/9
Small nuts	9/9 to 10/6	9/9 to 10/6
Rough unscreened engine coal	10/ to 10/6	10/ to 10/6
Best rough slacks	8/ to 8/6	8/ to 8/6
Small do.	7/3 to 7/6	7/ to 7/6
Coking smalls	7/3 to 7/9	7/ to 7/6
Coke:—		
Price at ovens:		
Furnace coke	12/6 to 13/	12/6 to 13/

Barnsley.

COAL.

The troubles arising from the labour disputes are slowly passing away, and collieries are able to work full time. There is still difficulty in regard to the traffic to Partington docks, with the result that a larger quantity of fuel is being sent to Hull on export account. Although but little of the recent Russian contracts have been placed in this district, there is a strong tone prevailing in regard to prices, possibly owing to the fact that further tonnage has got to be placed. There continues to be a good enquiry for best hards, which are largely used for home consumption, and in this respect buyers are in an advantageous position. The output of secondary steams is again of a full description, and for the present rather exceeds the demand, with the result that there is a tendency for prices to weaken. However, in view of the stronger enquiry, every effort has been made to maintain prices. With regard to small steam coal there is still a surplus available, although the demand for steam nuts is again of a rather stronger character. These are being taken by large engineering firms and electrical plants, but the demand for slacks is hardly so good. Some of the textile districts are not taking so large a bulk as they formerly were, and the quieter state of things in the coke manufacturing branch conduces to throw a considerable bulk of fuel on the market, with the result that prices are somewhat variable. Gas coal collieries find it necessary to work full time to meet the demand, and some classes of fuel hardly meet contract requirements. With regard to house coal trade, although the weather has been warmer it has had little effect on the demand, which is briskly maintained in view of the advance of prices which are anticipated to fall on the 1st prox. Best qualities continue to be difficult to obtain, and secondary sorts are now rather more scarce, whilst thinner seam fuel is being more largely

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone	15/	15/
Best Barnsley softs	14/3 to 14/6	14/3 to 14/6
Secondary do.	11/6 to 13/	11/6 to 13/6
Best house nuts	13/ to 13/3	13/ to 13/3
Secondary do.	11/ to 13/	11/ to 13/
Steam coals:—		
Best hard coals	13/	13/3
Secondary do.	11/9 to 12/	12/ to 12/3
Best washed nuts	11/6 to 12/	11/6 to 12/
Secondary do.	10/6 to 11/	10/9 to 11/
Best slack	8/ to 8/3	8/ to 8/9
Rough do.	6/6 to 7/6	6/6 to 7/6
Gas coals:—		
Screened gas coals	12/6 to 13/	12/6 to 13/
Unscreened do.	11/6 to 12/	11/6 to 12/
Gas nuts	12/ to 12/6	12/ to 12/9
Furnace coke	12/6 to 13/	12/6 to 13/

taken. There is little improvement in regard to coke, for in spite of the attempt to restrict the output the production continues to be considerably in excess of the requirements of the market, which still continues to be in a very sluggish condition. Prices lack firmness with buyers showing indifference to the future.

Hull.

COAL.

The tone of the Humbr coal market is not so firm as it was a week ago, though the relapse which occurred when it became known that South Yorkshire had received only a small share of the Baltic contract has been to some extent checked by the late news that the Northern Russian State Railways were in the market for another 160,000 tons of steam coal which it is understood will be taken from this country. Small coal, however, shows an easier tendency, the supply being plentiful and the demand quiet. There is some movement in the market for house coal, which is slightly dearer on the week, merchants being anxious to get contracts for their winter supplies fixed up. The export demand for steam coal chiefly is fairly good, and a normal quantity is being shipped at the docks. Loading conditions are good, and quick turns at the appliances assured. The freight market has been rather quiet, owing to a shortage of tonnage, but where business has been done it has been at about the same level as last week, Cronstadt commanding 5s. 9d. to 6s., according to size of tonnage, with other Baltic destinations at the usual difference. Little is doing for Mediterranean ports, which are on the basis of 9s. 3d. to 9s. 6d. Genoa. For Black Sea ports, tonnage is offering at 9s. 9d. to 10s. Odessa. News has been received that the prolonged strike at Riga is at an end and that the men have returned to work. The following are the approximate prices for prompt shipment, f.o.b. Hull, &c.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards	15/9 to 16/	16/ to 16/3
Washed double-screened nuts	13/3 to 13/6	13/3 to 13/6
Unwashed double-screened nuts	12/9 to 13/	12/9 to 13/
Washed single-screened nuts	13/	13/
Unwashed single-screened nuts	12/6	12/6
Washed smalls	10/3 to 10/6	10/3 to 10/6
Unwashed smalls	9/3 to 9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys	14/	13/6
Rough slack	10/3 to 10/6	10/3 to 10/6
Pea slack	9/	9/
Best Silkstone screened gas coal	13/6	13/3 to 13/6
Best Silkstone unscreened gas coal	12/6	12/ to 12/6
Derbyshire:—		
Best steam hards (Hull)	15/6	16/
Do. (Grimsby)	15/	15/6
Derbyshire nuts (doubles)	13/	13/
Derbyshire nuts (doubles) (Grimsby)	12/9	12/9
Derbyshire large nuts	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby)	14/	14/
Nottinghamshire hards	15/6	16/
Do. do. (Grimsby)	15/	15/6

Chesterfield.

COAL.

A good tone characterises the coal trade of the district. The demand for house coal is satisfactory, and prices, which are already firm, will be advanced generally on the first of next month. The prospects for a brisk winter business are very bright, and the season will open with colliery stocks lighter than they have been for many years. There is a steady growth in the demand for fuel for industrial purposes, and with a period of rest from labour troubles a large volume of business would be done in this branch of the coal trade. At present the requirements of the heavy steel trades are on a high level, and prices are firm. Contracts to replace those expiring at the end of September are being renewed at advanced figures. Cobbles and nuts for gas producers continue in excellent demand. There is more doing in slack for boiler-firing, and stocks which had accumulated during the holidays in various industrial centres are rapidly disappearing, and within a few weeks it is expected that consumers will experience some difficulty in obtaining full supplies of small coal. Prices are again showing a hardening tendency, and advances are insisted upon for renewal of contracts made a year ago. Gas coal is moving freely, and gas managers are beginning to press for fuller supplies. Contracts for the ensuing 12 months have been made at an average advance of 1s. per ton. The export trade is brisk, shipments proceeding at a satisfactory rate. The extraordinary demand for steam coal for Russia is having a very beneficial effect upon the market, where prices, which usually with the approaching close of the shipping season are inclined to weaken, have a tendency to advance. The heavy orders this autumn will be of great advantage to the collieries—enabling them, no doubt, to work full time throughout the winter, thereby placing the owners in a strong position for negotiating contracts for next year. The price of Derbyshire best Top Hards is to-day firm at 15s. 6d. delivered at Grimsby. There is a well-sustained demand for cobbles and large nuts for near Continental ports, and enquiries for similar fuel for shipment over next year are numerous. The coke trade is unchanged—the demand remaining dull and prices weak. Washed fuel is in steady request.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals	14/6	14/6
Secondary do.	12/6	12/6
Cobbles	12/	12/
Nuts	11/	11/
Slack	9/	9/

IRON.

There is no improvement to be recorded. Pig iron is in poor demand, and orders for finished iron are scarce.



**Nottingham.****COAL.**

A steady expansion is characterising the coal trade in Nottinghamshire, and, on the whole, the tone is of a fairly satisfactory character. In the domestic fuel section, whilst orders are coming to hand moderately well, the comparatively mild weather is helping to retard the demand. On the other hand, a certain class of householders, having in view the near approach of an advance in prices, are eagerly purchasing stocks for the winter. The orders from London and the southern counties are somewhat disappointing, but the trade with the immediate country districts is improving. Individual collieries are advancing their prices, and it is expected that a general increase to winter prices will come into operation next week. There is a good tone in the steam coal branch, in fact, sufficient to keep prices firm. The amount sent away for shipment continues on an extended scale, while best steam on the home market is in active request. At the same time there is a better enquiry for small steams. A lack of buoyancy pervades the slack market, with the result that prices are easy, and job lots are being sold at rates much below those obtaining a few weeks ago. The improvement in the sale of gas fuel, noted a week ago, is being fully maintained, and prices are assuming a firmer attitude.

**Prices at pithead.**

	Current prices.	Last week's prices.
Hand-picked brights .....	13/ to 14/6	13/ to 13/6
Good house coals.....	12/ to 13/	12/ to 12/6
Secondary do. ....	11/ to 11/6	10/6 to 11/
Best hard coals .....	11/9 to 12/6	12/ to 12/6
Secondary do. ....	10/6 to 11/6	10/6 to 11/6
Slacks (best hards).....	8/3 to 8/6	8/3 to 8/6
Do. (seconds) .....	7/ to 8/	7/ to 8/
Do. (soft).....	7/ to 8/	7/ to 8/

**Leicestershire.****COAL.**

There is, on the whole, a very satisfactory amount of business being done in this district. Most of the collieries are very well employed, whilst some are very busy indeed, and have an amplitude of orders in hand. There is not much, if any, short time being worked. Deliveries continue very full and stocks at the various collieries are but of small account generally. Merchants are in a buying mood and are also taking their placed orders. There is more doing in household coals, the demand showing considerable improvement for the small sorts, cobbles and nuts. The enquiry for steam coals of all descriptions is well maintained and a good amount of business is being done in them, with a prospect of a further increase in the demand. The present position here and the prospects for the more immediate future are quite encouraging. The local merchants are doing a steady business, and a touch of colder weather would naturally stimulate their turnover. There is at present no alteration in quotations, which are quite firm and there is, if anything, a tendency upwards.

**South Staffordshire, North Worcestershire and Warwickshire.****Hednesford.****COAL.**

Business in connection with the coal trade of the Cannock Chase district is in a satisfactory condition. Orders for most qualities of coal are fairly numerous, and there is not a very large quantity of coal in stock. On the whole, the collieries are well employed, many of them working full time. The improvement reported in the house coal trade is well maintained, and there is a fairly satisfactory demand for fuel for manufacturing purposes. Railway sales are more satisfactory this week, and business at the landsale depots is much the same as when last reported.

**Birmingham****COAL.**

The trade has taken a distinct turn for the better, people rushing to get in supplies before October, when another advance is predicted. For all sorts of manufacturing fuel a steady demand is experienced, and smalls, which have been recently more plentiful, show a tendency to harden.

**Prices at pit.**

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/	18/
Do. seconds deep .....	16/6	16/6
Do. best shallow .....	14/6	14/6
Do. seconds do. ....	13/	13/
Best hard .....	14/6	14/6
Forge coal.....	11/	11/
Slack .....	8/	8/
Warwickshire:—		
House coal, best Ryder ...	16/	16/
Do. hand-picked .....		
cobs .....	13/6	13/6
Best hard spires .....	15/	15/
Forge (steam) .....	10/6	10/6
D.S. nuts (steam) .....	9/6	9/6
Small (do.) .....	8/6	8/6

**IRON.**

The market, which was well attended, gave evidence that a steady trade was being done in the South Staffordshire iron and steel industries. Business is coming in regularly, and while in some departments customers are inclined to look ahead, purchases in the main are only sufficient to meet the needs of the moment. Thus pig iron is going in parcels of 50 to 100 tons instead of from 300 to 500 tons, and even these small lots are the subject of keen negotiation. In the circumstances stocks are still large, and prices are low. Northamptonshire forge is bought at 51s. 6d., about 53s. for the best qualities, Derbyshire at 52s. 6d., South Staffordshire common 52s., and at 54s. 2s. more. Foundry iron, for good class is in much better request than forge quality, and is steady in the bar iron trade, without much

expansion. Sales of merchant qualities are made at £7 5s., and £7 10s. is the highest. Common iron can be had under £7. A fair amount of activity exists in the bolt and nut trade in the Darlaston district, and local makers supply a substantial part of the material, despite the keenness of Continental firms. For small rounds, squares, and flats the quotations range from £7 2s. 6d. to £7 7s. 6d., three-eighths basis. The export demand for galvanised sheets is maintained at a good level, and makers also experience pressure for prompt delivery in the home market. Good orders are continually being placed at £11 minimum, ranging up to £11 10s. For black sheets the demand is also improving. The price for sheets for galvanising is £8, delivered in the district, and for merchant qualities up to £8 5s. Billets and targets are now cheaper for them, the British prices ranging from £4 17s. 6d. to £5 for Bessemer, and up to £5 5s. for Siemens qualities. Continental billets, which are sold in considerable quantities, fetch from £4 10s. to £4 15s. Despite the low prices for steel asked by Continental houses, a considerable amount of work has been acquired by English firms, and employment in this department is good. Since the strike railway material has been in active request, and makers of bridges, roofs, tanks, and boilers have work on hand to keep them engaged for some months to come. Compared with 12 months ago, the consumption of sheets in the Cradley district has fallen off, but steady employment is provided in the manufacture of chains, anchors, cables, and heavy forgings for the shipbuilding and engineering trades of the north of England and Scotland.

**Forest of Dean.****Lydney.****COAL.**

The advance in house coal prices mentioned last week has not checked the demand to any extent, and the collieries continue to put in full time. All the coal produced meets with a ready sale, and stocks are small. A good seaborne trade is being done, whilst the demand from the inland districts is getting more satisfactory. Slack coal is not selling so well as recently. Some of the steam coal pits are increasing their output, and there is more of this quality on the market now. The demand is somewhat easy, and prices are not so firm.

**Prices at pithead.**

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	17/6
Forest .....	16/6	16/6
Rubble .....	16/9	16/9
Nuts .....	15/	15/
Rough slack .....	7/6	7/6
Steam coal:—		
Large .....	13/	13/
Small .....	9/6 to 10/	9/6 to 10/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

**Devon, Cornwall, and South Coast.****Plymouth.****COAL.**

Messrs. W. Wade and Son report that the wholesale demand for coal is still devoid of activity at the South Coast ports, although there is an improvement in the retail demand for stocking orders. Prices and freights are somewhat fairly maintained at most of the coal exporting centres, weakness in current prices being only marked in one direction where the collieries appear to have deprived themselves of the support of contracts by which to continuously run off their surplus outputs. This position will doubtless be remedied with the approaching winter demand.

New Institute at Chasetown.—Prof. Ashley, Dean of the Faculty of Commerce of Birmingham University, on Saturday opened a new County Mining Institute erected and equipped by the Staffordshire Education Committee at Chasetown at a total cost of about £23,500. The institute is a two-storey building, with basement, in which there is an electric installation for lighting the building, and also for driving a Sirocco fan intended for testing air measurement. On the ground floor the rooms include a chemical laboratory with accommodation for 24 students and a lecture hall of similar size. Upstairs there is a staff room, chemical store rooms, physics lecture room, and a surveying room. After the opening ceremony, a meeting was held in Chasetown Institute. Mr. J. T. Homer (ex-chairman of the County Education Committee), who presided, said he believed the event in which they had just participated would be an auspicious one in the history of that part of Cannock Chase, and all that was now necessary was that the facilities for mining instruction which had been provided would be taken advantage of to the fullest possible extent. There was every reason to hope this would be the case, as the mining classes at Chasetown had been the most successful of any carried on under the auspices of the County Council. Through the instrumentality of the county mining classes, from which students had an opportunity of passing on to Birmingham University, Staffordshire was now turning out men trained and fitted to occupy the highest positions. Mr. W. Charlton (principal of the institute) explained that the ceremony which had taken place was the outcome of some 20 years of pioneer work at evening classes. The majority of students joining the classes were adults, and as there had been a considerable interval between their leaving school and entering on a course of science study, it was only with great difficulty that they were able successfully to tackle the work of the classes. In view of this experience preparatory evening schools were introduced in order to secure the attendance of boys who had just left the elementary day schools. The whole of the work of the preparatory, mining, and science classes would now be concentrated in the new institute. In addition a commencement had been made with organised courses of instruction for colliery, mechanical, and electrical engineers. A course of instruction in hygiene had been arranged, and it was hoped in the near future to deal with other general subjects.

**THE WELSH COAL AND IRON TRADES.**

THURSDAY, SEPTEMBER 25.

**North Wales.****COAL.**

The general demand for fuel during the past week has been of a fairly satisfactory character, and most of the pits have worked nearly full time. The break which has occurred in the weather has helped the house coal trade appreciably, and as most of the public institutions are taking in stocks preparatory to commencing firing on October 1, this part of trade is better and prices are firm on the whole. In regard to steam coal, the recent strike at Liverpool hampered deliveries a good deal for some days, but now that this has subsided things have improved. Railway companies are taking their full quantities; so are the manufacturing firms, and trade in the shipping of coal at the Mersey ports has improved somewhat. In the local brickworks, trouble has arisen with the men on the union question. Most of the clayworkers have joined the North Wales Surfacemen's Union, and at one works owned by the Ruabon Coal and Coke Company Limited, on account of some men refusing to join, the others struck work until they did, thereby causing much inconvenience. The matter has now been settled by the outsiders falling into line and joining the union, and work has been resumed. The demand for gas coal is up to the average and a satisfactory tonnage has gone away under contract during the past week. Nuts are readily sold, but slack is not in such good demand and there are accumulations at some of the pit banks. With reference to the question of prices generally, the colliery owners consider that their position is strong in regard to future business and they anticipate further advances. This opinion, however, is not shared by all the buyers, some of whom, whose contracts have expired, are buying in the open market, with the idea that a little later they will be able to make contracts at lower prices than are now being asked, but at the time of writing the following may be taken to represent the ruling standard prices:—

	Current prices.	Last week's prices.
Prices at pit f.o.r. :—		
Best house coal .....	15/ to 16/	15/ to 16/
Secondary do. ....	14/ to 15/	14/ to 15/
Steam coal .....	12/6 to 13/	12/6 to 12/9
Gas coal .....	13/ to 13/6	13/ to 13/9
Bunkers.....	12/ to 12/6	12/ to 12/6
Nuts .....	11/ to 11/6	11/ to 11/9
Slack .....	6/ to 7/9	6/ to 7/9
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 18/4	17/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/6 to 12/6	10/ to 12/6

**Monmouthshire, South Wales, &c.****Newport.****COAL.**

Tonnage supplies have improved considerably in the past few days, brightening up the situation, while the announcements relative to the Egyptian State Railways contracts are satisfactory in so far that a large quantity of Monmouthshire semi-bituminous coal will be taken, although it was hoped that these contracts would have been for the longer period up to July next, instead of which the shorter term up to March only was selected, the authorities doubtless hoping for more favourable terms later on. The stoppages on the non-unionist question in the neighbouring valleys have steadied the market considerably. As yet there has been practically no interference with the output in the Monmouthshire section, but any curtailment of production in the remainder of the coalfield will very quickly affect business here. Forward business continues scanty and most difficult to arrange, owing to the great disparity between the ideas of buyers and sellers as to the course of the market. In the freight market a fair amount of outward tonnage has been taken up, and with a limited quantity offering, rates are inclined to stiffen.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	16/9 to 17/	17/ to 17/6
Western-valleys, ordinary	16/ to 16/6	16/ to 16/6
Best Eastern-valleys .....	15/6 to 16/	15/9 to 16/
Secondary do. ....	15/ to 15/6	15/3 to 15/6
Best small coals .....	7/9 to 8/3	7/9 to 8/
Secondary do. ....	6/6 to 7/	7/3 to 7/6
Inferior do. ....	6/ to 6/6	6/9 to 7/
Screenings .....	8/ to 8/3	8/
Through coals .....	14/6 to 15/	13/ to 13/3
Best washed nuts .....	15/	14/ to 14/6
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/ to 20/	19/6 to 20/
Furnace coke .....	23/ to 25/	21/ to 21/6
Foundry coke .....	27/ to 30/	24/ to 26/

**IRON.**

There is little or no alteration to report in the general conditions of the local iron and steel trades. Scarcely any fresh business is being done, and quotations generally are as last reported. At bar mills work is much the same as last week, but what orders are coming along are only very small. Imports of foreign bars for the week total 12,000 tons, and here, too, prices show no alteration. Rail mills continue well engaged, and during the week some heavy orders are reported to have been booked. Quotations



remain steady at last figures. Matters at blast furnaces are at the present moment in rather a bad position, and quotations have a downward trend. The tin plate trade remains very quiet. Only very little business is being transacted, and quotations remain as a week ago.

Cardiff.

COAL.

The chief topic of conversation on 'Change since last week is the French Admiralty contract which has been placed for 100,000 tons for delivery within six months from October 1 with Messrs. Lysberg and Co., who it is understood have placed the whole of the quantity with Nixon's Navigation. As the price quoted was a delivered price, it is difficult to arrive at how much is included for coal and how much for freight. The general opinion is, however, that the price realised was a very satisfactory one, and it is reported to be equivalent to about 19s., f.o.b. This is practically new business, as with the exception of a small order placed by the French Admiralty some few months ago, they have not taken Welsh coal in any quantity for a very long period. It is evident that the exhaustive trials they have made of it a short time back have proved satisfactory, and there is every reason to expect that, in future, the French Government, like practically all other governments, will make contracts for best Welsh coal for their crack men-of-war. Although many rumours have been rife with regard to the Egyptian State Railways' contract, it was definitely reported on 'Change on Tuesday that Messrs. Milburn and Co. and Messrs. Morgan, Wakley and Co. have each secured 60,000 tons for delivery from October to the end of March at prices equivalent to 16s. 3d. to 16s. 6d. per ton net per metric ton. The enquiry originally was for 385,000 metric tons of best Monmouthshire or ordinary Cardiff large coals for delivery between October and July, or in the alternative, for 120,000 tons from October to March. Tenders were also invited for 50,000 tons of north country and 5,000 tons of Scotch coal, but at the time of writing, no information had been received at Cardiff as to the placing of these contracts. As has been previously stated, this business is always looked forward to with a considerable amount of interest, for the prices obtained afford a certain indication of the trend of the market for some time ahead. In this instance, the quotations are in advance of those paid several months ago, and it is believed that this has been the main factor in inducing the authorities to place their contract for the smaller amounts only. It will be remembered that the Egyptian State Railways last year experimented with American coal, with not altogether satisfactory results, and it is currently reported that the labour difficulties constantly occurring in South Wales were in great measure responsible for the adoption of that course. This year the authorities have decided to give north country coal a trial, and should the experience be a satisfactory one it is not improbable that further orders will go to Newcastle when supplies are again required. The restriction of the contractual period has occasioned some disappointment on the market, as the present arrangements are now viewed as being of a tentative character. With regard to trade generally, owing to the short supply of tonnage, business has been somewhat restricted, and in many cases comparatively low prices have been accepted—more especially for second-grade coals, in order to obtain clearance of wagons, and thus provide full work at the collieries. So far as the best Admiralty coals are concerned, prices are still firmly maintained at between 20s. and 20s. 6d., though in the case of middlemen somewhat lower rates have been accepted. With regard to contracts over next year, buyers are still holding off the market, though sellers are fully confident that considerably higher prices will be paid for supplies over next year than for this, and they are evincing no anxiety that orders are not forthcoming. As a matter of fact, sellers would much prefer that the old method of contracting should be reverted to—that is, that the contracting period should be fixed for November, which formerly was practically the universal custom. It is well known that some of the largest steamship companies entered into contracts a few months ago for their supplies over next year, and as the quantities in question were large, there is no doubt that the managers of these companies had come to the conclusion that nothing was to be gained by waiting. Sellers look upon this as a good sign. Strange to say, outputs are still below the normal, which doubtless is to be accounted for by the fact that a number of men are still on their holidays. There is no doubt that during this year the men have been earning large sums of money, and for this reason they are in a position to take a longer holiday than usual, and in many instances the returns prove that the outputs are still lower than they were in July. The non-unionist question has been very much in evidence during the past few days, and naturally this state of turmoil has a reflex action on the market. From present appearances the stoppages will continue for at least a few days longer, and it is evident that the Miners' Federation are once more making strenuous efforts to compel all men employed at the collieries to join the union. Charterings last week were considerably below the average, being only 253,850 tons, against 401,910 tons in the previous week, or a decrease of nearly 150,000 tons. The number of vessels in dock is also lower than usual, and as tonnage is scarce, in order to secure prompt boats, high rates in isolated instances have had to be paid. In one case it was reported that as much as 10s. 6d. had had to be paid for a spot boat for Genoa, although the rate for next week has not exceeded 9s. 6d. Shipments last week amounted to 390,322 tons, against 395,235 tons in the corresponding week of last year, or a decrease of 4,913 tons. From Newport there was an increase of 3,639 tons, from Swansea an increase of 4,855 tons, and from Port Talbot a decrease of 9,717 tons. Small coal prices are a little better than they were last week, and a considerable quantity has been sold at 7s. 9d. net f.o.b. Doubtless the non-unionist difficulty has affected prices, and more especially those for duff, as large quantities of the small from the pits now idle is washed. Monmouthshire coals show little alteration, best Black Veins selling at 17s., western valleys at 16s. 6d. to 16s. 9d., and best easterns at 16s. 3d. f.o.b. Cardiff. No. 3 Rhondda bituminous coal is a shade firmer, but for No. 2 qualities the quotation varies according to circumstances. Nominally the price is from 12s. 6d. to 13s., but sales have been reported as low as 11s. 9d. The coke market is quiet, special foundry being quoted at 28s. to 29s. ordinary at 25s., and furnace at 19s. to 20s. Patent fuel shipments last week amounted to 28,639 tons, of which the Crown Company were credited

with 10,949 tons, other local makers 652 tons, and Swansea 17,040 tons. Best brands are still quoted at 22s. 6d., and 19s. is being asked for contracts over next year. Pitwood is 22s. The following table shows the quantities of coal exported from the Bristol Channel ports to the principal foreign countries during the eight months ended August, and the increase or decrease as compared with the corresponding period of 1912:—

	Total Eight months. 1913. Tons.	Increase. Tons.	Decrease. Tons.
Russia .....	380,730	91,997	—
Sweden .....	156,648	20,649	—
Norway .....	72,391	—	2,978
Denmark .....	23,507	—	864
Germany .....	203,998	46,697	—
Netherlands .....	85,463	—	4,499
Java .....	20,411	—	7,820
Dutch possessions in Indian Seas .....	2,448	2,538	—
Belgium .....	337,348	150,476	—
France .....	4,864,731	1,397,999	—
Algeria .....	523,617	196,423	—
French Somaliland .....	33,285	14,523	—
Madagascar .....	5,728	—	9,623
Portugal .....	550,560	149,675	—
Azores .....	12,392	—	6,376
Madeira .....	94,619	21,990	—
Spain .....	857,361	190,521	—
Canary Islands .....	487,518	44,637	—
Italy .....	3,593,214	423,481	—
Italian East Africa .....	5,301	—	20,811
Austria-Hungary .....	235,888	152,775	—
Greece .....	206,775	30,190	—
Bulgaria .....	—	—	16,251
Roumania .....	90,218	3,053	—
Turkey (European) .....	55,965	—	17,239
„ (Asiatic) .....	52,838	—	36,046
„ (Crete) .....	—	—	6,563
Egypt .....	1,266,722	169,224	—
Tripoli .....	3,010	—	6,420
Tunis .....	113,173	30,376	—
China (exclusive of Hong Kong) .....	18,691	5,729	—
Japan .....	314	—	15,207
Mexico .....	19,068	4,497	—
Peru .....	8,697	—	4,861
Chile .....	341,439	—	30,190
Brazil .....	1,119,672	281,247	—
Uruguay .....	430,335	—	7,883
Argentine Republic .....	2,120,857	468,919	—
Channel Islands .....	40,865	—	7,919
Gibraltar .....	153,436	—	1,140
Malta and Gozo .....	389,257	213,994	—
Cape of Good Hope .....	30,823	19,514	—
Mauritius and De- pendencies .....	26,094	13,088	—
Aden & Dependencies .....	104,748	—	33,623
British India .....	75,550	31,510	—
Straits Settlements .....	17,714	5,590	—
Ceylon and Depen- dencies .....	142,404	—	9,284
Wei-hai-Wei .....	6,909	6,909	—
Hong Kong .....	39,239	18,531	—
Canada .....	9,891	—	1,823
British West India Islands .....	3,360	—	3,666
Falkland Islands .....	11,140	9,248	—
West Africa: French .....	116,777	52,544	—
„ Portuguese .....	158,967	—	38,232
Sierra Leone .....	30,922	7,650	—
Southern Nigeria .....	36,903	10,221	—

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	20/ to 20/6	20/ to 20/6
Superior seconds .....	19/3 to 19/6	19/6 to 19/9
Ordinary do. ....	18/3 to 18/6	18/ to 18/6
Best bunker smalls .....	10/ to 10/3	10/ to 10/3
Best ordinaries .....	9/6 to 9/9	9/9 to 10/
Cargo qualities .....	7/6 to 7/9	7/ to 7/6
Inferior smalls .....	6/ to 7/	6/3 to 6/9
Best dry coals .....	18/ to 19/	18/ to 18/6
Ordinary dries .....	15/9 to 16/6	15/6 to 16/
Best washed nuts .....	16/	15/9 to 16/
Seconds .....	15/	14/9 to 15/
Best washed peas .....	14/	13/9 to 14/
Seconds .....	13/	12/9 to 13/
Dock screenings .....	11/9	11/6 to 11/9
Monmouthshire—		
Black Veins .....	17/	17/ to 17/3
Western valleys .....	16/6 to 16/9	16/6 to 16/9
Eastern valleys .....	16/3	16/ to 16/3
Inferior do. ....	15/3 to 15/6	15/3 to 15/6
Bituminous coals:—		
Best house coals (at pit)	20/6	20/6
Second qualities (at pit)	17/6 to 18/	18/
No. 3 Rhondda—		
Bituminous large .....	16/9 to 17/	16/6 to 17/
Through-and-through .....	14/9 to 15/	14/6
Small .....	12/6	12/3 to 12/6
No. 2 Rhondda—		
Large .....	12/ to 13/	12/9 to 13/3
Through-and-through .....	10/6	10/6 to 11/
Small .....	7/6	7/ to 7/6
Best patent fuel .....	22/6	22/
Seconds .....	19/6 to 20/6	19/6 to 20/6
Special foundry coke .....	28/ to 29/	29/ to 30/
Ordinary do. ....	25/	23/ to 25/
Furnace coke .....	19/ to 20/	20/ to 21/
Pitwood (ex-ship) .....	22/	22/

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

IRON.

The tin-plate trade continues in a depressed condition, although the shipments last week amounted to 135,269 boxes, as against 92,838 boxes received from works. This leaves the stocks at warehouses 307,793 boxes, compared

with 350,224 boxes the previous week and 210,637 at the corresponding date last year. Prices are still on a low level, 14 x 20 cokes selling at 13s. 1½d. to 13s. 3d., and oil sizes at 13s. 6d. and 19s. 3d., although the latter rate has been slightly shaded for early delivery. There has again been a large import of foreign steel bars, billets, &c., and this competition is being felt by Welsh makers. At some of the mills rolling is only taking place two or three days a week, and very few new orders are coming along. Prices of Welsh bars are still quoted at £4 16s. 3d. for both Bessemer and Siemens qualities, but outside the area of the association sales are being reported at slightly lower than these figures. The galvanised sheet trade is quiet, and 24-gauge corrugateds are offering at £11. Some good orders have been placed with Messrs. Guest, Keen and Nettlefolds for rails, and the mills have been very busy, although no alteration has taken place in prices. There is very little business in iron ore, best rubio being offered at 18s. 6d., seconds at 17s. to 17s. 6d., and Almeria at 18s. per ton. In scrap metals the quotations are:—Heavy wrought 52s., cast 55s., steel rails, mixed sections, 55s., double-headed steel 60s., iron ditto 65s., and steel scrap 55s.

Swansea.

COAL.

The trade of the port during the past week was again exceptionally good. Activity was displayed both in the coal and patent fuel trades, the shipments amounting to 111,506 tons. A good attendance assembled on 'Change this morning, and the anthracite coal market showed a slightly improved tone. Swansea Valley large was more in demand, whilst for the better qualities higher prices were obtained. Red Vein large continued to be a very strong market. Machine-made nuts and cobbles were inclined to weaken. Rubbly culm was slightly firmer, and there was a better demand for duff, with prices harder. In the steam coal market a quiet feeling prevailed, and all classes were freely offered for immediate delivery at reduced figures.

Prices f.o.b. Swansea (oash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/ to 20/	19/ to 20/
Big Veiu large (less 2½ per cent.) .....	17/ to 18/	17/ to 18/
Red Vein large do. ....	12/9 to 14/6	12/9 to 14/6
Machine-made cobbles (net) .....	21/6 to 23/	21/6 to 23/
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 25/6	23/6 to 25/6
German do. do. ....	23/6 to 25/6	23/6 to 25/6
Beans (net) .....	16/6 to 18/6	16/6 to 18/6
Machine-made large peas (net) .....	12/ to 13/6	12/ to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.)	6/3 to 6/6	6/6 to 7/
Duff (net) .....	4/6 to 5/3	4/9 to 5/3
Steam coals:—		
Best large (less 2½ p.c.) ..	19/ to 20/	19/ to 20/
Seconds do. ....	14/ to 16/	14/ to 16/
Bunkers do. ....	11/3 to 12/3	11/3 to 12/3
Small do. ....	7/9 to 8/6	7/9 to 8/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.o.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.)	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

IRON.

Last week the iron and steel trades showed some improvement compared with the month of July. There was a large production of pig iron, and the steel furnaces were busily engaged. The tin-plate trade was fairly satisfactory, but there were several mills not working. Things were much brighter at the Aber Tin-plate Works, Llansamlet, where another four mills have been re-started, making a total of eight. The shipments of tin-plates last week were 135,269 boxes, receipts from works, 92,838 boxes, and stocks in the dock warehouses and vans, 307,793 boxes.

Llanelli.

COAL.

There is very little change to report on the coal market of the district. Trade generally is fairly brisk. The chief trouble at the moment appears to be lack of tonnage. If sufficient boats could be got business would be far more brisk and prices would very likely advance. There appears to be a good improvement in the inland trade and orders are fairly numerous. The anthracite market is firmer than it has been for the past couple of years, and nearly every sort is in good demand. Prices as yet have not shown big advances, but it is expected that in the early future some of the coals will go up a shilling or two. The machine-made kinds have shown welcome recovery and prices are far more pleasing. Steam and bituminous coals are still down and no improvement can be expected over the next few weeks.

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	20/6 to 22/6	20/6 to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Veiu large .....	17/6 to 18/6	17/6 to 18/6
Red Vein do. ....	13/6 to 14/6	13/6 to 14/6
Machine-made cobbles ..	19/6 to 20/6	19/6 to 20/6
German nuts .....	23/ to 25/	23/ to 24/
French do. ....	23/ to 25/	23/ to 24/6
Paris do. ....	23/ to 25/	24/ to 25/
Machine-made beans .....	20/ to 22/	20/ to 21/
Do. peas .....	13/ to 13/6	12/6 to 13/
Rubbly culm .....	6/6 to 7/	7/ to 7/3
Duff .....	5/ to 7/	5/6 to 7/
Other sorts:—		
Large steam coal .....	17/ to 18/	17/ to 18/6
Through-and-through ..	11/6 to 12/	11/6 to 12/
Small .....	9/6 to 10/	9/6 to 10/6
Bituminous small coal ..	10/6 to 11/6	10/6 to 11/6



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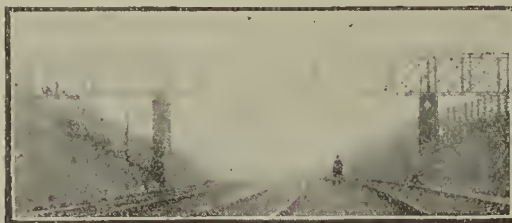
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diameter, loose flanges, and bolts and nuts.—A. UNDERWOOD,  
3, Queen-street, Cheapside.

### For Sale, Air Compressor, 200 cubic feet

air, cylinders 12 in., two steam cylinders 12 in., all 14 in. stroke, self-  
contained on air receiver, by Davey, Paxman & Co., also for 100 cubic feet.  
—A. UNDERWOOD, 3, Queen street, E.C.

### Two Slow Speed C.C. Machines for Sale,

either as Motors or Dynamos, output 150-kw. or 200-h.p., speed  
160 r.p.m., volts 440/500.—Further details and permission to view on  
application to Box 5391, *Colliery Guardian* Office, 30 & 31, FURNIVAL STREET,  
HOLBORN, LONDON, E.C.

### Dead-buffer Coal Wagons.—Seventy-two

now running in main line traffic, for sale, prompt delivery.—Box  
5390, *Colliery Guardian* Office, 30 & 31, FURNIVAL-ST., HOLBORN, LONDON, E.C.

### Wanted, Main and Tail Hauling Engines,

cylinders 12 in., 14 in., or 16 in. diameter, with drums 4 to 5 ft.  
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\*\* For other Miscellaneous Advertisements see Last White  
Page.

## The Colliery Guardian.

LONDON, FRIDAY, SEPTEMBER 26, 1913.

Mr. William Weir, the principal partner in the well known firm of William Baird and Co. Limited, has just died at the age of 87.

Statistics of compensation and proceedings under the Workmen's Compensation Act and Employers' Liability Act during the year 1912 are given in a Blue Book [Cd. 7088] just issued. Returns from the seven great groups of industries—mines, quarries, railways, factories, harbours and docks, constructional works and shipping, show that during the year compensation was paid in 3,599 cases of death and in 424,406 cases of development. In the coalmining industry the charge arising under the former Act works out at about 1.05d. only per ton of coal raised. The total amount of compensation paid in the seven industries during the year was £3,174,101, as compared with £3,056,404 last year; but when the various expenses have been taken into consideration the total charge is nearer £5,000,000. Compensation was also paid in 55 cases of death from disease and in 6,712 cases of disablement. The bulk of these cases, 87.9 per cent., occurred in the mining industry, and were due mainly to nystagmus, beat hand, beat knee and beat elbow.

The Institution of Mining Engineers held their annual meeting at Manchester on Wednesday. Dr. W. E. Garforth was in the chair. Three papers were read, two by Mr. T. F. Winmill, on "A Method of Measuring Goaf Temperatures" and "The Absorption of Oxygen by Coal." The third paper was contributed by Mr. Lomax, his subject being the microscopic examination of coal, especially in relation to



spontaneous combustion. It was announced that Dr. Garforth had been re-elected president. The members afterwards visited places of interest in Manchester, and on Wednesday evening the annual dinner took place.

Sir Henry Cunynghame, on Monday, opened the official enquiry into the circumstances surrounding the fire which occurred at the Cadder Colliery on August 3. As a result of the disaster 22 men lost their lives. The fire, it was reported, was not yet extinct. A full report of the enquiry up to and including Wednesday appears in this issue, and a report of the subsequent proceedings will be given next week. The electrical inspector on Thursday gave it as his opinion that the origin of the fire might be traced to electricity—a view not taken by the management. On the question of the non-provision of rescue appliances of a type approved by the Home Office, the Commissioner stated that correspondence that had passed between the Scottish owners and the Home Office, if introduced, could not affect the enquiry.

The Derbyshire Miners' Association have decided to erect a memorial to Mr. James Haslam, the founder and general secretary of the association. This mark of respect will take the form of a life-size statue of the late leader, which will be erected in front of the miners' offices. A portrait in oils will also be hung in the council room.

From various causes, 17,000 miners went on strike in the South Wales coalfields during the past week. The two chief centres of disturbance were the Aberdare and Rhondda Valleys.

The National Union of Railwaymen have refused the demand made by the Birmingham railway workers to declare a national strike.

The Times announces that an association has been formed, under the title of the United Kingdom Employers' Defence Union, with the object of consolidating the resources of employers and of maintaining their rights and their freedom to deal with workers and trade unions. It is intended to create a fund of £50,000,000, each member of the union, which has influential support, being invited to guarantee a sum commensurate with his position in the commercial world. It is stated that the union will not adopt an anti-trade union attitude.

A fall of roof at the Bardsley pit, in Lancashire, belonging to the Chamber Colliery Company, took place on Tuesday. Two men were killed and another seriously injured.

A meeting of representatives of the coal-owners and miners of Lancashire and Cheshire was held at Manchester on Monday to consider the application for a uniform rate of wages for surfacemen in both counties. It was stated that many employers had conceded terms which were found satisfactory. The employers' representatives said they were in favour of the principle of a minimum rate for surfacemen, and would recommend members accordingly. The conference adjourned until October 14.

At a meeting on Saturday last of the Derbyshire Under-Managers and Deputies' Institute a resolution for a shilling per day advance in wages of deputies and a week's holiday per year was adopted.

**The Movement of Capital.** LARGE profits are usually associated, in the popular mind, with industrial prosperity. There is, therefore, some excuse for a cynical incredulity on the part of the general public when the directors of great coal and iron companies, such as the Sheepbridge and Pearson and Knowles, complain of the effect of the constantly increasing

burden added to the cost of production by wages and recent legislation. It is, therefore, desirable to enquire into the justification of these complaints: for if they are valid in the case of large and powerful concerns, they must be much more serious as regards the lesser undertakings. There seems to be a widely-spread impression that capitalists who invest in colliery undertakings in this country do so from purely philanthropic motives, and are careless as to whether such investments will bring a return equivalent to that which can be safely obtained in other directions or elsewhere. A return on invested capital is due to the difference between the total cost of production and the realised price of the thing produced, and, in the case of coal, the realisable price is limited by international competition. If England possessed a monopoly of the production of coal, as practically she did less than a century ago, circumstances would be different. As matters stand, however, every permanent increase in the cost of labour and every addition to the cost of production resulting from restrictive legislation, causes a corresponding shrinkage in the margin of profit. It is, therefore, not surprising that the superior attractions presented by the enormous coalfields and attendant natural resources of other countries are steadily drawing away the capital which is, or otherwise would have been, invested in this country. But this is not all, for capital means wages; and the most efficient labour will assuredly follow the definite movement of capital.

In the annual report of the Scotland District, recently published, H.M. inspector (Mr. W. WALKER) draws attention to the scarcity of labour at nearly all the pits, which he considers to be a serious question, and thinks "is due in a large measure to the number of mine workers who have migrated during the last few years to Canada and other colonies." The considerable transference of capital from this country to the Dominion of Canada—especially during the last few years—is a matter of common knowledge, amounting to upwards of £150,000,000 since 1907. The following table appeared in the *Economist* of November 16, 1912:—

CANADIAN LOANS RAISED IN LONDON.			
	£		£
1896 .....	508,000	1905 .....	10,566,000
1897 .....	4,811,000	1906 .....	8,759,000
1898 .....	1,661,000	1907 .....	5,186,000
1899 .....	861,000	1908 .....	27,504,000
1900 .....	630,000	1909 .....	25,603,000
1901 .....	1,652,000	1910 .....	36,343,000
1902 .....	953,000	1911 .....	41,215,000
1903 .....	4,446,000	1912 (9 months) ..	17,845,000
1904 .....	4,504,000		

The approximate coal reserves of Canada have been estimated at 1,234,269 millions of tons, compared with 189,535 millions of tons for the United Kingdom; while the coal production of Canada for the year 1912 was less than 15 millions of tons, compared with 260 millions of tons for the United Kingdom.

Notwithstanding her own vast areas of coal Canada was obliged to import (principally from the United States) 14½ millions of tons of coal in 1911, equivalent to 59·5 per cent. of her total consumption. This peculiar state of affairs is largely due to the fact that the principal coal-fields are situated in the extreme east and in the far west, while the central provinces of Ontario and Quebec, which contain the great bulk of the population, are without coal deposits.

The general development of Canadian industries has, however, steadily increased the consumption of coal, which has more than doubled in the last 10 years, and this has expedited the development of the coalfields, largely by means of capital and the most efficient labour attracted thither from the United Kingdom.

Only a week ago, our South Wales correspondent alluded to a report that Mr. D. A. THOMAS, of the Cambrian Combine, had taken an interest in coal property across the Atlantic, as a result of his recent visit to the United States and Canada.

With regard to the question of increased cost of production due to wages, taxation, and restrictive legislation, some interesting information was given by Mr. ISAAC HODGES in his presidential address delivered to the Midland Institute of Mining, Civil and Mechanical Engineers, on November 9, 1910. The subject of the address was "The Increase of Working Costs in Coalmines during the Past Half-century, the Rate of Increase, and the Causes thereof," and referred to the Whitwood Collieries, the property of Messrs. Henry Briggs, Son, and Co. Limited, Normanton. At these collieries, the Stanley Main and Haigh Moor, seams had been worked in closely adjoining areas, and under similar conditions for the past fifty years, so that it was possible to state with a considerable degree of accuracy the increase in working costs during the period under consideration. Three outstanding years—1860, 1885, and 1910—were selected by Mr. Hodges, which gave two periods of a quarter of a century each, and the corresponding particulars were tabulated. The particular years represented a fair average for the time being.

The table given below shows the increase of working costs in the years 1885 and 1910 over those of 1860, and the manner in which each item of cost contributes to the total increase.

From these figures it will be seen that, taking the average of the two seams, the working cost increased from 1860 to 1885 by 30·4 per cent., and from 1860 to 1910 by 87·2 per cent. Of these increases, underground labour accounted for 15·2 per cent., and 56·8 per cent. respectively. Similar results were obtained by Mr. H. F. BULMAN and published in the series of articles on "The Cost of Producing

STANLEY MAIN SEAM.				HAIGH MOOR SEAM.			
	Per cent. of total increase of working cost in 1885 over that of 1860.		Per cent. of total increase of working cost in 1910 over that of 1860.		Per cent. of total increase of working cost in 1885 over that of 1860.		Per cent. of total increase of working cost in 1910 over that of 1860.
Wages—				Wages—			
Underground .....	15·5		58·4	Underground .....	14·9		55·3
Surface .....	1·2		3·6	Surface .....	2·1		4·3
Total wages .....		16·7	62·0	Total wages .....		17·0	59·6
General—				General—			
Stores .....		4·8	4·8	Stores .....		4·2	6·4
Boiler fuel and colliers' coal .....		1·2	2·4	Boiler fuel and colliers' coal .....		1·1	2·1
Rates and taxes .....		2·4	7·1	Rates and taxes .....		2·1	6·4
Management and general charges .....		1·7	4·1	Management and general charges .....		1·6	3·7
Mine rents .....		6·5	6·5	Mine rents .....		1·6	2·0
Workmen's Compensation Act .....		—	3·6	Workmen's Compensation Act .....		—	8·2
Total increase of working cost .....		33·3	90·5	Total increase of working cost .....		27·6	81·0



" which appeared in our columns in May and June 1910.

Colliery managers have made a valiant attempt to compensate for the increased cost of labour by the improvement and more extended use of labour-saving machinery, but this method has its limits.

Unless the miners and the Legislature can be induced to realise that capital once transferred to new fields abroad is not likely to return, even an heroic effort such as the proposed " National Union of Employers " must be doomed to fail, and can only hasten the end.

Trade Summary.

The London coal trade continues very unsatisfactory. The slight improvement in the demand on Monday last was not maintained in the presence of the warmer weather since. The delivery trade is slow, and depot orders small. The public and all the metropolitan wharves and depots are well supplied with stock coal, and little actual consumption of house coal is felt up to the present. Manufacturing coals are moving freely, and all cheaper qualities have been in better demand. Smalls and slacks are also improving slightly. Prices are stationary. Coke is very quiet. No cargoes are yet offering for Wallsend in the seaborne market except for contract.

Quotations on the Newcastle market have recovered slightly from the slump of last week, but steam coals continue weak, with the exception of secondary qualities. Gas coals are better.

The Durham coal trade has a weaker tendency, steam and manufacturing coals being easy. Gas coals are fairly steady.

There is continued improvement in the Lancashire house coal trade. Steam coals are rather plentiful. Slacks are recovering their tone.

West Yorkshire house coal prices have been advanced, and the market is exceptionally firm. Business in other sections is moderately active.

The collieries in South Yorkshire are now working full time, and steam coal prices are firm, except for secondary sorts. Small steams are in somewhat excessive supply, but nuts are in good request. The coke trade remains quiet.

There is a satisfactory demand for Derbyshire house coal, and the call for manufacturing coal continues to expand.

Business at Cardiff has been restricted by the short supply of tonnage, and comparatively low prices have at times been accepted. Prices generally, however, are firm. Small coal prices are rather better. Monmouthshire coals show little alteration. Rhondda bituminous coals are the shade firmer. Coke is quiet.

Trade in Scotland continues satisfactory in all branches.

THE BY-PRODUCTS TRADE.

Tar Products.—There is a healthy tone about the market and most products are steady, recent values being sustained. Carbolic seem to have come to a standstill on the downward gradient. Benzols and pitch are firm and in good request. Nearest values are:—

Benzols, 90's .....	1/1½
Do. 50's .....	1/0½
Do. 90's North .....	1/1
Do. 50's North .....	1/1½
Toluol .....	1/1½
Carbolic acid, crude (60 per cent.) .....	1/2½ to 1/3
Do. crystals (40 per cent.) .....	4/3
Solvent naphtha (as in quality and package) ...	9/3
Crude ditto (in bulk) .....	5/
Creosote (for ordinary qualities) .....	3/
Pitch (f.o.b. east coast) .....	44/6 to 45/
Do. (f.a.s. west coast) .....	43/6 to 44/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

Sulphate of Ammonia.—There is still a feeling in favour of higher prices and in most quarters this is reflected by quotations. The forward position is strong at £14 for October-December. American advices also confirm the tendency of the market here, the price there being back again to 3.15 dols. per 100 lb. Closing prompt prices are:—

London (ordinary makes).....	£12/15 to £12/16/3
Beckton (certain terms) .....	—
Liverpool .....	£13/10
Hull .....	£13/8/9
Middlesbrough .....	£13/7/6
Scotch ports.....	£13/15
Nitrate of soda (ordinary) per cwt. ...	10/9

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

A fire broke out in a new shaft at Ellington Colliery, Northumberland, on the 18th inst. Volumes of smoke issued from the pit-mouth, and one man in the shaft at the time was unable to escape. The Ashington Colliery Fire Brigade was summoned by telephone, and was soon working, under the direction of the manager, Mr. J. J. Hall, and other men. Large quantities of water were poured down the shaft, and the fire was soon overcome.

INDUSTRIAL AGREEMENTS IN THE COAL TRADE.

(Continued from page 589).

Scotland.

The next witness was Mr. Adam Nimmo, chairman of the Scottish Coal Trade Conciliation Board and president of the Lanarkshire Coalmasters' Association, who, accompanied by Mr. Robert Baird, gave evidence on January 22, 1913. He said there were four local coalowners' associations in Scotland — namely, the Lanarkshire Coalowners' Association, covering Lanarkshire, Renfrewshire, Dumbartonshire, Stirlingshire and West Lothian; the Ayrshire Coalowners' Association, covering Ayrshire and Dumfriesshire; the Fife and Clackmannan Coalowners' Association, covering Fife and Clackmannan; and the Lothian Coalowners' Association, covering Mid and East Lothian, including Haddingtonshire. These associations dealt with all local questions between the employers and workmen, but in all questions affecting general rates of wages and conditions of employment, they acted in concert through the Board of Conciliation upon which each of the local associations was represented, negotiating with the representatives of the Scottish Miners' Federation. The Board consisted of 12 representatives each of the employers and workmen, and the rules provided for a general maximum of 100 per cent. and a minimum of 50 per cent. above the 1888 standard. Witness put in a copy of the rules and the constitution. The Board had dealt with general rates of wages during the last 13 years, with the help of wages agreements setting forth the minimum and maximum and the price equivalent. The last agreement was entered into in 1909 and terminated on July 31, 1912. It was an agreement made, with the assistance of the Board of Trade, after a serious stoppage of work. Under it the calling-in of a neutral chairman was made obligatory. The agreement provided for a special arbitration before a neutral chairman, under which a scale of wages and values was to be adjusted as being in fair and reasonable correspondence in view of the district minimum wage then agreed to be recognised, subject to the consideration of the state and prospects of trade for the time being, the coalowners having stipulated as a fundamental condition to the agreement that for a wage 50 per cent. above the 1888 basis the equivalent price could not be less than 7s. 5.45d. per ton. At present they had no wage agreement, but the employers' and workmen's representatives had entered upon negotiations with a view to the adjustment of such an agreement. Meantime, the parties had agreed to the continuation of the Board of Conciliation, reference to a neutral chairman being obligatory in the event of a dispute as to wages arising, and being incapable of being settled by mutual consent. The Board was subject to six months' notice. Fluctuations in wages were chiefly regulated by recognised values of coal. If a sliding scale, as nearly automatic as possible, could be adjusted, the owners would regard it as the most satisfactory method. Upon an application being made for an increase or reduction, a meeting of the Board was required to be held within 14 days, and the most recently obtained realised value of coal was submitted and considered in relation to the state and prospects of trade. If the parties were unable to agree, the meeting might be adjourned for a further period of 14 days. If at the adjourned meeting the parties were still unable to agree, the application must be submitted to a neutral chairman, who decided whether it should be granted or not; he had power to decide that an advance or reduction less than the application should be granted. He was afraid that they more often than not had to go before the neutral chairman. Nevertheless, the Board had worked very well and, on the whole, had succeeded in developing harmonious relations between the workmen and their employers.

Witness said the wages agreements had been recognised and fulfilled by both parties, and the decisions of the neutral chairman had been loyally carried out, except in regard to the 1909 agreement. They considered that the workmen had broken that agreement in coming out on strike in 1912. The employers held that the demand for a minimum wage fell within the scope of the agreement, and that the workmen were under an obligation to submit it to arbitration. The workmen's representatives, however, declined to do this.

As to those questions which did not affect the general rate of wages, witness said they were dealt with, in the first instance, by the colliery companies themselves and their own workmen, but if they failed to come to an agreement usually the miners' local association was brought in, and if there was still failure, generally the coalowners' association and the executive of the Scottish Miners' Federation attempted to settle it. Within the last few years there had been an increasing tendency to

adopt methods of conciliation in attempting to settle local disputes. At present upwards of 90 per cent. of the miners were in the union, and there were very few owners outside the owners' organisation; the non-associated owners usually carried out their decisions. No compulsion was used to bring in outsiders, as the owners did not believe in a recourse to such methods, although having a strong faith in the value of strong organisations on both sides, as conducing to the proper fulfilment of agreements. Their experience was that the Conciliation Board had a steadying effect upon the industry and tended to prevent frequent ruptures owing to the opportunities afforded for a full exchange of views between the parties. Still further advantage was secured in relation to disputes if a wages agreement could be entered into which set forth as many of the points of agreement between the parties as possible on questions surrounding wages—that is, if some provision was made for arbitration within certain prescribed limits, and that at a comparatively early stage. It was also in the interests of both parties if the rules provided for an adjournment, so as to secure time for full deliberation by both parties upon all the facts and circumstances involved in the dispute. The arbiter selected might be vested with certain powers upon which the parties had agreed, and, pending his decision, it was most desirable that there should be no stoppage of work or lock-out. In the case of a serious dispute it would not be unreasonable to make the period of rest 30 days. In Scotland they had always objected most strongly to an entirely open arbitration upon every point that might be involved in the wages question. There were certain questions that they felt they could not safely refer to arbitration, such as the equivalent selling price, since it was only those who knew the industry who could say at what price the industry could be carried on. On the other hand, the workmen had always been opposed to an open arbitration upon the general minimum wage. Advantage would be gained in a serious situation by a joint reference to some independent tribunal upon the merits of the dispute, even supposing that tribunal was not permitted to give a judgment with a determining effect. It was often difficult to get at the facts of a dispute, and a review of the whole situation very often tended to bring them out. Of course a reference of that sort would be of little avail if a question of vital principle was involved.

Witness was in favour of making the parties financially responsible for the carrying out of a voluntary agreement. That had an important bearing on the last wages agreement concluded in Scotland, and unless some such provision was made it was impossible to find a way out of the difficulty that arose. He would advocate an arrangement by which both parties should deposit substantial sums as a guarantee of good faith. Industrial agreements should not be entered into for too long periods, as there might be some element of hardship otherwise; in an industry like the coal trade, however, it should be sufficiently long to give a guarantee of security. Generally speaking, in Scotland the agreements had been for periods of three years, but in two cases they had been for one year. Where there was any chance of a serious dispute, a properly-constituted ballot of the men should take place before stoppage of work, more or less with the object of bringing home to the men their responsibility and of ensuring that the men understood the issue which they had to deal with. Such a ballot might be taken in the same way as was provided in the Coal Mines Act, under the Board of Trade. As to the amount to be deposited by the parties, witness was not sure that £20,000 would be adequate. It was very seldom in Scotland that individual workmen or small groups of workmen broke away from the control of the executive. Witness did not suggest that payment of the full measure of damages should be exacted, but a sum substantial enough to be a guarantee of good faith. Payment might be enforced by law or by an arbiter appointed under the agreement, who might also settle the amounts. Asked as to whether the owners would employ men who had been expelled from the union, witness said that if they had acted on a general direct breach of agreement arrived at between the two sides, they would not employ them. If they came to the question of a particular colliery, he would reserve his judgment, because the question at issue might not be one for an association at all. It would depend on the circumstances, and whether he considered that they had any control over that particular colliery or not.

In answer to Mr. Bowerman, witness said the owners were not satisfied with the existing method of taking ballots. There was not, in their opinion, sufficient secrecy; the men were really under the shadow of the local officials, and voted under the influence of these officials. Possibly the latter received word from head-



quarters that a certain course was to be followed, and did their best accordingly to engineer the men into the position desired.

Witness said they were in favour of voluntary agreements being made legally enforceable. In Scotland, he thought, the men could be trusted to look after the non-associated coalowner who declined to carry out a bargain which was made with the great body of employers. But the owners' association would take no action in the matter. He did not think they could point to a single strike in Scotland that had taken place through a non-associated coalowner refusing to carry out the award under a board of conciliation, or because he had refused to accept a position that had been accepted generally by the other coalowners. Witness said they had never had any trouble at a colliery through non-union men. The attitude the owners would like was a free attitude; but he had no doubt that in Scotland there had been probably a compromise on many occasions on that question with a view to trying to keep the collieries running.

Mr. Nimmo said that in Scotland they had had some very large demands, and it was desirable that the fluctuations in wages should be slower both up and down. As regards the question of penalties, Mr. Nimmo said they relied greatly on the growing commonsense of workmen to enter into these bargains and to maintain them, and he did not think there should be any legislative interference brought to bear upon the parties on any of these labour questions, except that when the parties had entered into a bargain, and one of them was in breach, there ought to be some way of bringing home liability to the party in breach. Outside of that, an effort should be made to deal with all these labour questions by setting up such machinery as they had attempted to set up, possibly somewhat extended, but not going the length of legislative interference at all.

(To be continued).

## CONTINENTAL MINING NOTES.

### Belgium.

Exports and imports during the first eight months of this year were as follow:—

	Imports.		Exports.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	5,286,686	5,967,457	3,304,650	3,290,789
Coke .....	605,985	767,774	648,156	719,426
Briquettes ..	282,086	323,846	431,658	412,222
From Germany there were imported 3,463,797 tons of coal, 685,161 tons of coke and 314,046 tons of briquettes, as against 3,053,763 tons of coal, 546,062 tons of coke and 262,343 tons of briquettes last year. Imports of British coal rose from 1,071,154 tons to 1,572,620 tons.				

### France.

The official returns of coal production, published in the *Journal Officiel*, show that 20,611,592 tons of coal were raised in France during the first half of 1913, as against 20,194,394 tons in 1912. The following table can thereby be arrived at:—

	1913. Tons.	1912. Tons.
Output .....	20,611,592	20,194,394
Imports .....	11,344,200	9,059,300
	31,955,792	29,253,694
Deducting exports ..	891,914	1,251,034
Consumption .....	31,063,878	28,002,660

### Germany.

The Harpen Company raised 8,665,920 tons of coal during the year ended June 30, as against 7,530,068 tons in 1911-12, and the gross profits amounted to 33,546,154 marks, as against 25,680,676 marks in the former period, whilst the net profits were 10,240,936 marks, as against 8,529,470 marks. The dividend has been raised from 9 to 11 per cent., the total capital being 85 million marks.

Exports and Imports.—Exports and imports of fuel in July were as follow:—

	Imports (July).		Exports (July).	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	1,212,173	1,050,520	2,733,473	3,030,953
Lignite .....	636,849	644,122	3,303	6,315
Coke .....	60,132	100,943	703,283	567,474
Coal briquettes ..	2,414	2,463	231,133	197,716
Lignite do .....	8,556	8,722	40,655	56,970

Imports during the seven months ended with July were as follow:—Coal, 6,078,982 tons (+ 677,866 tons); lignite 4,147,033 tons (− 73,121 tons); coke, 353,585 tons (+ 27,783 tons); coal briquettes, 13,998 tons (− 14,808 tons); lignite briquettes, 68,416 tons (− 2,068 tons); and exports—coal, 19,399,643 tons (+ 1,566,623 tons); lignite, 36,779 tons (+ 7,669 tons); coke, 3,972,676 tons (+ 811,726 tons); coal briquettes, 1,395,411 tons (+ 157,207 tons); lignite briquettes, 496,775 tons (+ 202,145 tons). The imports of British coal in July fell from 1,090,550 tons to 923,561 tons, but the total for the seven months, 5,306,373 tons, is higher by 718,584

tons. Exports of coal in July increased to Austria-Hungary, Spain, France, Norway and Italy. So far this year only 5,680 tons of German coal have been forwarded to the United Kingdom, or 50,543 tons less than in the first seven months of 1912.

*Ruhr Coal Market.*—The decision of the Syndicate to maintain the price of coke on its present level until the end of the year is an unpleasant surprise to the iron industry, it having been confidently anticipated that a reduction of 1 mark per ton would be made. The reduction of the output by a further 10 per cent. is a consequence of the increased participation allotments. Current business is by no means bad when the general situation is taken into consideration. In the case of coke, it is true that the demand is quite insufficient, and that stocks are becoming larger and larger, and even in coal the requirements of consumers can be met with ease without using up the whole output. Nevertheless, the volume of traffic is very considerable, especially for export, though in many cases the price obtained is not remunerative. In the home market, the requirements of the iron industry are small; the business in coking coals is influenced by the unsatisfactory condition of the coke market, and the house coal trade has not yet come into full swing. Large and continuous shipments are being made to South Germany, where business has improved of late, though not to such an extent as to absorb the whole of the oncoming supplies. English competition is hardly felt at all.

*Coal Market in Upper Silesia.*—The situation remains favourable, the demand being so large that it is found impossible to satisfy all requirements promptly, consumers being anxious to get in as much fuel as possible before the autumn scarcity of railway wagons becomes acute. The same applies to the export trade, increased orders coming in continually from Austria-Hungary and Russian Poland. The necessities of the home market are, however, being attended to first, so that the export trade cannot be pushed. In these circumstances the accumulation of stocks at the pits is impossible, the whole output being taken over as soon as raised. Increasing the production is a matter of difficulty; for though some of the pits are enlarging their operations, the lack of trained workers is keenly felt. The demand for house coal is naturally improving as the season advances, whilst coking coals are in such high request that deliveries are in arrears. The coke market is exceedingly active, particularly in blastfurnace and foundry sorts, the entire output being absorbed at once.

### Russia.

The Minister of Communications has laid before the Council of Ministers a Bill to admit free from Customs duties 1,300,000 pounds of coal. A million pounds are intended for the South-West Railway and 300,000 for the secondary railways of Livonia.

## THE IRISH COAL TRADE

THURSDAY, SEPTEMBER 25.

### Dublin.

The principal coal firms are now engaging men to replace those belonging to the Transport Workers' Union, who are at present locked out; and this week the members of the Coal Merchants' Association have started operations for the delivery of coal in the city. They have formed a pooling arrangement by which deliveries are being made in turn by means of motor lorries under strong police protection, and the drivers are receiving special remuneration for their services. A number of coal merchants are also effecting some private deliveries, employing their own carts for the purpose. The orders now being carried out are those on hand which have been accumulating, and plenty of fresh orders continue to come in. The hospitals and charitable institutions will, it is understood, receive the first attention, as they are at present very much in need of supplies. There is no change in wholesale prices, but the small dealers are still making the most of the situation and charging exorbitant prices for the "bell" coal. Quotations in the city are:—Best Orrell, 27s. per ton; best Arley, 26s.; best Whitehaven, 25s.; best kitchen, 24s.; Orrell slack, 21s.; steam coals, from 21s. to 22s. per ton delivered; best coke, 24s. per ton delivered. Irish coals at Wolfhill (Queen's county) are:—Best large coal, 20s. per ton; best household, 18s. 6d. per ton; best culm or slack, 5s. per ton—all at the pit mouth; steam coals for contracts, 17s. 6d. per ton. Shipments for this port have been only on a small scale owing to the difficulty in discharging, and this week traffic between Dublin and Manchester is suspended. During the past week the number of coaling vessels arriving amounted to 24, as compared with 32 the week previously, chiefly from Garston, Newport, Glasgow, Ayr, Barrow, Preston, West Bank and Partington. The total quantity of coal discharged upon the quays was only 10,000 tons.

### Belfast

A fairly good business is being done locally in all qualities, and house coal sales are on the increase in view of an early advance in prices. Some anxiety is felt here owing to the various labour troubles existing, and the cross-Channel trade has suffered to some extent. The market keeps very firm, but there is no change in prices. Quotations in the city are:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 25s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Rates for steam coals, ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton. From August 31 to September 13 the total number of colliers entering the harbour was 109. Cargoes arriving during the week were chiefly from Ardrossan, Point of Aire, West Bank, Preston, Ayr, Workington, Garston, Girvan, Troon, Newport, Glasgow, Burryport and Ellesmere Port.

## LABOUR AND WAGES.

### Northumberland and Durham.

Replies have been received from the Northumberland Coalowners' Association to the modified requests of the various sections of the Northumberland Colliery Enginemen and Firemen's associations, which have been in abeyance for some considerable time. They are stated to be for the most part unfavourable.

A deputation from the Northumberland Colliery Mechanics' Association waited upon the coalowners at the Coal Trade Office, Newcastle, on Saturday, and preferred a request for an advance of wages. After discussion it was agreed that with pays commencing September 22 and 29, wages be advanced 2d. per day.

Representatives of the Northumberland Deputies' Association—Messrs. Hunter, Wright, Coulthard, Standbury, Forster and Kirkup—met the coalowners at the Coal Trade Offices, Newcastle, on Saturday, with a view to an advance in wages. After discussion, it was agreed to advance the deputies' wages 2d. per day, making them 7s. 5½d., the advance to commence with pays on September 22 and 29.

On Thursday, October 2, Lord Romer, chairman of the Durham Joint Board under the Mines Minimum Wage Act, will preside at a meeting of the Board, to be held at the Coal Trade Offices, Newcastle, to consider the revision of district rules. Lord Mersey sat in a similar capacity for Northumberland recently, and his report on suggested amendments of rules will shortly be to hand.

### Federated Area.

A meeting of representatives of the coalowners and miners of Lancashire and Cheshire was held in Manchester on Monday to consider an application for a uniform rate of wages for surfacemen in both counties. Mr. W. H. Hewlett presided over the meeting, which was private. At its close Mr. Thomas Ashton stated that a large number of the colliery proprietors in the two counties had already arranged rates which were satisfactory both to the workmen and to the employers, and the men were asking that the other employers should pay the same rates. After the matter had been discussed from every standpoint, the employers asked the workmen's representatives to retire while they considered the application. When they returned Mr. W. H. Hewlett, on behalf of the employers, stated that they had considered the application and decided to report to a full meeting of the whole of the coalowners of Lancashire and Cheshire. They agreed to the principle of a minimum rate for surface hands, and would recommend it to the meeting of the whole of the employers. The joint meeting was then adjourned until October 14.

The council of the Derbyshire Miners' Association, meeting at Chesterfield on Saturday, confirmed the proposal to erect a memorial to the late Mr. James Haslam, M.P., the founder and general secretary of the union. A life-size statue will be placed in front of the Miners' Institute in Chesterfield, and a large portrait is to be hung in the council room. Mr. Harvey was appointed general secretary in succession to Mr. Haslam. The opinion of Mr. Scott Fox, Recorder of Sheffield, having been taken regarding the Association's position with the Labour party, the council decided that it should be printed and circulated among the various lodges, together with the correspondence that has taken place between the Labour party and the Association regarding Mr. Kenyon's candidature in the recent by-election at Chesterfield. It was reported that it had been ascertained that the majority of the executive of the Labour party had communicated their approval of Mr. Kenyon's candidature.

Colliery deputies in Derbyshire are seeking an advance in wages, and at a meeting at Chesterfield on Saturday it was decided to make a demand for 1s. per day increase. The committee of the Derbyshire Under Managers' and Deputies' Institute met at the Angel Hotel in the afternoon, and their recommendations were brought before a large meeting of deputies from all parts of Derbyshire in the evening. The suggestions were that a demand should be made for 1s. per day increase, together with one week's holiday per annum, to be paid for. It was pointed out that although the miners had had several advances in recent years, the remuneration of the deputies had not increased during the last 10 or 15 years. The contention was made that if coalgetters were entitled to a minimum wage of 8s. 3d. per day, deputies were worth 10s. per day. Examinations for deputies, it was stated, had become more strenuous than in the past, and under the new Act greater responsibilities were imposed on the deputies. The resolution was carried by an overwhelming majority, and it was decided that the deputies should appoint deputations to meet the managers of the various pits on the same day, if possible.

The four unions which have federated for the purpose of taking joint action with regard to non-union labour in the collieries of North Staffordshire—the North Staffordshire Miners' Federation, the Firemen, Examers and Shotlighters' Association, the Enginemen and Stokers' Union, and the Navvies' and General Labourers' Union—have issued another warning manifesto to non-unionists.

At meetings of miners, held in Manchester and Bolton



ts last week-end and the beginning of this week, ions were adopted in favour of instructing at an y date the executive council of the Lancashire and shire Miners' Federation to seek a renewal (with various amendments) of the Minimum Wage Act, which, however, does not expire until the early part of 1915.

#### Scotland.

On Friday, of last week, the three pits at Messrs. Russell Limited Tannochside Collieries, Uddingston, were picketed, close on 1,000 men being thrown idle. It appears that the men felt they were underpaid in certain sections, and the matter was duly reported to the county union, who gave permission to stop. A meeting was held near the colliery, and a demand for an increase of 3d. per ton was agreed upon. A deputation waited on the management, when an offer of 1d. per ton was made. At a meeting held later it was agreed to accept the 1d. advance meantime, and to resume work on the following Monday.

The question of the wages both of the miners and of surface workers was considered at a meeting of the executive of the Scottish Miners' Federation which was held on the 17th inst. in Glasgow. The claim by the employers for a reduction of the miners' wages to the extent of 18½ per cent. on the 1888 basis was reported on by the secretary, Mr. Robert Brown, who intimated that the first meeting of the Scottish Coal Trade Conciliation Board on that question would be held in Glasgow on October 3. The meeting instructed the secretary in the meantime to put the whole matter of the Scottish miners' wages before the Miners' Federation of Great Britain for consideration. With regard to the claim by the surface workers for an advance in wages of 15 per cent., it was reported that the employers considered that the request for a meeting of the Conciliation Board could not be entertained, as, in their opinion, such a claim did not fall within the purview of the Conciliation Board. Further consideration of the question was deferred until the next meeting of the executive.

#### Surfacemen's Wages.

The result of the Federation card voting on surface-men's wages and conditions at collieries in the Miners' Federation area, has just been officially issued. The figures in favour of a minimum of 5s. per day and 15 per cent. on the rates of wages prevailing in February 1912 are as follow:—

Midland Federation .....	35,000
Derbyshire .....	33,000
Notts .....	28,000
South Derbyshire .....	4,000
Leicester .....	6,000
North Wales .....	10,000
Scotland .....	75,000
Durham .....	99,000
Cumberland.....	6,000
Somerset .....	4,000
Bristol .....	2,000
Cleveland.....	10,000
Forest of Dean .....	3,000
<b>Total.....</b>	<b>315,000</b>

The figures against are:—

Yorkshire.....	90,000
Lancashire .....	64,000
South Wales .....	116,000
Northumberland .....	36,000
<b>Total.....</b>	<b>306,000</b>

Sinking at the new Rufford Colliery is proceeding very satisfactorily. On Tuesday last week the High Hazel seam of coal was reached at a depth of 483 yards—11 yards deeper than at the Mansfield Colliery, which is within two miles distance as the crow flies. This shows that the Deep Hard will be reached when the sinking has proceeded another 72 yards, and it is hoped that this will be tapped about the end of October. At the time of the Rufford Pit disaster in February last the sinking had reached a depth of 162 yards, so that progress since that time has been fairly rapid, especially when it is remembered that the work was stopped owing to water troubles.

**Standard Wrought Iron for Rolling Stock.**—A new specification issued by the Engineering Standards Committee contains particulars of some alterations in the specification of August 1910. Some of the more important modifications are:—(1) A reduction in the number of tensile tests for best Yorkshire bar iron; (2) a similar reduction in the number of bend tests; and (3) the deletion of the quenching test; (4) the inclusion under grade "B" of the tests for plates which were included under grade "C," but with a slightly increased minimum elongation per cent. and somewhat more severe bend tests, and the insertion under grade "C" of plates of Cleveland iron quality; (5) an increase in the minimum contraction of area per cent. of original area for grade "A" round and square bars up to 1½ in. in diameter or section; (6) an increase in the minimum contraction of area per cent. of original area for grade "B" round and square bars up to 1½ in. in diameter or section; (7) the optional use of standard test pieces B or F for angles and flat bars up to 1 in. in thickness; (8) the provision of bend test pieces for blooms and billets, for bars over 2½ in. in diameter or section; (9) provisions for tests of the requirements for round or square bars over 1 in. thick; (10) the deletion from the specification of the tests of the requirements for round or square bars up to 1 in. in diameter or section; and (11) the deletion of the bending test for grade "B."

#### THE LONDON COAL TRADE.

THURSDAY, SEPTEMBER 25.

The London coal trade for the past week has again been disappointing. The earlier days of the week showed a promise of a firmer market, and a greater disposition to buy, especially in view of the approaching month of October, but the return to warm weather has greatly checked the demand and quickened the desire of those factors who were holding stocks to sell them as speedily as possible, even at somewhat lower prices. The markets have all been quiet but well attended, and a steady trade has been done in all qualities, prices ruling firm, but the buying was somewhat restricted. The depots still present a very crowded condition, and the heaps of coal stacked are apparently heavier than usual. In the seaborne market no business has been done with Durham or Yorkshire qualities, except what has been already contracted for. No cargoes have been on offer. The nominal prices remain as before, 21s. 6d. for best Wallsend, 20s. 6d. for seconds. Thirty-one cargoes are reported as having arrived in the Thames for Monday's market, and 11 for Wednesday's, all sold. Prices remain unaltered, both in the advertised public prices and also in the wholesale pit prices, unless, indeed, the customary variation of a dull market can be called a reduction. Some of the merchants have reduced public prices, and many of the collieries have departed from their current list prices, especially where stocks have rapidly accumulated. The warm weather has again stopped any practical development in the actual consumption, and merchants who have had heavy stocks, and also loaded wagons under contract continually coming forward, are anxious to clear, even at lower prices than last week. Monday's market opened with a firm tone, and the dull, cold weather gave a promise of an early demand for all qualities of house coal, but the return to open, mild weather during the week has greatly checked the flow of orders, and stopped a good deal of the buying. The retail trade has been only moderate, and a good many of the merchants report a falling off in public orders. On the other hand, collieries are still working upon the arrears of orders on hand, so that quotations remain firm, and the cheaper qualities of coal have found a readier market than usual. The settlement of the labour trouble has produced a steady tone to all manufacturing qualities. During the brief period of stoppage, however, some of the steam coal usually shipped at Liverpool found its way into the London market, and changed hands at very reduced rates. Since then the demand has been normal, and the special offers have been withdrawn. Smalls, also, and slacks have partially recovered from their depression, and although prices are still low, there is not so much underselling. The iron market is often a clear index to the condition of the coal market, and this is very dull just now, and some of the furnaces are closing down, although shipbuilders and engineers have plenty of orders on hand for all branches. Coal mining is apparently going forward nearer the London area than even the Kent coalfields, for during the week it was reported that coal has been discovered, and borings have been actively in operation at Great Missenden, Bucks. It was reported on the market on Wednesday that the Egyptian State Railways had bought 300,000 tons of Welsh coal, and 50,000 tons of north country coal.

#### Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/	13/
Do. nuts .....	12/	12/
Birley cube Silkstone .....	12/6	12/6
Do. branch coal .....	16/	16/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone.....	13/6	13/6
West Riding Silkstone .....	13/	13/
Kiveton Park Hazel .....	13/	13/
Do. cobbles.....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	12/	12/
New Charlton Wallsend .....	15/	15/
Wharfedale Silkstone coal.....	14/6	14/6
Do. Flockton Main .....	15/6	15/6
Do. Athersley house coal.....	12/	12/
Newton Chambers best Silkstone.....	17/	17/
Do. Grange best Silkstone .....	15/6	15/6
Do. Hesley Silkstone .....	14/	14/
Do. Rockingham selected .....	14/	14/
Do. Rockingham Silkstone .....	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best.....	12/6	12/6
Do. large nuts .....	12/3	12/3
Do. small nuts.....	10/	10/
Do. kitchen coal .....	10/6	10/6
West Hallam Kilburn brights.....	12/6	12/6
Do. do. nuts .....	12/3	12/3
Do. London brights .....	11/	11/
Do. bright nuts .....	11/	11/
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Shipley do. brights .....	13/	13/
Do. do. nuts .....	12/6	12/6
Mapperley brights .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Cossall Kilburn brights.....	12/6	12/6
Do. do. nuts .....	12/	12/
Trowell Moor brights.....	12/6	12/6
Do. do. nuts .....	12/	12/
Grassmoor Main coal .....	13/	13/
Do. Tupton .....	11/6	11/6
Do. do. nuts.....	11/6	11/6

	Current prices.	Last week's prices.
<b>Derbyshire—(cont).</b>		
Clay Cross Main coal .....	13/	13/
Do. do. cubes .....	13/	13/
Do. special Derbys .....	12/	12/
Do. house coal .....	11/6	11/6
Pilsley best blackshale .....	13/	13/
Do. deep house coal .....	11/6	11/6
Do. hard screened cobbles .....	11/	11/
Hardwick best Silkstone .....	13/	13/
Do. Cavendish brights.....	12/6	12/6
Do. cubes .....	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/6	12/6
Do. small hards.....	12/6	12/6
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards.....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	13/
Do. cobbles .....	13/	13/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/6	14/6
Bestwood hard steam coal.....	13/	13/
Do. bright cobbles .....	11/9	11/9
Hucknall Torkard main hards.....	12/9	12/9
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. ...	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts.....	11/3	11/3
Sherwood H.P. hards .....	12/6	12/6
Do. hard steam.....	11/6	11/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal.....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. bakers' nuts .....	10/9	10/9
Do. loco Two Yard hards .....	14/6	14/6
Do. Ryder nuts.....	11/3	11/3
Do. do. cobbles .....	12/6	12/6
Nuneaton steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts .....	10/9	10/9
Haunchwood steam .....	10/9	10/9
Do. screened cobbles.....	11/	11/
Do. nuts .....	10/9	10/9
Wyken steam coal .....	10/9	10/9
Do. screened cobbles .....	11/	11/
Do. nuts.....	10/9	10/9
Exhall Ell coal spires.....	12/9	12/9
Do. brights .....	11/6	11/6
Do. large steam coal.....	10/9	10/9
Do. hest screened cobbles .....	11/	11/
Do. large nuts .....	11/	11/
<b>Leicestershire.</b>		
Snibston steam.....	10/	10/
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	18/
Do. Eureka.....	12/6	12/6
Do. kitchen.....	10/6	10/6
Ibstock kibbles .....	9/9	9/9
Do. large nuts .....	9/6	9/6
Do. bakers' nuts .....	9/	9/
Do. Main nuts .....	9/6	9/6
Do. hards .....	9/3	9/3
Granville New Pit cobbles.....	11/	11/
Do. Old Pit cobbles .....	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/	13/
Sneyd best, selected .....	14/6	14/6
Do. deeps.....	14/	14/
Silverdale best.....	14/	14/
Do. cobbles .....	13/	13/
Apedale best .....	13/	13/
Do. seconds.....	12/9	12/9
Podmore Hall best .....	13/	13/
Do. seconds.....	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London .....		
Do. brights.....	11/	11/
Do. shallow one way.....	11/	11/
Do. deep nuts.....	11/6	11/6
Cannock steam.....	10/9	10/9
Coppice deep coal .....	13/6	13/6
Do. cobbles .....	13/	13/
Do. one way .....	11/	11/
Do. shallow coal .....	13/	13/
Cannock Chase deep main .....	16/	16/
Do. Deep kitchen cobbles ...	11/6	11/6
Do. best shallow main .....	13/	13/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles.....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards.....	11/9	11/9

#### From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, September 19.—There was no alteration in the seaborne house coal market to-day, which remained quiet, with no cargoes on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 28.

Monday, September 22.—The seaborne house coal market was quiet to-day for Durham, but there was a slight improvement in the Yorkshire section. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 31.

Wednesday, September 24.—There was no alteration in the seaborne house coal market to-day, which remained quiet; no cargoes on offer. Cargoes 11.



APPROVED SAFETY LAMPS FOR MINES.\*

(Continued from page 581).

The "Bifold Burner Marsaut"  
The Marsaut "A."  
The Marsaut "C."

Lamps.

Each of these lamps, the general designs of which are shown in fig. 14, is a double gauze, flame, oil lamp, with air-feed through holes in the middle ring. Each consists of the following essential parts:—

Bonnet or Shield of riveted steel, with a separate securely fastened crown, or of seamless steel, the bonnet and crown being in one piece. Furnished with outlet holes round the top, provided that the bottoms of the holes are not less than  $\frac{3}{16}$  in. above the top of the outer gauze. Furnished also with additional outlet holes in the crown. Fitted or not with a deflector, with or without a baffle ring.

In the "Bifold Burner Marsaut" and Marsaut "A" Lamps the bonnet is riveted to the middle ring.

In the Marsaut "C" Lamp the bonnet is riveted to a brass bonnet ring which is screwed to the middle ring and locked thereto by a sliding pillar held in position by the oil vessel.

(2.) Middle Ring of brass, steel, or iron, provided with vertical air inlet holes of total area not greater than 1.4 square inches. The inner flange prolonged or not to form a baffle ring.

Pillars, of brass, steel, or iron, 5, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

Bottom Ring of brass, steel, or iron.

(3.) Gauzes of either of the types shown in fig. 14: of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with flame-tight double folded lap or steel protected seams, formed to fit flanges of the inner and

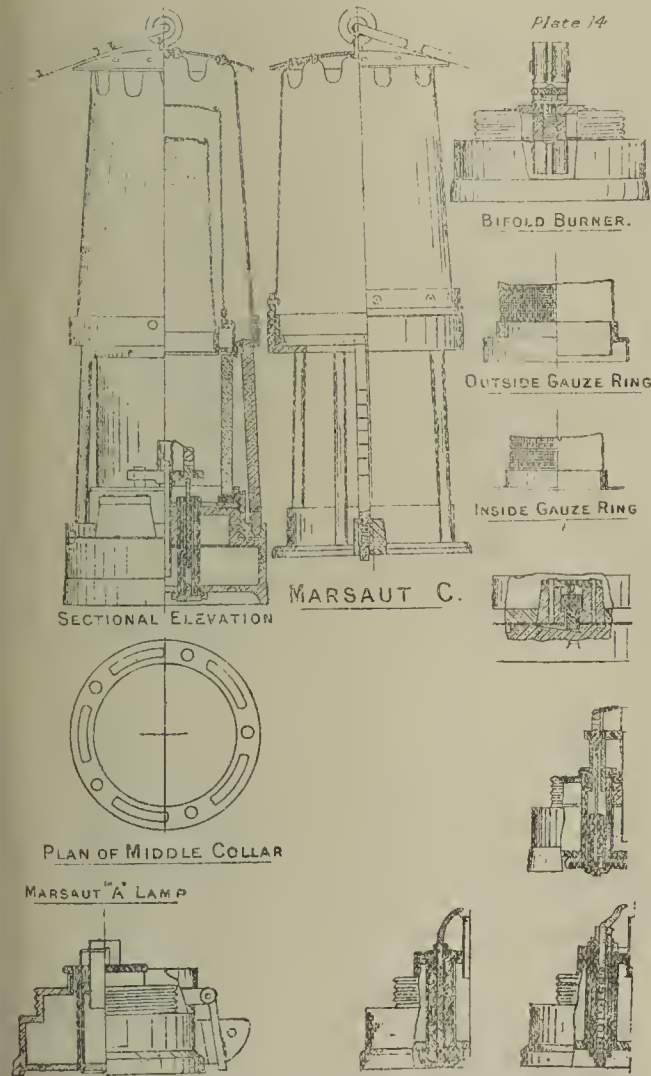


FIG. 14.—BIFOLD BURNER MARSAUT LAMP.

(J. H. Naylor.)

outer base rings, and so secured to the same by punch indentations or by rivets as to make strong and flame-tight joints. The arrangement of the gauzes is one or other of those shown in fig. 14, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without the gauzes.

Internal dimensions.	Outer gauze.	Inner gauze.
Height from shoulder of the base ring	4 in. $\pm \frac{1}{8}$ in.	4 in. $\pm \frac{1}{8}$ in.
Diameter at top	$1\frac{1}{2}$ in. $\pm \frac{1}{16}$ in.	$1\frac{5}{8}$ in. $\pm \frac{1}{16}$ in.
Diameter at bottom	$1\frac{1}{2}$ in. $\pm \frac{1}{16}$ in.	$1\frac{5}{8}$ in. $\pm \frac{1}{16}$ in.

or—		
Height from shoulder of base ring	$3\frac{3}{8}$ in. $\pm \frac{1}{8}$ in.	$3\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.
Diameter at top	$1\frac{3}{8}$ in. $\pm \frac{1}{16}$ in.	$1\frac{5}{8}$ in. $\pm \frac{1}{16}$ in.
Diameter at bottom	$1\frac{3}{8}$ in. $\pm \frac{1}{16}$ in.	$1\frac{5}{8}$ in. $\pm \frac{1}{16}$ in.

(4.) Glass of an approved type. Furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring.

External diameter	58 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height	60 mm. $\pm \frac{1}{2}$ mm.
Size mark	58-60 or J.H.N. 1.

\* From the Order dated August 26, 1913. [No. 886.]

Provided that the lamps may also be made to take glasses of the following dimensions, viz.:—

External diameter	58 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height	57 mm. $\pm \frac{1}{2}$ mm.
Size mark	58-57 or J.H.N. 2.

or— External diameter	57 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height	57 mm. $\pm \frac{1}{2}$ mm.
Size mark	57-57 or J.H.N. 3.

or in the case of the Marsaut "C" Lamp

External diameter	58 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height	$66\frac{1}{2}$ mm. $\pm \frac{1}{2}$ mm.
Size mark	58-66½ or J.H.N. 4

(5.) Glass Retaining Ring of brass, screw-threaded to fit the bottom ring: provided that the clearance between the bottom of the retaining ring and the top of the oil vessel shall not be so great as to make it possible, under reasonable working conditions, to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) Oil Vessel.—A solid casting of brass, or with a separate securely soldered brass bottom, of capacity sufficient to provide the required light for the required time as specified, fitted in the case of the Bifold burner Marsaut lamp with a bifold burner of the type shown in fig. 14, taking a circular wick of about  $\frac{3}{16}$  in. diameter; and in the case of the Marsaut "A" and Marsaut "C" lamps with a flat  $\frac{3}{8}$  to  $\frac{1}{2}$  inch burner, provided or not with a domed shield or with a porcelain body. Furnished or not with an electric igniter of one of the types shown in fig. 14, so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(7.) Locking Device.—One or other of the following:—

(i.) A lead-rivet lock with a hasp or lug securely fastened to the bottom ring by a sliding band or otherwise, or to a pillar, and a staple or lug securely soldered to the oil vessel.

(ii.) A magnetic lock of the type shown in fig. 14.

The lamps must have been made at the works of J. H. Naylor, Esq., at Wigan.

The Marsaut "B" and Marsaut "D" Lamps.

These lamps, the general designs of the upper portions of which are shown in fig. 15, are modifications of the Marsaut "A" lamp and are similar to it in all but the following respects:—

(1.) The Crown is of brass and is supported by three steel or iron pillars, which are fitted or not with a deflector ring as shown in fig. 15.

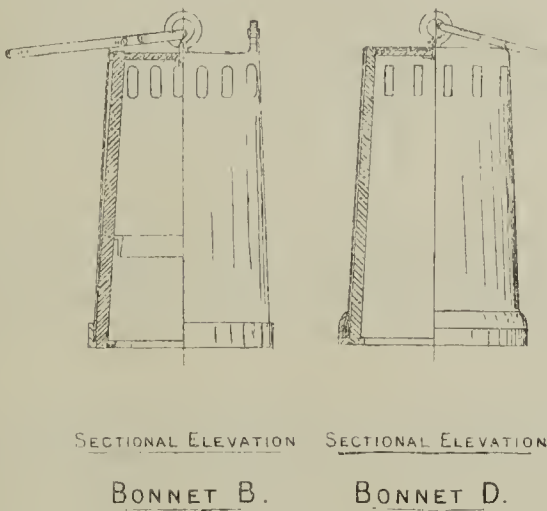


FIG. 15.—MARSAUT "B" AND MARSAUT "D" LAMPS (J. H. Naylor.)

(2.) In the case of the Marsaut "B" Lamp the bonnet is removable and is locked to the crown by a lead-rivet lock.

In the case of the Marsaut "D" Lamp the bonnet is fixed, the middle ring being securely spun over the base of it.

The lamp must have been made at the works of J. H. Naylor, Esq., at Wigan.

Patterson and Co.'s Safety Lamps, Type A 1 and Type A 3.

The specification of these lamps was contained in the Order dated June 27, 1913, and appeared in the Colliery Guardian August 8, 1913.

It is now provided that the lamp may be fitted with a Mueseler chimney and horizontal gauze in place of the inner gauze, the horizontal gauze forming a secure and flame-tight joint with the Mueseler chimney, and the dimensions of the latter being as follow:—

Height above horizontal gauze	not less than $2\frac{3}{16}$ in.;
Height below horizontal gauze	not less than $\frac{3}{4}$ in.
Diameter at top	not more than $\frac{3}{4}$ in.
Diameter at bottom	not more than $1\frac{1}{4}$ in.

The Glass is to be of an approved type. Furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and lock-ring seating:—

External diameter	57 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height	67 mm. $\pm \frac{1}{2}$ mm.
Size mark	57-67

Provided that the lamp may also be made to take a glass of the following size, viz.:—

External diameter	58 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height	60 mm. $\pm \frac{1}{2}$ mm.
Size mark	58-60

Oil Vessel of brass, steel or iron, of sufficient capacity to provide the required light for the required time, fitted with a flat  $\frac{1}{2}$  to  $\frac{5}{16}$  inch burner (fitted or not with a porcelain body); provided or not with a winding wick adjuster.

The lamps must have been made at the works of Messrs. Patterson and Co., at Trafalgar-street, Newcastle-on-Tyne.

Patterson and Co.'s Safety Lamp, Type B. 1.

The specification of this lamp also appeared in the same Order above referred to. There is now a similar provision as to the use of a Mueseler chimney, as in the case of the A 1 and A 3 lamps, and the specification as regards glass has also been altered in the same way.

"Prestwich Patent Protector" Lamp.

The "Prestwich Patent Protector" Lamp, the general design of which is shown in fig. 16, is a double-gauze, flame, spirit or oil lamp, with air-feed through vertical holes in the middle ring. It possesses the following essential parts:—

(1.) Bonnet or Shield of brass, steel or iron, with a separate securely fastened crown or cap; furnished with outlet holes immediately below the crown, provided that the bottom of the outlet holes shall not be less than  $\frac{1}{2}$  in. above the top of the inner gauze, and not more than  $\frac{1}{2}$  in. below the top of the outer gauze—fitted or not with a deflector (with or without a baffle ring).

(2.) Bonnet Ring (of the type shown in fig. 16) of brass, steel or iron, riveted to the bonnet, and screw-threaded to fit the pillar ring.

(3.) Pillar Ring of brass, steel or iron, screw-threaded to take the bonnet ring and locked thereto by means of a sliding pillar kept in position by the oil vessel; provided with vertical air inlet holes of total area not greater than 1.1 square inches.

(4.) Pillars, of steel, iron or brass, five or more (one sliding), so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass; provided that lamps now in use fitted with four fixed pillars which do not fulfil this requirement may be used until January 1, 1916.

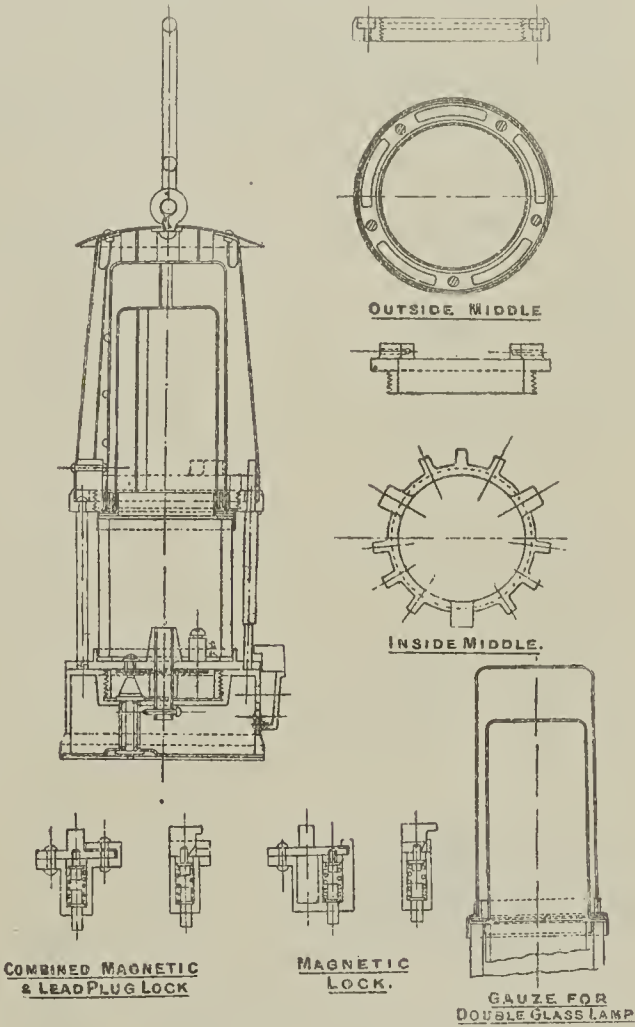


FIG. 16.—PRESTWICH PATENT "PROTECTOR" LAMP

(5.) Bottom Ring, of brass, with plate carrying tube extinguisher, fitted or not with a domed reflector; the plate is provided or not with an electric igniting device of the type shown in fig. 16.

(6.) Gauzes, of not less than 28 S.W.G. steel, or best charcoal annealed iron wire, 784 meshes to the square inch, with flame-tight double-folded or steel-protected seams, formed to fit flanges of the inner and outer base rings, and so secured to the same by punch indentations, or with a ring suitably spun and burnished on to the flange as to make strong and flame-tight joints, the gauze rings being so constructed as to form the seating necessary to hold the glass firmly in position, thus preventing the possibility of the lamp being put together without the gauzes.

Internal dimensions.	Outer gauze.	Inner gauze.
Height from the shoulder of the base ring	4 in. $\pm \frac{1}{8}$ in.	$3\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.
Diameter at top	$1\frac{3}{8}$ in. $\pm \frac{1}{16}$ in.	$1\frac{5}{8}$ in. $\pm \frac{1}{16}$ in.
Diameter at bottom	$1\frac{3}{8}$ in. $\pm \frac{1}{16}$ in.	$1\frac{5}{8}$ in. $\pm \frac{1}{16}$ in.

Provided that the lamp may be fitted with a Mueseler chimney and horizontal gauze in place of the inner gauze, the horizontal gauze forming a flame-tight connection with the Mueseler chimney, and the dimensions of the latter being as follows:—

Length above horizontal gauze,	not less than 3 in.;
Length below horizontal gauze,	not less than $\frac{3}{4}$ in.;
Diameter at top,	not greater than $\frac{3}{4}$ in.;
Diameter at bottom,	not greater than $1\frac{1}{4}$ in.

(7.) Glasses, of an approved type, single or double. Furnished with top and bottom asbestos washers



ensure flame-tight joints with the gauzes and the ring in the bottom ring.

	Outside glass.	Inside glass.
External diameter 58½ mm.	$\begin{cases} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{cases}$	$\begin{cases} 46½ \text{ mm.} \\ + 0 \text{ mm.} \\ - ½ \text{ mm.} \end{cases}$
Height..... 60 mm.	$\pm \frac{1}{4} \text{ mm.}$	$\pm \frac{1}{4} \text{ mm.}$
Size mark ..... 58½-60 or Protector 1	46½-60 or Protector 2	or P.L.C. 1.

(8.) *Spirit or Oil Vessel*.—A casting of brass or other similar alloy, with a securely soldered brass bottom, with suitable absorbent material, of capacity sufficient to provide the required light for the required time as specified; fitted with a round burner about 6 mm. in diameter, or a flat burner about ½ in. in width, and provided or not with a porcelain body and with a thumb-screw for regulating the flame.

(9.) *Locking Device*.—A hinged plate on the oil vessel, with a lug projecting over the bottom ring, so arranged that when in the locked position the oil vessel can be unscrewed to an extent sufficient to allow for the regulation of the flame, but not sufficient to cause the flame to be dangerous in an explosive atmosphere. The hinged plate is secured by:—

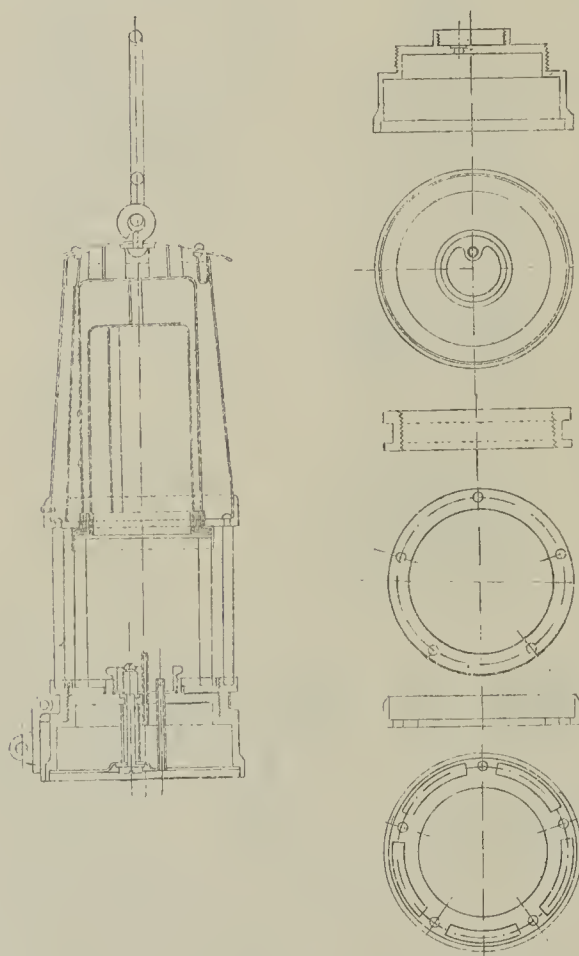
- (i.) A magnetic lock, of the type shown in fig. 16.
- or (ii.) An efficient lead rivet lock.
- (i.) That the strength of material and attachments throughout the lamp is not less than in the samples submitted for the official tests on May 5, 1913.
- (ii.) That the oil and wick used in the lamp shall be such that the lamp shall be capable of maintaining a light of candle-power not less than 0.30, as determined by a pentane standard, all round in a horizontal plane throughout a period of not less than 10 hours.

The lamp must have been made at the works of the Protector Lamp and Lighting Company Limited, at Eccles, Manchester.

#### No. 176 Oil Lamp.

The "No. 176 Oil Lamp," the general design of which is shown in fig. 17, is a modification of the "Prestwich Patent Protector" Lamp. It possesses the following essential parts:—

(1.) *Bonnet or Shield* of steel or iron, with a separate securely fastened crown or cap. Furnished with outlet holes immediately below the crown. Provided that the



MIDDLE RING

FIG. 17.—No. 176 OIL LAMP.  
(Protector Lamp and Lighting Company.)

bottom of the outlet holes shall not be less than ½ in. above the top of the inner gauze and not more than ½ in. below the top of the outer gauze. Fitted or not with a deflector (with or without a baffle ring).

(2.) *Middle Ring*, of brass, steel, or iron riveted to the bonnet, and provided with vertical air-inlet holes of total area not greater than 1.1 square inches.

*Pillars*, of brass, steel, or iron, five, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass: provided that lamps now in use fitted with four pillars, which do not fulfil this requirement, may be used until January 1, 1916.

*Bottom Ring* of brass, steel, or iron.

(3.) *Gauzes* of not less than 28 S.W.G. steel, or best charcoal annealed iron wire, 784 meshes to the square inch, with flame-tight double-folded lap or steel-protected seams, formed to fit flanges of the inner and outer base rings, and so secured to the same by punch or with a ring suitably spun and burnished.

The specification, so far as the arrangement of the lamp is concerned, is provisional, and will cease to be in force on Jan. 1, 1914, except for lamps now in use and for lamps introduced before July 1, 1914.

on to the gauze flange, as to make strong and flame-tight joints.

For dimensions, see Prestwich lamp; also provision as to use of a Mueseler chimney.

(4.) *Glass*, of an approved type, furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauze and retaining ring.

External diameter.....	58½ mm.	$\begin{cases} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{cases}$
Height.....	60 mm.	$\pm \frac{1}{4} \text{ mm.}$
Size mark.....	58½-60 or Protector 1 or	P.L.C. I.

(5.) *Glass Retaining Ring*, of brass, screw-threaded to take the bottom ring; the clearance between the glass retaining ring and the oil vessel being such that it shall not be possible under reasonable working conditions to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) *Oil Vessel*.—A casting of brass of capacity sufficient to provide the required light for the required time as specified in paragraph 8 below; fitted with a flat ½-in. burner and provided or not with a porcelain body and with an electric spark igniter of the type shown in fig. 17, so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(7.) *Locking Device*.—An efficient lead-rivet lock, with hinge attached to a sliding band on the bottom ring.

The lamp must have been made at the works of the Protector Lamp and Lighting Company Limited, at Eccles, Manchester.

(To be continued.)

#### NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**More Strikes with Less Cause: Serious Result of a Trivial Incident—Striking Declaration by Mr. D. A. Thomas—Misled Men and Corrective Statements: How Labour Unrest May be Prevented—Interesting Points in Colliery Assessment—"Long" Ton or Imperial Ton—Hydraulic Stowing in Mines: Some Important Statements—The Coal-trimmers' Saturday Afternoon Stoppage.**

It is estimated that at least 15,000 men have been on strike in this district. Chiefly, the reason is a determination to strengthen the Federation. There being 80 non-unionists (or men "out of compliance") at the Cwmaman Colliery, nearly 2,000 have stopped work in order to force these into the organisation, although many of the 80 are members of the Gas Workers' Union. Resolute insistence is being made upon the decision that all the men shall belong to one trade union—i.e., the Miners' Federation. On Monday the whole of the men—about 5,000 in number—at the Powell Duffryn collieries, in the Aberdare district, also came out in protest against non-unionists.

All the men at the Cambrian Combine pits were idle on Wednesday, they having determined upon going in procession to Pontypridd, where some of their number had to appear at the police court in answer to summonses for absenting themselves from work at the Naval Collieries.

The most remarkable stoppage was that at Clydach Vale (Cambrian pits) on account of a complaint concerning the action of a policeman who had visited a workman's home upon some matter relating to a pay ticket. Between 3,000 and 4,000 men ceased work, in protest. Mr. D. A. Thomas, head of the Combine, has pointed out that the grievance is not one for the employers to deal with; it was a matter for the police court. "The men ought to know by this time that they are not dealing with a management likely to be diverted from what they consider right by any pressure of this kind. If the men stay out for 10 years it will make no difference." They lose, he added, £8,000 to £10,000 a week in wages, while the company will be compensated by the Coalowners' Association. Large quantities of coal taken off the market would certainly not weaken the price; but from any increased price the men would derive no advantage, seeing that they were now being paid at the maximum.

The effect of these stoppages cannot fail to be serious in respect of the foreign trade, because they create abroad, just at the time when forward contracts are being made, a feeling of uncertainty as to future delivery; and, inasmuch as the merchants protect themselves by strike clauses, the buyer has to protect himself by purchasing at least a material proportion of his requirements in markets—such as Germany—that are not so subject to these risks.

A feature of South Wales experience in relation to colliery affairs is the constant discussion which appears in the local Press; not merely reports of accidents, strikes, &c., but repeated statements of the economics of the industry. Originating largely from the fact that so many of the undertakings, being in the hands of limited liability companies, have their accounts made public, their shareholders' meetings reported, and their working criticised, the discussion is followed up with special articles that set out all the considerations applying from different points of view. No statement of importance is made without prompt comment succeeding it; and some of the writers are evidently experts at their self-imposed task. As a consequence, the general body of readers become well informed, if only a little trouble be taken to understand the points at issue.

It is surprising to read that in a railwaymen's meeting in Neath, last Sunday, one speaker said that (in railway work) "for every £1 the honest indispensable toiler received, the fat lazy shareholder received £6." Such nonsense would not be heard at a miners' meeting without scathing exposure, for the unending discussions have made it clear that of the total value of coal at the pit mouth, 75 to 80 per cent. goes in wages; and that out of the balance has to come all costs of administration, sales, rates and taxes, &c.

Only this week appeared a prompt reply to one miners' leader who made assertions that were faulty, and based upon them an argument which, of course, fell to the ground as soon as the errors of fact were disclosed. He declared that since the conclusion of the existing agreement in April 1910, the market price of coal had risen 3s. per ton; and that this increase applied to the whole "output of about 1 million tons per week," and added: "Thus, while the owners have had an increase in the selling price amounting to 3s. per ton, the workmen have received only a paltry advance in wages of 10 per cent.," which he estimated to amount to less than 2d. per ton for the coal hewer.

Occasionally, shortsighted observers blame the newspapers for publishing such statements. But there remains the fact that such ideas do exist, and are promulgated; and, just as the speaker at the railwaymen's meeting may have honestly believed that the shareholder received £6 to the wage-earner's £1, so there are miners who would accept the statement—made in equal sincerity, for it was published openly—that whilst coalowners get 3s. additional price, the cutter of the coal gets less than 2d. increase in his wage rate.

Publication of the glaring mis-statement brought immediate reply. He had taken the average price of the earlier date (which included contract rates) and was comparing it with to-day's current sales, instead of recognising that the day-to-day sales are of relatively small quantities and are necessarily at much higher rates than the coal delivered on long-term contracts, which forms the great bulk of the deliveries. In addition, he had mis-stated the average price in April 1910, putting it 9d. lower than it actually was, and had given present-day prices 6d. to 9d. above what they will, upon audit, probably prove to be. Other factors applied to the error; and the average increase in the three years is believed to be only 1s. 3d. to 1s. 6d. But against this has to be set a heavy decline in the values of "smalls," the price of these coming into the average; and another very weighty influence upon profits has been the general increase in the cost of production—not alone in the cost of stores and other requirements, but also in rates and taxes, in lessened output per head, and in charges that had to be met in other directions. True, there has been an increase of profit, but that "3s. per ton" vanished into thin air directly it was scrutinised.

Few better examples of the value of free and full discussion have been afforded than by this instance. To stop the dissemination of mischievous errors of this sort is most serviceable—to the miners above all persons, for they have most to lose when misleading statements induce ill-considered action. Labour unrest is best prevented by spreading knowledge of facts.

The proceedings of the Merthyr Assessment Committee bring into prominence the very unsatisfactory method of assessment which exists in this country. For example, a clergyman was in the chair, and, without in the slightest degree depreciating that gentleman's business qualities, it can scarcely be maintained that a training in theology, though combined with experience in parish administration, is exactly the way to arrive at qualification for assessing electricity plant, &c.

The Powell Duffryn Company were represented before the committee by Mr. Kenshole, who sought to obtain a reduction in the rating of their electricity plant at Penallta Colliery, Gelligaer; and as it involved a principle that may have larger consequences hereafter, the matter attracted considerable attention.

Mr. Kenshole stated that the assessment must have been made under a misapprehension. It was £150 gross and £50 ratable, upon generating plant, with cables and poles, supplying power from the colliery at Penallta (in the parish of Gelligaer) to the new Britannia pit sinkings at Pengam (in the parish of Bedwellty). The company had linked up their generating plant with all their collieries in both parishes, and the installation is interchangeable. The company, said Mr. Kenshole, did not see why they should be charged in respect of the cables and poles which conveyed the power to Pengam, seeing that although the coal would be brought to bank in Bedwellty Union, much of it would be mined from the Gelligaer parish, and, therefore, would be rated to Gelligaer. Mr. Kenshole said if they were raising coal at Pengam only for Bedwellty parish, and operating with power from Penallta, he would agree that they might be assessable; but he asked the committee to have regard to the object in sinking the Britannia pit—namely, to raise coal in both parishes.

One of the members of the committee, questioned whether they could assess power which was used only for sinking purposes, and the clerk observed that during sinking no assessment was made on winding engine plant, for the reason that until coal was being mined there was nothing to assess. After a long argument, however, the assessment was confirmed.



Another item of business before the committee was an instruction to the overseers to deal with the assessment of the Powell Duffryn Company's colliery at Bargoed. The payment is on 6d. per ton at present; and it was said that these are the most modern pits in the country, with a daily output of from 2,000 to 2,500 tons. The Rhymney Company, with pits in the same locality much more difficult to work, have an assessment which works out on 6d. to 9d. per ton; and it was this contrast which has led to the instruction to the overseers.

Before the same committee came up a resolution which was passed at a conference of representatives of boards of guardians held at Neath in March last. This resolution urged the assessment committees throughout South Wales and Monmouthshire to adopt the imperial instead of the "long" ton in the rating of collieries; and reports from the assistant-overseers were now submitted to the committee showing that the following increases of ratable value would be brought about by this change:—Merthyr, £7,064; Aberdare, £7,150; Gelligaer, £8,904; Rhigos, £243—making a total of £23,361.

Mr. James, the clerk to the committee, said that the imperial ton had been adopted in assessments at Bridgend, Newport, Gower, Swansea, Neath, Pontardawe and Llanelly unions; whereas the "long" ton prevailed in the Pontypool, Bedwellty, Pontypridd, Abergavenny and Merthyr unions; and he said that in Merthyr alone the County Council was losing £23,000, which ought to go into the county basis. It was decided by the committee to call a conference with the coalowners upon this subject.

A curious effect of the Eight Hours Act was stated by the licensee of a public house at Aberdare, who declared that his trade had diminished by half. Asked how he accounted for this reduction, he attributed it to the places of amusement, and added, "Since the Eight Hours Act we don't do the trade we used to."

The question of hydraulic stowing in mines is engaging special attention, because of the interest manifested by Glamorgan mining students in what they witnessed during their recent tour in Saxony, and also because Mr. James B. Davies (said to be the inventor of the system) has been recently on a visit to South Wales. The *Colliery Guardian* gave the earliest report of the adoption of this system in Pennsylvania, and Mr. Davies, who is a Welshman, preserves his copy of this periodical containing the account sent across by its New York correspondent.

There seems to be a practically unanimous agreement that the system is advantageous, the chief adverse criticism being that it is costly. The arguments in favour are that it practically prevents subsidence, the limit probably being 10 per cent., and as a matter of ordinary practice it is singularly successful. In South Wales, however, the need for preventing subsidence may not be so great as in districts where the seams are nearer the surface; for the depth of the workings in the greater part of the coalfield makes serious subsidence unlikely, although there are certain areas—in the Rhondda, for example—where working of upper seams has had grave results—Ystrad Police-court building being a conspicuous instance.

Another argument in favour is that at present a good deal of coal is lost which could be worked were it not for the necessity of leaving barriers between properties, &c., and also the pillars. If compensation for damage by subsidence had to be generally paid, then the system of hydraulic stowing would doubtless come into greater prominence. It is argued further that fractures are sometimes set up owing to the presence of pillars, these being more injurious than otherwise to the surface; and that in such cases the introduction of the stowing system would prove effective.

One great advantage would be the freedom from gob fires or from accumulations of gas in the gob cavities.

Prof. Galloway, who has given expression to his opinion on the subject, mentions that the cost in some cases has been as low as 5d. per ton of coal worked, but it has run up to 1s. per ton. He considered, however, that the saving in timber and repairs appeared to be sufficient to meet this cost. "The amount of compensation paid in some parts of South Wales for damage to houses caused by subsidence has been so great as to necessitate abandonment of the coal," and he himself has had occasion to advise colliery proprietors that they should cease working coal under villages for that reason. With the adoption of hydraulic stowing, however, the working of coal could be continued in such cases without any damage being caused to the buildings on the surface. In many parts of the workings in the South Wales district it might be difficult to apply the system. There was a further objection in some cases that water would cause the floor of the mine to "puck," and would give rise to difficulties which did not occur so long as it remained dry.

He added that in the case of certain German mines the company had bought old rubbish tips 12 miles away; and, even then, it paid them to convey this stuff to the underground workings so as to fill up thoroughly any vacant space. Singularly enough, the system has not yet formed the subject of formal discussion at meetings of the South Wales Institute of Engineers, although it has been mentioned more than once.

One more "garden village" scheme has been initiated for South Wales, a fine site at Gorseinon, near Swansea, having been secured in close proximity to the collieries. The total cost is estimated at £68,000, of which £43,000 has been secured from the Loans Commissioners, repayable in 40 years, bearing 3½ per cent. Provision is made for the tenants to become shareholders and ultimately owners. At present development of the district is so rapid that there is a serious dearth of residences for wage earners, two or three families occupying one small house; and the demand by lodgers is heavy and continuous.

Another meeting has been held by the committee appointed to deal with the question of the trimmers' Saturday half holiday, and it was decided to call together all signatories to the trimming tariff.

In the course of the developments at Blaencwm Colliery, Cwmtwrch, Swansea Valley, the first of the expected seams has been reached; but the better seams lie below, and sinking is being continued in order that these may be reached.

During a meeting of colliers at Ruspridge, Cinderford, it was stated that during the past few weeks 800 new men had joined the union. Notwithstanding the recent advance of 5 per cent., dissatisfaction is reported to exist still, it being considered that the percentage should exceed 40.

Sir Alfred Mond, M.P. for Swansea, intending to leave this week for Canada, a deputation representing tin-plate manufacturers has waited upon him, asking that he will set before the Dominion Customs authorities some of the considerations that affect American competition with Wales. It is urged by the Welsh makers that the regulations as to imports of American tin-plate have been misread by the Canadian officials. The deputation consisted of Mr. F. Gilbertson, Mr. Beaumont Thomas and Mr. Clement; and Sir Alfred promised to put forth his best endeavours in regard to their desired object. Few public men possess Sir Alfred's knowledge of the economics of industry, and fewer still are endowed with his power of lucid presentation of a case affecting business; and the trade is, therefore, very fortunate in enlisting his services.

## MINING AND OTHER NOTES.

We understand that representatives of Messrs. Dorman Long and Co., the well-known ironmasters of Middlesbrough, have visited Dover in connection with the seam of iron ore opened out when the shaft at the Shakespeare Cliff Colliery was sunk; but the result of the visit is not yet known.

An important matter was raised at an inquest held at Ashington on Tuesday, September 23, on the body of Joseph Cockburn, a stoneman, 39 years of age, whose dead body with his head blown off was found in his house at Hirst on September 11. Evidence was given that the deceased man had worked as a stoneman in Ashington colliery for five years, but he had constantly complained that the fumes from the high explosives affected his stomach and nerves. He continued at his work until November last year when he became insane, and was sent to Morpeth Asylum, where he remained until August of this year. He started labouring work after his return, but complained of his head. Searching questions were put to the doctor to prove that the insanity was produced as a result of the inhalation of the fumes of rippite. Dr. Forgie, however, stated that there was absolutely no evidence in the body after an analysis of the blood had been made to prove such an assertion. There was nothing to indicate that carbon monoxide poisoning had ever been present in the body. He admitted, however, that after so long a period during which the deceased had not worked in the pit, it might have been possible for all traces of previous poisoning to have disappeared. The jury returned an open verdict.

The new session at the Nottingham University College commenced on Monday for evening students, and day classes will be resumed on Monday next. The work of the mining department has increased still further during the year. Six distinct courses of work are now being conducted regularly by the department and by it much of the analysis of mine air for the district is done. The Saturday afternoon course now extends over four years. There is urgent need for the provision of further accommodation for this rapidly-growing department. The colliery proprietors and royalty owners of the district have promised to contribute a sum of £300 per annum towards its support.

Mr. Hugh Watts, of St. Lawrence, Chepstow, and late of King's Acre, Newport, a director of Messrs. Watts, Watts and Co. Limited, coal and ship owners, of London, Cardiff, Newport, Liverpool, Newcastle, Glasgow, Algiers, and elsewhere, who died in London on June 28, aged 41 years, left estate valued at £184,455 gross, of which the net personalty has been sworn at £175,533. He empowered his trustees to continue his investments in various coal and goldmining and shipping undertakings, and especially in Messrs. Watts, Watts and Co. Limited, in the United National Collieries Limited, and in the Britain Steamship Company Limited, directing that any income from these undertakings in excess of 5 per cent. should, during the 21 years following his decease, be treated as an addition to capital.

Three electrically-driven band conveyors for the shipping of coal into vessels have recently been brought into operation at the Tyne Improvement Commissioners' Nos. 1, 2 and 5 river staiths, Whitehill Point, North Shields. Each of the belts is worked by a 20-horse power electric motor and the travelling, lifting and slewing of the machine are effected by independent motors of smaller power. The maximum height from which coal can be shipped by means of the conveyor at No. 5 staith is 46 ft. above high water of ordinary spring tides. In the case of the conveyors at Nos. 1 and 2 staiths, the maximum height is 39 ft. The heights measured above low water of ordinary spring tides level are 15 ft. more than the figures given. The conveyors have been constructed by the Commissioner's staff, the motors being supplied by the Sunderland Forge and Engineering Company Limited. The Tyne Commissioners have now six band conveyors in use at the Albert Edward Dock and the river staiths.

At the British Association, Mr. W. Wickham King and Mr. W. J. Lewis contributed a joint paper on "The Discovery of Lower Carboniferous Grits at Lye, in South Staffordshire." They mentioned that recently they had ascertained that at Lusbridge Brook, Lye, below the thick coal, carboniferous beds were exposed for a thickness of nearly 400 ft. as compared with 200 ft. at Saltwells.

Messrs. Bell Bros. Limited, of Middlesbrough, have placed an order for a plant of 72 Collin regenerative coke ovens with by-product plant on the direct process, also benzol and tar distillation plants, of a capacity of 3,000 tons of coke each week, with the Coal Distillation Company, Middlesbrough. The ovens will be constructed so that they can be fired either with coke-oven or blast-furnace gas, in which case, either part or the whole of the gases from the coal in the coking process will be available for the steel plant connected with Messrs. Bell Brothers' works. The Coal Distillation Company have also booked an order for 50 Collin regenerative ovens with by-product recovery plant for the Kramatorskaja, of Southern Russia.

At a sitting of the Valuation Court for the Middle Ward of Lanark, Messrs. James Dunlop and Co. Limited, Clyde Ironworks, appealed against an entry of £600 in respect of electrical plant at the works. They claimed deletion of this sum on the ground that the plant was exclusively used in working minerals, which were exempt under the provisions of the 1895 Act. The appeal was ultimately sustained, it being expressly stipulated that the electrical power was to be wholly utilised at the colliery. Messrs. A. G. Moore and Co., Blantyre Ferme Colliery, at the same court sought a reduction from £301 to £458 in the valuation of the minerals at the above colliery. It came out that the assessor had made his calculations on the basis of 7d. per ton for minerals, whereas the appellants desired to have these returned at 4d. per ton. Eventually, the court fixed the rate at 5d. per ton.

During the meeting of the British Association at Birmingham last week an excursion took place in the afternoon to Hales Owen and the Lutley Valley. The party visited Witley Colliery for the purpose of examining *in situ* the remarkable series of petrified trunks of trees which are there seen embedded in sandstone rocks. This wood has been specifically described by Dr. Arber, who finds it to be a new species of araucarian pine wood of the age of the Upper Coal Measures, and he has named it *Dadoxylon Kayi* after its discoverer.

In view of a new rule in regard to signalling in mines, which is to come into operation next year, a Mansfield electrician, Mr. J. E. Thompson, who is engaged at the Sherwood Colliery, has just made application to patent a contrivance which promises to be of the most useful service. The invention has been in operation experimentally at Sherwood Colliery for 13 months, and so accustomed have the winders become to its use that they would not care to wind without it. When the winder receives a signal from the pit bottom a square lamp fixed in the engine-house wall, immediately in front of him, lights up, showing the letter B, and the signal from the top of the shaft lights up another showing a letter T. Consequently the winder receives not only the bell signals, but the visual ones.

The pending retirement next year of Capt. H. V. Hart-Davis, chief agent to the Earl of Ellesmere, who is the largest private colliery owner in Lancashire, and one of the biggest landowners, is announced. Capt. H. V. Hart-Davis has occupied the position since 1903, when the great Bridgewater Trust (which had lasted exactly 100 years) expired. He will be succeeded by Mr. Charles Hardy, who married Lady Catherine Egerton, fourth daughter of Lord and Lady Ellesmere. Mr. Hardy is a member of the family who for many decades have controlled the extensive Lowmoor Ironworks, Yorkshire.

In a paper on "The Fossil Floras of the South Staffordshire Coalfield," read in the geological section of the British Association, Dr. E. A. Newell Arber said the rich series of floras of the district had suffered much unfortunate neglect in the past. Several collections had, it was true, been made from time to time, but with very few exceptions they had never been described, and some of them were without proper records of locality and horizon. Attention had been chiefly concentrated so far on the floras of the brick clays, and of the lowest beds of the productive measures on or about the horizon of the bottom coal. A considerable number of



cies had been obtained from both horizons, of which some were new records, both to the coalfield and to Britain. This work was still in progress. Information had also been obtained as to the horizon and localities in which the petrified specimens, long known, from this coalfield occurred, such information having been lost for many years past. It was hoped that in course of time it would be possible to trace the floras systematically from the lowest to the highest beds of the coal measures of that coalfield. The material, however, had to be obtained as opportunity offered.

It is officially announced that Mr. J. M. Allan, managing director of Messrs. Hawthorn, Leslie, and Co.'s engineering works at St. Peter's, Newcastle-on-Tyne, has been appointed to the position of managing director of Messrs. Cammell, Laird and Co.'s works at Sheffield and Penistone.

At the Lanarkshire Middle Ward Valuation Court both the United Collieries Limited and the Glasgow Iron and Steel Company Limited appealed against their being entered on the roll as occupiers of workmen's houses, while the workmen's names were entered as inhabitant occupiers. The court dismissed the appeals, maintaining that the houses were held by virtue of service and employment. A stated case was asked for by the appellants.

Operations have just been commenced a few miles beyond Knowsley by the Mountain Mine Colliery Company Limited, of Upholland. This company has been privately formed almost entirely with Liverpool capital, amongst those associated with it being well-known shipowners, cotton brokers, tar distillers, coal merchants, &c. The *raison d'être* of the company is to carbonise coal from the Mountain Mine seam, which outcrops in the Upholland district, and for which the company has secured leases extending over a very considerable area. An extensive by-product recovery plant has been erected within a few hundred yards of Upholland station, and connected with the Lancashire and Yorkshire Railway by a siding. In addition to the coke ovens, plant for the recovery of tar and sulphate of ammonia have been erected, and a benzol recovery plant is under contemplation. The producing stage has now been reached.

Messrs. Ed. Bennis and Co., of Little Hulton, are supplying, in addition to numerous other orders, two Bennis stokers—self-cleaning, hand-fired furnaces—each to the Lofthouse Colliery, near Wakefield, and the Easington Coal Company, South Durham.

Mr. J. J. Holroyd, late of the Hickleton Main Colliery, has been appointed under-manager at the Denaby Main Colliery. Mr. Holroyd started as a pony driver at Tankersley when he was 13 years of age and gradually worked himself up through the various grades. Having had a varied practical experience of 23 years under Messrs. Newton, Chambers and Co. Limited, in the Silkstone, Parkgate and Thurnscoe seams, he obtained his under-manager's certificate at Leeds, in 1903.

The High Hazel seam at the Rufford Colliery was reached last week, and probably by the end of October the Deep Hard will be tapped, so that everything points to the colliery coming quite up to expectations. If the seam proves to be a good one, the owners of the coal on the Farnsfield side will probably commence sinking at some future date. Everything points to big developments eastwards of Mansfield, and it is pretty certain that before many years have elapsed the coalfield for miles in the Lincoln and Newark direction will be tapped.

The dam on the canal between Pommerveul and Autoing, near Mons, gave way recently over a length of about 40 ft. A terrific mass of water burst through and flooded the country, penetrating the coalmines and buildings. The canal is now dry for a distance of about 6 miles.

Complaints of alleged jerry building at the new colliery village of Rossington were made at last week's meeting of the Doncaster Rural District Council. The surveyor remarked that in many respects the houses did not comply with the by-laws. The Council resolved that proceedings be taken in instances where offences had been committed. It was reported that the Local Government Board had been asked to sanction the loan of £3,990 for sewerage works at Rossington. A contract for the work had been let at £4,450, so the Board will be asked to increase the loan.

Objections to colliery companies as landlords were voiced at last week's meeting of the West Riding Standing Joint Committee. There was a recommendation to pay increased rent in respect of two houses occupied by constables at Dalton Brook, near Rotherham, owing to sanitary improvements which had been carried out. Mr. Herbert Smith, president of the Yorkshire Miners' Association, stated the houses were owned by the colliery company, and policemen should be absolutely independent of employers of labour. Mr. J. Guest, vice-president of the Yorkshire Miners' Association, agreed, and remarked that a constable who lived under a colliery company was undoubtedly to some extent under that company's influence. An amendment to refer the matter back was, however, defeated.

The Oughterside Colliery, near Maryport, are now waiting the arrival of the belated connecting main to light up their battery of 30 new by-product ovens, which will be in use in Cumberland and to 320, a striking growth of the new industry within the short years. The ovens lighted, and about to be lighted in Cumberland are Harrington 100, Moresby 60, St. Helens 40, Flimby 40, and Oughterside 30,

a total of 350. The Whitehaven Company are also to have a coke oven plant, so that in a very short time, local smelters will be able to get all the coke they require at home. This new industry has been of much benefit to West Cumberland; it has helped the local collieries by providing them with a market for their small coal and making the working of their small seams profitable, and it has given birth to the chemical industry at Maryport and Workington. Cumberland coal treated in by-product ovens yields a fair smelting coke, and is rich in by-products, the production and treatment of which is building up a lucrative and growing industry.

### THE FREIGHT MARKET.

There has been a moderate amount of activity in the outward freight market this week. On the north-east coast, Mediterranean rates are rather stronger at from 10s. to 10s. 3d. to Genoa from the Tyne, but rates in other directions tend to ease. Coasting business is being done at from 3s. 6d. to 3s. 7½d. to London, and from 3s. 9d. to 4s. to Hamburg. The Bay is based on 6s. 6d. to Bordeaux, and the Baltic is quoted at from 5s. 10½d. to 6s. to Cronstadt. At South Wales, chartering is moderately brisk. Mediterranean rates are a shade firmer for handy prompt tonnage, and steady for large vessels. South America is quiet. The coasting ports are firm. The Bay is weaker. There is not much doing at the Clyde or at Hull. Home-wards, the demand for tonnage at the Black Sea is improving, grain coming forward from the interior in larger quantities, and South Russia and the Azof are now open for both prompt and October berth sizes at an advance of 3d. Tonnage is in fair supply. The Far Eastern market is quiet. Very little is being done for the River Plate, and rates are in charterers' favour. America has only a small enquiry. The Mediterranean and ore ports are steady. The Baltic is unaltered.

Tyne to Antwerp, 1,600, 4s. 10½d.; Alexandria, 4,500, 9s. 1½d.; 500; Algiers, 2,000, 7s. 10½d.; Bordeaux, 2,500, 7s. 600, 10½d.; 3,200, 6s. 6d.; Bas Indre, 2,700, 6s. 6d.; Cronstadt, 2,900, 6s.; 4,000, 6s.; Genoa, 4,800, 9s. 4½d.; 500; 3,500, 9s. 6d.; 4,700, 9s. 9d.; 3,200, 9s. 9d.; 4,000, 10s.; 3,200, 10s.; Gibraltar, 2,500, 9s.; Havre, 2,000, 4s. 9d.; from Dunston; Helsingfors, 1,100, 5s. 9d.; Hamburg, 4s. 3d.; 2,100, 4s.; 2,700, 4s.; 1,000, 4s. 3d.; from Dunston; 2,700, 3s. 10½d.; Honfleur, 750, 5s. 6d.; Jersey, 900, 6s.; London, 1,650, 3s. 9d.; 1,500, 3s. 7½d.; 2,700, 3s. 6d.; La Rochelle, 2,200, 7s.; Marseilles, 4,600, 9s.; from Dunston; Norrköping, 1,050, 6s. 1½d.; Nantes, 2,300, 7s. 3d.; 1,700, 7s. 6d.; St. Nazaire, 2,500, 7s.; Piræus, 5,000, 9s. 3d.; Port Said, 4,000, 9s. 6d.; from Dunston; Rouen, 1,500, 5s. 6d.; two loading places; 1,500, 5s. 6d.; Reval, 2,500, 5s. 3d.; 1,700, 9s.; coke; Rochefort, 1,700, 7s.; Riga, 1,600, 6s.; Santos, 5,900, 21s., September; Syra, 5,000, 9s. 3d.; Savona, 4,000, 10s.; Torre Annunziata, 3,200, 10s. 4½d.; 600; Venice, 4,000, 10s. 9d.; Zea, 5,000, 9s. 3d.

Cardiff to Algiers, 4,400, 10 37½ fr., Sept. 27; 3,500, 10½ fr.; 4,000, 10½ fr.; Oct. 1; Alicante, 1,500, 11s. 3d.; Aden, 5,000, 11s. 9d.; Oct. 1-15; Bari and Brindisi, two ports, 4,000, 11s. 9d., end Sept.; Bourges, 3,700, 11s. 3d.; 2,900, 11s. 3d.; Buenos Ayres, 12 cargoes, contract over 1914, 17s. 6d.; Bordeaux, 1,400, 8½ fr.; Bermuda, 2,600, 8s. 6d.; 400, Admiralty; Braila, 4,300, 12s.; Brindisi, 4,000, 11s. 9d., 500, 10d., Sept. 30; Bahia Blanca, 6,800, 22s. 9d., 300, fuel, Oct.; Cronstadt, 2,800, 7s. 3d., end Sept.; 2,900, 7s. 6d.; Campana, 4,000, 23s.; Chantenay, 1,900, 7½ fr.; Cadiz, 2,600, 9s., 250; Constantinople, 4,600, 10s. 3d., Sept. 30; Danube, 4,300, 12s.; Dieppe, 1,400, 5s. 4½d.; 1,100, 5s. 6d.; Fecamp, 650, 5s. 9d.; Genoa, 5,300, 9s., 700; 5,400, 9s. 3d.; 9s., Oct. 1; 5,900, 9s. 6d.; 6,500, 9s. 6d., Oct. 5; 3,800, 9s. 6d.; Gibraltar, 3,200, 8s. 3d.; 2,700, 6s., Admiralty; 3,200, 5s. 9d., Admiralty; Galatz, 4,300, 12s.; Granton, 1,700, 4s. 9d.; Haida Pasha, 4,300, 10s., Sept. 27; Havre, 3,000, 5s. 3d.; Hayle, 180, 4s. 4½d.; Kustendje, 3,500, 10s. 9d.; Lisbon, 3,300, 7s. 3d., 400; Longhope, 2,350, 6s.; Leghorn, 5,900, 9s. 6d., 500, Sept. 27; 5,800, 9s. 6d., 500, Oct. 1; La Rochelle, 1,800, 7 fr.; Marseilles, 3,800, 11½ fr.; Monte Video, 5,000, 20s. 6d.; 5,500, 20s. 6d., early October; 6,000, 20s. 4½d., October 3; Madeira, 4,000, 9s. 4½d.; Monaco, 2,000, 15 fr.; Nantes, 1,700, 8 fr.; Naples, 5,900, 9s. 6d., 500, September 27; 5,300, 9s. 6d., 500, October 1; Oporto, 1,250, 8s. 3d., 250, end September; 900, 8s. 6d.; 1,500, 8s. 3d.; 1,600, 8s.; Oran, 1,500, 11½ fr.; Piræus, 4,100, 9s.; Port Said, 5,500, 9s. 4½d., September 27; 6,300, 9s. 4½d.; 5,400, 9s. 4½d., September 29; Patras, 1,400, 10s. 6d.; Reggio, 3,500, 10s. 7½d.; River Plate, 5,500, 21s. 9d., September 29; 4,500, 21s. 6d., September 28; 6,000, 21s. 9d.; 6,500, 21s. 6d.; 7,000, 21s.; 21s. 9d., September 27, 6d. less if later than September 29; 5,000, 21s.; Salonica, 3,500, 11s., 300; St. Servan, 2,400, 5s. 6d.; Sabang, 5,000, 13s. 3d.; St. Nazaire, 3,400, 7 fr.; Skien, 2,200, 6s. 6d., 400; Spezzia, 6,500, 9s. 6d., October 5; Savona, 6,500, 9s. 6d., October 5; 3,800, 9s. 6d.; Valencia, 2,000, 8s. 9d., 400, free tax; 1,300, 10s. 9d.; Venice, 6,500, 11s.; 4,000, 11s. 3d., 500; Varna, 3,700, 11s. 3d.; 2,900, 11s. 3d.; West Coast South America, 21s.; Zarate, 4,000, 23s.

Swansea to Rochefort, 2,300, 8½ fr.; St. Malo, 1,200, 5s. 9d.; Fecamp, 750, 5s. 9d.; Rouen, 650, 6s. 3d.; 2,300, 6s.; Belfast, 300, 3s. 9d.; Barcelona, 4,500, 9s. 9d.; Bahia, sail, 1,550, 17s. 6d.; Cagliari, 2,100, 10s. 6d., September 28; Alicante, 1,600, 11s. 3d.; Honfleur, 1,100, 5s. 9d.; Venice, 1,300, 10s. 9d.; Bilbao, 2,000, 7s. 9d., fuel; Sables, 1,300, 8 37½ fr.; St. Nazaire, 3,400, 7½ fr.; 1,100, 7½ fr.; Dieppe, 1,000, 5s. 6d.; Stettin, 2,000, 5s. 7½d.; Bayonne, 2,300, 9 fr. coal, 9½ fr. fuel; Charente, 1,900, 8½ fr.; Calais, 850, 5s. 6d.; Boulogne, 850, 5s. 6d.; Port Said, 4,000, 10s.; Genoa, 3,500, 10s.; Alicante, 1,250, 11s. 3d.; Charbourg, 7,800, 5s. 10½d.; Valencia, 1,000, 11s.; 1,100, 11s. 6d.; Brest, 1,350, 5s. 6d.

Blyth to Norrköping, 1,000, 6s. 1½d.; East Norway, 900, 6s. 4½d., 48 hours; Carthagena, 1,500, 10s. 7½d.; Naksöv, 1,100, 6s.; Nykjobing Falster, 1,300, 5s. 9d.; Riga, 2,000, 5s. 9d.

Hull to Marianople, 4,700, 10s. 9d.; Cronstadt, 3,400, 6s.; 4,000, 5s. 10½d.; Riga, 1,800, 5s. 9d.; Bilbao, 1,750, 8s.; Odessa, 4,300, 9s. 9d.; Middlefahrt, 1,300, 6s., timber; Black Sea, 9s. 6d., 1,000, 9s. 9d., 750, 10s., 550.

Immingham to Pernau, 1,500, 5s. 4½d.

Llanelli to Boulogne, 500, 5s. 6d.

Goole to Swedish Sound, 1,200, 6s.

Wales to West Coast South America and home to United Kingdom-Continent, sail, 42s. 6d. in and out, 43s. stiffened.

Forth to Cronstadt, 2,600, 6s.; 3,600, 6s.; St. Petersburg, 2,000, 6s. 1½d.; Kiel, 1,750, 5s. 10½d.; Kotka, 1,800, 5s. 6d.; Libau, 1,400, 5s. 9d.

Fredrikstad to Melbourne, sail, about 50s.  
Hamburg to San Francisco, sail, 20s., January-February; 20s., general.

Glasgow to Buenos Ayres, 21s., 200, October 1-20; Genoa, 9s. 9d.; Savona, 9s. 9d.; Leghorn, 9s. 9d.

Newport to Marseilles, 3,600, 11½ fr.; Venice, 4,100, 11s. 3d., end September; 6,500, 11s.; Nantes, 2,200, 8 fr.; Bahia Blanca, 19s. 9d., September; Monaco, 2,100, 15 fr.; Ancona, 4,100, 11s. 3d., end September; Genoa, 3,300, 10s. 6d.; Ayamonte, 950, 10s. 9d.; Patras, 1,400, 10s. 6d.; Gibraltar, 2,700, 6s.; Ancona, 4,200, 11s. 3d., 500; Naples, 9s. 3d., 700; 9s. 3d., 800, September; Torre Annunziata, 9s. 3d., 700; 9s. 3d., 800, September.

Bo'ness to Kiel, 1,700, 5s. 10½d.

Seaham Harbour to St. Nazaire, 3,000, 6s. 9d.

Wear to Bordeaux, 2,900, 6s. 6d.; Helsingfors, 1,100, 5s. 9d.; Cronstadt, 4,000, 6s.

Newport River to Algiers, 2,000, 11½ fr.

Port Talbot to Genoa, 5,000, 9s. 3d.; Malaga, 1,500, 10s.; 300, 1s.

Adressan to Torre Annunziata, 3,900, 10s. 6d. coal basis.

Fife port to St. Petersburg, 4,800, 6s.; Lubeck, 2,000, 6s.

Cronstadt, 3,900, 5s. 10½d.; Mentone, 1,400, 13s.

Grangemouth to Kiel, 1,800, 5s. 9d.

Rotterdam to Algiers, 1,750, 10½ fr. steam coals and 650 tons fuel; Port Said, 4,500, 9s. 3d.; Callao, sail, 27s.; Chili copper port, sail, 24s., coke; Bagnoli-Porto Ferrajo, 4,700, 8s. 9d.; Honfleur, 1,420, 5s. 4½d.; Porto Vecchio di Pombino, 5,800, 9s. 3d., end September; Ergasteria, 5,000, 10s. 3d. steam coals, 12s. 6d. coke; Malta, 4,400, 7s. 3d., September 30; St. Nazaire, 3,500, 6s., Trignac terms; 3,200, 5s. 10½d. steam coals, 6s. 7½d. fuel, option Trignac 1½d. extra, beginning of October; Marseilles, 5,200, 11 fr., September 30.

Liverpool to Northern States, about 9s., fertiliser; Canada, 8s. 6d., maize, on d.w.

Hartlepool to Hamburg, 2,100, 4s.; Aalborg, 1,100, 6s. 3d.

Homeward charters.—Potsi, 5,000, Middlesbrough, 15s., early September; 4,400, Rotterdam 14s., Hamburg 14s. 3d., October; 5,500, Rotterdam 14s., Antwerp 14s. 3d., October; Azof, 4,200 max., 15s. n.c., October 1-15; 5,000, Marseilles or St. Louis du Rhone, 13½ fr. one port, 13½ fr. both ports, ppt.; 4,000, 10 per cent., 15 n.c. or any, 15s. 6d. Hamburg, option Kherson, Nicolaieff, Odessa, or Sulina 1s. less, October 8-25; 3,500, 10 per cent., 15s. n.c. or any, 15s. 6d. Hamburg, option Black Sea 1s. less, October 20-November 10; 5,200, Rotterdam 12s. 9d., Hamburg, 13s. 3d., 31. less barley up to 3,000 tons, ppt.; Kherson, Nicolaieff or Odessa, 18,000 qrs., 10 per cent., 400, 14s. n.c. or any, 14s. 6d. Hamburg, October 1-25; 20,000 qrs., 10 per cent., 400, 14s. 3d. n.c. or any, 14s. 9d. Hamburg, barley, October 2-November 8; Nicolaieff or Odessa, 7,400, Rotterdam 11s. 9d., Hamburg 12s., with 3d. less barley, October 15-31; 6,000, Rotterdam 11s. 9d., Hamburg 12s. 3d., with 3d. less barley, October 1-15; Novorossisk or Theodosia, 4,700, Rotterdam 12s., Hamburg 12s. 6d., with 3d. less barley, September; Kherson, Novorossisk, Theodosia, 4,600, Bergen Christiania, basis 15s. one port, October 1-20; 4,800, 14s. n.c. or any, 14s. 6d. Hamburg, ppt.; West Australia, 1,794 net, New Zealand, 33s. two ports, 34s. three ports, October; Rangoon, 3,900 net, United Kingdom-Continent, p.p., basis 26s. 3d. one port, October; Calcutta, 6,000, United Kingdom-Continent, p.p., 23s. 9d. one port, 24s. 6d. two ports, d.w. basis, October-November; 2,676 net, Bombay or Kurrachee, Rs. 7, November; New York, 2,483 net, River Plate, basis 25 e., November; 28½ c., Australia, four ports, November-December; 25 c. two ports, 25½ c. three ports, Saigon, Haiphong or Touraine, October-November; 2,851 net, New Zealand, six ports, 31½ c., October; Wilmington, 3,543 net, Liverpool or Bremen, 30s., October; Gulf, 1,996 net, Holland and Tyne, 105s., late October; San Lorenzo, 4,700, 10 per cent., United Kingdom-Cont., 14s. 9d. o.c., less 6d., early October; 4,700, 10 per cent., 15s. o.c., less 6d., Ireland 6d. extra, France 1s. extra; 4,000, 10 per cent., 14s. 3d. o.c., less 6d., ppt.; Santa Fe, 5,000, United Kingdom-Continent, 21s., quebracho, September-October; 4,000 max., Rendsburg, 23s., quebracho, October-November; Genoa, 4,500, West Hartlepool, 8s. 6d., September; Bizarta, 2,800, Middlesbrough, 9s., f.d., September; Puget Sound, sail, 83s. 9d. United Kingdom-Continent, February; South Australia, sail, 30s. 6d., United Kingdom-Continent, option 27s. South Africa; North Pacific, 38s. 9d., United Kingdom-Continent, spot; Cuba, 9s. 3d., Northern States, ore; Montreal, 2s. 6d., Avonmouth or Rotterdam, 2s. 7½d. other ports; Sulina, 5,200, Copenhagen-Christiania range, 16s. one port, 16s. 3d. two ports, 16s. 6d. three ports, September; 3,200 max., 14s. 6d. n.c. or any, 15s. Hamburg ppt.; Kustendje, 5,500, 12s. 3d. n.c. or any, 12s. 9d. Hamburg, September-October; Kurrachee, 6,300, United Kingdom-Continent, 18s. 6d. one p.p., 19s. two p.p., including Marseilles, October; 2,382 net, 17s. p.p., full cargo barley, October; 5,500-6,000, 17s. 9d. one port, 18s. 3d. two ports, October; Moji, 9s. 6d., Bombay, October; Hornillo Bay, 3,500, Cardiff, 6s. 3d., September-October; Galveston, 2,541 net, Liverpool or Bremen, 32s. 6d., October; Vivero, 4,000, Rotterdam 5s. 4½d., option Emden 5s. 7½d., ppt.; Melbourne, sail, 32s., United Kingdom-Continent, January-February; time charter, Transatlantic trade, 4s. 6d. or 4s. 9d. first month, 4s. afterwards, one trip, delivery New York, re-delivery United Kingdom-Continent; 5s. 6d. one trip, delivery New York, re-delivery United Kingdom-Continent; 4s. 9d., one trip, delivery Gulf, re-delivery United Kingdom-Continent, October; Charleston, 32s. 6d., Liverpool or Bremen; New Orleans, 13s. 9d., Antwerp, net form; Nicolaieff, 6,500, Rotterdam 12s. 1½d., Weser or Hamburg 12s. 7½d., 3d. less barley, ppt.; Vladivostok, 2,180 net, United Kingdom-Continent, 31s. 3d. one port, 32s. 3d. two ports discharge; Benisaf, 4,000, Middlesbrough, 9s. 6d. f.t., ppt.; Sydney, N.S.W., sail, 33s., United Kingdom-Continent; time charter, States and West Indies trade, 3s., one round trip, delivery and re-delivery North of Hatteras; Danube, 3,500, 10 per cent., 15s. n.c. or any, 15s. 6d. Hamburg, option Sulina, Kherson, Nicolaieff, Novorossisk or Theodosia 1s. less, October 25-November 20; 6,000, Rotterdam 12s. 9d., Antwerp 13s., Hamburg 13s. 3d., no reduction barley, cancelling October 10; Kherson, 3,850, 14s. 9d. n.c., ppt.; Fremantle, 3,800, United Kingdom-Continent, 34s., January; Saigon, 5,500-6,000, Havre or Dunkirk, 27s., rice, option full cargo rice meal to Liverpool or Hamburg, 29s. 6d., September-October; Villa Constitution, 2,757 net, Genoa, 17s. 6d., scrap iron, ppt.; Philadelphia, 3,674 net, three ports Japan, 25 c., October; Alexandria, 10s., Hull, ppt.; St. Petersburg, 6,000, 1s. 4½d., London, ppt.



# COAL, IRON AND ENGINEERING COMPANIES.

**Arauco Company Limited.**—Interim dividend of 8s. per share, less tax, on account of current year, payable on October 15.

**Armstrong (Sir W. G.) Whitworth and Co. Limited.**—The directors have declared an interim dividend for the half-year ended June 30 last, at the rate of 10 per cent. per annum on the ordinary shares of the company, 4 per cent. per annum on the £5 preference shares, and 5 per cent. per annum, calculated from the dates of payment of the instalments, on the £1 second preference shares, payable after September 30.

**British Insulated and Helsby Cables Limited.**—Warrants for the interim dividend on the ordinary shares to June 30 have been posted.

**British Westinghouse Electric and Manufacturing Company Limited.**—The directors propose to make another reduction in its capital—this time to the extent of £720,000. An extraordinary general meeting is being held to-day, when the following resolution *inter alia* will be submitted as an extraordinary resolution:—"That the capital of the company be reduced from £1,875,000 (divided into 500,000 preference shares of £3 each and 75,000 ordinary shares of £5 each, all fully paid) to £1,150,000 (divided into 500,000 preference shares of £2 each and 75,000 ordinary shares of £2 each), and that such reduction be effected by cancelling paid-up capital which has been lost or is unrepresented by available assets, to the extent of £1 per share on each of the preference shares and to the extent of £3 per share on each of the ordinary shares, and by reducing each preference share to a share of £2 and each ordinary share to a share of £2." In order to maintain the same relative position of the two classes of shares as it stood at the incorporation of the company, it is proposed that the rate of dividend be increased as follows: On the preference shares from 10 per cent. to 15 per cent., and on the ordinary shares from 12 per cent. to 30 per cent.; the division of any surplus profit between the two classes of shareholders remaining as at present, viz., one-fourth thereof among the preference and three-fourths among the ordinary shares. The result would be that before division of surplus profits the preference shares will be entitled to the same amount of preferential dividend, viz., 6s. per share, and the ordinary shares to the same amount of dividend, viz., 12s. per share, as they were respectively entitled to at the date of the incorporation of the company. In the event of liquidation the rights of the two classes of shares remain as at present, so that the preference shares shall first receive £5 per share before any distribution is made to the ordinary shares.

**Cammell, Laird and Co. Limited.**—The directors have declared an interim dividend of 2½ per cent., less income-tax, on the cumulative preference shares of the company, payable on October 4 next.

**Cleathero (E. T.) and Sons Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of manufacturers of machinery, mechanical, electrical and consulting engineers, and to enter into an agreement with George Wishart. First directors: J. T. Cliffe, Avondale Park-avenue, Ashton-on-Mersey; William J. V. Fowden, 30, Church-street, Altrincham; and John Bernard Cleathero and E. T. Cleathero, both of "The Hollies," Barrington-road, Altrincham.

**Coltress Iron Company Limited.**—The profits for the year ended July 31 amount to £157,107. The directors recommend, in addition to the usual dividend on first and second preference, the payment of a dividend on the ordinary shares of 8 per cent. per annum, less the interim distribution made in April, together with a bonus of 7 per cent., making 15 per cent. for the year. They further recommend writing off £45,834 for the redemption of depreciation, the addition of £3,000 to the blastfurnaces relining reserve fund, and £30,000 to the ordinary reserve fund, carrying forward £17,053.

**Curtis's and Harvey Limited.**—Interim dividend of 3 per cent., less tax, on account of the current year, payable on September 30. A year ago no dividend was paid.

**Dominion Steel Company Limited.**—The Bank of Montreal has been instructed to notify that the directors have declared a dividend at the rate of 1 per cent. upon the ordinary shares.

**East Kent Colliery Company Limited.**—With reference to the issue of £150,000 10 per cent. debentures, the company has issued a supplementary circular announcing that the large holders of vendors' shares have expressed their willingness to contribute to the success of the issue and, to that end, with the object of making the terms of subscription more attractive, have placed at the disposal of the directors 5,000 vendors' shares, which are now offered *pro rata* at par (1s.) to the allottees of the first £100,000 debentures, being five vendors' shares at par for every £100 subscribed. It is recalled that the capital of the company comprises £490,000 in 5s. ordinary shares, of which £475,113 have been issued, and £10,000 in 200,000 vendors' shares of 1s. each, which latter are entitled to 50 per cent. of the profits after a preferential 10 per cent. has been paid on the ordinary shares.

**Ebbw Vale Iron and Coal Company Limited.**—A special meeting was held in London on the 17th inst., Mr. J. Brailsford presiding. The chairman proposed that the capital of the company be increased from £968,175 to £1,000,000 by the creation of 4,200 new ordinary shares of £1 each and 5,525 6 per cent. cumulative preference shares of £5 each. He also proposed that each of the present £13 shares be subdivided into eight ordinary shares of £1 each and one 6 per cent. cumulative preference share of £5. The chairman said it was wise and prudent to bring the capital up to £1,000,000. The new shares could not be allotted to shareholders in proportion to their present holding. The resolutions were agreed to.

**Elands Laagte Collieries Limited.**—Dividend of 2½ per cent. The date of payment has not yet been fixed.

**Eloesser Steel Driving Belt Limited.**—This private company has been registered, with a capital of £15,000 in £1 shares, to enter into an agreement with Eloesser-Kraftband-Gesellschaft, Charlottenburg, Berlin, Germany, and to carry on the business of engineers, founders, toolmakers, metal workers, boilermakers, iron and steel converters, electrical engineers and dealers in machinery. First directors include: E. Walthew, Green Moor, Buxton, Derby-

shire; L. W. Shepherd, Saxonhurst, Davenport, Stockport; Frank Bates, Grantham-gate, Stockport; and Bernard Kruger, Woodland-crescent, Hilton Park, Prestwich.

**Glenboig Union Fireclay Company Limited.**—The accounts for the year ended August 31, after providing for maintenance of works and for current charges, and including £3,064 brought forward, show a gross profit of £57,226. The directors recommend the following apportionments of the available total of £42,226, viz.: writing down cost of electric plant £3,000, writing down investments in Consols £3,000, a dividend of 10 per cent. (£15,000), a bonus of £1 per share (£15,000), and carrying forward £2,226. The dividend for the year is 30 per cent.

**Hyflo-Gould Limited.**—This private company has been registered, with a capital of £4,200 (4,000 ordinary shares of £1 each, and 4,000 founders' shares of 1s. each), to carry on the business of mechanical, consulting and heating engineers, electricians, &c. First directors: Alfred Ernest Wheeler, 12, Theobalds-road, W.C., Herbert William Gould and Charles Jules Gould, both of 1, All Souls-avenue, Willesden, N.W. Registered office, 12, Theobalds-road, Holborn, W.C.

**Lyon (C. W.) Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire the business of engineers and ironfounders lately carried on by Charles Wm. Lyon at Thornhill Lees, near Dewsbury, York, under the style of "Chas. Wm. Lyon" also to carry on the business of brass founders, iron and steel cable makers, tool makers, metal workers, manufacturers of agricultural and other implements, and steel converters, &c., and to enter into an agreement with John Lyon and Joseph W. Hare. First directors: John Lyon, Hebble-terrace, Thornhill Lees, Dewsbury; and George K. Rogers, Grove House, Thornhill Lees, Dewsbury.

**Mechanical Engineering Patents Limited.**—This private company has been registered, with a capital of £50,000 in £1 shares, to carry on the business of ironfounders, mechanical engineers, toolmakers, brassfounders, metal workers, iron and steel converters, electricians and electrical engineers, and to carry on any business relating to the winning and working of minerals. Signatories: Harry E. Barley, 3, Paper-buildings, Temple, E.C., and W. V. Gilbert, 195, Victoria-street, S.W.

**Mineral Estates Company Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of colliery proprietors and coal merchants, mechanical engineers and metal workers, &c. Signatories: Robert C. Lindsay-Brabazon, Ionna Vicarage, Neath, and Thomas Andrew Flynn, Lenrs-road, Neath. Registered office, Victoria-chambers, Neath, Glamorgan.

**New Hunknall Colliery Company Limited.**—The directors have declared a third interim dividend of 5 per cent. on the ordinary shares of the company, payable on November 1, free of income-tax. On July 11 the directors paid a second interim dividend of 2½ per cent.

**Palmer's Shipbuilding and Iron Company Limited.**—The forty-eighth annual report states that the accounts show that, after providing for the cost of upkeep and repairs, there is a trading profit for the year of £36,262 4s. 10d., as against £660 12s. 8d. for the previous year. Debenture and other interests amount to £33,994 13s. 10d., leaving a net profit for the year of £2,267 6s., as against a loss of £31,580 3s. 11d. in the previous year. The cost of the National Insurance Act to this company for the year has been £7,360. The directors have appointed Mr. G. Mure Ritchie chairman of the company in succession to the late Lord Furness. The vacancy created by the death of Admiral Douglas has been filled by the election of Mr. Claude G. Bryan, and in accordance with the articles of association his election will be submitted to the shareholders at the annual general meeting for confirmation.

**Partington Steel and Iron Company Limited.**—The balance-sheet shows that the whole of the subscribed share capital of £350,000 6 per cent. cumulative preference and £250,000 ordinary shares has been paid up, and that £77,865 has been received in respect of £150,000 5 per cent. first mortgage debenture stock.

**Pearson and Knowles Coal and Iron Company Limited.**—The report states that the profits for the year ended June 30, 1913, amount to £118,870 3s. 9d., and the balance brought forward from last year is £13,822 16s. 6d., together £132,693 0s. 3d. An interim dividend at the rate of 6 per cent. per annum on the first and second preference shares, and 6 per cent. per annum on the ordinary shares, was paid in March last for the half-year ended December 31, 1912, amounting to £28,250. The directors now recommend that a dividend be paid for the past half-year at the rate of 6 per cent. per annum on the first and second preference shares, and 10 per cent. per annum on the ordinary shares, making with the interim dividend 8 per cent. for the year, and a total distribution of £67,988 6s. 8d. The directors further recommend that £30,000 be added to the reserve fund, raising it to £382,500; that the sum of £15,156 7s. 5d., which represents the expenditure on capital account for the year, be written off, leaving a balance of £19,548 6s. 2d. to be carried forward. The directors consider it prudent to recommend substantial allocations to reserve in view of the company's investment in the shares of the Partington Steel and Iron Company Limited, and to the guarantees undertaken on its behalf. The company holds all the ordinary shares in the Partington Steel and Iron Company Limited, amounting to £250,000, which are fully paid up. The works are now rapidly approaching completion, the coke ovens and two blastfurnaces are already working satisfactorily, and it is anticipated that the remainder of the plant will be in full operation before the end of the year. All departments of the company's business show satisfactory results for the year, although a serious check in demand and a fall in prices occurred in the June quarter mainly due to the effects of the Balkan war, which adversely affected the iron and steel trades. These unfavourable conditions still continue—the coal trade, however, maintains its position. As was anticipated, the National Insurance Act has added largely to the cost of production without, in the experience of the board, resulting in benefit to the company's workmen proportionate to the expense. In normal times the contributions will be a serious tax upon wages as well as upon profits. The board are of opinion that a scheme administered in conjunction with old-age pensions, and deriving its revenue from the same source, would be worked with greater efficiency and economy, would distribute the

burden more equitably among the various classes of the community, and do much to remove the present admitted hardships and discontent.

**Sandwich Freeholds Limited.**—This company has been registered, with a capital of £20,300 (20,000 shares of £1 each, and 6,000 shares of 1s.), to acquire coalmines, and to carry on the business of colliery proprietors, manufacturers of patent fuel, ironmasters, steelmakers and converters, miners and smelters, &c. Minimum cash subscription, 20 per cent. of the shares offered to the public. Signatories: William Russel, 2, Wardrobe-place, E.C.; E. Mills, 48, Ardens-road, Brixton Hill; W. Godwin, 11, Grand Parade, Mitcham; Charles H. Friday, 2, Hichison-road, Peckham Rye, S.E.; and H. M. Dupree and E. A. M. Dupree, both of 19, Milton-avenue, Highgate, N. Qualification of directors not yet appointed, £100.

**Sheepbridge Coal and Iron Company Limited.**—The forty-ninth annual report states that the net profit for the year ended last June amounted to £244,996 6s. To this has to be added the balance brought forward, viz., £23,928 18s., making the total £268,925 4s., out of which dividend has been paid totalling £71,706 10s., leaving the sum of £197,218 14s. The directors recommend that this sum be appropriated as follows:—Final dividend, making 20 per cent. for the year, less income tax, payable October 1, on 549,700 ordinary shares at 2s. each, £54,970; 112,275 cumulative preference shares at 2s. each, £11,227 10s.; 137,725 cumulative preference shares at 9d. each, £5,509; amount to be retained towards the development of new properties, £100,000; and balance carried forward to next year, £25,512 4s. During the year there was a strong demand for coal of all qualities, which enabled higher prices to be realised. The incidence of the Coal Mines Act, 1911, the National Insurance Act, 1911, and the Coal Mines (Minimum Wage) Act, 1912, have materially added to the cost of production. The Newstead and Dinnington collieries have contributed substantially to the profits of the company. The Maltby Colliery has made considerable progress in development, and showed a profit for their last financial year. Sinking operations at Rossington have made satisfactory progress. Debentures to the amount of £100,000 were issued in October last. The amount applied for was considerably in excess of that sum.

**Sudd Fuel (Suddite) Limited.**—The balance-sheet to March 31, 1913, gives the following:—Debit: Issued participating preference shares (after deducting £1,250 calls in arrears), £78,750; issued ordinary shares, £100,000; sundry creditors, £11,065; total, £189,815. Credit: Purchase price, £118,500; preliminary expenses, commission, brokerage, and stamp duty, £12,819; plant and machinery for factory in Sudan, £16,194; cash at bank and on loan, £31,944; development account for the 13 months ended March 31, 1913, after deducting £1,236 interest and transfer fees, £5,737; other items, £4,621; total, £189,815.

**Wadsworth and Schofield Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire the business of ironfounders, carried on by James Wadsworth and David Schofield, at Phoenix Iron Foundry, New Bank, Halifax, York, and to enter into an agreement with J. Wadsworth and D. Schofield. First directors: James Wadsworth, 10, Godley-road, New Bank, Halifax; David Schofield, 20, Bankfield-view, Woodside, Halifax; and R. Henry Pickles, Rose-villas, Mytholmroyd, near Halifax. Remuneration of R. H. Pickles, £52 per annum.

**Wagon Finance Corporation Limited.**—Lord Aberconway has been appointed a director of the Wagon Finance Corporation Limited, to fill the vacancy caused by the death of Col. Sir Charles J. Stoddart.

**Wapping Coal Company Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to acquire the business of coal merchants, now carried on by Charles Robert Baker, at 3, Bathurst-terrace and Wapping Wharf, Bristol, and to enter into an agreement with Charles Robert Baker; also to carry on business as colliery proprietors. First directors: Charles Baker, 5, Brigstocke-road, Bristol; William Henry Thompson, 36, Blackpool-road, Bristol; and Charles Robert Baker, 3, Bathurst-terrace, Bristol. Registered office: Wapping Wharf, Bristol.

**Wellington Colliery (Stopes) Company Limited.**—This private company has been registered, with a capital of £6,000 in £1 shares, to acquire from A. and J. Gilbert and Co. Limited the business carried on at Stopes, Little Lever, near Bolton; to carry on the business of colliery proprietors, ironmasters, steelmakers, steel converters, miners, smelters, engineers and ironfounders, &c.; and to enter into agreement with (1) A. and J. Gilbert and Co., (2) Alfred Taylor and A. and J. Gilbert and Co. Limited, and (3) Samuel Barker, William Askew, and Charles Frederick Hilton. First directors, Samuel Barker, A. Taylor, Wm. Askew, C. F. Hilton, Thomas H. Chadwick, Thomas Coupe and Fredk. Barker. Registered office, the Wellington Colliery, Stopes, Little Lever, near Bolton.

**Yates and Thom Limited.**—Dividend of 5½ per cent. per annum on the preference shares for the half-year.

The *London Gazette* announces that the following companies will three months from now be struck off the register unless cause is shown to the contrary:—Connaught Coal and Iron Syndicate Limited, Engineering Digest Publishing Company Limited, Kourna Iron and Akoumiani Yalia Coal Mines Limited, Workers' Compensation and Legal Aid Society Limited.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ended Tuesday of the last week was as follows:—Amsterdam, 966 tons; Alexandria, 12,248; Antwerp, 752; Aalborg, 508; Bremen, 1,176; Buenos Ayres, 5,455; Copenhagen, 177; Cronstadt, 21,561; Christiania, 984; Drontheim, 295; Dahlsbruk, 1,697; Elsinore, 1,299; Ghent, 1,224; Harlingen, 1,318; Hamburg, 9,747; Konigsberg, 306; Malmo, 4,130; Nakskov, 640; Newfairwater, 590; Oxelosund, 3,814; Odessa, 4,371; Reval, 2,795; Rönneby, 1,822; Rouen, 668; Rotterdam, 1,065; Stettin, 349; St. Petersburg, 3,985; Stockholm, 2,092; Santos, 5,899; Trieste, 400; Venice, 301; and Wyk, 104; a total of 92,738 tons. For the corresponding period of last year 107,807 tons were exported.



No. 30.

# THE COLLIERY GUARDIAN

## MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below:—

Am. Gas Light Jl. = American Gas Light Journal.  
 Am. Inst. Min. Engin. = American Institute of Mining Engineers.  
 Berg- Hüttenmänn. Rdsch. = Berg- und Hüttenmännische Rundschau.  
 Brit. Assoc. = British Association.  
 Bur. of Census, U.S. Dep. of Commerce = Bureau of Census of the United States Department of Commerce.  
 Canad. Min. Jl. = Canadian Mining Journal.  
 Chem. Engin. = Chemical Engineer.  
 Chem. World = Chemical World.  
 Colliery Eng. = Colliery Engineer.  
 Colliery Guard. = Colliery Guardian.  
 Colorado Sch. Mines Mag. = Colorado School of Mines Magazine.  
 Compr. Air Mag. = Compressed Air Magazine.  
 El. World = Electrical World.  
 El. Z. = Elektrotechnische Zeitschrift.  
 Engin. Min. Jl. = Engineering and Mining Journal.  
 Engin. News (N.Y.) = Engineering News (New York).

Jl. Chem. Soc. = Journal of the Chemical Society.  
 Jl. Clevel. Eng. Soc. = Journal of the Cleveland Engineers' Society.  
 Jl. Ind. Engin. Chem. = Journal of Industrial and Engineering Chemistry.  
 Jl. Soc. Chem. Ind. = Journal of the Society of Chemical Industry.  
 Kohle Erz = Kohle und Erz.  
 Metallurg. Chem. Engin. = Metallurgical and Chemical Engineering.  
 Min. Engin. = Mining Engineering.  
 Min. Eng. Rec. = Mining and Engineering Record.  
 Min. Jl. = Mining Journal.  
 Min. Science = Mining Science.  
 Min. Scient. Press = Mining and Scientific Press.  
 Montan. Rdsch. = Montanistische Rundschau.  
 N. Staffs. Inst. Min. Engin. = North Staffordshire Institute of Mining and Mechanical Engineers.  
 Oesterr. Z. Berg- Hüttenwes. = Oesterreichische Zeitschrift für Berg- und Hüttenwesen.  
 Proc. Chem. Soc. = Proceedings of the Chemical Society.  
 Railw. Gaz. = Railway Gazette.

S. Afric. Min. Jl. = South African Mining Journal.  
 Shipbuild. Rec. = Shipbuilding Record.  
 Techn. Bl. = Technische Blätter.  
 Times Eng. Supp. = Times Engineering Supplement.  
 Trans. Inst. Min. Engin. = Transactions of the Institution of Mining Engineers.  
 U.S. Dép. of Interior = United States Department of the Interior.  
 U.S. Geol. Survey Bull. = United States Geological Survey Bulletin.  
 Werkzeugmaschinenbau, Prakt. Masch. Konstr. = Werkzeugmaschinenbau, Der Praktische Maschinen-Konstrukteur.  
 Z. Angew. Chem. = Zeitschrift für Angewandte Chemie.  
 Z. Bayr. Revis.-Ver. = Zeitschrift des Bayerischen Revisions-Vereins.  
 ZBl. Hütten Walzwerke = Zentralblatt der Hütten und Walzwerke.  
 Z. Schwachstrom. = Zeitschrift für Schwachstromtechnik.

\*\* We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

### I.—General

Coalmining; United States. J. D. A. Morrow. "Bull. 13th Census of U.S., 1910, Bur. of Census, U.S. Dep. of Commerce," 55 p.  
 Germany's Coal Consumption and its Determination. (Deutschlands Kohlenverbrauch und seine Feststellung.) Dr. Jüngst. "Kohle Erz," 1913, p. 650. 2s. 6d.  
 The Coal Consumption in the German Metal Industry. (Der Kohlenverbrauch in der deutschen Kohlenindustrie.) "ZBl. Hütten Walzwerke," 1913, p. 387.  
 The Status of the Lignite Industry. (Die Lage der Braunkohlenindustrie.) Dr. Kreuzkam. "Kali, Erz, Kohle," 1913, p. 665. 2s. 6d.  
 Second Annual Report of the Director of the Bureau of Mines for the Fiscal Year ended June 30, 1912. J. A. Holmes. "U.S. Dep. of Interior," 88 p.  
 Mine Fatalities in Different Countries. "S. Afric. Min. Jl.," vol. 22, 1136, p. 491; 2 tab. 2s.  
 Non-fatal Injuries in Bituminous Mines. F. L. Hoffman. "Coal Age," vol. 4, 6, p. 195-8; 7 tab. 1s. 3d.  
 Industrial Agreements in the Coal Trade: Durham and Cleveland, "Colliery Guard.," vol. 106, 2749, p. 489; Federated Area, 2750, p. 528; Northumberland, 2751, p. 588 (to be continued). (Evidence before Industrial Council.) 1s. 6d.  
 Mineral Statistics for 1912. "Colliery Guard.," vol. 106, 2748, p. 422. 6d.  
 Coalmines Inspection in 1912. "Colliery Guard.," vol. 106, 2750, p. 535 and 24 pp. Supplement; 25 fig. 6d.

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The Primal Source of the Deposits of Combustible Organogen. (Das Urmaterial der brennbaren organogenen Ablagerungen.) P. Kessler. "Techn. Bl.," 1913, p. 196.  
 Coalfields of Grand Mesa and the West Elk Mountains, Colorado. W. T. Lee. "U.S. Geol. Survey Bull.," ill., 8vo, p. 237. Wesley. 5s.  
 The Coalfields of Southern Chile. "Min. Jl.," vol. 102, 4070, p. 797-8. 1s.  
 Matanuska River Coalfield by Districts. W. R. Crane. "Coal Age," vol. 4, 5, p. 148-52; 12 ill. 1s. 3d.  
 The Coalfields of Western Canada. A. Lakes. "Colliery Eng.," vol. 34, 1, p. xi-xiv; 1 map. 1s. 6d.  
 The Mineral Resources of Virginia. T. L. Watson. "Min. Scient. Press," vol. 107, 1, p. 14-15. 1s. 4d.  
 Geological Research in the Coalfields. "Colliery Guard.," vol. 106, 2748, p. 419. (From the *Summary of Progress*.) 6d.  
 The Development of the Midland Coalfields. F. G. Meacham. "Colliery Guard.," vol. 106, 2751, p. 576. (Paper read before Brit. Assoc.) 6d.

### V.—Mining Technology.

Engineering Mechanics, with several chapters on Strength of Materials; for Mining and Technical Schools. (Technische Mechanik, nebst einem Abriss der Festigkeitslehre fuer Bergschulen und andere technische Lehranstalten.) Schwidtal. Third edition, 80 ill. Leipzig: F. Brandstetter. 3s. 6d.  
 Mining. R. T. Strohm. "Colliery Eng.," vol. 34, 1, p. 1-5; 3 fig. 1s. 6d.  
 Mining Machinery. S. F. Walker. 8vo, 1913.

### VI.—Working of Minerals.

Coalmining Machines. W. A. Miller. "Colliery Eng.," vol. 34, 2, p. 77-80; 8 fig. (With special reference to the use of the Shortwall machine. Early coal-cutters and their development.) 2s. 6d.  
 Mining in Alaska. "Min. Eng. Rec.," vol. 18, 11, p. 216-18.  
 Mines of the Continental Coal Corporation. "Coal Age," vol. 4, 6, p. 193-4; 8 ill. (Sixteen independent mines working from a central station). 1s. 3d.  
 Working an Inclined Coalbed. G. W. Evans. "Colliery Eng.," vol. 34, 1, p. 18-21; 6 fig. (Description of a method of working a pitching seam at Coal Creek Mine, Newcastle, Washington.) 1s. 6d.  
 Proposed Method of Longwall Mining. F. C. Corney. "Coal Age," vol. 4, 4, p. 120-2; 3 fig. (The method contemplates the subdivision of the workings into panels to be worked on the retreating system, with due regard to pitch of the seams; notes on special timbering in exceptional conditions.) 1s. 3d.

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Working in Water-bearing Strata at Springs Mines, Transvaal. "S. Afric. Min. Jl.," vol. 22, 1137, p. 519-20; 1 tab. 2s.  
 Electric Rock-drilling Machines. (Elektrisch betriebene Gestein-Bohrmaschinen.) R. Spreecke. "Werkzeugmaschinenbau, Prakt. Masch. Konstr.," 1913, 9, p. 85-9; 13 fig.  
 Rock-drill Testing at the North Star. R. H. Bedford and W. Hague. "Min. Scient. Press," vol. 107, 5, p. 179-81; 5 fig. 1s. 4d.  
 Shaft-sinking Methods of Butte. N. B. Braly. "Am. Inst. Min. Engin.," Bull. 80, 1881-1906; 9 pl.

### VIII.—Explosives, Blasting.

Sinking with Delay Action Fuses. W. V. de Camp. "Engin. Min. Jl.," 1912, p. 65; ill. 1s. 6d.  
 The Analysis of Black Powder and Dynamite. W. O. Snelling and C. G. Storm. "Bur. of Min.," Bull. 51.  
 Modern Explosives and Their Use. F. H. Gunsolus. "Jl. Clevel. Eng. Soc.," vol. 5, 6, p. 407-15.  
 Blasting with Liquid Air. "Compr. Air Mag.," vol. 18, 8, p. 6933-4. 1s.  
 Stability of Explosives. H. C. P. Weber. "Jl. Ind. Engin. Chem.," vol. 5, 8, p. 641-4; 2 fig.; 1 tab. (A modified form of stability test for nitrocellulose plastic at normal and elevated temperatures.) 3s. 6d.  
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 The "P.P." Safety Shot-firing Appliance. "Colliery Guard.," vol. 106, 2751, p. 581; 6 fig. 6d.  
 New Explosives Order. "Colliery Guard.," vol. 106, 2750, p. 540. 6d.

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Steel in Mine Construction. C. Scholtz. "Colliery Eng.," vol. 34, 1, p. 30-2; 2 fig. (Use of steel above and below ground, and some new methods of application.) 1s. 6d.  
 Applications of Concrete Underground. H. T. Mercer. "Canad. Min. Jl.," vol. 34, 14, p. 443-7; 4 fig. 1s. 6d.  
 Lining the Flush Pipe. "Coal Age," vol. 4, 3, p. 82-3; 3 fig. 1s. 3d.

Commercial Timber Cutting for Mines. C. M. Smyth. "Min. Science," vol. 63, 1733, p. 122-4; 2 ill. 1s. 6d.  
 Timbering in the Butte Mines. B. H. Dunshee. "Am. Inst. Min. Engin.," Bull. 80, p. 1511-20; 14 fig.  
 Accidents and Inadequate Timbering in Stopes. "S. Afric. Min. Jl.," vol. 22, 1139, p. 566. 2s.  
 Practical Examples of the Use of Concrete at Collieries. J. Gregory. "Colliery Guard.," vol. 2748, p. 423. (Abst. paper read before N. Staffs Inst. Min. Engin.) 6d.

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The Sinking and Equipping of Bedwas Colliery. E. L. Hann. "Colliery Guard.," vol. 106, 2749, p. 473; 8 fig. (Abst. paper read before S. Wales Inst. Engin.) 6d.

### XI.—Winding and Haulage.

Solution of Two Gasoline Motor Problems. R. O. Hodges. "Coal Age," vol. 4, 4, p. 118-9. 1s. 3d.  
 History of Gasoline Mine Motor. R. O. Hodges. "Coal Age," vol. 4, 3, p. 80-2; 3 fig. 1s. 3d.  
 Description and Working Results of the Electric Hauling Plant of the Eduard Pit (Anna II.) of the Eschweiler Colliery. (Beschreibung und Versuchsergebnisse der elektrisch betriebenen Foerderanlagen des Eduardschachts auf der Grube Anna II. des Eschweiler Bergwerksvereines in Alsdorf.) Hell. "Mitt. Aachen. Bezver. D. Ing.," 1913, 4, p. 4-10; 3 fig.  
 A Utah Coalmine Development. "Coal Age," vol. 4, 4, p. 112-7; 13 fig. (The mine car body is composed of two tramway buckets, which may be lifted and conveyed by the tramway carriers to the railway loading tipples.) 1s. 3d.  
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 Chinese Mine Hoisting. "Min. Scient. Press," vol. 107, 4, p. 137; 4 fig. (Two-shaft method; one for coal, the other for water.) 1s. 4d.  
 Four-claw Detaching Hook and Automatic Lowering Arrangement. "Colliery Guard.," vol. 106, 2748, p. 419; 3 fig. 6d.  
 The Bennett Duplex Vertical Overwinding Controller. "Colliery Guard.," vol. 106, 2748, p. 421; 2 fig. 6d.  
 The Karlik-Nahlik Barrier for Haulage Inclines. "Colliery Guard.," vol. 106, 2748, p. 422; 3 fig. 6d.

### XII.—Signalling.

Wireless Telephones in Westphalia Mines. (Drahtlose Fernsprecher in westfaelischen Bergwerken. "Z. Schwachstrom," 1913, 3, p. 75.

### XIII.—Lighting.

Electricity in Mines. H. S. Webb. "Colliery Eng.," vol. 34, 1, p. 47-9; 3 fig. (Classification of voltaic cells, open circuit cells, dry cells, closed circuit cells. Construction and care.) 1s. 6d.  
 Edison Electric Safety Lamp. "El. World," vol. 61, 4, p. 177. 1s. 3d.  
 Approved Safety Lamps for Mines. "Colliery Guard.," vol. 106, 2750, p. 523 (Hailwood, Best "Excelsior," "J.C.B.," Cremer, Davis-Marsic, Davis-Marstry, Davis-Marstry, Davis-Kirby, Davis-Thornley, Davis-Thornbury lamps); 2751, p. 579 (Johnson, Clapham and Morris, Laidler, and Mills lamps); (to be continued.) 1s.



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Ventilating Mines and Removing Gas. J. J. Rutledge. "Colliery Eng.," vol. 34, 2, p. 81-6. 2s. 6d.  
 Mine Ventilation. "Colliery Eng.," vol. 34, 1, p. 45-7; 1 fig. (Method of conducting air through mines. Legal requirements of the different States.) 1s. 6d.  
 Mine Ventilation. F. P. Brunel and P. T. Whitehead. "Colorado Sch. Min. Mag.," vol. 3, 8, p. 185-91. 1s. 6d.

**XV.—Mine Gases, & Testing.**

Apparatus for Gas Analysis Laboratories at Coalmines. G. A. Burrell and F. M. Seibert. "Techn. Paper 14, Bur. of Mines," p. 24; ill.  
 A Case of Gaseous Explosion Caused by the Electric Heating of Bitumen in Cable Troughs. W. M. Thornton and J. A. Smythe. "Electrician," vol. 71, 20, p. 820-2; 1 fig. (Investigation indicates that bitumen gas, however produced, lies between marsh gas and coal gas in inflammability.)  
 Influence of Increase of Initial Temperature in the Explosiveness of Gaseous Mixtures. A. Parker. "Proc. Chem. Soc.," vol. 29, p. 130; "Jl. Chem. Soc.," vol. 103, p. 934-40.  
 Testing for Carbon Monoxide. "Colliery Eng.," vol. 34, 1, p. 14-5. 1s. 6d.  
 Empson's Apparatus for Analysing Mine Air. W. Kyle. "Min. Engin.," vol. 17, 230, p. 164; 1 fig. 9d.

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How to Handle a Dry or Dusty Mine. D. Victor. "Colliery Eng.," vol. 34, 2, p. 92-101. 2s. 6d.  
 Shaledust as a Deterrent of Coaldust Explosions. "Min. Science," vol. 68, 1734, p. 166-8; 1 fig.  
 A Record of the Origin of the Principle of Stonedusting for the Prevention of Colliery Explosions. W. E. Garforth. "Trans. Inst. Min. Engin.," vol. 45, 4, p. 562-94. 8s.  
 The Influence of the Presence of Gas Upon the Inflammability of Coaldust in Air. W. M. Thornton. "Colliery Guard.," vol. 106, 2751, p. 578; 5 fig. (Paper read before Brit. Assoc.) 6d.  
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Fire Protection of Mines. J. Taylor. "Colliery Eng.," vol. 34, 1, p. 28-9. 1s. 6d.  
 The Decomposition of Coal in Heaps. (Ueber die Zersetzung von aufgestapelter Kohle.) J. Pusch. "Kohle Erz," 1913, 16, p. 370-1. 2s. 6d.

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The Reopening of Norton Colliery with Self-contained Breathing Apparatus after an Explosion. J. R. L. Allott. "Trans. Inst. Min. Engin.," vol. 45, 4, p. 595-628; 1 pl. 8s.  
 New Rescue Stations in Yorkshire. "Colliery Guard.," vol. 106, 2749, p. 487; 2 fig. 6d.

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The Spiral Wire Pump: a New Device for Raising Water. (Die Spiraldrahtpumpe, eine neue Wasserhebevorrichtung.) G. Scholtze. "Kohle Erz," 1913, p. 586; ill. 2s. 6d.

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The Coal Preparation Plant at Trifail. (Ueber die Kohlenaufbereitungsanlage in Trifail.) W. Seltner. "Oesterr. Z. Berg-Huettenwes.," vol. 61, 1913, 20, p. 267-72; 10 fig.  
 The Preparation of Coal. G. Buchanan. "Colliery Eng.," vol. 34, 1, p. 51-2. 1s. 6d.

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Briquetted Fuels: Manufacture and Properties. "Jl. Soc. Chem. Ind.," vol. 32, p. 76. 4s.  
 The "Agglutinating Power" of Coals. J. T. Dunn. "Jl. Soc. Chem. Ind.," vol. 32-8, p. 397-8.  
 The Manufacture of Coke in Belgium. E. Coppée. "Colliery Guard.," vol. 106, 2749, p. 488; 2750, p. 539; 6 fig. (Abst. paper read before Iron and Steel Inst.) 1s.

The Distillation of Tar in Metallurgical Practice. Gevers-Orban. "Colliery Guard.," vol. 106, 2750, p. 527; 4 fig. (Paper read before Iron and Steel Inst.) 6d.

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Progress of By-product Coking. "Times Eng. Supp.," 1913, 444, p. 17. 9d.  
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 Recovery of By-products in the Modern By-product Coke-oven Plant. C. A. Meissner. "Metallurg. Chem. Engin.," vol. 11, 8, p. 454-8; 8 fig. 2s.  
 The Preparation and Treatment of Coal for Coking. "Gas World," vol. 59, 1515, Supp. p. 7. 10d.  
 Coking in the United States. "Times Eng. Supp.," 442, 1913, p. 21. (Describes large installation of by-product ovens.) 9d.  
 Coke Hardness. O. Simmersbach. "Iron Age," vol. 92, 6, p. 296; 4 tab. (Experimental indications of the value of certain treatments.) 2s.  
 A New Apparatus for Sealing Coke-oven Doors. (Ueber einen neuen Apparat zur Abdichtung der Koks-ofentueren.) A. Wagener. "Bergbau," 1913, p. 401; ill. 2s.

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Our Coals. P. Kokuk. (Unsere Kohlen.) Leipzig: B. G. Teubner. 120 pp.  
 South African Gas Coals. J. W. Brown. "Am. Gas Light Jl.," vol. 99, 8, p. 119; 3 tab. 1s. 6d.  
 Determination of Moisture in Coal. R. J. Dunderdale. "Chem. World," vol. 2, 8, p. 263-4. 1s. 6d.  
 Efficiency Valuation of Fuels. W. F. Elwood. "Colliery Eng.," vol. 34, 1, p. 23-5; 2 fig. 1s. 6d.  
 Preliminary Report for the Committee on Coal Analysis of the American Society for Testing Materials and American Chemical Society. W. A. Noyes. "Jl. Ind. Engin. Chem.," vol. 5, p. 517-28. 3s. 6d.  
 Determination of Calorific Value by Experiment and by Calculation. F. v. Jüptner. "Jl. Soc. Chem. Ind.," vol. 32, p. 222. 4s.  
 Microscopic Structure of Coal and its Constituents. J. Lomax. "Jl. Soc. Chem. Ind.," vol. 32, p. 276. 4s.  
 The Testing and Valuation of Fuels and the Question of Guarantee of Heating Values. (Zur Untersuchung und Bewertung der Brennstoffe und der Frage der Heizwertgewaehr.) A. Zschimmer. "Z. Bayr. Revis. Ver.," vol. 17, 8, p. 75-9. 2s. 6d.  
 Calorimetric Determination of the Heat Value of Fuels. H. Thiele. "Z. angew. Chem.," vol. 26, 49, p. 370-5. 2s. 6d.  
 On the Behaviour of the Volatile Constituents of Coal on Heating. (Ueber das Verhalten der flüchtigen Bestandteile der Kohle beim Erhitzen.) O. Simmersbach. "Berg. Hüttenmänn.-Rdsch.," 1913, p. 197.  
 Sampling Coal Deliveries. G. S. Pope. "Chem. Eng. and Wks. Chem.," vol. 3, 28, p. 253-4. 1s. 6d.  
 Liquid, Solid and Gaseous Fuels for Power Production. F. W. Burstall and Others. "Colliery Guard.," vol. 106, 2751, p. 575. (Disc. Brit. Assoc.) 6d.  
 The Production of Motor Spirit from Coal. A. Rollason and A. W. Taylor. "Colliery Guard.," vol. 106, 2751, p. 577. 6d.  
 The Application of Liquid Fuels with Special Consideration of German Coal Tar Oil for Heating and Power Purposes. (Die Verwendung fluessiger Brennstoffe unter besonderer Berücksichtigung des deutschen Steinkohlenteeröles fuer Heiz- und Kraftzwecke.) "Mitt. Chemn. Bez. Ver. D. Ing.," vol. 5, 4, p. 31-3; 3 fig.  
 The Proper Utilisation of Coal and Fuels derived therefrom. H. E. Armstrong, G. T. Beilby, H. G. Colman, H. J. Yates, R. V. Wheeler, R. Lessing, W. H. Patterson and others. "Colliery Guard.," vol. 106, 2751, p. 591. (Disc. before Brit. Assoc.) 6d.

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 Economical Use of Anthracite. R. Trauttschold. "Coal Age," vol. 4, 3, p. 84-7; 2 charts, 8 tab. 1s. 3d.

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New York Law Governing Work under Compressed Air. "Engin. News" (N.Y.), vol. 70, 7, p. 307-8. 2s.  
 New Construction of Turbo-Blowers and Turbo-Exhausters for Metallurgical Works. (Neuere Ausführungen von Turbogebblasen und Turbogassaugern fuer Hüttenwerke.) E. Blau. "Förder-technik," vol. 6, 4, p. 77-82; 6 fig., 4 ill. 2s. 6d.

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General Observations on Recent Power Plants for Mines. (Allgemeine Betrachtungen ueber neuzeitige Maschinenanlagen. des Bergbaues. F. Koneczny. "Montan. Rdsch.," 1913, p. 669. 2s. 6d.  
 Distributing Power to British Columbia Mines. J. Thompson. "Min. Engin. World," vol. 39, 6, p. 249-51; 4 ill. 1s. 3d.  
 Electrical Application in the Cœur d'Alenes. J. B. Fisk. "Min. Engin. World," vol. 39, 4, p. 149-52; 2 fig. 1s. 3d.  
 Proper Installation of Alternators. C. A. Tupper. "Coal Age," vol. 4, 4, p. 125-7. 1s. 3d.  
 General Principles for the Working of Electric Plants Below Ground. (Allgemeine Grundsätze fuer den Betrieb elektrischer Anlagen unter Tage.) Koneczny. "El. Z.," 1913, 11, p. 304-5.  
 An Investigation of Explosion-proof Motors. H. H. Clark. 8vo., 44 p. Washington Government Printing Office.

**XXVIII.—Surface Transport.**

Apparatus for the Rapid Unloading of Railroad Cars. (Vorrichtung zur schnellen Entladung von Eisenbahnwagen.) "Bergbau," 1913, p. 403; ill. 2s.  
 Different Kinds of Automatic Grabs. (Verschiedene Selbstgreiferarten.) "Bergbau," 1913, p. 373; ill. 2s.  
 Electric Suspended Tramways. (Elektrohaengebahnen.) W. Schultz. "Techn. Bl.," 1913, p. 193; p. 201, ill.; p. 209, ill.; and p. 217, ill.  
 A New Type of Self-discharging Coaling Vessel. "Shipbuild. Rec.," vol. 2, 10, p. 282-8; 1 fig., 5 pl. (Dimensions 315 ft. by 43 ft. 9 in. by 24 ft.; capacity 3,750 tons.) 1s. 6d.  
 Ash- and Coal-handling Equipments. H. J. Edsall. "Coal Age," vol. 4, 3, p. 76-9; 7 ill. (The pivoted bucket carrier, with Didge system of storage for sized anthracite and travelling bridge railway or locomotive crane for run-of-mine bituminous.) 1s. 3d.  
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 Short Weights in Coal Cargoes. "Colliery Guard.," vol. 106, 2748, p. 424. (Report of Committee on Humber Coal Weights.) 6d.  
 British Railways in 1912. "Colliery Guard.," vol. 106, 2748, p. 435. 6d.

**XXIX.—Sanitation, Diseases, &c.**

Health Regulations for the Briquetting Industry. "Engineering," vol. 96, 2487, p. 293. 1s.  
 Pitch Workers' Cancer. "Colliery Guard.," vol. 106, 2748, p. 416. (Second report on proposed draft regulations.) 6d.

**XXX.—Mining Laws, Royalties.**

Coal Land Valuation. H. M. Chance. "Am. Inst. Min. Engin.," Bull. 79, p. 1315-42; 3 tab. (A consideration of the values which can be expressed in terms of a monetary unit.)  
 The Old Mining Laws and Regulations in Bohemia, Moravia and Silesia. (Die alten Bergrechte und Bergordnungen in Boehmen, Maehren und Schlesien.) J. Lowag. "Montan. Rdsch.," 1913, p. 677. 2s. 6d.

**CONTRACTS OPEN FOR COAL AND COKE.**

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

**Abstracts of Contracts Open.**

ABERYSTWYTH, SEPTEMBER 29.—Coal, Deep Cannock or Westminster, and the Ruabon Main coal, and Newport coal, also coke, for the Education Committee. Forms from the clerk, Mr. R. J. Roberts, District Education Office, Aberystwyth.  
 BEXLEYHEATH, SEPTEMBER 29.—Coal and coke, for the Bexley Urban District Council. Forms obtained on application to Mr. W. T. Howse, surveyor, Council Offices, Bexleyheath.  
 BIGGLESWADE, SEPTEMBER 29.—About 30 tons of crude fuel oil suitable for working Diesel oil engines, for the Biggleswade Water Board. Further particulars from Mr. H. Carne, waterworks engineer, Biggleswade Water Board, Biggleswade, Beds.  
 BRENTFORD, OCTOBER 4.—About 200 tons (more or less) of Rheola Merthyr coals (large), or other approved steam coal, 65 tons (more or less) of house coal, 100 tons (more or less) of small coal, and 100 tons (more or less) of coke, for the Urban District Council. Forms from Mr. J. W. Croxford, the surveyor, at his office, Clifden House, Boston-road, Brentford.  
 BROMSGROVE (STOURBRIDGE-ROAD), OCTOBER 6.—Coal and coke to the secondary school, Stourbridge-road, for the Managing Committee. Tenders to Mr. J. Lloyd, correspondent.  
 CAIRO (EGYPT), NOVEMBER 14.—For the Egyptian State Railways and Telegraphs Department either 300 or 600

metric tons of shale oil for gasmaking. Sealed tenders, on the proper forms, to the general manager, Egyptian State Railways and Telegraphs, Cairo.

COSELEY, OCTOBER 9.—Coke and best quality thick coal, for the Education Committee. Forms from Mr. Fred J. C. Poole, secretary, Education Office, Coseley.

DEAL, OCTOBER 7.—About 20 tons of best household coal, 25 chaldrons of broken coke, and firewood, for the Education Committee. Tenders to Mr. Alfred C. Brown, clerk, Deal.

DERBY.—Coal and coke, for the Education Committee. Particulars at the Education Office, Becket-street.

EDINBURGH, OCTOBER 6.—Coal, to the directors of the Edinburgh and District Tramways Company Limited. Specification can be obtained at the general manager's office, 1, South Charlotte-street.

INVERNESS, OCTOBER 7.—Coal, for the Inverness Burgh School Board. Sealed tenders to be lodged with Mr. W. C. Macbean, 42, Union-street, Inverness, clerk.

LUTON, OCTOBER 1.—Best Leicester cobbles and Luton gas coke, to the Managers of the Caddington Group of Council Schools. Tenders to Mr. Sydney Charles Weston, Mill-street, Luton.

MALDON, SEPTEMBER 30.—Steam and anthracite coal to the Southminster and Purleigh Waterworks, for the Rural District Council. Forms from Mr. Wm. Almond, surveyor to the Council, 6, Market-hill, Maldon, Essex.

MIDDLETON, OCTOBER 6.—Steam coal for the electricity works, for the Corporation. Forms from Mr. S. Pauls, Electricity Works, Middleton.

MOUNTAIN ASH, SEPTEMBER 29.—Best large house coal, for the Education Committee. Tenders to Mr. A. Morgan, director of education, Town Hall, Mountain Ash.

NEW MALDEN, OCTOBER 6.—Thirty-six tons of fuel oil, for Diesel oil engines, for the Maldens and Coombe Urban District Council. Forms from Mr. R. H. Jeffes, A.M.I.C.E., engineer and surveyor, upon receipt of one guinea (returnable).

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SOUTHAMPTON, OCTOBER 13.—Small coal for their Works Department, for the Corporation. Forms from the superintendent at the Corporation Wharf, Chapel.

TALGARH, OCTOBER 2.—Coal and split firewood, for the Breconshire Education Committee. Tenders to Mr. George P. Weale, clerk to the District Committee, Meaford House, Talgarh.

WALSALL, OCTOBER 7.—Deep and shallow nuts and coke, for the managers of the Rushall Council Schools. Sealed tenders to Mr. A. H. Lewis, clerk to the managers, 29, Leicester-street, Walsall.

WARRINGTON, OCTOBER 3.—Coal, for the Education Committee. Forms from Mr. J. Moore Murray, Director of Education, Education Office, Sankey-street, Warrington.

The date given is the latest upon which tenders can be received

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HONG KONG (CHINA), OCTOBER 1.—Pumping Engines.—Government of Hong Kong invite tenders for the supply of



vertical, rotative, steam pumping engines, capacity of 10 million gallons per day on a lift of about 400 ft., with boilers, auxiliary plant, pipe work, &c., to be erected at the Tytam Tuk Water Supply Works, Hong Kong. Specification and form of tender obtainable at the office of the Crown Agents for the Colonies, Whitehall-gardens, London, S.W., on payment of deposit of £1 (returnable).

ILKLEY, OCTOBER 7.—*Plant*.—Electric generating and distributing plant, for the Ilkley Urban District Council. Specifications from Mr. F. S. Eckersley, clerk, Town Hall, Ilkley.

JOHANNESBURG, OCTOBER 28.—*Boiler Tubes*.—Tenders are invited by the South African Railways Administration for the supply and delivery of iron and steel boiler tubes. Copies of the specification and form of tender can be obtained from the office of the High Commissioner in London for the Union of South Africa, 32, Victoria-street, S.W.\*

LEAMINGTON, SEPTEMBER 30.—*Cast Iron Pipes*.—About 23 tons of 3 in. cast iron pipes for water mains, for the Corporation. Specification and form of tender can be obtained from the borough waterworks engineer at the Town Hall.

LEICESTER, SEPTEMBER 30.—*Turbine, &c.*—Erection at the generating stations of the following plant, for the Corporation:—(a) One high-pressure steam turbine, direct-coupled to one 3,000-kw, 3-phase alternator, together with condensing plant, high and low tension switchboards, rotary converters, &c.; (b) two water-tube boilers, together with fuel economiser, and the necessary steam feed, blow-off, and drain pipes, &c. Forms from Mr. T. R. Smith, borough electrical engineer, on payment of a deposit of £2 (returnable).

LONDON, OCTOBER 7.—*Girder Work*.—About 80 tons steel bridge girders and other iron and steel work of British manufacture, for the Great Western Railway Company. Plans and specifications may be seen at the office of the engineer at Paddington Station.

LONDON, OCTOBER 13.—*Switchgear, &c.*—For the 20,000 volt high-tension switchgear, low-tension switchgear, and accessories, for the power-station and sub-stations to be constructed in connection with the electrification of the Melbourne Suburban Railways. Specification and form of tender may be obtained from the Agent-General for Victoria, Melbourne-place, Strand, W.C.

MELBOURNE (AUSTRALIA), OCTOBER 8.—*Rails, &c.*—For the supply and delivery of the following rails and fishplates, for the Agent-General for Victoria, Australia (alternative tenders): (Contract No. 25005) approximately 27,079 tons of 80 lb. steel rails; (contract No. 25005) approximately 2,215 tons of steel fishplates for 80 lb. steel rails. Specifications and forms of tender obtainable at the offices of the consulting engineers, John Coates and Co. Limited, 25, Victoria-street, Westminster, London, S.W.

MOUNTAIN ASH, SEPTEMBER 30.—*Steel Tanks*.—Supplying and erecting two circular steel tanks 46 ft. diameter and 20 ft. deep, together with platforms, ladders, &c., for the Urban District Council. Drawings, specification, &c., may be obtained on application to Messrs. Fox, Bateman and Fox, civil engineers, 5, Victoria-street, Westminster, or at the office of the surveyor (Mr. W. G. Thomas), Town Hall, Mountain Ash, on payment of a deposit of £5 (returnable after the contract has been entered into).

NENAGH, OCTOBER 1.—*Cast Iron Pipes*.—Supplying and delivering of about 68 cwt. of cast iron water pipes, 3 in. and 2 in. diameter and fittings, to the Urban District Council. Copies of specification may be had on application to Mr. Frank R. Maloney, town clerk.

ROCHDALE, OCTOBER 13.—*Mechanical Filtration Plant*.—Supply and erection of the necessary filters, chemical apparatus, oil engine, turbine or water motor, gearing, shafting, pipe connections, valves, &c.; also electric lighting plant on the trunk main from Ramsden Reservoir at North Ramsden, Walsden, for the Corporation. Specification and form of tender may be obtained on payment of a deposit of three guineas (returnable) from Mr. F. H. Brunt, A.M.I.C.E., engineer and manager, Waterworks Office, Lord-street, Rochdale.

SALFORD, SEPTEMBER 29.—*Compound Air Compressor*.—Compound air compressor, to the Corporation (Electricity Department). Specification, &c., from borough electrical engineer, Electricity Works, Frederick-road, Pendleton.

SHEERNESS, OCTOBER 6.—*Air-compressor*.—Erection of an air-compressor with receiver and air pipes, ram pumping engine, suction and delivery pipes, air vessel meter, &c.; also for the subsequent provision and erection of a surface condenser, stand-by compressor, and stand-by ram pumping engine, at Trinity-road pumping station, for the Urban District Council. Particulars from Mr. F. W. S. Stanton, civil engineer, 3, Victoria-street, Westminster, S.W., on deposit of £2 2s. (returnable).

SHEFFIELD, OCTOBER 6.—*Steel and Iron Work*.—For the steel and iron work in connection with the extension of the Grimesthorpe Works, for the directors of the Sheffield United Gaslight Company. Forms from Mr. J. W. Morrison, M.Inst.C.E., at the company's offices, Commercial-street, Sheffield.

STOCKHOLM, OCTOBER 1.—*Superstructures for Filters*.—Tenders are invited by the Stockholm Waterworks for the supply of four iron superstructures for the sheltering of filters.\*

WARRINGTON, OCTOBER 11.—*Gas Compressor, &c.*—(a) A gas compressor, (b) building for above, for the Corporation. Full particulars on application to Mr. W. S. Haddock, general manager.

WONTHAGGI (VICTORIA, AUSTRALIA), NOVEMBER 12.—*Haulage Engine*.—Tenders are invited by the Victorian Railways Commissioners for the supply and delivery of a haulage engine (mechanical portion only), and a 200-horse power electric motor and equipment, for the State coalmine.\*

WORTHING, SEPTEMBER 29.—*Extension of Plant*.—Erection at the electricity works, Worthing, of one generating set, consisting of a Diesel oil engine and a direct-coupled direct-current generator, for the Corporation. Forms of tender, specification, plans and general conditions may be obtained on payment of a deposit of £2 2s. (returnable) from Mr. Kennedy Allerton, town clerk, Municipal

particulars, &c., may be seen at the Intelligence Branch of the Board of Trade, E.C.

## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

10266 (1913). *Improvements in Steam Regenerative Accumulators*. Fried. Krupp Aktiengesellschaft, of Essen, Germany.—Relates to exhaust steam regenerative accumulators having a floating bell, and the object is to provide a steam regenerative accumulator of this kind, which ensures the advantage that the liquid which serves for the regeneration of the steam is caused to circulate by the steam pressure itself, without a special pump being necessary. Two constructional examples of the subject-matter of the invention are shown in the drawing. In the first constructional example a number of trays or vessels G, the diameter of which is only a little less than the diameter of the bell C, are placed one over the other, and are so built into the bell C that when it is in its lowest position all the trays or vessels G dip into the water charge B; but on the other hand, when the floating bell is in its highest position (in which it strikes against stops  $a^1$  on the receptacle A) they are all located above the surface of the water. On the bell C is also arranged an outwardly leading pipe H, which is of such a length that its lower opening is just above the surface of the water when the bell C is in the highest position, but dips into the water charge B when the bell is lower down. When a larger volume of exhaust steam is available than can be used, the excess thereof passes through the pipes  $e^1$  and F and the openings  $f^2$  into the interior of

Fig. 1.

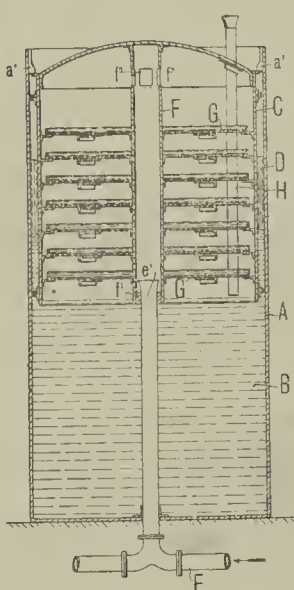
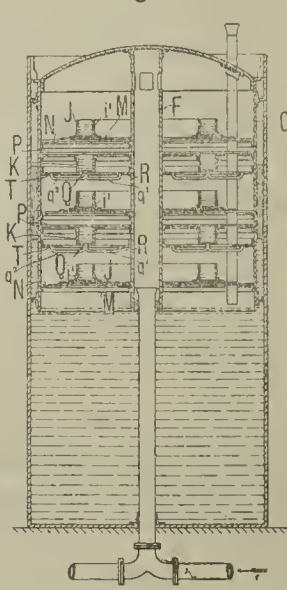


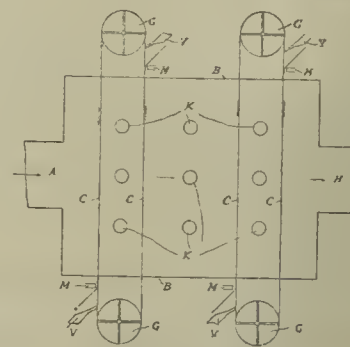
Fig. 2.



the floating bell C. In consequence of the contact of the exhaust steam with the cooler upper surface of the upper vessels G, the water charge B and the walls of the bell C, a portion of the exhaust steam will be condensed. The excess still present causes the bell C to rise so that the lower vessels G will ascend one after another and offer further contact surfaces to the exhaust steam. Owing to the augmentation of the contact surfaces, the condensed quantity is naturally also greater, so that, in general, a state of equilibrium will soon ensue in which the volume of condensed exhaust steam is equal to that supplied, and the bell therefore does not rise any further. Should it happen by way of exception that the excess of exhaust steam is so great that it cannot be condensed entirely, even when all the vessels G have emerged from the water charge B, the bell C rises to such a height that it strikes against the stops  $a^1$ . In this position the lower opening of the pipe H will be located above the surface of the water, so that the excess steam escapes into the open air through the pipe H. If more exhaust steam be consumed than is supplied through the exhaust pipe E, the deficit in exhaust steam will be withdrawn from the steam regenerative accumulator. The only difference between the second constructional example shown in fig. 2 and the one first described, is that the vessels G are replaced by a sprinkling apparatus. (Two claims.)

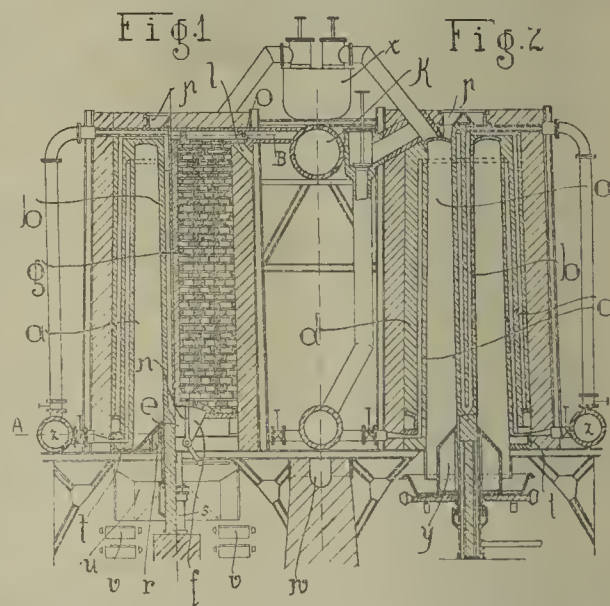
10341 (1913). *Apparatus for and Process of Purifying Blastfurnace and other Gases and Freeing them from Dust Particles*. A. H. Smith and D. Bagley, trading as Smith and Bagley, of Broad-street House, London, E.C., and M. E. Feilmann, 92, Victoria-street, Westminster, London, S.W.—Has for its object the removal of solid matters such as particles of metallic iron, gangue, coke or other fuel more particularly and generally described as dust from blast-furnace gases or from gases issuing from other similar types of furnace. The system makes use of revolving filtering bands, and the novelty claimed consists in the passage of the bands through the walls of the casing or flue to the outside, and the application of a vacuum extractor to remove the dust outside the casing or flue. The dust filter consists of an oblong casing of metal or other material through the interior of which bands of textile material, which may be endless, continuously circulate, travelling in a direction at right angles to the length of the casing and to the current of gas, and so arranged that the cross-section of the interior of the casing is completely filled with the fabric, through which the gases are therefore forced to travel, by which means they are deprived of the dust which they contain in suspension. The movement of the fabric is effected by means of rollers outside the casing or by any

other suitable means, and it enters and leaves the casing by means of slots so arranged that they are practically gastight. The gas may be passed through any number of successive layers of moving fabric, according to the amount and character of the dust and the degree of purification required. The interior of the casing is provided with means for imparting heat to the fabric, so that it is retained in a dry condition. The dust which is continuously removed to the outside of the casing by the moving fabric, is there removed continuously from the fabric by means of vacuum



extractors. Each of these consists of a metal casing provided with a slot which is pressed against the whole width of the band of fabric. Before the fabric is submitted to the action of the vacuum any magnetic dust particles may be separately removed by means of a magnetic separator so placed as to act on the dust within the fabric before it passes under the action of the vacuum extractor. The clean gases may be further cooled by an indirect cooler of the tubular kind. Motion is imparted to the gases by any suitable form of exhauster or blower at any convenient stage of the process. The attached drawing shows one method of carrying out the invention. (Three claims.)

14376 (1912). *Improvements in or relating to Apparatus for Making Coke and Gas*. H. Nelsen, 117, Julienstrasse, Essen-Ruttenscheid, Germany.—Relates to coke and gas making apparatus of the kind in which the coke chamber is vertical and annular with heating flues arranged in both the inner and outer walls of the annulus, and has for its object a vertical annular coke oven intended to manufacture good gas with few attendants, from coals rich in gas, with small

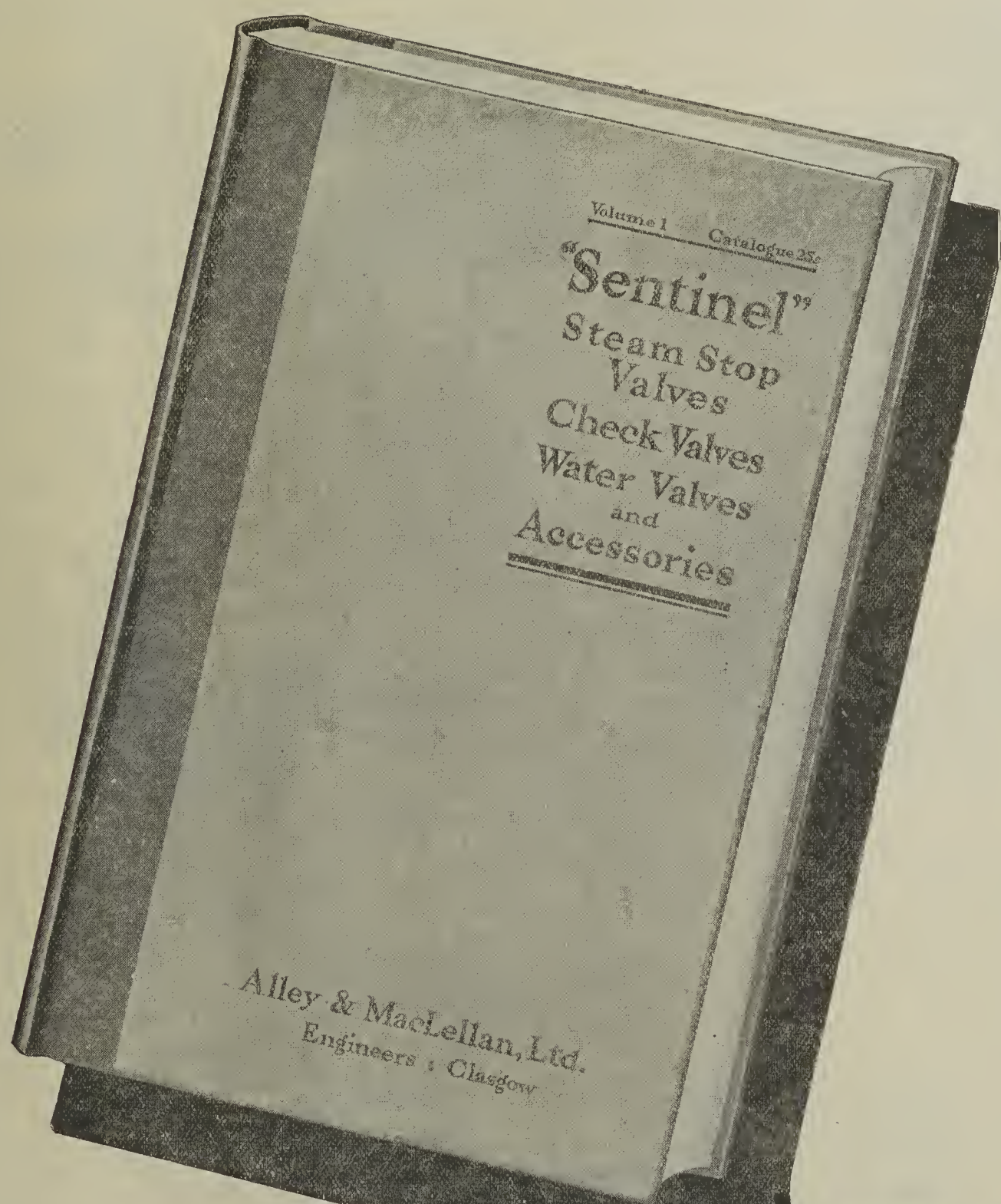


consumption of fuel. The invention consists in a coke oven in which the lower end of the annular chamber, when it is being discharged, presents an unobstructed ring-shaped opening through which the coke in the chamber can fall when the latter is being discharged. Fig. 1 shows a longitudinal section, the left half showing a section through the coke chamber and heating flues, and the right side a section through the regenerator. Fig. 2 shows a longitudinal section. (Three claims.)

16493 (1912). *A Method of Distilling Benzol Hydrocarbons from Saturated Wash-oil, or Benzolated Creosote*. C. Still, Recklinghausen, Germany.—A method by means of which the distillation of the hydrocarbons from the saturated wash-oils is carried out in a still which comprises a primary and a secondary distilling column, in such a manner that the final vapours of distillation contain only the light oils whose highest boiling point does not exceed 180 degs. Cent., and the naphthalene and constituents of the wash-oil, carried forward with the stream of steam or neutral gas, are separately recovered, prior to their entry into the pipe leading to the benzol condenser, and are withdrawn by a separate exit placed in the upper section of the secondary distilling column. This is achieved by cooling the vapours flowing from the wash-oil distilling column in a reflux cooler to such a degree that only the highest boiling point constituents—that is, the naphthalene and some constituents of the wash-oil—are condensed, which unite and flow back to the upper section of the secondary distilling column, thus again being subjected to the action of the outflowing vapours, and thereby liberated from any contained lower boiling point hydrocarbons, and are then drawn off through a separate outlet in the upper section of the secondary distilling column and recovered. This naphthalene and constituents of the wash-oil condensate, which have a temperature of about 100 degs. Cent. when leaving the



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of any kind, or for any purpose,  
will find much information in this  
volume. It is not the usual trade  
catalogue.



A free copy will be sent to  
engineers and other responsible  
enquirers on application to

**Alley & MacLellan**  
LTD

"Sentinel" Works

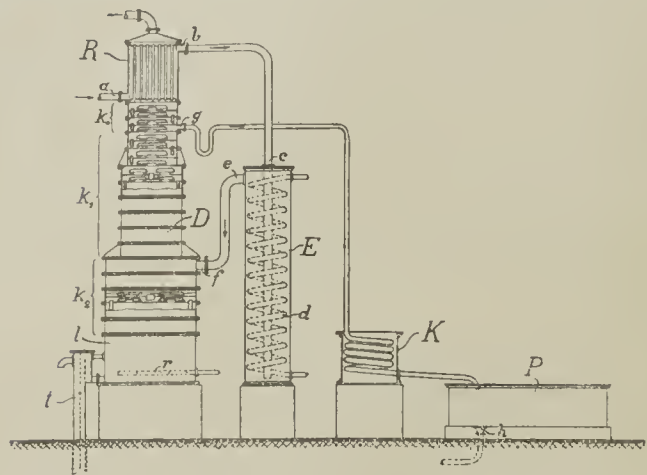
Polmadie - - Glasgow

Telegrams:  
Alley, Glasgow.

Telephone:  
751 Queen's Park  
(5 Lines)

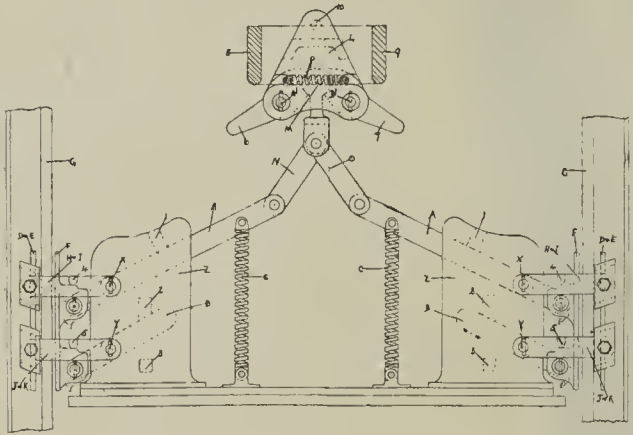


distilling column, are first moderately cooled down in a small condenser to about 70 to 80 degrees Centigrade, at which temperature the crystallising out of the naphthalene is still avoided, and are then discharged into open pans,



where they are completely cooled and the naphthalene crystallised out, this product and the constituents of the wash-oil being subsequently removed. An arrangement for carrying out the method described is shown on the above drawing. (Two claims.)

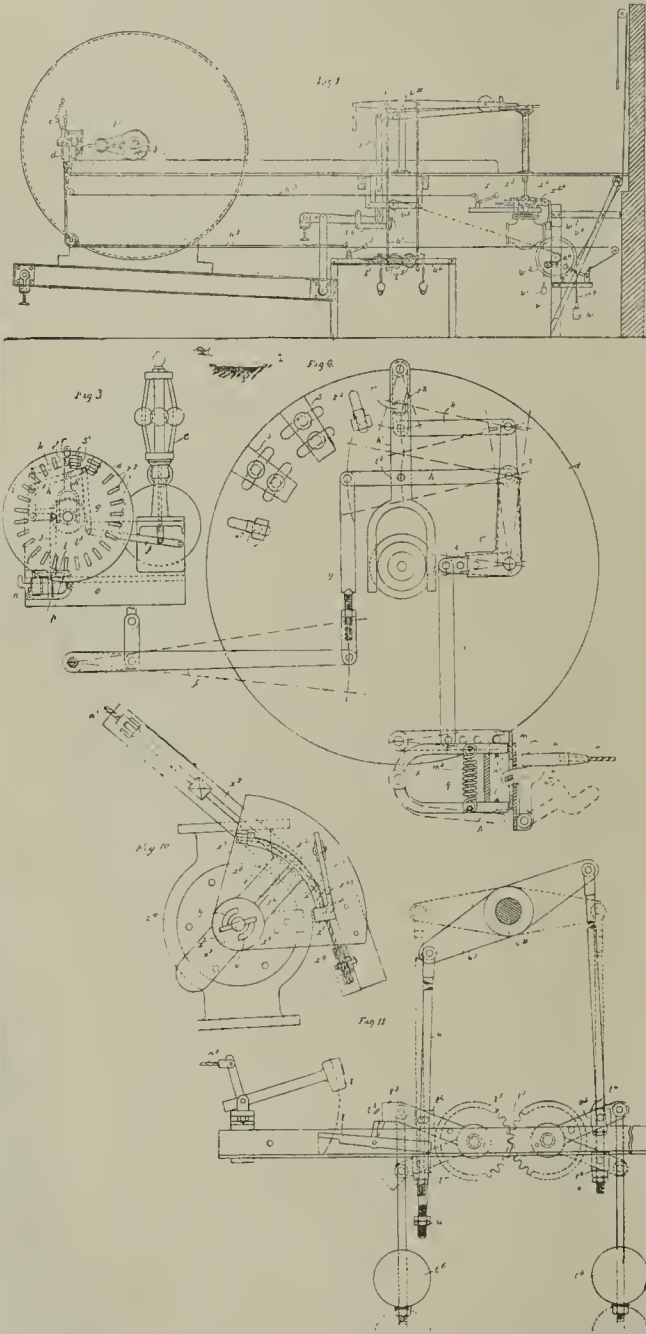
22467 (1912). *Safety Grip on Slides of Pit Shafts with Overwinding Appliance*. C. E. Yardley, 335, Barnsley-road, Pitsmoor, Sheffield.—The accompanying drawing is a complete side elevation of the combined gripping mechanism and releasing device in its normal position. The gripping appliance consists of duplicated standards Z erected upon a suitable base plate secured upon the top of the cage, each having an arrangement of operating levers A and B actuated or pulled downwards by coiled springs C when the winding rope breaks or is accidentally released. These levers are pivotally connected at X and Y to the standards, being capable of moving from the oblique position fig. 1 to an horizontal position upon the two cross pins supported between the two plates which form the standard, the amount of travel being limited by stop pieces 1, 2 and 3,



between the plates. This downward movement of the levers, caused by the contraction or closing action of the released springs C, causes the instantaneous closing of the parts D, E and F upon the guide rails G, the parts D and E upon the back of the rail head and F upon the face of the head. The two pins X and Y pass through one end of the links H and I, J and K, then through the sides of the standard and the levers A and B, said levers and links work freely upon the said pins. When the levers A and B are being moved from the oblique to the horizontal position they raise the connected gripping parts D, E and F by means of transverse crossheads 4 and 5, which connect the links on one side with the corresponding links upon the other side of the standard. If the overwinding occurs, the releasing device is drawn up to the ring or other device and the extended arms are forcibly turned downwards causing their upper ends to withdraw from and release the head of the junction piece M and with it the cage. Also the springs C immediately pull down the levers and apply the grips. (Three claims.)

28336 (1912). *Overspeed and Overwind Prevention Gear for Colliery Winding Engines and the like*. R. Yates and J. D. Miller, both of Rosehall Colliery, Coatbridge, Lanarkshire.—Relates to an improved construction of overspeed and overwind prevention gear for colliery winding and like engines, and consists primarily in the provision of devices including a slidable trigger element provided with a series of projections or the like and operatively connected with the engine governor, said projections or the like engaging normally with corresponding projections or the like on pivoted members associated with means for permitting release of devices for controlling the steam throttle valve, the brakes, and the reversing gear of the engine, on disengagement of the projections or the like on the trigger element from the projections or the like on said pivoted members. Fig. 1 is an elevation showing diagrammatically the general arrangement of a winding engine equipped with the gear; fig. 3 is an end elevation showing the engine governor and trip gear and relative connections; fig. 4 is an elevation showing details; fig. 10 is a detail view of the steam throttle valve and operative connections; fig. 11 is a detail view of the reversing gear controlling device. The operation of the apparatus is as follows:—At the beginning of a wind the trip gear occupies the position shown by dotted lines in fig. 3. As the speed of

the engine increases, the governor *e*, the link and lever elements and catch pin *r*<sup>1</sup> connected therewith come into operation. Should the engine at any part of the wind exceed the predetermined speed, the said catch pin comes in contact with one or other of the studs *r* and thus moves over to the right or left, according to the direction of rotation of the slotted disc *d*, the catch pin *r*<sup>1</sup>, together with the links *k* and bell crank lever *i*, which thus raise or lower the links *j* and lever *l* and thereby raise or lower the trigger slide member *m* until all the catches *m*<sup>1</sup> are clear of the catches *n*<sup>1</sup>, whereupon the triggers *n* are released and fall into the position shown by dotted lines in fig. 4, thus allowing the slotted sockets *n*<sup>2</sup> to slip over the ends thereof and release the cords *n*<sup>3</sup> so that the corresponding hammers or tappets engage the catch devices associated with the reversing gear, the throttle valve, and the brake gear whereby the reversing lever is brought to mid or neutral position, the steam supply is shut off, and the brakes applied, thus bringing the engine to rest. Should the engineman neglect to shut off steam when nearing the end of a wind the governor will again bring the trip gear into action in the manner above described. After the cage has been brought to rest at the completion of a wind, one of the check plates *s* will be in contact with the catch pin *r*<sup>1</sup>, and, should the engine be started in the wrong direction, the check plate *s* will push over the catch pin *r*<sup>1</sup>, thereby



releasing the triggers *n* as above described, and bringing the engine to rest with the cage say 2 ft., or any predetermined distance above the stopping place. The reversing gear operates as follows:—As shown the gear is in its normal position, and the hammer *t* is raised by a cord *n*<sup>3</sup> above the catch lever *t*<sup>1</sup>, while the lever *t*<sup>2</sup> and toothed wheels *t*<sup>3</sup> are held in position by the catch *t*<sup>4</sup>. Immediately the corresponding trigger *n* and cord *n*<sup>3</sup> are released the hammer *t* falls, striking the catch lever *t*<sup>1</sup> and withdrawing the catch *t*<sup>2</sup>, so as to allow the weights *t*<sup>3</sup> to drop. As one or other of the nuts *u* will be close up to the swivel block *t*<sup>4</sup>, according to the direction in which the engine is running, one of the rods *u*<sup>1</sup> will be pulled down and the other rod simultaneously raised into contact with its corresponding swivel block *t*<sup>4</sup> and will come to rest when the double-armed lever *u*<sup>2</sup> is in the position shown by dotted lines, and the reversing lever is in its mid or neutral position. This gear is reset by the engineman moving the reversing lever to its extreme position, either up or down, whereupon the catch *t*<sup>2</sup> drops automatically into the position shown by full lines in fig. 11. The operation of the valve controlling gear is as follows:—Should the engineman neglect to shut off steam at the proper time to allow the engine to be brought gradually to rest, the governor *e*, acting on the trip gear and triggers *n*, will release the corresponding cord *n*<sup>3</sup>, thereby causing the hammer *t* to drop on to one end of the lever *x*<sup>3</sup> whereby the other end of said lever *x*<sup>3</sup> is raised and strikes the tail piece *x*<sup>2</sup> so that the catch *x*<sup>2</sup> is moved out of the path of movement of the quadrant *x*<sup>1</sup> as shown by dotted lines, thus releasing the

weight *w*<sup>3</sup>. When the valve is full open the ends of the cotter *x*<sup>5</sup> are in engagement with the ends of the clutch elements *y*<sup>1</sup> opposite to those with which they are shown in engagement in fig. 10, so that when the quadrant *x*<sup>1</sup> is released, by raising the catch *x*<sup>2</sup>, it is rotated by means of the weight *w*<sup>3</sup>, the cotter *x*<sup>5</sup> being also rotated by said clutch elements and the valve closed. (Five claims.)

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

- 20746. Pit-bottom decking plant for collieries and the like. W. J. B. Leech and Rother Vale Collieries Limited.
- 20747. Process for making steel car wheels. H. R. Keithley.
- 20767. Treatment of coal tar and its products for the removal of the properties therein tending to induce pitch-cancer. H. W. Robinson.
- 20789. Pumps. Siemens Brothers Dynamo Works Limited (Siemens Schuckertwerke G.m.b.H., Germany.)
- 20809. Brick presses. J. Beanchard.
- 20831. Dry-ore separator. W. W. Bonson.
- 20848. Haulage clips. W. J. Wilson.
- 20855. Safety devices for steam-condensing plants where the air is exhausted from the condenser by means of an air-injector of the water-jet type. P. H. Müller.
- 20872. Socket or capping for attaching to the end of rope. P. N. Broughton Haggie and O. Sinclair.
- 20876. Process for the coating of sheets and plates with other metals. S. O. Cowper-Coles.
- 20877. Manufacture of coated plates. S. O. Cowper-Coles.
- 20878. Process for the electro-deposition of iron. S. O. Cowper-Coles.
- 20879. Means of collecting the dust caused by the working of rock drills, grindstones, and other similar articles. A. Williamson and R. Williamson.
- 20901. Construction of greaser for lubricating the axles of colliery tubs. W. Dodd.
- 20924. Cupolas. A. Tropenas and E. Tournier.
- 20961. Means or apparatus for cleaning iron and steel plates. Thomas and Clement Limited and M. J. Jones.
- 20964. Treatment of hot gases produced by the distillation of coal. W. J. B. Leech and A. Edwards.
- 21005. Toothed gearing. C. Marsden and Power Plant Company Limited.
- 21048. Art of making iron and steel. W. J. Mellersh Jackson. (Billings Process Company, United States.)
- 21066. Apparatus for carrying the steel from the steel furnaces to the roller mills and for casting the ingots en route. A. H. Cooper.
- 21077. Billet piercing presses. Brightside Foundry and Engineering Company Limited and C. Simmons.
- 21091. Apparatus for separating lighter from heavier particles, specially applicable for purifying or the like. T. T. Vernon.
- 21093. Chain mortising machines. A. Cooksley and C. Schlegel.
- 21098. Respiratory apparatus for use in rescue operations. J. F. Scott and H. Davenport.
- 21108. Pneumatic drills and like machines. J. Arthur and T. Gee.
- 21117. Steam superheating arrangements for locomotives and like boilers. G. H. Willans and J. A. W. Peacock.
- 21118. Feed-water heating and water circulating arrangements for locomotive and like boilers. G. H. Willans and J. A. W. Peacock.
- 21158. Metal melting furnaces. I. Hall.
- 21165. Railway fishplates. W. G. Delamain.
- 21166. Bearings for rolls and the like on corrugating and planing machines and the like. A. E. Windle.
- 21167. Worm-gear hoisting machinery. Herbert Morrison Limited and J. A. Butterworth.
- 21214. Turbine stator blading. Belliss and Morcom Limited and A. Jude.
- 21217. Steam boilers. J. Thompson.
- 21224. Centrifugal fans or pumps. S. C. Davidson.
- 21225. Centrifugal fans or pumps. S. C. Davidson.
- 21254. Screening device. F. Pratt-Barlow.
- 21260. Miners' or safety lamp. J. R. Boast and I. Goldmar.
- 21278. Haulage clip for use in hauling tubs conveying mineral in mines. H. Kewen.
- 21284. Recovery of metals from slags. C. Vautin.
- 21289. Brick kilns. W. Drayton.
- 21290. Process for the immediate fractional recovery of the by-products obtained in the production of illuminating town gas and coke. J. Fischer.

### Complete Specifications Accepted.

To be published on October 9, 1913.

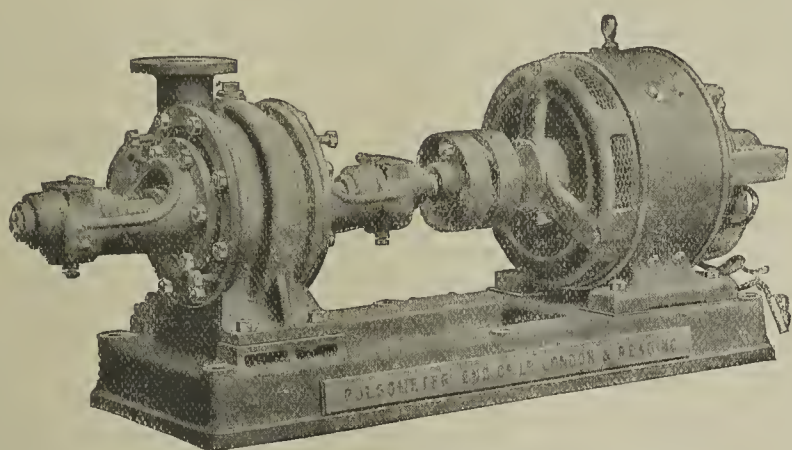
- 11428. Benzine or oil lamps and filling apparatus in connection therewith. Hailwood.
- 20677. Beams or bars for use in reinforced concrete structures. Whitson.
- 20938. Charging apparatus or projectors for coal or other solid materials. Williams, and W. J. Jenkins and Co.
- 21069. Mills or apparatus for reducing ore or other materials. Rodger.
- 21293. Steam boilers. Talbot.
- 21304. Manufacture of ammonia and its salts. Winstanley and Williams.
- 21305. Rock-boring apparatus and carriages therefor. May Mining Company and Stocks.
- 21345. Refractory bodies required to withstand high temperatures. McCourt, Radiant-Heating Limited and Schnabel.
- 22692. Means or apparatus for scotching the wheels of vehicles, more particularly colliery tubs or wagons. Houghton.
- 22896. Miners' safety and like lamps. Hailwood.
- 24307. Steam-condensing plant. Higgins.
- 25435. Steam engines. Whitmore and Scott.
- 25922. Valve and valve gear for the motors of feed-pumps and the like. MacLeod.

(Continued on page 654.)



# PUMPS

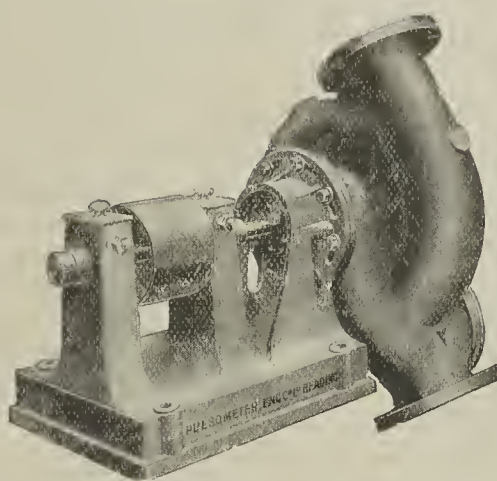
## FOR ALL PURPOSES.



HIGH LIFT CENTRIFUGAL PUMPS.  
TYPE C.

For Lifts up to 150 ft.

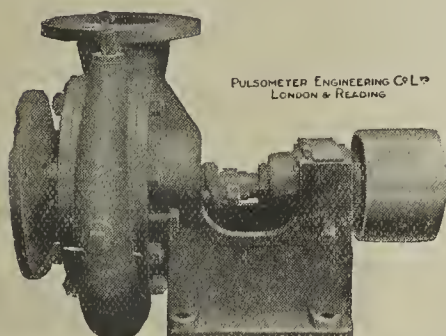
List No. 522.



CENTRIFUGAL PUMPS.  
TYPE V.

For Lifts up to 80 ft.

List No. 523.

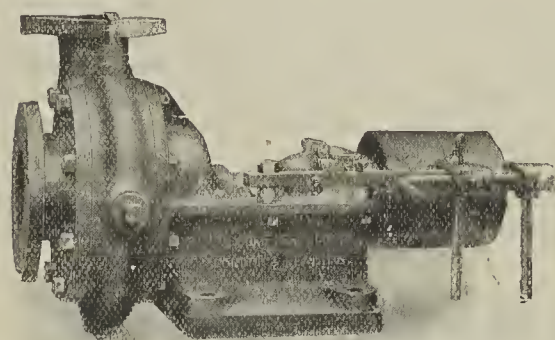


TYPE A.

CENTRIFUGAL PUMPS.

For Lifts up to 40 ft.

List No. 524.

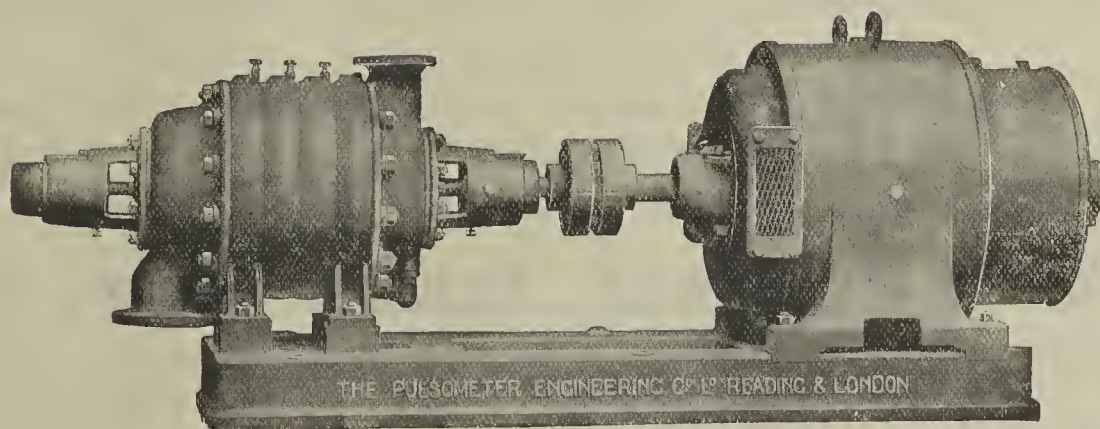


TYPE A.

CENTRIFUGAL PUMPS

with Fast and Loose Pulleys.

List No. 524.



TURBINE PUMPS.  
Motor or Belt Driven.  
For Lifts up to 1,200 ft.

List No. 527.

# Pulsometer Engineering Co., Ltd

Offices—11, Tothill Street,

LONDON, S.W.

Nine Elms Iron Works,

READING.



26197. Apparatus for producing a mixture of combustion products and steam. Lemale.  
 2221. Miners' safety lamps. Best, Best, Best, Best, and Best.  
 26222. Gauzes for miners' safety lamps. Best, Best, Best, Best, and Best.  
 26762. Apparatus for preventing over-speeding and/or over-winding in connection with mine cages, elevators, and the like. Wilson and Reah.  
 27582. Haulage clips. Weetman.  
 28675. Apparatus for screening and washing gold, sand, coal, and other minerals. Pleasance.  
 29199. Steam valves for steam-driven direct-acting pumps. G. and J. Weir Limited and Petermoller.  
 29429. Mechanical process of making peat fuel. Warburton. 1913.  
 155. Water-gauge protector for high-pressure steam boilers. Schulz.  
 250. Pistons and cylinders of steam engines. Shuman.  
 412. Process of casting. Wade. (Liquid Forged Steel Co.)  
 604. Elastic fluid turbines. Warwick Machinery Company (1908). (General Electric Co.)  
 1649. Miners' picks. Williams.  
 3973. Miners' safety or like lamps. Hailwood.  
 5452. Process and apparatus for melting turnings and other cast iron scrap. Wagner.  
 9867. Method of obtaining water-softening material from sulphate lyes. Günther.  
 10874. Metallic packing. Piérard.  
 10913. Jig conveyors. Eickhoff.  
 11007. Flywheel storage arrangements such as used in the electrical driving of hauling or winding machinery. Siemens Schuckertwerke Ges.  
 11186. Method of making patterns for foundry moulding. Bell.  
 12417. Wire-drawing apparatus. Watson, and W. D. Houghton and Co.  
 12770. Weighing machine. Ulbricht.  
 13805. Process for case-hardening iron and steel articles. Geb. Schubert.  
**Complete Specifications open to Public Inspection before Acceptance.**  
 1913.  
 17327. Device for use in actuating the controlling gear of power engines, turbines, and the like. Gagg.

**Grimsby Coal Exports.**—The export of coal from Grimsby during the week ended on the 18th inst. was shown by the official returns to total 23,279 tons foreign and 106 tons coastal, as compared with 24,054 and 754 tons respectively during the corresponding week of last year. The shipments were as follow:—Foreign: To Antwerp, 540 tons; Copenhagen, 1,593; Dieppe, 862; Esbjerg, 847; Gefle, 4,342; Gothenburg, 4,489; Kristinehamn, 275; Kristiansand, 632; Hamburg, 831; Helsingborg, 2,353; Lemvig, 1,135; Moss, 481; Randers, 694; Ronne, 792; Sarpsborg, 376; Sofieholm, 1,093; Solvesborg, 935; Wisby, 597; and Rotterdam, 412. Coastal: To London, 106 tons.

#### CATALOGUES AND PRICE LISTS RECEIVED.

The G. St. John Day (Patents) Limited, of Mumps Electrical Works, Oldham, are the makers of an ingenious lamp-holder, of which they send us particulars. An important feature of the holder is an adjustable contact, by means of which any pressure of contact can be secured. Both lamp and cords are securely locked.

Messrs. Bleichert's Aerial Transporters Limited (Egypt House, 36, New Broad-street, E.C.) send us a handsomely illustrated pamphlet showing various applications of conveying plants for unloading and loading ships and trucks and for service on storage grounds. These include cable cranes, automatic telfers, combined loading and conveying plants, &c. The company have devoted special attention to the question of transport on sites difficult of access, and photographs of some interesting installations under such conditions are given.

The A.E.G. Journal for September contains an interesting article on the use of large gas engines as prime movers in electric generating stations attached to ironworks, special reference being made to the use of coke-oven and blast-furnace gas. The A.E.G. has designed a special series of three-phase generators with a large diameter, the inductors of which are manufactured of cast steel in order to secure a large flywheel effect with strength and low weight. A compounded former-wound coil for preserving the insulation in high-tension machines and a new arc ignition apparatus are described.

We have received from Messrs. Willans and Robinson Limited (Victoria Works, Rugby), a pamphlet describing the Willans rotary air-pump system (Muller-Josse patent), for use in connection with surface condensers for steam turbine plant. There are two common applications, which may be termed the "shunt" and "series" systems respectively. In either case, the air is extracted from the condenser by means of the air-ejector, the condensate being extracted by means of a separate centrifugal pump drawing water from the bottom of the pump. The two systems differ in the method of supplying water to the air-ejector, the "shunt" system being used where the head across the circulating pump suffices for the purpose of extracting the air. In such case, the main circulating pump is designed to deliver a greater quantity of water than is required as cooling water in the condenser, the surplus water being used as air-ejector water, and is returned to the source of supply or to the suction side of the circulating pump. Where the "series" system is used, the whole body of the condenser-cooling water is passed through the air-ejector before entering the condenser. An advantage of the system is the absence of all tanks, and no

make-up water is required. The makers have booked an order for an 8,500 kw. plant for the Sheffield Corporation and have secured other orders for turbines having a total output of 100,000 kw.

#### GOVERNMENT PUBLICATIONS.

\*\*\* Any of the following publications may be obtained on application to this office at the price named **post free**.

Consular and Trade Reports: Bahamas, Report for 1912-13, 4½d.; Spain, Bilbao for 1912, 6½d.; China, Canton for 1912, 2d.; Muscat, 1912-13, 5½d.; Siam, Chiangmai, 1912, 4d.; China, Ningpo, 1912, 4½d.; Review of the Trade of India, 1912-13, 1s. 4d.

Accounts of Foreign Trade for August 1913, 6d.

East India Railways Report for 1912, 6s.

Explosion Report, No. 208, at Messrs. Kynoch Limited, Holford Mills, near Birmingham, 1½d.

List of Technical Institution Courses, &c., 1911-12-13, 4d.

Regulations for Scholarships Exhibitions, &c., in Science for 1914, 1½d.

Births, Deaths and Marriages: Seventy-fourth Annual Report for England and Wales for 1911, 6s. 1d.

#### PUBLICATIONS RECEIVED.

CANADA DEPARTMENT OF MINES. THE NICKEL INDUSTRY By A. P. Coleman. 1913. Ottawa: Government Printing Bureau.

CANADA DEPARTMENT OF MINES. PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA FOR 1912. By John McLeish. 1913. Ottawa: Government Printing Bureau.

"Transactions of the North-East Coast Institution of Engineers and Shipbuilders" (Vol. 29, Part 7), September, price 5s.; "Report of the Bureau of Mines, Ontario" (Vol. 19, Part 2); "The Cobalt-Nickel Arsenides and Silver Deposits of Tenniskaming," by W. C. Miller; "Publications de l'Association des Ingénieurs de l'Ecole des Mines de Mons" (Tome 7); "The Journal of the Franklin Institute" (Vol. 176, No. 3), September, price 50 cents.

**Partnership Dissolved.**—The *London Gazette* announces the dissolution of the following partnership:—C. E. Smith and B. K. Barnes, carrying on business as tin-smiths, lamp manufacturers, and ironworkers, at Glasshouse Bridge Works, Newcastle-upon-Tyne, under the style of Smith and Barnes.

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# THE COLLIERY GUARDIAN

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No. 2753.

## INSTITUTION OF MINING ENGINEERS.

### Annual Meeting in Manchester.

The twenty-fourth annual general meeting of members of the Institution of Mining Engineers was held at Manchester on Wednesday, September 24, 1913, in the Lord Mayor's parlour, Town Hall (as shortly reported in our last issue). Dr. W. E. GARFORTH, president of the institution, presided, supported by Sir Thomas Holland (president of the Manchester Geological and Mining Society), Prof. W. Boyd-Dawkins, Prof. O'Shea (hon. secretary of the institution), Mr. Sydney A. Smith (hon. secretary of the Manchester Geological and Mining Society), Mr. Percy Strzelecki (secretary to the institution), and others.

Sir CHARLES BEHRENS (Deputy Mayor) referred to the serious illness of the Lord Mayor, who, had he been able to be present, would, Sir Charles was sure, have given the members of the institution a very cordial welcome, which was but due to so important a body as the Institution of Mining Engineers. The institution had a membership of 3,500, and was concerned with one of the most important questions that could come before the people of England—the supply of coal. Where the people of Lancashire would be without a supply of coal he did not know. It was owing to the coal industry, in great measure, that Lancashire was such a prosperous county, for coal not only met the needs of the cotton industry, but of iron and other industries. It was in 1905, he was reminded, that the institution last visited Manchester. Manchester had had most prosperous years since then—at any rate the last three or four years had been prosperous—and he saw no signs as yet of any falling off in the trade of this great district. It would have been a pleasure for Manchester people to have taken the visitors along their great Ship Canal, which had done so much for the trade of Lancashire; but, unfortunately, the labour trouble had not yet been settled.

Dr. GARFORTH thanked Sir Charles Behrens very much for the kind welcome he had extended to the institution, and expressed the sincere regret of all present at the illness of the Lord Mayor. They sympathised with Sir Walter Royse and his family, and hoped he would be soon restored to good health. Dr. Garforth went on to express his appreciation of the courtesy of the civic authorities in allowing the institution to meet in the Town Hall. With regard to the Deputy Mayor's remarks as to Lancashire's indebtedness to a cheap supply of fuel, he had to say that they quite recognised that fact. Indeed, the members of the institution had for years past seen the necessity of providing the people of this country with a cheap supply of fuel, and when they knew the large industrial concerns extending from Manchester in all directions they quite realised that they must do their very utmost to provide a very cheap and plentiful supply of coal. Of course, as they knew, in Lancashire, many of the thicker seams of coal had been exhausted during the past hundred years. Therefore they had to resort to the best means of working the thinner seams, and he was very glad to be able to say that within recent years, especially in the last decade, they had been able to work many thick seams by means of mechanical appliances that were not contemplated some years ago; and at the present time they were raising a larger output of coal, where these appliances were in use, than they were, without the appliances, in the thick seams, and he need not say that the safety was much greater than it was, say, 40 years ago. In fact statistics showed they were safer now by something like 63 per cent. by the introduction of these appliances, and especially owing to the better methods gained by experience in working the coalseams. Therefore, he thought they might look forward for many years to come to having a cheap and plentiful supply of fuel. As regarded cheapness, it must be remembered they had had their difficulties to contend with. The miners often thought they were entitled to a larger percentage of the profits than the coalowners thought right and fair; but if depressed times came—and we knew depressed trade followed good trade as the night the day—they hoped good sense between employers and employees

would prevail and thereby enable this county to maintain the position it had held for so many years among the nations of the world. A commercial warfare had been going on for many years, but when the critical time came he hoped all sections of the community would be sufficiently loyal and try to maintain the country's supremacy. Dr. Garforth concluded by moving the following resolution:—"The members of the Institution of Mining Engineers regret to hear of the serious illness of the Lord Mayor, Sir Walter Royse, and sincerely trust he may be speedily restored to good health."

Sir THOMAS HOLLAND, in seconding the resolution (which was passed unanimously), said that when this meeting was projected the Lord Mayor very generously promised them the use of his parlour, and it had been a great disappointment to Sir Walter not to be able to welcome the institution in person. Sir Walter Royse took an interest in subjects that were akin to that of mining; he was interested in technical and scientific matters, as well as being a business man and an administrator. The Manchester Geological and Mining Society, which he (Sir Thomas Holland) represented, wished him to express on their behalf, in seconding this resolution, their deep sympathy with the Lord Mayor, and their hope that the improvement which had been noticed recently would be maintained, and that the Lord Mayor would soon be restored to health. They all hoped he would live long to enjoy the honour which the King conferred upon him, and which he so richly deserved.

Sir CHARLES BEHRENS acknowledged the good wishes expressed in regard to the Lord Mayor, and then withdrew.

### Annual Report.

The HONORARY SECRETARY (Prof. O'Shea) read the twenty-fourth annual report of the council.

The PRESIDENT read the auditor's certificate as to the accounts, and moved the adoption of the report and accounts.

Mr. ARTHUR SOPWITH, of Handsworth, Staffordshire, seconded, and the resolution was adopted.

The SECRETARY (Mr. Percy Strzelecki) announced that at the meeting of the council that morning Dr. William Edward Garforth, LL.D., M.Inst.C.E., had been unanimously re-elected president of the institution for the ensuing year. The gentlemen appointed vice-presidents were as follow:—

Messrs. John Gerrard and Sydney A. Smith, representing Manchester Geological and Mining Society; Messrs. J. P. Houfton and W. H. Hepplewhite, representing the Midland Counties Institution of Engineers; Mr. Walter Hargreaves and Professor F. W. Hardwick, representing the Midland Institute of Mining, Civil and Mechanical Engineers; Messrs. James Barrowman, James Hamilton, and William Walker, representing the Mining Institute of Scotland; Messrs. W. C. Blackett, C. C. Leach, J. H. Merivale, F. R. Simpson, and J. G. Weeks, representing the North of England Institute of Mining and Mechanical Engineers; Mr. Hugh Johnstone, representing the North Staffordshire Institute of Mining and Mechanical Engineers, and Mr. Alexander Smith, representing the South Staffordshire and Warwickshire Institute of Mining Engineers.

It was announced that the next general meeting will be held in London on Thursday and Friday, May 28 and 29, 1914, and that the next annual meeting will be held in North Staffordshire on September 16, 1914, upon the invitation of the president and council of the North Staffordshire Institute of Mining and Mechanical Engineers.

### A Method of Measuring Goaf Temperatures and the Absorption of Oxygen by Coal.

Papers on these subjects were read by Mr. T. F. WINMILL, research chemist at the Doncaster coalowners' laboratory.

The PRESIDENT moved that the best thanks of the meeting be given to Mr. Winmill for his very interesting and valuable papers.

Mr. JAMES HAMILTON, of Glasgow, seconded, and the resolution was approved.

Prof. LOUIS (Newcastle-upon-Tyne) said Mr. Winmill

had given them results which would be most valuable, but he might have tested the variations in the explosibility of unoxidised, partially oxidised, and completely oxidised coal. He had reason to think that coal which was oxidised was less dangerous, less apt to explode, than coal in the earlier stages. He himself was inclined to think that dust was less likely to explode after passing through the screens than before.

Dr. W. N. ATKINSON (Cardiff) said he thought these two papers contributed by Mr. Winmill were very valuable and on very important subjects. It appeared to him the method prescribed of taking the temperature in goaves might be very useful, and extended to a much greater degree than had ever been attempted in the past by the crude method of putting a thermometer into a long tube and shoving it into the goaf. If the results obtainable from the system described by Mr. Winmill were to be relied upon, he thought it quite possible that very valuable information might be obtained. With reference to the result of tests set out, it would be interesting to have a little more information—first, as to the normal temperature of the seam; and second, what conclusion Mr. Winmill drew from the figures. The figures showed an increase of 16 degrees—from 68 to 84; but it was stated that the low initial temperatures were affected by wet sand—that they were "due to the fact that the rib-side, on being left, had been well stowed with wet sand." In drawing any conclusion from the figures, it was necessary to have a true initial temperature. He would like to know what Mr. Winmill's conclusion was from the figures. Did they indicate that a goaf fire was likely to occur, or the contrary?

Dr. JOHN HARGER (Liverpool) said he had been engaged in similar work to that described by Mr. Winmill, and would like to ask him if the rapid absorption of coal at first was not best explained by the fact that the oxygen at first turned out the methane, taking its place as absorbed free oxygen until an equilibrium was established, after which such action would cease, and only that of oxidation continue? At first two actions were taking place, and later only one. As to the curves, he thought Mr. Winmill's interpretation was wrong.

Mr. F. E. E. LAMPLOUGH (Cambridge), after acknowledging the courtesy of the institution in inviting him to be present to participate in the discussion, said that in connection with the first paper he thought the Callender type of thermometer, with an extra compensating lead, would be found more convenient for working, and a 4-way cable covered with lead was a commercial article for this purpose. If, however, it was more important to know the difference between the goaf temperature and the surrounding strata, there would be great advantages in the stronger and simpler copper-constantan thermo-couple, the "hot" junction being placed in the goaf, and the "cold" junction a foot or two deep in the adjacent strata; a number of such couples would be worked with a single lead from each and one common lead. Mr. Lamplough said that the second paper described experimental work of great interest. He was sure a great amount of time and labour must have been given to produce the results collected in the paper. In particular the experiments on the influence of temperature, fineness, and percentage of oxygen, were of importance. A diagram of the apparatus used would greatly add to the value of the paper, and he hoped the author would be able to include this. Although the effect of fineness of the dust was not very considerable when the temperature was kept constant, yet in actual practice with partial retention of heat the effect would probably be of much greater importance. Some recent American experiments tended to confirm this. With regard to the interpretation of the experimental results, he could not at all accept the conclusion drawn by the author of the paper that the absorption of oxygen was due to two distinct chemical actions. In dealing with the curves, the author assumed the existence of two unimolecular reactions, and their assigned value to four unknown quantities to make equations to fit the curves. Even



with this latitude of choice, Mr. Winnill thought his equations would give values for the total absorption too low by at least 10 per cent. Though many different equations could be constructed to fit a limited curve, they could not be assumed true for later periods of reaction. The fact was that it was quite incorrect to attempt to apply velocity equations to such reactions. The laws governing the velocities of chemical actions referred only to reactions occurring in a homogeneous solution, and any attempt to apply these laws to such a heterogeneous action as the absorption of a gas by so complete a solid as coaldust was fallacious. This was further shown by the fact that gradual rise in temperature gradually increased the total absorption, which would be impossible on the hypothesis of definite chemical actions; but although increased temperature greatly increased the rate of absorption, giving greater total absorption, the proportionate falling off in the rate was made if anything slower, a result unknown in chemical reactions under conditions to which the laws of chemical reactions were applicable. Moreover, the rate was not proportional to nor independent of the fineness of the dust. The experimental results, however, were most interesting, and, when supplemented by a further paper in the directions foreshadowed by the author, would form a most important contribution to the knowledge of this complex subject.

Mr. J. D. PATON (Manchester) submitted that it would be better for the colliery staff if the results given in the paper were stated in degrees Fahrenheit. If the resistance of the test unit was very materially increased in relation to the resistance of the leads, the actual error that would creep in could pretty well be neglected. While he had not had actual experience of an installation of resistance thermometers in goaves, he had, within the neighbourhood of Manchester, an extensive installation where the units were deposited in large masses of heat, and measured with an accuracy of one-tenth of 1 per cent. between zero and 170 degs. Fahr. At a certain temperature the goaf became dangerous, and on the installation he had in mind an alarm was fixed, which warned the engineer when the critical temperature had been passed. This, he submitted, was an excellent arrangement and tending to protection.

Mr. W. C. BLACKETT (Sacriston, Durham) said it was all very well for the scientific gentleman to lay down these precepts for the practical men who worked the mines, but they had forgotten one important point—the practical effect of what the goaf was going to be. It might be due to ignorance, but it did seem to him that they would not quite know when the goaf had squeezed a different resistance into the wires, or whether the difference in the resistance was due to heat. He would like to ask Mr. Winnill to state whether the temperature of the wires would not interfere with the electrical resistance so that you could not possibly rely on the results of the instruments to give the measurement of the current. He could not help thinking the wire would be so squeezed that it would practically operate so that no one would know whether the difference in resistance was due to an increase or a decrease in the heating of these special appliances.

Mr. J. W. FRYAR (Bentley Colliery, Doncaster) said there was nothing much he could say at present in connection with these papers. He thought the method of measuring temperatures, described in the first paper, was very useful and very practical. With regard to the second paper, it seemed to him at the present time entirely a case for the scientific gentlemen to criticise the methods which were being adopted and obtain certain information, and it would eventually come to the practical men to make use of it when the former have made up their minds as to the true method of getting data to work upon. At present the paper might seem premature, but this discussion and criticism by scientific gentlemen would be most useful and most valuable, and make the experiments as they went on more useful and valuable, and probably give better results.

Mr. W. M. MACKIE (Leeds) said he would like to ask Mr. Winnill if he had paid any attention to the dryness or dampness of the air. He had done a great deal of work in connection with spontaneous combustion, and knew they had to be very cautious to have the air constant as to dryness, for a damp air gave quicker heating, or, should he say, the oxidation would be much quicker than in a dry air. He should think that down the pit the air must often be loaded with moisture, and he wondered if that was a factor that might be usefully studied. He had recently done one or two tentative experiments with coal, simply studying the heating, and got some very curious results by using an overloaded, he might say, with moisture, but he had so far done nothing that he could draw any definite conclusion from.

Mr. JOHN GERRARD (Manchester) said it was stated: "The steep initial portion of the curve still persists, showing that even with this low percentage a sufficiently rapid oxidation takes place in the fresh coal to raise the temperature to a dangerous point. He would like Mr. Winnill to put that into figures—what temperature was a "dangerous temperature?" He would like to know how long these experiments had been going on. He did not for one moment suppose that these results were hastily drawn; but one had had experience of results which after further and more exhaustive experiments had proved entirely illusory. He did not know anything that gave more anxiety to mining men than this question of gob fires, or spontaneous combustion, and it was obvious that in some districts, especially in the district of Doncaster, the sense of responsibility must be great. He had had experience of the Manchester district, and going back for 40 years he recalled the fact that there had been, he thought, about 38 cases of fires due to spontaneous combustion. At any rate, not much more than one a year. Now, if it was proposed that the owners of mines in this district that were liable to a gob fire once a year should be saddled with the onerous regulations which obviously were absolutely necessary at Doncaster, it seemed to him there should be fuller consideration of the question, and that a conclusion should not be arrived at until there had been an exhaustive investigation. They had not had a single ignition of gas in the memory of anyone in connection with a gob fire. He would like to know what was the cost of the appliance which was described in the first paper for ascertaining the temperature. In a large mine it seemed to him that if you were to have any satisfaction after making the experiment, and able to sleep in your bed, you must have a large number of these appliances in operation, or they might be misleading. Indications in regard to temperature were not always reliable. He had known cases of spontaneous combustion where there had been no notice of a rising temperature, and where the real indication was that of smell or sweating. He hoped they would have such further investigation as was promised, and that the result would be to guide and help the mining men in this important matter.

Mr. W. C. BLACKETT said he had no wish to disparage an apparatus of this kind, but they must beware what they approved, or, before they knew where they were, it might be prescribed by some Order or Act of Parliament, that every mine must have these things.

Mr. FRYAR said it was not put forward as an instrument that every colliery should have. It was an advantage to know what was going on in the goaves of mines—especially those that were subject to spontaneous combustion. The thermometer was designed to assist in obtaining information which, at the present time, was not available, and one good reason for putting it forward was to see if any of the scientific men present could suggest a better method than the one which was in use.

Mr. W. H. CHAMBERS (Rotherham) said he had nothing new to add to the paper that he read before the Midland Institute 12 or 13 years ago, and all his experience since had confirmed what he said then, that the cause of the gob fires was the absorption of oxygen in the goaves, mostly where cavities were left, by leaving timber or ribs of coal and an insufficient current of air to carry off the heat generated by chemical action. These investigations were, no doubt, very useful, the scientific interpretation of them was very interesting, but he thought the mining men wanted to get a little further. They were not concerned much how this thing came on; they knew it did come on, and they were achieving considerable success in getting early warning of heating going on by analysing the air. The Doncaster Committee were doing useful work in that way. It had been very effective. He did not think it was as yet complete, but he was interested to hear only the other day that it certainly had reduced to a very great extent the danger they previously suffered from. In their own collieries they had an average of two fires a year. They had had over 50 fires in 30 years, and within the last two years they had not had a new one, and he thought that was making progress in the right direction. By this system of analysing the air, getting early warning, they had been able to prevent the fire that would have broken out but for that early warning. With regard to the use of these thermometers, he did not see the wisdom of placing them all over the pit. The only place he put them was where there was some condition that was likely to bring a fire.

Mr. J. T. STOBBS (Stoke-on-Trent) said that, as mining people, they knew what a goaf was, and they could foresee the spot where the heating would originate. They all knew, once they put in a scientific apparatus, they advanced the confidence of sub-officials

in it; they replaced the watchfulness of men and officials by these scientific instruments. The paper on the absorption of oxygen by coal was very important. In the paragraph in the paper, where the result of experiments was tabulated, it was stated:—"The experiment, however, shows that any proposal to stop, at any rate the earlier stages of spontaneous heating by a reduction in the oxygen percentage, short of a total removal of the oxygen, would appear to have no basis in fact." In North Staffordshire, where they had seams subject to spontaneous combustion, their method of working was based on the diminution of the oxygen in the air-current, and that method had been successful. It was the best method they knew in North Staffordshire—an artificial reduction in the percentage of oxygen in the air-current.

Mr. WINMILL, in replying, said he thought everybody had gone straight on to the paper without reading the first sentence, where he said it was important to know, in connection with the consideration of the question of gob fires in mines, what was the normal goaf temperature, and he had endeavoured to describe the effect of certain conditions. It was quite conceivable it would not be desirable to put these instruments for measuring the temperature in many parts of a mine. He had not advocated putting them in every few yards. His purpose was simply to describe a convenient method for use in mines for measuring the temperature when normally you could not get it. That was the aim and object of the paper. Someone asked the cost of the coil. It was about 6d. Then to come to the question of the leads. They were the only things that cost any money at all. That was why he rejected Mr. Lamplough's suggestion to put in a fourth lead. That would cost an extra 10s. so he cut that out. He was next asked to explain a dangerous point regarding the resistance and temperature for a coil of a given kind. He used that phrase purposely, because he did not know what a dangerous point was. He thought 40 degs. Cent. was dangerous. He had no hesitation in saying that by regulating the air current coal could be caused to fire at about that point. Anything higher than that he would consider dangerous. As to the coils breaking, or giving doubtful indications, he had to say that at present there were three leads, and since those leads were bound together they were forced to assume the possibility of breaking was very remote. As he had said, if the goaf were airtight its temperature should ultimately become that of the strata around. He had tried many coils, and the temperature of none had never risen above that of the strata surrounding. Somebody asked what was the temperature of the strata. It was about 80 degs. Fahr. He was indebted to Prof. Louis for the suggestion he should try the explosibility of the non-oxidised dust. He had not tried it yet, but would do so.

Let no one think he was proposing this as more than one means of detecting a rise in temperature, and that every mine in which it was installed would not have need for watchfulness. Such an idea was ridiculous and never occurred to him. Dr. Harger thought the oxygen absorption by coal was due to turning out the methane. There, again, he was ready to fall in with the suggestion. His view was that coal absorbed oxygen. Dr. Harger thought the absorption was due to the oxygen turning out the methane. He (Mr. Winnill) had not committed himself to anything beyond the declaration that coal absorbed oxygen. Then Mr. Lamplough and Dr. Harger fell foul of his analysis of the curves. There again his critics had read into his paper very much more than he intended to convey, and increased its importance to a point which he dared not hope it would reach. Having given a curve, it was necessary, if you wanted to find out how much oxygen was absorbed, to know something about the curve, in order to get an approximate equation of the curve. You could not draw a curve to infinity. In drawing this curve he found it fell into parts. It was there suggested there were two reactions, and no doubt there were probably many more. Mr. Lamplough had suggested that this conclusion was absolutely fallacious, because of the increase in the rise of the temperature. Might he point out the normal increase in the velocity of reaction was 10 degs. Cent., was about 2; it averaged between 2 and 3 at any rate. He regretted he was not in agreement with Mr. Lamplough and Dr. Harger on this question of curves. The curves were facts; they could be interpreted as one liked. He had simply suggested one interpretation.

#### Microscopical Examination of Coal.

Mr. JAMES LOMAX read a paper describing further researches in the microscopical examination of coal, especially in relation to spontaneous combustion.

The PRESIDENT expressed the thanks of the meeting to Mr. Lomax for his interesting and valuable paper. It was a paper that would, he believed, make history.



Mr. Lomax had been studying this matter for 30 years; and for the last 25 years—probably more—he had been cutting these thin sections of coal to the thinness of one two-thousandth part of an inch. The president appealed to the meeting to say whether all the microscopical sections shown on the screen should be published, or only a portion. His own view was that the institution ought to publish them all.

The meeting readily assented to the suggestion that all should be published.

The PRESIDENT went on to say what must be the effect in years to come of the labours and discoveries of Mr. Lomax on this subject. With due respect to America and Germany, he thought Mr. Lomax had been the one to bring forward these sections. They might receive a different interpretation in the future from that they got at the present time. They might attach a proper value to such work now, but in years to come this work of Mr. Lomax would be remembered, and he would receive the credit which was his due.

Mr. FRYAR seconded the resolution of thanks to Mr. Lomax, and it was passed.

#### Votes of Thanks.

Mr. J. R. R. WILSON moved a vote of thanks to the president and council of the Manchester Geological and Mining Society for making the arrangements in connection with the meeting. Mr. Wilson said he thought this would be more or less a record meeting, not only in point of numbers attending, but as regarded the quality of the papers and discussion, and the character of the excursions.

Mr. JAMES HAMILTON (Glasgow) seconded, and the resolution was carried.

Mr. JOHN GERRARD moved a vote of thanks to Sir Thomas and Lady Holland for their hospitality in connection with the reception to be held at the Manchester University on Thursday evening.

Mr. FRYAR seconded, and the resolution was adopted.

On the motion of Mr. J. P. PULLON (Leeds), seconded by Mr. W. B. WILSON (Newcastle), thanks were accorded to the owners of collieries and works to be visited.

Dr. ATKINSON moved a vote of thanks to the president for his services in the chair, and those he had rendered to the institute.

This was seconded by Prof. LOUIS and passed with acclamation.

The PRESIDENT thanked the meeting for the resolution it had passed. He had, he said, always tried to do what he could to further the interests of the institution, and if they worked together in the future as in the past he believed—especially when they got their charter and the capital fund—their institution would rank with any other institution in the world.

#### Excursions.

The afternoon was given up to two excursions—to the engineering works of Mather and Platt Limited, Newton Heath, Manchester, and the Royal Lancastrian Pottery Works of the Pilkington's Tile and Pottery Company, Clifton Junction, near Manchester.

#### Dinner.

Members and friends to the number of about 300 had dinner in the evening at the Midland Hotel. Sir THOMAS H. HOLLAND, of the Manchester University, and president of the Manchester Geological and Mining Society, presided. The company included Dr. Garforth (president of the institution) and Mrs. Garforth, Sir Charles and Lady Behrens, Sir Alfred Hopkinson, K.C. (vice-chancellor of the Manchester University), Prof. Boyd Dawkins, Mr. W. C. Blackett, Dr. Atkinson, Mr. John Gerrard, Prof. Dixon, Dr. Edward Hopkinson, Col. Hollingworth, Prof. O'Shea and others.

After the loyal toasts had been honoured, Prof. HAROLD B. DIXON proposed "The Institution of Mining Engineers." He likened the mining engineer to the man who is between the devil and the deep sea, seeing that he had to face and combat not only the dangers that Nature had put before him, but also those barriers which had been artificially erected by lawmakers desirous of safeguarding the mine-worker. However much one might sympathise with those whose aim it was to minimise the danger of the miner, he could not help thinking that too many regulations and too much precept might act not only in a way in which they were not intended to act, but might be disastrously unfair to the engineer and the miner. He, for one, would be no party to making greater restrictions on the mining industry, for he believed that everyone in the Institution of Mining Engineers was ready and anxious to adopt measures of safety when and so soon as those measures had been properly controlled and one knew they were trustworthy. If they could say that of the rank and file—and he was sure they could—what could they say of the president, who had led the way in work not only for the safety of the mine, but also in training men who would rescue their fellow-workers in the most terrible circumstances? Dr. Garforth's fame was, he thought, quite beyond question. It was no use asking who first demonstrated that coaldust might explode. What

did that matter? Dr. Garforth was the first who actually applied in practice a remedy which, if it emerged successfully from the crucible of trial, would, he thought, be adopted all round with the greatest advantage, and not only would this institution be proud of itself and of Dr. Garforth, but generations yet unborn would thank him for his work.

Dr. W. E. GARFORTH, president of the Institution of Mining Engineers, in replying to the toast, said he was glad to tell the company that the institution continued to prosper and that the roll of membership had increased until they had 3,500 members. As to the depth at which coal had been worked, he might mention that within a few miles of Manchester they were working at a depth of 3,700 ft. and in a temperature of 103 degs. One of the difficulties of the future was how to reduce the temperature, because men working in that temperature could not possibly do the same work as men working in a lower one. As to the distance coal was brought underground, he could say that many collieries were now bringing coal from  $3\frac{1}{2}$  to 4 miles under the surface. This distance could be travelled in greater safety than in crossing from one side of Trafalgar-square to the other side. With regard to the character of the work of the institution, he was glad to say that the scientific and practical were well combined. In that respect their *Transactions* would compare most favourably with those of any other institution. It was most pleasing that day to see the scientific men taking part in the discussion on spontaneous combustion, and practical men also giving their views. He ventured to think that now they had members of the various scientific societies, microscopical and chemical, with them they had a combination of knowledge which would help them in years to come to prevent a recurrence of dreadful accidents. One word as to the output of coal. When he said that the output last year was 264 million tons, they would be able to form some idea what coalmining meant in this country. It represented a block 100 yards square at the base and 15 miles high.

Sir ALFRED HOPKINSON, K.C., vice-chancellor of the Manchester University, proposed "The City and Trade of Manchester District."

Sir CHARLES BEHRENS, deputy mayor, responded.

Prof. W. BOYD DAWKINS gave the toast of "Our Guests," and Dr. EDWARD HOPKINSON, one of the directors of Mather and Platt Limited, responded.

Mr. W. C. BLACKETT (president of the North of England Institution of Mining and Mechanical Engineers), proposed "The Chairman."

Sir THOMAS HOLLAND, in his reply, in the name of the Manchester Geological and Mining Society, offered the other federated institutes a cordial welcome to Manchester and to the royal Duchy of Lancaster. It seemed to be his luck, or, if they liked, his misfortune, to return to England at a time when some of the institutions in which he was most interested found it necessary to indulge in revolutionary reforms, all of which were necessary, he supposed, even if they were as uncomfortable as a spring cleaning. In London he found the mining and the science students divided into two camps, preparing for a veritable War of Roses, and after being so long in the fighting line each claimed him as a trained and efficient recruit. What could he do? He was a graduate in pure science, and a specialist in the purest, or as some of them would say, the most useless branch of microscopical petrology. But his administrative work in India had taught him to rove the respect and admiration for the miner which he had developed in his early days when he obtained, and, he hoped, earned his living as a student-miner. What could he do then but join both parties? As the result of a mutual understanding, he had the privilege two years later of opening the Union for both parties. The miner beside whom he worked in his early days was a metal miner. Most of those he met in India were coalminers, and he really could not tell which he liked most; they were all friends. So when he came home one party induced him to join the Institution of Mining and Metallurgy, and another lot pushed him, in spite of their by-laws, into this Institution of Mining Engineers, where coal was the chief subject. Fancy his horror, when joining the council of both, to find each applying for a charter and each expecting the jealous opposition of the other. Naturally, he thought he was in for another War of Roses. But a few months ago he had the privilege of seeing the two dukes of mining and of metallurgy join hands at lunch in London, when each promised to support the application of the other. And let him warn his hearers that that promise was made before lunch! He had said that his official contact with the mining community in India brought him friends among miners. But his interest in the subject was not personal only. It was based on the fact that pure science and practical mining were more closely united than many students of science seemed to imagine. There was a tendency not long ago for the official geologist to look askance at the man who took up economic problems in mining. He regarded the miner as of another caste, working at a low level, "where the pure light of science is dimmed by the smoke of commercialism." On the other hand, some practical men, not long ago, were inclined to regard the work of the scientific student as a harmless but useless eccentricity. The direct advantages to an industry were not always apparent; but it was a good sign of the times that the application was now so rapid. How many mining men, 20 years ago, troubled to read Prof. Dixon's Bakerian

lecture on the "Rate of Explosions in Gases"? It is true waves were known more than 20 years ago, but the first wireless installation for underground communication in this country was installed only that month. Next year, perhaps, we should see lives saved by it. Would they ask themselves, then, how many of the 12,000 odd English miners who had been killed underground during, say, the last decade, might have been saved if there had been a freer communication between scientific and practical men? This understanding must be mutual. Scientific work involved exercises in the practical verification of each theoretical deduction. Practical mining was thus a perpetual and a most exacting scientific training—more so, to him, than the cramming of scientific facts in the class-room of a university. The mining engineer had a form of education that one got too little of in the universities, and that was what ought to be the end of science—namely, discipline, both mental and physical. The product of the class-room appeared to the practical man too often as what Huxley called the product of "precocious mental debauchery," the results of book-gluttony and lesson-bibbing. This product was, as he had said elsewhere, like someone said of the early riser, who was conceited all the forenoon and stupid for the rest of the day. It was evident to him that, in spite of educational experts, the scientific student and practical worker were getting more and more to realise their mutual importance. The fact that practical mining men had asked him to take that place of honour, showed that they of the mining community were ready to remove the disabilities of science.

#### Results of the Work at Eskmeals.

On Thursday there were two excursions open to members: (1) to the electric cable works of Messrs. W. T. Glover and Co., Trafford Park, Manchester, followed by an inspection of the Ship Canal Docks; and (2) to the National Gas Engine Company's Works, Ashton-under-Lyne; and afterwards a trip to the reservoirs and waterworks, among the Yorkshire hills and valleys, of the Ashton, Stalybridge and Dukinfield corporations.

In the evening there was a large and interested assemblage in the Chemical Theatre of the University to hear Prof. HAROLD B. DIXON speak of the research work and explosive experiments at Eskmeals, Cumberland. Dr. GARFORTH presided.

Prof. Dixon showed an anxiety not to "give away" the secrets of the report on these experiments. The report was printed, he said, but not yet signed, and until that was done he did not feel at liberty to speak otherwise than very guardedly. With the aid of lantern slides he showed the buildings and equipment of the station at Eskmeals. He then illustrated the experimental work which is done there, and threw on the screen a number of photographs of flames, produced by explosions. His experiments, he said, showed that a mixture of coaldust with 40 per cent. of incombustible dust was more difficult to light than one where the percentage of non-inflammable dust was less, and with a one-to-one mixture the flame would not travel far. Somewhere about 50 per cent. they had the turning point. It was possible to ignite it. There were, however, other factors to consider. In order to have a coaldust explosion the dust must be disturbed. It had been found that a very light dust was more easily stirred by a slow licking flame than by a heavier one. Again, a flame might pass a barrier and do damage further on. The thing was to put out the flame as soon as possible. The zone system he spoke of as a poor remedy, because of the possibility of a flame driving clean through it. The remedy was to get something which could be applied in the mines, and which you could not light by any ordinary means, by any ordinary accident, such as a broken lamp, or the ignition of a little gas, or an accident to electrical plant. If they could ensure non-ignition of the dust, then he would not say that you could entirely eliminate the dangers of the mine, but you would immensely lessen them.

Dr. GARFORTH urged that it was very desirable to have an extra quantity of stonedust in the mine to dilute and render harmless the coaldust. Here was a remedy which could be applied at a small cost, seeing that at a colliery where the weekly wage bill was £3,000, the cost of providing and applying the stonedust was but £4 a week, or £200 a year on a wages and materials bill of £200,000.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—E. Pass and E. Peart, carrying on business as engineers at Station Works, Denton, under the style of E. Pass and Co.; R. S. Belsten and T. O. Morgan, carrying on business as electrical, mechanical and general factors, at Boot-buildings, Aberdare, under the style of the Electrical Wiring and Accessories Company, but latterly under the style of the South Wales Accessories Company; H. Whiteley and H. Verity, carrying on business as colliery agents, at Rawden, under the style of West Riding Coal Company; F. Riley and F. Fuller, carrying on business as engineers, at Tunstall, Stoke-on-Trent, under the style of the Speedwell Engineering Company; W. R. Blair, C. S. Dunkley, and R. N. Barnett, carrying on business as coal merchants, at Wellfield road, Cardiff, under the style or firm of the Pentwyn Coal Company, so far as regards R. N. Barnett.



ASTLEY GREEN COLLIERY.

Visited by the Institution of Mining Engineers.

The members of the Institution of Mining Engineers, who held their yearly meeting in Manchester last week, paid a visit last Friday to the Pilkington Colliery Company's new Astley Green Colliery in South Lancashire. The party numbered close upon 160, and were accompanied by Dr. Garforth, president of the institution, and Mr. J. Gerrard, H.M. inspector of mines. They journeyed by special train from Exchange Station, Manchester, and on arrival at Atley Moss Station they were conveyed by train along the company's mineral railway to the Astley Green pits, the visitors thus obtaining an idea of the difficulties which have been encountered in making a railway across the bogland of Chat Moss. At the collieries the party were received by Messrs. C. Pilkington, P. Wood and J. Files, the company's representatives, who accompanied them on a tour of inspection of the surface buildings and underground workings. Successful experiments were conducted with wireless telephones which have been installed for demonstration purposes by Herr Reinecke, the inventor, and conversations were carried on during the morning between stations at the pit bottom and a point over a quarter of a mile in the workings. At the close of the visit, which proved most interesting, luncheon was served in the firm's new-erected rescue station.

The Astley Green Colliery of the Pilkington Colliery Company Limited belongs to the Clifton and Kersley Coal Company Limited, and consists of two pits having shafts of an internal diameter of 21 ft. The sinking of these pits through the drift and the permian marls and sandstones down to the Worsley Four-feet mine at a

below the permian rocks at a depth of 459 ft. from the surface. The sinking of the pits has been continued without encountering any serious difficulty, and the following principal seams have been passed through:—

Seam.	Approximate thickness. Ft. in.	Depth from surface. Ft
Crombouke .....	3 4 .....	1,602
Six-feet .....	4 6 .....	1 752
Trencherbone .....	4 0 .....	2,481
Depth to bottom of No. 1 shaft	— .....	2 670

The work of opening out the Crombouke, Six-feet, and Trencherbone seams is proceeding as rapidly as circumstances permit.

The main winding engine at No. 1 pit is now in position. This engine, which was built by Messrs. Yates and Thom, Blackburn, is arranged with Corliss valves, and is of the tandem compound type, working at a steam pressure of 160 lb. per square inch. The two high-pressure cylinders are 35 in. and the two low-pressure cylinders 60 in. in diameter, with a stroke of 72 in. The drum is semi-conical, rising from 17 to 27 feet in diameter, and can carry a rope 2½ in. in diameter. The engine is designed to wind 8 tons of coal from a depth of 2,628 ft. in 60 seconds, giving a maximum rope speed of 82 ft. per second. The head-gear (which was made by Messrs. Head, Wrightson, and Co. Limited) is of the lattice-girder type, and is 80 ft. in height from the banking level to the centre of the sheaves, which are 20 ft. in diameter. The winding engine exhausts into a Rateau-Morison accumulator. The power station is situated midway between the two shafts, and contains one 220 kw. Belliss-and-Morcom generator and one mixed pressure Musgrave "Zoelly"

principle of the well known "Bennis" compressed air system.

The screening plant, constructed by Messrs. Heenan and Froude Limited, is in course of erection, and is designed to deal with 3,000 tons of coal per day. It consists of seven picking-belts, and will be driven by 21 motors of the squirrel-cage type.

The whole of the surface is in a more or less transitional state: sidings are being laid and brow-levels altered, and the Bridgewater Canal, which flows alongside the colliery, is being widened for a loading wharf.

The railway line which has been built to connect the colliery with the London and North-Western system on Astley Moss is interesting, as this had to be carried over the bog (in some places 28 ft. deep) for some considerable distance, and it has been found necessary to lay the line over brushwood in a manner very similar to that employed by George Stephenson when he made the first railway from Manchester to Liverpool.

MIDLAND INSTITUTE OF MINING, CIVIL AND MECHANICAL ENGINEERS.

Miners' Nystagmus.

A meeting of the Midland Institute of Mining, Civil and Mechanical Engineers was held at Doncaster on Saturday.

Mr. Robert Jagger, of Carr House, Shelley, near Rotherham, was elected as a student.

A paper by Dr. J. COURT, of Staveley, was read on the subject of miners' nystagmus. An abstract of the paper appears on p. 701 of this issue.

In the discussion on the paper, the CHAIRMAN (Mr



VISIT OF THE INSTITUTION OF MINING ENGINEERS TO THE ASTLEY GREEN COLLIERIES.

[Photo by C. B. Owen, Didsbury.]

depth of 772 ft. has already been recorded in a paper by Messrs. Charles Pilkington and Percy L. Wood, read before the Manchester Geological and Mining Society in 1910.\* This paper described in detail how the pits were sunk through the drift and the permian beds, and the following notes therefore give but briefly the particulars of the sinkings.

Each shaft was sunk 25 ft. in diameter for a depth of 30 ft., and lined with very solid brickwork, and at this depth a strong anchor weighing 25 tons was laid. A heavy thrust pillar was now built round the top of each shaft, crowned with a pressure-ring weighing 45 tons; thirteen 4 by 4-inch steel rods were run from the pressure-ring to the anchor-ring, and these formed the guides for the descending tubbing. The hydraulic jacks acted on the top of the tubbing and against the overhanging part of the pressure-ring, the thrust being taken by the 13 steel rods to the anchor-ring below, and by bolts to the bottom of the thrust pillar on the surface. The jacks exerted a total pressure of over 1,800 tons, and worked up to 5 tons per square inch. The pressure-ring at No. 1 pit is still in position on the top of the pillar, but at No. 2 pit the ring has been taken away, and segments of it can be seen lying on the surface to the east of the pit. The tubbing, headed by the cutting shoe, was forced down by 12 hydraulic jacks acting as previously mentioned, and the permian sandstones were reached at a depth of 113 ft. From this point the system of underhung tubbing was adopted, and the shaft was tubbed as it went down, the diameter of the shaft being reduced to 10 ft. 6 in. at a short distance below the cutting shoe, and a final bulging curb laid in the coal measures

400 kw. turbine. A Belliss-and-Morcom air compressor of a capacity of 1,000 cubic feet, driven by a synchronous motor of 200-horse power, is in course of erection. The switchboard is of the ironclad draw-out panel type. The three-phase current is generated at 2,000 volts, and at 50 periods. The neutral point of the system is earthed through a resistance, and a duplicate overhead line is erected round the colliery.

At No. 2 pit the original sinking engine is still in position, and will have to serve as a winding engine for some little time. The permanent winder will be placed behind it at a later date. To the east of No. 2 pit is erected an Ingersoll air compressor of a capacity of 3,000 cubic feet. It is of the cross-compound type, the steam cylinders being of the Corliss type and measuring 17 and 38 in. in diameter respectively, with a 42-in. stroke. The air cylinders are 20½ in. and 32½ in. in diameter respectively. The Schiele ventilating fan, which is a temporary one, and so arranged that the air can be reversed, is 12 ft. in diameter, and is driven by a 100 horse-power motor.

Eight Lancashire boilers, measuring 8 ft. in diameter by 30 ft. long, supply steam to the colliery at a pressure of 160 lb. per square inch. Superheaters designed for 90 degs. Fahr. of superheat are fitted, also an economiser. Five boilers are at present in use. The boilers are equipped with "Bennis" hand-fired furnaces, similar to those already in use at the Outwood and the Wet Earth collieries, both belonging to the same company. The "Bennis" hand-fired furnace is utilised to burn shale and other practically unsaleable fuel, and the furnace being self-cleaning it is possible to consume as much as 40 lb. of fuel per square foot of grate surface per hour without any bad effects due to having to open the fire doors to clean out the ashes. The furnace works on the

Walter Hargreaves, of Leeds), said he felt perfectly certain that there had been a mistake somewhere in the drafting of the regulations which had enabled county court judges to continue men on compensation until the disease absolutely disappeared. Dr. Court had done some very useful work for the mining industry if he had been able completely to upset the theory hitherto accepted that a man suffering from nystagmus was affected in the ability to distinguish a gas cap. He had recognised the importance of improved illumination and had started to furnish his pits with electric lamps. Formerly they had been using the Wolf safety lamp, which he believed gave a much better light than the majority of lamps, but they seemed to have suffered quite as much as anybody else from cases of nystagmus. He was unable to share Dr. Court's confidence in respect to amended legislation, as the attitude of the Home Office did not encourage any hope in that direction. When fresh diseases were being added, he feared they might expect little consideration in trying to put on a time limit, although experiments proved that the Home Office had been basing their calculations on wrong premisses. He had often wondered whether any man was known to suffer from nystagmus who had not been down a coalmine, and he would like to ask Dr. Court if, in his extended experience, he had come across such a case. He would also like him to tell them about the difference in quality of a light in which a man might work. For instance, he had noticed a very considerable difference between walking after an electric safety lamp in the pit and walking after an oil lamp; although the electric lamp was giving double or perhaps three times the light he could still walk after a man carrying one without the slightest discomfort to his eyes, whereas if he followed a man with an ordinary oil lamp he had

\* Inst. M. E. 1910, vol. xxxix, p. 529, C.G., June 24, 1910.



always to ask him to carry his lamp in front, so that it seemed to him that the electric lamp had not the same objectionable elements as an oil lamp.

Dr. COURT said he had never seen a case (other than miners') except due to a commencing disease of the brain or general paralysis. With regard to the quality of the light, he could say that he had carried with great comfort an electric lamp in the collieries where he had conducted his examinations, and he found, as the chairman had said, that it was much easier to follow because it was a more diffused light and there was more of it, whereas the little brilliant small light in the safety lamp, partly cut off by the bonnet, was more concentrated upon the eye in the intense darkness and was unpleasant—he could only explain it in that way—whereas the electric lamp had no bonnet and no base, and was perfectly free, like a candle, to illuminate in all directions, and the light being so diffused was much more comfortable. It was, however, useless to look for immediate results—even within 12 months they could not give an opinion, because the collieries were full of men who had previously worked with oil safety lamps, and a man who had worked with oil lamps and then went down an electrically-lighted pit and contracted an attack of influenza would, although using an electric lamp, very likely start the disease.

Mr. J. HUMBLE said that the men at Brodsworth after using electric safety lamps found themselves much better able to read the newspaper on getting to their homes than was the case when they had the old style of oil safety lamp.

Mr. BLUNT agreed with this testimony.

Mr. W. D. LLOYD said at the Altofts collieries portable electric lamps were introduced in March 1911 partly as a safeguard against nystagmus, but also to increase the safety and efficiency of the workmen. Since that time the oil lamp had been gradually replaced, and there were at the present time 1,500 electric lamps in daily use. There were lamps which would give 1·5-candle power when freshly charged, but none of them, so far as his experience went, would do so for nine hours. A light of 1·5-candle power could be obtained over an arc of 45 degs. with the lamps at present in use by using a reflector, but though reflectors were useful and desirable while the lamp was being carried, they were out of place at the coal face, and being removable were soon lost. The lamps at present in use weighed about 5½ lb., gave a remarkable good light compared with oil safety lamps, and were much appreciated by the men. A point on which Dr. Court's opinion would be valuable was whether he thought the light, which was at present being obtained with the lamps described, was really sufficient to overcome any tendency towards nystagmus. A stronger light could only be obtained by still further increasing the weight of the lamp, and it was not advisable to do this unless it was absolutely necessary. Taking the improved light into consideration, the cost of working electric lamps, he thought, could be considered fairly reasonable. A liberal estimate of the cost of working, based on nearly three years' experience, including all material required for repairs and renewals, current for charging at 1½d. per unit, all wages, including giving out the lamps and 10 per cent. depreciation on first cost, was under 3½d. per lamp per week, as compared with 1½d. or 1¾d. which he supposed would be considered the usual cost of working oil lamps—or, in other words, they were really getting nearly three times the light at about double the cost. The point he wished to elicit from Dr. Court was whether these lamps—which were really equivalent to only about 1-candle power all round—were going to bring about the results they hoped. He could not say much about the effect these lamps had had upon the men suffering from nystagmus; fortunately, they were fairly free from it at Altofts, but they had a number of men still at work who had had it, but they had not so far had a great many cases as compared with what other people had.

Dr. COURT said they must bear in mind that a lamp, no matter what candle-power it was, could not be in the same position as a candle. A man using a candle in the pit, or a flare lamp, could stick his candle or lamp close to where he was striking, and therefore got so much greater and better light where he was cutting his coal.

Mr. J. R. WILKINSON said in his experience he had not found a single case of nystagmus in collieries where candles were used, while in the same period 12 had drawn compensation from two collieries using safety lamps. The quality of the light, apart from its intensity, seemed to be a matter of importance.

Mr. G. BLAKE WALKER said that as a result of the oculists' and county court judges' interpretation of the Home Office Order, this question of oscillations was reduced to an absolute absurdity, and there were a great many people taking money out of their employers' pockets who were perfectly able to work, and always did work, until

the Home Office invented an industrial disease which enabled them to draw compensation. He was quite sure no colliery owner wanted to escape the payment of compensation in adequate cases, but it was the injustice they felt very acutely. In the first year after the disease was scheduled, the number of cases on which compensation was paid in Yorkshire was 15, but in 1911 it amounted to 225, and he had reason to believe that in the present year it would be very much higher. A man should not continue to draw compensation unless he could show that his nystagmus was of such a character as to prevent his earning his former wage. The fixing of a time limit to a claim was the only course which would satisfactorily meet the serious position. The only other alternatives he could suggest were a progressive reduction after a certain payment of full compensation, as under the National Insurance Act, and the universal practice of friendly societies, or a material reduction of the compensation payable when a colliery company offered the men surface employment; the employer was, however, afraid to give surface employment at full underground wages because of the wholesale number of men who might send in claims to secure the same terms. If, however, a substantial reduction were made in such cases in the compensation payable, colliery companies might thereby be induced to find this work, which it was admitted, would be to the workmen's own physical advantage and tend towards a cure or improvement of the disease.

Replying to Mr. HUMBLE, Dr. COURT said he had not known of a case of nystagmus with men working in candle pits.

Sir ARTHUR MARKHAM, M.P., also strongly supported the theory that improved illumination in the pit was the surest remedy and preventive of the disease. He had endeavoured to persuade the Government for some time past to appoint a committee to enquire into and report on the whole question of nystagmus, but although Departmental Committees had been appointed to enquire into most trivial matters, the Home Office had not had any authentic information put before them before they produced the Order in regard to nystagmus. They had been producing orders like a Chicago sausage-making machine; before one Order was out they had another supplementing or varying it, so that managers did not know where they were. He was a member of a Departmental Committee at the present time, and last week he asked one of the inspectors giving information his opinion on a certain Order on which men had been withdrawn from the mine, but none of the inspectors could give him any definite reply whether the men should be withdrawn or not because the Order was so indefinite, and if the inspectors themselves could not say, how was a manager to know whether he was breaking or conforming to the law? He would like to see electric safety lamps made compulsory. He had just provided something like 15,000 such lamps, and was ordering a good many more. By their use he maintained not only would the risk of nystagmus be practically eliminated, but a profit would be effected. By the aid of the better light safety would be secured; then the time lost by men running about the pit to get their oil lamp re-lit would be saved—he was told that from 10 per cent. to 15 per cent. on an average got into the dark with the old oil safety lamp; men would not have to wait at the pit bottom "to get their sight," but could go straight to their work, and, most important of all, they could see whether they were filling dirt or coal. Since the introduction of electric lamps in his pits the standard of filling was considerably improved, with advantage to the men as well as to himself, for it represented a considerable advance in wages to them. In regard to the reduction of compensation, he thought colliery companies would be more careful if, as in his own case, they were their own insurers, than when the liability merely fell upon an insurance company. He did not think the colliery companies should feel this an excessive charge. In France, in the event of a fatal accident the company had to pay £300 to the widow, and provide pensions for the children until they could earn a living for themselves. From a return issued last week he saw the total compensation for the whole of this country amounted to only 1·15d. per ton. He did not think there was the slightest chance of Parliament giving the relief Mr. Blake Walker asked for. He was sure no one in the room begrudged compensation in genuine cases, but what they did complain of was that they should have to be paying to men who spent their time drinking in public-houses, and thus not only wasting the money, but hindering their own recovery, for he was perfectly convinced that intemperance was one of the primary predisposing causes to nystagmus, and certainly prevented a recovery. That point of view had, however, never been considered by the Home Office. Dr. Court was then heartily thanked for his paper, on the proposition of the CHAIRMAN, seconded by Mr. STUBBS.

## THE GEOGRAPHICAL VALUE OF COAL.

Brief reference has already been made to the suggestive address in the geographical section at the British Association by Prof. H. N. Dickson, the president. Prof. Dickson said we were getting into the position of the merchant whose trade was constantly expanding and who foresaw that his premises would shortly be too small for him. In the type of civilisation with which we were most familiar there were two fundamental elements—supplies of food energy and supplies of mechanical energy. Since at present, partly because of geographical conditions, these did not necessarily (or even in general) occur together, there was a third essential factor, the line of transport.

On the question of transport and trade currents, Prof. Dickson said it is not likely we should have heavy freight-carrying monsters in the air for a long time to come, and until we had the aerial "tramp," transport must be effected on the surfaces of land and sea. However much we may improve and cheapen land transport, it cannot in the nature of things become as cheap as transport by sea. For on land the essential idea was always that of a prepared road of some kind, and, as Chisholm has pointed out, no road could carry more than a certain amount; traffic beyond a certain quantity constantly required the construction of new roads. It followed, then, that no device was likely to provide transport indifferently over land and sea, and the seaport had in consequence inherent elements of permanence. Improved and cheapened land transport increased the economy arising from the employment of large ships rather than small ones, for not only did transport inland become relatively more important, but distribution along a coast from one large seaport became as easy as from a number of small coastal towns.

Concentration in special areas of settlement formerly chiefly effected for military reasons, has in modern times been determined more and more by the distribution of supplies of energy. The position of the manufacturing district was primarily determined by the supply of coal. Now, in this country our present yearly consumption of coal was of the order of 300 millions of tons, and it was computed that at the present rate of increase "the whole of our available supply will be exhausted in 170 years." With regard to the rest of the world, it was impossible even to guess at the time which must elapse before a universal dearth of coal became imminent. Here again, however, the present interest lay rather in the phases of change which were actually with us. It was impossible to over-estimate the importance of what was to all intents and purposes a new departure of the same order of magnitude as the discovery of the art of smelting iron with coal, or the invention of the steam-engine, or of the steam locomotive. He meant the conversion of energy into electricity, and its transmission in that form (at small cost and with small loss) through great distances. The Plain of Lombardy produced raw materials in abundance, but Italy had no coal supply. The waterfalls of the Alps, however, yielded much energy, and this transmitted in the form of electricity, in some cases for great distances, was converting Northern Italy into one of the world's great industrial regions. Chisholm gave an estimate of a possible supply of power amounting to 3,000,000 horsepower, and said that of this about one-tenth was already being utilised in the year 1900. But assuming again, with Sir William Ramsay, that coal must continue to be the chief source of energy, it was clear that the question of accessibility now wore an entirely different aspect. However inaccessible any coalfield might be from supplies of raw material, it was only necessary to establish generating stations at the pit's mouth and transport the energy to where it could be used. One might imagine, for example, vast manufactures carried on in what were now immense agricultural regions of China, worked by power supplied from the great coal deposits of Shan-si.

It was clear, therefore, that there must begin in the near future a great equalisation in the distribution of population. Manufacturing industries would be more uniformly distributed, because energy, obtained from a larger number of sources in the less accessible places, would be distributed over an increased number of centres. The distinction between agricultural and industrial regions would tend to become less and less clearly marked, and would eventually almost disappear in many parts of the world.

So far as our information went, the development of the steamship and the railway, and the universal introduction of machinery which had arisen from it, had so increased the demand made by man upon the earth's resources that in less than a century they would have become fully taxed. When colonisation and settlement in a new country proceeded slowly and laboriously, extending centrifugally from one or two favourable spots on the coast, it took a matter of four centuries to open up a region the size of England. Now we did as much for a continent like North America in about as many decades. In the first case it was not worth troubling about the exhaustion of resources, for they were scarcely more than touched, and even if they were exhausted there were other whole continents to conquer. But now, so far as information went, we were already making serious inroads upon the resources of the whole earth. One had no desire to sound an unduly alarmist note, or to suggest that we were in imminent danger of starvation, but surely it would be well, even on the suspicion, to see if our information were adequate and reliable and our conclusions correct. What was wanted was that we should seriously address ourselves to a stocktaking of our resources.



## THE COAL AND IRON TRADES.

THURSDAY, OCTOBER 2

## Scotland.—Western District.

## COAL.

There is no new feature to be reported as regards the west of Scotland coal trade. While there is no expansion in demand, the volume of business continues satisfactory and prices remain fairly high. Although tonnage has been more scarce, coalmasters are not experiencing any difficulty in disposing of the production of the collieries and shipments are well up to normal. Ell coal is well booked for a week ahead and although the best qualities are still quoted 13s. 3d., in some cases the price might be shaded. Secondary qualities are fairly plentiful at somewhat easier rates. A large business is being done in navigation and steam coals, and some of the best qualities are fully booked for two weeks ahead. Splint coal is in active demand at firm prices. Among smalls, treble nuts are still very busy and shippers are finding some difficulty in obtaining adequate supplies. Doubles are a trifle easier, but are not by any means plentiful, while singles continue in good request, with prices the same as last week. Shipments amounted to 109,200 tons compared with 103,894 tons in the preceding week and 111,762 tons in the corresponding week of last year. At Glasgow, the total clearances were 77,618 tons, Bowling 334, Greenock 985, Ardrossan 4,357, Troon 8,881, Irvine 2,098, and Ayr 14,927 tons. Producers have learned with satisfaction of the settlement of the strike at Riga, as a continuance must surely have affected the trade of this district in time.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	12/6 to 14/
Ell .....	13/3	13/3
Splint .....	13/ to 15/3	13/ to 15/6
Treble nuts .....	13/9 to 14/	13/9
Double do. ....	12/6 to 13/	13/
Single do. ....	11/6	11/6

## IRON.

Business on the Glasgow pig iron warrant market has been quiet during the week, the total turnover amounting to only 12,000 tons, and the closing price is a shade below the previous week. Cleveland iron closed at 54s. 9d. cash, and transactions also took place throughout the week at 54s. 11½d. cash, 54s. 4½d. 5 days, 54s. 10½d. and 55s. one month. The imports of pig iron into Grangemouth from Middlesbrough and district continue fairly heavy, and amount to 17,209 tons. The number of furnaces in Scotland has been further reduced, and now total 85 compared with 86 last week, and 88 in the corresponding week last year. Prices of Scotch makers iron are unchanged. Monkland is quoted f.a.s. at Glasgow, No. 1, 68s., No. 3, 66s. 6d.; Govan, No. 1, 65s., 6d. No. 3, 64s.; Cambroë, No. 1, 71s. 6d., No. 3, 67s. 6d.; Clyde, No. 1, 73s. 6d., No. 3, 68s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 74s., Nos. 3, 69s.; Glengarnock, at Ardrossan, No. 1, 74s., No. 3, 69s.; Eglinton, at Ardrossan or Troon, No. 1, 68s. 6d., No. 3, 67s. 6d.; Dalmellington, at Ayr, No. 1, 69s. 6d., No. 3, 67s. 6d.; Shotts at Leith, No. 1, 74s., No. 3, 69s.; Carron at Grangemouth, No. 1, 74s. 6d., No. 3, 69s. 6d. per ton; Scotch hematite is quoted 71s. per ton for west of Scotland delivery. Nothing fresh can be reported with regard to the manufacturing branches of the trade. The export trade is still largely affected by foreign competition, the low rates of Continental makers enabling them to secure most of this business, and some local trade also. Scotch makers report that ordinary qualities have been in fair request, and the shipping demand is good. Local consumers are only buying against immediate requirements, and comparatively little fresh business is passing. The feeling is prevalent that the further reduction in the prices of steel decided upon at a meeting of the Steelmakers' Association held in London on Saturday last, will be followed by reductions in the prices of iron.

## Scotland.—Eastern District.

## COAL.

Although no special development has been reported in the Lothians, the recent good demand has been well maintained. All classes of coal are in request at firm prices. Collieries, as a rule, are well off for orders, and second quality steams are particularly in demand. There is an ample supply of tonnage at the various ports, as vessels have been arriving in larger numbers. Shipments are well up to normal. From Grangemouth the quantity shipped totalled 41,987 tons, Granton 11,603, Leith 54,648 and Bo'ness 19,365 tons—127,603 tons, compared with 119,247 in the preceding week and 127,034 tons in the corresponding week of last year. Prices generally remain on the same level as last week.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal .....	13/	13/
Secondary qualities .....	11/6 to 12/	11/6 to 12/
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/6 to 12/9	12/6 to 12/9
Single do. ....	11/ to 11/6	11/ to 11/6

A brisk business is being done in the Fife coal trade. There has been a large number of steamers at the ports and the pressure on the collieries has been fully maintained. A good demand has been experienced for all qualities of coal, and with the large amount of tonnage available the production of the collieries is being well maintained. The shipments have been at Glasgow 67,182, Charleston 200, 63, Dysart 2,014 and Wemyss 1,394—compared with 120,942 tons in the corresponding week of last year and 123,844 tons in the same week last

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	17/	17/
Unscreened do. ....	15/	15/
First-class steam coal .....	14/ to 14/3	14/ to 14/3
Third-class do. ....	11/6 to 12/	11/6 to 12/
Treble nuts .....	13/9 to 14/3	13/9 to 14/3
Double do. ....	12/6 to 13/	12/6 to 13/
Single do. ....	11/ to 11/3	11/ to 11/3

The total shipments from Scotch ports during the week amounted to 358,552 tons against 344,083 in the previous week and 362,640 tons in the same period last year.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 148,892 tons of coal and 3,472 tons of coke were despatched from Tyne Dock, a decrease of 9,716 tons of coal and an increase of 2,255 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 57,468 tons of coal and 1,274 tons of coke, a decrease of 104 tons of coal and 3,592 tons of coke. The Blyth shipments totalled 84,830 tons of coal and coke, a decrease of 2,284 tons. With further reference to the Egyptian State Railways' contract for 50,000 tons of North country steam coals, reported last week, it is now stated that the order has been divided as follows:—Yorkshire best hards, 20,000 tons at from 15s. 6d. to 16s. per ton, f.o.b.; best Blyths, 20,000 tons at about 14s. 9d.; and Lambtons, 10,000 tons, price not stated. There is a persistent rumour on the Cardiff market that the railways have purchased large quantities of D.C.B.'s and Yorkshires in addition to the order just mentioned, but this business cannot be traced in this district. The Russian State Railways are stated to have placed contracts for about 230,000 tons of steams for the Riga-Orel section, delivery from October into the early months of next year. Of this quantity, the order for about 50,000 tons appears to have gone to Westphalia, whilst the balance of 180,000 tons is to be drawn from this country, options of various coals—Yorkshire, Derbyshire and Northumberland—being stipulated. How this order will be divided is not yet known, for the contract is in the hands of Russian merchants who are now trying to cover their commitments in this country, and the order will, naturally, go to that district or those districts from which the most favourable terms are quoted. A contract has been arranged through second-hand holders for 10,000 tons of good ordinary unscreened Durham bunkers for delivery in monthly quantities over next year at 11s. 10½d. per ton, f.o.b. Some 60,000 tons of Durham gas seconds for similar delivery have been sold at 12s. 3d. per ton, f.o.b., a price which marks an advance on similar business recently done. The Paris, Lyons and Marseilles Railways have contracted for 100,000 tons of Durham coking coal for delivery over next year at Marseilles. The price is stated at 26-29 francs per ton delivered into wagons at that port, and the tonnage for carrying the bulk of the coal has already been booked up. These railways are now enquiring for a further quantity of 160,000 tons of Durham coking unscreened and smalls for similar delivery. The French Midi Railways also want 100,000 tons of Durham coking coal for shipment to Bordeaux over next year. Tenders of the Paris-Lyons-Mediterranean quantity are wanted by October 10, whilst offers to the Midi Railways are due in on October 7. There is also an enquiry for from 350,000 to 380,000 tons of Durham coking coal or Welsh smalls for delivery over the next year. Tenders are wanted next week. A feature in the forward market is the enquiry for best Blyth steams for delivery over the first four months of next year. Merchants are offering 13s. per ton f.o.b., but collieries want 13s. 6d. f.o.b. for delivery over any part of next year. There are reported to be considerable offers of 12s. 3d. f.o.b. for Durham gas seconds for delivery over 1914, but there does not appear to be any acceptances at that price. For shipment to Genoa over next year sellers are asking 20s. per ton c.i.f. for Durham gas bests; over the autumn 23s. 9d. is asked, and 23s. 6d. offered. There is some improvement in prompt prices this week, and business is very brisk. There is a considerable amount of congestion of loading turns, however. The following changes in f.o.b. quotations for prompt shipment are manifested on the week: Best steams, Blyths, 3d. dearer; seconds, Tynes, stronger; unscreened, is. advanced; smalls, Blyths, 3d. reduced; gas bests, 6d. more; seconds, firmer; unscreened bunkers, Durhams, 3d. increased; Northumberland, from 1s. to 1s. 6d. improved. Other descriptions of fuel are unaltered.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	14/6 to 14/9	14/3 to 14/6
Do. Tynes (Bowers, &c.) .....	15/	15/
Secondary, Blyths .....	12/	12/
Do. Tynes (Hastings or West Hartleys) .....	12/9 to 13/	12/6 to 13/
Unscreened .....	11/6 to 12/6	11/6
Small, Blyths .....	8/ to 8/3	8/3 to 8/6
Do. Tynes .....	6/9 to 7/	6/9 to 7/
Do. specials .....	9/ to 9/6	9/ to 9/6
Other sorts:—		
Smithies .....	14/	14/
Best gas coals (New Pelton or Holmside) ...	15/ to 15/6	15/
Secondary gas coals (Pelaw Main or similar) ..	14/	13/9 to 14/
Special gas coals .....	15/6 to 16/	15/6 to 16/
Unscreened bunkers, Durham ..	12/9 to 13/9	12/6 to 13/6
Do. do. Northumbrian ..	12/6 to 13/	11/6
Coking coals .....	13/6 to 14/	13/6 to 14/
Do. smalls .....	13/6	13/6
House coals .....	15/6	15/6
Coke, foundry .....	18/ to 19/	18/ to 19/
Do. blast-furnace .....	17/6	17/6
Do. gas .....	17/ to 18/	17/ to 18/

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 96,900 tons of coal and 440 tons of coke, as compared with 93,740 tons of coal and 1,600 tons of coke for the corresponding period of 1912, being an increase of 3,160 tons of coal and a decrease of 1,160 tons of coke. The coal market is without much change. Tonnage is more plentiful, and with a fairly active enquiry the tone is firm; the forward demand tends to broaden. Gas qualities appear to be fully stemmed, and are scarce. Bunker coals are steadier on a better demand. Smallers are offering more freely, and values are down. There is more enquiry for coking coals. Gas coke is in good demand. Foundry coke is a little better, and blastfurnace kind is active. Household coals are quietly steady. The Malmö Gasworks have accepted tenders for 30,000 tons of best Durham at a c.i.f. price, stated to allow 13s. for New Pelton or Holmside, and 13s. 6d. for Wear specials—shipment over next year. A contract has also been placed for 50,000 tons second Durham gas over next year at 12s. 3d. f.o.b., and 50,000 tons of ordinary Durham bunkers, shipment over the same period, has realised 11s. 10½d. The Paris, Lyons and Marseilles Railway are inviting offers of 100,000 tons of coking, unscreened and small coals, and the Midi Railways of France require 100,000 tons of coking smalls—both for delivery over next year. Quotations are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/9	15/3
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	16/6	16/6
Ordinary do. ....	16/	16/
Other sorts:—		
Lambton screened .....	15/9	15/3
South Hetton do. ....	15/6	15/
Lambton unscreened .....	13/6	13/6
South Hetton do. ....	13/6	13/3
Do. treble nuts .....	16/	16/9
Coking coals unscreened ..	13/9	13/6
Do. smalls .....	13/6	13/3
Smithies .....	14/9	15/6
Peas and nuts .....	16/6 to 17/	17/
Best bunkers .....	14/	14/
Ordinary bunkers ..	13/6	13/6
Coke:—		
Foundry coke .....	20/	20/
Blast-furnace coke (divrd. Teesside furnaces) .....	18/9	19/3
Gas coke .....	18/	17/3

With tonnage more plentiful, and loading terms difficult to arrange, rates for most directions are barely maintained. Recent fixtures include:—Havre 4s. 9d., Rouen 5s. 6d., Calais 4s. 10½d., London 3s. 6d., Hamburg 4s., Port Said 9s. 4½d., Las Palmas 9s. 6d., Marseilles 9s. 3d., Constantinople 10s. 6d., Malta 7s. 9d., Savona 9s. 9d., Venice 11s. 3d., Palermo 11s., Algiers 8s. 9d., Naples 9s. 9d., St. Nazaire 7s. 3d., Bordeaux 6s. 6d., Cronstadt 6s. 3d., Lubeck 5s. 3d., Aalborg 5s. 9d., Sundswall 5s. 9d., Gefle 5s. 9d., Fairwater 4s. 10½d., Pillau 4s. 9d.

## Middlesbrough-on-Teess.

## COAL.

There is little new to report concerning the fuel trade. Tonnage is expected to become more plentiful, and freights easier, consequently coal should move off more freely. As it is, a fair amount of business is passing. Gas coal is in good request, and the supply, especially of best sorts, is none too plentiful. Best Durham gas coal ranges from 15s. to 15s. 6d.; second kinds are 14s.; and up to 16s. is quoted for special sorts. Bunker coal is very well taken up. Ordinary Durham bunkers are 12s. 9d. to 13s. f.o.b.; superiors, 14s. to 14s. 3d.; and specials, 15s. to 15s. 3d. There is a good and increasing demand for household coal at 15s. 6d. to 15s. 9d. Coking coal is well taken up at prices ranging from 13s. 3d. to 14s. Coke is in continued heavy request for local consumption, notwithstanding recent blowing out of blastfurnaces, and up to 18s. for delivery at Teesside works has to be paid for average blastfurnace qualities. Best foundry coke is obtainable at 17s. 9d. to 18s. f.o.b. and gashouse coke is in the neighbourhood of 17s. 9d.

## IRON.

Shipments from the Tees during September fully realised expectations. They totalled 117,814 tons, 107,086 tons of which went from Middlesbrough, and 10,728 tons from Skinningrove. For the previous month the total despatches of pig were returned at 111,254 tons, and for September last year the loadings reached 118,079 tons. The Skinningrove clearances last month were practically all for Scotland, only 540 tons going elsewhere. Of the pig sent from Middlesbrough during the month just ended, 70,120 tons went to foreign ports, and 36,966 tons to coastwise customers. Once more Scotland was the largest receiver, taking 28,540 tons; whilst Germany received 13,793 tons, Japan 8,717 tons, Belgium 8,244 tons, Italy 7,357 tons, France 6,471 tons, Sweden 5,483 tons, Wales 5,185 tons, Holland 5,035 tons, and the United States 3,315 tons. Of the 17,523 tons of manufactured iron shipped at Middlesbrough last month, 9,690 tons went abroad, and 7,833 tons coastwise; and of the 27,947 tons of steel cleared, 23,803 tons went to foreign countries, and 4,044 tons to coastwise customers. India was, as usual, the largest receiver of both manufactured iron and steel, importing 6,482 tons of the former, and 6,598 tons of the latter. Pig iron continues quiet, but as provision has yet to be made to meet a good deal of the autumn needs, there is likely to be fairly brisk buying at any time. No. 3 g.m.b. Cleveland pig is 55s. f.o.b.; No. 1, which is scarce, 57s. 9d.; No. 4 foundry, 54s. 6d.; No. 4 forge, 54s. 3d.; and mottled and white iron, each 54s.—all for early delivery, but, doubtless, forward contracts could also be made at round about these figures. East coast hematite is moderately enquired for, and a few lots of Nos. 1, 2 and 3 have been disposed of at 66s., at which figure both makers and merchants are prepared to sell for either early or forward delivery. There is nothing passing in foreign ore, and market rates are nominally upheld on the basis of 19s. 6d. ex ship Tees for best rubio. Orders for manufactured iron and steel are scarce, and reduced quotations do not induce buying. Ship plates and angles have been lowered, and quotations for other descriptions are



expected to be reduced. Iron ship plates are £7 10s., iron ship angles £7 15s., steel ship plates £7 5s., and steel ship angles £8 17s. 6d.

South-West Lancashire.  
COAL

The pressure for house coal of all qualities during the last few days of September was very marked, it being general knowledge that winter prices would commence on the 1st inst. These are now in operation, being advances of 10d. or 1s. on the summer prices. With regard to shipping, work was resumed at Partington tips on Friday, and now that the strike at Manchester Docks has been settled there may be an improved demand for bunkering and general shipping purposes. The market is showing some signs of hardening a little, and present quotations for screened Lancashire steam coals range from 13s. 3d. f.o.b. for ordinary grades to about 14s. f.o.b. for the best qualities. With regard to coastwise and cross channel shipments of house coal, there has been a good deal of anxiety on the part of merchants to get prompt shipments and it has been quite impossible to meet all requirements for immediate delivery. Open sale prices are quite firm with a tendency to harden where previously small easements had been made. There is an improvement in the quantity of slack moving away from collieries, but nothing new to report with regard to price. The strike on the non-union question, which commenced early in August at Haydock and Golborne collieries, is over, work being resumed at the beginning of this week.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/	16/3
Do. (f.o.b. Garston, net) .....	16/9 to 17/3	16/6 to 17/
Medium .....	15/3	14/6
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	12/3
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/3 to 14/	13/3 to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

South Lancashire and Cheshire.  
COAL.

The attendance on the Manchester Coal Exchange on Tuesday was good. There is an improved demand for all classes of house coal, which the advance in prices has not checked. Furnace coal still meets with good enquiry and, now that work has been resumed at Partington tips, there is brisk business in shipping coal at full rates. Slack also is good. The general prices are as below:—

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/3 to 18/	16/6 to 17/
Medium .....	16/ to 16/9	15/3 to 16/
Common .....	13/3 to 14/	12/6 to 13/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

IRON.

The Associated Steelmakers reduced the price for sectional material 10s. per ton, making the price of bars now £7 delivered. Steel, if anything, is a little lower. We think parcels of good foundry iron could be bought at under 60s., forge iron 55s. The Associated Iron Bar Makers have not yet reduced their prices, which remain at £8 for Crown, £7 10s. second quality, hoops £8 7s. 6d., sheets £8 12s. 6d. Steelworks report steady work on bars at £7 to £7 5s., according to specification, and billets £5 5s. Wagon builders and engineers remain much as previously quoted. Large works are now experiencing great difficulty in securing water for the boilers, and all sorts of shifts are being resorted to.

Yorkshire and Derbyshire.  
Leeds.  
COAL.

The market on Tuesday was a busy one, both as regards attendance and turnover. An unusually large number of local merchants were present, while the Humber coal trade was largely represented. There was a great pressure for prompt supplies of house coal, but generally speaking the collieries were unable to take orders for prompt delivery, as most of them have work in hand sufficient to last for three weeks. The pits have worked full time, and all siding stocks of house coal have been cleared. Empty wagons have been somewhat scarce this week, and there have been considerable delays in the movement of loaded trucks.

*House Coal.*—The spell of warm weather has checked the demand from London and other distant markets, but colliery price lists are unaffected. The very best qualities of Haigh Moor are almost unprocurable, as the output is quite inadequate to meet the demand. The coastwise trade keeps up remarkably well, and more attention is being given by south coast and Thames buyers to the better qualities. Freight rates are slightly easier this week. In the West Riding markets the public are anxious to obtain supplies at the old prices, and merchants have in many cases had to lift ground stocks, which had been prepared for winter, in order to meet the current demand. The new pit prices are firmly quoted, and average about as under:—Haigh Moor selected, 18s. 6d. to 19s. 6d.; Wallsend and London best, 17s. 6d. to 18s. 6d.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other sorts, 14s. to 15s. 6d.

*Gas Coal.*—October schedules of deliveries specify a largely increased tonnage, and although the collieries are working at full pressure the output is barely sufficient to meet contract requirements. Very little gas coal is on

offer in the open market, but for spot lots, where prompt delivery can be given, prices are even slightly higher than contract rates. A fair quantity of rough unscreened gas coal is being exported from Hull to the nearer Continental ports.

*Manufacturing Fuel.*—There is a very large tonnage of slack on the market, and lower prices have been generally quoted during the past few days. One or two contracts have been made this week at about current rates, but generally speaking buyers are holding off from forward business in the expectation of lower prices.

*Washed Furnace Coke.*—The coke industry seems to be going from bad to worse. Sales of washed patent oven coke are reported this week at as low as 12s. per ton at the ovens. Only prompt orders or very short-term contracts are accepted at this figure, but quotations for longer date contracts are not being considered by buyers, as prices are expected to come lower still.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	15/	15/
Wallsend & London best	14/ to 14/6	14/ to 14/6
Silkstone best .....	14/ to 14/6	14/ to 14/6
Do. house .....	12/6 to 13/6	12/6 to 13/6
House nuts .....	11/6 to 12/6	12/ to 12/6
Prices f.o.b. Hull:		
Haigh Moor best .....	17/ to 18/	16/6 to 17/6
Silkstone best .....	16/ to 17/	15/6 to 16/6
Do. house .....	15/ to 15/9	15/ to 15/6
Other qualities .....	14/6 to 15/	14/6 to 15/
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 12/	11/ to 12/
Unscreened gas coal ...	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	11/ to 11/6	11/ to 11/9
Large double-screened engine nuts .....	10/ to 10/6	10/ to 10/9
Small nuts .....	9/6 to 10/3	9/9 to 10/6
Rough unscreened engine coal .....	10/ to 10/6	10/ to 10/6
Best rough slacks .....	8/ to 8/6	8/ to 8/6
Small do. ....	6/9 to 7/3	7/3 to 7/6
Coking smalls .....	6/9 to 7/3	7/3 to 7/9
Coke:—		
Price at ovens:		
Furnace coke .....	12/ to 12/6	12/6 to 13/

Barnsley.

COAL.

Much interest has been shown by those who are largely concerned in the steam coal branch of the trade with regard to the placing of contracts for supplies to the Egyptian State Railways and for other Russian ports. The first announcement that a very large proportion of the fuel required would be drawn from South Yorkshire is correct, but at the time of writing, details are not obtainable. With the Baltic season approaching its end, the latter business was sure to attract a good deal of competition and large firms have shown a keener interest in the attempt to secure the business. This has done something to check the weakening tendency which has been apparent for the last fortnight and will, perhaps, establish prices on a steady basis for the rest of the year. So far as the best quality of hards is concerned, the home market continues to be fairly strong and producers of this class of fuel can afford to ignore the foreign business. Secondary descriptions have gained a little strength owing to the new foreign enquiry, but the increasing large output from the newer collieries is now not so readily dealt with. The enquiry for all kinds of small steam fuel is again of a quieter description, and prices will, no doubt, show a greater weakness as the winter advances. Manufacturers are not taking so large tonnages as before and slacks are in less request on coke-making account, so that buyers find cheaper offers on the market. However, best steam nuts continue to be readily disposed of and pea slacks are also in fairly good request. Finer slacks are occasioning more difficulty. The gas coal collieries are kept fully at work in meeting requirements of contracts and very little fuel is offered for current sale, though the enquiry is fairly good. In regard to the house coal trade, as expected during the past few days, the collieries generally have issued new price lists imposing 1s. per ton increase on the winter prices which had prevailed during the summer. For the best class of coal, orders are very plentiful and secondary descriptions are also being more enquired for for the nearer markets, but there appears to be some doubt as to whether this will be sustained in the absence of cold weather. Merchants, at the present time, find it no easy matter to obtain their requirements from the collieries. Business in coke is again of a sluggish character, prices are still weak and the position is practically unchanged.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	16/	15/
Best Barnsley softs .....	15/3 to 15/6	14/3 to 14/6
Secondary do. ....	12/6 to 14/	11/6 to 13/
Best house nuts .....	14/ to 14/3	13/ to 13/3
Secondary do. ....	12/ to 14/	11/ to 13/
Steam coals:—		
Best hard coals .....	12/9	13/
Secondary do. ....	11/6 to 11/9	11/9 to 12/
Best washed nuts .....	11/6 to 11/9	11/6 to 12/
Secondary do. ....	10/3 to 10/9	10/6 to 11/
Best slack .....	8/ to 8/3	8/ to 8/3
Rough do. ....	6/6 to 7/	6/6 to 7/6
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/6 to 12/	11/6 to 12/
Gas nuts .....	12/ to 12/6	12/ to 12/6
Furnace coke .....	12/6 to 13/	12/6 to 13/

Hull.

COAL.

There is a fair volume of business doing in the Humber coal market. With the end of the Baltic season approaching exporters are turning their attention seriously to completing their contract requirements. Moreover, the allocation of

55,000 tons to South Yorkshire and 30,000 tons to Derbyshire by the Riga railways is inducing enquiries by the Russian merchants through whom the business will be done. Steam coal is therefore somewhat firmer and dearer on the week, and export business generally brisk; secondary sorts and smalls show no improvement. Gas coal is, however, in good demand and advanced. House coal is also in good request. Business forward over next year is in the embryo stage, and there seems little likelihood of much actual business being done until prices shape themselves as usual in the railway contracts. The freight market has been rather quiet, and rates are somewhat easier. Baltic business has been done on the basis of 5s. 9d. coal, a steamer taking 24,000 tons of coal at this figure, also taking 600 tons coke at 8s. 3d. Mediterranean fixtures are few, Genoa being quoted at 9s. 6d. to 9s. 9d. Large quantities of coal are being shipped from all the Humber ports, though only about normal shipments are reported at Hull. Loading conditions are satisfactory. A signal honour has been done to the Humber coal trade by the selection of Councillor J. H. Hargreaves, J.P., to be Mayor of Hull for the ensuing municipal year. Mr. Hargreaves is a highly-respected merchant and managing director of the Hull Coal Supply Association. The question of the one o'clock stop on Saturdays has been compromised by the men agreeing to work until five o'clock on vessels on tidal sail and to forego all claims to overtime for such work. The Hull employers, in agreeing to the settlement, expressed regret that the men had not seen their way to extend the time to six o'clock. The agreement applies to Hull, Goole and Immingham. Grimsby has not arrived at a settlement yet. The following are the approximate prices for prompt shipment f.o.b. Hull, &c.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	16/	15/9 to 16/
Washed double-screened nuts .....	13/6	13/3 to 13/6
Unwashed double-screened nuts .....	12/9 to 13/	12/9 to 13/
Washed single-screened nuts .....	13/	13/
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls .....	10/3 to 10/6	10/3 to 10/6
Unwashed smalls .....	9/3 to 9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys .....	14/	14/
Rough slack .....	10/3 to 10/6	10/3 to 10/6
Pea slack .....	9/	9/
Best Silkstone screened gas coal .....	14/	13/6
Best Silkstone unscreened gas coal .....	12/6	12/6
Derbyshire:—		
Best steam hards (Hull) .....	15/6	15/6
Do. (Grimsby) .....	15/	15/
Derbyshire nuts (doubles) .....	13/	13/
Derbyshire nuts (doubles) (Grimsby) .....	12/9	12/9
Derbyshire large nuts ...	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	15/6	15/6
Do. do. (Grimsby) .....	15/	15/

Chesterfield.

COAL

There is a marked improvement in the demand for house coal, prices of which were advanced generally on the first day of this month. Many collieries are now full of orders which can only be executed in rotation. Stocks are exceptionally low, and the return of cold weather will certainly cause a further rise in quotations. There is every indication of a good winter trade in fuel of this class. Business in coal for manufacturing purposes continues satisfactory. The demand for cobbles and nuts suitable for gas-producers is as active as ever, and prices are firm at late figures. The whole output of these qualities is readily taken up. New contracts are entered into at prices which show an advance upon those accepted twelve months ago. Slack for boiler firing is in greater demand, and prices are hardening, particularly for the better qualities. There are no stocks on hand at the collieries and consumers are dependent upon the daily output of the pits. Steam coal for locomotive use is in steady demand, and good consignments go forward from day to day. The export market is strong, and the demand for steam coal is exceptionally great. The foreign requirements of steam coal are on a large scale, and are such as to practically ensure full work for steam coal pits throughout the winter. Prices are very firm at 15s. 6d. to 15s. 9d. per ton delivered alongside steamer at Grimsby. The demand for cobbles and nuts for near Continental ports is well maintained, and large shipments are made from the Humber ports. Washed fuel continues in steady request at prices that are firm but unchanged. Gas coal is much called for. The coke market shows no improvement, the demand continuing slow and prices weak. Coking fuel finds a ready sale at firm rates.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	15/6	14/6
Secondary do. ....	13/6	12/6
Cobbles .....	12/6	12/
Nuts .....	11/6	11/
Slack .....	9/	9/

IRON.

The pig iron is lifeless at present and there does not appear to be much, if any prospect of an early change for the better. The finished iron branch of the trade is also depressed, and it is impossible to secure sufficient work to keep the plant fully occupied.

Nottingham.  
COAL.

The coal trade in Nottinghamshire is displaying a fair amount of activity, and although the general demand is perhaps not above the average for the time of the year, still most of the pits are making practically full time, the



making a point of keeping up stocks in view of increased requirements. There has been no change in the demand for household fuel, the weather militating somewhat against any decided improvement. Notwithstanding, orders are being executed on a reasonably satisfactory scale, and the position has justified owners in making an advance of 6d. per ton on all classes of house coals, this advance coming into operation on the first of this month. In the steam coal branch the demand is beginning to show a falling-off, so far as exports are concerned, but the tone in the home market is moderately active and promises to improve. Taken all round, values are keeping steady. Gas fuel is in fair request. The position in regard to slacks is about the same, some qualities being obtainable at slightly easier rates. Coke is in rather quiet request.

#### Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	13/6 to 14/6	13/ to 14/6
Good house coals.....	12/6 to 13/6	12/ to 13/
Secondary do.....	11/6 to 12/	11/ to 11/6
Best hard coals .....	11/6 to 12/6	11/9 to 12/6
Secondary do.....	10/6 to 11/3	10/6 to 11/6
Slacks (best hards).....	8/ to 8/6	8/3 to 8/6
Do. (seconds).....	7/ to 8/	7/ to 8/
Do. (soft).....	7/ to 8/	7/ to 8/

#### Leicestershire.

##### COAL.

The amount of business being done in this district still continues to be good. There is, perhaps, less urgency in the demand, especially for household coals, for which the unusual warmth in large measure accounts. But, on the whole, the various collieries are well employed, and the output is generally of a satisfactory character. Deliveries have not been quite so large in amount in the past week, but the falling off may be attributed to the weather. The little slackness is evidently only a passing phase, and a temperature more characteristic of autumn will soon cause a brisker demand. The collieries, as a rule, hold but light stocks, though, in some instances, the accumulation is more than is desirable. The steam coals are generally in good request for all descriptions, and this branch of the business shows little alteration. The outlook is generally considered to be good, as there is much business on hand, and a fair amount is current. The local merchants are not quite so busy. The quotations have in the past week undergone a change. A tendency upwards was hinted last week, and, since writing, this district has, in common with adjacent ones, put up prices to as much as 1s. a ton.

#### South Staffordshire, North Worcestershire and Warwickshire.

##### Hednesford.

##### COAL.

The coal trade generally throughout the Cannock Chase district is in much the same satisfactory condition as when last reported. Orders are coming in fairly well for most qualities of coal, consequently the collieries are being kept busy, most of them working full time. Considering the mildness of the weather, the house coal trade is remarkably good, and there is a fairly good demand for fuel for manufacturing purposes. There is not very much coal in stock. Railway sales are brisk, and business is improving slightly at the landsale depots.

##### Birmingham

##### COAL.

The coal trade is in a good position. The demand for household fuel is opening out, and regular supplies of manufacturing fuel are wanted. The revised prices came into effect on October 1. These are:—

#### Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/
Do. seconds deep .....	16/	16/6
Do. best shallow .....	14/9	14/6
Do. seconds do.....	14/	13/
Best hard .....	15/	14/6
Forge coal.....	11/	11/
Slack .....	7/6	8/
Warwickshire:—		
House coal, best Ryder ...	16/6	16/
Do. hand-picked .....		
cobs .....	14/	13/6
Best hard spires .....	15/	15/
Forge (steam) .....	11/	10/6
D.S. nuts (steam) .....	10/	9/6
Small (do.) .....	8/3	8/6

##### IRON.

The attendance was up to the average, and the conditions showed little change on the week. They can be described as only fairly satisfactory. A lack of confidence is abroad unusual to this period of the year. The returns of the Wages Board reflect the state of trade. The selling price of £8 3s. a ton is a drop of within a fraction of 5s. compared with the preceding two months, and of 5s. 9d. compared with March and April. This brings with it a reduction of 2½ per cent. in puddlers' wages, which, with the bonus of 6d. are now 11s. a ton, at which rate they will remain until the next ascertainment in December. The total output for the two months for the 17 representative firms was 29,365 tons—a drop of 552 tons from the preceding two months, and of 11,861 tons compared with the corresponding period of 1912, which, however, were part of the boom period. The high-water mark of last year was September and October, when the output reached 44,500 tons. With the market still inclined to fall, customers are very cautious about entering into commitments. The output in the figure of £9 10s. fixed at the beginning of the year, but merchant qualities have fallen to £7 5s. to £7 7s. 6d., while there is no incentive to keep all the works going full time. The price of iron is obtainable at £6 15s. to

£6 17s. 6d., against Belgian prices of £5 17s. 6d. and £5 18s. 6d., the latter figures, however, being net, while local quotations are subject to 2½ per cent. Small rounds, squares, and flats also show a declining tendency. This department feels the effects of somewhat strenuous competition from abroad. Gas strip is selling at £7 7s. 6d. to £7 10s., according to size of order, representing a reduction of 2s. 6d. Conditions in the galvanised sheet industry have also undergone a slight modification. The requirements of the agricultural district seem now to be fairly well covered, and the export trade is easily the busier. The check in output has been sufficient to cause fall in price, for while the official quotations are maintained at £11 to (in a few cases where small quantities are bought, £11 5s.), the bulk of the business is done at £10 17s. 6d. Black sheet makers have a fair amount of work on hand. Competition is keen, particularly from South Wales, and the price for doubles is about £8. Pig iron remains a weak spot in the market. Northamptonshire grey forge has, in some instances, been sold at as low a figure as 50s. Many makers, of course, refuse to accept this price, but are willing to do business at 51s. 6d. and 52s. The reduction of 10s. in steel announced during the week is, it is understood, primarily intended to combat foreign competition, but German prices are still below those of England. Semi-raw steel ranges from £4 17s. 6d. to £5 for Bessemer, and 2s. 6d. extra for Siemens. Foreign material from £4 12s. 6d. to £4 15s.

#### Forest of Dean.

##### Lydney.

##### COAL.

All qualities of steam coal are plentiful in this district at the moment, the demand having slumped very considerably during the past few weeks. Most of the collieries, however, are working full time, but a good portion of the output is going at spot prices. The house coal pits are still enjoying a good run of business, especially considering the fine spell of weather we are enjoying. Five and six days are being worked by the majority of the collieries. Stocks are comparatively light. Slack coals are still a drug in the market and there are heavy stocks.

#### Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	17/6
Forest .....	16/6	16/6
Rubble .....	16/9	16/9
Nuts .....	15/	15/
Rough slack .....	7/6	7/6
Steam coal:—		
Large .....	12/ to 13/	13/
Small .....	9/6 to 10/	9/6 to 10/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

#### THE WELSH COAL AND IRON TRADES.

THURSDAY, OCTOBER 2.

#### North Wales.

##### Wrexham.

##### COAL.

During the past week most of the collieries in this area of the coalfield have experienced a slightly improved demand for practically all classes of fuel. With the advent of October, house coal is much better sold and prices are improving. During the summer prices have remained steady on the whole, and as at the beginning of July the coalowners put on another advance owing to increased cost of production, buyers held back from making contracts, and bought from hand to mouth, in hope that prices would fall later on. This, however, has not been the case, excepting for spot lots now and then, and now further advances are being quoted, both for the open market and forward contracts. The landsale retail depots are fairly busy, and here again a slight advance in prices has taken place. The trade in steam coal is brisk for locomotive, manufacturing and shipping purposes, and a large tonnage has been sent away during the past week. There is some difficulty, however, in getting the quick return of wagons from Birkenhead, owing to the greatly congested state of the traffic there. With reference to large coal and nuts for gas making, the average weekly quantities against contracts have been supplied, and prices remain unaltered. There is an improvement in the market for slack, and prices are being advanced to the extent of 6d. per ton and upwards for good rough sorts. There is no alteration in the market for gas coke. This week's average prices are as follow:

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal .....	15/6 to 16/6	15/ to 16/
Secondary do. ....	14/6 to 15/3	14/ to 15/
Steam coal .....	12/6 to 12/9	12/6 to 13/
Gas coal .....	13/ to 13/9	13/ to 13/6
Bunkers.....	12/3 to 12/9	12/ to 12/6
Nuts .....	11/ to 11/6	11/ to 11/6
Slack .....	6/6 to 7/6	6/ to 7/9
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 18/9	17/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/6 to 12/6

#### Monmouthshire, South Wales, &c.

##### Newport.

##### COAL.

A decline in ready tonnage and a slow enquiry have combined for some days now to weaken the tone of the coal market, the result being shown in the quotation list, which in nearly every item indicates reduced values. A few leading collieries are well placed enough to quote recent figures firmly, but, generally speaking, the market is very haphazard, with sellers eagerly seeking to place consignments. Stocks are very plentiful just now, sidings at docks and collieries being congested with laden wagons, and until considerable accretions of tonnage come to hand, no

improvement can be foreshadowed. In the freight market, business has been fairly active, rates being fully maintained and the enquiry here is the least disappointing feature of the market. Pitwood supplies have not been too abundant, but the difficulty of obtaining receivers has considerably hampered sellers, who otherwise might have done better. Best French fir has changed hands at 22s. ex-ship.

#### Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	16/9 to 17/	16/9 to 17/
Western-valleys, ordinary	15/9 to 16/	16/ to 16/6
Best Eastern-valleys .....	15/6 to 15/9	15/6 to 16/
Secondary do. ....	15/ to 15/3	15/ to 15/6
Best small coals .....	7/9 to 8/	7/9 to 8/3
Secondary do. ....	7/3 to 7/6	6/6 to 7/
Inferior do. ....	6/9 to 7/	6/ to 6/6
Screenings .....	8/	8/ to 8/3
Through coals .....	12/3 to 12/6	14/6 to 15/
Best washed nuts .....	13/9 to 14/	15/
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/ to 20/	19/ to 20/
Furnace coke .....	20/6 to 21/	23/ to 25/
Foundry coke .....	24/ to 26/	27/ to 30/

##### IRON.

The conditions of the local iron and steel trades remain practically as last reported. Not a great amount of fresh business has been transacted, and quotations show little or no alteration. At bar mills work remains good, but only a very little forward business is being done, values remaining steady at last quoted figures. Imports of foreign bars for the week total 6,000 tons, with quotations for these, too, showing no alteration. Rail mills continue to be well engaged, with values steady at last quoted figures. There is a slight improvement generally at blastfurnaces, so far as volume of business is concerned, but as yet no increase in prices obtained. Trade remains very quiet in the tin-plate department; several mills are still out of operation, and very little fresh business is being negotiated. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tin-plate bars: Bessemer £4 16s. 3d., Siemens £4 16s. 3d. to £4 17s. 6d. Tin-plates: Bessemer primes, 20 × 14, 13s. 3d., 28 × 20, 26s. 7½d.; Siemens primes, 20 × 14 13s. 3d., 28 × 20 26s. 7½d. Finished black plate, £9 15s. to £10 per ton. Pig iron: Welsh hematite, 73s. to 74s., delivered in the district.

##### Cardiff.

##### COAL.

During the past week there has been a scarcity of tonnage, which, however, has been compensated for in a large measure by the stoppage for four or five days of some 7,000 men employed at the Cambrian and Naval collieries. It is estimated that the loss in wages caused by this stoppage was about £10,000. At present the non-unionist question is a burning one. Even at the pits which are working it is found that the outputs, instead of increasing, as was expected would be the case, are considerably less than they were during the corresponding weeks in August. The only explanation of this state of things is that the miners must be still prolonging their holidays. There is no doubt that they have plenty of funds, as for many months past wages have been at a maximum. Last week the shipments amounted to a little over 355,000 tons. The charterings for the week totalled about 276,000 tons, or 22,000 tons more than in the preceding six days. Best collieries are well stemmed and, except in isolated cases, they are able to command anything from 20s. to 20s. 6d. for their coals. In the case of middlemen, lower prices have been, and are being accepted. Superior second Admiralties are 19s. to 19s. 6d., and ordinary seconds 18s. 3d. to 18s. 6d. Contracts for 1914 are still hanging fire, but as there are still three months to run before the end of the present year, sellers are showing no anxiety, but are still maintaining the attitude they have consistently taken up—that buyers will have to pay considerably higher prices over next year than they have had to pay over this. Naturally, buyers are loth to pay these increased rates, and continue to hold off, but whether this policy is a wise one only the future will disclose. It is no secret that the Admiralty last year, through the delay on their part in entering into their usual 12 months' contracts, had to pay at least 1s. per ton more than they would have been able to purchase at a month or so earlier. The tenders which the Egyptian State Railways invited for 50,000 tons of north country coal, in addition to the contracts which they placed with Messrs. Milburn and Co. and Messrs. Morgan, Wakley and Co., as reported in last week's *Colliery Guardian*, have since been adjudicated upon. At first it was reported that the entire order had gone to Tyne shippers, but this turns out to be incorrect. Both Blyth coal and Yorkshire coal have been taken, the former at about 14s. 9d. f.o.b., and the latter at 15s. 6d. to 16s. f.o.b. Messrs. Morgan, Wakley and Co., it is stated, have secured an order for 35,000 tons of small coal for the Belgian State Railways. There is usually a good deal of competition for these orders, and on the present occasion it is believed that the prices ranged from 15½ fr. to about 17 fr. delivered at Antwerp and Ghent. There are several other contracts open, the principal one being for 380,000 tons of small coal for the French State Railways for delivery over next year. Another large enquiry is coming from the Paris, Lyons, and Mediterranean Railway authorities, who ask for tenders for about 50,000 tons of large steams for delivery at Marseilles from January 1 to August 31, and for 100,000 tons of small for delivery over the whole of 1914. There are also about due enquiries from the Argentine and Irish railways. Although it is customary for exporters to suspend the shipment of small coal to a very large extent during the ingathering of the fruit harvest in Italy and Spain, there continues to be a fairly good demand, and as much as 8s. has been paid for cargo qualities. The present price, however, is round about 7s. 9d. Bunkerings are from 10s. 3d. to 10s. 6d. per ton. Although stocks of Monmouthshire coals are rather heavy, there is no easiness in quotations. Black Veins are still quoted at 16s. 9d. to 17s., western-valleys at 16s. 3d. to 16s. 6d., and best eastern-valleys at 15s. 6d. to 15s. 9d., in each case f.o.b. Cardiff. There is no change in house coals, fancy qualities of which still command 20s. 6d. No. 3 Rhondda bituminous is



16s. 6d. to 17s., No. 2 ditto 12s. 6d. to 13s. In consequence of the scarcity of tonnage freights, are still maintained, especially for the Italian ports, the current rate for Genoa being 9s. 6d. to 9s. 9d. Shipments of coal coastwise during August amounted to 305,794 tons, as against 328,417 tons in the corresponding month of last year, being a decrease of 22,623 tons. From Cardiff alone there were shipped 149,251 tons, of which Southampton took 38,930 tons, London 32,640 tons, Liverpool 24,950 tons, and Bristol 17,905 tons. From Newport the shipments were 60,781 tons, Swansea 36,866 tons, and Port Talbot and Briton Ferry 18,184 tons. The Cardiff *Journal of Commerce* publishes the following as the average declared price per ton of coal exported from the chief Welsh ports during the month of August:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam .....	17	5	16	4	16	4	15	4
Through-and-through	15	7	14	10	11	0	11	3
Small .....	9	8	11	4	8	7	9	10
Large anthracite .....	21	0	29	6	16	7	17	7
Household .....	16	4	—	—	—	—	13	8

Prices in August of last year were:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam .....	16	0	15	0	14	9	15	3
Through-and-through	11	3	11	2	10	7	10	4
Small .....	9	1	10	4	8	6	8	6
Large anthracite .....	24	7	—	—	16	4	17	5
Household .....	17	3	—	—	—	—	—	—

Shipments of patent fuel for the week amounted to 34,832 tons, of which the Crown Company loaded 15,232 tons, and other local makers 6,830 tons, Swansea 9,170 tons and Newport 3,600 tons. Prices of best brands are still 22s. 6d. Contracts have been made over next year at 19s., less 3d. There is no improvement in the coke market. Selected foundry is nominally 28s. to 30s., ordinary qualities 4s. to 5s. less. Furnace coke is 20s. to 21s. The pitwood market is weak, best French fir selling at 21s. 9d.

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	20/ to 20/6	20/ to 20/6
Superior seconds .....	19/ to 19/6	19/3 to 19/6
Ordinary do. ....	18/3 to 18/6	18/3 to 18/6
Best bunker smalls .....	10/3 to 10/6	10/ to 10/3
Best ordinaries .....	10/	9/6 to 9/9
Cargo qualities .....	7/9 to 8/	7/6 to 7/9
Inferior smalls .....	6/3 to 6/9	6/ to 7/
Best dry coals .....	18/ to 18/9	18/ to 19/
Ordinary drys .....	15/6 to 16/	15/9 to 16/6
Best washed nuts .....	16/ to 16/6	16/
Seconds .....	15/ to 15/6	15/
Best washed peas .....	14/6	14/
Seconds .....	13/6	13/
Dock screenings .....	11/9 to 12/	11/9
Monmouthshire—		
Black Veins .....	16/9 to 17/	17/
Western-valleys .....	16/3 to 16/6	16/6 to 16/9
Eastern-valleys .....	15/9 to 16/	16/3
Inferior do. ....	15/3 to 15/6	15/3 to 15/6
Bituminous coals:—		
Best house coals (at pit)	20/6	20/6
Second qualities (at pit)	17/6 to 18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	16/6 to 17/	16/9 to 17/
Through-and-through .....	15/	14/9 to 15/
Small .....	12/3 to 12/6	12/6
No. 2 Rhondda—		
Large .....	12/6 to 13/	12/ to 13/
Through-and-through .....	10/6 to 11/	10/6
Small .....	7/6 to 7/9	7/6
Best patent fuel .....	22/6	22/6
Seconds .....	19/9 to 20/6	19/6 to 20/6
Special foundry coke .....	28/ to 30/	28/ to 29/
Ordinary do. ....	23/ to 26/	25/
Furnace coke .....	20/ to 21/	19/ to 20/
Pitwood (ex-ship) .....	21/9	22/

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

#### IRON.

The tinplate trade continues very dull. Shipments for the week only amounted to about 75,000 boxes, or some 10,000 boxes less than were received from works, and stocks now stand at 316,610 boxes. Some of the mills are well booked to the end of the year, but others have very little to do. Probably the mills generally are not working more than about three-quarters of their capacity. Trouble has arisen at Pontardawe and Glanaman, but it is hoped that an amicable settlement will soon be effected. The Cilfrew Works, near Neath, which have been closed down since last April, are expected to restart in the course of the next two or three weeks. These works employ about 200 men. Manufacturers find it impossible to get higher prices for their plates on account of the keen competition existing. In no case can they realise anything beyond the 13s. 3d. basis, and in many cases a concession of 1½d. per box has had to be given. Oilplates are 13s. 7½d. to 13s. 9d., except for 10 × 20, which are 19s. 3d. to 19s. 6d. As the duty on tin-plates has been reduced by the United States Government from about 32 per cent. to 15 per cent., it is possible that some increased business will result, but makers do not seem to be very optimistic. Imports of foreign steel bars during the week amounted to about 3,000 tons. Prices of Welsh tinplate bars are without alteration, Siemens still being quoted at £4 16s. 3d., and Bessemer at £4 15s. In the galvanised steel trade there is an improvement as compared with a few weeks ago, but the depression in spelter has prevented the placing of new orders. Some of the makers still quote £11 for 24-gauge corrugateds, but others are accepting £10 17s. 6d. The total exports for the eight months ending August amounted to 498,073 tons, being an increase of nearly 96,000 tons as compared with the corresponding period of last year, but it must not be forgotten that the returns were materially affected then by the national coal strike. There is no

change in rails. Iron and steel workers' wages were advanced on Wednesday 2½ per cent. Welsh pig iron is 71s. to 71s. 6d. f.o.t. Scrap metals are unchanged.

#### Swansea.

#### COAL.

The trade of the port last week was again of a very satisfactory nature. The coal and patent fuel trades were active, the shipments amounting to 107,855 tons. There was a capital attendance on 'Change this morning, but the anthracite coal market was without much alteration. There was not a great deal of business passing, and the undertone was quiet. Swansea Valley large was freely offered for immediate delivery at lower figures; but for the better qualities prices were inclined to harden. Red Vein large was slightly weaker, whilst machine-made nuts and cobbles were easy. Both rubbly culm and duff were rather slow. In the steam coal market there were very few enquiries, and this department closed a shade easier.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large (less 2½ per cent.) .....	17/ to 18/	17/ to 18/
Red Vein large do. ....	12/9 to 14/6	12/9 to 14/6
Machine-made cobbles (net) .....	21/6 to 23/	21/6 to 23/
Paris nuts (net) .....	23/6 to 26/6	23/6 to 26/6
French do. do. ....	23/6 to 25/6	23/6 to 25/6
German do. do. ....	23/6 to 25/6	23/6 to 25/6
Beans (net) .....	16/6 to 18/6	16/6 to 18/6
Machine-made large peas (net) .....	12/ to 13/6	12/ to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	6/3 to 6/6	6/3 to 6/6
Duff (net) .....	4/3 to 5/	4/6 to 5/3
Steam coals:—		
Best large (less 2½ p.c.) ..	19/ to 20/	19/ to 20/
Seconds do. ....	14/ to 16/	14/ to 16/
Bunkers do. ....	11/3 to 12/3	11/3 to 12/3
Small do. ....	7/9 to 8/6	7/9 to 8/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) ..	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

#### IRON.

There was some slight improvement in the tin-plate trade last week. The prospects were that more of the mills would be fully employed, but the industry, while improving, was somewhat hampered by the high cost of raw material. The mills in operation registered good outputs, and in a couple of instances there were substantial increases. The galvanised sheet trade shows a marked improvement on the position of a few weeks ago. The yield of pig iron at the blastfurnaces was quite up to the average, and there was a good production of steel ingots at the various steelworks. The bar-rolling mills were also actively engaged. Last week the shipments of tin-plates were 75,497 boxes, receipts from works 84,314 boxes, and stocks in the dock warehouses and vans 316,610 boxes.

#### Llanelli.

#### COAL.

The coal trade of this district continues to be fairly satisfactory, and the demand for most qualities, with exception of the manufacturing kinds, continues to be good. The prospects of the coming months are certainly better than they have been for a considerable time and prices are firmer at the moment than they have been for the past two or three years. For the trade to be so firm so early in the season speaks well for the next six months. Unfortunately, tonnage is still rather scarce and this is keeping the market back somewhat. All the anthracite large kinds are in big demand and most of the collieries raising the horticultural coal are fully sold and will not entertain new business at the moment. Prices for these kinds advanced a shilling a ton on the 1st inst. The machine-made kinds, with the exception of stove qualities, are not very firm, and there is ample room for improvement. The position is still very quiet in steam and bituminous, most collieries are working full, but prices are down considerably. This week's prices are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	20/6 to 22/6	20/6 to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	17/6 to 18/6	17/6 to 18/6
Red Vein do. ....	14/2 to 15/	13/6 to 14/6
Machine-made cobbles ...	19/6 to 20/6	19/6 to 20/6
German nuts .....	23/ to 24/	23/ to 25/
French do. ....	23/ to 24/	23/ to 25/
Paris do. ....	24/ to 25/	23/ to 25/
Machine-made beans .....	20/ to 21/	20/ to 22/
Do peas .....	12/6 to 13/	13/ to 13/6
Rubbly culm .....	6/9 to 7/3	6/6 to 7/
Duff .....	5/ to 7/	5/ to 7/
Other sorts:—		
Large steam coal .....	17/ to 18/6	17/ to 18/
Through-and-through ...	11/6 to 12/	11/6 to 12/
Small .....	9/6 to 10/6	9/6 to 10/
Bituminous small coal ...	10/6 to 11/6	10/6 to 11/6

"They are working night and day at the works," is the information in regard to the efforts of the directors and managers of the Workington Combine to get the rail mill and other departments re-started at Moss Bay. Probably the rail mill will be started within a week. Everything depends upon the progress made by the engineers and their staff of fitters, workmen and labourers, so that it is impossible just yet to fix a date for the resumption of operations. The fishplate mill will start, it is expected, shortly after the rail mill.

#### MINE MANAGERS' EXAMINATIONS.

##### Mine Surveys.

A rule has been made by the Board for Mining Examinations and approved by the Secretary of State, September 11, 1913, under section 9 (2) of the Coal Mines Act, 1911 (1 and 2 Geo. 5, c. 50), amending the rules of July 30, 1912, and March 7, 1913, as to the qualifications of applicants for first- and second-class certificates of competency.

For the second paragraph of rule 4 (a) (v) relating to the qualifications of applicants for first-class certificates of competency as amended by the rule of March 7, 1913, shall be substituted the following paragraph:—

"Each candidate must produce a plan of a mine survey and an underground levelling made and drawn by himself with the original plottings and the notes from which the plottings have been made, and the work must be certified by him as having been carried out by himself. The plan and levelling must have been made and drawn not more than 12 months before the date of the examination."

#### DEVELOPMENTS AT KIRKBY COLLIERY.

##### The Sinking of Internal Shafts.

Members of the Midland Colliery Managers' Association on Saturday visited the Kirkby Colliery of the Butterley Company to inspect the sinking of an internal shaft from the Top Hard seam to the Soft coal seam 166 yards below. There was a good attendance of members, who were much interested in the successful carrying out of this important undertaking.

Mr. J. BIRCUMSHAW, manager of the colliery, read a short paper, in which he stated that during 1912 the directors decided to sink deeper one of the existing Kirkby shafts. Sinking operations were commenced on January 4 last at the upcast shaft, and were continued until the end of July. During this period a depth of 200 yards was reached below the Top Hard coal and the Waterloo Deep Soft and Deep Hard seams were proved. The work of sinking was necessarily slow, as the shaft was available for sinking for only about 12 hours daily, owing to winding men and coal at the same shaft. After the men are brought out each day the shaft is examined and cleared of any loose material, and then the sinking rope is attached to the link below the winding rope capel, and the banking platform, bogie truck and partition for protecting the sinkers are erected. This takes about an hour, and the same time is taken in dismantling at the end of the sinking shift in making ready for the coal-winding shift. An interesting part of the sinking arrangement was the manner in which provision was made for the rider passing through the rail track of the travelling bogie at the banking level of the Top Hard seam. A model showed how this was accomplished. At the end of July it was considered advisable to suspend sinking operations at the upcast, and the sinkers were transferred to the new shaft to sink through the water-bearing limestone during the time the permanent machinery was being constructed. The new shaft was 20 ft. diameter. About 27 yards had now been sunk, and was being lined with cast iron tubbing. The measures at this point were fairly dry, and it was hoped no further tubbing would be necessary. The Soft coal was proved at a depth of about 530 yards, and it was quite probable this seam would be worked. Winding and surface arrangements were being made for dealing with an output of 2,000 tons per day of eight hours, allowance being made for the usual stoppages.

Mr. STRACHAN, the president, thanked the Butterley Company for giving their permission to visit the colliery, and particularly Mr. H. Eustace Mitton, who was mainly responsible for permission being obtained. He was sure they would all benefit by what they had seen—the turbo-electrical plant, the sinking, &c., all of which showed that there must have been great perseverance on the part of Mr. Mitton and his staff.—Mr. McLAREN, seconding, recalled the fact that he was engaged at the colliery some seventeen years ago, when the output was about 700 tons, as compared with some 2,400 tons per day at the present time. Improved methods of working had been adopted involving the use of extensive electrical plant and underground haulage, the success of which must have more than compensated for the capital outlay. The sinking of the new shaft and the working of the lower coal measures meant more capital, more labour and an assurance of continued prosperity for the district.

Mr. MITTON, acknowledging the vote of thanks to himself, said, anticipating the requirements for further electrical power, an exhaust- and mixed-pressure steam turbo-generator of the B.T.H.-Curtis type was installed in August. This plant had been running most satisfactorily, and a duplicate had been ordered for their Britain Colliery. It was of 500 kw. capacity; it used exhaust steam from the winding engines, which was hitherto wasted in the atmosphere, and used high-pressure steam when the winders were standing for long periods. When they came to think that all the power required for hauling, cutting and screening 2,400 tons of coal per day of eight hours was provided from the exhaust steam referred to, they must be struck with the rapid strides that had been made in the past few years in harnessing what had hitherto been a waste of power. Their idea, as far as possible, was to have every thing in duplicate, so that in the event of anything going wrong with one plant the spare plant would be available for continuity of service. They had to thank Mr. Bircumshaw, Mr. Drabble, Mr. Turton and their staff for the able way in which they had solved the various difficulties which were met in carrying out the work.



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(A Classified List appears on page 708.)

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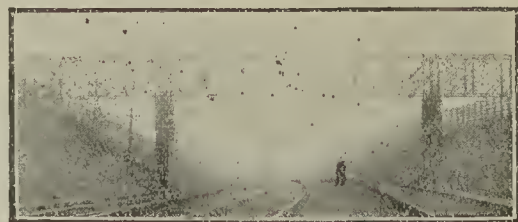
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\* \* For other Miscellaneous Advertisements see Last White Page.

### Forthcoming Annual Meetings.

Manchester Geological and Mining Society—

October 14, 1913

South Staffordshire and Warwickshire Institute of Mining Engineers ... .. October 20, 1913

## The Colliery Guardian.

LONDON, FRIDAY, OCTOBER 3, 1913.

The annual conference of the Miners' Federation of Great Britain will be held at Scarborough during next week. Mr. R. Smillie will preside.

The Conciliation Board for Scotland will meet to-day (Friday) to consider the owners' request for a reduction of wages of 9d. per day.

The men employed in and about the collieries of North Staffordshire handed in their notices on Saturday to terminate their contracts within 14 days. The non-union question is once more the cause of the trouble; about 2,000 only of the 30,000 men affected are non-unionists. The owners contend that the action of the union is illegal.



It is stated that, owing to faults in seams involving heavy labour costs, and the refusal of the shareholders to provide fresh capital to cope with the difficulty, the directors of the Duffryn-Rhondda Colliery Company have decided to propose the voluntary winding up of the concern.

The Lord Mayor on Wednesday opened the National Gas Exhibition at Shepherd's Bush. The object of the exhibition is to illustrate the many applications of gas. Interesting conferences and lectures have been arranged for the discussion of such subjects as smoke abatement and the proper use of coal gas in domestic and industrial spheres.

The Miners' Federation have decided to take the case of *Herd v. the Weardale Steel and Coke Company* to the House of Lords. The question involved is the right of miners to be brought to the pit bank at any time when such action did not interrupt coal drawing. The plaintiff was originally awarded damages for false imprisonment, but this decision has been reversed by the Court of Appeal.

At a meeting of the Midland Institute of Mining, Civil and Mechanical Engineers on Saturday, Dr. Court contributed a paper on the subject of miners' nystagmus, and suggested that a time limit should be recognised.

from the Home Office. Mr. Robert Nelson, H.M. Electrical Inspector of Mines, gave it as his opinion that the conditions after the fire pointed to the possibility of an electrical origin. The Commissioner declined to admit the correspondence between the Home Office and the Scottish owners on the ground that it did not affect the questions before him. The proceedings for the last three days are given elsewhere in these columns.

The Miner's Output.

IN our leading article last week we drew attention to the statement made by Mr. W. WALKER, H.M. inspector of mines, in his annual report for the year 1912, that there had been a scarcity of labour at nearly all the mines in the Scotland district. This state of affairs is by no means confined to Scotland, and at the recent annual meeting of the Sheepbridge Company Lord ABERCONWAY made special reference to the subject. He said that "he believed that the greatest difficulty ahead was the want of men. They were short of men to-day, and they did not know where to get them. There was not one colliery owner who could not do with 1,000 more men in his pit if he could get them." This is serious, but it is only half the story. Referring

the number of mechanical coal-cutters employed in the United Kingdom was 1,659; in 1909, 1,691; in 1910, 1,959; in 1911, 2,146; and in 1912, 2,444; an increase of 785 in the quinquennial period, or 47 per cent.

Whilst the quantity of coal produced in the United Kingdom, per person employed, has steadily fallen, the personal output in other countries, in almost all cases, has risen. The table below, taken from the Coal Tables, 1911, issued by the Board of Trade, gives an interesting comparison.

One of the causes to which the diminished output per person employed in the coalmines of the United Kingdom is attributable, is the Eight Hours Act. At the annual meeting of the Pearson and Knowles Coal and Iron Company, the chairman, Sir J. S. HARMOOD BANNER, said that the shorter hours now worked accounted for two-thirds of the reduction of output per man, and that absenteeism was responsible for a further 20 per cent. Many of our readers will remember the optimistic views which were expressed by the promoters in Parliament of the Eight Hours Act. This is the actual result.

A further drawback as regards the productiveness of labour, pointed out by Sir J. S. HARMOOD BANNER, consists in the fact that under the Minimum Wage Act there is now a

QUANTITY OF COAL PRODUCED PER PERSON EMPLOYED, IN TONS.

	United Kingdom. <sup>a</sup>	British India.	Dominion of Canada. <sup>d</sup>	Commonwealth of Australia.	Dominion of New Zealand.	Union of South Africa. <sup>h</sup>				Russian Empire.	Sweden.	German Empire. <sup>e</sup>	Belgium.	France.	Spain.	Austria.	Japan. <sup>j</sup>	United States.
						Natal.	Orange Free State. <sup>g</sup>	Transvaal. <sup>g</sup>	Cape of Good Hope.									
1886-90	312	60	341	333 <sup>b</sup>	359 <sup>b</sup>	104 <sup>f</sup>	—	—	109	139	138	272	177	209	114	181	96 <sup>f</sup>	400 <sup>f</sup>
1891-95	271	65	375 <sup>b</sup>	358	388	164	—	232 <sup>i</sup>	45	161	130	251	166	197	109	177	98	444
1896-1900	298	68	457	426	441	123	—	215 <sup>b</sup>	56	162	136	264	175	209	130	173	90	496
1901-05	281	82	495	437	474	164	—	249	68	154	142	240	165	196	131	172	125	543
1906-10	275	100	439	462	470	211	309 <sup>b</sup>	304	59	150 <sup>i</sup>	142	249	163	191	150	188	109	596
1907	292	99	425	491	468	213	302	277	63	155	149	258	163	197	153	195	106	630
1908	271	99	422	497	478	200	312	286	52	146	147	246	160	189	150	190	115	538
1909	266	99	400	388	456	209	306	323	57	—	123	239	162	195	162	181	97	617
1910	257	104	453	449	478	229	302	356	59	—	146	212	164	188	156	183	112	618
1911	260	109	394 <sup>c</sup>	485 <sup>c</sup>	481 <sup>c</sup>	243	274	439	71	—	144	—	157	—	—	191	—	613 <sup>c</sup>

<sup>a</sup> The figures are based on the total number of persons returned to the Home Office as employed in mines under the Coal Mines Regulation Act, after deducting the estimated number engaged in raising minerals other than coal. They are not, therefore, identical with the figures given in the text above, but they are relative.

<sup>b</sup> Average for four years.

<sup>c</sup> Provisional figures.

<sup>d</sup> British Columbia and Nova Scotia only, for 1906 and prior years. In later years the particulars for Saskatchewan and Alberta are also included. These four provinces accounted for about 99½ per cent. of the total production of the Dominion in 1911. Number of persons employed in and about coalmines in the other provinces cannot be stated.

<sup>e</sup> These figures relate to the average number of persons employed during each year.

<sup>f</sup> Average for two years.

<sup>g</sup> British from 1900.

<sup>h</sup> The figures for Natal represent the average number of persons employed at producing collieries on productive work during the period of output in 1906 and previous years. In the years 1907 to 1910 the figures represent the average number of persons employed on productive and non-productive work during the year. The particulars for 1911 for each State of the Union of South Africa show the number of persons at work during the year.

<sup>i</sup> Average for three years.

<sup>j</sup> Persons employed in private mines only in years prior to 1897: the production per person employed is calculated on the output of private mines only in those years. The number of persons employed in State mines cannot be given, but it is known to be small.

An inquest was held on Friday last into the accident which occurred at the Silverwood Colliery, belonging to the Dalton Main Colliery Limited, whereby three men lost their lives owing to a fall of coal.

The Scottish, North-east of England and Midland steelmakers' associations have decided to reduce their minimum selling quotations by 10s. per ton. This is the second reduction of a similar extent intimated this year.

The prolonged strike of miners in the Edge Green and Golborne district of South Lancashire has at last come to an end. The men struck work on the non-union question, and the men who were not members of the Federation before the strike have now consented to join it. The cost of the strike is estimated at about £20,000.

It is understood that, regarding the proposed re-establishment of the Conciliation Board for the regulation of wages in the Northumberland coal trade, the coalowners and the representatives of the men have agreed to the principle of a minimum percentage, and the point now to be settled between the two parties concerned is the selling price at which the minimum percentage should be applied.

The enquiry into the Cadder Colliery fire disaster on August 3 was concluded on Saturday before Sir Henry Cunynghame, Commissioner

to the shortage of men, Lord ABERCONWAY said that "the men employed worked a good deal less than the time that was placed at their disposal," and that "in the coal and other trades generally the men were working about 20 per cent. short of their full possible time, which meant that one-fifth of the trade resources were idle." This view of the situation is amply confirmed by the General Statistics issued by the Home Office, for it is stated\* that in 1912 the average output of mineral at mines under the Coal Mines Act was 311 tons per person employed underground, a decrease of 20 tons on the preceding year. Last year's official returns, however, are abnormal on account of the national coal strike, as no allowance has been made in them regarding the number of persons employed. The corresponding output for the four previous years was as follows:—1908, 346; 1909, 340; 1910, 328; 1911, 331. During this period there was a steady decline of labour efficiency from 346 to 331, or more than 4 per cent. This is the more extraordinary as during the same period labour-saving machinery has been largely introduced into the coalmines. In 1908

\* Mines and Quarries: General Report, with Statistics, for 1912. By the Chief Inspector of Mines. Part I. District Statistics, p. 7.

guaranteed wage independent of the quantity of coal sent out, so that there is not the stimulus for a man to make such a good output as he did formerly.

The welfare of an industry is dependent upon a sufficiency of capital, and capital will go where it is best served. If the economic conditions of coalmining in our country cease to be attractive, there are wide fields for the investment of capital elsewhere.

To-day's *Standard* contains further confirmation of the reported acquisition of American coalfields by British capitalists, referred to in our last issue. It is said that a Welsh syndicate, believed to be headed by Mr. D. A. THOMAS, chairman of the Cambrian Combine, has taken up an option on a hundred thousand acres of coal lands in the New River area, which is one of the four chief mining regions in West Virginia, and contains coal of excellent quality. The capital involved is estimated at 10 million pounds.

As by far the largest factor of the cost of production of coal consists in wages, the deal may be attended by a heavy loss to the mining labour of this country.

Trade Summary.

The London market during the week has been very slow. A fair amount of activity has been shown for manufacturing



qualities and also for kitchen and bakers' fuel, but the general house coal trade has been exceedingly quiet. The shipping trade continues brisk, and no Durham qualities are on offer yet. All vessels arriving in the river are under contract. Prices are stationary, but the recent advances are with difficulty maintained. Small nuts and slacks have improved slightly.

There is a strong forward enquiry for best Northumberland steam coals, and prompt business is also more active in steam, gas and bunker coals. Loading turns are congested.

The Durham coal trade is steady, and tonnage is rather more plentiful. Gas qualities are scarce. Coke is rather better, and house coals are quietly steady.

Lancashire house coal prices have been raised, and prior to the turn of the month there was considerable pressure. The shipping market, with the settlement of labour troubles, shows signs of hardening. Larger quantities of slack are moving off.

The call for prompt supplies of West Yorkshire house coal has been heavy, but the collieries are well booked, and there is little free coal for disposal. Slacks are in excessive supply.

South Yorkshire hard coals have stiffened slightly, but the enquiry for small manufacturing grades is easy. House coal prices are up, and orders are fairly plentiful. Coke is sluggish.

There is a marked improvement in the demand for Derbyshire house coal, and prospects are good. Slacks and steam coals generally are in strong request.

The larger collieries in South Wales are well stemmed, but middlemen are accepting lower rates and buyers are holding off, without, however, exciting much anxiety amongst producers. Small coals are in fair request. Monmouthshire coals are steady, and house coals are unchanged.

There is little change in the trade in Scotland, and business continues to expand.

#### CONTINENTAL MINING NOTES.

##### Belgium.

The Bonehill Company is about to erect, at its works at Hourpes-lez-Thuire, a battery of regenerative coke ovens on the Lescocq system. The surplus gas will be utilised to heat a group of puddling furnaces.

The output of pig iron from Belgian blastfurnaces during the eight months ended with August last comprised 62,340 tons of foundry pig, 19,060 tons of forge pig, and 1,572,150 tons of steel pig—a total of 1,653,550 tons, as contrasted with only 1,534,090 tons in the corresponding period of 1912.

The Société des Charbonnages du Bois Cazier at Marcinelle, in the Charleroi district, are asking for a concession extending over about 514 hectares in the communes of Loverval, Marcinelle, Gerpinnes and Nalinnes. The Société Campinoise pour Favoriser l'Industrie Minière are applying for a concession in the new Campine coalfield, extending over 3,640 hectares in the province of Limburg and Antwerp. The Charbonnages due Rieu Cœur and the Charbonnages du Hainaut at Hautrages, in the Borinage district (Hainaut), have decided to amalgamate their concessions situated near the canal from Mons to Condé.

##### France.

*Coalmining in the Nord in 1912.*—According to the report of M. Mettrier, chief inspector of mines, coal was raised from 54 shafts in the Nord in 1912, and 52 other shafts were in process of sinking. The output from these amounted to 6,646,937 tons, or 160,259 tons more than in 1911, the average value being 15'33 fr. per ton, as against 14'60 fr. in 1911. Of the total output, 3,833,376 tons were sold (17'89 fr.), 2,105,566 tons were consumed in the manufacture of coke and briquettes (14 fr. 42 c.), and 868,254 tons were consumed by the collieries and their workmen (6 fr. 69 c.). Of the total sales of fuel produced in the Nord, in 1912, 2,072,099 tons were consumed in the department itself, 680,286 tons in the Seine, and 424,444 tons in the Meurthe-et-Moselle; 148,438 tons of briquettes were purchased for the Navy. The means of transport, according to the mineral carried, were—by rail, 4,505,131 tons; by boat, 1,349,064 tons; by cart, 111,899 tons. It may be noted that including the colliery consumption, but excluding railway and bunker coal, 8,818,058 tons of coal were consumed in the department; of this quantity, 2,876,850 tons were produced in the Nord basin, 5,318,742 tons in the Pas-de-Calais, 752,345 tons in Belgium, 3,022 tons in Great Britain, and 96,375 tons in Germany.

##### Germany.

A new colliery is to be established at Kriskowitz, in the Ratibor district of Germany, by the West Bohemian Mining Company.

The König Wilhelms Bergwerksverein, of Essen, has decided on the sinking of a new shaft and the construction of a battery of 50 coke ovens at its Wolfsbank collieries.

*Insurance in France.*—The reports on the employers' insurance accident in the coalmining industry for 1912 have shown an average cost per worker was 392 marks and 35 marks for 1,000 marks of wages. These figures have since 1900, when they were 19'08 marks and

17'23 marks respectively; in 1911 they were 38'24 marks and 28'44 marks respectively. In certain branches in 1912 the average cost amounted to as much as 44 marks per workman and 35'18 marks per 1,000 marks of wages. The total cost was 36,643,081 marks, of which 27,225,323 marks were expended in indemnities, funeral expenses and other benefits, the remainder being absorbed in management and legal expenses, &c.

*The Health of German Miners.*—Some interesting particulars are given in the annual report of the General Relief and Pension Fund of Bochum in regard to hygienic conditions prevailing in the Ruhr coalfield during 1912. From this point of view 1912 has been more satisfactory than any of its predecessors. In a total working population of 376,710, there were 242,645 cases of sickness incapacitating from work, as against 235,641 in 1911; 67,472 of these were due to injuries received in the course of work below ground. Classifying the ailments, 34,078 were of a rheumatic nature, 32,931 were connected with the digestive organs, 28,994 with the respiratory organs, 22,601 with the skin, 17,480 were influenza affections, 5,612 eye diseases, (including conjunctivitis, trachoma and nystagmus), 4,855 diseases of the nervous system. Whereas in 1911 1,086 men were known to be suffering from ankylostomiasis, the total had fallen in 1912 to 380. The cases of nystagmus, however, rose from 1,371 to 1,510. It is interesting to observe that the prevalence of disease was greatest during the month of March, when a strike was in existence, thus repeating the experience in 1905. The number of deaths in 1912 was 4,171, as compared with 3,896 in 1911; of these 1,047 in 1912 and 765 in 1911 were due to accidents in the course of work.

*Ruhr Coal Market.*—There is little new to report on the situation, the demand, though by no means bad, being too small to enable the large output to find a market, and stocks are consequently heavy. The iron industry is in an unsatisfactory condition and taking less fuel, whilst other industries are not needing as much as could be desired. Gas coal is rather more active of late, but coking coals go off badly. As before, the export trade forms a safety valve against the overloading of the home market, for, although the prices are kept down by foreign competition, the quantities disposed of are large, a considerable proportion going to Belgium, Holland and France. Business in South Germany has been rather slack again, and oncoming supplies have had to be stocked to some extent. The coke market is depressed owing to the large excess of supply over demand.

*Coal Market in South Germany.*—For the time of year the trade in house coal is quiet, owing to the warm weather, so that the usual activity of the autumn trade is lacking, though contracted quantities are being taken up regularly. Sales are few, both industrial consumers and dealers having covered their requirements sufficiently, and only rarely needing to make additional purchases. Negotiations for the renewal of the contracts expiring at the end of the year have been commenced by a few private owners in the Saar district, the prices quoted being generally the same as for the present year. The State collieries, however, are holding back; but it is not expected that they will make any changes in price.

*Coal Market in Upper Silesia.*—Even admitting that September is generally the commencement of the busy season, the situation must be characterised as unusually favourable. The increase in prices has not affected the demand, the producing capacity of the pits being taxed to the utmost, so that little coal is going into stock. Some of the pits have been extending the working areas, but in spite of this have not yet been able to lay up any stock for the coming winter trade. Foreign buyers, Austria-Hungary and Russian Poland in particular, cannot be supplied with all their requirements. Orders for large and house coals are coming in very abundantly, and deliveries are in arrears. All grades needed by the iron industry are taken up eagerly, and still the supply is insufficient. The trade in gas and coking coals is also increasing, and both are getting scarce. In the coke market, too, the demand is growing, and owing to the scarcity of coking coals, blast-furnace coke cannot be produced quickly enough for consumers.

*Fuel Traffic in Ruhr Harbours during August.*—Deliveries of coal, coke and briquettes by rail to: Ruhrort, 1,244,436 tons; Duisburg, 414,240 tons; Hochfeld, 27,125 tons; total, 1,685,801 tons. Shipments outward:—To Coblenz and higher up-river places, 862,936 tons; places below Coblenz, 19,552 tons; Holland, 629,394 tons; Belgium, 383,757 tons; France, 40,439 tons; other destinations, 40,477 tons. Total shipments from: Ruhrort, 1,258,529 tons; Duisburg, 40,989 tons; Hochfeld, 26,733 tons; Rheinpreussen, 92,243 tons; Schwelgern, 99,867 tons; Walsum, 83,193 tons; aggregate, 1,976,554 tons.

##### Russia.

The Austrian Country Bank has sold to a French financial group, directed by the firm of Motte, Meillassous and Co., of Roubaix and Zeenstochau, its Flora collieries at Dombrova, in Poland.

##### Switzerland.

It is stated that during the construction of a conduit for supplying water from the upper lake in the Fully Mountain, an important discovery of anthracite has been made, and a concession has been granted to Dr. J. Billwiller, of Unterreggen, St. Gall.

#### THE BY-PRODUCTS TRADE.

*Tar Products.*—The general tone of the market is one of stability. Benzols keep firm, and so does pitch. Naphthas are quiet but steady. Carbolics continue easy and in indifferent request. Creosote steady and unchanged in price. Other products keep much about the same. Nearest values are:—

Benzols, 90's .....	1/1½
Do. 50's .....	1/0½
Do. 90's North .....	1/1
Do. 50's North .....	1/1½
Toluol .....	1/1
Carbolic acid, crude (60 per cent.) .....	1/2½ to 1/3
Do. crystals (40 per cent.) .....	1/4½
Solvent naphtha (as in quality and package) ...	1/9½
Crude ditto (in bulk) .....	1/5
Creosote (for ordinary qualities) .....	1/3
Pitch (f.o.b. east coast) .....	44/6 to 45/
Do. (f.a.s. west coast) .....	43/6 to 44/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

*Sulphate of Ammonia.*—The market is very firm, and prices continue to advance at all points. There is a fairly good demand, especially for forward delivery, for which £14 and upwards is now asked. Beckton still holds off the market, as far as committing itself to any definite quotation, which is significant. Closing prompt prices are:—

London (ordinary makes) .....	£12/17/6
Beckton (certain terms) .....	—
Liverpool .....	£13/15
Hull .....	£13/12/6
Middlesbrough .....	£13/12/6
Scotch ports .....	£13/15
Nitrate of soda (ordinary) per cwt. ...	10/9

*South Staffordshire Mines Drainage.*—The annual reports of the South Staffordshire Mines Drainage Commission were considered at a meeting of the Commissioners at Dudley on Wednesday last. In regard to the Tipton district, Mr. E. Howl (general manager) reports that the output of minerals during the year ending June 30 last had been 428,438 tons, which at the amount per ton fixed by the arbitrators' award, gave a rate of £10,905. This had been amended by an allowance for pumping under an agreement sanctioned by the High Court of Justice (Chancery Division) prior to the passing of the 1891 Act, to a net rate of £10,770, being an increase of £700 upon last year. The deficiency of revenue to meet working expenses was £5,744 as against £3,868 last year. The chief causes of this deficiency were the abnormal rainfall and the increase in cost of fuel and labour. The negotiations which had been carried on by the Birmingham Canal Company, the Public Works Loan Board, and the Mines Drainage Commissioners during the past 18 months had now reached a definite form, and the engrossment of the agreement in triplicate now awaited signing and sealing by the three bodies. One of the clauses in the agreement was an undertaking by the Drainage Commissioners to promote a Bill in the next session of Parliament to complete and confirm the arrangements embodied in the agreement. Steps had been taken in order that legislation might be obtained as quickly as possible. The assessments for the Old Hill district amounted to £7,099, against £6,430 the previous year. The expenditure had been £5,921, compared with £4,954. Interest on the loan (£18,345) amounting to £905 had been paid, and £300 paid into court by the receiver. The mineral assessed for general drainage rates for the year ended December 31 last has been 2,084,247 tons, representing a revenue of £8,684. This was a decrease in output of 141,580 tons, equal to £589 in rates. There had been an increase of 996 tons and 32,390 tons in the Tipton and Old Hill districts; but there was a decrease of 70,087 tons in the Oldbury district, and of 104,879 tons in the Kingswinford district. The outlay upon maintenance of works and steam and electrical pumping had been £1,911, as against £1,831 the previous year. In addition to this £187 had been spent upon new surface drainage works and placed to debit of capital account. The general drainage loan stood at £64,622. In the Tipton district the rainfall for the year ended June 30 last was 37'97 in., compared with 34'57 in. the previous year, being 9'84 in., or 35 per cent. above the average of the last 20 years. The volume of water dealt with by the commissioners during the year was 19½ million tons, compared with about 16 million tons in each of the three previous years. To deal with the great increase of water not only had the ordinary plants been worked at excessive speeds, but four auxiliary plants had been at work. The price of slack at pit had averaged 5s. 7½d. per ton, compared with 5s. 1½d. the previous year. Owing to the great quantity of water to be pumped, the necessity of working auxiliary engines, and the increase in the cost of fuel, the amount spent in pumping and tanking had been £17,861, as compared with £13,398. During the year the mineral raised in Tipton district had been 428,438 tons against 405,727. The total water raised was 24,930,631 tons, made up as follows:—Commissioners' engines, 19,553,816 tons, private pumps and steam pumps supplied by the Commissioners, 4,073,400; private tanks, 1,303,416. This showed that 58 tons of water had been raised in the district for every ton of mineral. Mr. S. B. Priest, reporting on the Old Hill district, states that the costs amounted to £2,219. There had been a slight increase in the cost of repair of damage from mining, and owing to heavier rainfalls surface pumping had cost more than the previous year. The total locks pumped were 10,800, against 7,437 the year before. It was gratifying to find that the output of this district had slightly increased during the period, the mines drainage rate having produced £7,099 against £6,430 the year before. The cost of working the pumping engines was £3,365, against £2,470 the previous year, but the cost per lock per 100 ft. raised is slightly less than the year before. This was due to the largely-increased quantity of water dealt with. The cost of maintaining the Buffery level had been £572, against £482 the year before. This increase is mainly due to the constant necessary draining out of the mud coming down from the crop mines. The water in the Waterfall-lane pound and the disused water winding pits in the Saltwells Colliery did not rise.



## THE IRISH COAL TRADE.

THURSDAY, OCTOBER 2.

## Dublin.

Sufficient men have been engaged by the large coal firms in the place of those who are locked out to enable them to resume business, and during the past week there has been a considerable increase in deliveries by merchants' own carts and motor lorries, although operations are still restricted owing to the difficulty of getting adequate police escorts. It is stated that the result of the use of motor lorries for the purpose of delivering coal is so satisfactory that the merchants are considering the advisability of retaining them permanently, in which case a number of carters will find that their services can be dispensed with. Only a few orders are now coming in, which will be carried out at current rates, but there are an immense number which have been booked since the strikes began still awaiting fulfilment. There has been a good demand on the part of householders for best "black" turf since retailers of coal put up prices, and large boatloads have been coming into the city by the canals from the Midlands and west, although even this service is interrupted this week owing to some of the hands having gone out. Many of the residents in the suburbs have been reduced to the use of gas alone for domestic purposes, as the carting of coal from the merchants affected by the labour disputes has been chiefly confined to the centre of the city. There is no change in prices, which range from 24s. to 27s. per ton for house coals; Orrell slack, 21s.; steam coals, from 21s. to 22s. per ton delivered; coke, 24s. per ton delivered; Irish coals in Queen's County, from 5s. to 20s. per ton at the pit mouth. During the past week the number of coaling vessels arriving amounted to 44, as compared with 24 the week previously, chiefly from Preston, Workington, Garston, Newport, Ayr, Ellesmere Port and Partington. The total quantity of coal discharged upon the quays was 16,967 tons.

## Belfast.

In the wholesale market a further advance of 6d. per ton in the better qualities of house coal has been made, and in this branch business is improving, as an early advance in city prices is expected. There is a good demand for other classes of fuel, and the inland trade has materially increased. Quotations in the city are:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Rates for steam coals, ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton. There is an average supply in the port, cargoes arriving during the week being chiefly from Workington, Swansea, Garston, Glasgow, Ardrossan, Lydney, Ayr, Whitehaven, Girvan, Burryport, Campbeltown, Maryport, Newport, Liverpool, Irvine, Neath Abbey, Troon and Cardiff.

We are officially informed that the sole management of Messrs. John Lancaster and Co. Limited (Griffin Nantyglo Collieries) is now vested in Messrs. D. Davis and Sons Limited, who have recently acquired the interest in that company which was held by Messrs. Furness, Withy and Co. Limited. The directors of Messrs. John Lancaster and Co. Limited are now:—Mr. Fred. L. Davis (chairman), Mr. T. Vivian-Rees (managing director), Mr. David Hannah (consulting engineer), Mr. H. L. Warner, and Mr. J. Bell White.

**The Cost of Production and Shortage of Labour.**—At the annual meeting of the Sheepbridge Company, Mr. Frederick Fowler, the chairman, said the prospects for next year were good. At Dinnington Colliery they were now drawing at the rate of 17,000 tons per week, which, considering the depth (670 yards) and the fact that it was from only one shaft, he believed was a record for any colliery in this country. The total output of the company's collieries, together with that produced from subsidiary collieries in which they had a large interest, now amounted to about 2,500,000 tons per annum. Recent legislation in regard to the Coal Mines Act and the Workmen's Compensation Act and various other measures had placed a burden on Sheepbridge of nearly £60,000 per year, but they had been able to bear this in good times. The development of Maltby Colliery was not proceeding as quickly as they would like, the difficulty being the insufficiency of men. At Rossington Colliery they had reached a depth of about 176 yards, and they hoped to reach coal in the course of two or two and a-half years. They were in the coal measures now, so that they had some idea as to the position of the measures and the depth of the coal. Lord Aberconway said the turnover of their company for the year ended June 30, 1912, was £879,000, and for the year ended June 30, 1913, it had risen to £1,287,000. In wages last year they paid only at Sheepbridge the sum of £424,000, whilst if they also took the Dinnington, Maltby, Rossington and Langwith by-product companies, the total amount of wages they paid was £780,000. Compared with 25 years ago, the cost of raising coal at Sheepbridge had increased by 40 per cent. Of this increased cost a very large proportion was due to higher wages. In a reference to the shortage of men, he said the men employed worked a good deal less than the time that was placed at their disposal. In the coal and other trades generally the men were working about 20 per cent. short of their full possible time, which meant that one-fifth of the trade resources were idle. Despite the fact that many new collieries were being sunk in South Yorkshire and other collieries in South Wales, he was confident that the whole of the output would be absorbed without any difficulty. He believed the greatest difficulty ahead was the want of men. They were short of men to-day, and they did not know where to get them. There was not one colliery owner who could not do with 1,000 more men in his pit if he could get them.

## THE LONDON COAL TRADE.

THURSDAY, OCTOBER 2.

The London coal trade for the past week has been very slow, especially for all household qualities. The warmth of the weather has kept down the actual consumption of fuel to a very low ebb, and in the meantime stocks are gradually accumulating at the various wharves and depots. The manufacturing qualities are moving more freely, and the demand seems on the increase. The sales, however, were restricted towards the end of the month, as very few buyers care to buy largely until the month has turned. The seaborne market also is very quiet, but no change is recorded in the market quotations, 21s. 6d. for best Durham Wallsend, and 20s. 6d. for seconds. Yorkshire qualities are more freely offered, but none of the boats arriving with Durham coal are offering on the open market at present. Thirty-six cargoes arrived in the river Thames for Monday's market, and three for Wednesday, but all under contract. The demand usually associated with October 1 has been very moderate this year on account of the continuance of so much warm weather, and those collieries who have issued notices of advance have considerable difficulty in maintaining their list price. Factors have to a large extent cleared up the old purchases based on the summer prices, and for a time are refraining from ordering any further quantities except from hand to mouth, unless the prices are exceedingly low. Meanwhile collieries are fairly well employed, but general complaint is made that the output is considerably less than formerly. Railway wagons also are getting to be a serious matter, for the season is rapidly approaching when so many empties are withdrawn from the coal traffic to bring forward the goods and farm produce. Factory qualities are stationary. The demand recently for small nuts and slacks has slightly improved, but the prices have in no case reverted to anything like the prices obtainable six months ago. The development of the labour troubles in the north, and more especially the cotton district, is causing considerable anxiety on the London market, for the smalls usually sent to Manchester and Liverpool are diverted to London, and often at a considerable sacrifice in price. The shipping trade continues brisk, and the tonnage is fairly maintained. Very little forward business is being done, but shippers report a fair amount of tonnage still to be forwarded, and naturally very keen pressure is brought to bear upon the matter by the speedy anticipation of the closing of the Baltic ports. The attendance on the market is very good for the season of the year, and apart from the household section, there is a fair amount of activity in all grades of fuel. The depots are well supplied, and the principal marshalling stations and junctions are somewhat congested with loaded wagons. The bulk of the Warwickshire collieries advanced 6d. per ton on the contract prices on October 1. The recent circulars issued by the majority of the London merchants giving statistics, and other information relating to the benefits of using coal and not gas in dwelling houses, has been answered during the week by a counterblast from the gas companies, and resulted on Wednesday last in the opening of a National Gas Exhibition at Shepherd's Bush, which was opened by the Lord Mayor, and promises to be of unusual interest and utility.

## Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal	13/	13/
Do. nuts	12/	12/
Birley cube Silkstone	12/6	12/6
Do. branch coal	16/	16/
Do. seconds	11/	11/
Barnsley Bed Silkstone	13/6	13/6
West Riding Silkstone	13/	13/
Kiveton Park Hazel	13/	13/
Do. cobbles	13/	13/
Do. nuts	12/	12/
Do. hard steam	12/	12/
New Sharlston Wallsend	15/	15/
Wharfedale Silkstone coal	14/6	14/6
Do. Flockton Main	15/6	15/6
Do. Athersley house coal	12/	12/
Newton Chambers best Silkstone	17/	17/
Do. Grange best Silkstone	15/6	15/6
Do. Hesley Silkstone	14/	14/
Do. Rockingham selected	14/	14/
Do. Rockingham Silkstone	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best	12/6	12/6
Do. large nuts	12/3	12/3
Do. small nuts	10/	10/
Do. kitchen coal	10/6	10/6
West Hallam Kilburn brights	12/6	12/6
Do. do. nuts	12/3	12/3
Do. London brights	11/	11/
Do. bright nuts	11/	11/
Do. small nuts	10/	10/
Manners Kilburn brights	12/6	12/6
Do. do. nuts	12/	12/
Shipley do. brights	13/	13/
Do. do. nuts	12/6	12/6
Mapperley brights	12/6	12/6
Do. hard steam	11/6	11/6
Cossall Kilburn brights	12/6	12/6
Do. do. nuts	12/	12/
Trowell Moor brights	12/6	12/6
Do. do. nuts	12/	12/
Grassmoor Main coal	13/	13/
Do. Tupton	11/6	11/6
Do. do. nuts	11/6	11/6

## Derbyshire—(cont).

Clay Cross Main coal	13/	13/
Do. do. cubes	13/	13/
Do. special Derbys	12/	12/
Do. house coal	11/6	11/6
Pilsley best blackshale	13/	13/
Do. deep house coal	11/6	11/6
Do. hard screened cobbles	11/	11/
Hardwick best Silkstone	13/	13/
Do. Cavendish brights	12/6	12/6
Do. cubes	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards	12/6	12/6
Do. small hards	12/6	12/6
Do. deep large steam	12/	12/
Annesley best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Linby best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Digby London brights	13/	13/
Do. cobbles	13/	13/
Do. top hards	13/	13/
Do. High Hazel coal	14/6	14/6
Bestwood hard steam coal	13/	13/
Do. bright cobbles	11/9	11/9
Hucknall Torkard main hards	12/9	12/9
Do. do. cobbles	11/3	11/3
Do. do. nuts	11/	11/
Do. do. High Hazel H.P.	14/9	14/9
Do. do. London brights	12/3	12/3
Do. do. large nuts	12/3	12/3
Do. do. bright nuts	11/3	11/3
Sherwood H.P. hards	12/6	12/6
Do. hard steam	11/6	11/6
Do. brights	11/3	11/3
Do. cobbles	11/3	11/3
Do. large nuts	11/3	11/3

## Warwickshire.

Griff large steam coal	11/	10/9
Do. screened cobbles	11/6	11/
Do. bakers' nuts	11/3	10/9
Do. loco Two Yard hards	14/6	14/6
Do. Ryder nuts	11/9	11/3
Do. do. cobbles	13/	12/6
Nuneaton steam coal	11/	10/9
Do. screened cobbles	11/6	11/
Do. nuts	11/3	10/9
Haunchwood steam	11/	10/9
Do. screened cobbles	11/6	11/
Do. nuts	11/3	10/9
Wyken steam coal	11/	10/9
Do. screened cobbles	11/6	11/
Do. nuts	11/3	10/9
Exhall Ell coal spires	14/3	12/9
Do. brights	12/6	11/6
Do. large steam coal	12/4	10/9
Do. best screened cobbles	12/3	11/
Do. large nuts	12/3	11/

## Leicestershire.

Snibston steam	10/	10/
Do. cobbles	10/6	10/6
Do. nuts	10/6	10/6
South Leicester steam	10/	10/
Do. cobbles or small hards	10/6	10/6
Do. nuts	10/6	10/6
Whitwick steam	10/	10/
Do. roasters	10/6	10/6
Do. cobbles	10/6	10/6
Do. nuts	10/6	10/6
Netherseal hards	18/	18/
Do. Eureka	12/6	12/6
Do. kitchen	10/6	10/6
Ibstock kibbles	9/9	9/9
Do. large nuts	9/6	9/6
Do. bakers' nuts	9/	9/
Do. Main nuts	9/6	9/6
Do. hards	9/3	9/3
Granville New Pit cobbles	11/	11/
Do. Old Pit cobbles	11/	11/

## North Staffordshire.

Talk-o'-th'-Hill best	13/	13/
Sneyd best, selected	14/6	14/6
Do. deeps	14/	14/
Silverdale best	14/	14/
Do. cobbles	13/	13/
Apedale best	13/	13/
Do. seconds	12/9	12/9
Podmore Hall best	13/	13/
Do. seconds	12/6	12/6

## South Staffordshire (Cannock District).

Walsall Wood steam coal, London		
Do. brights	11/	11/
Do. shallow one way	11/	11/
Do. deep nuts	11/6	11/6
Cannock steam	10/9	10/9
Coppice deep coal	14/6	13/6
Do. cobbles	14/	13/
Do. one way	12/	11/
Do. shallow coal	13/6	13/
Cannock Chase deep main	16/	16/
Do. Deep kitchen cobbles	11/6	11/6
Do. best shallow main	13/	13/
Do. shallow kibbles	13/6	13/6
Do. best brights	13/	13/
Do. yard cobbles	13/6	13/6
Do. yard nuts	12/6	12/6
Do. bakers' nuts	10/3	10/3
Do. screened hards	11/9	11/9

## From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, September 26.—The seaborne house coal market was exceedingly quiet to-day, with very little enquiry, and no Durham or Yorkshire cargoes available. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 16.

Monday, September 29.—The seaborne house coal market continued quiet again to-day, no sales reported for either Durham or Yorkshire. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 36.

Wednesday, October 1.—The seaborne house coal market was again without alteration to-day, no cargoes being available, with very little enquiry for supplies. Best (Durham) 21s. 6d.; seconds 20s. 6d. Cargoes 3.



## WORKMEN'S COMPENSATION IN 1912.

A return has been issued by the Home Office giving the statistics of compensation and of proceedings under the Workmen's Compensation Act, 1906, and the Employers' Liability Act, 1880, during the year 1912. [Cd. 7088.] The return is prefixed by an introduction written by Mr. Delevingne, Director of the Industrial Division of the Home Office.

Returns have again been collected from the seven great groups of industries—mines, quarries, railways, factories, harbours and docks, constructional works, and shipping. These returns furnish materials for a general review of the working of the Compensation Act of 1906 in relation to the main body of the industries of the United Kingdom. In these seven groups of industries the number of employers included in the returns was 136,279, and the aggregate number of persons employed coming within the provisions of the Act was nearly 7½ millions, of whom more than 5 millions come under the heading "factories." In these industries, in the year 1912 compensation was paid in 3,599 cases of death and in 424,406 cases of disablement. The average payment in case of death was £158; in case of disablement, £6 3s. The annual charge for compensation, taking the seven groups of industries together, averaged 8s. 7d. per person employed. It was lowest in the case of persons employed in factories, being only 5s. per person; in the case of railways it was 8s. 2d.; it rose to 11s. 3d. in quarries, to 15s. 9d. in shipping, and to 11s. 7d. in constructional work; it was highest in docks, 21s. 4d., and in mines, 21s. 10d. It is noteworthy that in the coalmining industry the charge arising under the Act works out at about 1·05d. only per ton of coal raised. The total amount of compensation paid under the Act in the seven groups of industries during the year was £3,174,101, as compared with £3,056,404 last year. When to this is added the costs of management, commission, legal and medical expenses, &c., it is estimated that the total charge borne by the seven industries probably amounts to nearly £5,000,000.

The foregoing figures include, in addition to accidents, cases of the various industrial diseases (now 24 in number) included under the Workmen's Compensation Act. Compensation was paid, in the seven groups of industries, in 55 cases of death from disease and in 6,712 cases of disablement. The bulk of these cases, 87·9 per cent. of the total, occurred in the mining industry, and were due mainly to nystagmus, beat hand, beat knee, and beat elbow. Of the remainder, 606 were cases of lead poisoning.

The statistics show that only a very small proportion of the claims under the Act become the subject of litigation. The total number of cases under the Workmen's Compensation Act which were taken into court in 1912 was 10,972; many of these, however, were applications for dealing with allowances that had already been granted, and many were settled out of court or otherwise disposed of, so that the total number of original claims for compensation finally settled within the cognisance of the courts was only 5,858. Of the 5,858 claims for compensation settled judicially under the Act in the United Kingdom, the decision was in favour of the applicant, that is, the workman, in 4,455, or 76 per cent. The total number of cases under the Employers' Liability Act, 1880, taken into court in the whole of the United Kingdom, was 604 in 1907, 406 in 1908, 298 in 1909, 217 in 1910, 223 in 1911, and 197 in 1912. These figures show clearly the tendency of the remedy provided by the older Act to fall into disuse since the Act of 1906 came into full operation.

The following table enables a ready comparison to be made between mines and the whole of the seven selected industries.—

	Mines.	Seven selected industries (including mines)
Number of persons employed.....	1,086,113	7,411,005
Number of fatal cases .....	1,246	3,544
Payments in respect of same.....	£202,367	£557,120
Persons wholly dependent .....	717	2,101
Payments in respect of same.....	£175,408	£479,825
Persons partially dependent .....	394	1,072
Payments in respect of same.....	£25,692	£73,876
No dependants.....	135	371
Payments (medical, &c., expenses) in respect of same .....	£1,267	£3,419
Number of disablement cases .....	167,959	417,694
Payments in respect of same.....	£897,090	£2,503,196
Continued from previous year .....	17,352	36,440
Payments in respect of same.....	£348,540	£933,700
First payments during year .....	150,607	£31,254
Payments in respect of same .....	£548,550	£1,569,496
Fatal cases of disease .....	2	55
Payments in respect of same .....	£430	£9,987
Disablement cases (diseases) .....	5,949	6,712
Payments in respect of same .....	£85,831	£103,798
Total compensation (1912) .....	£1,185,727	£3,174,101
Total (1911) .....	£1,255,223	£3,056,404
Lump sums:—		
in respect of same.....	4,509	26,651
Industrial diseases .....	£132,792	£775,353
Payments in respect of same.....	237	429
per person employed £1 1s. 10d. ...	8s. 7d.	

## Increase in Compensation.

We are now in possession of statistics showing the actual number of cases in which compensation has been paid, and the amount of compensation, in the seven industries over a period of five years. In 1908, compensation was paid in 3,473 fatal cases to the amount of £536,123, and in 325,484 disablement cases to the amount of £1,544,549. In 1912, compensation was paid in 3,599 fatal cases to the amount of £567,107, and in 424,406 disablement cases to the amount of £2,606,994. The increase in the compensation charge in the seven industries, therefore, is attributable almost wholly to the disablement cases. While the fatal cases have increased only 3·6 per cent. and the amount of compensation in such cases 5·7 per cent., the number of disablement cases has increased 30 per cent. and the amount of compensation for such cases has increased 68 per cent. The increase has been steady throughout the five years.

The material for a full investigation of the causes of the increase is not available. So far as regards the increase in the number of cases, in part it is no doubt due to the fact that the remedies provided by the Act have become better known and more fully used. This would be a longer process in the non-fatal than in the fatal cases. Workmen now stay away—legitimately—for injuries when previously they would have kept on with their work as best they could. As, however, all the seven industries (with the exception of shipping) were also included in the Act of 1897, this cause must have produced much of its effect before the Act of 1906 was in full operation. To a large degree, the increase must be due to expansion of trade. The number of persons employed in the seven industries (according to the returns) rose from 6,560,745 in 1909 (the 1908 returns are not trustworthy) to 7,411,005 in 1912, an increase of 13 per cent. The effect of trade expansion, moreover, on the accident rate cannot be measured merely by the increase in the number employed. Busy trade results in longer hours being worked—e.g., in those trades where slackness of trade is met not by discharging workpeople but by working shorter time, work is speeded up, &c. How far these causes account for the increase or how far the increase is due to improper claims or to malingering cannot be gauged.

So far as regards the increase in the average amount of compensation per case, there has been no general rise in wages throughout the five years which would affect the figures to any considerable extent. The accumulation of cases of permanent or long standing incapacity, an increase in the amounts paid in redemption of weekly allowances and a growth in the average duration of incapacity, have each contributed to the increase.

## Duration of Compensation.

Particulars are given of the duration of compensation in each of the industries. Cases continued from 1911, which were terminated during 1912, are included; but cases which were terminated by payment of a lump sum and not by the recovery of the workman, and in which, therefore, the period during which compensation was paid does not represent the period of disablement, are excluded.

Table A (p. 695) shows, with regard to the accident cases, the proportion of cases in each group. In the case of mines the figures for 1911 are also inserted in italics.

It must be borne in mind that cases terminated by payment of a lump sum are not taken into account in Table A. These cases are usually cases in which the disablement is likely to last for a considerable period—as the payments made show—and the proportion of cases of disablement of longer duration would be higher than the figures in the last two columns of the table indicate.

Of the 424,406 disablement cases, 38,600 were continued from 1911 and 385,806 arose during the year. 386,281 cases were terminated during the year, either by the cessation of the disablement or the redemption of the weekly allowance by a lump sum, leaving 38,125 cases outstanding. Of these outstanding cases, 11,481 had lasted more than one year; 4,577 had lasted more than one year, but less than two; 6,057 had lasted two years, but less than five; 847 had lasted over five years. The mining industry accounts for a large proportion of the long-standing cases. The total number at the end of 1911, which had lasted more than one year, was 9,627.

The average payment for "continued cases" in 1912 was £25 12s., as compared with £23 in 1911 and £21 in 1910.

## Lump Sum Payments.

Out of 424,406 cases 27,080 were settled by payment of a lump sum, either at once or after a period during which a weekly payment was made. In the 13,713 cases which were settled at once without any previous weekly

payments, the average sum paid was £6 16s. In the 8,029 cases which were settled after weekly payments had been made for a period less than 26 weeks, the average sum paid was £21 3s.; in the 5,338 cases settled after weekly payments had continued for more than 26 weeks, the average payment was £99 2s. The total compensation paid amounted to £793,597, or 30 per cent. of the whole amount of compensation paid during the year in respect of disablement cases.

## Industrial Diseases.

Compensation was paid in 55 fatal cases to the amount of £9,987, and in 6,712 disablement cases to the amount of £103,798. The number of continued cases was 2,160, or nearly one-third of the total number (in the case of accidents the proportion is only one-eleventh), and they accounted for £61,378, or more than half the total disablement compensation. The number of cases, which at the end of 1912 had lasted more than one year, was 1,255, as compared with 854 at the end of 1911 and 497 at the end of 1910. The total amount of disablement compensation in 1911 was £82,959, and in 1910 £54,345. These figures are largely determined by the figures for the mining industry for nystagmus, beat hand and beat knee.

The figures for nystagmus are remarkable. In the first full year (1908) during which the new provisions as to industrial diseases were in operation, the number of nystagmus cases was 460 (of which 386 were new cases and 74 continued from the last half of 1907); 380 of these cases were continued into 1909 and 631 new cases arose, or 1,011 cases in which compensation was paid in 1909; 662 of these were continued into 1910 and 956 new cases arose, making a total of 1,618 cases in 1910; 1,144 were continued into 1911 and 1,375 new cases arose, making a total of 2,519 in 1911; 1,819 cases were continued into 1912, and 1,376 new cases arose, making a total of 3,195 in 1912. In 1908 the remedy was still probably unfamiliar, but a comparison of 1912 with 1909 shows that the number of new cases arising annually has more than doubled. The 1912 figures, however, show that the growth in the number of new cases has stopped for the present. What is perhaps more important is that the figures of "continued cases" show that the proportion of long-continued disablement cases is very high; the number of cases continued from 1911 to 1912 greatly exceeds the number of the new cases that arose in 1911. It is evident that the adoption of means to prevent the occurrence of this disease, which the most recent investigations attribute to insufficiency of the light by which miners do their work, is becoming a matter of importance to the employer. The figures for beat hand and beat knee show no accumulation of long standing cases, but a very considerable increase in the actual number of cases.

The following table shows the statistics relating to those diseases principally associated with mining:—

Disease.	No. of cases (mines).		Certificates of disablement given by certifying and appointed surgeons (mines).
	Continued from previous years.	In which first payment was made during year.	
Ankylostomiasis .....	—	4	—
Poisoning by nitrous fumes or its sequelæ .....	—	2	—
Nystagmus .....	1,819	1,376	1,238
Subcutaneous cellulitis of the hand (beat hand) ..	45	1,070	729
Subcutaneous cellulitis over the patella (beat knee) .....	67	1,259	1,065
Acute bursitis over the elbow (beat elbow) .....	10	114	181
Inflammation of the synovial lining of the wrist joint and tendon sheaths	5	166	216

In addition to the cases recorded in the first two columns there were four cases of lead-poisoning, and its sequelæ amongst miners, nine cases of arsenic poisoning or its sequelæ, and one case of eczematous ulceration of the skin, &c. On the other hand, the following cases of beat hand were recorded in other industries:—Quarries, two; railways, two; factories, five; three cases of inflammation of the synovial lining in factories. There were no certificates of suspension under any of these heads, but one certificate of refusal to suspend was issued in a case of nystagmus, and there were 10 supplementary certificates given under Regulation 5 in respect of the same disease.

## Administration of the Act.

The number of cases under the Workmen's Compensation Act, 1906, actually dealt with by county court judges, sheriffs and arbitrators appointed by judges amounted to 7,956. Of these, 7,678 were decided by judges or sheriffs, and 145 by special arbitrators; and 133 were settled by acceptance of money paid into court. In 1911 the number of cases dealt with was almost the same—7,954. In addition to the cases actually dealt with, there were 3,016 cases which were



TABLE A							
Industry.	Total.	Percentage of cases terminated in 1912 in which compensation had lasted					
		Less than two weeks.	Two weeks and less than three.	Three weeks and less than four.	Four weeks and less than 13.	Thirteen weeks and less than 26.	Twenty-six weeks and over.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Shipping .....	100·00	7·17	20·09	15·68	44·35	8·63	4·08
Factories .....	100·00	9·43	29·72	19·58	36·54	3·53	1·20
Docks .....	100·00	10·38	23·09	17·14	41·14	5·78	2·17
Mines .....	100·00	6·23	36·08	18·88	33·26	3·67	1·88
Do. 1911 .....		6·08	35·11	19·38	34·31	3·55	1·57
Quarries .....	100·00	7·91	31·66	19·40	35·73	3·13	2·17
Constructional work .....	100·00	13·06	26·96	17·97	35·91	3·93	2·14
Railways .....	100·00	15·78	28·74	16·99	32·26	4·51	1·72
Grand total .....	10·00	8·52	31·90	18·97	35·19	3·80	1·62
Total in 1911 .....		8·73	32·06	19·80	34·46	3·57	1·38

TABLE B.—ARBITRATIONS IN COUNTY COURTS (ENGLAND AND WALES) AND SHERIFF COURTS (SCOTLAND) UNDER THE WORKMEN'S COMPENSATION ACT, 1906.—MINES.

Nature of injury.	Total number of cases.	How dealt with.				Claims for compensation settled.							
		Heard by judge or sheriff.	Heard by arbitrator.	Acceptance of money paid into court.	Otherwise disposed of.	No. of claims settled.	Result.		Amount of compensation awarded.				
							For applicant.	For respondent.	Lump sums.		Weekly payments		
									No. of cases.	Total amount.	No. of cases.	Total amount.	
England and Wales :—													
Death—										£ s. d.		£ s. d.	
Leaving dependants.....	574	554	3	2	15	531	489	42	489	90,624 9 7	—	—	
Not leaving dependants .....	2	2	—	—	—	2	2	—	2	20 0 0	—	—	
Total incapacity .....	669	536	9	2	122	395	313	82	61	1,489 0 10	252	165 5 11	
Partial incapacity .....	225	162	10	—	53	117	87	30	8	347 15 1	79	29 0 6	
Total .....	1,470	1,254	22	4	190	1,045	891	154	560	92,481 5 6	331	194 6 5	
Scotland :—													
Death—													
Leaving dependants.....	142	138	—	—	4	28	18	10	18	2,939 3 8	—	—	
Total incapacity .....	432	363	—	—	69	258	145	113	6	49 1 1	139	90 14 2	
Partial incapacity .....	97	83	—	—	14	26	16	10	1	120 0 0	15	8 6 9	
Total .....	671	584	—	—	87	312	179	133	25	3,108 4 9	154	99 0 11	

TABLE C. MEMORANDA REGISTERED IN COUNTY COURTS (ENGLAND AND WALES) AND SHERIFF COURTS (SCOTLAND) UNDER SCHEDULE II. (9) OF THE WORKMEN'S COMPENSATION ACT, 1906.—MINES.

Nature of injury.	Total number of cases.	How settled.			Amount of compensation.			
		By agreement.	By committee.	By agreed arbitrator.	Lump sums.		Weekly payments.	
					Number of cases.	Total amount.	Number of cases.	Total amount.
England and Wales :—						£ s. d.		£ s. d.
Death—								
Leaving dependants .....	400	391	9	—	399	78,636 11 6	—	—
Not leaving dependants .....	—	—	—	—	—	—	—	—
Incapacity .....	2,438	2,427	11	—	180	12,472 1 10	1,241	873 3 11
Total .....	2,838	2,818	20	—	579	90,508 13 4	1,241	873 3 11
Scotland :—								
Death—								
Leaving dependants .....	141	141	—	—	141	26,534 2 11	—	—
Incapacity .....	4,231	4,279	—	2	1,718	8,050 0 8	190	135 0 6
Total .....	4,422	4,420	—	2	1,859	34,584 3 7	190	135 0 6

either withdrawn, settled out of court, or otherwise disposed of in such a way as not to enable the officials of the court to state definitely the results, making the total altogether of cases taken into court, under the Act of 1906, 10,972, as compared with 11,075 in 1911. Besides the cases under the Act of 1906, a small number of cases outstanding under the earlier Acts were also dealt with as follows:—58 cases decided by judges or sheriffs, two by arbitrators, and 10 otherwise disposed of, a total of 70 taken into court, as compared with 110 in 1911. The cases actually dealt with by the courts under the Act of 1906 included 5,858 original claims for compensation, 1,639 applications with reference to weekly payments already granted, *e.g.*, for redemption, revision, or termination, and 459 applications for apportionment of agreed compensation among dependants. Of the claims for compensation, the decision in 4,388 cases was in favour of the applicant, and in 1,403 in favour of the employer. The proportion of cases in which the applicant was successful was 76 per cent., as compared with 78 per cent. in 1911. In 1,319 cases under the Act of 1906, the compensation was awarded on account of death, and in all except three of them the deceased had left dependants. Excluding these three, the total amount of compensation awarded was £214,550, an average of £163 per case. With regard to the grants of compensation for injury under the Act of 1906, there were 1,094 cases in which the compensation is returned as consisting of a lump sum, and 1,975 in which a weekly sum was assigned. In 105 of the cases in which a lump sum was paid, the plaintiff accepted money paid

into court. In the majority of the remainder a lump sum appears to have been awarded by consent of the parties. The average amount of the compensation was £33 19s. 1d. In the cases under the Act of 1906 in which a weekly payment was awarded, the average compensation was (a) for cases of total incapacity, 11s. 7d.; (b) for cases of partial incapacity, 8s. 1d. Table B shows the figures so far as they relate to mines. The number of cases in which memoranda were registered in county and sheriff courts during the year under the Act of 1906 was 34,429, and, in addition, there were 133 memoranda registered under the earlier Acts. The number registered in 1911 was 33,654 under the Act of 1906, and 168 under the earlier Acts. The number is still only a small proportion of the cases in which compensation is settled by agreement, and in the case of England and Wales and also Ireland shows a decrease on the previous year. The totals under the Act of 1906, under each head, were—by agreement, 34,406; by committee, 20; by arbitrator, 3. The average compensation to dependants in cases of death under the Act of 1906 was £181, and the average weekly payment in cases of incapacity was 13s. 2d. The number of cases of incapacity under the Act of 1906, in which the memorandum registered was for a lump sum and not a weekly payment was 9,039, as against 6,273 cases in which a weekly payment was agreed upon. The corresponding figures for 1911 were 8,835 and 7,671. The average amount of the compensation was £24 11s. In addition to the 9,039 cases in which the original agreement was for a lump sum, there were 9,982 cases in

which the memoranda for redemption of weekly payments by a lump sum were registered. In 597 cases the registrar refused to record the memorandum and referred it to the judge in pursuance of Schedule II. (9) (d) of the Act. In 133 of the cases the memoranda was thereupon withdrawn; in 247 the memoranda were ordered by the judge to be recorded, and 193 other orders were, made by him. In three cases the judge, after the memorandum had been recorded, ordered the record to be removed on the ground that the agreement had been obtained by improper means, in pursuance of Schedule II. (9) (e). The figures in regard to mines are given in Table C. Under Schedule II. (16) of the Act of 1906, the Secretary of State has power to confer on any committee, representative of an employer and his work men as respects any matter in which the committee act as arbitrators or which is settled by agreement submitted to and approved by the committee, all or any of the powers conferred by the Act exclusively on county or sheriff courts or county court judges or sheriffs. Five Orders have been made under this provision in respect of the five committees of the Durham Colliery Owners' Mutual Protection Association on the one side, and on the other of the Durham Miners' Association, the Durham Colliery Mechanics' Association, the Durham County Colliery Enginemen and Boiler Minders' Association, the Durham Cokemen's Association, and the Durham Deputies' Mutual Aid Association respectively. During 1912, these committees sat, in all, on 14 occasions and dealt with 361 cases, of which 127 were fatal, and 234 disablement, cases. In 1912 there were only 197 cases under the Employers' Liability Act. In 10 of these the question of compensation was actually determined under the Workmen's Compensation Act, in pursuance of the power given by section 1 (4) of the Act of 1906. The number of cases under the Workmen's Compensation Acts carried to the Courts of Appeal was 208 (as compared with 206 in 1911), or just under 2·6 per cent. of the cases decided in the county courts and sheriffs' courts; 107 were appeals by workmen, and 101 by employers. Of the appeals by workmen, 17, and of the appeals by employers 34, were successful; 64 were abandoned, withdrawn, or settled out of court before hearing. Three of the appeals were under the Act of 1897. Out of 144 cases in which the point on which the appeal arose is known, 41 turned on the meaning of the words, "accident arising out of and in the course of the employment," in section 1 (1) of the Act. There were four appeals to the House of Lords (as compared with three in 1907, three in 1908, two in 1909, nine in 1910, and 12 in 1911), the workman being the appellant in all the cases. There were six appeals by workmen in actions under the Employers' Liability Act. Medical Referees. The number of medical referees appointed for the purposes of the Workmen's Compensation Act was on December 31, 1912—in England, 215; in Scotland, 83; in Ireland, 44. The total number of references under Schedule II. (15) was 267, viz.:—By judge, 153; by appointed arbitrator, one; by agreed arbitrator, four; by committees, 109. The total number of references under Schedule I. (15) was 519; under Schedule I. (18), four; and as assessor under Schedule II. (5), 1,112. There were 378 appeals under section 8 against decision of certifying surgeon, 44 being by workmen and 334 by employers. The decision was confirmed in 279 cases. The number of appeals under section 8 in Scotland is remarkable, and points to some abuse by Scottish employers of the power given by the Act; 252 appeals were taken by employers (as compared with 81 in England and Wales), and only 33 succeeded. Certified Schemes. The statistics furnished by the Chief Registrar of Friendly Societies show that on December 31, 1912, 119 certified schemes were in operation in England and Wales, of which 12 were in connection with mines. Of 171,712 workmen in the employment, 66,657 were under the schemes, the corresponding figures in the case of mines being 17,311 and 16,349. Hull Coal Exports.—The official return of the exports of coal from Hull for the week ending Tuesday, September 23, 1913, is as follows :—Amsterdam, 2,620 tons; Antwerp, 856; Alderney, 122; Bergen, 102; Bremen, 1,897; Copenhagen, 75; Christiania, 1,365; Cronstadt, 2,274; Dahlsbruk, 1,858; Drammen, 198; Drontheim, 599; Guernsey, 222; Genoa, 2,477; Ghent, 1,060; Hamburg, 2,186; Harlingen, 1,584; Harburg, 5,090; Husum, 501; Heligoland, 183; Libau, 3,072; Marseilles, 505; Nakkov, 1,248; Narvik, 705; Rouen, 3,495; Rio de Janeiro, 501; Rotterdam, 631; Riga, 4,709; St. Petersburg, 10,366; Sandefjord, 704; Sanjobing, 630; Stockholm, 296; Wyk, 111; and Wasa, 2,304; total, 54,646 tons. Corresponding period September 1912, total, 66,325 tons.



## THE CADDER PIT DISASTER.

### Home Office Enquiry.

[SPECIALLY REPORTED.]

We give below a continuation of the report of the proceedings in the enquiry held last week at the instance of the Home Office into the circumstances attending the disaster at Cadder Colliery, Bishopbriggs, on August 3 and 4. Sir Henry Cunynghame presided in the Justiciary Court, Glasgow.

### The Electrical Inspector's Evidence.

At the resumption of the enquiry on Thursday, September 25 the Commissioner said that to suit the convenience of Mr. Robert Nelson, H.M. electrical inspector of mines, who was desirous of getting away, he would take his evidence now.

In reply to the Commissioner, witness said he had had great experience since his appointment in dealing with electrical accidents that had occurred. From his experience he considered that electricity might have been the cause of the fire. The conditions he saw at Cadder Colliery were exactly those which he had seen in other cases in which, undoubtedly, the fire had had an electrical origin.

Witness admitted that he was more likely to see clearly the possibilities in the direction of electricity than in others, and he would not be surprised that other inspectors of mines should put the origin of the fire down to another cause. Probably their opinion would be of more value, on the whole, than his, as they would be more familiar with the whole conditions of the mine. The possibilities of electricity causing this fire, however, had very emphatically been placed by the other electrical witnesses rather too low.

Examined by Mr. C. D. Murray, K.C., for the Carron Company, witness said that as a general rule no one was present when a fire broke out, but he knew the case of a cable—at the Bowhill Colliery—which burst into flame while the men were looking at it. It was a three-core cable, but that made no difference. It was armoured also.

I suppose you will admit that that particular three-core cable was one which in every way complied with the law?—Oh, certainly.

Is your theory of that fire just in plain English this, that there was defective jointing?—Yes.

Under normal circumstances would the presence of that defective joint be revealed by testing?—Not necessarily. There might be a contact that a test would not reveal, but which would be disclosed when the cable carried its full load. He should imagine that the defective jointing was most likely to occur in the installation of the cables.

From your experience, can you suggest any remedy for a cause such as that?—No, I cannot.

Do you say it was one of those unfortunate accidents against which provision cannot be made?—That is so. These are very exceptional, but they do occur.

Witness, in further reply to a question by Sir Henry Cunynghame, said he saw the electrical possibilities in this case much more clearly perhaps than mining engineers did, and it was his evidence that the fire might have been caused in that way from what he had seen of the remains of the electrical apparatus, and from what he had heard in that court.

At this stage of the enquiry, Mr. Walker, the chief inspector of mines, read a report prepared by Messrs. McLaren and Masterton, in which they gave it as their opinion that the work of removing the debris in the vicinity of the cabin where the fire was supposed to originate would be extremely dangerous. In the interests of safety they recommended that nothing of that nature should be done.

The Commissioner said that in view of that report it was evident they must abandon all hope of making an inspection of the pit. Accordingly it would simply be for them to continue the enquiry and to endeavour to get at the facts the best way they could. He certainly was not disposed to do anything merely with a view to satisfying curiosity, which would endanger lives, and accordingly all parties interested would see that it was impracticable to examine the pit.

Mr. E. D. Murray, K.C., and Mr. Robert Smillie both indicated that they entirely concurred with the view expressed by the Commissioner.

### The Home Office and the Rescue Order.

At a later stage, evidence with regard to the recovery of the bodies was given by David Downie, under-manager at No. 17 pit, and James Baird, district mining manager for the Carron Company. The rescue party started from the communication door about 10 o'clock on Monday morning, and it took about a quarter of an hour or 20 minutes to reach the place where Ramsay and Davidson were.

Mr. Murray questioned Baird as to the exhaustion of the oxygen in the apparatus. The men had two hours' oxygen before they went down, and witness said that the cylinders of two men were exhausted after half-an-hour's work. According to Mr. Stevenson, the instructor of the brigade, that put the whole brigade out of action.

The Commissioner said it was curious that with an automatic apparatus they should have exhausted so much of the oxygen in so short a time. That was important in the question of how far even an oxygen apparatus was entirely trustworthy. There were doubts about it.

John Carey, one of the rescue party, said that in his opinion as a miner the reversal of the air saved McDonald's life.

John Marshall, winding room engineman at No. 15 pit, said the method of changing the ventilation was by a steam jet let into the shaft about 40 fathoms. Some time previous to the accident a joint was leaking. That was about the middle of July. He was employed to put it right. He renewed the joint, and it stood some time, and then began to leak again. He then put in a "spade" at the leaking joint. The real cause of the first delay was the necessity for taking out the spade.

William Johnstone, fireman, stated that some time in May of this year he was asked to become a member of a rescue brigade. There was no rescue brigade formed, but a list of the men who were to form the rescue brigade was posted up at the pithead.

When the examination of this witness had been completed the Commissioner asked if the representatives of the miners desired to bring forward further evidence.

Mr. Smillie said there was a point on which he desired a ruling. They had requested Mr. Baird, of the Scottish Coalmasters' Association, to be present at the enquiry and to produce the correspondence between him and the Home Office with regard to rescue brigades.

The Commissioner said that that request had been engaging the attention of the Home Office, and he had been informed that there was no objection on behalf of the Home Office to letting the correspondence be seen, but as to whether it should be brought into the enquiry depended on whether it was relevant or not.

Mr. Macmillan said he thought the precedent letters should certainly be put before him, for this reason, that the Carron Company were not acting in conformity with the statute on the date of the accident.

The Commissioner pointed out that it was a fact that the company was in default, and he would hear anything that could be said in palliation, but when it came to putting in formally a lot of documents as to the conduct of the Scottish coalowners and the Home Office he thought it was beyond the scope of the enquiry.

In the course of further discussion, Mr. Watson said the Order made under the Act by the Home Secretary was issued in April 1912. Along with that Order a circular was sent round, in which it was stated that "the Order comes into force at once, and it will be necessary, therefore, for each owner to take steps without delay to comply with the requirements of the Order. Reasonable time will be allowed in which to complete the formation of rescue brigades and to obtain the requisite appliances." Their view was that the expression "reasonable time" included exactly what had happened here—namely, the question of law, the construction of the Act itself as to what was compliance with the Order, and the agreement, or at any rate the arrangement, under which a test case was to be raised in order to decide that point.

The Commissioner said Mr. Smillie wanted to know the Government attitude. A circular sent to the mine by the Home Office affected the question he had to consider and should certainly be admitted, but the question as to what was the Government attitude was beyond his affair. It was an important point, but it was not within his powers.

At the resumption of the enquiry on Friday, Mr. Arnold Hughes, electrical engineer of the Carron Company, was recalled. He was asked by Mr. C. D. Murray, K.C., if he had noted the point that Mr. Robert Nelson the previous day had spoke of the possibility of the fire being caused by a defective joint in the armoured cable? In point of fact, witness deposed that there was no joint at all within the area of the fire.

### Evidences of CO Poisoning.

Dr. Dale Logan, Coltness Ironworks, Newmains, Lanarkshire, said he had made a special study of carbon monoxide in connection with underground fires, blasting operations of collieries, and the like. The presence of 0.2 per cent. would render a man unconscious within half an hour, and 0.3 per cent. was regarded as fatal. If the mental conditions of the men were anxious, or if they were in a state of fright, or doing hard work, they would be overcome far more quickly. The same remark applied if they were climbing over falls or doing hard work. It would depend upon their conditions, and in underground fires they were dealing not only with the presence of carbon monoxide, but also with a diminution of oxygen in the air.

So that in cases of underground fire, with perhaps half or less than half the normal percentage of oxygen, a very small percentage of carbon monoxide would prove fatal?—Yes; cases have been proved in which 0.1 per cent. of carbon monoxide has caused death. I know that Mr. Atkinson, one of H.M. inspectors of mines, reported a case in which 0.1 per cent. caused death, and the reason for that was the decreased percentage of oxygen in the air.

By the Commissioner: From the position in which the bodies were found in the main dook of No. 15 pit at Cadder, do you infer that there would have been a very considerable percentage of carbon monoxide present?—Yes; a very considerable percentage of carbon monoxide must have been present.

Where the carbon monoxide was present to such an amount as to overwhelm men in that short period, and

taking into account the decreased percentage of oxygen in the air owing to the fire, he should say that death would ensue very probably within half-an-hour, and certainly within an hour.

Would you draw any inference from the fact that bodies were found close together, apparently cut down in groups?—Yes; that means that the individual capacity for resisting the poison was eliminated altogether. The personal equation was, as it were, blotted out; although the men varied in strength they all went down together, and that points to a very large percentage of carbon monoxide in the air.

By Mr. Murray, K.C.: It was not an unusual thing to have survivors found after explosions as McDonald was found. It was well recognised now, from the record of many explosions, that men might have escaped if they had simply remained in their working places and not rushed into danger. The oncoming of *rigor mortis* was delayed if the atmosphere was warm.

Commenting on this point, the Commissioner remarked that it rather seemed to him that that showed that the men in the pit must have been dead for some time before being discovered, because the rescuers spoke of their being "stiff."

Mr. Murray: Do you think it reasonable to suppose that the saving of McDonald's life might be due to the reversal of the current of air, he being in a different position, and now having succumbed as Pat Regan had done?—I am afraid that that is pure speculation.

### The Electrical Question.

Mr. A. B. Muirhead, chief consulting engineer with Selby Bigge and Co., Glasgow, corroborated the evidence of Mr. Arnold Hughes as to the extremely high probability that the fire was not caused by electrical means.

By Mr. Murray: Can you yourself figure any reasonable conditions which could have existed in the electrical system which would have been a source of the fire?—Not in the condition in which the plant was maintained.

Is it your opinion that you must look to some other source than the electrical plant for the origin of the fire?—Yes, outside the electrical plant altogether. I have no doubt about that.

Mr. A. H. Steele, junior inspector of mines for the West of Scotland, spoke to having taken specimens of the air of the mine. The first one was taken on August 7, and it showed 0.5 of carbon monoxide. He had seen this pit from time to time as junior inspector, and he had always found the pit in very good condition. Any defects he had pointed out had always been immediately remedied.

Did it strike you that the men were reasonably careful and skilful?—I consider they were some of the best men in Scotland—at least, in the west of Scotland. The employers were exceptionally good. He had formed no opinion as to the probable cause of the fire, and would rather not venture on possibilities. There were too many probabilities already, and where so many experts had disagreed he preferred not to say anything.

### Mr. McLaren's Evidence.

Mr. R. McLaren, senior inspector of mines for the West of Scotland, questioned by the Commissioner as to what in his opinion was the origin of the fire, said he quite concurred in the evidence given about the electrical plant. From the very outset he had been of the opinion that it did not emanate from anything in the electrical apparatus. There were, however, several likely causes. The first he considered was spontaneous combustion, but the seams of coal were too far apart to allow of that, and so he put it aside. The question of waste also came before him. They had had some cases of oil waste having fired spontaneously, and he had some enquiry as to whether waste was kept about the cabin or the switches. From the evidence he had heard given, and as a result of his own enquiries, he thought he might put that aside as well. They were, therefore, tied up to one thing—a naked light. In Scotland it was quite a common thing for the men to trim their lamps when they sat and took a smoke. In doing this they took a portion of the wick that was in the spout out, kept it alight, and placed it either upon a stone or a piece of wood. For two reasons they required to have a light—to see to put in new wick and to light it when it was in. They saturated the new wick with oil, relit their lamp, and every miner, as a rule, put out the old wick which was still burning. Sometimes a man might inadvertently leave the old wick burning, and he knew one case where in leaving it burning a slight fire took place. He thought, therefore, the fire at Cadder was probably due to that cause or matches, but whatever was the cause he was of the opinion that a naked light contributed in some way to the accident.

### The Provision of Rescue Apparatus.

By the Commissioner: If rescue apparatus could have been brought down at an earlier period to this mine, do you think that any of the men could have been rescued?—When I arrived at the surface and went to No. 15, and saw the amount of smoke and noticed the smell of paraffin and burning timber, I at once concluded it was not possible that any men were alive. The operations after that were not to discover any living men, but to try to keep the rescue party free from danger in getting the bodies.

Do you consider the provision of rescue apparatus of the



oxygen type most important, but on this occasion it could not be said that even if it had been there anybody would have been saved?—That is my opinion.

By Mr. Macmillan, K.C.: Is the question of the apparatus to be adopted a matter of controversy among experts?—We are not all agreed that the apparatus is just perfect. I have not yet made up my mind as to what is the most effective apparatus.

By Mr. Smillie: It is necessary, I suppose, to have safety lamps in mines in which gas is given off, but the Home Office have never laid it down that there must be a particular kind of lamp?—Oh, no.

And in regard to any other safety appliance the Home Office stipulates that there must be a suitable and adequate appliance, but they have never laid it down that there must be a certain make?—No, I think the Home Office exercises commonsense in that.

Is it not the same in regard to breathing apparatus? Have they not carefully refrained from telling colliery owners that they must use a certain kind of apparatus, but they have laid it down that there must be men trained in rescue work with appliances?—That is so.

By Mr. Murray: Is it your opinion that in point of plant and equipment the Carron Company have attended to the safety of the men in the pit?—I have always found them willing to do everything that was necessary.

#### Mr. Hugh Johnstone Gives Evidence.

Mr. Hugh Johnstone, divisional inspector of mines for the Midland and Southern district of England, said he did not think it was possible to form an opinion as to the cause of the fire. One could only consider all the causes, and then, by eliminating the least probable, come to the most probable. If he were compelled to make a guess, he should say that the fire occurred through a man's jacket being set on fire from something in his pocket.

Questioned on the subject of rescue apparatus, witness said there were now in his district 1,000 men trained and certificated in the use of this apparatus. He frankly admitted that there was some doubt as to the best type of apparatus. Practically all the separate types had some excellences, and it was a matter of some doubt as to which was on the whole the best for mining work.

By Mr. Smillie: I put it to you that if there had been a fully-equipped rescue brigade which could have turned out within 15 or 20 minutes of the time when the alarm was given, there might have been some of the men, besides McDonald, got out of that pit alive?—If I am to use my judgment on the evidence adduced I should say no, because I think that, with the exception of McDonald, the men were all dead by eight o'clock.

#### Mr. Walker's Evidence.

Mr. William Walker, chief inspector of mines for Scotland, also gave evidence regarding the probable cause of the fire. He thought there were in this mine possibilities of fire from electricity, but after hearing the evidence he was not convinced that it arose from that cause. He discarded the theory of spontaneous combustion, either in coalseams or in waste, and said they were driven to consider the other probable causes—the changing of the lampwicks or a lighted wick left in a workman's coat pocket. He had come to the conclusion that the most probable cause was the setting fire to the wooden partition at the cabin by a wick thrown down by some person.

The enquiry was thereafter adjourned till Saturday.

The concluding stages of the enquiry were entered upon on Saturday.

Mr. Wm. Walker was further examined, and stated to the Commissioner that the accident taught precautions which ought to be taken in future. He thought the cabins and electric distribution boards should not be in the vicinity of any inflammable material, and that those wooden partitions, such as were around the cabin at Cadder, were a very great danger. He also doubted the wisdom of placing cabins and switch houses like those in this pit under such a mass of wood as there was above the girders there. He understood that there was some 14 or 15 feet of solid timber.

By the Commissioner: I understood it would have been possible to have packed this with stone instead of with wood?—Yes; some unflammable material, or have got another site.

Counsel and Mr. Smillie afterwards addressed the Commissioner, and reviewed at length the evidence which had been led.

In closing the enquiry, the Commissioner thanked counsel and other representatives on both sides for the ability, brevity and courtesy displayed in conducting the case.

No intimation was given by Sir Henry Cunynghame as to when his report would be issued.

The Central Translations Institute, of Danes Inn House, 265, Strand, London, W.C., issue a very handy card of "Standard Metric Equivalent Tables, Comprising Weights and Measures and Prices in Francs and Marks." These tables are neatly printed on a large card, suitable for hanging up in offices, &c., and show in a concise manner and without loss of time all the principal equivalents between British weights and measures and the metric system, as also sterling amounts worked out into the equivalents in francs and marks. The tables will be sent post free on receipt of 1s. 2d.

## LABOUR AND WAGES.

### North of England.

The quarterly meeting of the council of the Cleveland Miners and Quarrymen's Association was held on Tuesday at Middlesbrough. A resolution that a ballot be taken to decide whether the association should sever its connection with the Miners' Federation of Great Britain was defeated.

A further meeting between the coalowners of Northumberland and the men's representatives was held on Saturday at the Coal Trade Office, Newcastle, for the purpose of considering the re-establishment of a conciliation board or a sliding scale for the regulation of wages of miners in the county. The employers suggested at previous meetings that a conciliation board might be tried, and the men, on their part, considered this, as well as the alternative of a sliding scale. A great difficulty which both sides recognised was that there was, since the Conciliation Board went out of existence, no basis upon which the selling price of coal could be made without a quarterly ascertainment. Among the questions considered on Saturday were a minimum percentage, and the selling price of coal to represent that minimum. The business was adjourned for further consideration without any decision having been arrived at, but it is understood that the coalowners and the representatives of the men have agreed to the principle of a minimum percentage, and the point now to be settled between the two parties concerned is the selling price at which the minimum percentage should be applied.

The quarterly meeting of the Durham County Colliery Enginemen's Association was held last week at Durham. The report of the agent (Mr. W. B. Charlton) made reference to the General Regulations under the Mines Act, 1911, as to the employment of colliery enginemen. It was complained that there were managers who, from these rules, could only read a rigid eight-hours day from the beginning of the week to the end, and denying to men the right to vary the shifts in accord with the varying strain of the work. The rules will permit the 24 hours being filled up by a seven, eight, and nine hours shift in accord with the custom of the county. To insist on the shifts now being uniform is making a bid for danger. The report referred to the trouble in regard to private railways, and stated that members who had been employed on the railways removing the minerals from the collieries to the staiths, have had their wages, hours, and other conditions of work regulated by arrangements effected between the association, the Conciliation Board, and the Owners' Association. Now the managers of the respective railways had discovered that they were private lines separate and distinct from the collieries, the Owners' association had taken up the cue, and, in reply to requests made, said they had no jurisdiction. The terms of recent agreements adopted between the association and the colliery owners had been refused to the line men. The withdrawal of labour under these circumstances seemed to be the only means open. Reference was made in the report to a proposal made at the Trades Union Congress by the National Federation of Enginemen, Stokers and Kindred Trades, to instruct the Parliamentary Committee "to draft a Bill to amend the Coal Mines Act, 1911, so as to provide for the raising of the age limit for all persons employed in charge of haulage machinery which raises and lowers men either on the surface or underground, from 18 years to 22 years." This proposal the Durham Association did not support. Only a person with a superficial knowledge of mining would support that proposal.—It was decided that the association seek to obtain at least one six-hour shift per fortnight for all underground enginemen. A further resolution instructed the executive committee to press the owners of collieries who had not complied with the 10 hours' agreement of 1912, to comply at once, the men to work 10 hours and be off 14 hours. A third resolution was carried, demanding that all enginemen, boilerminders and firemen employed in conveying minerals, &c., to and from the collieries on railways not being public railways, have the terms of their hiring regulated by agreements adopted between the association and the owners' association.

Nearly 1,800 miners employed at Eldon Colliery, Durham, struck work last week. It is stated that the men refuse to carry their own powder in accordance with the requirements of the new Act. The men, it is stated, contend that the deputies should carry the explosives into the pit in canisters and distribute them to the miners at the "kist." The men balloted on Wednesday, and decided to resume work on the following day, pending a settlement of their grievance.

On Sunday there was a meeting of the members of the Whitehaven Miners' Lodges in the Market Hall to consider what course should be taken in regard to the winding enginemen of the Whitehaven Colliery. There are nine of these—three at each pit. They had asked for an advance of 4½d. per day, and not having obtained it had given in their notice. Mr. M. Mossop, secretary of the Cumberland Winding Enginemen's Association, was admitted to the meeting, and stated that the winding enginemen at Whitehaven in asking for an increase of wages, simply sought to put on the same basis at that which obtained before the recent readjustment of the enginemen's wages in Cumberland—namely, that they receive 4½d. per day more than "the rest of the county," a privilege which they had enjoyed for many years owing, it was stated, to their work at the Whitehaven pits being more responsible on account of the engines used there. After hearing the explanation the meeting passed a resolution to the effect that the Whitehaven miners were prepared to stand by the winding enginemen, and would not work under any new enginemen. The facts were stated to be these, as they appear from the point of view of the Whitehaven Colliery Company:—On June 26, 1912, a

joint committee consisting of the winding enginemen and members of the Cumberland Coalowners' Association arranged for fixed wages for the various classes of workmen connected with the Cumberland Enginemen's and Boiler Firemen's Association. It was agreed that the winding enginemen had to have 6s. per day, which represented a basis wage of 5s. a day, with 20 per cent. added. The percentage varies with the state of trade and the selling price of coal. Whitehaven winding enginemen at that time had 5s. 11½d. per day, and in accordance with the agreement were brought up to 6s. The other winding enginemen in the county at that time had 5s. 7½d., and they were also brought up to 6s. Previously the Whitehaven men had claimed that their work was more difficult, and that they ought to have more than the rest of the county; but on that occasion the other winding enginemen contended that the work of the Whitehaven men was no more difficult than theirs, and that they ought to have the same wage. Subsequent to the agreement putting them all on the same level at 6s., the Whitehaven winding enginemen were not satisfied, saying that they ought to have received an advance *pro rata*, which would still have left them 4½d. a day better than the other enginemen of the county. After considerable negotiations, the following agreement was arrived at:—

"It was agreed at a meeting held to-day with the Winding Enginemen's Association that the Whitehaven's enginemen's wages shall be 6s. 3d. per shift from June 26, 1912, it being clearly understood that in the case of any advance in the future that the Whitehaven winding enginemen only have the same wage as the other enginemen in the county. In the case of a reduction in the county, whatever the percentage is at the time, the same to be taken off wages of the Whitehaven enginemen on that date. Colliery Office, Whitehaven, September 4, 1912."

After this agreement the percentage added to the 5s. wages basis had increased from 20 per cent. to 35 per cent., making the percentage addition 1s. 9d. and the resultant wage per day 6s. 9d. in the county. Under the agreement the Whitehaven enginemen were also paid 6s. 9d. The agreement is dated September 4. In October Mr. Mossop wrote that his executive held that the agreement was contrary to the rules, and thereupon the question was again open as to the claim of the Whitehaven enginemen to have 4½d. a day more than the rest of the county. Mr. Blair, the general manager of the Whitehaven Colliery, suggested that a committee should go round and inspect the collieries of the county, and if they said that the conditions at Whitehaven were more difficult and that the men should be better paid than the rest of the county, he would be quite willing to pay. That suggestion, or arbitration in any other form, was not accepted for some time. On July 26, 1913, the suggestion of a committee was agreed to. A committee was appointed and went round and inspected the various winding engines. The owners' side on the committee were convinced that the Whitehaven work was as easy as the rest of the district, and that they were winding less coal per hour at two of the Whitehaven pits. The men's representatives did not agree with this view. The Whitehaven Colliery Company suggested a neutral chairman, but the men would not accept that suggestion, and again repudiated arbitration in any form. Finally, the Whitehaven winding enginemen gave 14 days' notice to terminate their work with the colliery company.

Following on report of the threatened strike at the Whitehaven collieries, a conference was held on Thursday afternoon of last week (presided over by Mr. Blair) between the Whitehaven winding enginemen, Mr. Sharp, Mr. Hanlon, and three pit delegates, along with Mr. Moses Mossop, the secretary of the Cumberland Winding Enginemen's Association, and, after a long discussion, the enginemen agreed to withdraw their notices and submit the question as to the mode of procedure to the council of the Engineers' Association.

There is trouble within the ranks of the Cumberland Colliery Enginemen and Boiler Firemen's Association. Mr. Moses Mossop, who was for 40 years a winding engineman and has been for many years secretary of the association, has not been aggressive enough for some of the younger members of the association, even though the coalowners have complained that the policy of the association has been too aggressive. The result was that Mr. Joseph Nixon, a colliery blacksmith, who is an effective man on the platform, was put forward as a candidate for the secretaryship at the half-yearly meeting and elected. The legality of this action was, however, challenged by Mr. Mossop and his supporters on the ground that Mr. Nixon was not a financial member of the association, and that, according to their interpretation of a rule, he must be so. Moreover, they contend that the meeting at which Mr. Nixon was elected was not fairly representative of the association, and that Mr. Mossop has the confidence of the majority of members.

#### Federated Area.

It was announced on Tuesday by means of another manifesto issued by the unions which have federated for the purpose of eliminating non-union labour from the ranks of all colliery workers in the mines of North Staffordshire—the North Staffordshire Miners' Federation, the Firemen, Examiners and Shot-lighters' Association, the Enginemen and Stokers' Union and the Navvies' and Labourers' Union—that during the present week another "show card" would take place. The manifesto states that notices have already been forwarded to the North Staffordshire colliery owners to terminate the contracts as from September 27 of some 28,000 union men. Only about 2,000 men remain outside the respective unions. Since notices were tendered, letters have been forwarded by Mr. J. H. Knight, secretary and solicitor of the North Staffordshire Coalowners' Association, on behalf of 20 firms, to the secretaries of the four unions concerned, suggesting a further conference of workers'



representatives with the coalowners. One letter states that the coalowners, having taken counsel, are advised that the notices are illegal and they cannot admit their validity. "The trouble is one that does not concern them, and they trust you will find there is no need to resort to such extreme measures, which must have such serious consequences to the industries of the district," concludes the letter.

The strikers at Messrs. Richard Evans and Co.'s collieries at Golborne and Haydock decided on Monday to return to work, as the non-union men have decided to join the Federation. Mr. Henry Twist, the miners' agent, addressing a meeting at Golborne, said that the strike had cost from £16,000 to £20,000, paid out of the union funds and by levy.

A special meeting of the Northumberland Colliery Enginemen and Firemen's Association was held at Newcastle on Saturday to consider the owners' replies to requests for modifications of employment. These were chiefly in the direction of reduction of hours. In the case of locomotive men it was reported that the owners had agreed to a reduction from 11 to 10 hours for main line men on their suffering a reduction in pay, but all the other suggestions had been refused. It was decided to ask for an immediate meeting with the owners again to discuss the questions.

The Rising Sun Colliery, Wallsend, was laid idle on the 26th ult. owing to the putters laaving work in consequence of a dispute about prices. The putters state that new tubs are being introduced at the colliery, with the result that their earnings have been adversely affected. Their demand for new score prices was refused, and they left work. They decided to resume work on Monday.

Messrs. Straker and Love's Oakenshaw colliery was laid idle on the 26th ult., owing to a dispute between the putters and the manager. The putters are asking for a helper-up in the south flat of the Second East District, and it is stated that the management has refused to accede to their demand. The hewers are supporting the putters.

The dispute as to whether the surfacemen at the collieries in the West Riding shall have a minimum rate of pay on the basis that obtains in South Yorkshire advanced another stage towards agreement on the 25th ult., when a joint committee of the Coalowners' Association and the men's unions met at the Hotel Metropole, Leeds, to confer. Mr. C. B. Crawshaw, of Dewsbury, chairman of the Owners' Association, presided. After a conference lasting three hours, the meeting was adjourned until the second week in October, it being understood that in the meantime other committees will meet and that their views on certain proposals will be ascertained.

Mr. C. Bunfield, secretary, reported at the monthly council meeting of the Notts Miners' Association on Saturday afternoon on the position in regard to surfacemen's wages in the county. He read correspondence which had passed between himself and the secretary of the Midland Counties Coalowners' Association. After some discussion the society was instructed to press for an immediate conference with the coalowners on the question. The assistant secretary, Mr. W. Carter, gave a report concerning the men's grievances at Trowell Moor Colliery. With regard to the non-unionist question, the manager had given considerable assistance, and nearly all had joined the association, but no agreement had been arrived at as to the wages of surfacemen. It was hoped that a settlement would be reached on Monday, when a deputation would have an interview with Mr. A. Hewlett. If not, notices would be tendered. A circular was read from the Nottingham Trades Council strongly recommending miners in that district to attend a demonstration of trades unionists to protest against the action of the Watch Committee in stopping free speech. The council recommended the members to make a grant of £200 to men on strike or locked out in Dublin.

A meeting of the executive of the Yorkshire Miners' Association was held at Barnsley on Monday. With regard to the dispute at Brooks pit, Netherton, the district had decided unanimously in favour of tendering 14 days' notice. At Cleckheaton No. 1 pit, the question there had been before the district, and it had been decided to allow the men, who are acting in sympathy with the men of No. 2 pit, to take a ballot. With regard to No. 2 pit, a ballot had been taken. Referring to the scheme of employers, Mr. Wadsworth said it would have been far better if they had set out to raise £50,000,000 with the object of paying the working men better wages and finding them better conditions of labour, better housing, and better education, instead of trying to crush out of existence men who were paid from 18s. to 25s. per week. He (Mr. Wadsworth) said he did not think there were many employers who were in "this business." He did not think the employers, so far as the Miners' Federation was concerned, would be a party to any such tyrannical transaction as was suggested.

The various collieries in the Burnley district of North-east Lancashire, which employ about 3,000 men and youths, were rendered idle last Friday through a strike of day-wagemen. These men came out without the authority of the union, and their absence rendered practically the whole of the pits idle. The chief complaint of the day-wagemen is that they are not allowed to work on Saturdays. At present they only put in five days a week, and get five days' wages. The miners' officials were in communication with the day-wagemen and the employers, and efforts were made to bring about a settlement of the dispute. Work was resumed on Monday.

#### Scotland.

A meeting of the Scottish Miners' Federation was held at Glasgow on the 29th ult. The proposed reduction of wages by the employers were discussed. The board will meet to-day (Friday), in the North British Station Hotel, Glasgow.

At a meeting of the Musselburgh District Branch of the Scottish Colliery Firemen's and Shot-firers' Association held on Saturday, further dissatisfaction was expressed at the attitude of the Scottish Miners' Federation towards the colliery firemen in their efforts to secure by organisation better protection of their interests than they believe can be afforded by the Miners' Federation. It was stated that the Miners' Federation were inclined to class members of the Colliery Firemen's Association as non-unionists. Besides, the Federation refused to grant clearance cards to members who wish to join or had joined the Colliery Firemen's Association, though in England there was a free exchange of clearance cards between such bodies. A further meeting will be held to discuss a motion that all members of the Colliery Firemen's Association leave the Scottish Miners' Federation.

The officials of the Scottish Shale Miners' Association are still actively engaged in their campaign against the employment of non-union men in various parts of the shale fields. The membership of the association is now 4,200.

In connection with the agitation at the Prestongrange collieries of the Summerlee and Mossend Company to have the present system of six days' deferred pay reduced to four days, Mr. Thomas Neilson, a director of the company, has written the Lothians Miners' Federation urging that the system of six days should continue. The Miners' Federation officials have resolved to insist upon the concession to four days.

#### Iron, Steel, and Engineering Trades

The following intimation has been made to Messrs. James C. Bishop and James Gavin, joint secretaries of the Scottish Manufactured Iron Trade Conciliation and Arbitration Board, by Mr. John M. Macleod, C.A., Glasgow:—"In terms of the remit, I have examined the employers' books for July and August 1913, and I certify the average net selling price at works brought out is £7 13s. 4-06d. per ton." This means no change in the wages of the workmen.

According to the quarterly return received by the Consett Iron Company Limited, and Mr. Edwin Holliday, the operatives' representative, from Messrs. J. R. Wippeny and James Cox, the general secretaries of the Board of Conciliation and Arbitration for the Manufactured Iron and Steel Trade of the North of England, the wages to be paid to the steel mill men at Consett Works will, by the sliding scale agreement entered into in March 1896, be increased by 2½ per cent. on and after October 1, and then be 22½ per cent. over the standard rate. This is the third quarter in succession that the mill hands at Consett have been conceded a similar advance.

The ascertainment of Messrs. Price, Waterhouse and Co. of production and prices in manufactured iron in the Cleveland and North of England district has been communicated to the secretaries of the Board of Conciliation at Middlesbrough and Darlington. The ascertainment automatically fixes ironworkers' wages by a sliding scale, and the secretaries declare that, in accordance with that arrangement, there will be an advance of 3d. per ton on puddling and 2½ per cent. on all other forge and mill wages, to take effect from Monday last.

The quarterly ascertainment under the sliding scale in force in Cumberland shows that the average selling price of pig iron warrants at cash has been 69s. 5d. per ton, compared with 73s. 3d. per ton in the previous quarter, and 76s. 9d. in the corresponding quarter last year. Blastfurnacemen's wages, accordingly, are reduced by 9¾ per cent., but are still 36¾ per cent. above standard.

The return of the accountants to the Midland Iron and Steel Wages Board, which controls ironworkers' wages in North and South Staffordshire, Shropshire, Lancashire, Yorkshire, and South Wales shows a serious falling-off in the selling price of iron during July and August as compared with the two previous months, and a decline of 552 tons in the output. In accordance with the sliding scale arrangements the wages of puddlers during October and November will be 3d. per ton less than in the previous two months, and all other mill and forge wages will be reduced 2½ per cent. from Monday next. In addition to the puddling rate puddlers are allowed a bonus of 6d. per ton, which brings their wages to 11s.

#### THE TIN-PLATE TRADE

##### Liverpool.

Business is distinctly on the quiet side; enquiries keep coming along, but only orders of the hand-to-mouth description seem to result, buyers proceeding very cautiously indeed. Many mills are closed down, and we are afraid more will have to follow suit unless affairs quickly improve; the output is certainly in excess of the demand just now. Quotations vary a good deal, but the following may be taken as about the figures generally being quoted to-day:—Coke tins: I C 14 × 20 (112 sh 108 lb.), 13s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 6d. to 26s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 9d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 7½d. to 13s. 9d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 7½d. to 13s. 9d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 6d. per box; I C squares and odd sizes, 13s. 6d. to 13s. 9d. basis for approved specifications. Charcoals rule easy at 15s. 6d. and upwards according to tinning. Coke wasters are quoted:—C W 14 × 20, 12s. 4½d. per box; C W 28 × 20, 25s. 6d. to 25s. 9d. per box; C W 14 × 18½, 11s. 6d. per box; C W 20 × 10, 16s. per box—all f.o.b. Wales, less 4 per cent.

The new mineral railway between Lord Ellesmere's Linnshaw Collieries, Walkden, and his lordship's wharves at Clifton, is now completed and ready for use.

#### COAL, IRON AND ENGINEERING COMPANIES.

**Anglo-French (Transvaal) Navigation Coal Estates Limited.**—An interim dividend of 5 per cent. (1s. per share) has been declared on account of the 7 per cent. cumulative preference shares.

**Anglo-Westphalian No. 1 Colliery Limited.**—A statement will shortly be issued, for public information only, by the above company. The capital authorised is £230,000 in 230,000 shares of £1 each, of which 120,000 shares have been issued at par, payable by instalments, and 48,000 shares have been issued as fully paid. The company has been formed to acquire, develop, and work a coal area, about 2,500 acres in extent, situated near Chislet, in the county of Kent, about 3 miles east of Canterbury.

**Ashton Vale Iron Company Limited.**—The accounts for the year to June 30 last, including £217 brought forward, show a profit of £8,044. The directors, after writing off £1,500 for depreciation, and reserving £2,000 for additional electrical plant, recommend a dividend of 3 per cent., carrying forward £110.

**Bengal Iron and Steel Company Limited.**—The directors have decided to pay the arrears of the preference dividend for the year ended September 30, 1912.

**British Combustion Turbines Limited.**—This private company has been registered, with a capital of £2,500 in £1 shares, to carry on the business indicated by the title and that of ironfounders, mechanical engineers, toolmakers, brassfounders, metal workers, iron and steel converters and metallurgists. First directors: Robert F. Collinge and P. A. Dunderdale. Registered office, New Broad-street House, E.C.

**British Westinghouse Electric and Manufacturing Company Limited.**—The shareholders at a meeting on Friday last gave sanction to the directors' proposal to reduce the capital of the company by £725,000.

**Cammell, Laird and Co. Limited.**—The proposal of the directors to renew at 5 per cent. the £500,000 worth of first mortgage debentures at 4 per cent., which fall due for redemption at the end of this year, has been confirmed by the debenture holders. Separate meetings of the 4½ per cent. and 5 per cent. debenture holders were held, and the proposal of the directors was confirmed with only one dissentient vote. The company propose to replace these debentures by an issue of £500,000 first mortgage debenture stock at 5 per cent., repayable at 103 per cent. in 1930 or at 105 per cent. if it is desired by the company to redeem them earlier.

**Dick, Kerr and Co. Limited.**—The directors report for the year ended June 30 last that the profits amount to £30,092, which, added to the sum brought forward from last year (£10,016), make a total of £40,108. Out of this sum the debenture interest and trustees' fees have been paid, and there has been reserved the sum required to provide for the premium payable on the redemption of the present debenture stock. These items absorb £11,484, leaving a balance of £28,624 available for appropriation as under: To pay a dividend of 6 per cent. per annum on the preference share capital, £18,300. To carry forward the balance of £10,324. The directors regret that they are unable to recommend the payment of a dividend on the ordinary shares. The special reserve of £16,000 has been transferred to a reserve for depreciation of investments, thereby reducing the book value of the investments.

**Dundee Coal Company Limited.**—Interim dividend of 1s. per share.

**Fisher Brothers Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of ironfounders, &c. Signatories: William Maddocks, 37, Earl-street, Coventry, and Joseph William Mills, Highercombe, Coventry.

**Furness, Withy and Co. Limited.**—The directors have declared a quarterly dividend of 6d. per share on the ordinary shares.

**Hepburn Conveyor Company Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares (2,000 preference and 3,000 ordinary), to carry on the business of mechanical, electrical and general engineers, constructors of conveyor elevators, iron and steel merchants, &c. First directors: Herbert Womersley, 6, Gaythorne-terrace, Sandal, York; George Williams, Bleak House, Huddingley Hill, Sandal; and William Hepburn, 66, Acresfield-road, Pendleton, Lancaster.

**Millom and Askam Hæmatite Iron Company Limited.**—The directors recommend a final dividend on the ordinary shares of 7 per cent. for the year ending 30th inst., making with the interim dividend of 5 per cent. paid on June 30 last, a total distribution of 12 per cent. for the year.

**Shipping and Coal Company Limited.**—This private company has been registered, with a capital of £100,000 in £1 shares, to acquire the businesses now carried on by Scheepvaart and Steenkolen Maatschappij of Rotterdam at Newcastle-on-Tyne, Hull, Immingham, and Glasgow, under the style of the Shipping and Coal Company, and to carry on the business of dealers in coal, and to search for and dispose of coal and metals and minerals, also to enter into an agreement with Scheepvaart and Steenkolen Maatschappij. First directors: Willem Van der Vorm, Victor R. Los, and William Ross. Registered office, Baltic House, 27, Leadenhall-street, E.C.

**South African Coal Depots (Cape Town) Limited.**—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of importers, exporters and merchants of coal and other kinds of fuel. Signatories: Thomas James Bowles, 118, South Esk-road, Forest Gate, Essex; and Henry C. Blackburn, 34, Elsham road, Leytonstone. Registered office, 9, Great St. Helen's, E.C.

**United Silica and Minerals Limited.**—This private company has been registered, with a capital of £65,000 in £1 shares, to acquire mines, quarries, minerals and metaliferous lands, and to dispose of and deal with lands containing copper, lead, tin, iron and coal, &c., and to carry on the business of smelters, engineers, colliery proprietors, coalmasters, patent fuel manufacturers, iron masters and founders, &c. Minimum cash subscription, seven shares. Signatories: G. Fox, H. Santler, H. J. Dixon, E. H. Saunders, W. Robinson, S. Herbert and James Fitzpatrick. Registered office, 184, Palace-chambers, Westminster, S.W.



## MINING AND OTHER NOTES.

A fire broke out about nine o'clock on Monday night at Blackhill Colliery, near Maryhill, Glasgow, belonging to the Summerlee Iron Company, by which the coal-screening plant at the pithead was completely destroyed. The fire originated in the building in which the plant was situated.

A fortune of over £2,000,000 has been left by the late Mr. William Weir, head of the famous firm of ironmasters, Messrs. William Baird and Co., of Glasgow.

Prof. Hummel, who has been appointed to the mining department of the Leeds University, delivered his inaugural lecture on Wednesday, at the Philosophical Hall, Leeds, taking as his subject "The Danger of Coaldust, and its Preventive." The professor pointed out how successful stonedust was as a preventive of explosion and ignition due to coaldust. He expressed the hope that West Yorkshire colliery owners and managers, who were up-to-date in most matters, would take the lead in introducing this excellent method of guarding against danger and loss of life.

The Wolf Safety Lamp Company, Sheffield, who have this week received an order for a complete installation of 2,250 Wolf alkaline electric lamps from the Ackton Hall Colliery Company, Pontefract, inform us that their lamps have carried off the highest award, namely, the Grand Prix, at the Ghent Exhibition.

At the annual meeting of the Pearson and Knowles Coal and Iron Company Limited, Sir J. S. Harwood Banner, M.P. (chairman), said that the total number of men employed in 1913 was 10,308, in comparison with 9,789 in 1912, and the wages paid in 1913 were £734,220, as against £658,128 in 1912, or an increase this year of £76,092, which did not include any wages in connection with the Partington Steel and Iron Company Limited. During the last two months the coke ovens and blastfurnaces had been in active operation, and he anticipated that in October or November at the latest they would have a full test of these great works, which had caused them an immense amount of thought and anxiety.

Mr. Rea, the president of the Pennsylvania Railroad, has announced that his directors have decided to sell the railroad's stock holdings in anthracite mining companies, including several with which it has been connected for 40 years. The Susquehanna Coal Company is the principal operating company and selling agency of these mines. Congress recently forbade the railroad to carry and market coal from its own mines in competition with coal from independent mines. This legislation is part of the Anti-trust Law, and suits to enforce it are pending against the Reading and the Delaware, Lackawanna and Western railroads.

It is believed that, so far as the provision of coaling facilities is concerned, the Admiralty's plans for Rosyth have undergone considerable modification. As oil fuel is becoming more general in use in his Majesty's ships, it is learned that the accommodation for the storage of oil will be considerably augmented, and the coaling station may be correspondingly decreased in size. As it is intended to keep a fleet permanently in the estuary in the vicinity of the Forth Bridge, temporary facilities for the coaling of the ships have been made. The first of a number of barges has been moored in the fifth. These barges are simply "scrapped" battleships, which have been fitted with cranes for handling the coal.

Medals are to be presented to the nursing sisters who did such good work in the Cadeby disaster of last year. They have been subscribed for through the officials of the Cadeby Main branch of the Yorkshire Miners' Association, and are at present on view.

At a meeting of the Coal Merchants' Section of the Bradford Chamber of Trade, held last week, consideration was given to the matter of the notification by coalowners of the arrival of empty wagons in their sidings, and the general opinion was expressed that, in view of the delays on the railway and the difficulty in fixing the responsibility, coalowners should be asked to advise merchants of the date of arrival of empty wagons in their sidings with the same promptitude as they advise the despatch of loaded ones. In reference to the suggestion that the Gas Committee of the Corporation should undertake trading in coal, it was resolved that no action be taken at present, but that the proposal should be watched closely in case of developments.

The engagement is announced of Mr. Edward Fielden Pilkington, eldest son of Mr. and Mrs. Charles Pilkington, of the Headlands, Prestwich, to Miss Catherine Dorothy Willink, only daughter of Mr. and Mrs. H. G. Willink, of Hillfields, Burghfield, near Reading.

Mr. J. B. Atkinson, M.Sc., who recently retired from the post of senior inspector of mines for the Newcastle district, informs us that he has set up in practice at 9, Kensington Terrace, Newcastle-upon-Tyne, as a consulting mining engineer. Mr. Atkinson, who comes of a distinguished North-country mining family, prior to his long term of inspectorship, was actively associated with the management of large collieries in Durham and Yorkshire. He is a vice-president of the North of England Institute, a member of council of the Institution of Mining Engineers, and a past-president of the Mining Institute of Scotland, in which country he acted as inspector before coming to Newcastle on the death of Mr. Hedley. Mr. Atkinson will devote his attention to all questions practically affecting the ownership and management of mines.

Mr. Ernest Pearce, late partner in and for 20 years associated with M. Spencer and Sons, Albion Steelworks, Sheffield, has commenced business as a manufacturer of cast steel, files and miners' tools, at the Sterling Steelworks, Rockingham-street, Sheffield.

It is stated that the Rotherham rescue station in St. Ann's-road is almost completed, and it is expected it will be available for emergencies in the course of a month. In connection with the apparatus it has been decided, it is said, to make use of the liquid air, and machinery for producing it is to be installed.

At last week's meeting of the Adwick-le-Street Parish Council Dr. Ashforth drew attention to the overcrowding of houses in the district, and stated in some cases there were 15 or 17 persons in a house. Mr. Lazenby, estate agent to the Brodsworth Colliery Company, said he could not agree to 17, but did not deny 15 in some houses. As far as he was concerned, such a condition of things would be remedied as soon as possible. Dr. Mackay remarked that he knew a house where there had been 18 inmates, and Dr. Ashforth replied that unfortunately the result of taking action would be to throw people out, as they had nowhere to go. Upon a question being asked as to whether the authorities could not be compelled to put up workmen's dwellings, the chairman asked what was the use when there was no water supply? A house, he pointed out, was not supposed to be passed for occupation until it had a proper supply.

Some curiosity is felt in the Doncaster district as to when the projected colliery at Harworth will be commenced. Enquiries show that matters are going forward satisfactorily. The colliery company have taken over the brickyard at Harworth, which formerly belonged to Lord Galway. It is not far from the site of the projected pit, and will be a valuable adjunct to it. In connection with the new colliery which Sir Arthur Markham is to sink at Armthorpe, near Doncaster, and which, it is understood, will be known as the Cantley Colliery, boring operations are proceeding very satisfactorily. The work is under the direction of Herr William Heyroth, and is being carried out by a staff of 15 Germans. It is anticipated that the sinkers will make their appearance before many months have elapsed. As yet no large volume of water has been encountered, and it is thought probable the sinking may prove a comparatively easy one.

It is announced that the Wyken and Craven collieries in North-east Warwickshire will in future be controlled by the Warwickshire Coal Company Limited, who are carrying out a big scheme at Keresley, a few miles distant. The Wyken Colliery was established in the nineties by a company who had previously worked the old Wyken Main pit, and a few years ago Sir Arthur Markham, M.P., came into possession of the undertaking. Under his proprietorship the Craven Colliery was acquired and developed, and the output of the two collieries is considerable. The combined collieries will constitute the largest undertaking of its kind in the Warwickshire coalfield and find employment for something like 4,000 men and boys.

At the Crystal Palace on Saturday, on the occasion of the National Band Festival, the grand championship for the 1,000-guinea challenge trophy was won by Irwell Springs; St. Hilda Colliery, Durham, last year's winners, were second.

The directors of Messrs. Pease and Partners have appointed Mr. M. Palmer to the position at Waterhouses in succession to the late Mr. Crofton. Mr. Palmer is the son of Mr. Henry Palmer, formerly manager at Medomsley. To the position of manager at Stanley and Bowden Close, Mr. Joseph Pease has been appointed. He is a son of the Right Hon. J. A. Pease, M.P.

At Lancaster, on the 25th ult., William James Foreman, veterinary surgeon, of Leadgate, was charged with suspecting the existence of a disease known as parasitic mange amongst the ponies at the Langley Park Collieries of the Consett Iron Company, and not giving prompt notice of the suspected disease to an inspector of the local authority. A horsekeeper named Elliott, employed by the company, was charged with a similar offence. The magistrates dismissed the summons against Mr. Foreman. In regard to Elliott, the magistrates found that he had failed to report the fact of mange among the ponies, and he was fined £5 and costs.

At a meeting of the Birmingham Chamber of Commerce on Monday, a resolution was passed to form a committee of employers and traders for the purpose of enquiring into and reporting upon the report of the Departmental Committee on Industrial Agreements, the operation of the Trade Disputes Act, and labour unrest generally.

The executive committee of the Miners' Federation of Great Britain has decided to defend in the appeal case *Herd v. the Weardale Steel and Coke Company Limited*, Durham, which is being taken to the House of Lords. The question involved is the right of miners to be brought to bank at any time when that can be done without interrupting the coal-drawing operations.

At Littleton on Saturday last, an interesting gathering was held on the occasion of the coming of age of Mr. H. R. Hornsby, son of Mr. G. H. Hornsby, agent for the Sherburn and Littleton Collieries of the Lambton and Hetton Collieries Limited. He was presented with a splendid motor cycle of an up-to-date pattern, and a silver cigarette case, subscribed for by the officials and workmen of the four collieries.

Before Mr. Registrar Gillespie, at the Leeds Bankruptcy Court on the 26th ult., the public examination of Mr. Frederick W. Tannett-Walker was closed.

One of the pits of the Kinneil Collieries, West Lothian, is temporarily closed down. The men are desirous of having electric safety lamps introduced.

In the Sheriff Court at Hamilton last week, John Hamilton, coalmaster, pleaded guilty to a contravention of the Explosives Act, 1875, at a store at Woodside Colliery, on August 29. It appeared that at the above store, which was registered for the keeping of mixed explosives, he was entitled to have 1,000 lb. of gunpowder, or  $\frac{1}{2}$  lb. of any other explosive in lieu of each 1 lb. of gunpowder not so kept. On the date stated he had 350 lb. of gunpowder and 700 lb. of another explosive—viz., gelignite—being 375 lb. in excess of the quantity allowed by law as aforesaid. Sheriff Shennan imposed a fine of £2.

At a meeting of the Sheepbridge Coal and Iron Company Limited, on Monday, Lord Aberconway complained that owing to increased wages and legislation the cost of coal productions had risen greatly during recent years. He stated that in 25 years their cost had risen 40 per cent., mainly due to higher wages. In spite of this increase, he said, there was a tendency amongst men to work a great deal less than the time at their disposal. They found in the coal trade to-day that men were working about 20 per cent. short of their full possible time, which meant that one-fifth of the trade resources of the country were unemployed and idle. His lordship added that the cost of recent legislation was considerable. The Mines Act, Insurance Act and Workmen's Compensation Act cost the company something like £60,000 per annum.

The annual prize distribution in connection with the Warwickshire School of Mining took place at Nuneaton on Saturday. The annual report for session 1912-13 stated that preparatory classes were arranged at 11 centres, each course consisting of 50 hours' tuition in practical mining and 50 hours in arithmetical subjects. The preparatory classes were primarily intended for students under 16 years of age, in order to prepare them for the more advanced work of the senior class. The amount of work done in 1912-13 was very encouraging, and students had shown a keenness which had been absent in previous years. That, in part, was due to the stimulating effect of recent mining legislation; but chiefly might be attributed to a general awakening of younger miners to the necessity and advantage of increased technical knowledge and to the support and encouragement given to students attending the mining school by several colliery managers and officials. Special classes for colliery officials were held during the session at Nuneaton and Glascote, and at both centres the work was of a satisfactory character. The southern part of the coalfield was considerably affected by night work. This was a serious difficulty in the way of regular attendance. As the value of the work done in the mining school became recognised by responsible parties at the collieries, the difficulty would be reduced, and should ultimately be removed.—Mr. McTrusty, mining lecturer to the County Mining School, said there were nearly 1,000 boys under the age of 16 years employed in the Warwickshire coalfield. Out of those only 80 attended the mining classes, and he thought the fact a very serious one; indeed, one which colliery managers should take very seriously to heart. They had a system of prizes offered by several of the colliery proprietors, in addition to those given by the County Council, which, he hoped, would induce boys to attend the classes. Seeing that the Warwickshire Miners' Union exercised so great a power over the working men, it ought to accept a certain amount of responsibility in respect of their education.

It is stated on good authority that an important Scotch colliery company are seriously contemplating opening out the old Lonsdale pit at Dearham, and although nothing definite has yet been arrived at, the matter is looked upon with some importance by the villagers. A short time ago several representatives of the firm visited Dearham, and in company with Mr. J. Robson, a local gentleman with an intimate knowledge of the Dearham royalties, made an inspection of the district in connection with the Lonsdale colliery. The pit was closed down in 1894, and a quarter of a century ago it was the industrial mainstay of the village, employing 250 hands with a daily output of 400 and 500 tons. The Lonsdale Colliery is situated in the centre of the village; and although it was well worked on the west side, there is said to be an immense area of coal on the north side which has never been touched.

**Standard Fishbolts and Nuts.**—A specification issued recently by the Engineering Standards Committee deals with steel fishbolts and nuts, and prescribes the quality of the steel and tests for both the steel and finished fish bolts. The question of design is left open, although a pattern is suggested for square nuts for use with angle fishplates. The clauses of the specification also deal with the process of manufacture of the steel, with tensile, bend and unscrewing tests, and the number thereof, with inspection, additional tests before rejection, margin of weight, gauging and so on where the steel should fail to comply with the tests and requirements. Appendices refer to standard Whitworth screw threads, and to forms of standard tensile test pieces.



## Letters to the Editor.

**Editor is not responsible either for the statements made, or the opinions expressed by correspondents.**

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### LOW-TEMPERATURE CARBONISATION.

SIR,—I quite agree with Mr. John Harger that there is no connection between the low-temperature carbonisation of coal and the temperature of white hot, or gaseous carbon.

I desire to ask him to reconcile his statement that "there are no hydrocarbons in coal" with that of T. F. Winnill, B.A., given on page 626 of your last issue. In giving the result of his experiments, he states that 100 grammes of soft coal gave off 80 cubic centimetres of combustible gas, consisting of methane and higher hydrocarbons. As Mr. Harger says "he should be very interested to hear of any evidence of coal containing hydrocarbons," I would refer him to the experiments of Messrs. Porter and Ovitz, as reported on page 165. *The Carbonisation of Coal*, by V. B. Lewes, stating that when samples of freshly-mined coal were kept for a short time in sealed jars, the gas liberated consisted almost entirely of methane. I would also refer him to Thorpe's *Inorganic Chemistry*, page 217, vol. i., "when recently raised, coal always contains occluded gas, consisting principally of methane, 100 grammes of coal will give off 200 cubic centimetres of gas, of which 180 are methane."

A. ROLLASON.

31, Station-street, Nottingham,  
September 29, 1913.

### THE INCLINATION OF COLLIERY SIDINGS.

SIR,—I understand that it is the custom in Germany to lay out colliery sidings on a horizontal plane instead of on a slight incline of, say, 1 in 70 and 1 in 80, as is the case, I believe universally, in this country.

Can any of your readers explain why this is so, and also how the costs of the two systems compare? I imagine that the cost of working horizontal sidings must be considerably greater than that of incline sidings.

If any of your readers can throw any light on this subject it will be much appreciated by

October 1, 1913. COLLIERY MANAGER.

### NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**The Saturday Afternoon Stoppage Loses Five per Cent. of Trade—Willing Workers Debarred—Conciliation Board and a Peculiar Case—Home Office Enquiry to be held at Garnant—Great Prosperity of Wagon Builders—The Question of Subsidence again: Some Extraordinary Facts—Coalowners' Mining School Operations—Anthracite Men Seek General Five per Cent. on Price Lists—Thousands of Strikers Resume Work—Startling Protest by a Workman against Strikes—"This Damnable Federation"—The Affairs of Duffryn-Rhondda Colliery—Men Sue Employers for not Providing Work.**

Although a meeting was held in Cardiff on Friday of the signatories to the trimming tariff, and a report was presented as to negotiations with the men concerning the Saturday half-holiday, no decision was arrived at.

The subject came up at Tuesday's meeting of the Cardiff Chamber of Commerce and led to an interesting discussion. Mr. J. T. Duncan, the president, stated the terms which had been offered but were rejected—namely, 1s. per hour from 1 p.m. till 4, and 2s. 6d. per hour from 4 o'clock till 6; so that in addition to their usual earnings all the men working from 1 till 6 would receive 8s. He said that not more than 5 per cent. of the men would be required to work on Saturday afternoons; at any rate, the quantity of coal shipped on an average Saturday afternoon did not exceed 5 per cent. of the week's total.

Cardiff, he added, was placed at a disadvantage by the men's rejection of these generous terms—every competing coal port outside Bristol Channel being able to ship after one o'clock. For want of wagons on Monday collieries would be stopped, and a hardship be imposed upon the miners. He believed that 20 per cent. of the trimmers were willing to work on Saturday afternoons, and many tippers (who were not so well paid as the trimmers) felt keenly the loss of the overtime payment.

Mr. H. Radcliffe, one of the largest shipowners in the port, alluded to upon the action of the men in the coal gangs, and suggested that the work of the gangs, so as to ensure continuance of the trade, should be a serious matter from the view of increased trade. There was not dock room to do the trade now, let alone the

expansion.—Mr. J. A. Jones, who followed, emphasised the fact that no trimmers were asked to work from Monday morning till Saturday night; but that certain men, not willing to work on Saturday afternoon themselves, were preventing others from going to work, although some of the latter might have no more than two or three days' work during the week, and would wish to make up their wages on Saturday afternoons.—Other speakers referred to the grave effect which the stoppage had upon the coasting trade, pointing out that most of the boats working late on Saturday were coasters.—Mr. Vivian Rees said he did not think the men appreciated the fact that they were striking so serious a blow at the trade of the port; for not only had the dock accommodation been practically decreased by 5 per cent., but the stoppage operated against the supply of tonnage just as they were calling out for additional vessels.

The Conciliation Board met on Monday, and dealt with a number of disputes, &c. One matter of an unusual character arose. Complaint was lodged by the owners that the men in the Havod seam at Locket's Merthyr Colliery had given notice terminating their contracts, these notices being a breach of the Conciliation Board agreement, as the question in dispute had not been referred to the Board in the usual way. The workmen's representatives, however, denied that there was any dispute, alleging that the men had only given notice to leave the colliery in ordinary course. The owners replied that they could not accept that statement, as negotiations had taken place on the question between the men and the management. No action was taken in the matter.

The Anthracite Miners' Association has resolved that the workmen at one of the collieries in the district shall put in their notices as a protest against alleged victimisation of men who are active in the Labour movement.

A Home Office enquiry is to be held by Dr. W. N. Atkinson into an alleged breach of rules by an official at the Raven Colliery, Garnant, in regard to which the workmen have been on strike for two months. It is stated by the men that the official was found with his lamp open whilst in the mine.

Wagon builders have experienced remarkable prosperity for some time past, and present indications are most favourable for a continuance of that prosperity: both the large increase of output and the special circumstances of the industry—even the trimmers' Saturday half-holiday—combining to advance their interests. By the Board of Trade regulations, under which the dead-buffer wagons will at the end of the year have to be set aside, some thousands of this class of rolling stock are affected, with the result that new or converted wagons will be needed to meet traffic requirements. Unfortunately for colliery companies, wagon prices are now exceptionally high, and this fact leads to hiring upon a larger scale than ever. But, whether for sale outright or for hire, the wagon companies stand to make money, and it is not surprising to find Bristol and South Wales Wagon Company shares at 50 per cent. premium, and Wagon Finance Corporation at 37s. for the £1 paid share.

The question of subsidence is being further discussed in this coalfield, it being noted that whereas landowners, in their leases of mineral areas, formerly put upon colliery owners the burden of meeting any claims for subsidence, some are now granting building leases where the whole risk is put upon the builders, no claim to be made upon either colliery company or landowner in the event of subsidence. This, of course, restricts building, and adds to the housing difficulty, as to which public opinion is being assiduously informed. It is stated by one local official that in the Rhondda the Ordnance Survey has disclosed the fact that since 1898 the whole district has sunk "in many localities over 5 ft., the maximum being 7.95 ft. at Llwynypia."

Principal Griffiths (South Wales University College), with Prof. Knox (School of Mines, Treforest), and Mr. H. M. Ingledew, have attended on behalf of the Mining Board a meeting of the sub-committee of the Monmouthshire Education Authority. They set forth proposals as to co-ordinating the work of the Mining Board with that of the local authority in respect of mining education; and suggested that the Monmouthshire Council should proceed with its work in elementary instruction, and that the Mining Board should set up at Crumlin a school for advanced teaching.

Prof. Knox and Mr. Ingledew have also waited upon the Federation executive, and have explained the work undertaken at the School of Mines in training men for official positions in the coalfield. The members of the executive expressed sympathy with the method, and promised to assist the entry of the best candidates for the proposed training.

Ammanford colliers have passed a resolution that no agreement be signed in 1915 on behalf of the Anthracite area unless 5 per cent. be granted upon their price lists; and they call upon all South Wales men to support them in this design.

In the course of an address to the meeting where this resolution was arrived at, Mr. Stanton argued that the non-unionist question should be made a national one, and, instead of having sectional struggles, to have a great struggle, and demand the fullest recognition. Federationists, he said, were 95 per cent. of the workmen.

It should be borne in mind that the "defaulters" are not really non-unionists, but are, as to a large proportion, Federationists whose contributions are in arrears. For example, the lodge secretary at Gwaun-cae-gurwen reported last week that there were 221 in arrears of two months and upwards, and that there were a few men who had not joined the union.

Aberaman and Cwmaman district miners, who ceased work last week in protest against non-unionists, decided to resume and to adopt a badge system, whereby they would be able to discover non-unionists, and so avoid working with them. This decision, affecting 7,000 in all, was not reached without protest and criticism, one man remarking that if a lampman were non-unionist, all would have to be idle if they refused to take their lamps from him, and asking also what would happen to a haulier who refused to supply trams to non-unionists—would he not be dismissed, and then have to support his family on 10s. a week? Another speaker characterised the project as a "brainless fight." Nevertheless, the mass meeting gave it unanimous approval. Mr. Morgan, miners' agent for the anthracite district, is reported to have said that he considered the practice of refusing to associate with non-wearers of the badge would lead to more complications than anything else. The badge system has been for some months in operation at Maesteg and the neighbourhood.

Twelve hundred men in the Ystradgynlais district, where the non-unionist question was raised, have also decided to resume work.

The seven thousand men of the Cambrian Combine, who stopped on Tuesday week, resumed operations again on Monday last. There was a decision to march to Pontypridd on Wednesday of last week, when the hauliers' cases came on; there was a "grievance" concerning a police officer who had had to interview one man in respect of his pay ticket; and, after the stoppage, other grievances were alleged. The meeting which decided on resumption of work was held on Friday, and the condition of resuming was that the management should receive a deputation concerning grievances—which they are always ready to do.

One collier, speaking at the meeting, protested against "these sky-rocket strikes, in which we are engaged eternally. There is not an atom of sense behind it. Are we strong enough to move this damnable Federation not to starve our wives and children? They have to stand by empty cupboards while the men have to sit in halls listening to empty speeches"—a declaration that won some amount of applause.

The hauliers' cases referred to in a preceding paragraph affected nearly 300 men, who were sued for damages; and they occupied the Pontypridd Bench for two days. The Cambrian Combine sought to recover £2 each from 291 men who had absented themselves from work, alleging against them breach of contract at the Naval Colliery. It had been planned, as stated, that about 7,000 employees of the Combine would march in procession to the court-house; but not more than 200 to 300 assembled at the rendezvous, and less than 1,000 formed the total after picking up contingents en route.

The point at issue between the management and the men was as to the hauling of coal by the afternoon and night shifts, this having been the practice hitherto, but the men having raised objection on the ground that the amount of coal hauling had so much increased. The pay of these hauliers was on a rate of 3s. 8d. per day, whereas those on the morning shift had a rate of 3s. 11d.; and the former contended that their work should be hauling rubbish, whilst that of the latter was hauling coal. The claim was for the higher rate when put to hauling coal. On the part of the management, however, evidence was given to show that the practice had been for the afternoon and night men to deal with coal that had been worked and left in the working places by the morning shift. The men had, it appears, passed a resolution that they would not take this coal to the double parting.

In defence, the men's solicitor raised the point that the cause of stoppage was a dispute with the management, and that it was not for the Bench to enquire into the merits of the dispute. He contended that section 3 of the Trade Disputes Act applied in this instance; but Mr. Kenshole (for the plaintiffs) argued that the Act did not apply where an individual committed a breach of his own contract. The Stipendiary agreed and disallowed the objection.

Ultimately, judgment with costs was given for plaintiffs (except in three instances and in certain cases where there was special defence), for an amount to be agreed upon; and stay of execution was refused. An order was made for the amount to be set against wages.

Whilst workmen are constantly being told of successful colliery enterprise, they do not hear so much of its risks and failures, one example of the latter having this week been made manifest at the meeting of Duffryn Rhondda directors. Owing to non-response to an appeal for more capital, it has been decided that the undertaking cannot any longer be carried on by them; and probably the trustees for the debenture holders will take over the property. Troubles underground have quite changed the position of the concern during the past four years, and there has been no dividend on the ordinary shares since 1909, when 5 per cent. was declared, the two years preceding having witnessed distributions of 7½ and 10 per cent. Mr. D. A. Thomas (who, by the way, is now director of 25 companies) joined the board about two years ago, and has served as chairman and managing director, his accession being



signalised by the rise in share values to above par; but the "faults," labour costs, and need of heavy capital outlay for deeper sinkings to the steam-coal measures have combined to hinder satisfactory progress. Voluntary liquidation of the company will probably take place.

The Gwaun-cae-gurwen Company having succeeded two months ago in an action against hauliers for breach of contract, eight of their men have made claim for loss of work on two days, and the case came on in Pontardawe Court last Friday. Plaintiffs had been sent back home by the fireman on June 21 and 22; and the present contention was that if the company could maintain a claim because the men would not work, these men were entitled to claim because work was not provided. The defence submitted on behalf of the company was that stoppage had been occasioned by refusal of men to work on the screen, and the Bench gave judgment in favour of the employers.

### MINERS' NYSTAGMUS.\*

By J. COURT, L.R.C.P., M.R.C.S.

The writer holds no appointment from any coal-owners' association, or miners' association, or insurance company, but as one of the medical referees for Derbyshire his remarks are free from bias and founded entirely upon facts and observations made during a life-long experience of 40 years among the collieries of the United Kingdom and Belgium.

During the year 1891 the writer examined in Derbyshire an equal number of men working with safety lamps and with naked lights. Afterwards he went down the Durham collieries, and one in the Forest of Dean, and found that the safety lamp men suffered badly, whilst the naked light men were almost free from nystagmus. By these observations made 22 years since upon nearly 2,000 men, the writer claims to have been the first doctor in Great Britain to have proved that insufficient light was the chief cause of the disease.

There are doubtless contributory causes, such as errors of refraction in the eyes, which is quite a common condition amongst all classes of people. Then, again, there is without doubt a constitutional liability, because many men are found to be affected who have been employed only a few years in the pits, whilst the majority of miners who have been underground during the greater part of their lives escape altogether. Moreover, there is a difference between the colliers in one district and those in another. In some men the disorder is latent, in such wise that an attack of illness like influenza will cause nystagmus to appear, and so will intemperance. An accident like a blow on the head or an injury attended by sudden shock will also bring out the symptoms. Muscular fatigue increases the trouble, because the sufferers are always worse at the end of the day's work than they are at the beginning. Furthermore, anything that gives rise to exhaustion of the nerve-centres will help to develop nystagmus. For example, the hotter the atmosphere is in a mine, the greater is the fatigue, and therefore the liability to the disorder.

If the writer were asked what are the best means to prevent miners' nystagmus, he is convinced by his own researches and the experience of others that improved illumination will in time do away with the trouble altogether.

### The Compensation Act and Nystagmus.

The writer next deals with practical points in relation to the present state of the law, and the liabilities of coalowners for compensation in cases of miners' nystagmus.

The Compensation Act clearly lays it down that no workman shall receive compensation unless he is completely incapacitated from following his employment. But the Departmental Committee makes a law for itself when it orders that a miner with nystagmus should leave his work even if the disease is slight, and does not prevent him from getting a day's wages. The result is that this order is acted upon all over the country, and certificates are constantly given for slight symptoms of the disease, although the miner is no worse than and perhaps not as bad as many of his fellows hard at work in the same colliery. The decisions of the county court judges are influenced by this departmental order. For, instead of the incapacity of the workmen being called in question, provided that a collier has the slightest possible oscillations of the eyes, and these oscillations can only be obtained by some extraordinary and severe tests in a doctor's consulting-room, nevertheless it is held that the man has not recovered, and therefore that he should not return to work even if he is able to do so.

Two years ago, in answer to a letter from Sir Arthur Markham, the writer strongly advised that a Government enquiry by commission should be held to determine the following questions:—

1. The true cause or causes of miners' nystagmus.
2. The duration of the complaint and the best means of cure.
3. Whether there is a constitutional liability.
4. Whether one attack of itself predisposes to another.
5. Whether the mild cases are incapacitated from work underground and to what extent.
6. Whether miners' nystagmus causes the sufferer to be a danger to himself and other miners at work with him.

If nothing further is done and there is no relief to the present intolerable position, the writer advises that an Act of Parliament be obtained, restricting the time

of compensation in cases of nystagmus to four months. In the event of any workman being dissatisfied, an appeal should be allowed to a board of expert referees as to his incapacity for work, their decision to be binding.

There is excellent authority for this limitation of time. The writer would draw attention to the recent order of the Home Secretary, extending the provisions of the Workmen's Compensation Act, dated July 30 last. Referring to glass-workers (section 2), it states that—

"A glass-worker suffering from cataract shall be entitled to compensation—for not more than six months in all, and for not more than four months unless he has undergone an operation for cataract."

This recent Order from the Home Office is the result of a Departmental Committee enquiry held this year (1913). It will also have a most important bearing upon the coalmining industry. The Committee have decided to schedule for compensation cases of clonic spasm of the eyelids, or (in plain English) "blinking." The schedule (paragraph 12) reads—

"The disease known as miners' nystagmus, whether occurring in miners or others, and whether the symptom of oscillation of eyes be present or not."

This means that any man with blinking of the eyelids and complaining of other symptoms can demand compensation. The writer holds strongly to the opinion that if a miner has no oscillation of the eyeballs, he ought not to be certified as having miners' nystagmus.

There was very strong evidence given by experienced surgeons against the views of the Committee, which ought to have made them pause before scheduling blinking. The writer has never seen a case of "blinking" or clonic spasm of the eyelids which prevented a miner from working down the pit. There are so many diseases of the eye and other complaints which cause "blinking" that he would certainly never give a certificate of disablement from miners' nystagmus, unless oscillation of the eyeballs was present. Mere blinking is a subjective symptom, which can be stopped, and it does not affect the eyesight. Again, this ruling of the Home Office contradicts the opinions of the highest medical authorities, who say that nystagmus is an involuntary oscillation of the eyeballs sometimes (but not always) accompanied by other symptoms.

### Miners' Nystagmus and the Detection of Gas-caps.

The writer then deals with regard to miners suffering from nystagmus, and their ability or otherwise to detect a "gas-cap" in a safety lamp. At the outset he insists that observations, in order to be of any value, should be made underground at the coal face where men are at work and the conditions of light, &c., are absolutely normal.

The chief reason for undertaking these researches down the mines, somewhat onerous and difficult at the writer's time of life, was to find out whether Mr. Snell's contention that men with miners' nystagmus could not see a "gas-cap" was correct. In the year 1908, the British Medical Association met in Sheffield, and Mr. Snell was the president for that year. In his address, which was afterwards published in the *British Medical Journal* of August 1, he made the very serious statement that miners suffering from nystagmus were not able to see the "gas-cap" over the flame of a safety lamp when firedamp was present in the workings of a colliery. The writer proposes now to bring forward evidence which he believes will go far to prove that Mr. Snell's observations were faulty and artificial, and lead to erroneous conclusions.

For a full description of the experiments which were conducted by Mr. Snell, with the assistance of the late Mr. A. H. Stokes, H.M. inspector of mines, and in the presence of colliery managers, and expert eye surgeons, the writer must refer the members to the printed report in the *British Medical Journal* for August 1, 1908, pages 243-244.

The chief objection that the writer has to the experiments is that they were purely artificial. The men were first placed in a dark room with a single safety lamp, then they were placed on their sides, as in the position of a "holer," and kept there for a time; then they were asked to stand up and look at a gas-cap horizontally. No wonder the men could not see a gas-cap. The unusual conditions and the presence of doctors, Government inspectors, and other officials, would tend to make them nervous and apprehensive. The writer maintains that the conclusions to be drawn from such experiments, conducted in that fashion, cannot be looked upon as reliable. First of all, the only place to test the capability of a miner with nystagmus to detect firedamp is in the pit, where the conditions are natural and normal. No one ever heard of a miner first lying on his side in a constrained position for a time, and then immediately getting up and looking straight before him, instead of searching with his eyes near the roof where firedamp collects. The tests, therefore, were entirely abnormal. Then again, coal gas is not the same as firedamp, and it is on the face of it improper to say that a miner with nystagmus is not able to detect a firedamp "cap" because he failed to see a "cap" produced by coal gas.

Then another question arises: How many of Dr. Snell's cases suffered from defective eyesight? Eight of the men were over 50 years of age, one of these was 60, and another 65. Owing to changes in normal vision, which nearly always takes place in men of 50, it is quite likely that they could not see a gas-cap from this cause, apart from nystagmus.

### Dr. Court's Experiments.

The writer now deals with his own researches, which were undertaken entirely to test the soundness of the foregoing opinions.

The writer determined, therefore, if he could, to

make practical tests in the collieries, and approached Mr. R. W. Cuthbertson, the agent for the Staveley Company.

A total of 106 miners were examined underground in the workings of three large collieries, in the months of August, September, and November, 1912. Out of this total, 58, or 54.7 per cent., were found to be suffering from nystagmus, and it is a most remarkable fact that 93 per cent. of this number were able to detect gas-caps varying from 2 to 5 per cent., whilst only 7 per cent. of this number failed to detect gas at all. Furthermore, out of a total of 106 cases examined, 48, or 45.3 per cent., were found to be not suffering from the disease, and although 96 per cent. of this number were able to detect gas-caps, as stated above, there were 4 per cent. of this number who failed to observe a gas-cap in the safety-lamp to the extent of the above percentages.

Amongst the men examined in No. 2 colliery, there were two rather remarkable cases, two brothers, aged 32 and 43 respectively. Both had nystagmus in a bad form, and both said that the light revolved fast. Neither of these young men had ever been off work on account of the disease, and they made no complaints about their eyes. One had worked 19 and the other 21 years in the mine, and despite the bad symptoms both could detect a 3½ to 4½ per cent. gas-cap. It would seem, then, that the vision was good despite the oscillations, and it is more than probable that there is some constitutional predisposition in both brothers.

It should be pointed out that when the foregoing examinations were about to be made, and were actually being carried out, the following arrangements were adhered to:—

1. All the cases were chosen indiscriminately by the under-managers from various parts of the mine, at a few hours' notice from Mr. Cuthbertson, and no intimation whatever was given to the under-managers of the various pits as to the purpose for which the men were required.

2. The writer first examined each case individually, as to whether the man was suffering from nystagmus or otherwise.

3. Each case (after being examined) was then sent on to be tested as to his ability to detect firedamp on the flame of a safety lamp.

4. When the tests for gas were being effected, it was not known by the "gas-examiner" whether the man was suffering from nystagmus or otherwise.

5. Each case was tested separately, both in firedamp and in fresh air.

6. After the completion of each individual test, the workman could not in any way communicate or hold conversation with those remaining to be examined.

7. The distance from the general body of the men to be examined to the point where the writer was conducting his examination varied from 60 to 80 yards, and the distance from the writer to the point where the gas tests were effected varied from 70 to 90 yards.

### Results.

An analysis and a summary of the examinations are recorded in Tables I. and II.

TABLE I.—ANALYSES OF EXAMINATIONS.

Description.	Number of colliery.						
	No. 1.	No. 2.	No. 3.	Total.			
Number suffering slightly from nystagmus, 23·6 per cent. ....	15	...	8	...	2	...	25
Number suffering seriously from nystagmus, 31·1 per cent. ....	24	...	5	...	4	...	33
Number not suffering from nystagmus, 45·3 per cent. ....	31	...	2	...	15	...	48
Number suffering slightly, who detected 2 to 3 per cent. of gas	10	...	3	...	1	...	14
Number suffering slightly, who detected 3 to 4 per cent. of gas	4	...	5	...	1	...	10
Number suffering slightly, who could not detect gas at all.....	1	...	<i>Nil</i>	...	<i>Nil</i>	...	1
Number suffering seriously, who detected 2 to 3 per cent. of gas	17	...	1	...	3	...	21
Number suffering seriously, who detected 3 to 4 per cent. of gas	4	...	4	...	1	...	9
Number suffering seriously, who could not detect gas at all .....	3	...	<i>Nil</i>	...	<i>Nil</i>	...	3
Number not suffering from nystagmus, who detected 3 to 4 per cent. of gas .....	7	...	2	...	7	...	16
Number not suffering from nystagmus, who could not detect gas at all .....	1	...	<i>Nil</i>	...	1	...	2
Number not suffering from nystagmus, who detected 2 to 3 per cent. of gas .....	23	...	<i>Nil</i>	...	7	...	30

TABLE II.—SUMMARY OF ANALYSES OF EXAMINATIONS.

Total number of cases examined.....	106
Total found to be suffering from nystagmus .....	58 = 54.7 per cent. of cases examined.
Total not suffering from nystagmus .....	48 = 45.3 per cent. of cases examined.
Total cases suffering from nystagmus who could detect gas .....	54 = 93 per cent. of cases suffering.
Total cases suffering from nystagmus who could not detect gas .....	4 = 7 per cent. of cases suffering.
Total cases not suffering from nystagmus who detected gas .....	46 = 96 per cent. of cases not suffering.
Total cases not suffering from nystagmus who could not detect gas .....	2 = 4 per cent. of cases not suffering.

With respect to 41 'holers who were drawn from all districts of the colliery, 20 of these men, which is a high percentage, had nystagmus, but not one of them had been incapacitated from work, and, when the writer questioned them, each man said that he had nothing the matter with his eyes. The writer, however, presumes that if a Home Office expert saw these miners, he would order them out of the pit "lest they should get worse." Again, not one of all the cases examined had clonic spasm of the eyelids. The writer ought also to add that every case was tested at the fifth hour of the shift, when the disease is most marked.

\* From a paper read before the Midland Institute of Mining Engineers.



## THE FREIGHT MARKET.

There has been a considerable amount of activity in the north-east coast outward freight market, and rates remain fairly high. Coasting business is being done at about 3s. 6d., Tyne to London, and 4s. to Hamburg. North France is worth from 4s. 9d. to 5s. 1½d. to Havre, with Rouen at 5s. 6d. The Bay is based on from 6s. 3d. to 6s. 6d. to Bordeaux, with St. Nazaire at 7s. 3d. The Baltic is quoted at 5s. 9d. to Cronstadt. The Mediterranean has Genoa at from 9s. 6d. to 10s. At South Wales, chartering has been moderately active. Rates for the Mediterranean are a shade easier, more tonnage being on offer. Other directions show a little weakness. South America is steady. At the Humber the market is slow, but steady. Little is doing at the Clyde. Homewards, the River Plate is very dull, and transactions are few. The Black Sea is steady, with supplies coming forward in good quantities. Orders are sparingly quoted, however. During the last few days there has been a somewhat improved demand from the Azof and Danube. America is easier, with lower rates from the northern ports. India favours charterers. The Mediterranean and ore trades are steady. The Baltic is firm.

Tyne to Aalborg, 2,300, 5s. 6d.; 1,700, 5s. 9d.; Algiers, 3,000, 8s. 9d.; Bona, 2,500, 10s. 6d.; 300, Bordeaux, 3,000, 6s. 3d.; 3,700, 6s. 6d.; Barcelona, 3,000, 6s. 3d.; 5,500, 9s. 6d. coke, 11s. 6d. goods; 5,500, 9s. 7d. coke, 700, from Dunston; 10s., coke; Cadiz, 1,500, 10s.; Cannes, 1,600, 11s. 6d., from Dunston; Carthage, 1,100, 11s.; Copenhagen, 2,000, 5s. 4½d., Christiansholm terms, fixed abroad; 2,000, 5s. 3d.; Constantinople, 4,100, 10s. 6d.; Calais, 1,700, 4s. 10½d.; Cronstadt, 3,000, 5s. 9d.; Elsinore, 900, 6s.; Fairwater, 1,800, 4s. 10½d.; Genoa, 3,200, 10s.; Gefle, 1,900, 5s. 9d.; Helsingfors, 2,800, 5s. 6d.; Hamburg, 2,500, 4s.; Havre, 2,000, 4s. 9d.; 1,250, 5s. 1½d.; Kiel, 2,600, 5s. 6d.; Lubbeck, 1,800, 5s. 3d.; London, 2,100, 3s. 6d.; Las Palmas and Teneriffe, 9s. 6d.; Marseilles, 4,100, 9s. 3d., 600, from Dunston; Malta, 5,000, 7s. 9d.; Naples, 4,500, 9s. 9d.; Nice, 2,800, 10s. 3d.; Port Said, 4,200, 9s. 3d.; 4,000, 9s. 4½d.; Pillau, 2,100, 4s. 9d.; Rendsburg, 1,700, 6s.; Rouen, 1,500, 5s. 6d.; St. Nazaire, 1,750, 7s. 3d.; 2,200, 7s. 3d., from Dunston; 2,800, 7s. 3d., Trignac terms; Sundswall, 1,700, 5s. 9d.; St. Petersburg, 2,000, 9s., coke, from Derwenthaugh; Savona, 5,400, 9s. 9d.; Salerno, 3,800, 9s. 8d.; Venice, 7,000, 11s., 500; 7,500, 11s.; 4,000, 11s. 3d.

Cardiff to Alexandria, 5,500, 9s. 7½d., 500; 5,000, 9s. 6d., reported; 4,500, 9s. 6d., Oct. 10; Algiers, 5,200, 10½ fr.; 5,200, 10½ fr.; 3,000, 8s. 10½d.; 3,000, 10½ fr.; 3,400, 10½ fr.; Almeria, 2,400, 9s.; Ancona, 5,500, 11s. 6d., Oct. 6; Brest, 1,800, 5s. 6d.; Bona, 13½ fr., Oct.; Bahia Blanca, 21s.; sail, 17s. 3d., Oct.; steam, 20s. 3d.; Buenos Ayres, 6,500, 21s. 9d.; 21s., early Oct.; Barrow, 1,750, 5s.; Boulogne, 650, 5s. 6d.; Barcelona, 4,100, 10s., Oct.; Calais, 2,000, 5s. 6d.; Chantenay, 1,200, 7½ fr.; Constantinople, 3,600, 10s. 3d., 500, Oct. 6; 4,600, 10s. 3d., 400, Oct. 6; Caen, 1,350, 5s. 10½d.; Civita Vecchia, 4,200, 10s. 9d.; Corubion, 2,200, 7s. 6d.; Colombo, 8,000, 12s. 3d.; Campana, 4,000, 23s.; 5,600, 22s. 6d., Oct. 14-23; Danube, 3,800, 12s., Oct. 10; 4,500, 13s., Oct.; 3,000, 11s. 6d.; Dieppe, 2,200, 5s. 1½d.; Devonport, 2,800, 2s. 9d., Admiralty; Genoa, 6,300, 9s. 6d., 5,200, 9s. 3d., Oct. 4, reported; 4,000, 9s. 10½d.; 4,300, 9s. 10½d.; Islands, 2,500, 9s. 3d., Oct. 4; 5,500, 9s. 3d., Oct. 10; Las Palmas, 2,500, 9s. 3d.; 5,000-5,500, 9s. 3d.; Leghorn, 4,000, 9s. 9d., 500, Oct.; 4,000, 9s. 10½d.; Malta, 4,200, 7s. 9d., October 6; 3,500, 6s. 7½d., early October, Admiralty, reported, 2,700, 8s., next week; 4,500, 7s. 9d.; Marseilles, 5,500, 11½ fr.; Malaga, 12s. 6d., October; Naples, 5,300, 10s. 3d., 500; 4,000, 9s. 9d., 500, October; Oporto, 1,300, 8s. 6d.; Port Said, 4,500, 9s. 4½d., October 5; 6,800, 9s. 6d., October 6; 5,000, 9s. 7½d.; 4,500, 9s. 4½d., October 13; 4,100, 9s. 6d., October 6; Piræus, 3,600, 9s. 4½d., October 6; Puerto Militaires, 4,000, 22s.; Palermo, 3,000, 10s. 6d.; Port Sudan, 11s. 9d., November; Rouen, 650, 6s. 6d.; River Plate, 6,500, 21s. 9d.; 19s. 4½d., November; 7,000, 20s. 9d., October 5; Rochefort, 1,500, 7½ fr.; Rosario, 5,600, 23s., October 14-23; 4,000, 23s. 6d.; Savona, 9s. 6d., October; 5,200, 9s. 3d., October 4; 2,700, 10s. 6d., 350; 4,000, 9s. 10½d.; Spezia, 9s. 6d., October; 4,000, 9s. 10½d.; Sicily, 3,000, 10s. 9d.; Salerno, 2,500, 11s.; St. Nazaire, 2,500, 7 fr.; Santos, 5,500, 22s., October; Taranto, 2,900, 10s. 9d., 400; Teneriffe, 2,500, 9s. 3d.; 5,000-5,500, 9s. 3d.; Tyne, 1,000, 5s., f.d.; Torre Annunziata, 4,500, 10s. 3d., 800; 4,200, 10s. 9d.; Venice, 6,500, 11s. 3d., October 4; 5,500, 11s. 6d., October 6; 6,000, 11s. 6d.; 4,300, 12s.; Villa Constitucion, 4,000, 23s.; 5,600, 22s. 6d., October 14-23.

Newport to Civita Vecchia, 2,200, 10s. 9d., October 6; Bordeaux, 1,800, 7½ fr., October 8; Genoa, 5,300, 9s. 9d.; Bona, 2,200, 13½ fr.; Almeria, 2,300, 9s., 450; Aguilas, 1,200, 11s.; Vigo, 2,000, 7s. 3d.

Port Talbot to Nantes, 2,200, 7½ fr.; Rochefort, 2,000, 7½ fr.; La Pallice, 2,400, 7 fr.

Swansea to Brest, 1,800, 5s. 6d.; Rouen, 1,700, 6s. 3d.; 1,200, 6s. 3d.; Copenhagen, 750, 7s.; Calais, 1,600, 5s.; Bayonne, 1,600, 5s.; Oran, 1,500, 12 fr. coal, 13 fr. fuel; Licata, 800, 11s. 9d.; Havre, 750, 5s. 9d.; 1,100, 5s. 7½d.; Dieppe, 950, 5s. 6d.; Monte Video, 4,500-4,800, 21s.; Genoa, 2,800, 10s.; 1,800, 10s. 6d. coal, 11s. 3d. fuel; Savona, 2,800, 10s.; Fecamp, 800, 5s. 9d.; Rouen, 1,500, 6s.; Ancona, 3,200, 12s. 1½d., 500, October 5; 12s. 1½d. coal, 12s. 10½d. fuel; Torre Annunziata, 4,200, 10s. 9d.; Civita Vecchia, 4,200, 10s. 9d.; Leghorn, 10s. 6d. coal, 11s. 3d. fuel; Bari, 3,000, 11s. 6d. coal, 12s. 3d. fuel; Malaga, 1,000, 12s. 6d.; Caen, 1,000, 5s. 10½d.

Hull to Buenos Ayres, 5,000, 19s. 9d., 250, second half October; Dahlsbruck, 1,300, 5s. 6d.; Riga, 1,900, 5s. 9d.; Bordeaux, 2,000, 6s. 6d.; Marianople, 4,100, 11s. 3d.

Boston (Lincs.) to Barcelona, 1,300, 15s.; 800, 17s. 6d.

Wales to West Coast South America and home to United Kingdom-Continent, sail, 42s. 6d. in and out, 4s. 3d. always stiffened; Mexillones, sail, 19s. 3d.; Monte Video, sail, 16s. 3d.

Antwerp and Thames to Bahia Blanca, 26s. 6d., rails and cement, early October.

Barryport to Rouen, 700, 6s. 6d.; Hamburg, 1,100, 5s.

Newport River to Algiers, 2,000, 11½ fr., fuel, reported.

Blyth to Cronstadt, 3,000, 5s. 9d.; 2,700, 6s.; Constantinople, 4,000, 10s. 6d.; Havre, 1,200, 5s. 1½d.; Palermo, 2,600, 11s.; Novorossisk, 4,200, 10s., 500, 9s. 9d., 750.

Wear to Torre Annunziata, 4,100, 9s. 9d., 800; Bordeaux, 3,700, 6s. 6d.; Venice, 4,000, 11s. 3d.; Algiers, 3,000, 8s. 9d.; 1,400, 6s. 3d.

Amsterdam to Genoa, 3,500, 9s. 4½d.

Amsterdam to Gibraltar, 1,600, 8s. 9d.

New to Oporto, 10s.; 9s. 9d.; Savona, 10s.; 9s. 9d.; 10s.; 9s. 9d.; Riga, 2,000, 6s.

Fife port to St. Petersburg or Cronstadt, 3,100, 5s. 10½d. Forth to St. Petersburg, 2,000, 6s. 1½d.; Hudikswall, 1,200, 6s. 6d.

King's Lynn to Riga, 1,800, 6s.

Hartlepool to Fredrikshaven, 1,100, 5s. 9d.; Hamburg, 1,100, 4s.

Barry to Santos, 22s., early October.

Rotterdam to Bagnoli-Porto Ferrajo, 4,000, 9s. 3d., October 4; Bordeaux, 2,400, 6s. steam coals, 6s. 9d. fuel; St. Nazaire, 3,300, 6s. 9d.; 3,900, 6s., Trignac terms, October 6; Algiers, 4,800, 10½ fr., option 500 tons fuel; Bilbao, 2,300, 6s., October 15.

Bo'ness to Gibraltar, 1,650, 5s. 9d.

Homeward charters:—Azof, 5,200, Antwerp or Rotterdam, 12s. 9d., no reduction barley, ppt.; 18,000 qrs., 10 per cent., 400, 15s. 3d. n.c. or any, 15s. 9d. Hamburg, ppt.; 3,500, 10 per cent., 14s. 9d. n.c. or any, 15s. 3d. Hamburg, October 25-November 15; 6,100, Rotterdam 13s., Antwerp, Emden or Weser 13s. 3d., Hamburg 13s. 6d., with 3d. less barley, ppt.; 4,700, Denmark, 17s., oil cake, option part grain 2s. less, ppt.; 7,800, Rotterdam 12s. 9d., Weser 13s., Hamburg 13s. 3d., 3d. less barley, completing outside 1s. 6d. less, ppt.; Kherson, 6,000, London or Rotterdam 12s., Weser 12s. 3d., Hamburg 12s. 6d., 3d. less barley, ppt.; Danube, 5,700, Liverpool and/or Glasgow, 12s. 9d. one port, 13s. 3d. both ports, October 1-15; Bombay, 5,200-5,700, Antwerp, 18s., ore, November; 3,272 net, United Kingdom-Continent, two ports, 21s. 6d. on d.w., October; 8,500, two ports, basis 22s. Dunkirk and Hull, with option, d.w. basis, October; 6,500, Garston, 19s. 6d., ore, October; Port Pirie, 6,700, Antwerp, 18s., ore, November-December; Philadelphia or Baltimore, 30,000 qrs., 10 per cent., Avonmouth or Rotterdam 2s. 6d., Hull or Antwerp 2s. 7½d., October-November; 25,000 qrs., 10 per cent., Avonmouth or Rotterdam, 2s. 6d., other p.p. 2s. 7½d., October-November; San Lorenzo, 5,000, 10 per cent.; United Kingdom-Continent, 14s., o.c., less 6d., ppt.; Baltimore, 2,807 net, Bordeaux, 2s. 9d., October-November; Port Breira, 9s., Tyne Dock, f.t., ppt.; Bilbao, 3,100, Tyne Dock, 5s. 9d., ppt.; 1,800 West Hartlepool, 6s. 1½d., ppt.; 2,526, 6s. 1½d. ppt.; 3,100, Middlesbrough, 6s., ppt.; 1,850, 6s., ppt.; 2,900, Rotterdam, 5s. 9d., October 2; Fremantle, sail, 33s., United Kingdom-Continent, option 27s. 6d., South Africa; 32s., United Kingdom-Continent, option 32s. 3d. Albany, charterers paying extra insurance; South Australia, sail, 33s. 9d., United Kingdom-Continent; time charter, Morocco trade, £700, one round trip, delivery United Kingdom-Continent; time charter, Mediterranean and Black Sea trade, about 4s. 10½d., one round trip, delivery and re-delivery, United Kingdom-Continent; Nicolaieff or Odessa, 8,500, Rotterdam 11s. 6d., Antwerp 11s. 9d., Hamburg 12s., 3d. less barley, ppt.; Sulina 6,000, Rotterdam 11s. 3d., 3d. less barley, October; 2,900, North Spain, 13s. 6d. one port, 13s. 9d. two ports, option Danube loading 1s. more, ppt.; Sydney, New South Wales, 9,500, United Kingdom-Continent, basis 33s. 6d. one port, France 1s. extra, January; Narvik, 8,000, Northern States, 7s., Oct.; 2,850, 7s., Oct.; Fremantle, 6,500, United Kingdom-Continent, 33s. 9d., January; 2,778 net, 32s. 6d., less 6d. direct, January; 2,853 net, 32s. 6d., less 6d. direct, option Mediterranean 1s. 3d. extra or Adriatic 2s. 6d. extra, Geraldton and/or Fremantle 6d. more, January; Newcastle, N.S.W., 3,207 net, West Coast South America, 25s., October-November; New York, 2,541 net, South Africa, six ports, 30s., October-November; Carthage or Bremen, 3,600, Maryport, 8s., ppt.; Puget Sound, sail, 82s. 6d. one port, 85s. two ports, United Kingdom-Continent; time charter, River Plate trade, 4s. 3d., one round trip, delivery Liverpool, re-delivery United Kingdom-Continent; time charter, Transatlantic trade, 4s. 9d., one trip, delivery Gulf, re-delivery United Kingdom-Cont.; Burmah, 26s. 3d., Hamburg or Holland; Kherson, Nicolaieff or Odessa, 16,000 qrs., 10 per cent. (400), 14s. n.c. or any, 14s. 6d. Hamburg, ppt.; 3,400, 13s. 7½d. n.c. or any, 14s. 1½d. Hamburg, cancelling Nov. 10; 6,400, Rotterdam 12s., Weser 12s. 3d., Hamburg 12s. 6d., 3d. less barley, ppt.; Novorossisk, 2,500, Liverpool, 12s. 9d., ppt.; Gulf, 5,000, Rotterdam, Antwerp, Hamburg, Tyne, 15s. one port, 15s. 6d. two ports, October; Sagunto, 5,000, Rotterdam, 6s. 9d., ppt.; Port Larath, 4,000, Middlesbrough, 9s., ppt.; St. Nazaire, contract, 15,000 tons, Rotterdam, 5s. 6d., October to March; Kherson and Nicolaieff, 4,400, Hull and Stockholm, 13s., ppt.; West Australia, 6,000, United Kingdom-Continent, 32s. 6d. one port, 33s. two ports loading, option South Australia, Melbourne, Geelong, 33s. 6d., January 1; Saigon, 4,600, France, including Bordeaux, 28s. one port, 29s. two ports discharge, 1s. extra maize, November-December; Calcutta, 2,400 net, Bombay or Kurrachee, Rs. 6, October; Sapelo, 800 stds., 10 per cent., United Kingdom-Continent, 90s. one port, 92s. 6d. two ports, ppt.; La Goulette, 3,000, Rotterdam, 7s. 9d.; Garrucha, 5,300, Rotterdam, 7s., ppt.; Hornillo Bay, 5,800, Rotterdam, 6s. 9d., ppt.

Grimsby Coal Exports.—The exports from Grimsby during the week ended Friday, 26th ult., totalled 30,277 tons foreign and 1,011 tons coastal, as compared with 32,377 tons foreign and 3,140 tons coastal during the corresponding week of last year. The week's shipments were:—Foreign: To Aarhus, 1,830 tons; Antwerp, 734; Christiania, 401; Dieppe, 302; Esbjerg, 148; Foaberg, 343; Gefle, 2,441; Hamburg, 470; Gothenburg, 5,207; Helsingborg, 3,117; Landsrona, 4,165; Malmo, 2,627; Kallundborg, 1,773; Rotterdam, 269; Skien, 496; Ystrad, 4,238; Wisby, 815; and Copenhagen, 892. Coastal: To Yarmouth, 200; Southwold, 32; Lowestoft, 500; Rye, 170; and London, 109.

Merchants and Shipping Strike Expenses.—It is stated that arrangements are being made for a meeting of merchants to be held to consider the proposal that part of the responsibility for special expenses incurred in shipping and allied strikes should be accepted by traders. At present the question of responsibility is ignored in the bills of lading; but it is known that for some time past shipowners have had under consideration a proposal for specifying that they accept no responsibility for the merchants. At a special meeting held at the London Chamber of Commerce last month a resolution was passed adverse to the scheme, on the ground, partly, that all such expenses were incidental to the usual business of shipowning and should continue to be covered by the freight paid.

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

BARNES.—The Urban District Council of Barnes are prepared to receive tenders for the supply, before November 1 next, of about 120 tons of best Yorkshire Silkestone, to be delivered in barges alongside the Council's wharf at Mortlake. Tenders, stating the name of the colliery from which it is proposed to obtain the coal, and marked "Tender for house coal," must be sent, so as to be received by me before 12 noon on Monday, October 13, 1913. No special tender form will be issued. The Council do not bind themselves to accept the lowest or any tender. Wm. Thos. Goodale, clerk, the Council House, Mortlake, S.W.

HAMMERSMITH, OCTOBER 15.—The Council invite tenders for the supply of such quantities of (a) anthracite coal and (b) mechanical stoker coal as may be required at their electricity station. Forms of tender and further particulars may be obtained on application to Mr. G. G. Bell, borough electrical engineer, Electricity Department, 85, Fulham Palace-road, W. Sealed tenders, endorsed "Tender for Coal," must be delivered to the undersigned not later than 4 p.m. on Wednesday, October 15, 1913. The Council does not bind itself to accept the lowest or any tender. Leslie Gordon, town clerk. Town Hall, Hammersmith, W.

## Abstracts of Contracts Open.

ABERAYRON, OCTOBER 7.—Coal, for the Aberayron District Education Committee. Sealed tenders to Mr. B. C. Jones, clerk, Aberayron.

AIRDRIE, OCTOBER 6.—Best household coal (specified), and best household dross (specified), for the Court House Commissioners. Tenders to Mr. J. Dunn Russell, clerk to the Commissioners, County-buildings, Airdrie.

ANTWERP, OCTOBER 7.—About 9,500 tons of coal briquettes, required by the Municipal Engine Service. The specification, price 50 c. (5d.), may be consulted at the 4<sup>me</sup> Bureau, and also at the Secrétariat of the Hôtel de Ville.

BROMSGROVE (STOURBRIDGE-ROAD), OCTOBER 6.—Coal and coke to the secondary school, Stourbridge-road, for the Managing Committee. Tenders to Mr. J. Lloyd, correspondent.

BRUSSELS, OCTOBER 8.—About 2,200 tons of coal briquettes to the Soc. An. du Canal et des Installations Maritimes de Bruxelles, 59, Rue de Canal. Specification may be purchased for 25 c. (2½d.) at the cashier's office.

CAIRO (EGYPT), NOVEMBER 14.—For the Egyptian State Railways and Telegraphs Department either 300 or 600 metric tons of shale oil for gasmaking. Sealed tenders, on the proper forms, to the general manager, Egyptian State Railways and Telegraphs, Cairo.

COSELEY, OCTOBER 9.—Coke and best quality thick coal for the Education Committee. Forms from Mr. Fred J. C. Poole, secretary, Education Office, Coseley.

DEAL, OCTOBER 7.—About 20 tons of best household coal, 25 chaldrons of broken coke, and firewood, for the Education Committee. Tenders to Mr. Alfred C. Brown, clerk, Deal.

DORCHESTER, OCTOBER 11.—Coal and coke, for the Dorset County Council. Forms from the secretary, Education Department, County Offices, Dorchester.

EAST WOODHAY, OCTOBER 6.—About 30 tons of "One-way" coal or a good coal suitable for the Trustees of the East Woodhay Allotment Coal Charity. Tenders to the Rectory, East Woodhay.

EDINBURGH, OCTOBER 6.—Coal, to the directors of the Edinburgh and District Tramways Company Limited. Specification can be obtained at the general manager's office, 1, South Charlotte-street.

GATESHEAD-ON-TYNE, OCTOBER 11.—Coal for the Corporation. Specifications from Mr. N. Percy Pattinson, borough surveyor, Town Hall, Gateshead.

INVERNESS, OCTOBER 7.—Coal, for the Inverness Burgh School Board. Sealed tenders to be lodged with Mr. W. C. Macbean, 42, Union-street, Inverness, clerk.

LEITH, OCTOBER 6.—Coal, about 4,500 tons singles or 6,000 tons washed singles, for the Corporation. Forms and further information from the burgh electrical engineer, Great Junction-street.

LONDON, OCTOBER 8.—About 18,000 tons best South Wales steam coal or, by preference, one of the following varieties, viz.:—Fendale, Albion, Nixon's Navigation, Powell Duffryn, Insole's Cymmer or National Merthyr, for the directors of the Bombay, Baroda, and Central India Railway Company. Forms to be obtained at the offices, Gloucester House, 110, Bishopsgate, E.C.

MIDDLETON, OCTOBER 6.—Steam coal for the electricity works, for the Corporation. Forms from Mr. S. Pauls, Electricity Works, Middleton.

MORLEY, OCTOBER 27.—House coal, for the corporation. Forms from Mr. F. Thackray, town clerk.

NEWTOWN (MONTGOMERY), SEPTEMBER 30.—Coal, for the Montgomeryshire Education Committee. Tenders to Mr. Llewelyn Phillips, clerk to the committee, County Education Offices, Newtown.

NUNEATON, OCTOBER 15.—Coal for the education committee. Forms from Mr. F. S. Clay, Education Offices, Nuneaton.

RUABON, OCTOBER 6.—Coal for the Denbighshire Education Authority. Tenders to Mr. T. J. Roberts, correspondent, Ty Brith, Penycae, Ruabon.

SHEERNESS, OCTOBER 14.—About 400 tons washed slack, for the Urban District Council. Forms from Mr. Vincent H. Stallon, clerk of the Council, Council Offices, Sheerness.

WALSALL, OCTOBER 7.—Deep and shallow nuts and coke, for the managers of the Rushall Council Schols. Sealed tenders to Mr. A. H. Lewis, clerk to the managers, 29, Leicester-street, Walsall.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &amp;c.

BEDLINGTON, OCTOBER 7.—Steel Tubes.—Supply of 200 yards of 15 in. steel tubes, coated, in 18 ft. lengths, and delivered at Doctor Pit Siding, Bedlington, Northumberland, for the Bedlingtonshire Urban District Council. Further particulars, &c., from surveyor, Mr. J. E. Johnson, Bedlington.



**BLAENGARW.—Hard Heading Driving.**—For driving a hard heading about 70 to 80 yards in length. Further particulars may be obtained on application to International Colliery Office, Blaengarw.

**ILKLEY, OCTOBER 7.—Plant.**—Electric generating and distributing plant, for the Ilkley Urban District Council. Specifications from Mr. F. S. Eckersley, clerk, Town Hall, Ilkley.

**JOHANNESBURG, OCTOBER 28.—Boiler Tubes.**—Tenders are invited by the South African Railways Administration for the supply and delivery of iron and steel boiler tubes. Copies of the specification and form of tender can be obtained from the office of the High Commissioner in London for the Union of South Africa, 32, Victoria-street, S.W.\*

**LONDON, OCTOBER 7.—Girder Work.**—About 80 tons steel bridge girders and other iron and steel work of British manufacture, for the Great Western Railway Company. Plans and specifications may be seen at the office of the engineer at Paddington Station.

**LONDON, OCTOBER 13.—Switchgear, &c.**—For the 20,000 volt high-tension switchgear, low-tension switchgear, and accessories, for the power-station and sub-stations to be constructed in connection with the electrification of the Melbourne Suburban Railways. Specification and form of tender may be obtained from the Agent-General for Victoria, Melbourne-place, Strand, W.C.

**LONDON, NOVEMBER 3.—Corrugated Sheets.**—Galvanised corrugated sheets to the Egyptian War Department. All particulars obtainable from Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.

**MELBOURNE (AUSTRALIA) NOVEMBER 3.—Galvanised Iron Pipes.**—Tenders will be received at the office of the Deputy Postmaster-General, Melbourne, for the supply and delivery of 900 galvanised iron pipes.\*

**MELBOURNE (AUSTRALIA), OCTOBER 8.—Rails, &c.**—For the supply and delivery of the following rails and fishplates, for the Agent-General for Victoria, Australia (alternative tenders): (Contract No. 25005) approximately 27,079 tons of 80 lb. steel rails; (contract No. 25005) approximately 2,215 tons of steel fishplates for 80 lb. steel rails. Specifications and forms of tender obtainable at the offices of the consulting engineers, John Coates and Co. Limited, 25, Victoria-street, Westminster, London, S.W.

**NEWCASTLE-ON-TYNE, OCTOBER 6.—Boilers.**—For supply of two multitubular marine type boilers for their tug "J. O. Stevenson," for the Tyne Improvement Commissioners. Forms and specifications from Mr. J. McDonald Manson, general manager and secretary, Tyne Improvement Commission Offices, Bewick-street, Newcastle-upon-Tyne, on payment of a deposit of £1 (returnable).

**PONTARDAWE.—Shaft Sinking.**—For the sinking of a shaft 14 ft. in diameter to a depth of about 150 yards, for the South Wales Primrose Coal Company Limited, Pontardawe. Specification and other particulars can be obtained on application to Messrs. Wight and Fido, consulting mining engineers, Atlas-chambers, James-street, Cardiff.

**ROCHDALE, OCTOBER 13.—Mechanical Filtration Plant.**—Supply and erection of the necessary filters, chemical apparatus, oil engine, turbine or water motor, gearing, shafting, pipe connections, valves, &c.; also electric lighting plant on the trunk main from Ramsden Reservoir at North Ramsden, Walsden, for the Corporation. Specification and form of tender may be obtained on payment of a deposit of three guineas (returnable) from Mr. F. H. Brunt, A.M.I.C.E., engineer and manager, Waterworks Office, Lord-street, Rochdale.

**SANDGATE, OCTOBER 7.—Cast-iron Water Main, &c.**—About 3,300 yards of 6 in. cast-iron water-main in 9 ft. or 12 ft. lengths, and specials, for the Urban District Council. Particulars and forms of tender from Mr. Chas. J. Conquest, engineer, Council Offices, Sandgate.

**SHEERNESS, OCTOBER 6.—Air-compressor.**—Erection of an air-compressor with receiver and air pipes, ram pumping engine, suction and delivery pipes, air vessel meter, &c.; also for the subsequent provision and erection of a surface condenser, stand-by compressor, and stand-by ram pumping engine, at Trinity-road pumping station, for the Urban District Council. Particulars from Mr. F. W. S. Stanton, civil engineer, 3, Victoria-street, Westminster, S.W., on deposit of £2 2s. (returnable).

**SHEFFIELD, OCTOBER 6.—Steel and Iron Work.**—For the steel and iron work in connection with the extension of the Grimesthorpe Works, for the directors of the Sheffield United Gaslight Company. Forms from Mr. J. W. Morrison, M.Inst.C.E., at the company's offices, Commercial-street, Sheffield.

**SOUTH SHIELDS, OCTOBER 15.—Turbine.**—Erection of one 2,000-kw. turbine, direct coupled to two three-phase generators in tandem, together with condensing plant, rotary converters, transformers and switchgear, &c., for the corporation. Specification and forms from Mr. Harry S. Ellis, borough electrical engineer, South Shields, on payment of £1 1s. (returnable).

**SYDNEY (AUSTRALIA).—Steel Bridge.**—Tenders are invited by the Department of Public Works of New South Wales for a steel bridge for the Wilson River, in the fifth section of the North Coast Railway.

**WARRINGTON, OCTOBER 11.—Gas Compressor, &c.**—(a) A gas compressor, (b) building for above, for the Corporation. Full particulars on application to Mr. W. S. Haddock, general manager.

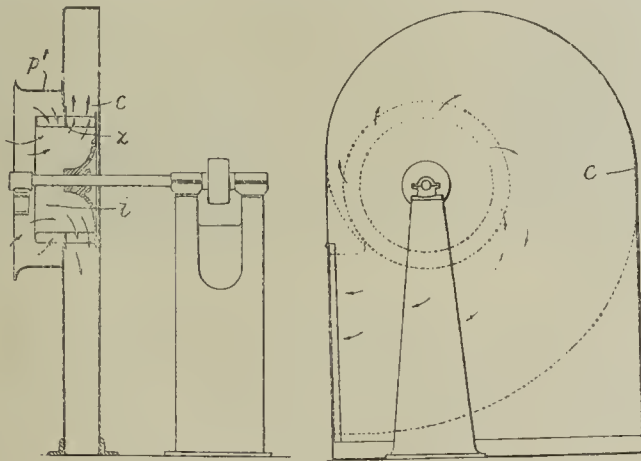
**WETHERBY, OCTOBER 8.—Pipe Laying, &c.**—For the supplying and laying of about 3,300 lineal yards of 3 in. cast iron water pipes with valves, &c., for the Rural District Council. Specification, &c., from Mr. H. A. Johnson, M.Inst.C.E., 15, The Exchange, Bradford, on payment of a deposit of 1 guinea (returnable).

**WONTHAGGI (VICTORIA, AUSTRALIA), NOVEMBER 12.—Haulage Engine.**—Tenders are invited by the Victorian Railways Commissioners for the supply and delivery of a haulage engine (mechanical portion only), and a 200-horse power electric motor and equipment, for the State coalmine.\*

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

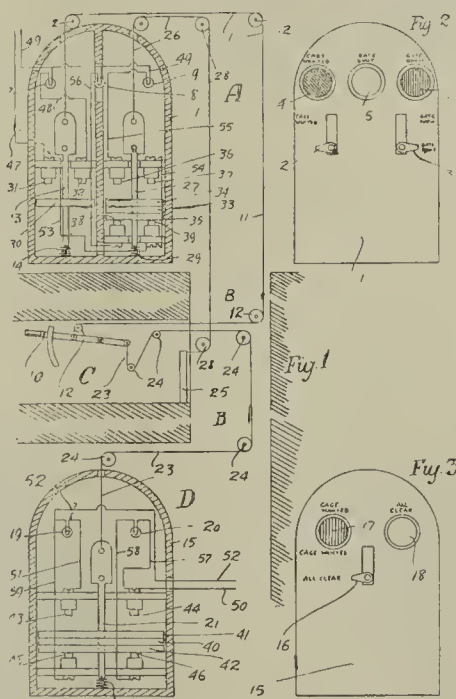
## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

406 (1913). *Improvements in or relating to Centrifugal Fans.* S. C. Davidson, of Sirocco Engineering Works, Belfast, Ireland.—Relates to centrifugal fans of the kind which forms the subject of application for Patent No. 1476 of January 18, 1912. In the fans described in the said application, a fan wheel having an axial inlet is so arranged in relation to the case in which it rotates that the intake or negative parts or ends of the blades protrude into and are so exposed to the space from which the air is drawn into the fan, that the air enters the fan wheel from said space both centripetally and axially, while the positive parts or ends of the blades are exposed to the space into which said air is circumferentially discharged, means being provided whereby the air which is being discharged from the positive part of the fan wheel is substantially if not entirely prevented from returning to the space from which it is drawn in to the negative end of the fan wheel. According to the present invention, a partition is carried by or forms part of the fan wheel itself. It may extend outwards from the periphery, and it may also extend inward through the blades for a suitable distance towards the axis. In some



cases the inner edge or portion of the partition, or the outer edge or portion, or both edges, may be curved or bent over to better direct the flow of air into, through, or from the fan. The partition carried upon the fan wheel will generally meet or overlap another fixed partition mounted outside the fan wheel. The blades of the fan wheel may in some cases with advantage be formed in parts or halves, secured to each side of the partition. In some cases a form of fan wheel is employed consisting of a large number of blades, long axially and short radially, in combination with a certain number of radially deep blades, which extend inward radially or in suitable curves to the hub or boss of the fan wheel, and these blades may extend axially for the full depth of the intake chamber, or for only part of the axial depth thereof, and their edges may be suitably shaded to suit the mounting, dimensions and position of the fan wheel. The position of the partition may be varied according to requirements; for example, it may be located centrally of the fan wheel blades, at the neutral point thereof, or it may be located nearer to the ends of the blades either on the positive or discharge side or the negative or intake side. The drawings show a vertical section and side elevation of a fan wheel fitted with a casing. (Five claims.)

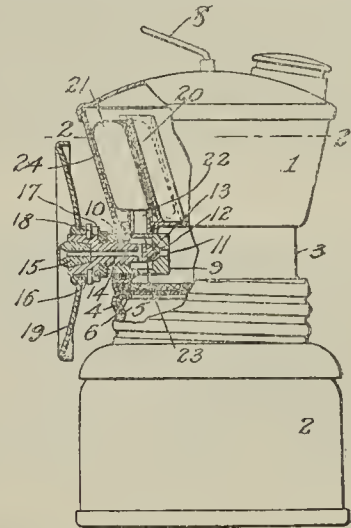
2546 (1913). *A Safety Signalling Apparatus for Use in Mines.* J. Close, of Kirkland-terrace, Glengarnock, Ayrshire, Scotland.—Has for its object to provide improved means whereby the engineman and the attendant at the pit bottom (the "bottomer") may be informed, from the middle working, or workings, of the movements, or required movements, of the cage. Under this invention electrical indicators are provided in or at the engine room and at the bottom of the pit, whilst pull ropes or equivalent are led from such indicating means to a device or devices at the middle working or workings whereby the operation of such electrical indicators is controlled in such manner that the



required signals may be sent to the engineman and bottomer. The indicators in the engine-room and at the pit bottom are operated by means of electricity supplied from any suitable source in the engine-room at the pit bottom respectively, such electrically-operated indicators being controlled, from the workings, by means of pull wires or ropes or equivalent so that no live conductors require to be led down the shaft. The devices at the middle workings preferably consist of hand levers, connected by means of pull ropes with the said indicators in such manner as to give the required signals, and of suitable connections from the gates to the engine-room indicator whereby the engineman is informed as to whether such gates are open or

closed. As well as having electric lamps as above described in the indicators, suitable pointers or the like may be provided, such pointers being operated mechanically (or, if desired, electrically) from the pull wires or equivalent so as to point to printed words such as "danger," "caution" or "clear" which words correspond with the lamps coloured red, green and white respectively, so that even should the lamps fail, the indications are correctly given. In cases where there are more than one working between the pit bottom and the pithead each working is provided with its own connections to the indicators. Fig. 1 is a diagrammatic view of the complete apparatus; fig. 2 is an outside view of the engine room indicator; fig. 3 is an outside view of the indicator at the pit bottom. (Two claims.)

3115 (1913). *Improvements in Miners' Lamps.* F. E. Baldwin, 320, Broadway, City of New York, U.S.A.—Relates to improvements in miners' acetylene lamps, and one of the objects is to provide an improved miners' acetylene lamp constructed in such a way that a sudden increase in atmospheric pressure in the mine will not extinguish the lamp. A further object is to produce a lamp provided with a detachable carbide container, the construction being such that the flame of the lamp need not be extinguished when a charged carbide container is being substituted for one which is exhausted. The accompanying drawing illustrates in side elevation and partly in section a lamp constructed in accordance with the invention; 1 indicates the water reservoir or tank and 2 the carbide container, the tank having at its base a neck 3 provided with threads 4 which engage a similarly-threaded neck 5 on the carbide container 2, a tight joint being formed by a gasket 6. As is usual in such lamps, water is delivered to the carbide by a pipe 7 which may be provided with a stirrer or scraper 8 to clean the pipe. The burner is supported by a nipple 9 secured in the neck 3 by solder 10, the nipple having a gas opening or passage 11 and a valve seat 12 formed therein. The valve 13 which co-operates with this seat is carried by a threaded stem 14 which also supports the usual burner 15. The stem carries



a collar 16 having open slots 17 which engage pins 18 on the stem, the collar having secured to it a reflector 19. By this construction the valve may be manipulated to open and close the orifice 11, and the reflector is made detachable so that should it become broken a new one may be supplied. The construction also includes an elastic bag or sac 21 contained in a protecting chamber 20 formed in the water tank, the mouth of the bag engaging a short tube or throat 22 which communicates with the gas duct in the nipple 9 through an opening 23. The outer wall of the tank is perforated to permit free access of the air to the chamber in which the elastic bag is contained. With the construction as described, when the atmospheric pressure in the mine is suddenly increased, as it is when a blast is fired, the increased pressure acts on the flexible sac and collapses it, thereby raising the pressure of gas behind the burner, so that a substantial equilibrium in pressure is immediately established between the gas behind the burner and the atmospheric pressure at the orifice of the burner. The increased atmospheric pressure will not, therefore, force the gas back through the burner orifice and extinguish the flame, notwithstanding the increased atmospheric pressure at the orifice of the burner which tends to drive the gas back through it. (Five claims.)

8583 (1913). *Improvements in Explosives.* H. P. Bostaph, of 2291, Jefferson-avenue, Detroit, Michigan, U.S.A.—According to this invention an explosive consisting of perchlorate of ammonia, dinitrobenzene, nitrate of soda and wood meal can be greatly improved by the addition of rosin. While not confined strictly to exact proportions, it has been found that most excellent results are obtained by compounding the explosive in the following proportions:—

	Per cent.
Perchlorate of ammonia .....	37
Dinitrobenzene .....	11
Nitrate of soda .....	43
Wood meal .....	8
Rosin .....	1

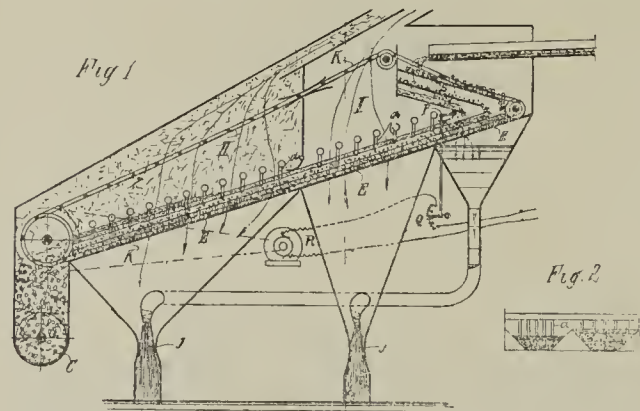
To prepare the compound the chemicals are pulverised so that the perchlorate of ammonia will pass through a screen 80 meshes or more to the square inch, and good results have been obtained when the screen is of 100 meshes. The dinitrobenzene should be pulverised to pass through a screen of 50 meshes to the square inch or a smaller mesh screen, and good results have been obtained with a 60-mesh screen. The nitrate of soda should be pulverised to pass through a 60-mesh or smaller screen, and good results have been obtained by the use of an 80-mesh screen. The wood meal should pass through a 40-mesh or smaller mesh screen, and good results have been obtained with a 60-mesh screen. The rosin should be pulverised to pass through a 30-mesh or smaller mesh screen, and good results have been obtained by the use of a 40-mesh screen. After the several ingredients have been thoroughly dried, pulverised and screened, as stated, the rosin is first mixed with the wood meal, and then these two ingredients are mixed with all the other ingredients together. The rosin distributes the detonations to the whole of the substance, but does not affect the safety of the compound. Too much rosin lowers the safety factor. Furthermore, exhaustive tests have demonstrated the necessity of pulverising the ingredients so that they pass through screens, and that they should be absolutely dry before being mixed together, the degree of pulverisation having been



and to increase the strength of the explosion as much as 100 per cent. as compared with that from the same ingredients, but coarser and unable to pass respectively through screens of the mesh above specified. (Six claims.)

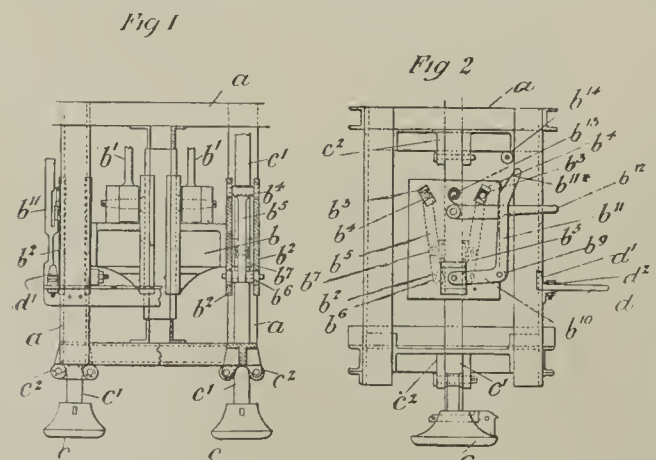
13694 (1913.) *An Improved Method of Igniting and Unlocking Miners Safety Lamps.* W. W. Gordon, 5, The Lyons, Hetton-le-Hole, County Durham, and J. Wright, 53, Caroline-street, Hetton-le-Hole, County Durham.—A single-phase transformer with two secondary windings is inserted in the available alternating current supply. No. 1 secondary winding gives a supply at 25 volts which is applied to the terminals of an electromagnet through a switch which is fixed in a convenient position so that the attendant whose duty it is to unlock the safety lamps can close it every time a lamp is to be unlocked. To unlock a lamp it is placed so that the locking pin is directly above the core of the electromagnet, so that when the attendant closes the switch the magnet pulls the locking pin clear of the lamp top, which can then be screwed off. No. 2 secondary gives a supply at 6 volts; this supply is connected to the primary terminals of an induction-coil which is fitted with an interrupter, the secondary or high-tension leads of the induction-coil is fitted with suitable contacts on a length of flexible cable so that it is possible to light locked lamps by placing one contact on the body of the lamp and the other on the insulated terminal of the lamp, which thus closes the circuit across a gap through which the high-tension of the induction-coil creates a spark hot enough to ignite the lamp wick. (One claim.)

20078 (1912.) *Method of and Apparatus for Draining or freeing Coal from Water.* C. Simon, of 21, Selmastrasse, Essen-Ruhr, Germany.—Relates to an improved method in which strata of coal of uniform thickness with the coarser particles forming the bottom layer are moved over a draining screen, constantly loosening up the upper layer of said strata and passing air laden with coaldust through said strata. The material is sorted into various sizes and deposited in various layers in the manner in use with other draining systems—that is, preferably with the coarse material as the bottom layer. As this bottom layer of coarse material is exceedingly porous, the air can easily pass through it and withdraw the moisture. The uppermost layer of fine material is, however, nearly impermeable to air; thus, with a view to facilitating the passage of air therethrough, this layer is penetrated by means of pivot-shaped raking prongs.



These raking prongs are preferably constituted by pipes through which air is forced into the material to be freed from water. In this way the drainage is accelerated and the passage of the air through all the material to be drained secured. In order further to increase the draining effect, the air and, if necessary, the coaldust carried along thereby, may be heated. This dry coaldust is mixed up with the upper layer of fine material, which is more or less impermeable to air, thereby rendering same more penetrable to air, and contributing in this way to the drying thereof. In addition, the coaldust is deposited more abundantly where the current of air passes through the strata more quickly, having thus a regulating effect on the uniform distribution of the air-stream. Fig. 1 is a longitudinal sectional view of a complete apparatus and fig. 2 a transverse sectional view of the draining screen. (Nine claims.)

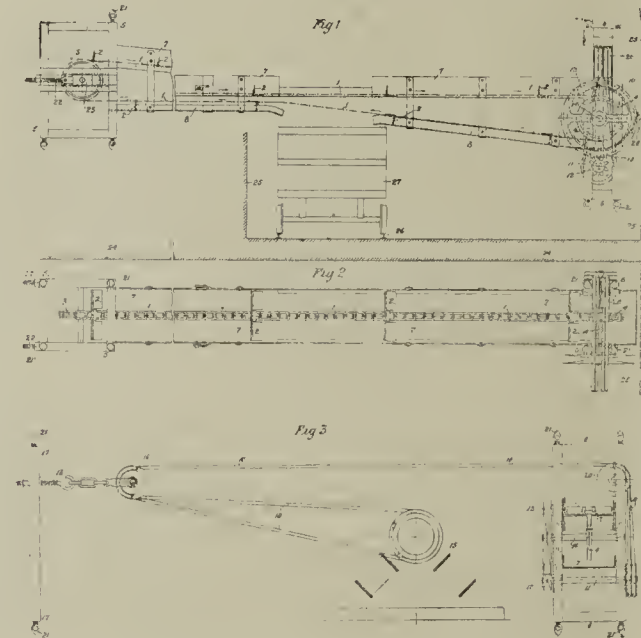
21423 (1912.) *Improvements in or connected with Stamping Machinery for Compressing various Materials, and more especially Coal for Coke Making and the like.* J. J. H. Mackinlay, of Wrockwardine House, St. George's, Salop, and W. Krueger, of No. 61, Southfield-road, Middlesbrough, Yorkshire.—Relates to improvements in that class of machinery in respect of which letters patent were granted dated February 9, 1907, No. 3241, in which a cross-head is constantly reciprocated by mechanical power, and, by means of gripping devices, carried by the cross-head, the legs of the stamps are gripped, thus raising the stamps to the required elevation, when the gripping devices are tripped



and the stamps released so that they fall and effect the required compression. The primary object of the present invention is to provide improved means for controlling the gripping devices. The machine is provided with a frame in which is guided a cross-head which is by a link connected with a lever or the like operated by mechanical power so that the cross-head is constantly reciprocated. The leg of the stamp works loosely in guides carried by the frame of the machine, and attached to the cross-head, so as to move with it. The plate or frame which is guided by the stamp leg, and the stamp are upwardly and outwardly inclined

slots in which are mounted sliding blocks to which are pivotally connected the upper ends of links the lower ends of which are pivotally connected to a strap loosely encircling the stamp leg, and the links have pivotally connected to them holders in which are mounted friction blocks which, when the sliding blocks are at the lower ends of the inclined slot, are caused to impinge upon the leg of the stamp and thus constitute gripping devices. On said plate or frame is pivotally mounted at its angle a bell crank lever, the horizontal arm of which is pivotally connected to the strap connecting the links carrying the gripping devices, so that the turning of the bell crank lever on its axis with the vertical arm of said lever in an outward downward direction raises the sliding blocks in the inclined slots and takes off the gripping devices from the leg of the stamp, thus releasing it. The bell crank lever is, during the downward stroke of the cross-head, held with its vertical arm in an upright position, with the gripping devices out of action, by means of a spring controlled detent. The vertical arm of the bell crank lever is provided with a crank or incline, and on a fixed part of the frame of the machine is a roller against which the said incline comes at the top of the stroke of the cross-head, with the result that said arm is forced outward and raises the strap and links so that the sliding blocks are forced up the inclined slots, thus taking the gripping devices off the leg of the stamp and permitting the latter to fall. On the downward stroke of the cross-head the vertical arm of the bell crank lever moves inward and is again engaged by the detent, which near the end of the downward stroke of the cross-head comes against a stop and is thereby raised, releasing the bell crank lever so that the sliding blocks travel down the inclined slots and the gripping devices again grip the leg of the stamp, when the above-described operations are repeated. Fig. 1 is a front elevation partly in section of a machine embodying the present improvements, and fig. 2 is a side elevation thereof. (Three claims.)

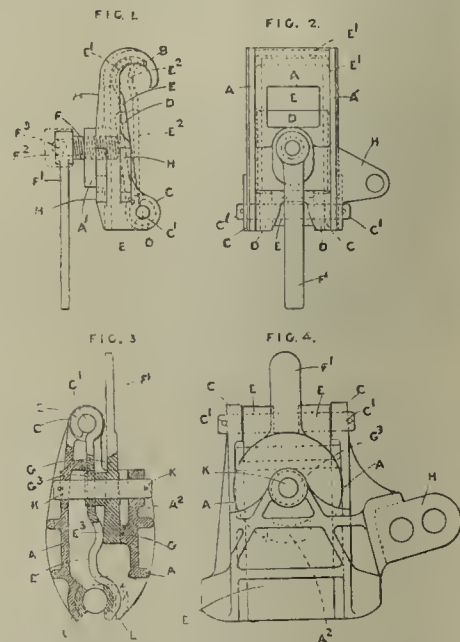
24256 (1912.) *Improvements in and connected with Coal and other Mine Conveying Machinery.* E. Douglas, Bispham Hall, Billinge, near Wigan, Lancashire.—Has reference to machinery for delivering or conveying coal and other minerals or materials from a working face of a mine, or the like, and conveying and delivering it into trucks or tubs. The conveyor itself is of the double-trough type having a central link or chain conveyor, with conveyor scrapers or blades on them at suitable intervals; and the top run of the chain will work on the top or upper channel, and the lower run of chain will work in the lower channel. In action, the coal will be thrown by the miners on to the upper trough of the conveyor, and it will be scraped by the scrapers or blades in the trough along same until it reaches a point directly above the trucks or tubs, where the trough is open, and the coal can fall down into the trucks; and



from this point the conveyor frame is open on the top; but below this portion (which extends between a point above the tubs or trucks to the drive gear specified) the upper trough is open, but the lower trough is closed below and any small material or dust that is conveyed by the conveyor chain drops down into it, and is moved by the return scrapers or blades, and discharged into the tubs or trucks. Beyond this point the scrapers simply slide along the bottom of the lower trough, or upon suitable supports or guides for the blade ends. The two trough portions may, suitably, be connected together by vertical connecting pieces; and at the back end the sprocket wheel over which the central-link conveyor passes, which carried the blades, has an adjusting means for tightening or slackening the chain. Fig. 1 is a sectional elevation showing the plant, fig. 2 is a plan, and fig. 3 is an end view. (Three claims.)

26248 (1912.) *Improvements in the Construction of Haulage Clips and the like.* F. G. Seeley, of Abberton Cottage, Abberton, near Colchester, Essex, and G. Wood, of "Holmesdale," Dronfield, Derby.—Relates to an improved construction of clip for the frictional attachment of colliery corves and wagons, to a haulage rope or cable, or for similar purposes. Figs. 1 and 2 are a side and front elevation respectively of one form of clip to be used in connection with an overhead cable. Fig. 3 is a part side sectional elevation, and fig. 4 is a front elevation of a clip for an underhead cable. In constructing an overhead clip the main body A is formed channel shape with a channel-shaped lip B at one end to ride upon the cable and maintain the clip in position thereon, and with extension arms C having a pin C', whereon the gripping plate D is mounted or pivoted loosely. This gripping or pressure plate D is preferably channelled so as to lip over a flexible or spring plate E which is also mounted or pivoted loosely on the pin C' to allow for flexibility at the pivoted or mounted end. The upper portion of the flexible or spring plate E forms the gripping jaw at E', which has freedom of motion as shown in dotted lines at E'. On the body A is formed a boss A' wherein is screwed a screw F which presses the channelled gripping plate D, which latter presses the flexible or spring plate E, so that as this screw F is rotated in one or the other direction, pressure is put on or released from the cable as desired. The usual jaws H for connecting up to the corves or wagons

are used. Preferably the screw F is operated by a handle F' fixed thereon, or the handle may be loose and have a square hole fitting a square on the screw F or there may be a fixed head F' on the screw F with a tommy hole F' as shown in dotted lines to enable the screw to be rotated by a suitable tool. In another method of operating the flexible steel plate a wedge-shaped cam plate is used which is attached to or in one with a socket having preferably a square hole. This cam plate is moved by a key or lever fitting the hole, and it acts on a raised portion on the gripping or pressure plate, so as to either put pressure on or release it from the cable. For underhead cables (figs. 3 and 4) one method is shown



whereby the wedge-shaped plate G is in one with the handle or lever F', the sides of the plate G operate on one side on a piece A' projecting from the main body A and on the other side direct on a preferably curved portion E' of the flexible or spring plate E. This wedge-shaped cam plate G is mounted on the pin K, the boss G' passing through a suitable hole in the flexible or spring plate E. By means of the handle F' pressure is put on or released from the cable, as desired. Clipping plates L may be temporarily attached to either of the jaws so as to accommodate a smaller diameter or size of cable, or they may be removed for larger sizes of cables. (Three claims.)

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

- 21325. Extraction of tin from tin-bearing materials. W. E. Gibbs.
- 21327. Regenerative furnaces for the treatment of steel and other metals or materials. J. S. Atkinson.
- 21346. Automatically tiltable cargo buckets. J. F. Johnson.
- 21353. Centrifugal fans. R. Hancock.
- 21385. Process of treating sulphur-bearing materials. H. Koppers.
- 21405. Turning tool and machine tool generally, for cutting steel and other metals in machines. W. Waring.
- 21413. Tubes, tubular bodies, or the like, and the manufacture of same. E. Perry.
- 21423. Handle for coal sacks and the like. R. D. Braili.
- 21427. Atomising apparatus for washing, purifying and cooling gases. H. E. Theisen.
- 21447. Dumping receptacles. Fried. Krupp Akt.-Ges.
- 21465. Automatic grab with counter levers. O. Weigner.
- 21479. Diving apparatus. A. B. Dräger and Drägerwerk Heinh. and Bernh. Dräger.
- 21488. Purification of mine air. F. J. Brougham. (E. A. Ford, Transvaal.)
- 21504. Device or contrivance for relieving or cleansing pump valves. W. Evans.
- 21519. Cable grips or connections for haulage cables and the like. J. Smith.
- 21521. Apparatus for handling steel plates and the like in shearing the same. D. F. Bryson and D. McNaughton.
- 21535. Means applicable to purposes such as raking and conveying materials. W. H. Cutten.
- 21542. Balance indicator for showing and measuring percentages of (CO<sub>2</sub>) carbonic acid gas in flue gases. G. Schauli.
- 21605. Miners' pick. T. Hughes and E. Morris.
- 21613. Automatic detonator-warning. R. D. H. Bird.
- 21615. Steam condensers and like apparatus. D. B. Morison.
- 21650. Apparatus for ore concentration. A. H. Higgins, W. W. Stenning, and Minerals Separation Limited.
- 21655. Chain for cutting slots, with method and machine for sharpening same. J. Horand.
- 21663. Hoists or lifts for conveying loads of all kinds. G. Schlösser.
- 21717. Air compressors. R. C. Craig.
- 21727. Expanding holders for boring rock. J. R. Hoyle and W. Locke.
- 21736. Arrangement of flaps in pumps, more especially in explosion water lifters. Akt. Ges. Brown, Boveri et Cie.
- 21738. Process and apparatus for treating ores. A. Niewerth, née Vliex.
- 21745. Rotary engines, pumps and the like. R. B. Helliwell.
- 21749. Collapsible gates. E. H. Dring.
- 21777. Rotary fans. S. Dick.
- 21788. Improvements in boiler and other furnaces for the purpose of forcing and inducing draft. M. Davison.
- 21817. Detonators. Nobel's Explosives Company Limited, D. Corrie and G. A. Ashcroft.
- 21860. Portable breathing-apparatus. D. C. H. Schumann and Hanseatische Apparatebau-Ges. vorm. L. von Bremen and Co.

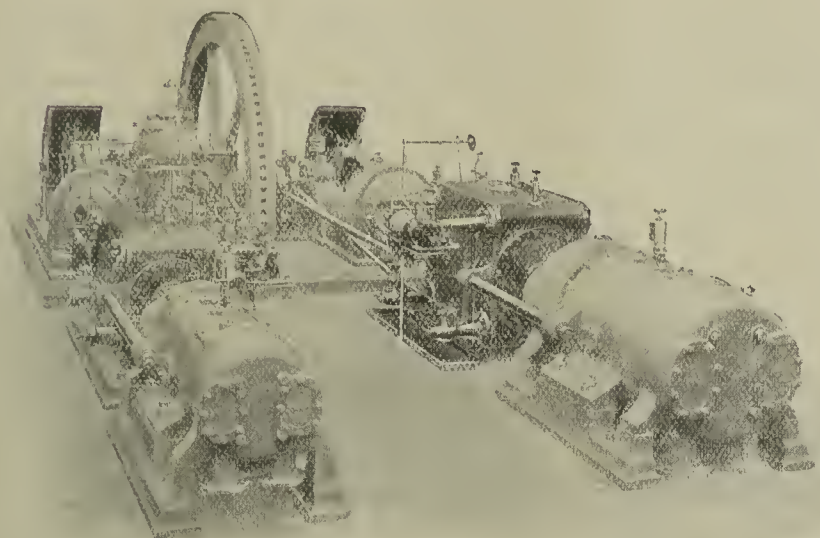
(Continued on page 706.)



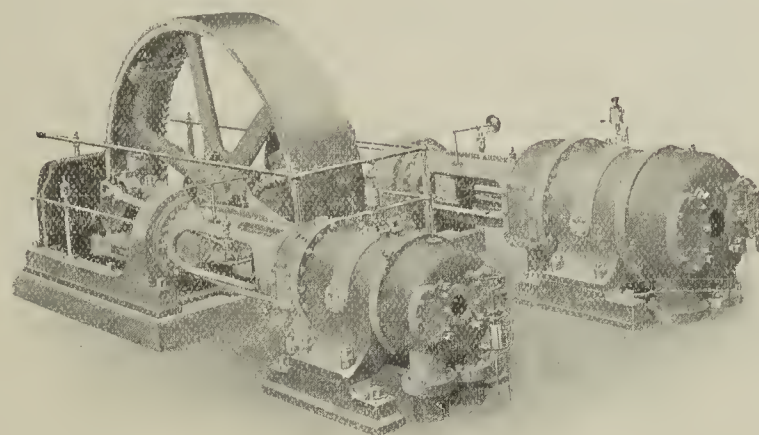
# WALKER BROS. (WIGAN) L<sup>TD</sup>

Pagefield Ironworks, WIGAN.

New Broad Street House, LONDON.



Pair Compound Corliss Steam Two Stage Air Compressing Engines.



Pair Two Stage Air Compressing Engines for Belt Drive.

## AIR COMPRESSING AND BLOWING ENGINES.

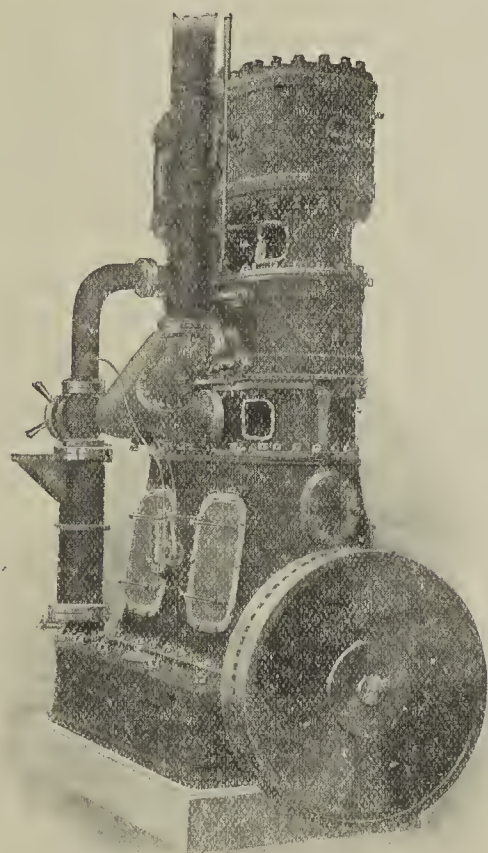
Disc Valves to Recent Patents

now applied to, or on order for

Engines indicating over 90,000 H.P.

Raising Total Output to

450,000 I.H.P.



Vertical Air Compressors of the Quick Revolution Type.

## "INDESTRUCTIBLE" TYPE MINE VENTILATING FANS,

suitable for

Steam or Motor Drive.

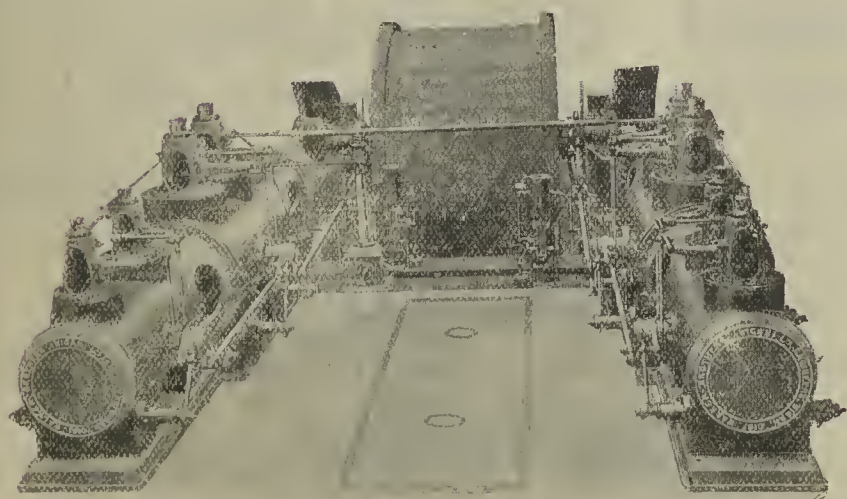
Capacity of Installations at Work or on Order,

90,000,000 cubic feet per minute.

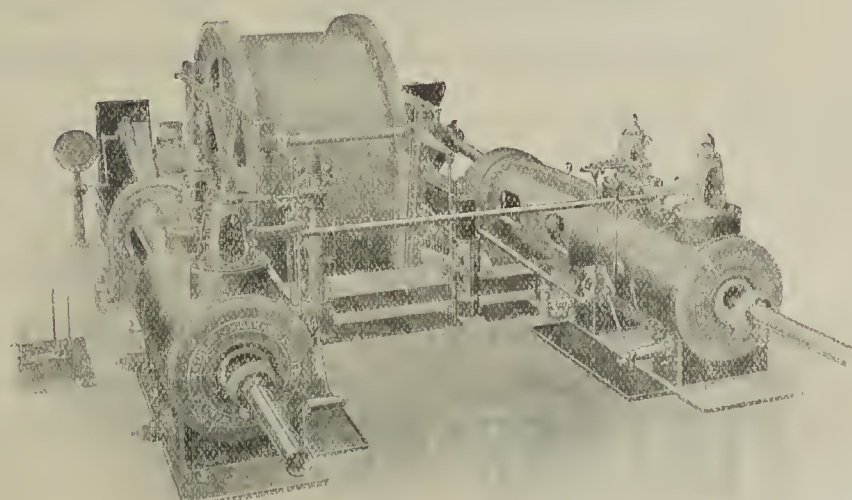
Patent Unloading Device for Power Driven Plants.

Simple Design with Sensitive Control.

Easy Means for Reversing Air Current.



Twin Tandem Compound Winding Engines.



Horizontal Winding Engines with Non-Compound Cylinders.

WINDING, HAULING AND GENERAL MINING MACHINERY.



361. Air-regenerators for portable breathing-apparatus. D. C. H. Schumann and Hanseatische Apparatebau-Ges. vorm. L. von Bremen and Co.  
**Complete Specifications Accepted.**  
To be published on October 16, 1913.  
1912.
19100. Methods of and apparatus for treating carbonaceous materials for the production of coal and like gases. Royston (General Reduction Gas and By-products Company).
19101. Methods of and apparatus for treating carbonaceous materials for the production of water gas. Royston (General Reduction Gas and By-products Company.)
21400. Construction of chains. Mather and Platt Limited, and Buckley.
21860. Bucket conveyors. Read.
21956. Chutes for the delivery of material carried by an endless conveyor. Read.
23435. Toothed gears. Hudson.
24001. Means or apparatus for scotching the wheels of colliery tubs or wagons and like vehicles. Houghton.
24626. Crucibles for electric furnaces. Morgan Crucible Company and Spiers.
26231. Eyeguards or protectors for pit ponies. Griffiths.
26815. Driving chains. Renold and Hans Renold Limited.
29934. Suction gas plant. Kershaw.  
1913.
1182. Centrifugal air compressors. British Thomson-Houston Company (General Electric Company).
1655. Device for preventing accidents in coal and other mines due to overwinding. Wilson.
2095. Brick machines. Rider.
3824. Rotary engines, pumps and compressors. Bylger.
5484. Method of obtaining refined mineral tar and resinous oils. Melamid.
6182. Machines for making foundry moulds. Geiger.
8530. Explosives for use in coalmining and the like. Carew and British Westfalite Limited.
8876. Turbines. Nettle.
9820. Rolling, crushing and grinding mills. Paisley and Cruickshank.
11464. Blades of propellers and fans. Imle and Horenz and Imle Ges.
12376. Explosive compounds. Dippel.
13464. Elastic-fluid turbines. Warwick Machinery Company (1908). (Vereinigte Dampfturbinen Ges.).
16473. Automatic lubricating device for the rails and ropes of elevators, lifts, conveyors and the like. Fabrikationsges. Automischer Schmierapparate "Helios" Otto Wetzels and Co.
- Complete Specifications open to Public Inspection before Acceptance.**  
1913.
1188. Fluid-pressure turbines. Westinghouse.
18422. Treatment of tin ores and slags containing tin. Billiton Maatschappij (firm of).
20580. Centrifugal pumps, blowers, compressors and the like. Eisenwerke Akt.-Ges. and another.
20864. Bending machines. Rhodes.

#### PUBLICATIONS RECEIVED.

- ANNUAL REPORT OF THE DEPARTMENT OF PUBLIC WORKS OF THE PROVINCE OF ALBERTA, 1912. Edmonton: J. W. Jeffrey, Government Printer.
- COMPULSORY ARBITRATION IN INDUSTRIAL DISPUTES. By W. F. Hamilton, K.C. 1913. London: Butterworth and Co. Price 3s. 6d. net.
- NEW SOUTH WALES DEPARTMENT OF MINES, MINERAL RESOURCES No. 7, "MERCURY, OR QUICKSILVER IN N.S.W." By J. E. Carne. Second edition. Sydney: W. A. Gullick. Price 2s. 6d.
- "Monthly Magazine of the Incorporated Chamber of Commerce of Liverpool," September (Vol. 12, No. 9); "Revue de l'Ingénieur et Index Technique, Organe Officiel de l'Institut Technique Industriel" (Vol. 22, No. 1-3), price 2 fr. 50 c.; "The Journal of the South African Institution of Engineers" (Vol. 12, No. 2), September, price 2s.; "Bulletin of the American Institute of Mining Engineers" (Vol. 81), September.

#### GOVERNMENT PUBLICATIONS.

- \*\*\* Any of the following publications may be obtained on application to this office at the price named **post free.**
- Employment of Children Abroad: Regulations, 1½d.
- Factory Forms: (No. 39A), June 1913, 8d.; (No. 11), July 1913, 1½d.
- Consular and Trade Reports, 1912: Foreign Trade of Austria-Hungary, 2d.; Sweden, Gothenburg, 5½d.; Gambia, 8½d.; Fiji, 3d.; China, Shanghai, 2d.; Italy, Brindisi, 2½d.; Persia, Kermanshah, 3d.; U.S.A., New Orleans, 6½d.; Austria-Hungary, Fiume, 2½d.; Germany, Hamburg, 8d.; Persia, Khorasan, 1912-13, 4d.
- Woods, Forests and Land Revenues: Ninety-first Report for 1912-13, 1s. 4d.
- Workmen's Compensation: Statistics for 1912, 8d.
- Statistical Abstract for the United Kingdom in Each of the Last 15 Years, 1898-1912, 2s. 4d.
- Acts, Local, 1913: Humber Commercial Railway and Dock, 9½d.; Caledonian Railway Order Confirmation, 2s. 1d.
- Statutory Rules and Orders, 1913: COAL MINES EXPLOSIVES ORDER, 1/9/13 [953], 2½d.; Ditto, REGULATIONS, 4/9/13 [955], 1½d.; Glamorgan County Council Light Railways Order, 1½d.
- Boiler Explosion Report: St. Helens Colliery (No. 2240), 2½d.
- Banking, Railway and Shipping Statistics, June 1913, 7d.
- Pauperism, England and Wales, for August, 1½d.
- Railway Conciliation Scheme: Statement, 2s. 8d.

#### CATALOGUES AND PRICE LISTS RECEIVED.

- The General Electric Co. Limited (67, Queen Victoria-street, E.C.) send particulars of a new white glassware, named "Superlux," for which exceptional reflecting and diffusing qualities are claimed.
- The Adnil Electric Co. Limited (Adnil Building, Artillery-lane, E.C.) forward a catalogue of portable electric tools, including single-phase drills, D.C. and polyphase reamers, table drills, electric grinders, electro-magnetic chucks and fixing plates, &c.
- Literature has been sent to us relating to the "New Era" chemical fire-extinguishers made by the Valor Company Limited (Aston Cross, Birmingham). These extinguishers are fitted with renewable charges, and will throw a stream from 30 to 40 feet. Another appliance is the "New Era" chemical fire engine, which projects a chemical stream 50 to 60 feet vertically, and has a capacity of 30 gallons. Other appliances are the "Fyroul" and "Fydrant" extinguishers.
- Messrs. Bonecourt Surface Combustion Limited (Parliament Mansions, Victoria-street, S.W.) send a leaflet describing the application of the Bonecourt heating diaphragms for industrial purposes. By this system the gas is burnt without flame, and over 70 per cent. of the heat is converted into radiant energy at the surface of the diaphragm. A small blowing fan is necessary to supply air at the required pressure.
- The International Electric Co. Limited (111-115 Salisbury-road, Kilburn, N.W.) have issued a sectional price list devoted to indicators, alarms, and similar appliances. Particulars are given of a glow-lamp signalling indicator for mines, adapted to different levels. By operating the switch on each level corresponding lamps are automatically switched on at the indicator by means of relays suitably mounted in a gas and water-tight case. Each indicator is provided with one more lamp than there are levels, this being fitted with a red glass for indicating when winding is proceeding, and operated by a special winding switch.
- The "Thermo-feed" regulator is made by Messrs. Ronald Trist and Co. Limited (Coronation House, 4, Lloyd's-avenue), and full particulars are contained in a pamphlet just issued by them. The makers guarantee that these regulators will

maintain the working level with an altitude fluctuation not exceeding ½ in. from a predetermined point (or, in the case of a water-tube boiler ¼ in.). An explanatory scale drawing in colours explains the working of the appliance, which possesses the unique feature that means are provided for altering the working level whilst actually under steam. The "Thermo-feed" consists of a single controlling valve operating between two seats. This and a copper float constitute the whole of the moving mechanism, controlling a regulation feed-valve connected to it by means of a pipe.

**Social Problems in the South Yorks Coalfield.**—The annual report of Dr. Dunne, the medical officer of health to the Doncaster Rural District Council, just issued, is of great interest to the South Yorkshire coalfield, to which it contains numerous references. Dr. Dunne states that among the features of the past year were the sod-cutting ceremony at Rossington Colliery, foreshadowing in the near future a large mining population in what had hitherto been a rural district of great beauty; the reaching of coal at the Askern Main Colliery, an event of much importance to that district; and the decision of the Council to town-plan an area of Askern. The district comprised 84,878 acres and 42 parishes. The chief occupation of the inhabitants was coalmining, large numbers of men being employed in colliery development and in making new railways. Sewage outfall works are under construction at Askern, Adwick, Edlington, Skellow, Owston, Rossington, Norton and Sutton—all due to the colliery and industrial schemes which are proceeding. The report continues: Very serious problems will have to be solved in respect to drainage. The late Mr. W. H. Pickering, H.M. inspector of mines, warned the authorities that as the strata are waterlogged within a few feet of the surface in many of the places, the drainage is difficult, and that when the coal is worked and the surface has sunk 3 ft. in consequence, all the drainage levels will be destroyed and swamps will form unless preventive measures are taken. Building has been very active during the year, 513 houses having been completed. There are on an average 250 houses in course of erection at any given time. The creation of a small colliery village at Owston by the Bullcroft Colliery Company had been going on during the year, and the building of a large colliery village at Askern had been commenced. The Rossington Colliery village, which will consist of 850 houses, had been started, and the Edlington Colliery village was being extended to meet the demand for houses. The rent of the new houses, which consist of five rooms, varies from 6s. 6d. to 7s. 6d. per week. The demand for houses has caused a corresponding rise in the rents of the old country cottages. Dr. Dunne states he does not see much prospect of the supply of houses meeting the demands of the population in the district for some time to come. Overcrowding in the new colliery villages, extending into the rural parishes around in varying degree, is widespread. No steps to abate overcrowding, which is on such a wholesale scale, would be of the slightest use, though in one or two cases notices had been served. The effects of this overcrowding, both in its hygienic and moral aspects, were 'deplorable, and the efficiency of adult labour thus housed must be lessened. The speedy and adequate supply of houses for the industrial population of the district was the most urgent of all the local problems which the development of the South Yorkshire coalfield had brought into existence. The presence of a small branch infectious diseases hospital to serve the northern part of the district is a necessity. Adwick's population has increased from 307 in 1901 to 6,000 at the present time, and it is 10 miles from the Conisboro' Hospital. Carcroft is destined to be a district of several thousand inhabitants, and Askern has trebled its population. The birth rate for the whole district was 32.13, and the infantile mortality rate 96.5, compared with 126.4 the previous year, which drop was due to the copious rains. The fall in the birth rate might be taken as an expression of the difficulty which the industrial population coming into the district had in finding houses. The death-rate was 13.6, against 14.9, and there were 101 violent deaths against 26 the previous year, this great increase being due to the Cadeby disaster.

## Prevention of Coaldust Explosions.

SIR HENRY CUNYNGHAME, Chairman of Explosions in Mines Committee,  
**RECOMMENDS**

Fifty per cent. Incombustible Dust—**ONE TO ONE**,  
such as FULLERS EARTH (vide Report of Lecture before the British Association at Birmingham).

**FULLERS EARTH**, as supplied to the Explosions in Mines Committee,  
is "Efficacious" and free from "Crystalline Silica,"  
and can be supplied in unlimited quantities by

**L. G. HILL, 5, Oxford Road, Acocks Green, Birmingham.**

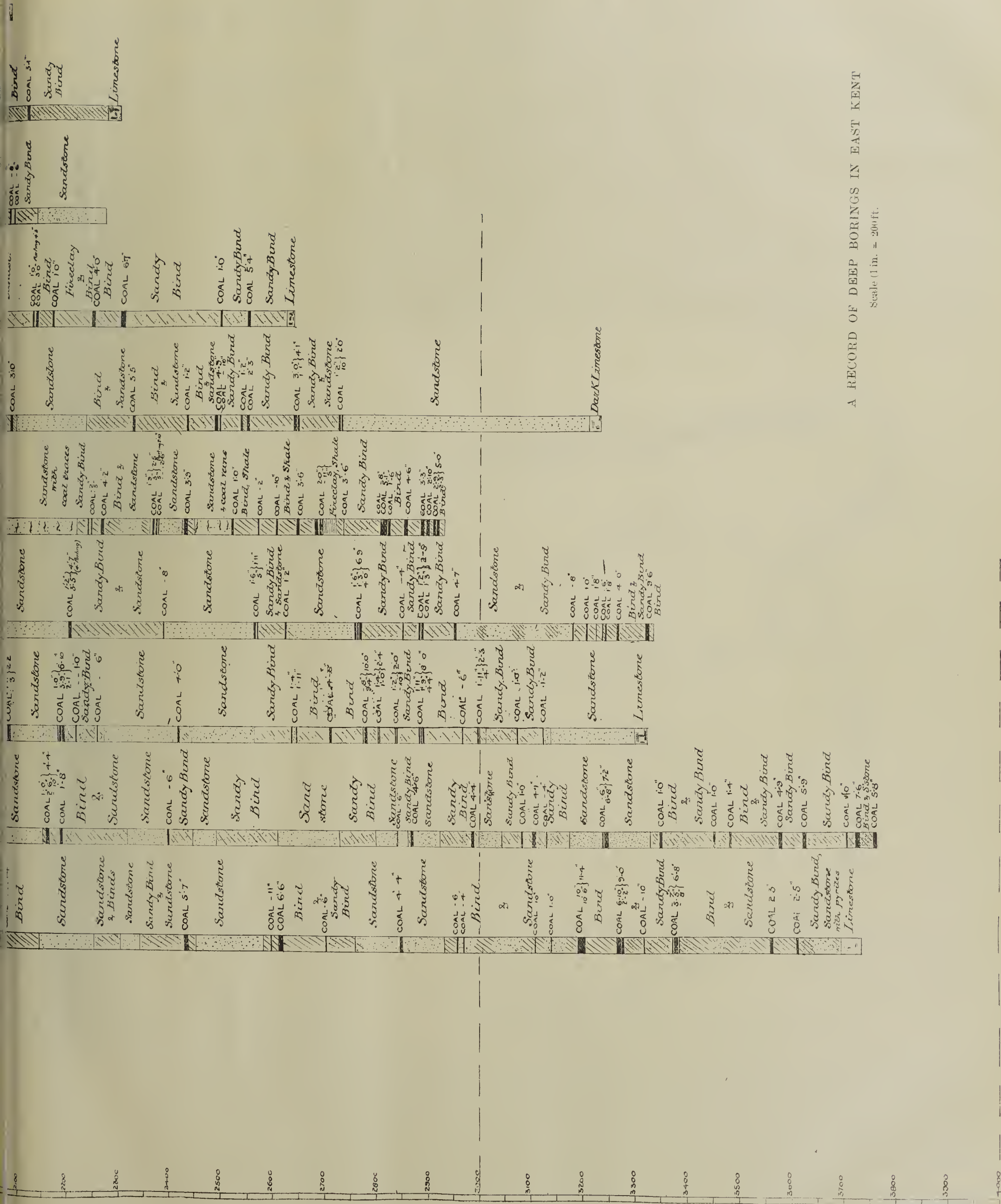












A RECORD OF DEEP BORINGS IN EAST KENT  
Scale (1 in. = 200 ft.)







# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY, OCTOBER 10, 1913.

No. 2754.

## TEN DEEP BORINGS IN EAST KENT.

By MALCOLM BURR, D.Sc., F.G.S., &c.

(With a Plate of Sections.)

The description of the borings of Waldershare and Fredville, the two first undertaken under the auspices of the Kent Coal Concessions Limited, have been published by Prof. Boyd Dawkins (*Journ. Soc. Arts*, 1907, lv., pp. 456-7) and Dr. E. A. Newell Arber (*Q. J. G.S.*, lxx., 1909, pp. 21-39 and pl. i., and *Geol. Mag.*, Dec. 5, vol. ix., pp. 97-99, 1912). The Fredville boring has also been discussed in some detail, especially with regard to the mesozoic rocks, in a paper dealing with the general aspects of the coalfield (v. Burr, *Science Progress*, No. 2, January 1909). Since the completion of these holes, the same company, together with its allies and subsidiaries, has put down a large number of borings to a great depth, and in this paper a brief description and outline section of the next ten holes is published for the first time.

The country explored, as is now generally known, may be best described as that part of East Kent which is bounded on the south-west by the main Dover-Canterbury road, on the north and east by the River Stour, and on other sides by the sea. The relative position of the boreholes is shown on the accompanying map.

The records and cores have been examined and searched for fossils with the greatest care; the mesozoics have been studied by Mr. G. W. Lamplugh, F.R.S., and the fossil contents have been collected and are being examined by the staff of the Geological Survey; the coal measures have been examined in detail by Dr. E. A. Newell Arber for plants, and by Mr. H. Bolton, M.Sc., F.R.S.E., of Bristol, for animal remains. The details of these investigations will be published when they are complete. They will probably involve some minor changes in the classification.

So much time was lost in the first two holes, owing to the swelling of the soft gault clays, that it was decided to employ Messrs. Mather and Platt to bore down to the coal measures, and then to hand the hole over to a driller for the production of cores. It was hoped by these means to effect economy both of time and money. Messrs. Mather and Platt employ the churn-bit system, with rope instead of rods; consequently, there were no cores, and the section had to be established by comparing the dirt brought up on the chisel with the mesozoic cores from the earlier holes of Waldershare and Fredville.

Messrs. Mather and Platt began the following holes—Goodnestone, Barfreestone, Woodnesborough, Walme-stone, Mattice Hill and Oxney; of these, the first four were continued by Mr. John Thom, and the last by Messrs. Vivians. The borings of Trapham, Stodmarsh and Ripple were carried out in their entirety by the Internationale Bohrgesellschaft, of Erkelenz. Maydensole was executed by the Société Anonyme de Forage et Entreprises Minières "Tréfor," of Brussels, which firm also completed the Oxney boring by sub-contract from Messrs. Vivians.

The tabulated results of time taken show in a startling manner the superiority of the Continental contractors; the explanation is that boring, as a branch of engineering, has received more attention on the Continent than in the British Islands, where the scope is relatively limited, and has been undertaken by wealthy companies with very large resources. It should be borne in mind, too, in justice to the English contractors, that in some instances cores were asked for of so great a diameter—10 in., and even more—from the coal measures, that the weight of the full core-barrel was very great, and involved the contractor in numerous stoppages and breakdowns. The foreign contractors have a further advantage in that they can churn with chisel or drill at will, the operation of changing from chisel to crown taking but a few minutes; whereas, in the earlier holes, the same effect could only be obtained by a change of contractor, which involved a delay of weeks, and occasionally of months.

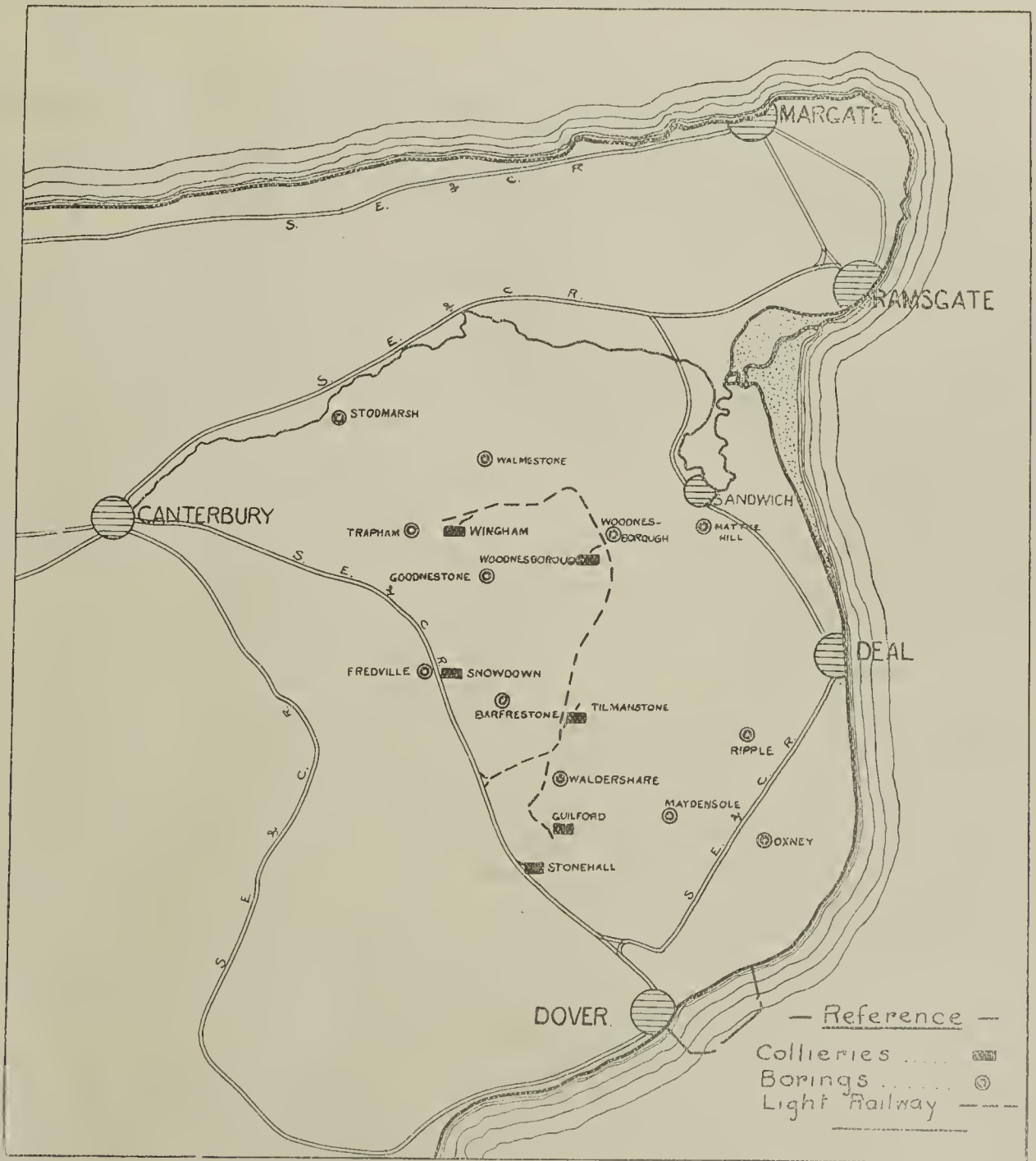
Where the chisel was used, the record is necessarily imperfect. At Maydensole, for instance, the contractor

used the chisel down to a depth of 927 ft., at which point *Cypridea* was recognised; the chisel had passed through the greensands unnoticed, and the smashed up Weald clay was mistaken for gault. At Trapham, too, the chisel gave no clear account of the greensand nor wealden, and none of the mesozoics below the gault are recognisable at Ripple. The record of the mesozoic rocks is only complete at Maydensole below the Weald clay, and at Oxney below the greensands; in every other hole it is doubtful.

With regard to the general features, the thickening of the gault towards the north is noticeable, as also the usual absence of the glauconitic marl; the highly characteristic lithological features of this bed sharply mark the base of the chalk, but unfortunately it occurs only in lenticular patches; where it is absent, as in all

greensands disappear. The Wealden series is persistent, though attenuated, at least as far north as Walme-stone, but can be only roughly divided into Weald clay and Hastings beds—*e.g.*, the shale series and sand series. The oolites thin out to the north and east, the upper beds disappearing first; the existence of the lias is doubtful and remains to be demonstrated by the study of the fossils.

The coal measures are being carefully studied, in minute detail, by Dr. Arber and Mr. Bolton. Both these gentlemen have reported privately to the companies the results of their investigations up to date, and will in due course publish them in the scientific press. In a general way it may be stated that the coal measures fall into three divisions—the rich transition, containing coals of a high percentage of volatile matter, a relatively



SKETCH MAP SHOWING THE POSITION OF BORINGS AND COLLIERIES.

the holes and all the sinkings, except Woodnesboro' and Walme-stone, the division between the chalk and gault cannot be discriminated. The passage from the argillaceous lower chalk to the calcareous upper gault is so indistinct that even in the sinking pits, where it can be examined at leisure, and the fossils collected, the division is only fixed with difficulty. In the absence of the glauconitic marl the base of the chalk is taken at the hard reef crowded with *Plocoscyphia labrosa*. A reef evidently identical with this, and crowded with the same sponge, occurs at the same horizon on the outcrop, and may be studied on the foreshore between Folkestone and Dover.

In the greensands it is noticeable that the Hythe beds have gone out entirely, that the Folkestone beds, though greatly attenuated, are remarkably persistent, even more so than the Atherfield clay: in the north, the

barren arenaceous belt of varying thickness, and the rich middle measures, containing thick seams of sub-anthracitic steam coals. Many of these are smokeless Navigation coals, on analysis equal to the best South Welsh steam coals. Dr. Arber has shown that the transition series occupies the central and south-western portion of the field, the barren portion is a curved belt on the north and east, and the middle a curved belt still further to the north and east.

In a general way, the seams in the middle coal measures are more numerous and thicker than those in the transition; in both the roofs and floors appear to be equally good.

The lower coal measures, in the strict sense, are absent, and have apparently never been deposited, and there is no sign of Millstone Grit. The middle measures lie unconformably on the lower carboniferous, which



TABLE A.—SHOWING THICKNESS OF BEDS AND DEPTH AT WHICH THE COAL MEASURES AND CARBONIFEROUS LIMESTONE WERE STRUCK.

	Waldershare.	Fredville.	Goodnestone.	Barfrestone.	Woodnesboro'.	Mattice Hill.	Walmestone.	Trapham.	Stodmarsh.	Ripple.	Maydensole.	Oxney.	Tilmanstone Pits.	Guilford Pits.
Altitude above O.D. ...	335	259	136	193	51	11	74	59	87	68	253	138	225	365
Thickness—														
Drift .....	—	—	9	4' 6"	19	3	137	23	41	—	2	21	—	?
Eocene .....	—	—	—	—	11	—	—	—	—	—	—	—	—	—
Chalk .....	820	947' 8"	771	879' 6"	796	906	760' 6"	877'	977	790	—	813	756	766
Gault .....	156	—	181	—	153	—	155	—	—	—	—	—	180	144
Folkestone .....	11	2' 4"	6	3	?	40	1' 6"	?	?	?	about	1' 6"	5	4' 9"
Sandgate .....	30	33	29	36	?	—	15' 6"	?	—	?	956	19' 6"	31	36'
Atherfield .....	29	17	7' 6"	7	?	13	—	?	—	?	—	10'	3	24' 9"
Total Lower Greensand .....	70	52' 4"	42' 6"	46	37	53	17'	?	—	?	—	31'	39	65' 6"
Wealden .....	42	35	42' 6"	33	37	2	5' 6"	98	—	—	abt. 84	39'	60' 6"	51' 3"
Corallian .....	63	54	?	—	?	—	—	?	—	—	—	—	—	—
Oxfordian .....	95	171	?	174	?	—	—	?	—	92	51	3	35' 6"	142
Bathonian .....	143	91' 6"	?	83	?	—	—	?	—	—	101	90	97' 6"	—
? Lias .....	5	24	—	—	—	—	—	—	—	—	—	—	—	—
Total Oolites and ? Lias .....	306	340' 6"	142	257	30	—	—	126	48	—	152	93	133	—
Enter Coal Measures .....	1,394	1,375' 6"	1,188	1,220	1,072	975	1,075	1,124	1,066	882	1,194	997	1,168' 6"	—
Transition Coal Measures .....	1,469	472	184' 6"	1,604	—	—	—	—	—	518	1,156	778	—	—
Middle Coal Measures .....	—	—	1,532' 6"	503	1,549	1,076	1,201	1,651	1,079	1,769	1,409	1,927	—	—
Total thickness Coal Measures .....	*1,469	*459' 6"	*1,717	*2,107	1,549	1,076	1,201	1,651	1,079	2,287	*2,565	2,705	—	—
Total thickness coal of seams over 1 ft. ....	17' 3"	7' 4"	49' 10"	57' 9"	30' 5"	9' 3"	40' 11"	29' 9"	26'	52' 8"	63' 2"	65' 10"	—	—
Enter Carb. Limestone .....	—	—	—	—	2,621	2,051	2,276	2,775	2,145	3,169	—	3,702	—	—
? Devonian .....	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Bottom of holes .....	2,863	1,835	2,905	3,327	2,633	2,075	2,285	3,226	2,263	3,316	3,759	3,743	—	—
Remarks	As reported by Boyd Dawkins down to entry into C.M.							Entrance into limestone undefined.			Record imperfect to 927 and 1,089-1,094.			

\* These figures denote the thickness proved, the hole finishing in the coal measures without entering the limestone.

has been proved beneath the coal measures in several holes; the formation is represented by pale limestone containing *Productus corrugato-hemisphericus*, black limestones with *Syringothyris cuspidata*, and black calcareous shales. The brachiopods from the carboniferous limestone were determined by Mr. Henry Woods.

In order to show at a glance the thickness of the various beds, and the depth at which the coal measures and carboniferous limestone have been struck, these figures are given in tabular form, for ease of reference, in Table A. Particulars of the time and cost of each hole are also given in Table B.

To make the geological table complete and up to date, particulars of the Waldershare and Fredville borings are also included, together with the section of the pits at Tilmanstone and Guilford. Snowdown is omitted, the section being but very slightly different from that of the boring of Fredville, which is close to the pits.

Goodnestone Boring.

Situated in the parish of Goodnestone, near the eastern corner of the park of the same name, on the property of Mr. H. Filtzwalter Plumtre; altitude, 136 ft. above O.D. The hole was began by Messrs. Mather and Platt on December 19, 1906, and sunk to 1,176 ft. with chisel and cord, so the record is very imperfect down to this point. Messrs. Mather and Platt finished their work on October 7, 1907, when the hole was taken over by Mr. John Thom, who began boring on November 14, 1907, and carried the hole down to 2,905 ft., which depth was reached on November 21, 1910.

The horizon at the surface is the *Uintacrinus* band of the zone of *Marsupites*—that is to say, almost the highest of the chalk in East Kent—so that practically the whole of the chalk was passed through. It was not possible to determine the base of the chalk, but it is estimated to be at 780 ft., which leaves 181 ft. for the gault. The greensand and wealden are each 42 ft. and the oolites 142 ft. thick. The top of the coal measures is a typical coarse grey sandstone, the surface quite flat and smooth, with pieces of the overlying greenish sandy marl adhering. The coal measures were penetrated to a depth of 2,905 ft., beyond which point the contractor was unable to continue. The upper portion, down to 1,958 ft., consists mainly of sandstones, with nine thin seams of coal, recalling the section proved at the Ropersole boring. The lower portion consists chiefly of binds, and contains 10 seams of coal of over 2 ft. in thickness; the thickest are two of 4 ft. 6 in., one 6 ft. 7 in., and one 8 ft. 8 in.

The analysis of the samples show that they are all of the same type, with a percentage of volatile matter varying from 14.5 to 20.

The section is remarkably poor in fossil contents and the contractor was unable to find sufficient material to determine the horizon with certainty. It appears, how-

ever, that the upper 300 ft. is in the transition series, and the lower in the higher part of the middle coal measures.

Barfrestone Boring.

Situated in the parish of, and near the village of the same name, at an altitude of 193 ft. above O.D. The hole was carried by Messrs. Mather and Platt to a depth of 1,254 ft. This took from December 12, 1907, to September 9, 1908, when Mr. John Thom took over the hole and carried it down to 3,327 ft. 6 in., beginning on December 23, 1908, and ending on May 30, 1912.

There is 4 ft. 6 in. of clay-with-flints, and the bottom of the gault was reached at 884 ft.; the horizon of the chalk at the surface is the extreme top of the zone of *Micraster coranguinum*. There is the usual 46 ft. of greensand and 33 ft. of wealden. The corallian is missing, but the Oxfordian is well developed, which is interesting, as at the Snowdown pits, 1½ miles to the north-west, the corallian is also well developed, while at Tilmanstone, 1½ miles to the south-east, not only is the corallian gone, but only the base of the Oxfordian remains, there being but 3 ft. of Oxford clay; in this borehole the Oxford clay appears to be 102 ft. thick.

The coal measures were struck at 1,220 ft. and penetrated to 3,327 ft. 6 in., where the hole stopped, still in the coal measures. This length of 2,107 ft. is rich both in fossils and in coal; the aggregate thickness of the latter is 57 ft. 9 in., the best seams being 6 ft. 1 in. (almost certainly the Beresford seam, which is now being worked at Snowdown and Tilmanstone collieries), 4 ft. 7 in. (in two), 6 ft. 9 in., 4 ft., and 9 ft. 6 in.

The flora is rich, and Dr. Arber considers the first 1,600 ft. to be in the transition zone, and the remainder in the middle coal measures.

Woodnesborough Boring.

Situated in the parish of Woodnesborough, at the Drainless Drove cross roads by the Prince of Wales Inn, near to Sandwich Corporation Waterworks. The site is 51 ft. above O.D. at the foot of the tertiary escarpment. The hole was bored by Messrs. Mather and Platt with chisel and rope to a depth of 1,100 ft.: the time occupied was 12 months, namely, from March 20, 1908, to March 26, 1909, but a delay of 5½ months was caused by a heavy boring chisel falling down the hole and becoming so jammed at the bottom that it was necessary to bore through it. Mr. John Thom took the hole over and started boring from 1,100 ft. on September 8, 1909, and continued the hole down to 2,633 ft., which depth was reached on April 20, 1912.

The first 19 ft. consisted of a yellow sandy brick-earth, locally termed "clite." The discovery of brachials of *Uintacrinus* at 45 ft., and again to 65 ft., definitely fixes the horizon of the chalk at these points as being the lower portion of the zone of *Marsupites*, the highest zone of the chalk occurring in East Kent. A well marked 4 ft. bed of glauconite marl shows the base of the chalk at 815 ft., one of the few instances where it

has been possible to determine the thickness of the gault, which is 153 ft. The greensands and wealden are persistent as usual, and the oolites are reduced to 30 ft.

The coal measures at this boring are 1,549 ft. thick, as the boring passed into the carboniferous limestone at 2,621 ft. The rocks are mainly binds, tolerably rich in plant remains, upon which evidence Dr. Arber attributes the whole of the section to the middle coal measures. There is an aggregate of 30 ft. 5 in. of coal: the thickest seam is 6 ft. 7 in., and analysis shows them to be steam-raising coals, the volatile matter running from 12.98 per cent. in the lowest seam (5 ft. 4 in.) to 24.22 per cent. in the top seam (2 ft. 3 in.). These seams correlate fairly well with those proved at Goodnestone.

The carboniferous limestone was bored for 12 ft., consisting of massive limestone, with a few calcareous shales: no fossils were found. At the junction itself the ground is much broken, and no core obtainable: probably there is a fault at this point.

Walmestone Boring.

Situated in the parish of Preston, at Little Walmestone Farm, the property of Mr. H. Western Plumtre, at an altitude of 74 ft. above O.D. Messrs. Mather and Platt began boring with chisel on October 16, 1908, and carried the hole down to 469 ft. by November 26, 1908, when it was taken over by Mr. John Thom, who finally ended the hole at a depth of 2,286 ft. on February 28, 1913. This great length of time was not the fault of the contractor, as the hole was stopped for an aggregate of not less than 500 days, partly by the company's orders, partly by the usual breakdowns and waiting for tubes.

The hole begins on top of the tertiary escarpment, and 137 ft. of eocene beds were passed through before the chalk was reached; the base of the latter is marked by 5 ft. of glauconite marl at 897 ft. 6 in.: the gault is 155 ft.; in the greensand it is curious to note that the Folkestone beds persist, and the Sandgate, but that the Atherfield clay has gone out. The wealden is reduced to 5 ft. 6 in. of weald clay, which rests directly on the coal measures. As is to be expected so far north, the whole of this section is in the middle coal measures, and the total thickness is 1,201 ft. only, but this contains 41 ft. of coal in seams from 1 ft. 6 in. to 5 ft. 10 in. and 6 ft. in thickness. The volatile contents average about 22 per cent.

The carboniferous limestone was entered at 2,276 ft. 6 in. from the surface, and was penetrated to a depth of 9 ft.; it consists of grey limestone, containing only indeterminable mollusca, with some black shales intercalated.

Mattice Hill Boring.

Situated in a field, the property of Mr. G. C. Solley, near Stewarts Folly, by the side of the Delf Stream, about half-a-mile south-east of Sandwich Station, at an altitude of 11 ft. above O.D. Messrs. Mather and Platt



TABLE B.—DETAILS OF BORINGS IN EAST KENT, SHOWING THE PROGRESS AND COST OF BORING.

Name of boring.	Contractor.	Begun.		Ended.		Total depth bored.	Total time expended.	Average monthly progress.	Dia. of bottom core.	Total cost.*		Cost per foot.
		Date.	Depth.	Date.	Depth.					£	s. d.	
Goodnestone	Mather and Platt	19-12-06	Ft. Surface	7-10-07	1,176 0	1,176	9½ months	Ft. 124½	In. 1	£	s. d.	£ s. d.
Do.	John Thom	14-11-07	1,176	21-11-10	2,906 0	1,730	3 years	48½		8,782	4 2	3 0 6a
Barfrestone	Mather and Platt	12-12-07	Surface	9- 9-08	1,254 0	1,254	9 months	132½				
Do.	John Thom	23-12-08	1,254	30- 5-12	3,327 6	2,073	3 years 5 months	50½	1½	10,202	4 1	3 1 4b
Woodnesboro'	Mather and Platt	20- 3-08	Surface	26- 3-09	1,100 0	1,100	1 year	91½				
Do.	John Thom	8- 9-09	1,100	20- 4-12	2,633 0	1,533	2 years 7 months	49½	4	7,597	19 5	2 17 8c
Mattice Hill	Mather and Platt	19- 6-09	Surface	10- 2-10	1,096 0	1,096	7½ months	141½				
Do.	Vivian	20- 7-10	1,096	8- 7-12	2,075 0	979	2 years	40½	3½	4,085	3 5	1 19 0d
Walimestone	Mather and Platt	16-10-08	Surface	26-11-08	469 0	469	40 days	348½				
Do.	John Thom	8- 9-09	469	18- 2-13	2,286 0	1,817	3 year 5 months	14½	5	7,525	6 1	3 5 10e
Oxney	Mather and Platt	21- 4-10	Surface	23- 7-10	834 0	834	3 months	278½				
Do.	Vivian	8-10-10	834	9- 2-12	1,803 0	969	16 "	60½	8½	8,204	5 10	2 3 10f
Do.	Trefor	19- 3-12	1,803	20-11-12	3,743 0	1,940	8 "	242½				
Ripple	Int. Bohrg.	14- 2-11	Surface	30-11-11	3,317 0	3,321	8½ "	402	4	6,613	10 2	1 19 7g
Maydensole	Trefor	24-11-10	"	16-11-11	3,760 0	3,760	12 "	313	3	9,983	0 6	2 13 1h
Trapham	Int. Bohrg.	20-10-10	"	28- 7-11	3,226 0	3,226	9 "	358	4½	6,877	17 0	2 2 7i
Stodmarsh	Int. Bohrg.	9-12-10	"	20- 7-11	2,262 0	2,262	7 "	323	5	5,283	18 1	2 6 8j
Waldershare	A. C. Potter and Co.	4- 1-05	"	10- 4-06	1,409 0	1,409	15 "	94½				
Do.	John Thom	30- 5-06	1,409	26- 9-07	2,863 0	1,454	16 "	91½	1	7,113	1 8	2 9 8k
Fredville	A. C. Potter and Co.	8- 8-05	Surface	20-12-06	1,502 0	1,502	16½ "	92½				
Do.	John Thom	7- 2-06	1,502	20- 8-07	1,835 0	333	18½ "	18½	1½	4,105	18 10	2 4 3l

\* Including water-supply, road-making, geologists' costs, &c.

a Total of 284 days delay, waiting for tubes and spares, for "instructions" from contractor, and sundry repairs. Last core raised, 1 in. in diameter.  
b Delay of one month 20 days waiting for tubes. Total of 12 months lost through obstructions. About three months lost waiting for tubes, &c.  
c Five months lost waiting for tubes. Five and a-half months lost through chisel falling down hole. Total short stoppages of 123 days for tubes, &c.; loss also of three months due to core-tube jamming; one month waiting for tubes.  
d The large diameter of the core beginning at 12½ in. involved many special difficulties and delays owing to the great weight of the full core barrel and difficulty in breaking off the core.  
e Total time lost waiting for tubes, coal, instructions of Board, &c., and sundry breakdowns, 500 days.  
f Very large and heavy cores; took 25 days to break an 11½ in. sandstone core; broken rods delayed seven weeks, and a stripped nipple 11 weeks.  
g Bored with chisel to 1,317 ft.  
h First 900 ft. with chisel; only 227 ft. bored in first month owing to want of water.  
i About 2,000 ft. bored with chisel.  
j About 1,500 ft. bored with chisel. Cost of water supply much higher than usual.  
k Six and a-half months' delay in tubing and sundry breakages. Ninety-six days lost through waiting for tubes, new crowns, and foreman's holidays; diameter of last core 1 in.  
l Six months lost through broken rod. Eighteen days waiting for tubes; three and a-quarter months men "waiting for instructions." Diameter last core 1½ in., and piece of iron at bottom of hole compelled stoppage.

bored the hole with chisel and rope down to 1,096 ft., beginning on June 19, 1909, and ending on February 10, 1910. The hole was then taken over by Messrs. Vivians, who started boring on July 20, 1910, and ended on July 8, 1912, at a depth of 2,075 ft. The progress was not very rapid; but this was due to the great weight of the cores, the diameter of which was never less than 8 in., and for the greater part of the hole 10 and even 12 inches.

There is 14 ft. of drift; the base of the gault was reached at 919 ft. 6 in. There is then no less than 40 ft. of indurated sandstone rock, all samples of which are of the familiar *mammillatus* bed type, to the apparent exclusion of the soft Sandgate clays. This is followed by 13 ft. of Atherfield clay, the upper portion of which may be referable to the Sandgate beds. Below the Atherfield clay there is 2 ft. of mixed ground, which may be the remains of the wealden. At 975 ft. the chisel showed a blue shale, which is probably coal-measure shale; at 993 ft. it encountered a hard rock, which is undoubtedly coal-measure sandstone. The coal measures here consist almost entirely of shales and binds, but are poor in coals, the aggregate being but 9 ft. 3 in. The two best seams are 2 ft. 10 in. and 3 ft. 5 in.; these are both, according to analysis, high-class smokeless navigation coals. The volatile matter is 14.96 per cent. in the 3 ft. 5 in. and 16.82 per cent. in the 2 ft. 10 in.

Owing to the great diameter of cores, the fauna and flora afford abundant material; the first 700 ft. permitted no less than 326 determinations of plants, but the lower portion is faulted and broken, so that only 29 determinations were possible. The whole of the section is in the middle coal measures.

The carboniferous limestone was entered at 2,051 ft. substantially earlier than was expected; and from this, and the poverty in coal, it is suggested that the thick coal series has been faulted out, but the regularity in the neighbouring borings points to a purely local disturbance. The lower carboniferous was penetrated in a depth of 24 ft. and consists of black calcareous shales, with a gentle dip, and a few badly preserved invertebrates.

Oxney Boring.

Situated in the parish of East Langdon, in Oxney Bottom, on the Dover-Deal high road, on the Oxney estate, facing the gates of Oxney Park, the property of Major Banks, at an altitude of 138 ft. above O.D. The hole was begun by Messrs. Mather and Platt on April 21, 1910, and carried by them to 834 ft. on July 23, 1910. It was then taken over by Messrs. Vivian on October 8, 1910, who were greatly handicapped by the large size of the hole, as cores of 10 in. and even 12 in. were asked for. Messrs. Vivian took the hole down to 1,803 ft. by February 9, 1912, when they sub-contracted the hole to the Société Anonyme de Forage et Entreprises Minières "Tréfor," who began boring on March 19, 1912, and ended at a depth of 3,743 ft. on November 20, 1912.

The chalk and gault combined are rather thinner than usual, the reason probably being that the upper gault is thinner to the south and east than to the north and west. The greensands and wealden, for analogous

reasons, being thicker than usual, but the oolites are reduced to 93 ft. The coal measures were struck at 999 ft., only 859 ft. below O.D. In the upper portion of the measures barren grits predominate. Dr. Arber attributes the upper 778 ft. to the transition, the remainder to the middle coal measures. The rich ground begins about 2,000 ft., below which point there is an aggregate thickness of 65 ft. 10 in. of coal, making this one of the richest sections in the coalfield. There are three seams between 2 ft. and 3 ft. in thickness, three between 3 ft. and 5 ft., and six over 5 ft. thick, the thickest being 11 ft. 4 in.; the 2 ft. 1 in. has 18.29 per cent. of volatile matter, but the others are more anthracitic, the volatile percentage running from 10 to 15.

The carboniferous limestone was entered at 3,702 ft. and penetrated for 40½ ft. The limestone is typical, with an arenaceous bed in the middle. There are a few badly-preserved mollusca, which are not determinable.

Trapham Boring.

Situated on Trapham Farm, at Wingham Green, in the parish of Wingham, about half-a-mile to the west of that village on the side of the Canterbury road, at an altitude of 59 ft. above O.D. This was the first English contract of the Internationale Bohrgesellschaft, of Erkelenz, and the results were startling. Boring began on October 20, 1910; 800 ft. were bored in the first week; the gault was bored and tubed on the ninth day, and the coal measures touched at 1,124 ft. on the tenth day. The hole finished at 3,226 ft. on July 28, 1911—that is to say, in nine months, at an average progress of 358 ft. per month.

Down to the coal measures, and when in them, in the hard grits, the chisel was employed, so the record is imperfect in certain places. The base of the gault was proved at 877 ft.; there is 98 ft. of greensand and wealden combined, and 126 ft. of oolites. The upper part of the coal measures consists almost entirely of barren grits, the first workable seam not being reached till 1,901 ft.; from this point down to 2,724 ft. there is an aggregate of 29 ft. 9 in. of workable coal. The first three seams are gas and coking coals, with from 27 to 37 per cent. of volatile matter, the remainder being of the steam navigation type, with from 18 to 21 per cent. of volatile matter.

The boring passed into the lower carboniferous somewhere between 2,775 ft., and penetrated it to a depth of 3,226 ft. It consists of grey and carboniferous limestones with calcite veins, occasionally with shaly partings, slightly arenaceous in places, black shales with pyrites and carbonaceous matter, and black compact limestones with *Syringothyris cuspidata* (det. Woods), and in the lower portion some sandstone, free from lime.

The fauna consists of a few brachiopods, of which the above-mentioned species is common, and the only one that is determinable.

Maydensole Boring.

Situated in the parish of Northbourne detached, on the extreme eastern corner of the Waldershare estate of

the Earl of Guilford, a short distance from Maydensole Farm, at an altitude of 253 ft. above O.D. This was the first hole bored in England by the Société Anonyme de Forage et Entreprises Minières "Tréfor," who began boring on November 24, 1910, and finished at a depth of 3,760 ft. on November 16, 1911. The chisel was intended to be employed down to the base of the gault, but the rapidity of the progress took it through the greensands unobserved, and a *Cypridea* was found at 927 ft., showing that the tender blue weald clays had been mistaken for gault; the lower part of the Hastings beds is indurated, as at Guilford Colliery.

The coal measures were struck at 1,194 ft. below the surface, or 941 ft. below O.D., or almost exactly level with the top of palæozoic floor at Tilmanstone. The upper 1,156 ft. is referred by Dr. Arber to the transition, the rest to the middle coal measures. The section is a rich one, containing 63 ft. 2 in. of coal; nine seams are over 4 ft. thick, the thickest is 7 ft. 6 in.; the two upper seams contain respectively 19.2 and 18.5 per cent. of volatile matter; the others approach the anthracitic class, the volatile matter ranging from 11 per cent. to 17 per cent.

Ripple Boring.

Situated in the parish of Ripple, in the valley on the west side of the village of that name, in a field belonging to Mr. F. Morrice, at an altitude of 68 ft. above O.D. The work was done by the Internationale Bohrgesellschaft, who began boring on February 14, 1911, and finished on November 30, 1911, having bored 3,317 ft. in 8½ months. Owing to the extreme rapidity of the progress with the chisel through the first few hundred feet, and to the fact that the palæozoic floor is reached sooner here than anywhere else in Kent, the hole was churned right into a thin seam of coal at 925 ft. The record of the ground above is accordingly very incomplete, and it is impossible to subdivide the 92 ft. of ground between the base of the gault and top of the coal measures, which occurs at only 882 ft. below the surface.

Dr. Arber refers the upper 500 ft. to the transition and the remainder to the middle coal measures. The ground is practically barren down to 2,000 ft., but between that point and 3,115 ft. there is an aggregate of 52 ft. 8 in. of coal. The seams are rather thick, as will be seen in the section; they are mostly anthracitic smokeless navigation coals, the percentage of volatile matter running from 10 to 13 in the lower seams, and from 16 to 22.6 in the upper three.

The carboniferous limestone was entered at 3,169 ft., and penetrated to 3,316 ft.: the unconformable passage is seen in a core from 3,169 ft. 3 in. The upper part consists of massive grey limestone, with a few badly preserved mollusca, the lower 26 ft. consists of alternative bedding of black shales and impure limestone.

Stodmarsh Boring.

Situated in the parish of Stodmarsh, on Stodmarsh Court Farm, about 1 mile west of the village, on the Canterbury road, at an altitude of 87 ft. above O.D. The contractors were the Internationale Bohrgesellschaft, who bored from the surface to 2,262 ft. in seven months,



on December 9, 1910, and finishing on July 31.

There are 41 ft. of lower London tertiaries and 977 ft. of chalk and gault; below this point the section is a remarkable one, as there appears to be no greensand or wealden at all, but only 48 ft. of oolites resting on the coal measures. These oolites consist of 43 ft. of typical Bathonian limestone and 5 ft. of a tough dark blue clay. The coal measures were entered at 1,066 ft. below the surface and left at 2,145 ft., where the hole entered the carboniferous limestone. Thus the measures are here only 1,079 ft. thick, compared with about 1,800 at Trapham, which is about 2 miles further south. This wedge formation gives a clear indication of the proximity of the actual edge of the coalfield.

Although there is only a little over 1,000 ft. of measures, there is an aggregate of 26 ft. of coal; the chief seams are a 4 ft. 9 in., a 6 ft. 2 in. and 7 ft. 6 in. The two latter are so near together that they really form one seam 13 ft. 8 in. thick, with a parting; the coals are more bituminous than would be expected at the low horizon, the volatile contents ranging from 23 per cent. to 35 per cent., and several of the seams are good gas and coking coals.

The carboniferous limestone was struck at 2,145 ft., and penetrated to 2,225 ft., the upper four-feet consists of black calcareous shales. Down to 2,220 ft. we have white and grey massive limestone passing into shales, argillaceous limestone and black limestone inter-laminated with black impure shales with calcite veins and some black shales with very little lime. At 2,257-61 the shales are disturbed and full of thick calcite veins; the hole ended at 2,263 in typical limestone. The only determinable fossil is the brachiopod *Productus corrugato-hemisphericus*, Vaughan (det. Woods), which is abundant.

#### DEVELOPMENTS IN THE SOUTH YORKSHIRE COALFIELD.

The new colliery districts of South Yorkshire were touched upon in a report presented by the county medical officer this week to the West Riding County Council at Wakefield. He states that in the Thorne parish information had been obtained that a definite area had been selected as the site of a new centre of population at the Thorne Colliery, Moor End. Already street planning had been considered by the colliery company for 800 to 1,000 houses. The water supply would probably be provided from the borings of the colliery. It was anticipated that several years must elapse before coal was obtained, but definite development was now assured, and therefore the Rural Council should be taking action. The medical officer also points out that in regard to Stainforth parish the location of the Hatfield Colliery houses has been definitely settled. The company do not propose to build themselves, but will probably follow the plans of other South Yorkshire collieries by preparing model plans and specifications for offer to selected builders, from whom the houses will be taken on leases. It is expected that the colliery will be in operation within five years, and that some 400 houses will be required; about 100 have already been erected at three centres. Here also, it is pointed out, there is an opportunity for town planning and the preparation of a comprehensive sewerage scheme. No movement had yet taken place in the Hatfield parish, except for the enlargement and improvement of some of the existing dwellings, but rapid developments are expected. The medical officer continues: "Having regard to the above position, there is evident necessity for action by the District Council in the provision of a town-planning scheme which would give them power to regulate the position of new dwellings, and thereby economise in sewerage. Difficulties would also be obviated which produce insanitary conditions and eventually increase the cost of remedial work."

Little has been heard lately as to the progress which is being made with the sinking of the Hatfield Colliery, near Doncaster. Operations were commenced a year ago last March, but, owing to the presence of water, they had not been so rapid as at some other collieries. Mr. Berry, the general manager of the Hatfield Main Colliery Company, told our correspondent this week that the work is proceeding satisfactorily, and they hoped very shortly to have overcome the water difficulty. The cementation system, which is well known on the Continent, is being employed at Hatfield under the personal direction of its inventor, Mr. Albert Francois. The method employed is to fill the fissures in the strata with cement under high pressure and thus keep back the water from the workings. The ground at Hatfield, Mr. Berry stated, is simply saturated with water, and by the cementation process they hoped to keep it out and have a practically dry sinking. They had kept back at least 90 per cent. which would have had to be otherwise dealt with in the ordinary way, and the remaining 10 per cent. is being pumped up. Up to the present they had been sinking through sandstone, which was very porous, and had a great deal of trouble in dealing with the water as they got through the sandstone it

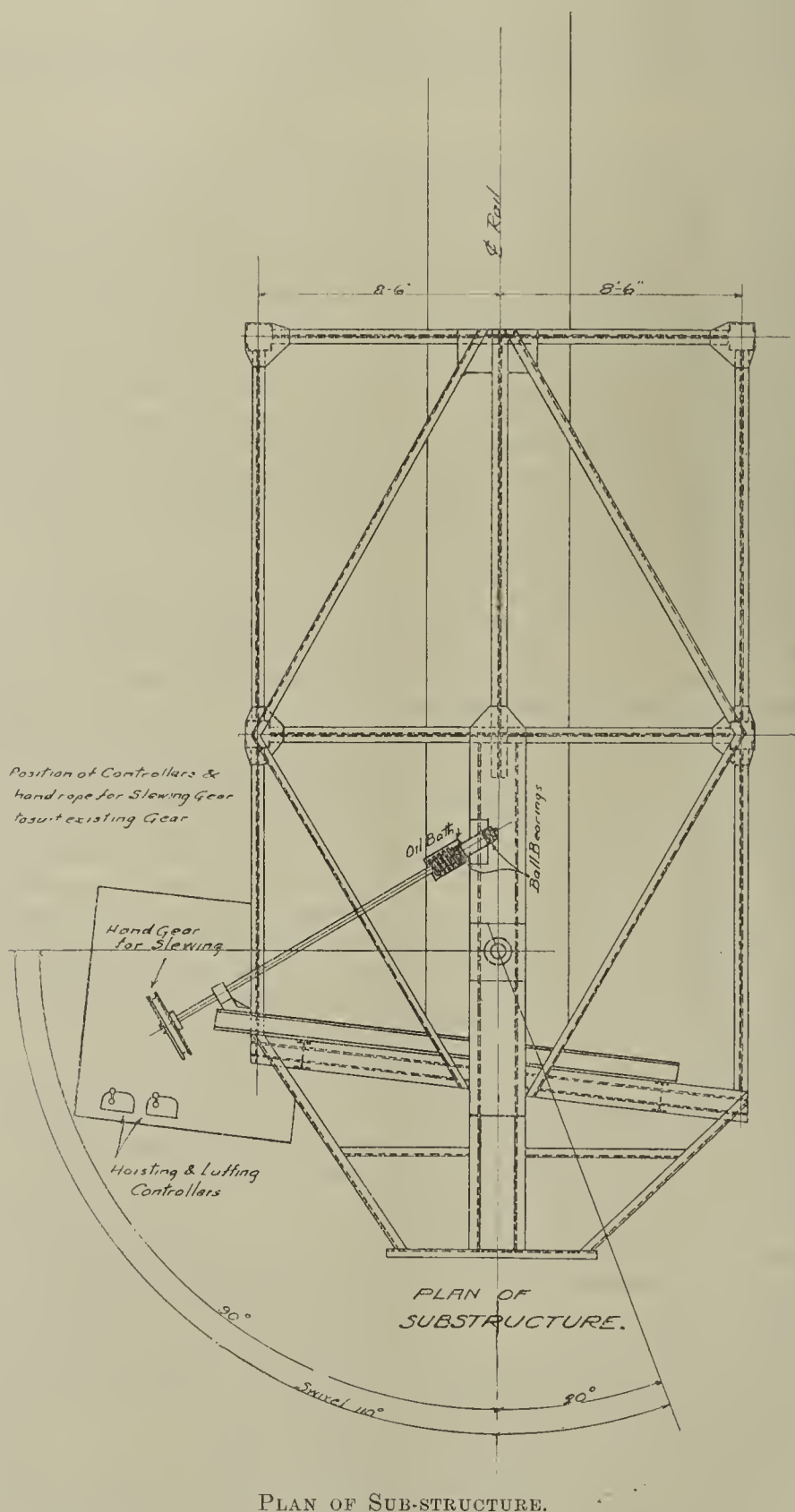
would not matter how much water there was in the marls and limestone, as they would be able to keep up to it. If they had been sinking in the ordinary way they would have had from 5,000 to 8,000 gallons of water per minute to deal with. At the present time there are about 150 men employed at the colliery, and with the exception of one Frenchman, who has come over to learn the process, they are all Britishers. So far there has been little movement in the direction of providing housing accommodation for the men who will be required when the coal is won, but building will doubtless be commenced when the sinkers have got through the red sandstone. M. Francois has taken a residence in Hatfield. His sinking process is being used at several new pits on the Continent and in this country.

In reference to the projected colliery at Harworth, although as yet there is not much to be seen on the surface, there is a good deal of activity behind the scenes. As previously announced, the royalties under Viscount Galway's estate have been secured by an Anglo-German combination, in which the principal figures are Herr Hugo Stinnes, a Westphalian mining magnate, and Mr. Arnold Lupton. It is now stated that Mr. J. H. W. Laverick, of Tinsley Park Colliery, Sheffield, has been appointed local consulting engineer to the company, and that Mr. M. Waterhouse, late of the Hoyland Silkstone Colliery, near Barnsley, has received the appointment of resident manager, and will have the supervision of the sinking operations. Progress is being made with the preparations for connecting the colliery site with the line of the Great Northern Railway Company.

#### IMPROVED COAL SHIPPING FACILITIES ON THE TYNE.

Considering the great care taken by colliery managers to prevent breakage of coal in the various stages of handling at the colliery, it is a matter for surprise that similar precautions are not more in evidence at the ports of shipment. Bearing in mind, however, amongst other points to be considered, the variation in the widths and depths of vessels, the rise and fall of the tide, the necessity of distributing the coal over the holds, and the quantity to be dealt with in a limited time, it is admitted that the problem of transferring coal from a railway truck at the river or dock side to the bottom of a ship's hold presents considerable difficulties. In loading coal into vessels, moreover, any machinery used must admit of being housed or stowed back when not in use within the line of the quay, so as not to interfere with the masts or bridges of the vessel as the latter is manoeuvred in the dock.

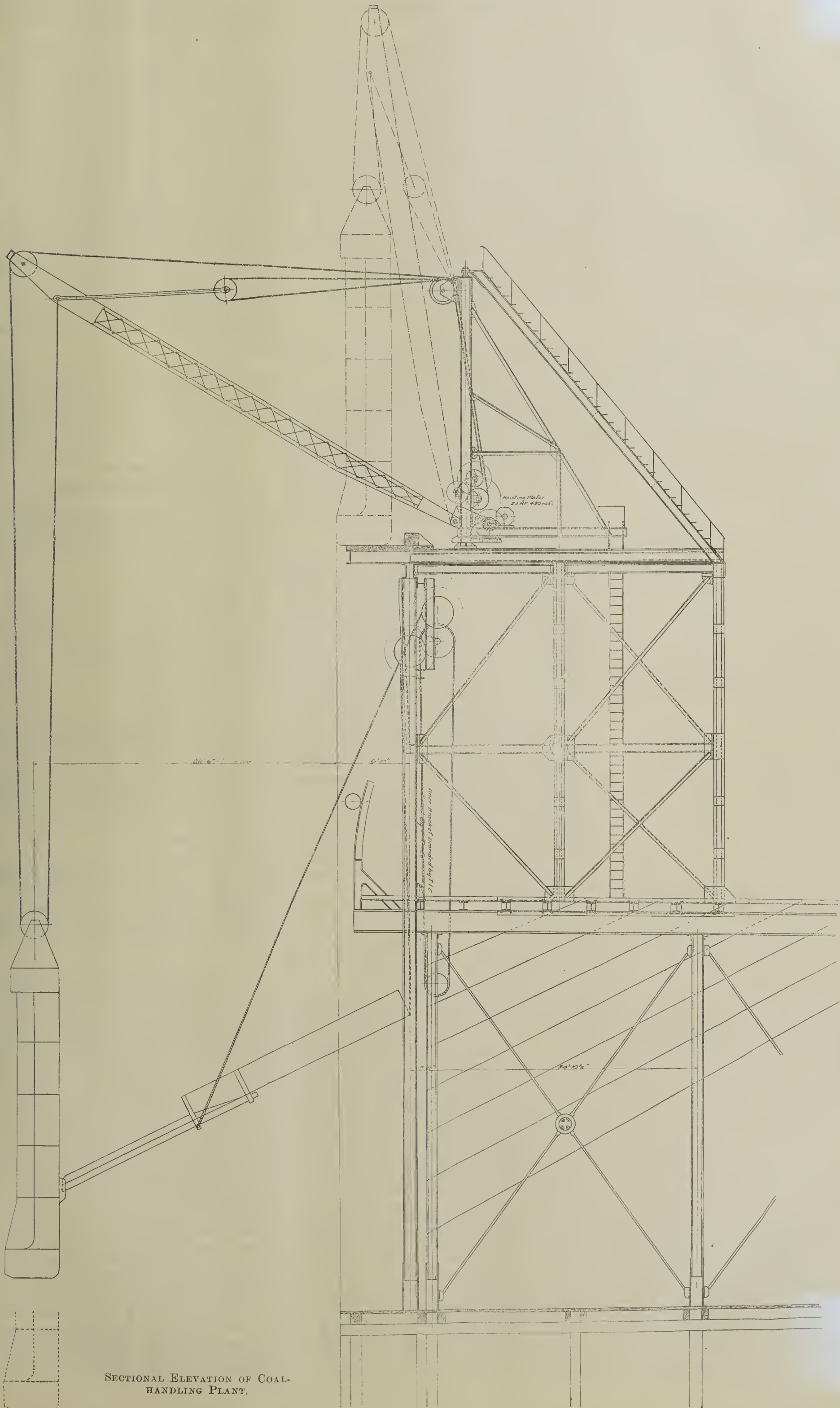
The Tyne Improvement Commissioners have recently introduced into service at their No. 5 river staith, Whitehill Point, North Shields, an anti-coal-breaking appliance, by which it is claimed the afore-mentioned conditions are fully complied with, whilst the difficulties referred to are overcome. This appliance is of the Hancock type, worked automatically, and consists of a chain of trays, placed in vertical casing, revolving round upper and lower tumblers. A 12-ton crane has been



It is understood the sinking will be carried out with the permanent plant, and that the first sod will probably be cut about the end of the year. It was at first thought the colliery village would be distributed over two separate sites, but it is now understood it will all be built upon Lord Galway's land to the north of the lane leading from Harworth to the Bawtry-Blyth road. There are hints that with their experience of housing in the Westphalian coalfield, the directors may introduce some features that are rather novel as far as colliery housing in this country is concerned. This rumour is interesting in view of the criticism frequently levelled at existing colliery villages in the South Yorkshire coalfield.

constructed on a platform over the east spout of the staith at a sufficient height to allow railway wagons to travel underneath, and the anti-breaker, when in use, is suspended by the crane in the hold of the vessel and is attached to the end of the staith spout. Three sides of the anti-breaker are enclosed, while the fourth is fitted with a series of telescopic doors, the top one of which is attached to the telescopic teeming spout by a simple automatic coupling. The height of the anti-breakage appliance can be adjusted independently of the spout, that portion of the vertical tube below the spout being always closed by the telescopic doors, whilst that above





SECTIONAL ELEVATION OF COAL-HANDLING PLANT.



order to allow the coal to enter the tube. The trays, pivoted to endless chains, receive the coal and lower it gently but rapidly to the bottom of the apparatus where it is deposited on the heap of coal forming in the hold, with a minimum of breakage. The trays are actuated by the weight of the coal itself, and the speed is regulated by means of an automatic brake of the centrifugal type. The brake is operated by machine-cut steel gearing driven from the upper sprocket shaft, and is enclosed in a dust-proof case. The capacity of the anti-breaker is quite equal to the teeming spout, 800 tons per hour having been loaded through one apparatus.

The maximum outreach of the crane is 28 ft. 6 in. from the face of the jetty and coal is lowered to the hold in the vessel to a depth of 25 ft. below high water of ordinary spring tides. This anti-breakage appliance and crane were constructed by Messrs. F. Turnbull and Co., of Heaton, Newcastle-upon-Tyne, and the motors were supplied by the British Thomson-Houston Company Limited.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinion expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### STONEDUST AND THE PREVENTION OF EXPLOSIONS: A CORRECTION.

SIR.—I see that Mr. L. G. Hill, of Birmingham, has been advertising his fuller's earth, for the prevention of coaldust explosions, in your paper, with the intention presumably of using the Eskmeals experiments as a means of pushing his goods.

In the advertisement it is stated that I "recommend" incombustible dust such as fuller's earth—one to one.

I never made any such recommendation. My words were: "The Committee is just about to report on this matter, and to give a full account of its experiments, which I will not anticipate here."

The matter is still under discussion, and no decision has been arrived at. HENRY CUNYNGHAME.

St. Enoch's Hotel, Glasgow,  
October 1, 1913.

### THE DETECTION OF COB-FIRES.

SIR.—In the discussion on Mr. Winmill's paper on "The Absorption of Oxygen by Coal," reported in the current issue of the *Colliery Guardian*, you report Mr. W. H. Chambers as saying, "By this system of analysing the air, getting early warning, they had been able to prevent the fire that would have broken out but for this early warning."

What Mr. Chambers *did* say on this point was:—"Since we have used the system of systematic air-sampling and analysis introduced by Dr. Harger, who spoke just now, we have not had a single new fire, and several places have been detected which would inevitably have become fires but for the early warning given."

As it is reported, the credit is given—unintentionally, no doubt—to the present workers at Bentley. I think you will admit it is only fair that I should get any credit there is for my own work.

The system they have in use at the Cadeby and Denaby Colliery Company was worked out at Liverpool University by me, and, thanks to Mr. Chambers, it was put on trial under my supervision at the mines, with the results stated.

Some mines are not so easily patrolled, from the point of detecting gob fires, and twice the number of samples and observations would have to be done (which means more expense) to get the same degree of security. JOHN HARGER.

Chemical Laboratory, Liverpool University,  
October 6, 1913.

**Mining Institute of Scotland.**—A general meeting of the Mining Institute of Scotland will be held in the Heriot-Watt College, Chambers-street, Edinburgh, to-morrow (Saturday), October 11, 1913, at three o'clock. Mr. Henry Rowan's paper on "Underground Fires," Mr. John Watson's paper on "The Testing of Fans: a Plea for Standardised Test Conditions," and Mr. James Hogg's paper on "Magnesite Deposits in Euboea, Greece," will be discussed. A paper by Mr. Willoughby M. Dunn on "The South Kenmuir Colliery." Mr. Dunn will show three slides showing gas and

## CONTINENTAL MINING NOTES.

### Austria.

**Official Wholesale Coal Prices, Vienna Exchange.**—Pilsen coals, large, 33 90 kronen per ton in truck loads, ex Franz-Josefs Bahnhof. Ostrau-Dombrau-Karwin coals: Large 30-31 kr., cubes 29-60-30-60 kr., nuts 29-30 kr., small 23-23-20 kr., washed smithy coals 30-30-50 kr., coke 38-40 kr. per ton net cash, ex shutes Nordbahnhof. Rossitz-Zbeschau-Oslawan coals: Washed smithy coals, coarse or fine, 30-50-31-50 kr., coke 30-32 kr. per ton, ex shutes Nordbahnhof or Staatsbahnhof. Upper Silesian coals: Best large or cubes 32-90-33-70 kr., intermediate large or cubes 32-10-32-90 kr., seconds large or cubes 27-30-28-40 kr., best nuts I. 33-30-34-10 kr., II. 29-60-30-10 kr., best small 23-50-24 kr., seconds 22-50-23 kr. per ton net cash, ex shutes Nordbahnhof. In truck loads: Best large or cubes 31-30-32-10 kr., nuts 31-70-32-30 kr. per ton, ex Nordbahnhof. Gas coke from Vienna Gasworks, 32-40-34 kr. per ton ex works. Lignite: Dux large 22-10-23-60 kr., Brüx or Dux cubes 22-10-23-60 kr., nuts 21-60-23-10 kr., Mariaschein cubes 24-10-25-60 kr., nuts 23-60-25-10 kr. per ton, ex shutes Franz-Josefs or Nordwest Bahnhof.

### Belgium.

The producers of Flénu (flaming) coals have reduced their prices from October 1, leaving prices as follows:—Smudge, 15 fr.; smalls, 16½ fr.; unscreened, 18½ fr.

**Mining Accidents in 1912.**—By accidents in Belgian coal-mines last year 35 persons were killed and 32 injured, 31 of the deaths occurring below ground. Classified according to cause, the deaths below ground were as follow:—In shafts, two; haulage, two; falls, 19; due to firedamp, nil; asphyxiation (other than firedamp), one; eruptions of water, nil; explosives, four; transport of workers, three. The number of deaths is to be compared with an average of 29 in the 11 years 1901-12. The death-rate (1.11 per 1,000 employed) compares with an average rate of 1.10 in the same period, whilst there were 5.01 deaths per million tons raised, as against 4.95.

### Germany.

**Official Coal Prices on the Essen Exchange.**—The Syndicate's price list per ton ex pit is as follows: Gas and open-burning coals—gas coal through-and-through, 12-50 to 14-50 marks, open-burning gas coal through-and-through 12-25 to 13-25 marks, open-burning coal through-and-through 11-50 to 12-00 marks, large coal 14 to 15-50 marks, semi-screended 13-50 to 14-50 marks, washed nuts I./II./III. 14-25 to 15 marks, IV. 13-75 to 14-50 marks, nuts slack 0 to 20/30 mm. 9 to 10 marks, 0 to 50/60 mm. 10-50 to 11-25 marks, fines 8 to 10-75 marks. Bituminous coals: Through-and-through 12 to 12-75 marks, best mixed 13 to 13-50 marks, large 14 to 14-50 marks, washed nuts I./II./III. 14-25 to 15 marks, IV. 13-75 to 14-50 marks, coking coal 13-25 to 14 marks. Lean coals: Through-and-through 11-25 to 12-75 marks, through-and-through mixed 12-25 to 13-25 marks, through-and-through improved 13-25-14-75 marks, according to proportion of large, large 13-75 to 16-25 marks, washed nuts I./II. 15-75 to 19 marks, III. 16-50 to 20 marks, IV. 12-25 to 14-75 marks, anthracite nuts I. 20-50 to 22 marks, II. 22 to 26 marks, through-and-through slack 10-25 to 11-25 marks, fines below 10 mm. 7-25 to 10 marks. Coke: Blastfurnace coke 16-50 to 18-50 marks, foundry coke 19 to 21 marks, broken coke I. and II. 21 to 24 marks. Briquettes 11-50 to 15 marks, according to quality.

**Ruhr Coal Market.**—Business continues its previous course; and while there is no special activity shown as the season advances, the volume of traffic is considerable and the supply of railway wagons satisfactory. In addition, there is no obstruction to water-borne traffic, and therefore large shipments are being made to the stockyards on the Upper Rhine. There is no improvement as yet in the situation of the iron industry, and indeed matters are worse in some branches. It follows as a matter of course that the demand for corresponding grades of fuel is weakening, and that, for the same reason, the trade in coking coals is not good. Gas coals are selling better, though the demand cannot be regarded as brisk. Whilst the export trade is fairly extensive on the whole, the unsatisfactory state of the Belgian iron industry has had an effect on the sales in that quarter. Holland, however, continues to be a good customer, and business has, at any rate, not gone back in the North Sea districts. English competition is weak, the prices asked being too high, and for the same reason little is doing with English coals in South Germany.

**Coal Market in Upper Silesia.**—The traffic returns for the first half of September show a daily average which is 15 per cent. higher than for the same period of last year. Larger deliveries could have been made were it not for the scarcity of labour in comparison with the heavy demand for fuel, and the situation will become more acute in this respect as the winter trade progresses. Moreover, the pits have no stocks to fall back on for making good the shortage in output. Enquiries for all grades are very active and are difficult to satisfy completely. The foreign demand is also growing, especially from Russian Poland, which is taking nearly twice as much coal as last year. The coke market is also very favourable, and there are no stocks of blastfurnace or foundry coke, the output being taken over as fast as it can be delivered.

**Production of Fuel.**—The following shows the output of various classes of fuel during August and the eight months ended therewith:—

	August.		Jan.-August.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal.....	15,909,840	16,542,626	116,395,324	127,318,665
Lignite ...	6,805,332	7,259,280	52,880,555	56,658,980
Coke .....	2,521,128	2,747,680	18,688,125	21,418,997
Coal briquettes.	495,327	507,693	3,470,855	3,910,817
Lignite do	1,628,093	1,874,830	12,363,461	14,084,566

Reckoning the equivalent in coke and briquettes 1,078,852 tons of coal were imported in August 1912, and 961,356 tons in August 1913, whilst exports amounted to 3,573,037 tons and 3,926,158 tons respectively. The consumption of coal was 13,577,824 tons, as against 13,415,655 tons. For the eight months the figures were as follow:—Imports, 7,506,531 tons (+582,367 tons); exports, 29,702,752 tons (+3,105,047 tons; consumption, 105,122,444 tons (+8,400,661 tons). In the case of lignite the corresponding figures for the eight months were:—Imports, 4,844,636 tons (−64,118 tons); exports, 1,260,475 (+435,578 tons); consumption, 60,243,141 tons (+3,278,629 tons).

**Hamburg Coal Trade.**—Mr. H. W. Heidmann, of Hamburg, writes: The imports of coal into Hamburg have been in September:—

From	1913. Tons.	1912. Tons.
Northumberland and Durham...	238,525	256,098
Yorkshire, Derbyshire, &c. ....	76,367	58,686
Scotland .....	143,316	125,310
Wales .....	12,514	6,544
Coke .....	303	—
Total.....	471,025	446,640

### THE BY-PRODUCTS TRADE.

**Tar Products.**—The market generally is steady, but there is not very much actual business passing. Benzols continue to rule firm, but pitch is if anything a shade quieter. Naphthas and creosote are much about the same. In crude carbolic there is a slight improvement, though crystals are unchanged. Closing values are:—

Benzols, 90's .....	1/1½
Do. 50's .....	1/1
Do. 90's North .....	1/1
Do. 50's North .....	1/1½
Toluol .....	1/1
Carbolic acid, crude (60 per cent.) .....	1/2½ to 1/3½
Do. crystals (40 per cent.) .....	4/8
Solvent naphtha (as in quality and package) ...	9/9½
Crude ditto (in bulk) .....	5/5
Creosote (for ordinary qualities) .....	3/3
Pitch (f.o.b. east coast) .....	43/6 to 44/6
Do. (f.a.s. west coast) .....	43/ to 44/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—The market keeps very firm, and prices in all sections of the market, particularly as regards forward delivery, for which producers are holding persistently. There is a fairly good spot enquiry, and American advices continue satisfactory. Nearest prompt prices are:—

London (ordinary makes).....	£12/12/6
Beckton (certain terms) .....	—
Liverpool .....	£13/12/6 to £13/13/9
Hull .....	£13/10/ to £13/11/3
Middlesbrough .....	£13/12/6
Scotch ports.....	£13/15/ to £13/17/6
Nitrate of soda (ordinary) per cwt. ...	10/9

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

**Demurrage on Railway Wagons.**—The railway companies have just issued revised regulations with regard to the demurrage allowance and charges on railway wagons. The revisions, which are applicable to private sidings and shipment traffic, are the result of negotiations which have taken place between members of the iron and steel trade, including several Leeds firms, and the companies. As now definitely arranged in settlement of the controversy, the exemption from demurrage at private sidings will be as follows:—Before conveyance, two days, instead of one, as first proposed, exclusive of the day upon which the loading is begun; and, after conveyance, three days instead of two, exclusive of the day of arrival. Traffic for shipment:—Before conveyance, two days, instead of one, exclusive of the day upon which the loading is begun; after conveyance, at the port, four days, exclusive of the day of arrival, which is an increase of two days in respect of coastwise shipment. On the stock of the local company, loaded both in and out, the trader is allowed the sixth day before demurrage is chargeable—e.g., stock arriving on a Monday must be at the railway company's disposal for forward transit loaded not later than Saturday. The demurrage charges per day will be on ordinary wagons 1s. 6d. per wagon and 3d. per sheet; on high capacity wagons above 15 and not exceeding 20 tons carrying capacity, 2s.; above 20 and not exceeding 30 tons, 3s.; and above 30 tons, 5s. On specially-constructed wagons the charges will be 3s. above 15 and under 20 tons carrying capacity, 6s. for 20 tons and under 30 tons, and 10s. for 30 tons and above.



## APPROVED SAFETY LAMPS FOR MINES.\*

(Continued from page 644).

Messrs. J. H. Rothwell and Co.'s "A" Lamp.

This lamp, the general design of which is shown in fig. 18, is a double-gauze, flame, spirit lamp, with air-feed through vertical holes in the middle ring. It consists of the following essential parts:—

(1.) *Bonnet or Shield* of riveted steel, with a separate securely riveted crown. Furnished with outlet holes immediately below the crown, provided that the bottom of the holes shall not be less than  $\frac{3}{16}$  in. above the top of the outer gauze. Fitted or not with a deflector, with or without a baffle ring.

(2.) *Middle Ring* of brass, steel or iron, riveted to the bonnet and provided with vertical air-inlet holes of total area not exceeding 1.1 square inches. The inner flange prolonged or not to form a baffle ring.

*Pillars* of brass, steel or iron, five, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Outside Bottom* of brass, steel or iron, carrying the locks.

(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with flame-tight, double folded lap seams, with or without a metal liner, formed to fit flanges of the inner and outer base ring; the gauzes being so secured to the base rings by punch indentations, or by being riveted or spun on, or by being

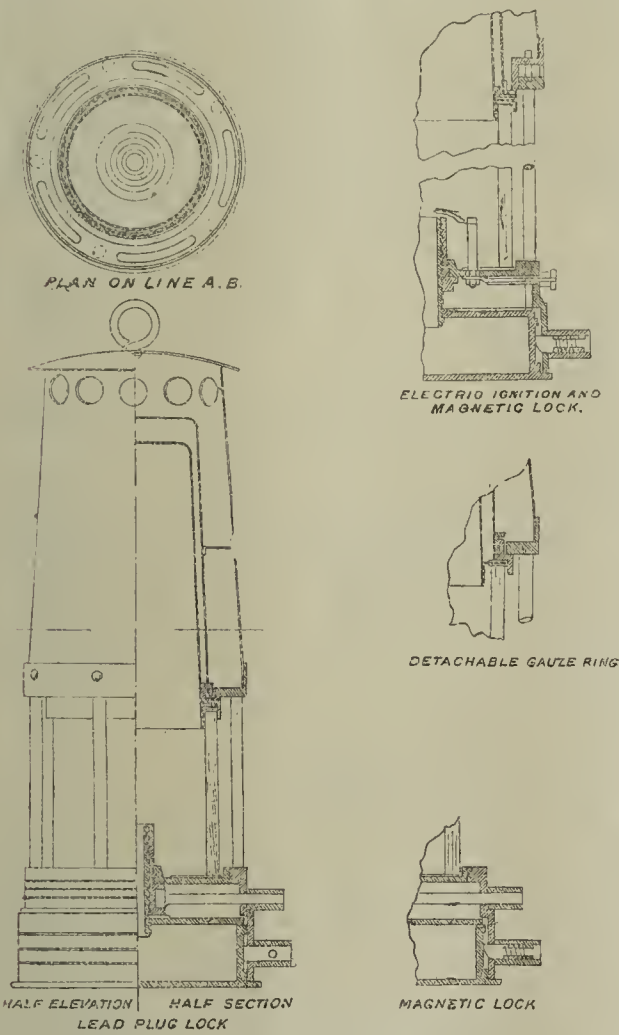


FIG. 18.—SPIRIT LAMP, TYPE "A."  
(Rothwell and Co.)

gripped between the rings which are screwed together, as to make strong and flame-tight joints.

The arrangement of the gauzes is one of the arrangements shown in figs. 18 and 19, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without a gauze.

Internal dimensions.	Inner gauze.	Outer gauze.
Height to shoulder of base ring .....	$3\frac{1}{2}$ in. $\pm \frac{1}{4}$ in.	$4\frac{1}{2}$ in. $\pm \frac{1}{4}$ in.
Diameter at top ...	$1\frac{1}{16}$ in. $\pm \frac{1}{8}$ in.	2 in. $\pm \frac{1}{8}$ in.
Diameter at bottom $1\frac{1}{4}$ in. $\pm \frac{1}{8}$ in.	...	$2\frac{1}{8}$ in. $\pm \frac{1}{8}$ in.

Provided that the lamp may be fitted with a Mueseler chimney and horizontal gauze in place of the inner gauze, the horizontal gauze forming a flame-tight connection with the Mueseler chimney, and the dimensions of the latter being as follow:—

Length of chimney below horizontal gauze, not less than  $\frac{1}{4}$  in.  
Length of chimney above horizontal gauze, not less than  $3\frac{3}{8}$  in.  
Diameter at top, not greater than  $\frac{7}{16}$  in.  
Diameter at bottom, not greater than  $1\frac{1}{4}$  in.

(4.) *Glass* of an approved type, cylindrical in form, and within the dimension limits and bearing one of the size marks specified below. Furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring; furnished also or not with additional loose brass glass rings:—

External diameter .....	60 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height .....	60 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	60-60

Provided that the lamp may be made to take glasses of the following dimensions, viz.:—

External diameter .....	60 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height .....	57 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	60-57

or—

External diameter .....	$58\frac{1}{2}$ mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height .....	60 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	$58\frac{1}{2}$ -60

\* From the Order dated August 26, 1913. [No. 886.]

(5.) *Glass Retaining Ring* of brass, screw-threaded externally to fit in the "outside bottom," and internally to take

(6.) *A Brass Extinguisher* recessed to fit a locking bolt held by a flat spring which retains the extinguisher in position. The extinguisher is screw-threaded internally to take the burner.

(7.) *Spirit Vessel*.—A casting of brass, with burner securely screwed into same and soldered, and a brass or iron bottom securely soldered on, the vessel being of capacity sufficient to provide the required light for the required time as specified, and provided with suitable absorbent material. The burner takes a wick about  $\frac{1}{4}$  in. in diameter. The spirit vessel is capable of being unscrewed, when the lamp is locked, to an extent sufficient for the adjustment of the wick, but not sufficient to impair the safety of the lamp.

(8.) *Electric Igniter*.—The lamp may be provided with an electric igniter of the type shown in fig. 18, so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(9.) *Locking Device*.—One or other of the following:—

(i.) A magnetic lock of the type shown in fig. 18.  
(ii.) A lead-rivet lock of the type shown in fig. 18.

The lamp must have been made by Messrs. J. H. Rothwell and Co., at their Sindsley Works, at Swinton, near Manchester.

Messrs. J. H. Rothwell and Co.'s "C" Lamp.

This lamp, the general design of which is shown in fig. 19, is a modification of Messrs. J. H. Rothwell and Co.'s "A" Lamp. It is a flame, oil lamp, with air-feed through vertical holes in the middle ring. It consists of the following essential parts:—

(1.) *Bonnet or Shield* of riveted steel, with a separate securely riveted crown, or of seamless steel, the bonnet and crown being in one piece. Furnished with outlet holes immediately below the crown; provided that the bottom of the holes shall not be less than  $\frac{3}{16}$  in. above the top of the outer gauze. Fitted or not with a deflector, with or without a baffle ring.

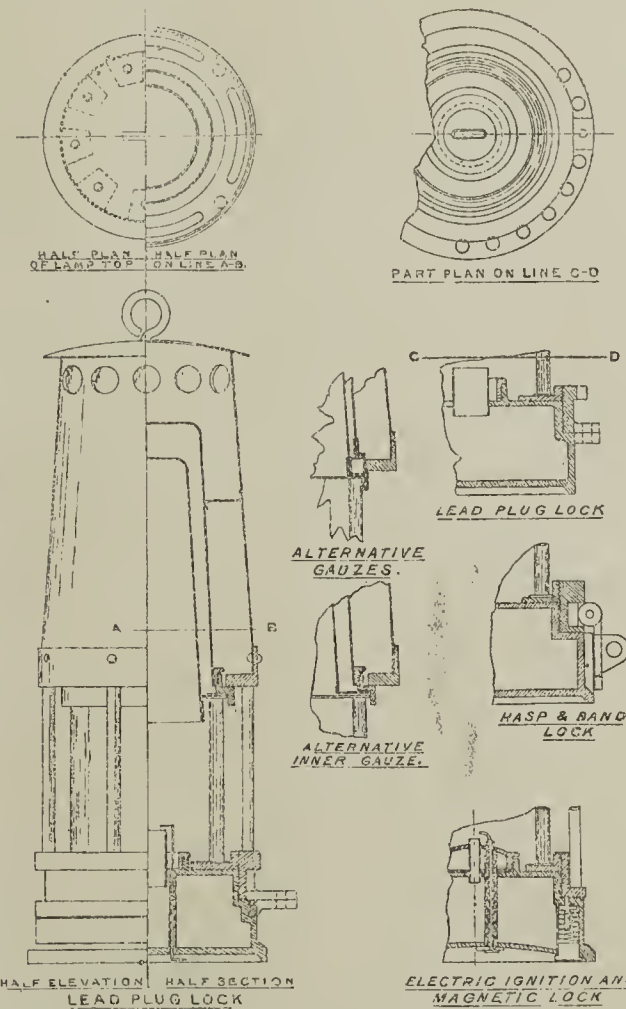


FIG. 19.—MARSAUT LAMP FOR OILS, TYPE "C."  
(Rothwell and Co.)

(2.) *Middle Ring* of brass, steel or iron, riveted to the bonnet and provided with vertical air-inlet holes of total area not exceeding 1.1 square inches. The inner flange prolonged or not to form a baffle ring.

*Pillars* of brass, steel or iron, five, so arranged that a straight line touching the exterior part of the consecutive pillars does not touch the glass.

*Bottom Ring* of brass, steel or iron.  
The particulars as to gauzes are similar to those in the case of the "A" lamp, with the exception that the diameter of the inner gauze at bottom is  $1\frac{1}{8}$  in. ( $\pm \frac{1}{8}$  in.), and that of the outer gauze  $1\frac{1}{2}$  in. ( $\pm \frac{1}{8}$  in.).

(4.) *Glass*, of an approved type: Furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring.

External diameter .....	57 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height .....	57 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	57-57

Provided that the lamp may also be made to take glasses of the following dimensions:—

External diameter .....	57 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height .....	60 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	57-60

or—

External diameter .....	60 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height .....	60 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	60-60

or—

External diameter .....	57 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height .....	67 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	57-67

External diameter .....	60 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Height .....	67 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	60-67

(5.) *Glass Retaining Ring* of brass, screw-threaded to fit the bottom ring, the clearance between the glass retaining ring and the oil vessel being such that it shall not be possible, under reasonable working conditions, to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) *Oil Vessel*.—A casting of brass, of capacity sufficient to provide the required light for the required time as specified; fitted with a flat  $\frac{5}{16}$  to  $\frac{9}{16}$  inch burner, with or without a domed reflector: provided or not with an electric igniter of the type shown in fig. 19, so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(7.) *Locking Devices*.—One or other of the following:—

(i.) A magnetic lock of the type shown in fig. 19.  
(ii.) A lead-rivet lock with a hasp or lug secured to bottom ring, and a staple or lug securely soldered to the oil vessel.  
(iii.) The lamp must have been made by Messrs. J. H. Rothwell and Co., at their Sindsley Works, at Swinton, near Manchester.  
(iv.) That the lamp shall have marked upon it its name and the name of the maker.

Messrs. J. H. Rothwell and Co.'s "B," "D" and "E" Lamps.

The general designs of the upper portions of Messrs. J. H. Rothwell and Co.'s "B," "D" and "E" lamps are shown in fig. 20. The "B" and "D" lamps are modifications of the company's "A" and "C" lamps respectively, while the "E" modification can be applied to both the "A" and "C" lamps. The "B," "D" and

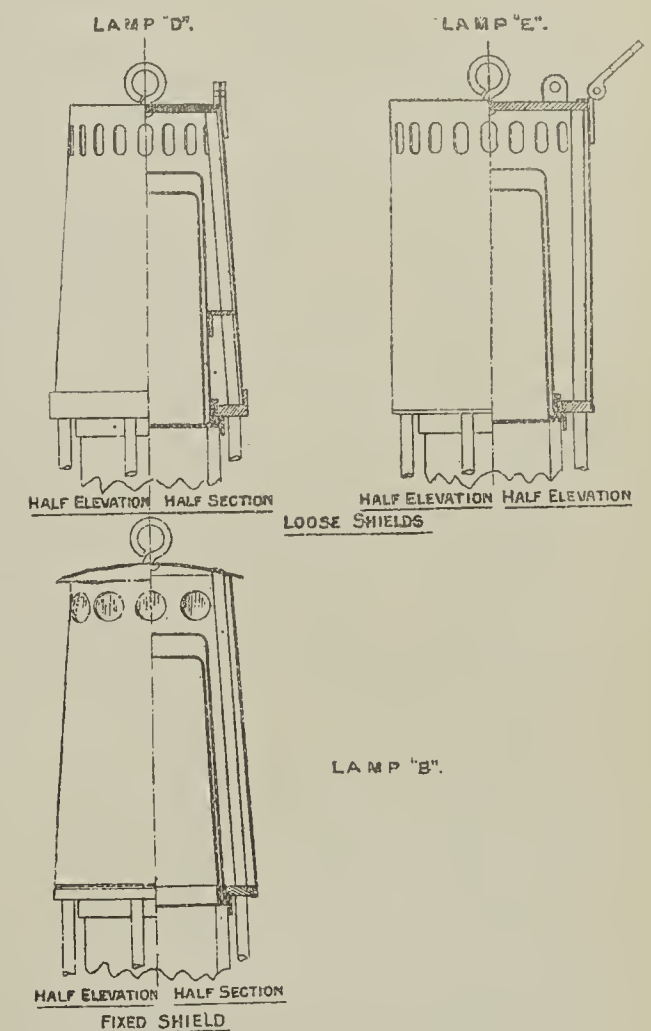


FIG. 20.—TYPES "B," "D" AND "E."  
(Rothwell and Co.)

"E" lamps are similar to the "A" and "C" lamps in all but the following respects:—

(1.) *The Bonnet* is either removable, in which case it is locked at the crown by a lead-rivet lock; or fixed, in which case it is secured by the base ring being turned in underneath the middle ring.

(2.) *The Crown* is of brass, steel or iron, and is supported by three or four steel or iron pillars.

(3.) *The Pillars* may be fitted or not with a deflector ring, as shown in fig. 20.

(To be continued.)

The Antwerp courts have just given a decision in the case of the Pyman Steamship Company, of West Hartlepool, v. the Anglo-Belgian Coal Company, of Antwerp. During the coal strike in this country the steamship company purchased from the coal company 500 tons of coal for their steamer "Dunholme," then at Antwerp, the best Belgian or Westphalian bunker coal being specified for at 30s. a ton. After steaming 19 miles, the captain of the "Dunholme" found it impossible to maintain sufficient steam pressure for the voyage, and he returned and appealed to the Tribunal of Commerce in Antwerp. The Tribunal appointed surveyors to report on the quality of the coal, and they reported that the coal did not represent what the shipowners had a right to expect, and allowed the steamship company £550 for loss of time and extra expenses. This award was disputed, and the Antwerp courts have now upheld the surveyor's decision.



## THE COAL AND IRON TRADES.

THURSDAY, OCTOBER 9.

## Scotland.—Western District.

## COAL.

There has been no new feature in the west of Scotland coal trade during the week, and the position is practically unchanged. While there is considerable selling for shipment next year, exporters are not inclined to cover, as their ideas of prices differ widely from those of the coalmasters. The best qualities of ell coal are in much the same position, but secondary qualities are plentiful on reasonable notice. The demand for splint coal is well maintained, and prices are firm. Navigation and steam coals are very active, some of the better qualities being well booked for some time. In smalls, treble nuts are difficult to obtain, but doubles and singles are a trifle easier, though not by any means plentiful. The shipments in this district are not so large as in the previous week, the falling off being chiefly in foreign exports, the coastwise shipments being well up to the usual. At Glasgow the clearances totalled 70,544 tons, Bowling 260, Greenock 1,407, Ardrossan 3,682, Troon 3,840, Irvine 1,150 and Ayr 18,163 tons—total 99,046 tons, compared with 109,200 in the previous week, and 107,181 tons in the corresponding week of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/ to 13/3	13/3
Splint .....	13/ to 15/3	13/ to 15/3
Treble nuts .....	13/9	13/9 to 14/
Double do. ....	12/6 to 12/9	12/6 to 13/
Single do. ....	11/ to 11/3	11/6

## IRON.

Business on the Glasgow pig iron warrant market has been distinctly dull during the week, the total turnover not exceeding 8,000 tons. Owing to the absence of business, prices receded 6d. per ton, the closing price being 54s. 3d. per ton compared with 54s. 9d. in the previous week. Transactions were also recorded at 54s. 6d. one month, and 54s. 9d. three months. Consumers generally are only purchasing against immediate requirements. There are 85 furnaces in blast in Scotland, compared with the same number last week, and 88 in the corresponding period of last year. The imports of pig iron into Grangemouth from Middlesbrough and district reached 7,936 tons, a decrease of 2,405 tons over the same period last year. The prices of Scotch makers' iron have been reduced sixpence per ton since last week. Monkland is quoted f.a.s. at Glasgow, No. 1, 67s. 6d., No. 3, 66s.; Govan, No. 1, 65s. 6d., No. 3, 64s.; Carnbroe, No. 1, 71s., No. 3, 67s.; Clyde, No. 1, 73s., No. 3, 68s.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 73s. 6d., Nos. 3, 68s. 6d.; Glengarnock, at Ardrossan, No. 1, 73s. 6d., No. 3, 68s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 68s., No. 3, 67s.; Dalmellington, at Ayr, No. 1, 69s., No. 3, 67s.; Shotts at Leith, No. 1, 73s. 6d., No. 3, 68s. 6d.; Carron at Grangemouth, No. 1, 74s., No. 3, 69s. per ton. Producers of Scotch hematite are still adding pretty freely to their stocks. Makers are booking very little fresh business, and the price shows no steady tendency. No improvement is manifest among the manufacturing branches of the trade, and it is with great difficulty that works are kept even moderately well employed. The low prices of foreign competitive products are largely responsible for the existing dullness in trade, and is affecting the local as well as the export market. Continental makers continue to offer hoops, bars and strips at prices much below the association's rates, which are based on £7 10s. per ton less 5 per cent. for crown bars for local delivery, the shipment price being £6 15s. per ton net f.o.b. Glasgow. Galvanised sheet and black sheet makers are fairly well off for orders, but the malleable and wrought iron branches of the trade continue in a most unsatisfactory position. Until some alteration is made in the present prices, no improvement is likely to occur.

## Scotland.—Eastern District.

## COAL.

The coal trade of the Lothians shows little alteration from the previous week. Secondary qualities of steam coal continue active, while the demand for treble nuts is unabated; doubles, however, are somewhat weaker. Shipments are not so heavy, being 13,000 tons less than last week. At Grangemouth 44,775 tons were shipped, Granton 10,377, Leith 46,601, and Bo'ness 12,391 tons—total 114,144 tons, compared with 127,603 in the preceding week, and 107,255 tons in the corresponding week of last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/ to 14/	13/
Secondary qualities .....	11/9 to 12/3	11/6 to 12/
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/6 to 12/9	12/6 to 12/9
Single do. ....	11/ to 11/3	11/ to 11/6

There is continued activity in the Fife coal trade. The pressure on the collieries is fully maintained, and there is a large supply of tonnage at the ports. On account of inadequate berthing accommodation a number of steamers are being delayed, and the need of more hoists is being urgently felt. Collieries as a rule are well booked for some time, and the general demand is very strong, with treble nuts specially in request, and other sizes being also well booked. Shipments have been unusually heavy, and at Leith 121,719 tons in the preceding week, compared with 114,144 in the same period last year. Prices are firm.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	17/	17/
Unscreened do. ....	15/	15/
First-class steam coal.....	13/9 to 14/3	14/ to 14/3
Third-class do. ....	11/3 to 12/	11/6 to 12/
Treble nuts .....	13/9 to 14/3	13/9 to 14/3
Double do. ....	12/3 to 12/9	12/6 to 13/
Single do. ....	11/ to 11/3	11/ to 11/3

The aggregate shipments from Scottish ports reached 339,311 tons compared with 358,522 in the previous week, and 330,096 tons in the corresponding week of last year.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 138,565 tons of coal and 3,585 tons of coke were despatched from Tyne Dock, a decrease of 9,995 tons of coal and an increase of 2,744 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 54,049 tons of coal and 6,135 tons of coke, a decrease of 5,506 tons of coal and an increase of 2,189 tons of coke. The Blyth shipments amounted to 91,239 tons of coal and coke, a decrease of 1,886 tons. The Chirkett Steamship Company, of Constantinople, is stated to have contracted with a German merchant firm for the supply of 50,000 tons of best Blyth steams for delivery at Constantinople over 12 months, commencing now. The c.i.f. price is stated at 22s. 8d. per ton, which is an exceedingly low figure, and looks as though the contractors expected a considerable fall in coal prices and/or freights ere their contract terminates. Usually this order comes direct to Newcastle merchants. Fifteen thousand tons of Blyth steam seconds have been sold for November-February delivery at 13s. 6d. per ton, f.o.b. With reference to local tenders of 100,000 tons of steam coals for Indian Railways, it is stated that the administration has arranged with Indian collieries for all the coal required. With prices and freights at their present level, it was hardly to be hoped for that the order would come in this direction. A considerable parcel of Blyth steam smalls has been sold for delivery up to the end of this year at 8s. f.o.b. Best Blyth steams are stated to have been sold on Russian account for delivery over the first three months of next year at 13s. 6d. f.o.b. This price is also reported to have been accepted for January delivery. The Russian merchants who recently secured the South Russian Railways' order for the supply of large quantities of British coals to Black Sea ports are stated to have arranged for 500,000 tons of South Yorkshire coals. If this be true, very little of the total order can come to this district. A considerable enquiry for steam seconds for early shipment to Alexandria is in circulation. It is reported that collieries are asking 13s. 6d. f.o.b. for best Blyth steams for shipment over next year; speculators are holding off at that price, however. Gas coal sales arranged during the week include the following:—10,000 tons Durham seconds for October-December shipment at 14s. f.o.b.; 15,000 tons Wear specials for similar delivery at 15s. 6d. f.o.b.; 10,000 tons Tyne primes for like loading for the Palermo Gasworks at an unstated price; and 15,000 tons Old Pelton coals for October-January shipment to the Trieste Gasworks at 14s. 4d. f.o.b. For next year's loading, producers of gas bests are stated to be declining business at 13s. f.o.b. from January to December, but have their books open for limited shipment from March onwards over the year. The Christiania Gasworks have received tenders of 5,000 tons of Wear gas specials for shipment during the winter. Several large parcels of best Durham unscreened bunkers have been sold for delivery to the coaling stations over next year at from 12s. 3d. to 12s. 6d. f.o.b. A quantity of Northumbrian unscreened bunkers of fairly good quality is stated to have been sold for shipment to the end of this year at 11s. 9d. f.o.b. A considerable quantity of ordinary Durhams has been sold for shipment this month at 13s. f.o.b. The prompt coal market is quiet, by reason of the great congestion of loading turns. Supplies for early shipment are very difficult to obtain. Best Blyth steams are almost out of the market until about the 25th inst. and good grades of gas coal are very scarce for spot loading. There is a very good tonnage supply at most of the shipping places, although the tugboatmen's strike has made owners rather chary of sending their vessels as far up the Tyne as Dunston—thereby lessening the pressure above bridges, but adding to it at Tyne Dock and at Blyth and Sunderland. Generally speaking, f.o.b. quotations for prompt shipment are firm at last week's figures, the only changes being as follow:—Best steams, Blyths, 3d. dearer; Tynes, similarly increased;

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	14/9 to 15/	14/6 to 14/9
Do. Tynes (Bowers, &c.) ..	15/ to 15/3	15/
Secondary, Blyths .....	12/6	12/
Do. Tynes (Hastings or West Hartleys) .....	12/9 to 13/3	12/9 to 13/
Unscreened .....	11/6 to 12/6	11/6 to 12/6
Small, Blyths .....	8/ to 8/3	8/ to 8/3
Do. Tynes .....	6/9 to 7/	6/9 to 7/
Do. specials .....	9/3 to 9/6	9/ to 9/6
Other sorts:—		
Smithies .....	14/	14/
Best gas coals (New Pelton or Holmside) ...	15/3 to 15/6	15/ to 15/6
Secondary gas coals (Pelaw Main or similar) ..	14/	14/
Special gas coals .....	15/6 to 16/	15/6 to 16/
Unscreened bunkers, Durhams ..	12/9 to 13/9	12/9 to 13/9
Do. do. Northumbrians ..	12/6 to 13/	12/6 to 13/
Coking coals .....	13/3 to 13/9	13/6 to 14/
Do. smalls .....	13/3	13/6
House coals .....	15/6	15/6
Coke, foundry .....	19/ to 20/	18/ to 19/
Do. blast-furnace .....	17/6	17/6
Do. gas .....	17/ to 18/	17/ to 18/

seconds, Blyths, 6d. advanced; Tynes, 3d. improved; special steam smalls, stronger; gas bests, firmer; coking coal, 3d. reduced; smalls, 3d. cheaper, and foundry coke 1s. higher. Foundry coke is in strong demand for west coast ironworks, but export trade is slack.

Later.—One of the Tyne collieries producing a superior quality of Durham unscreened bunkers has contracted to supply various Mediterranean and Western Islands coaling stations with 500,000 tons of coal to be delivered over next year. The price has not transpired, but it is stated to be over 15s. per ton f.o.b. The Midi Railways of France have contracted with local firms for 60,000 tons of best Durham steam coals for shipment over next year to Cette, Bordeaux and Bayonne. The price is stated to be on the basis of 13s. 6d. per ton f.o.b.

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 94,620 tons of coal and 1,965 tons of coke, as compared with 89,640 tons of coal and 530 tons of coke for the corresponding period of 1912, being an increase of 4,980 tons of coal and 1,435 tons of coke. The all-round demand is fully maintained, and the tendency of the coal market is towards higher prices. Turns are full for the greater part of this month, and collieries are making full prices for all descriptions of coal. Best steams are firmly held. Gas qualities are in a strong position. Smalls are the turn dearer in spite of large production, and bunker coals continue to meet with a ready sale. Households are in better demand, and prices are firmer. There is an increased enquiry for Durham coke for the west coast. A contract has been placed for 15,000 tons of Wear special gas, shipment October to December, at 15s. 6d. f.o.b., and 10,000 tons of second Durham gas has realised 14s. f.o.b., delivery October to December. The Christiania Gasworks are inviting immediate offers of 5,000 tons of special Wear gas, and it is understood that the Paris, Lyons and Marseilles Railway have taken up 100,000 tons of Durham coking coals for delivery next year, at about 26/25 fr. delivered into wagons at Marseilles. Current prices are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/9	15/9
Secondary do. ....	14/3	14/
House coals:—		
Best house coals .....	17/	16/6
Ordinary do. ....	16/6	16/
Other sorts:—		
Lambton screened .....	15/9	15/9
South Hetton do. ....	15/6	15/6
Lambton unscreened .....	13/9	13/6
South Hetton do. ....	13/6	13/6
Do. treble nuts .....	16/3	16/
Coking coals unscreened... ..	13/6	13/9
Do. smalls .....	13/3	13/6
Smithies .....	15/6	14/9
Peas and nuts .....	16/9 to 17/	16/6 to 17/
Best bunkers .....	14/	14/
Ordinary bunkers ..	13/6	13/6
Coke:—		
Foundry coke .....	20/	20/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	18/9	18/9
Gas coke .....	18/	18/

The outward freight market is on the easy side. Recent fixtures include:—Coasting: London 3s. 7½d., Havre 5s., Rotterdam 4s., Hamburg 4s. Bay: Rochefort 6s., Bordeaux 6s., St. Nazaire 6s. 6d., Bayonne 6s. 6d., and Oporto 10s. 9d. Baltic: Reval 6s., Memel 4s. 6d., Pillau 4s. 10½d., Sundswall 5s. 9d. Mediterranean: Valencia 9s. 6d., Marseilles 8s. 9d., Gergenti 10s. 9d., Naples 9s. 6d., Civita Vecchia 10s. 6d., Algiers 8s. 1½d., Genoa 9s. 6d., and Port Said 9s. 6d.

## Middlesbrough-on-Tees.

## COAL.

Fuel keeps steady. There is now an ample and a cheaper supply of tonnage. Demand for gas coal continues heavy, but owing to the scarcity of some of the best known brands, prices are largely nominal. Best Durham gas coal is 15s. 6d., seconds 14s., and specials 16s. It is reported that producers of best gas coal have refused 13s. for delivery over the whole of next year. There is a good supply of bunker coal. Ordinary Durhams are 12s. 9d. to 13s., superiors 14s. to 14s. 3d., and specials 15s. to 15s. 3d. With deliveries of household coal increasing, values promise to improve. Quotations at present run from 15s. 6d. to 15s. 9d. Coking coal is in good request and ranges from 13s. 3d. to 14s. Coke is strong. Best foundry kinds are in the neighbourhood of 20s. f.o.b., and gashouse sorts 17s. 9d. Local consumption of coke continues very heavy, and with the supply of furnace kinds scarce fully 18s. has to be paid for average blastfurnace qualities delivered at Teesside works, and in some cases as much as 18s. 6d. is reported to have been realised. Superior furnace coke has sold at 19s.

## IRON.

The pig iron trade is quiet. Values of Cleveland pig this week dropped below what they have been since April last year, but they have rallied somewhat. After falling to 53s. 6d. f.o.b., No. 3 g.m.b. has returned to 54s., whilst No. 1 now stands at 56s. 6d., No. 4 foundry, 58s. 6d., No. 4 forge 53s., and mottled and white iron each 52s. 9d.—all for early delivery, but probably forward contracts could also be made at round about these figures. Sellers of east coast hematite pig have reduced their prices by 6d. per ton, but this movement has not tempted buyers into the market. Both makers and merchants are now offering Nos. 1, 2 and 3 at 65s. 6d. for either early or forward delivery. There is little or nothing passing in foreign ore. A persistent report of an odd cargo having been sold at below current rates is contradicted, and the rumour appears to be groundless. In the absence of business, market quotations remain nominally on the basis of 19s. 6d. ex-ship Tees for rubio of 50 per cent. quality. Orders for finished iron and steel are scarce, but many producers have fairly good contracts running. As was expected, manufactured iron prices have followed the downward movement of steel quotations. Common iron bars are £7 10s., best bars £7 17s. 6d., best best bars £8 5s., packing iron £6, iron ship plates £7, iron ship angles £7 15s., iron ship rivets £8 10s., steel bars £7 5s., steel ship



plates £7 5s., steel ship angles £6 17s. 6d., steel boiler plates £8 5s., steel hoops £7 10s., steel strip £7 5s., and steel joists £6 12s. 6d.—all less the customary 2½ per cent. discount. Heavy steel rails are £6 10s. net. Iron and steel galvanised corrugated sheets stand at £11 f.o.b.—less the usual 4 per cent.

South-West Lancashire.

COAL.

In inland household coals the keenness of the demand has fallen off since the winter prices came into force, but a good many orders remain yet on the books waiting execution. With regard to shipping, the bunker coal trade is steady, and there is a moderate amount of enquiry from outside steamers. The quantity of steam coal available after contract requirements is not very great; particularly is this so with the better qualities. There is no change to report with respect to prices, these being about same as named last week, viz. 13s. 3d. to 13s. 6d. f.o.b. for ordinary Lancashire coals, to 14s. f.o.b. for the better sorts. In household coals for the coastwise and cross-channel trade the demand continues satisfactory from all the points with the exception of Dublin, and more fuel would be taken if collieries were able to provide it. Slacks have little that is new. The demand is on the increase but is promptly met and with such full time being worked at all the collieries there is a little surplus going into stock.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/	17/
Do. (f.o.b. Garston, net) .....	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/3 to 14/	13/3 to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

South Lancashire and Cheshire.

COAL.

The Manchester Coal Exchange was well attended on Tuesday. House coal is in better request and the advanced rates are fully maintained. Furnace coal continues in good demand, and there is a better enquiry for shipping coal. The call for slack is moderate with good quantities offering, and prices not quite so firm.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 13/4	13/3 to 14/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

IRON.

Very quiet meeting in Manchester yesterday. In spite of the low prices, there is not much confidence, business generally being very dull. Prices remain without alteration. There is not much enquiry to really tempt the maker. Forges are working fairly good time and prices remain as previously mentioned. The association had a meeting this week, but prices were not altered. Steelworks are fairly busy with bars at £7 to £7 5s., billets £5 5s. Engineers, wagon works and foundries are only moderately employed.

Yorkshire and Derbyshire.

Leeds.

COAL.

There was a full and representative gathering of traders on the market on Tuesday, and a fair amount of business was put through. Local merchants attended in good numbers, and were pressing for prompt supplies of house coal, while representatives of the Humber shipping trade were enquiring strongly for secondary grades of steam coal for export. One or two spot lots of slack were on offer at very low prices, but apart from this quotations generally were firm. The pits have worked full time, and stocks all round are light. Empty wagons have been fairly plentiful, but there are strong complaints about delay in transit of loaded traffic.

**House Coal.**—In spite of the advance in prices the demand continues quite brisk, and is sufficient to absorb the output from day to day. London merchants are still pressing for good supplies of the higher-priced coals, and the collieries supplying these qualities are still in arrear with deliveries. There is considerable pressure in the coastwise trade for cargoes of second-class house coal, and prices have firmed up to some extent during the past week. Freight rates show very little variation on the week. In Bradford, Leeds, Huddersfield, and other West Riding centres merchants are pretty well occupied in supplying the public with the secondary qualities of house coal, but the demand for the best qualities shows signs of falling away—probably owing to the very high prices. Ground stocks at the depots are very light in view of the winter trade. Current pit prices average as under:—Haigh Moor selected, 18s. 6d. to 19s. 6d.; Wallsend and London best, 17s. 6d. to 18s. 6d.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other sorts, 14s. to 15s. 6d.

**Gas Coal.**—There is no surplus of gas coal on the market, as contract needs are so great that practically the whole output of the pits is needed. One or two small parcels are reported to have been sold this week at prices even higher than current contract rates. The demand for rough unscreened gas coal for export noted last week still continues, and the best qualities realise about 13s. per ton f.o.b.

**Manufacturing Fuel.**—Stocks of engine nuts and washed fuel are on the light side, but most of the West Riding pits have a fair number of loaded trucks containing slacks. Special prices are frequently met with, but the demand is sluggish, both for manufacturing and coking purposes.

**Washed Furnace Coke.**—There is no improvement in the demand for this commodity, and makers have difficulty in realising more than 12s. a ton at the ovens for current sales, whilst for forward the market is very quiet. One or two makers have resorted to ground stocking rather than take the low prices prevailing. In other cases the ovens are put on short blast, and although the output altogether is much reduced supplies are still over plentiful.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected .....	15/	15/
Wallsend & London best .....	14/ to 14/6	14/ to 14/6
Silkstone best .....	14/ to 14/6	14/ to 14/6
Do. house .....	12/6 to 13/6	12/6 to 13/6
House nuts .....	11/6 to 12/9	11/6 to 12/6
Prices f.o.b. Hull:		
Haigh Moor best .....	17/6 to 18/6	17/ to 18/
Silkstone best .....	16/6 to 17/6	16/ to 17/
Do. house .....	15/ to 16/	15/ to 15/9
Other qualities .....	14/6 to 15/	14/6 to 15/
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 12/	11/ to 12/
Unscreened gas coal .....	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	10/9 to 11/6	11/ to 11/6
Large double-screened engine nuts .....	10/ to 10/6	10/ to 10/6
Small nuts .....	9/6 to 10/	9/6 to 10/3
Rough unscreened engine coal .....	10/ to 10/6	10/ to 10/6
Best rough slacks .....	8/ to 8/6	8/ to 8/6
Small do. ....	6/6 to 7/	6/9 to 7/3
Coking slacks .....	6/9 to 7/3	6/9 to 7/3
Coke:—		
Price at ovens:		
Furnace coke .....	12/ to 12/6	12/ to 12/6

Barnsley.

COAL.

There is unusual animation prevailing in the steam section of the trade at this period of the year. This is presumably due to the fact that Russian merchants who have accepted contracts for supplies for the State railways, are seeking to place tonnage with the collieries. It is stated they require 480,000 tons of district coal for shipment to the Black Sea ports between now and the spring. This is entirely new business for South Yorkshire, and, coming along during the quieter period following the closing of the Baltic ports, it is expected keen competition will have been aroused. However, the large new collieries which are being developed are steadily adding to the enormous output of the district, and the buyers appear to be placing orders very steadily, and no doubt will be able to find concessions for business which will be very acceptable at this time of the year. Reports vary considerably as to the progress which is being made in the allotment of the tonnage, although it appears to be generally agreed that the coal will be taken from this district, excepting 60,000 tons which is to be bought in North Derbyshire and Notts. There is evidence that the supplies have already commenced from the official return relating to the traffic at Hull. Last month 17,278 tons were sent to South Russian ports whereas in previous years business in this direction has not exceeded a total of a few thousand tons during the whole of any year. The market, under the influence of this enquiry and a further 50,000 tons which it is stated has been placed for the Riga railways also in this district, has become a little stronger during the week, although the weakened home demand is having to be contended with. Business appears to be done more in the nature of a spot character and little strength is given to quotations for forward delivery. On the week best hards are about 3d. per ton dearer, but it is questionable whether secondary descriptions of large steams are making better prices than a fortnight ago. In respect to small manufacturing fuel, prices seem to be on a rather firm basis. The demand from the home industrial district has expanded during the past fortnight. Steam nuts and pea slacks have shown signs of improvement from a seller's standpoint, but they continue to have considerable difficulty in dealing with the large output of slacks. The tonnage of gas coal required on contract account is very large, and collieries, although working full time, find it a difficult matter to fully comply with the request made for delivery. In regard to house coal, although the increase in prices has naturally somewhat checked the enquiries, collieries are still busy with orders which were placed previously. This is particularly the case in respect of the best class of fuel, and merchants are complaining of the delay occurring in delivery. There is more enquiry from the West Yorkshire districts for secondary classes of house coal, and for the present, prices appear to be firmly maintained. The business in regard to coke continues much the same, with a very little enquiry for forward, and prices lack firmness.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	16/	16/
Best Barnsley softs .....	15/3 to 15/6	15/3 to 15/6
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	14/ to 14/3	14/ to 14/3
Secondary do. ....	12/ to 14/	12/ to 14/
Steam coals:—		
Best hard coals .....	12/9 to 13/	12/9
Secondary do. ....	11/6 to 11/9	11/6 to 11/9
Best washed nuts .....	10/6 to 11/9	11/6 to 11/9
Secondary do. ....	10/3 to 10/9	10/3 to 10/9
Best slack .....	8/ to 8/3	8/ to 8/3
Rough do. ....	6/6 to 7/	6/6 to 7/
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/6 to 12/	11/6 to 12/
Gas nuts .....	12/ to 12/6	12/ to 12/6
Furnace coke .....	12/ to 12/6	12/6 to 13/

Hull.

COAL.

There is a very brisk demand for steam coal on export account in the Humber coal market, and values for South Yorkshire hards are well maintained in the region of 16s., or a little more for prompt shipment. To complete Baltic season contracts a good deal of buying is in progress. Small steams and manufacturing coal are in fair demand, but prices are unchanged. Gas and house coals are in good request and prices are steady. Little real business is being done regarding requirements forward, for which collieries are asking 6d. and 1s. in advance of last year's prices. The shipments of coal for abroad is proceeding at an enormous rate. All the appliances at the Hull docks are fully engaged, and the unusual sight of a number of vessels waiting in the river for berths has been witnessed every day this week. In consequence of the long turns the freight market is not so active and rates are easier. What little tonnage has been taken up has been for Baltic destinations, 5s. 9d. having been paid for Cronstadt and 5s. 3d. for a large steamer for Reval, and 5s. 6d. for one of medium size. No Mediterranean fixtures are recorded. For South America steamers have been booked at 18s. 3d. Buenos Ayres and 18s. 6d. Monte Video. The following are the approximate prices for prompt shipment f.o.b. Hull, &c.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	16/ to 16/3	16/
Washed double-screened nuts .....	13/6	13/6
Unwashed double-screened nuts .....	12/9	12/9 to 13/
Washed single-screened nuts .....	13/	13/
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls .....	10/3 to 10/6	10/3 to 10/6
Unwashed smalls .....	9/3 to 9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys .....	14/	14/
Rough slack .....	10/3	10/3 to 10/6
Pea slack .....	9/	9/
Best Silkstone screened gas coal .....	14/	14/
Best Silkstone unscreened gas coal .....	12/6	12/6
Derbyshire:—		
Best steam hards (Hull) .....	15/6	15/6
Do. (Grimsby) .....	15/	15/
Derbyshire nuts (doubles) .....	13/	13/
Derbyshire nuts (doubles) (Grimsby) .....	12/9	12/9
Derbyshire large nuts ...	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	15/3 to 15/6	15/6
Do. do. (Grimsby) .....	15/	15/

As was anticipated, the official returns of the coal export from the Humber ports show a decrease in September. The most surprising is that at Hull 129,503 tons less were shipped to the order of foreign buyers than in September last year. Grimsby and Goole are also behind, but in a much less degree. On the other hand, the foreign export from the new King's Dock at Immingham was 66,912 tons more than a year ago, but this only went half-way to counterbalance the falling off at the sister ports. The following is a return of the export (exclusive of bunkers) for the month and for the current year, with comparative totals:—

	September		Nine months, Jan.-Sept.	
	1913.	1912.	1913.	1912.
	Tons.	Tons.	Tons.	Tons.
Hull .....	393,026	512,529	3,357,691	2,671,174
Grimsby .....	116,417	118,568	870,941	885,252
Goole .....	131,067	145,842	977,630	792,542
Immingham .....	198,395	131,483	1,215,532	458,608
Totals ..	838,905	908,422	6,421,794	4,807,576

From the foregoing it will be seen that although there has been a falling off of 69,517 tons in the net total exported from the Humber during September, there is for the nine months to date a very substantial increase of 1,614,212 tons.

Chesterfield.

COAL.

The coal trade of the district is in a strong position, and, as the year advances, more certain does it appear that the good time which it has experienced latterly is not by any means come to an end. There is, for the period of the year, an exceptionally satisfactory demand for house coal, and orders are coming to hand faster than the collieries can deal with them. Many are already considerably in arrear, and customers are pressing for a more prompt execution. Prices which were advanced at the beginning of the month are readily paid. Prospects for the winter are still very encouraging. Orders for fuel for manufacturing purposes are plentiful and the qualities chiefly required for steel-making purposes, such as cobbles and nuts, are in brisk request. Stocks that accumulated in the colliery sidings during the recent holiday season are now completely exhausted and deliveries can now only be made in proportion to the output of the pits from day to day. This applies equally to slack for steam-raising purposes, for which the demand is steadily increasing and prices are again moving upwards. There is a steady call for steam coal for locomotive purposes. The export branch of the trade maintains the strong tone which has characterised it during the past few weeks. The month of October usually witnesses a gradual falling-off in the demand for steam coal, due to the closing of the Baltic shipping season. This year, however, the contrary is the condition of things. Owing to the heavy supplementary purchases of steam coal for the Russian railways, which is to be shipped to the Black Sea, there is such an amount of activity as has not been seen in the autumn for many years past, and this busy state of affairs is likely to continue for the next three or four months; indeed, it may go on until the opening of next year's Baltic season. The outlook, therefore, is more promising than it was even a year ago and the belief is that next year's contracts will realise higher prices than those ruling now. Shipments are on a large scale just now, but supplies of



From coal are difficult to obtain outside contracts. Where they are obtainable, good prices are readily paid. As a remarkable proof of the strong position of the steam coal trade, it is worthy of observation that the price at the pit is practically the same as that for best coke. Cobbles and nuts are in good request and there is more enquiry for slack for shipment. Washed fuel continues to meet with a ready sale. There is no improvement in the coke market, which remains exceedingly quiet, with no sign of an early change for the better. Buyers do not evince any desire to purchase for forward delivery.

## Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	9/	9/

## IRON.

The iron trade is in a dull condition and orders are badly wanted, both for pig iron and finished iron. The amount of work coming to hand is not, by any means, sufficient to keep the plant of the district fully employed.

## Nottingham.

## COAL.

With the opening of October there has been a decided improvement in the coal trade of Nottinghamshire, and merchants are doing a business well up to the average, notwithstanding the advance in prices which has come into operation. A more seasonable turn in the weather is having a stimulating effect in the house fuel section, more particularly at the local landsale depots, where the bulk of the demand is for immediate requirements. The increased consumption has not at present made any material alteration in the position at the collieries, which are practically making full time, and can comfortably cope with the orders, as there is a fair amount of stock. So far as steam coals are concerned, the demand is steady, with prices of the leading qualities unchanged. A good quantity of fuel is leaving the county to the eastern ports for shipment. There is an active enquiry for industrials in the home market. Gas coals are in increasing request, works ordering freely in view of the approach of winter, with the result that prices are firm. The position in regard to slacks is slightly better, but the demand generally is not active. Nevertheless, for good qualities owners are not inclined to sell at lower rates, but common sorts are obtainable at fractional reductions.

## Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	14/ to 14/6	13/6 to 14/6
Good house coals .....	13/ to 14/	12/6 to 13/6
Secondary do. ....	11/6 to 12/6	11/6 to 12/
Best hard coals .....	11/3 to 12/6	11/6 to 12/6
Secondary do. ....	10/9 to 11/6	10/6 to 11/3
Slacks (best hards) .....	8/ to 8/6	8/ to 8/6
Do. (seconds) .....	7/ to 7/9	7/ to 8/
Do. (soft) .....	7/ to 8/	7/ to 8/

## Leicestershire.

## COAL.

No material alteration in the course of business has taken place in the last week. There is a steady demand all round, and whilst no description of coal is in urgent request, there is none which is particularly neglected. The continued mildness of the weather still causes a quietness in household coals—more particularly of the better kinds, but there is some enquiry for middle sorts and small coals. Steam coals are in fair request for all descriptions, though some sorts of slacks are a little less wanted. Local merchants are only moderately busy. The collieries very generally are maintaining their output, and stocks are not as a rule heavy. The outlook still continues good, and colder weather would much stimulate business. But there is nothing to cause any complaint of business as it is at present. The quotations continue very firm at the late rate, and there is no sign of any weakening, and business is only done on the current rates.

## South Staffordshire, North Worcestershire and Warwickshire.

## Hednesford.

## COAL.

The coal trade of the Cannock Chase district is in much the same satisfactory condition as when last reported, and will probably continue brisk. The collieries are well employed, most of them running full time. Orders on the books are fairly plentiful, and there is not very much coal in stock at the collieries. The house coal trade is fairly satisfactory, and as the season advances will no doubt continue to gain in strength. There is not much change in the demand for coal for manufacturing purposes, but orders are not so plentiful for slack.

## Birmingham.

## COAL.

While the recent advances in prices have rather staved off new orders, the wet weather has stimulated the household trade, but the rain has also had the effect of reducing the production. The demand for smalls is not perhaps as good as it should be, but a revival will no doubt take place when the winter orders for electrical works and horticultural purposes come in. Meanwhile, the pits are working four or five days a week.

## IRON.

The quarterly meeting was well attended, particularly from South Wales, but the amount of business passing was not in accordance with expectations. Enquiries indicated a fair demand, but buyers are apparently unconvinced by the advance of present prices, and hesitate to commit themselves. The market betrayed a drooping tendency in the case of pig iron and finished iron. Pig iron smelters have difficulty in finding outlets for their pro-

## Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep .....	18/6	18/6
Do. seconds deep .....	16/	16/
Do. best shallow .....	14/9	14/9
Do. seconds do. ....	14/	14/
Best hard .....	15/	15/
Forge coal .....	11/	11/
Slack .....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked cobs .....	14/	14/
Best hard spires .....	15/	15/
Forge (steam) .....	11/	11/
D.S. nuts (steam) .....	10/	10/
Small (do.) .....	8/3	8/3

duction, notwithstanding the fact that eight furnaces have been put out of action in the Midland area during the quarter now closed. Staffordshire producers are relatively well off, thanks to the large requirements of subsidiary industries in the matter of foundry iron. There is, however, considerable competition for the business offering, and prices accordingly rule low, though they are perhaps rather less irregular than was the case a month ago. The loss on the quarter, however, amounts to 3s. or 4s. on all common grades of pig iron. South Staffordshire common forge qualities are now quoted at 51s. to 52s., and part-mine at 53s. 6d. upwards. Best all-mine realises 92s. 6d. to 97s. 6d., and cold-blast 125s. Northamptonshire makers quote 51s. to 52s., and other district makes remain in the usual relation. Contrary to anticipation, marked bar makers made no change in their standard of £9 10s. Business in this department was very much at a standstill, as a reduction in the rate has been regarded as inevitable, and in the meantime consumers are indisposed to operate. Unmarked bars, although unchanged on the week, have fallen much below the usual standard of comparison with marked bars. Merchant qualities are obtainable at £7 5s. to £7 10s. delivered Birmingham. Nut and bolt material is quoted at £6 15s. to £7 delivered Darlaston. This is about £1 more than Belgian rivals are prepared to accept, but the difference is somewhat nullified by the facilities for quick delivery which district makers are able to offer in the present state of trade. Price-cutting still prevails in the galvanised sheet branch, although manufacturers are well off for orders. The mills are assured of steady running for two months or more ahead. Market quotations move between £11 and £11 10s., but a considerable amount of business is passing at £10 17s. 6d., and in very special cases £10 15s. is accepted. The black sheet trade is weak, and manufacturers state that the profit margin has all but disappeared. Doubles are offered at £8 2s. 6d. to £8 5s. for merchant qualities, and singles at £8 and upwards. There is a little more doing in strip, but the condition of this branch is far from satisfactory. A meeting of the Staffordshire Tinned Sheet Association was held during the afternoon, but no alteration was made in prices, which are:—32s. per cwt. for charcoal and 34s. for best charcoal, singles, with the usual extras. The revision of steel prices has not had any considerable effect in advancing business. Enquiries, however, are more promising. Meanwhile actual transactions are kept within contracted lines. Billets and sheet bars are unaltered at £4 17s. 6d. to £5 for Bessemer and 2s. 6d. extra for Siemens.

## Forest of Dean.

## Lydney.

## COAL.

The weather conditions since our last report have been rather more favourable to the consumption of household coals, but the demand, as yet, has not shown an upward move. The pits are only averaging four and five days in the week just now, but the next week or two will probably see a change. Stocks are not very bulky. The demand for the steam coals of the district does not improve, and the collieries are having difficulty in managing full time. Prices, too, show a weakness in many cases.

## Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	17/6
Forest .....	16/6	16/6
Rubble .....	16/9	16/9
Nuts .....	15/	15/
Rough slack .....	7/6	7/6
Steam coal:—		
Large .....	12/6 to 13/	12/ to 13/
Small .....	9/ to 10/	9/6 to 10/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

## Devon, Cornwall, and South Coast.

## Plymouth.

## COAL.

Messrs. W. Wade and Son report that there is an improvement in the wholesale demand for house coal at the south-coast ports, which is chiefly due to the change of weather and approach of winter rather than to the expectation of any advance above present prices. Local competition keeps retail prices low in most western ports, while the competition of inland railborne coals is keenly felt by those who import by sea. Freights remain unaltered.

**Shipment of Bunker Coal.**—During the month of September the quantity of coal, &c., shipped for the use of steamers engaged in the foreign trade amounted to 1,825,057 tons, as compared with 1,593,347 tons in September 1912 and 1,681,507 tons in September 1911. The aggregate so shipped during the first nine complete months of the present year was 15,545,617 tons, as against 13,202,091 tons and 14,340,947 tons in the corresponding periods of 1912 and 1911 respectively.

## THE WELSH COAL AND IRON TRADES.

THURSDAY OCTOBER 9.

## North Wales.

## Wrexham.

## COAL.

The coal trade of this district has been up to the average for the past week. The majority of the collieries have been able to work practically full time, but in some cases a shortage of wagons has been experienced, which has caused considerable inconvenience and delay. Orders for house coal are now coming to hand more freely, and prices are being maintained at the figures last quoted. Landsale depots, too, are fairly busy, and prices are at present unchanged. The position of gas coal is unaltered, as the gas companies take the usual proportionate quantities on account of the current contracts. Gas coke is being freely offered by the gas companies at prices varying from 13s. 4d. to 15s. per ton at the gas works. With reference to steam coal, the demand for locomotive coal is all that can be desired, and negotiations are going on with some railway companies for the fixing up of further contracts. In the industrial market, trade appears to continue to be good, and the demand for fuel correspondingly satisfactory. The shipping trade has been hampered by the congested state of traffic at Birkenhead, where a large quantity of goods of all kinds has been held up. Consequently tonnage has been coming to hand badly, which has resulted in coalowners having to accept a lower figure from buyers who were able to send wagons for spot lots. There is also a labour dispute at the South Docks, Liverpool, where 500 dock labourers came out on strike on Monday last as a protest against an alleged breach of the agreement in regard to Saturday afternoon work, and they were still out at the time of writing these notes. As a result of this several large vessels have been held up. The market for small fuel is fairly good, and the prices ruling are practically the same as last week. The current prices for this week are as follow:—

Prices at pit f.o.r.:	Current prices.	Last week's prices.
Best house coal .....	15/ to 16/	15/6 to 16/6
Secondary do. ....	14/ to 15/	14/6 to 15/3
Steam coal .....	12/6 to 13/	12/6 to 12/9
Gas coal .....	13/ to 13/9	13/ to 13/9
Bunkers .....	12/ to 12/6	12/3 to 12/9
Nuts .....	11/ to 11/6	11/ to 11/6
Slack .....	6/3 to 7/6	6/6 to 7/6
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 18/4	17/6 to 18/9
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

## Monmouthshire, South Wales, &amp;c.

## Newport.

## COAL.

The steam coal market has this week shown no indication of improving business, the dull conditions recently prevailing continuing throughout all departments. The demand is slow and restricted, and for next year's business, which at this autumn time it is usual to discuss seriously, there is very little being said. The wide divergence of ideas respecting prices which to-day separate buyers from sellers no doubt tend to accentuate the apathetic conditions of the market, and it is difficult at the moment to see where renewed strength is to be gained. Certainly tonnage conditions have not favoured good business, but stocks are now so heavy that very much chartering and shipping will have to be done before accumulations are wiped out. No news has yet been received as to the placing of orders for the Paris, Lyons and Mediterranean Railways, tenders for which were lately handed in. Usually a big proportion of Newport semi-bituminous coal is used on these lines, but fears are now expressed that the prices quoted, roughly equal to about 16s. f.o.b. have had the effect of diverting the business. The general tendency this week has been towards easier values for the inferior grades of coal, while the classes are quoted as before. Pitwood quotations are about 3d. easier than last week, good wood ruling around 21s. 6d. ex ship.

Prices f.o.b. cash 30 days, less 2½ per cent.

Steam coals:—	Current prices.	Last week's prices.
Best Black Vein large ...	16/9 to 17/	16/9 to 17/
Western-valleys, ordinary	15/6 to 15/9	15/9 to 16/
Best Eastern-valleys .....	15/3 to 15/6	15/6 to 15/9
Secondary do. ....	15/ to 15/3	15/ to 15/3
Best small coals .....	7/9 to 8/	7/9 to 8/
Secondary do. ....	7/3 to 7/6	7/3 to 7/6
Inferior do. ....	6/6 to 7/	6/9 to 7/
Screenings .....	8/	8/
Through coals .....	12/ to 12/3	12/3 to 12/6
Best washed nuts .....	13/3 to 13/9	13/9 to 14/
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/ to 20/	19/ to 20/
Furnace coke .....	20/ to 21/	20/6 to 21/
Foundry coke .....	24/ to 25/	24/ to 26/

## IRON.

During the past week there has been very little change in the local iron and steel trades, hardly any fresh business has been done, and, generally speaking, quotations show but little alteration. Work is not quite so good at bar mills, but quotations for Welsh bars remain nominally unaltered. Imports of foreign bars for last week were heavier than usual, totalling 9,000; quotations for these, too, show no alteration. Rail mills are fairly well placed for some time to come, with values steady at last quoted figures. There is no improvement to report in the conditions at blastfurnaces, where work continues fairly good, and quotations unaltered. The tinplate trade shows no



improvement, business still continues to be very quiet, and future prospects are not encouraging. A number of mills are still idle, and are likely to remain so for some time. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tin-plate bars: Bessemer £4 15s., Siemens £4 16s. 3d. to £4 17s. 6d. Tin-plates: Bessemer primes, 20 x 14 x 112, 13s. 3d., Siemens primes, 20 x 14 x 112, 13s. 3d. Pig iron: Welsh hematite, 73s. to 74s., delivered locally. Finished black plate, £9 15s. per ton.

Cardiff.

COAL.

The chief complaint during the past week has been that of the lack of tonnage. Both at Cardiff, Barry and Penarth the docks have, comparatively speaking, been so badly supplied with vessels that sellers in some cases have been glad to accept 20s. and even less for best steam coals where buyers were in a position to offer prompt boats. On no single day did the number of vessels berthed reach 200, whilst on the last two days of the week they only numbered about 160. The heavy shipments at Cardiff, amounting as they did to nearly 420,000 tons for the week, came as a great surprise and shows that many of the vessels loaded were of exceptional size. Happily, an improvement is now within measurable distance. During the last fortnight the quantity of tonnage chartered has amounted to nearly 668,000 tons, and as this is now beginning to arrive, it is likely to have a stiffening effect on prices. Indeed, some of the best collieries are now firmly quoting 20s. 3d., and as they are well supplied with stems they are not likely to reduce this figure. On the contrary, should tonnage come forward as plentifully as anticipated, there is no doubt that prices will attain even a higher level, especially with the easier freights now offering. As the French Naval contract for 50,000 tons of Nixon's coal is to be carried out between now and the end of the year, there is every reason to believe that the quantity of first-class Admiralty coals obtained direct from the collieries will be very limited. The non-unionist question also continues to have a marked effect on the output, especially at some of the second-class collieries. Superior second Admiralties are still quoted at 19s. to 19s. 6d., but ordinary qualities are offering at 18s. and, in some cases, even at 17s. 9d. per ton. So far as next year's business is concerned, there is but little to report. Sellers are still maintaining their views, and buyers, for the most part, are holding off. It is stated, however, on reliable authority, that a contract for first-class coals has been concluded over the whole of next year at 19s. 3d. net, an increase of about 1s. 9d. per ton as compared with the prices obtained twelve months ago. The time is fast approaching when tenders will be invited by the British Admiralty, and there is no doubt that some large buyers are holding off until they know the result of this competition. There is not much change in the small coal market. Shipments to the vine-growing countries have been considerably decreased on account of the difficulty in getting wagons, and prices are on the weak side. Best bunkerings do not fetch more than 10s. 6d., whilst cargo qualities are obtainable generally at from 7s. 3d. to 7s. 6d., though in a few cases 7s. 9d. has been paid. The demand for Monmouthshire coals is very quiet, and prices are irregular. Black Veins are 16s. 9d. to 17s. 3d., and western-valleys 16s. to 16s. 3d., with lower grades down to 15s. 6d., in each case f.o.b. Cardiff. On account of the termination of the strike amongst the clay workers in Cornwall, there is a better demand for No. 3 Rhondda bituminous coals, which are to-day quoted at 17s. No. 2 Rhondda is 13s. to 13s. 6d., but inferior qualities are obtainable at from 11s. 9d. to 12s. Shipments of patent fuel for the week exceeded 38,000 tons of which the Crown Company loaded 11,974 tons, and other local makers 6,000 tons, whilst Swansea makers shipped 20,646 tons. The prices of best brands are 22s. 3d., and of second qualities 20s. to 21s. 6d. The coke market is very dull. Special foundry is nominally 28s., and ordinary foundry 26s. Furnace coke is quiet at 20s. to 21s., but it is stated that considerable quantities are being sold to consumers in the Midlands at 17s. 6d. delivered, but this is probably under contract. Pitwood is weak at 21s. 3d. per ton.

Prices f.o.b. Cardiff (except where otherwise stated).

Steam coals:—	Current prices.	Last week's prices.
Best Admiralty steam coals .....	20/ to 20/3	20/ to 20/6
Superior seconds .....	19/ to 19/6	19/ to 19/6
Ordinary do. ....	17/9 to 18/	18/3 to 18/6
Best bunker smalls.....	10/6	10/3 to 10/6
Best ordinaries.....	10/ to 10/3	10/
Cargo qualities .....	7/3 to 7/9	7/9 to 8/
Inferior smalls.....	7/	6/3 to 6/9
Best dry coals .....	18/ to 18/6	18/ to 18/9
Ordinary drys .....	15/6 to 16/	15/6 to 16/
Best washed nuts .....	16/ to 16/6	16/ to 16/6
Seconds .....	15/	15/ to 15/6
Best washed peas .....	14/6	14/6
Seconds .....	13/6	13/6
Dock screenings .....	11/9	11/9 to 12/
Monmouthshire—		
Black Veins .....	16/9 to 17/	16/9 to 17/
Western-valleys .....	16/ to 16/3	16/3 to 16/6
Eastern-valleys .....	15/9	15/9 to 16/
Inferior do. ....	15/3	15/3 to 15/6
Bituminous coals:—		
Best house coals (at pit)	20/6	20/6
Second qualities (at pit)	17/6 to 18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/	16/6 to 17/
Through-and-through...	15/	15/
Small .....	12/3 to 12/6	12/3 to 12/6
No. 2 Rhondda—		
Large.....	13/ to 13/6	12/6 to 13/
Through-and-through...	11/	10/6 to 11/
Small .....	7/6 to 8/	7/6 to 7/9
Best patent fuel .....	22/3	22/6
Seconds .....	20/ to 21/6	19/9 to 20/6
Special foundry coke .....	28/	28/ to 30/
Ordinary do. ....	26/	23/ to 26/
Furnace coke .....	20/ to 21/	20/ to 21/
Pitwood (ex-ship) .....	23/	21/9

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

IRON.

The chief topic of conversation just now is the probable effect of the reduction of the American tariff on the tin-plate industry. Though no one supposes for a moment that the new tariff will help to restore the lost business with the United States, it is thought that it will check to some extent the dumping of American tin-plates into Canada, though it is the opinion of some of the Llanelly manufacturers that a much more substantial modification of the tariff will have to be made before the Welsh trade can derive any great advantage. A reduction in the tariff from 5s. 4½d. per box to 2s. per box is certain to do some good, but to what extent only the future will disclose. Up to the present there have been but few fresh enquiries, and prices show very little change; 14 x 20 cokes are 13s. 1½d. to 13s. 3d., oil sizes 13s. 6d. and 19s. 3d. per box. Shipments last week only amounted to 75,567 boxes, as against 107,697 boxes received from works, so that stocks in the dock warehouses and vans have gone up to 348,740 boxes as compared with 193,457 boxes at the corresponding date of last year. Imports of iron and steel plates and bars during the week exceeded 6,000 tons, but the German makers have now ceased offering. Welsh tin bars are from £4 15s. to £4 16s. 3d. Another serious accident has occurred at Messrs. John Lysaghts' works, at Newport, the crank shaft of one of the vertical engines driving a number of mills and cold rolls suddenly breaking, and causing the cylinder to blow out. About 300 rollers, shearers, furnacemen, &c., will be thrown out of employment for about a fortnight. Rather more business is doing in galvanised sheets, but there is no improvement in prices, which still remain at from £10 17s. 6d. to £11 for 24-gauge corrugateds. Messrs. Guest, Keen and Nettieolds have booked an order for 10,000 tons of rails for the East Indian Railways. Welsh pig iron is lower, mixed numbers of hematite being 70s. to 71s. f.o.t.

Swansea.

COAL.

During the past week the returns of the trade of the port were not quite so good, compared with the previous two or three weeks. The coal trade was rather dull, but there was a good export of patent fuel. The shipments of coal and patent fuel amounted to 96,398 tons. An average attendance assembled on 'Change this morning, and the undertone of the anthracite coal market was a shade harder. There was an increased demand for Swansea Valley large, and values were marked up a little. Red Vein large was very firm and difficult to obtain, even at the high prices ruling. Machine-made sizes were without alteration, but peas continued firm. Rubbly culm was freely offered for prompt loading at reduced prices, whilst duff was steady. In the steam coal market there was little business doing, and this department closed weak.

Prices f.o.b. Swansea (cash in 30 days).

Anthracite:—	Current prices.	Last week's prices.
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/6 to 20/6	19/ to 20/
Big Vein large (less 2½ per cent.) .....	17/6 to 18/6	17/ to 18/
Red Vein large do. ....	14/6 to 16/	12/9 to 14/6
Machine-made cobbles (net) .....	21/6 to 23/	21/6 to 23/
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/6
French do. do. ....	23/6 to 25/6	23/6 to 25/6
German do. do. ....	23/6 to 25/6	23/6 to 25/3
Beans (net) .....	16/6 to 18/6	16/6 to 18/6
Machine-made large peas (net) .....	12/6 to 13/6	12/ to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.)	6/ to 6/3	6/3 to 6/6
Duff (net) .....	4/6 to 5/3	4/3 to 5/
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	14/ to 15/	14/ to 16/
Bunkers do. ....	11/ to 12/	11/3 to 12/3
Small do. ....	7/9 to 8/6	7/9 to 8/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.)	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

IRON.

There was some improvement in the condition of the tinplate trade in this district last week. There were 16 tinplate and sheet rolling mills fully employed at the Duffryn works, Morriston, only two mills remaining idle, this being due to shortage of competent hands. The Forest and Worcester were also doing well, heavy outputs being registered. There was a good production of pig iron at the blast furnaces, and practically all the furnaces were working in the steel trade. Employment at the Mannesmann tube works continued good, and the foundries in the district were also busily engaged. The shipments of tinplates last week were 75,567 boxes, receipts from works 107,697 boxes, and stocks in the dock warehouses and vans 348,740 boxes.

Llanelly.

COAL.

There is no change to report in the coal trade of the district and prices for nearly all kinds are being maintained. There is a very good enquiry for several qualities and it is really difficult to get quotations for prompt shipment, in fact some of the pits are fully stemmed well into December. The one thing keeping the market back at the moment is the lack of tonnage, and if this can be remedied there would be a spurt for nearly all coals at once. There is an excellent demand for all anthracite large sorts and prices received are very satisfactory. It is almost impossible to get prompt delivery even for inland, and it is a big advantage for factors to own their wagons just now so that they may have preference. Machine made nuts are quickly bought up, but beans are weak again, and collieries are quoting at low figures to have wagons released. There is no improvement in steam and bituminous kinds and the market is quiet. Prices this week are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	20/6 to 22/6	20/6 to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large.....	17/6 to 18/6	17/6 to 18/6
Red Vein do. ....	13/6 to 14/6	14/ to 15/
Machine-made cobbles ...	19/6 to 20/6	19/6 to 20/6
German nuts .....	23/ to 25/	23/ to 24/
French do. ....	23/ to 24/	23/ to 24/
Paris do. ....	23/ to 25/	24/ to 25/
Machine-made beans .....	18/ to 20/	20/ to 21/
Do peas.....	12/6 to 13/	12/6 to 13/
Rubbly culm .....	6/ to 6/3	6/9 to 7/3
Duff .....	5/ to 7/	5/ to 7/
Other sorts:—		
Large steam coal.....	17/6 to 18/	17/ to 18/6
Through-and-through ...	11/ to 11/6	11/6 to 12/
Small .....	9/ to 10/	9/6 to 10/6
Bituminous small coal ...	10/ to 11/	10/6 to 11/6

ASSOCIATION OF MINING ELECTRICAL ENGINEERS.

The annual meeting of the Association of Mining Electrical Engineers was held in Birmingham on the 3rd inst. The proceedings commenced with a civic welcome extended to the members by the Lord Mayor (Lieut.-Col. E. Martineau) at Mason College.

Mr. W. C. MOUNTAIN, the president, expressed the thanks of the delegates, and the business of the meeting was then proceeded with, Mr. Mountain mentioning that the association had 1,081 members. Their association, and particularly their certificates granted on examination, were now being recognised by colliery owners and managers as things of value. In the past electrical machinery in the collieries had suffered a great deal from the fact that the class of men who looked after it were utterly incompetent for their duty. That, however, was being got over, and the present class of men were a great improvement.

Mr. Alexander Anderson was elected president for the ensuing year, Messrs. Arthur Hall and Roslyn Holiday vice-presidents and Mr. C. F. Jackson treasurer. Mr. MOUNTAIN said that Mr. Anderson had been president of the West of Scotland branch for two years; Mr. Holiday was the first president of the York branch; Mr. Hall was one of the pioneers of the association and the president of the Midland section when the association commenced; and Mr. Jackson had been treasurer for two years.

Mr. ANDERSON then took the presidential chair and delivered his address. He said that, in common with many other industries, the science of coalmining was advancing, and the mining electrical engineer had to extend his knowledge to cope with the new conditions which were constantly arising. The day for the engineer who had only a little elementary knowledge of electrical machinery was gone, and the sooner he realised the fact the better for himself and for all those associated with its use. Electrical plant had now become so complicated that to run it successfully complete knowledge of construction and characteristics had become not only desirable, but essential. It was difficult to get really first-class men, because many young men who entered the profession did not seem to realise the necessity for beginning their theoretical education at once and relied solely on what years of practical experience might teach them. They did not seem to grasp the fact that a smaller number of years combined with some hard study would make them the competent and efficient tradesmen that all aspired to become. If the latter course were adopted he felt certain they would not have the same difficulty which they had now in finding reliable engineers amongst the younger men. They were all accustomed to hearing an expression of opinion regarding the large number of rules and regulations that were laid down for their guidance, but could they not do something themselves to prevent the necessity for them? He thought they could; and the elimination of the unreliable for the reliable engineer was the first step in that direction. As years went on they would see a steady development of the use of electricity as an aid to mining. Already they had collieries equipped from the winding engine to the undercutting of the coal, relying solely on electricity as the motive power; and that class of colliery was rapidly extending. He was frequently struck, however, with the primitive housing given to underground switchgear. The average underground distributing station of the present day would compare badly with that of the future, when they might expect to see well-made walls and clean and even floors. They had not many men now who were capable of looking after both electrical and mechanical sides; but their future requirements would necessitate all engineers combining both qualifications. Numerous as electrically-driven coal-cutters were to-day, they would be still more so in the future, as the time was surely coming when little coal would be mined by hand.

Mr. ANDERSON presided at the annual dinner held at the Grand Hotel in the evening. Supporting him were the Lord Mayor of Birmingham (Lieut.-Col. E. Martineau), Prof. Gisbert Kapp, Mr. Arthur Sopwith, Mr. R. A. Chattock (city electrical engineer), Mr. William Charlton (president of the South Staff rdshire, Warwickshire, and Worcester-shire branch of the National Association of Colliery Managers), and Mr. Robert Nelson (H.M. electrical inspector of mines).



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(A Classified List appears on page 760.)

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\* \* For other Miscellaneous Advertisements see Last White Page.

## The Colliery Guardian.

LONDON, FRIDAY, OCTOBER 10, 1913.

The annual meeting of the Manchester Geological and Mining Society will be held on Tuesday next, when Sir Thomas Holland will deliver his presidential address.

The annual meeting of the South Staffordshire and Warwickshire Institute of Mining Engineers will be held on October 20. A paper on concrete reservoirs will be read by Mr. J. L. Jeffrey, and Messrs. J. Davis and Son, Derby, will exhibit apparatus and appliances.

The quantity of coal, coke and manufactured fuel exported from the United Kingdom last month amounted to 6,501,578 tons, valued at £4,554,427, as compared with 6,300,611 tons, valued at £4,003,429, in September 1912, and 6,000,852 tons, valued at £3,419,005, in September 1911.

The report of Mr. W. Walker, H.M. inspector of mines, upon his enquiry into the accident which occurred on February 7 last, at the Rufford Colliery, Notts, has been issued. He finds that the accident was due to a sinking hook of faulty design, the margin of safety being insufficient. Mr. Walker suggests the use of "clivvy" or "D" link, giving a factor of not less than 10 to 1; that in shafts of 100 yards or more in depth overwinding devices should be provided; the provision of rope ladders in the shaft; the compulsory erection of a second winding engine; improved lighting at the pit bottom; and the provision of beams in the head-gear to prevent a water-barrel falling back on to the chains and hooks. He also refers to the flimsy covering erected by the engineman, which was directly responsible for the loss of lives.

A conference on coal smoke abatement was held yesterday at the National Gas Exhibition, Shepherd's Bush.

The banskmen's question was again considered on Friday at Cardiff at a joint meeting of the committee appointed by the Coal Conciliation Board, but, though it was intimated that the owners were prepared to submit proposals for certain collieries, the workmen's representatives were unable to accept them until they had conferred with their colleagues.



At a meeting of the Durham Joint Board under the Minimum Wage Act at Newcastle last week substantial increases in the minimum rates of wages were asked for by the men.

With regard to the application by the Scottish coalmasters for a reduction of the wages of miners by 18½ per cent. on the basis of the rates prevailing in 1888, it has been arranged that the matter be referred to the decision of Lord Balfour of Burleigh as neutral chairman.

The strike notices in the North Staffordshire coalfield, which were to have taken effect to-morrow (Saturday) bringing 30,000 men out of employment, have been postponed until November 8. A conference to discuss the matter has been arranged for October 21.

The annual conference of the Miners' Federation of Great Britain opened at Scarborough on Tuesday. On Thursday the executive were authorised to draft a Bill for the amendment of the Minimum Wage Act, designed to secure the inclusion of all surface workers, the setting aside of such district rules as it was felt should not be made conditions of receipt of the minimum wage, and an increase of at least 9d. per day in the minimum rates for all grades.

The ballot of the members of the Miners' Federation, under the Trade Union No. 2 Act, has resulted in a substantial majority in favour of the Federation taking political action and raising a fund for the same. Other large trade unions are to be approached with a view to co-operative action in the matter. A resolution was passed declaring that as deductions for lights, lamps, or explosives cannot legally be enforced without the consent of the workmen using them, notice should be given to all colliery owners in Great Britain that after a date to be agreed upon there should be no further deductions. An important resolution was also adopted, and with one dissentient, that the executive should approach the executives of the other large trade unions with a view to co-operative action in support of each other's demands. Various amendments of the Workmen's Compensation Act were also proposed.

A meeting of the Mining Institute of Scotland will be held at Edinburgh to-morrow (Saturday), when a paper will be read by Mr. Willoughby M. Dunn on "The Electric Winding Plant at the South Kenmuir Colliery."

The annual meeting of the North Staffordshire Institute of Mining and Mechanical Engineers takes place on Monday next at Stoke-on-Trent. Several important papers are down for discussion. The annual dinner of the institute will follow the meeting.

Discussion will take place on several papers at the meeting of the South Wales Institute of Engineers at Swansea on Tuesday next.

MANY months have elapsed since the appearance of the Fourth Report of the Explosions in Mines Committee of the Home Office, and the mining community are still anxiously awaiting some recommendation regarding the use of incombustible dust to prevent or minimise the danger of coaldust explosions.

But although the oracle in its collective form has not yet spoken, the public have been afforded several opportunities of forming a shrewd guess regarding the probable nature of those recommendations.

Two of the members of the Committee, the chairman, Sir HENRY CUNYNGHAME, and Prof. H. B. DIXON, have recently lectured to the members of the British Association and the Institution of Mining Engineers respectively: the former on "Explosions in Mines, and the Means of Pre-

venting Them," and the latter on "Explosion Experiments at Eskmeals." On each occasion the lecturer discussed the results of the recent experimental work upon the proportion of stonedust which must be added to coaldust in order to prevent or minimise the effect of an explosion both as regards ignition and propagation. On each occasion the speaker displayed commendable caution, and expressed his opinion in the most guarded terms. Unfortunately, however, some of these opinions have since been misstated, or given the force of actual pronouncements, in no way justified by the authentic reports of the lectures. It will therefore serve a useful purpose to recall the views as they actually were expressed.

For instance, it has been put forward by implication that Sir HENRY CUNYNGHAME recommended the employment of 50 per cent. of fuller's earth as a preventive of coaldust explosions. We can find no justification for this in the reports of the lecture. The actual statement was that, of the various incombustible dusts for preventing ignition, the best was bicarbonate of soda; but shale, fuller's earth and fluedust—that was to say, coal ash from boilers—could also be employed. This is altogether different.

With regard to explosions, Sir HENRY CUNYNGHAME said that with 3 parts of stonedust to 5 parts of coaldust the explosion was feeble, with 4 to 6 it was smaller still; and when the mixture consisted of stonedust and coaldust in equal proportions, the explosion stopped. The Committee was about to report on the matter, so that all he would say was that it was highly probable if the dust in a mine consisted of over 50 per cent. of incombustible matter it would be almost impossible to explode it, except by a very large-scale explosion, which was in the highest degree unlikely to happen if they treated the whole mine with the incombustible dust.

The qualification is important, and the speaker further impressed upon his hearers the fact that safety was relative and not absolute.

Sir HENRY CUNYNGHAME at the same time insisted upon the necessity for some immediate action, remarking that while those who were conducting the experiments "were deliberating, mines were burning."

Prof. DIXON's view, as expressed in his lecture, was equally guarded, but to the same purpose. His experiments had led him to the opinion "that a mixture of coaldust with 40 per cent. of incombustible dust is more difficult to light than one where the percentage of non-inflammable dust is less; and that with a one-to-one mixture the flame would not travel far. Somewhere about 50 per cent. they had the turning point, but it was still possible to ignite the mixture."

Without waiting for perfection, a recommendation of a one-to-one mixture of stonedust and coaldust appears to be reasonable. If only non-ignition of the dust could be ensured, the danger of coaldust explosions in the mine would be immensely lessened, even if it were not entirely eliminated.

On September 30 Prof. HUMMEL delivered his inaugural lecture to the Mining Department of the Leeds University, taking for his subject "The Danger of Coaldust, and its Preventive." The lecture consisted principally of a review of the experiments carried out at Altofts—little, if any, reference being made to the work since carried out at Eskmeals.

Prof. HUMMEL appears to think that in advocating the use of stonedust the last word has been said. With this view we unfortunately cannot agree. Stonedust within limitations is a

valuable means of prevention against coaldust explosions, and is probably the most efficient according to our present knowledge. Hence it would be madness not to avail ourselves of its services until some better means can be found. Prof. HUMMEL is of opinion not only that stonedust renders accumulated coaldust non-explosive, but that it also prevents propagation of a gas explosion.

However Prof. HUMMEL apparently bases his calculations upon the employment of a 9 to 1 mixture of stonedust and coaldust, and this, as a general practice, is hardly likely to be entertained—at any rate at the present time. "Let each one of us go away from this lecture with one idea, and that is that stonedust is the true preventive to the menace of coaldust, that it is effective, simple in application, and cheap," was the peroration to Prof. HUMMEL's lecture, and we deprecate its optimism.

Finality is rarely if ever reached in practical science, and while we are grateful for, and gladly avail ourselves of, the best means at our disposal, we still diligently seek and confidently hope to find something better.

The work begun by the coalowners at Altofts and continued by the Home Office at Eskmeals has hardly passed beyond the preliminary stage. The productive period, is, however, not far distant, and the determination to place the investigation upon a sound basis ensures confidence in its results. In the prosecution of an enquiry of this description, it was inevitable that progress, at any rate in the early stages, must be very slow, for the conditions involved by the problem covered a wide area, and had been little studied in their direct relation to coalmining.

Had the scope of the enquiry been limited to the study of stonedust, the problem would have been comparatively simple, but we understood that (to repeat the words of the late Mr. ENOCH EDWARDS) the Government undertook "the control and responsibility of the continuation of the Altofts experiments, in view of their great importance to the mining population in the direction of the prevention of coaldust explosions."

Although, as we have already said, stonedust is probably the most efficient means of preventing coaldust explosions, according to our present knowledge, this will not satisfy the demand for reasonable safety.

Until the Home Office can satisfy the public that they have found the best practicable means for the prevention of explosions in mines, the work which they have undertaken will remain uncompleted; and should the experimental work be discontinued before that result has been achieved the vast expenditure of money and time which had then been incurred would have been largely wasted.

THE important paper published in another column of this issue, entitled "Ten Deep Borings in East Kent," by Dr. MALCOLM BURR, forms a notable addition

to our knowledge of the geological features of the Kent coalfield. The value of this contribution is twofold. In the first place, it affords useful information respecting the nature and thickness of the mesozoic cover concealing the palaeozoic floor in this area. In the second place, it adds considerably to our knowledge of the stratigraphical character of the Kent coalfield, since these new borings have in most cases been carried for some distance into the coal measures, and some of them even reach the carboniferous limestone below. It may be well



attention, with regard to the Tilmanstone and Milford sections, on the plate illustrating this paper, that these two represent the sequence proved in the sinking pits now in progress, thus accounting for their shallow depth relatively to the borehole sections accompanying them. It is especially important that these pit sections should have been included, because the information they afford is necessarily more precise than that which is possible to procure from a borehole, especially in cases where a chisel drill has been used in place of a core drill.

Dr. BURR calls attention in his paper to some of the features of these records. Of particular interest are the local variations in the thickness of certain of the mesozoic formations, and the question arises how far these are real or only apparent, a question which will only be definitely decided when the shafts are sunk. This applies, perhaps, still more to the coal measure beds themselves, because although in some localities these strata are believed to be lying approximately horizontally, at Waldershare and Fredville they are dipping at a considerable angle.

The question of the dip of the palaeozoic strata has an important bearing upon the structure and boundary of this coalfield. In a paper read in 1907 before the Royal Society of Arts, Prof. BOYD DAWKINS not only gave the angle of dip of the coal measures at Fredville and Waldershare with much confidence, but with equal assurance he defined the limits of the synclinal basin which determines the area of the Kent coalfield, constructing from these data a horizontal section, which, if correct, at once fixes the area within which boreholes can be sunk with a reasonable prospect of reaching carboniferous rocks.

The accuracy of these deductions is of prime importance to the future development of the Kent coalfield, and it would be interesting to know how far these inferences from the few borings which were then available are confirmed by the far larger number now published. Unfortunately, however, so far as an answer to this question goes, information respecting the inclination of the beds is meagre, and possibly we must wait for more shafts to be sunk before the true shape of the basin can be accurately determined.

The proofs afforded by these borings of the persistence of certain mesozoic strata, and the thinning out of others, are of more than academic interest, for the nature of these overlying rocks has proved in some cases to be one of the most formidable obstacles to practical shaft sinking. This point has already occupied the attention of the Geological Survey, who, in the year 1911, published a memoir based upon the information at that time available. In that volume, written by Mr. LAMPLOUGH and Dr. KITCHIN, a most important fact, ascertained by them, has been recorded, a fact which must exercise a profound influence upon future geological speculations respecting the depth and character of the concealed palaeozoic floor. Hitherto—mainly, perhaps, as a result of GODWIN AUSTEN'S classical work, and the still more brilliant teaching of SUSS and others—much trust has been placed in the theory of posthumous folding, and it has been the fashion to regard the axes of later folds, visible at the surface, as mere repetitions of older folds in the palaeozoic floor.

These Kent borings, however, tend to diminish materially our faith in that assumption, for it is shown by Mr. LAMPLOUGH and KITCHIN that the strata, one of the most pronounced features of south-eastern England, is a recent one which is superimposed upon an

earlier and pre-tertiary syncline. In the face of such a structural reversal in post-palaeozoic times, but little confidence can be placed in the theory of posthumous folding as a guide to coal prospecting in concealed areas.

What is left, then, as a basis for geological deduction respecting our concealed coalfields? The answer to this question is given by this paper of Dr. BURR'S. Systematic boring alone can afford trustworthy information under such conditions. This is a lesson which has been far more thoroughly learnt upon the Continent than in this country, but we can scarcely go so far as Dr. BURR in assigning, as a reason for our backwardness in this branch of engineering, the relatively limited scope available in this country. We have many important problems of concealed coal areas awaiting solution, and two successive presidents of the Geological Society have urged the necessity for systematic boring as the only satisfactory means of determining the limits of our mineral wealth. There is another question also with regard to which we await further information from the Kent coalfield, and that is the character of the coal seams themselves and their correlation with those of other areas. The latter point has to some extent been cleared up by the work of Dr. ARBER, based upon his palaeobotanical researches upon the Waldershare and Fredville series, but Dr. BURR informs us that other and more complete results have now been obtained by Dr. ARBER and Mr. BOLTON, and will in due course be published. Generally we are informed that these coal measures fall into three divisions—the transition series, of rich although not very thick bituminous coals, presumably of an age between the Westphalian and Stephanian, a relatively barren arenaceous series, and the so-called middle measures, with thick steam coals.

The transition series is said to occupy the central and south-western portion of the field, the barren belt is a curved area on the north and east, and the steam coal belt is a similar curved area still further to the north and east. Such an arrangement seems to fit in well with the presumed synclinal structure of the basin, with an axis perhaps somewhere south of the line joining Dover and Canterbury. It would point to important differences in the character of the coals at various horizons, and, if these inferences are confirmed, it will be no small triumph for the eminent palaeobotanists who have been able to apply highly specialised knowledge to so practical a purpose.

#### Trade Summary.

The London coal trade during the past week has shown a little more activity, but house coals are still selling with difficulty. Factors, however, have shown a stronger disposition to buy, and the volume of trade doing is gradually on the increase. Manufacturing coals are moving more freely, and all kinds of kitchen coal and bakers' nuts are in better demand. Prices, however, continue stationary, and rule low for the season of the year. Small nuts and slacks are quiet. Coke exceedingly dull.

At Newcastle prompt supplies are scarce, and quotations are firm. Coking coals and smalls are easier. Coke is fairly strong.

The tone of the Durham coal trade is strong, with an upward tendency.

There is less pressure for Lancashire house coals. The bunker trade is steady, and the consumption of slacks is heavy.

In West Yorkshire the demand for house coal is satisfactory, and the export trade in steams is firm.

The trade in South Yorkshire steam coals is exceptionally brisk, largely owing to the weight of new orders. The increases in house coal have rather checked the demand. Coke is weak.

The Derbyshire house coal trade is active in all departments.

The position at Cardiff has been complicated by lack of tonnage, but shipments have been unusually heavy, and prices are very firm. Small coals are weak. Monmouthshire coals are quiet. Rhondda bituminous coals are better.

The Scottish coal trade continues active in all branches.

#### MINERS' FEDERATION OF GREAT BRITAIN.

##### Annual Conference at Scarborough.

The annual conference of the Miners' Federation of Great Britain was opened in the Assembly Hall of the Clarence Gardens Hotel, Scarborough, on Tuesday morning. Mr. ROBERT SMILLIE, president, was in the chair, supported by Mr. W. E. Harvey, M.P., vice-chairman, and Mr. T. Ashton, secretary, and there were present 143 delegates, representing 660,000 men.

At the outset the delegates were welcomed by the Mayor, Mr. A. M. Daniel.

##### Presidential Address.

The PRESIDENT, in his inaugural address, said he wished to express his deep pleasure at the progress which their movement had made this year. At Swansea, a year ago, they represented 586,000 members, to-day they represented 660,000; but their Federation would not fully represent the mining movement until they could place on their books a million members. They had further to congratulate themselves that they had not had many serious accidents in the mines during the past year. They made a rather startling discovery this year when the report of the Cadeby enquiry was given by their representatives. They found, when they approached the Home Secretary in reference to that incriminating report, that the latest piece of mining legislation had been found faulty in two or three of its clauses; that its clauses did not carry out the intention of the people who put it on the Statute Book, and that a prosecution could not take place however clearly it might be proved that the managing director was responsible for the deaths of those men. In the enquiry into the Cadder disaster they were startled again by the fact, already known to them, that the mining companies of the west of Scotland had made no provision whatever to carry out the clauses of the Mines Act to provide either for rescue stations or for the training of rescue brigades. What startled them more than all was that the general manager who was responsible for this mine said distinctly in court that while he had intended to carry out the law and had already enrolled men to form a rescue brigade, and had posted their names on the pit bank and was going to train them, he was waiting for orders before carrying it out, from the Coalowners' Association. They had been told by the inspector of mines that if there had been a fully equipped rescue brigade it could not have saved any man, because the victims must have been dead within an hour and a-half from the time the smoke was found; yet they had one case of a man brought out unconscious after 15 hours, and was living and well to-day. He hoped the Home Office would do more than send out circulars to owners when they were not carrying out the law, but would take action against those owners who were defying the law and refusing to carry it out.

Referring to the trade union movement, Mr. Smillie said they had had criticism recently from people who knew very little from the inside of the movement. They had Mr. Philip Snowden making a statement that the Minimum Wage Act passed last year gave the miners more in increased wages than all that trades unionism had ever done. To suggest to the country that the passing of the Minimum Wage Act had conferred greater benefits on their people than the work of that great Federation for 15 or 20 years was so ridiculous that he could hardly express his opinion of it. The Federation during the last 15 or 20 years had conferred 100 times more benefit upon the mining community than the Minimum Wage Act. He did not agree that if Parliament had not interfered last year they would have been beaten. They were entitled to use Parliament as they did to secure all benefits and make them permanent—shorter hours of labour, minimum rates of wages for all classes of workers—but when they came to realise what had been done by trade unions, they could safely say that the Midland miners would not have secured a minimum wage but for the strike of 1893, and the Scottish and South Wales miners would never have secured similar benefits but for strikes and the fear of strikes. He was in favour of settling every dispute that could be settled by commonsense and on equal terms round a table, but he was of opinion if that failed locally or nationally there was no other weapon in their hands but the power to strike.

Speaking of the Dublin strikes, Mr. Smillie said there was nothing in the world which would bring the workers to their senses quicker than an organised attempt on the part of employers to crush out trade unionism. They had launched their Mines Nationalisation Bill, and he thought the present year's transactions in the mining industry would more than anything else justify them in an agitation for the nationalisation of the mines. He believed never in the history of the mining industry had there been fortunes made equal to those made in the last 18 months, and he maintained that the mine workers had not got anything like their fair share of the increased prices which had been taken from the people. They could have paid a fair and full value for the mines, for the working stock of the mines, not the minerals which they did not propose to pay for, and in six years repay the whole cost of purchase without a single penny of taxation.

The executive, said the president, asked the conference to make a grant of £1,000 per week to be sent to Mr. Bowerman, to distribute among the starving people of



Dublin. The executive had also decided to be responsible for £2,500 of the £10,000 voted by the Parliamentary Committee.

In conclusion he said he wished to say something as to the position of the Federation towards the Labour party of the country, because he could not remain silent respecting what had taken place at Chesterfield. The Chesterfield election proved the loyalty of the Derbyshire miners to their own officials and their resentment of any outside interference, but it did not prove that the miners of Derbyshire did not want to be in the Labour party. The Federation must either be true to any movement it joined or leave it. So long as they were part of the Labour party he would object to any disloyalty by any part of the Federation.

Mr. W. E. HARVEY, M.P. (Derbyshire) asked the delegates to reserve their judgment on the Chesterfield election until they had heard the explanation. The Derbyshire miners had nothing to hide.

#### The Minimum Wage.

The afternoon session was held in private, and a discussion was opened on the minimum wage proposals. At the adjournment Mr. ALBERT STANLEY, M.P., and Mr. HERBERT SMITH reported that there had been a discussion of various phases of the Minimum Wage Act, and the following resolution had been unanimously adopted from Lancashire requesting that at the termination of the Coal Mines Minimum Wage Act the Federation take steps to secure its continuation in an amended form; from the Midland Federation that "This conference is of opinion that in view of the tendency under the Minimum Wage Act to reduce wages in some parts of the Federation from the standard rates to the minimum rates the time has come when definite payment should be fixed for all difficulties arising in working places, and hereby gives the executive full authority to assist any district trying to secure such payment."

The conference then started discussion on the proposal from Scotland for a 7s. minimum, but it was incomplete and no decision was reached.

The conference was continued on Wednesday.

#### The Chesterfield Election.

A discussion was opened on the Chesterfield election, Mr. FRANK HALL putting the case of the Derbyshire miners.

Eventually Mr. T. GREENALL (Lancashire) moved a resolution approving of the decision of the executive not to endorse Mr. Kenyon's candidature. He said the Derbyshire miners had smashed the constitution of the Labour party into smithereens.—Mr. H. ROUGHLEY (Lancashire) formally seconded.

Mr. ROBSON (Durham) asserted that the miners were the weak spot in the Labour party. A number of their members had signed the constitution of the Labour party, who had not in the least observed the pledge they had placed themselves under, and the inference was that they had signed it for the sake of preserving £350 a year.

Mr. Greenall's resolution was carried with four dissentients, Mr. Kenyon voting in favour of it.

On the motion of Mr. W. BRACE, M.P., an instruction was given to the executive to request a joint meeting with the committee of the Labour party with respect to the Chesterfield election with a view to putting matters right.

#### Mutual Insurance.

Mr. ALBERT STANLEY, M.P., moved a resolution in favour of a mutual scheme for the indemnity of checkweighers and other officers of the Federation under the Workmen's Compensation Act. He said the Cannock Chase district had to pay £40 or £50 a year to an insurance company to cover this liability.

Mr. A. ONIONS (South Wales) remarked that in South Wales they covered the whole in one policy.

Mr. W. STRAKER (Northumberland) said in the north of England the general funds of the association were responsible for any liability to accident to their officials.

Mr. R. BROWN (Midlothian) said they had a mutual scheme in Scotland, and they covered this liability for a nominal amount.

The resolution was defeated.

#### Weighing Machines.

Mr. J. G. HANCOCK, M.P. (Nottingham), proposed a resolution calling the attention of the Home Secretary to the fact that in many cases pit-bank weighing machines were not on solid foundations, thus rendering it impossible for the mineral to be accurately weighed. He said they had called the attention of Mr. Mottram, the chief inspector, to this; he had admitted the difficulties and disadvantages, and within the last week or two the Government inspectors had visited the machine houses in Nottinghamshire. What would come of it he could not say. They had also approached the owners, who had admitted the difficulty but had not shown a reasonable disposition to meet it.

Mr. CARTER (Nottingham) seconded, and it was carried.

The conference was resumed on Thursday.

#### Parliamentary Representation.

At the opening of the session, Mr. D. WATTS MORGAN presented the result of the ballot which has been taken under the Trade Union (No. 2) Act as to establishing a political fund. The figures created somewhat of a surprise for the largeness of the minority who are opposed to

spending money on political purposes. On a total poll of 476,666 as many as 194,800 voted against the proposal. Under the new Act these members are in a position to claim exemption from the payment of the levy.

Total number of votes cast .....	476,666
Number in favour of political action .....	261,613
Number of votes against political action .....	194,800
Unmarked papers in ballot boxes .....	17,000
Spoilt votes .....	3,223
Majority for political action .....	66,843

The membership of the Federation in July was 619,000, and deducting 30,000 for boys not allowed to take part in the ballot, 81 per cent. of the members voted, the highest percentage recorded in any of the ballots taken under the Trade Union Act. The return of the ballot to the Chief Registrar of Friendly Societies has been signed and certified by the three scrutineers.

On the motion of Mr. J. G. HANCOCK, M.P., the report was accepted, and the executive were authorised to collect the levy from the members.

The payment is 1s. per member per annum, and if the whole of the members of the Federation contributed would provide an income of £33,000 a year.

#### Evictions in Trade Disputes.

Mr. W. ADAMSON, M.P. (West Fife) formally moved that an amendment of the law is urgently required making it illegal for any workman to be evicted from his house during a trade dispute, and requesting the Labour party to introduce a Bill into Parliament at once.

Mr. FRANK HALL (Derbyshire) formally seconded, and it was carried without discussion.

#### The Housing Problem.

Mr. J. WINSTONE (South Wales) proposed that, in view of the failure of private enterprise to provide housing accommodation for the people, the Government be urged to amend housing legislation in such a way as to give improved facilities to local authorities to borrow money for longer periods at lower rates of interest and also that the amounts advanced should be increased from two-thirds to nine-tenths.

Mr. C. EDWARDS (Monmouth) said that in Risca, with a population of 13,000, they had built 300 municipal houses, letting at a rent of from 2s. to 2s. 6d. a week less than similar houses built by private enterprise.

The resolution was carried.

#### Workmen's Compensation Act.

The conference then proceeded to discuss a series of resolutions asking for the amendment of the Workmen's Compensation Act.

Mr. ALBERT STANLEY, M.P. (Cannock Chase), proposed that the Compensation Act ought to be amended to secure the payment of the full wages when a workman is incapacitated by accident, and requesting the mining members to draft a Bill and ballot for it next Session.

Mr. SHILTON (Cannock Chase) seconded the resolution.

Mr. STEPHEN WALSH, M.P. (Lancashire) pointed out that so long as they were members of the Labour party they were not at liberty to ballot for or draft a Bill until it had been agreed to by the Labour party at its meeting at the beginning of the Session.

Mr. STANLEY said there was no intention to override the Labour party.

The resolution was carried, and it was agreed that the Bill should be drafted by the executive.

The PRESIDENT believed the time had come when the Government ought to be approached and asked to introduce a Bill to amend the Workmen's Compensation Act. These matters must form the subject of a Government Bill because there was nobody else able to carry such a measure successfully through the House of Commons.

Mr. E. HUGHES (North Wales) moved that the Act be amended so that compensation to injured workmen shall only be stopped or suspended upon an order granted by a county court judge. He said that 80 per cent. of the employers in North Wales were connected with an employers' mutual indemnity company whose doctor periodically visited all injured workmen and reported to the employers as to when he considered the men should be fit to return to work, and at that date the compensation was stopped, although the workmen knew nothing about the report.

Mr. MANSELL (Midland Federation) who seconded, said he had a case in his district where an injured workman was ordered to return to work, but on going to a specialist he was certified to be unfit.

The resolution was carried.

Mr. DOONAN (Scotland) moved that injured workmen shall have the right to a commutation of their compensation on the same terms as the employers.—Mr. J. COOKE (Scotland) seconded, and it was carried.

Mr. S. ROEBUCK (Yorkshire) moved a resolution requesting the Labour party to introduce a Bill amending the Workmen's Compensation Act. He said they asked for the repeal of the provision relating to contracting out, an increase of the maximum amount payable in the case of an employer's bankruptcy to the full amount liable under the law, and the payment of compensation from the day of accident.

Mr. ALBERT STANLEY, M.P., who seconded, said they had had an unfortunate experience in his district of contracting out. They had pretty well broken it down, but they had still two large collieries contracted out.

Mr. W. E. HARVEY, M.P. (Derbyshire), said the whole of the districts would be asked to send in suggestions for the amendment of the Act.

The resolution was carried.

#### Checkweighers and Civil Rights

Mr. W. BRACE, M.P. (South Wales), moved that the executive be instructed to interview the Home Secretary as early as possible to press the urgent necessity of passing legislation for removing all disabilities of checkweighers by which it shall be rendered impossible for checkweighers to be deprived of their livelihood for any action which is not illegal when performed by other workmen. He said that when the Checkweighing Acts were passed they were intended to be enabling Acts giving checkweighers the ordinary rights of citizens, but the courts had interpreted them as disabling Acts.

Mr. H. JENKINS (Swansea) seconded, and it was carried.

#### Deductions from Wages.

Mr. STEPHEN WALSH, M.P. (Lancashire), moved that notice be given to all colliery owners that on and after a date to be agreed upon by a national conference no further deductions shall be made in respect of light, lamps or explosives used by mineworkers.

Mr. J. E. SUTTON, M.P. (Manchester), who seconded, said they had done all they possibly could with the coalowners, but they were unable to carry it through, and they considered it should be made a national question.

Mr. LATHAM (Shropshire) said the men in his district were charged 6d. a lb. for tallow candles which they could buy at a co-operative store for 2½d.

Mr. DOONAN (Scotland) opposed the resolution, as it contemplated a general strike to enforce it.

Mr. FRANK HALL (Derbyshire) said he could give instances in Derbyshire in which the tonnage rate had been increased by 5d. per ton. Could they enforce free explosives at that colliery where they already got 5d. per ton by agreement?

The PRESIDENT said agreements had been made as Dick Turpin made agreements with passengers on the highway. It would inevitably mean a strike if the employers did not give way.

The resolution was carried by 73 votes to 40.

#### The General Strike.

Mr. FRANK HODGES (South Wales) moved that the executive be requested to approach the executive committee of other big trade unions with a view to co-operative action in support of each other's demand. He said the Miners' Federation was the most perfect organisation which existed in the trade union world, but their organisation and methods were planless in connection with the wider working class movement. The railwaymen now had a programme for an eight-hours day and a minimum wage, the dockers were formulating a programme. In 1915 all the miners' district agreements terminated, and they would be busily engaged between now and then in formulating their proposals. But were they to formulate that without knowing what the other big unions were formulating? He wanted their executive to take the initiative and approach the other big unions, with a view to a uniform movement; and substituting a scientific strike policy for the present anarchistic methods.

Mr. BURTON (Northumberland), who seconded, said the miners of that country had decided by a large majority in favour of this resolution.

The resolution was carried with two dissentients.

#### The Minimum Wage.

Mr. ALBERT STANLEY, M.P., reported that at the private sitting in the afternoon the following important resolution on the amendment of the Miners' Minimum Wage Act had been passed:—

"That the executive committee be requested to draft a Mining Minimum Wage Bill, including in its provisions the following amendments:—

"(a) That the Act shall be made applicable to all surface workers in the mining industry.

"(b) That it shall set aside such rules in the district awards as in the opinion of the executive ought not to be imposed as a condition of receiving a minimum wage.

"(c) That the minimum wage for colliers and all other pieceworkers shall be ascertained with reference to one week's earnings, entirely disregarding the earnings of all previous and subsequent weeks.

"(d) That in all disputed cases onus of proof shall be on the employers.

"(e) That the minimum for each grade shall be raised by at least 9d. per day, including percentage, and that the Bill when drafted shall be submitted to a further conference for modification, amendment or adoption."

#### Fines and Deductions.

The following resolution from South Wales was unanimously adopted:—

"The Home Secretary having announced his intention of introducing a Bill giving time for the payment of fines in police court cases, the executive be instructed to bring to his notice the necessity that any amendment of the law in this direction should include a provision preventing courts making orders for deductions or damages recovered from a workman for fines or deductions from wages."

#### Election of Officers.

Mr. Robert Smillie (Scotland) was unanimously re-elected president, Mr. W. E. Harvey, M.P. (Derbyshire) was re-elected vice-president, Mr. Thos. Ashton (Manchester) secretary and Mr. W. Abraham, M.P. (South Wales) treasurer, Messrs. Herbert Smith and S. Roebuck (Yorkshire), J. Parkinson (Lancashire), S. Finney (Midlands), Frank Hall (Derbyshire), C. Bunfield (Nottinghamshire), E. Hughes (North Wales), W. Buckley (South Derbyshire), J. Doonan and J. Finner (Scotland), J. Cairns (Northumberland), W. Brace, M.P., G. Barker and Vernon Hartshorn (South Wales), W. House and W. H. Cann (Durham) to form the executive.

Mr. Albert Stanley, M.P., was nominated for the American delegation, Mr. Herbert Smith for Parliamentary Committee, Mr. James Winstone for the Canadian delegation and Mr. Charles Bunfield for the Co-operative Congress at next year's Trades Congress.—Mr. Harry Twist (Wigan) was nominated for the executive of the Labour party at the Glasgow Congress.

**Grimsby Coal Exports.**—The quantity of coal exported from Grimsby during the week ending Friday, October 3, was 24,347 tons foreign and 1,753 tons coastal, compared with 20,250 and 1,852 respectively for the corresponding week last year. The shipments were: Foreign—To Antwerp, 1,659 tons; Dieppe, 768; Dryafjord, 422; Gothenburg, 1,155; E-bjerg, 1,898; Halmstad, 620; Hasle, 623; Karlskrona, 1,212; Helsingborg, 4,065; Norrköping, 1,811; Nykøping, 1,869; Malmö, 419; Pargas, 1,434; Pernau, 1,501; Rotterdam, 465; Södertälje, 1,213; Trolleborg, 2,296; and Hamburg, 927. Coastal: To Lowestoft, 597; Gravesham, 380; and Southwold, 776.



## THE IRISH COAL TRADE.

THURSDAY, OCTOBER 9.

## Dublin.

The labour disputes are still unsettled, and the Coal Merchants' Federation continue to supply coal by means of motor lorries under police protection both in the city and suburbs, although only the most urgent orders are being carried out. Operations on the quays are still being carried out with difficulty, and a number of collier and other vessels are unable to get their cargoes discharged, in consequence of which a good deal of traffic is being diverted to other ports. Last week a collier with a cargo of coal for the Corporation was held up by members of the Transport Workers' Union, the labourers refusing to unload the boat on the ground that the company which forwarded the coal to the Corporation had the week previously supplied coal to the tramway company, a large number of whose employees were on strike; since then the men have returned to work and the cargo has been discharged. There has so far been no general advance in prices of house coal, quotations being nominally the same as those recently ruling, but owing to the fact that business is restricted, largely owing to the difficulty and extra expense in effecting deliveries, merchants are in many instances getting special prices for their coals at present. Prices of steam coals are from 22s. to 23s. per ton, and coke 23s. per ton delivered in the city. During the past week the number of coaling vessels arriving only amounted to 28, as compared with 44 the week previously, chiefly from Garston, Preston, Ayr, Glasgow, Newport, West Bank, Swansea and Point of Ayr. The total quantity of coal discharged upon the quays was 13,378 tons.

## Belfast.

There is no change in city prices, although advances have been made for inland orders in consequence of the higher rates now obtained for all qualities of English and Scotch house coal at the ports of shipment. There is a fairly good supply in the port, and business in all departments continues to improve as the season advances. Quotations in the city are as follow:—Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Prices of steam coals, ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton. Cargoes arriving during the week were chiefly from Garston, Ayr, Ardrossan, Preston, Partington, Widnes, Troon, Ellesmere Port, Girvan, Glasgow, Maryport, Newport, Whitehaven, Workington, and Neath Abbey.

## THE TIN-PLATE TRADE.

## Liverpool.

Business is very slow just now. Some makers seem to be comfortably booked up for the rest of the year, but many are "hungry," and it is only the fact that prices are now down to cost of production which prevents them falling lower. As it is, spot lots are being disposed of at exceedingly low figures. For plates to make, shipment over the next three to four months works are quoting:—Coketins: I C 14 × 20 (112 sh. 108 lb.), 13s. 1½d. to 13s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 6d. to 26s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 7½d. to 13s. 9d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 7½d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 7½d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 6d. per box; I C squares and odd sizes, 13s. 6d. to 13s. 7½d. basis for approved specifications. Charcoals rule easy at 15s. 6d. basis and upwards according to tinning. Coke wasters are in fair request, and quotations run:—C W 14 × 20, 12s. 3d. to 12s. 4½d. per box; C W 28 × 20, 25s. 6d. to 25s. 7½d. per box; C W 14 × 18½, 11s. 4½d. to 11s. 6d. per box; C W 20 × 10, 15s. 10½d. to 16s. per box—all f.o.b. Wales, less 4 per cent.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—T. Lake, C. H. Lake, J. R. Lemon and G. Garnish, carrying on business as ironfounders, at Newport-road, Barnstaple, under the style of Thomas Lake and Co., so far as concerns J. R. Lemon and G. Garnish; R. B. Hodgson and H. T. Cowham, under the style of Hodgson and Cowham, at Grosvenor Buildings, Steelhouse-lane, Birmingham, in the trade of iron and steel manufacturers' representatives and agents; H. Petty and W. J. Glover, carrying on business as motor engineers, at King-street, Leicester, under the style of Glover and Co.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, September 30, 1913, is as follows:—Amsterdam, 1,099 tons; Alexandria, 4,468; Antwerp, 592; Assana, 788; Bremen, 573; Buenos Ayres, 5,329; Copenhagen, 631; Cronstadt, 9,004; Drontheim, 166; Dunkirk, 1,220; Degerhamn, 542; Genoa, 4,890; Hamburg, 8,926; Harburg, 4,076; Harlingen, 843; Libau, 5,790; Landsrona, 4,000; Montreal, 1,107; Malmo, 1,973; Oporto, 1,373; Odessa, 12,927; Oscarshamn, 864; Oxelosund, 1,415; Pernau, 1,963; Palermo, 292; Reval, 1,176; Rotterdam, 5,880; Riga, 4,528; Rouen, 1,400; Stockholm, 701; Sandefjord, 336; Venice, 303; total, 89,170 tons. Corresponding period September 1912, total, 95,968 tons.

**North Staffordshire Institute of Mining and Mechanical Engineers.**—The forty-first annual meeting of the members of this institute will be held at the North Stafford Hotel, Stoke-on-Trent, on Monday, October 13, 1913, at 4 p.m. The following papers will be open for discussion:—"The Reopening of Norton Colliery with Self-contained Breathing Apparatus after an Explosion," by Mr. J. R. L. Allott; "Practical Applications of the Use of Concrete at Collieries," by Mr. G. G. G. The members of the institute and guests will be entertained at the North Stafford Hotel on the evening of October 13, 1913, at 6.30 p.m. prompt, Mr. J. R. L. Allott, in the chair.

## THE LONDON COAL TRADE.

THURSDAY, OCTOBER 9.

The London coal trade for the past week has commenced to show a little more activity than during the few immediately preceding weeks, but the increase in the volume of trade doing is not very marked at present, and seems to be only with difficulty maintained. The ordinary London merchant shows very little disposition to buy freely whilst his own depots are so overloaded with stock, and the knowledge of the marshalling sidings and "wait order junctions" being so congested with loaded coal trucks enables him to look on the approaching colder weather with a good deal of equanimity and freedom from care. The factors, however, have commenced to buy more freely, and have somewhat eagerly bought up any special quantities offering at reduced prices, showing that the summer parcels are now at an end, and to do anything like a regular business with the smaller merchants and dealers up and down the country, further consignments have to be bought, even if the price is at times against them. The depot trade is week, and merchants report that orders from the general public are very slow. The half-hearted delivery trade also makes the turnover at many of the principal depots very little above the average summer day's trading. The protracted warm weather undoubtedly has a good deal to do with this. At the country stations, however, now that harvesting operations are at an end, the bulk of the merchants find an increasing number of orders are forthcoming as the farmers and others turn their attention to the great question of the winter supply of fuel. Manufacturing qualities have throughout shown a steady, regular, demand, and although various reports of the somewhat depressing state of the iron and steel markets have occasionally had an influence upon the hard steam coal market, yet prices have kept very regular, and the demand has been fairly strong. Coke has been very weak for some considerable time. Kitcheners qualities and bakers' nuts have shown very little change. The demand continues fairly strong, but prices remain stationary. The advances on October 1 to the winter contract rates somewhat checked the flow of orders at first, but was found to be only of a temporary character. As the days of the month advance the orders are found coming in again with their old accustomed regularity. In the small coal market, the overplus in the supply has tended towards a weakening influence as regards price, but the increased consumption for electric lighting and gas-making is beginning to make itself felt. The seaborne market is without change 21s. 6d. per ton for best Wallsend, 20s. 6d. for seconds, but all vessels coming forward are under contract. Twenty-four vessels are recorded as arriving in the River Thames for Monday's market, and six for Wednesday. The labour troubles are becoming somewhat acute, and the threatened lock-out in the cotton trade is watched with a good deal of anxiety, largely because, perhaps, it will force so much small coal on the London markets again. The Port of London Authority are having trouble with some of their workmen, but the one which will possibly affect the London market most is the threatened stoppage in the North Staffordshire coalfield.

## Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal	13/	13/
Do. nuts	12/	12/
Birley cube Silkstone	12/6	12/6
Do. branch coal	16/	16/
Do. seconds	11/	11/
Barnsley Bed Silkstone	13/6	13/6
West Riding Silkstone	13/	13/
Kiveton Park Hazel	13/	13/
Do. cobbles	13/	13/
Do. nuts	12/	12/
Do. hard steam	12/	12/
New Sharlston Wallsend	15/	15/
Wharfedale Silkstone coal	14/6	14/6
Do. Flockton Main	15/6	15/6
Do. Athersley house coal	12/	12/
Newton Chambers best Silkstone	17/	17/
Do. Grange best Silkstone	15/6	15/6
Do. Hesley Silkstone	14/	14/
Do. Rockingham selected	14/	14/
Do. Rockingham Silkstone	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best	12/6	12/6
Do. large nuts	12/3	12/3
Do. small nuts	10/	10/
Do. kitchen coal	10/6	10/6
West Hallam Kilburn brights	12/6	12/6
Do. do. nuts	12/3	12/3
Do. London brights	11/	11/
Do. bright nuts	11/	11/
Do. small nuts	10/	10/
Manners Kilburn brights	12/6	12/6
Do. do. nuts	12/	12/
Shipley do. brights	13/	13/
Do. do. nuts	12/6	12/6
Mapperley brights	12/6	12/6
Do. bard steam	11/6	11/6
Cossall Kilburn brights	12/6	12/6
Do. do. nuts	12/	12/
Trowell Moor brights	12/6	12/6
Do. do. nuts	12/	12/
Grassmoor Main coal	13/	13/
Do. Tupton	11/6	11/6
Do. do. nuts	11/6	11/6

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal	13/	13/
Do. do. cubes	13/	13/
Do. special Derbys	12/	12/
Do. house coal	11/6	11/6
Pilsley best blackshale	13/	13/
Do. deep house coal	11/6	11/6
Do. hard screened cobbles	11/	11/
Hardwick best Silkstone	13/	13/
Do. Cavendish brights	12/6	12/6
Do. cubes	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked bards	12/6	12/6
Do. small hards	12/6	12/6
Do. deep large steam	12/	12/
Annesley best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Linby best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Digby London brights	13/	13/
Do. cobbles	13/	13/
Do. top hards	13/	13/
Do. High Hazel coal	14/6	14/6
Bestwood hard steam coal	13/	13/
Do. bright cobbles	11/9	11/9
Hucknall Torkard main hards	12/9	12/9
Do. do. cobbles	11/3	11/3
Do. do. nuts	11/	11/
Do. do. High Hazel H.P.	14/9	14/9
Do. do. London brights	12/3	12/3
Do. do. large nuts	12/3	12/3
Do. do. bright nuts	11/3	11/3
Sherwood H.P. hards	12/6	12/6
Do. hard steam	11/6	11/6
Do. brights	11/3	11/3
Do. cobbles	11/3	11/3
Do. large nuts	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal	11/	11/
Do. screened cobbles	11/6	11/6
Do. bakers' nuts	11/3	11/3
Do. loco Two Yard hards	14/6	14/6
Do. Ryder nuts	11/9	11/9
Do. do. cobbles	13/	13/
Nuneaton steam coal	11/	11/
Do. screened cobbles	11/6	11/6
Do. nuts	11/3	11/3
Haunchwood steam	11/	11/
Do. screened cobbles	11/6	11/6
Do. nuts	11/3	11/3
Wyken steam coal	11/	11/
Do. screened cobbles	11/6	11/6
Do. nuts	11/3	11/3
Exhall Ell coal spires	14/3	14/3
Do. brights	12/6	12/6
Do. large steam coal	12/	12/
Do. best screened cobbles	12/3	12/3
Do. large nuts	12/3	12/3
<b>Leicestershire.</b>		
Snibston steam	10/	10/
Do. cobbles	10/6	10/6
Do. nuts	10/6	10/6
South Leicestershire steam	10/	10/
Do. cobbles or small hards	10/6	10/6
Do. nuts	10/6	10/6
Whitwick steam	10/	10/
Do. roasters	10/6	10/6
Do. cobbles	10/6	10/6
Do. nuts	10/6	10/6
Netherseal hards	18/	18/
Do. Eureka	12/6	12/6
Do. kitchen	10/6	10/6
Ibstock kibbles	9/9	9/9
Do. large nuts	9/6	9/6
Do. bakers' nuts	9/	9/
Do. Main nuts	9/6	9/6
Do. hards	9/3	9/3
Granville New Pit cobbles	11/	11/
Do. Old Pit cobbles	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best	13/	13/
Sneyd best, selected	14/6	14/6
Do. deeps	14/	14/
Silverdale best	14/	14/
Do. cobbles	13/	13/
Apedale best	13/	13/
Do. seconds	12/9	12/9
Podmore Hall best	13/	13/
Do. seconds	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London		
Do. brights	11/	11/
Do. shallow one way	11/	11/
Do. deep nuts	11/6	11/6
Cannock steam	10/9	10/9
Coppice deep coal	14/6	14/6
Do. cobbles	14/	14/
Do. one way	12/	12/
Do. shallow coal	13/6	13/6
Cannock Chase deep main	16/	16/
Do. Deep kitchen cobbles	11/6	11/6
Do. best shallow main	13/	13/
Do. shallow kibbles	13/6	13/6
Do. best brights	13/	13/
Do. yard cobbles	13/6	13/6
Do. yard nuts	12/6	12/6
Do. bakers' nuts	10/3	10/3
Do. screened hards	11/9	11/9
<b>From Messrs. Dinham, Fawcett and Co.'s Report.</b>		
<b>Friday, October 3.</b> —The Durham seaborne house coal market was quiet to-day, but there was some Yorkshire seconds disposed of—no quotations given. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 18.		
<b>Monday, October 6.</b> —There was very little enquiry for Durham seaborne house coal at to-day's market, and only a small trade done in Yorkshire seconds at nominal prices. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 24.		
<b>Wednesday, October 8.</b> —There was a slight improvement in the enquiry for seaborne house coal at to-day's market, but no cargoes available. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 6.		



## ANOTHER HOME OFFICE PROSECUTION IN SCOTLAND.

### Cage Gates, Refuge Holes and Electrical Apparatus.

Sheriff Shennan in the Hamilton Sheriff Court has now concluded a protracted proof in the complaints against Robert Wilson Dron, mining engineer, Bearsden, and James Dalgleish, manager of Dalziel and Broomside Colliery, Motherwell, who were charged with having between March 15 and April 16 last failed to take certain precautions in connection with the mechanical and electrical apparatus at the colliery. The charges referred to—(1) the condition of the cages; (2) the condition of the refuge holes in the main haulage road; (3) failure to mark refuge holes with a distinctive number; (4) failure to have the proper number of refuge holes in certain seams in No. 1 and No. 2 pits of the colliery; (5) failure to mark distinctively additional refuge holes in the side dook haulage road, and placing across entrance to these signal wires, thus impeding ingress; (6) failure to provide proper means of egress to certain engine houses at the colliery; (7) failure to have certain fuses in the distributing box forming part of the electrical apparatus in the Pyotshaw seam of No. 2 pit so protected and enclosed as to prevent contact by persons; (8) failure to cover with insulated material a number of unarmoured cables; (9) failure to have properly secured by some non-conducting and readily breakable material certain cables; (10) in certain seams in No. 2 pit failure to take adequate precautions to prevent the signal wires getting attached to the cables therein; (11) failure to have an earth conductor at the gate-end box in the Blackband seam of No. 2 pit; (12) failure to have a flexible cable for the portable apparatus in the pony level. The case, naturally, has excited much interest amongst those associated with the mining industry in Scotland, and we give a *résumé* of the evidence led.

Mr. Robert Nelson, H.M. Electrical Inspector of Mines, who was the first witness examined, stated that he visited Dalziel and Broomside Colliery on April 16, accompanied by other two inspectors, Mr. Wm. Walker and Mr. R. G. M. Prichard. He was informed that the voltage of the electricity was 500 volts, and he observed for himself that the system in use was direct current. He examined some electrical plant in the Pyotshaw and Blackband seams in No. 2 pit. In the Pyotshaw seam he found a distribution box containing some fuses not so constructed as to prevent the risk of electrical shock. When he saw the fuses they were not in actual use, but he was told that they had been used. Nothing was said about any intention not to use them again. He drew the attention of Mr. Barr, the acting manager at the time, to this defect, and he also spoke of it to Mr. McNeil, the electrician. These officials admitted that there was risk. In the Pyotshaw and Blackband seams he found several parts of the cables insufficiently insulated, the insulating material having been worn away. He observed in the Pyotshaw seam certain unarmoured cables resting on nails instead of being properly secured by some non-conducting and readily breakable material with efficient insulators. At the gate-end box in the pony level in the Blackband seam there was not an adequate safeguard in respect that there was failure to have the earth conductor soldered into a lug for its terminal connection. The trailing cable of a coal-cutting machine was not connected to the system by a properly constructed connection. In the Blackband section witness met Mr. Dron, and they talked over the alleged defects. He showed Mr. Dron the defects in the insulation of the cable which introduced the greatest risk.

Cross-examined for the defence, witness said he had a long conversation with Mr. Dron on the subject of the alleged defects, but he could not remember anything particular of what Mr. Dron said. He made no notes of his examination on the spot, but he did so that same day, and he submitted his report to the Chief Inspector of Mines. He did not admit that the fuses of which he complained were recognised as sufficient for their duty under the old regulations. He had certainly seen a number of them in use, but he had invariably pointed out their danger. He admitted that the conditions in that particular section of the pit on the occasion of his visit were very dry. There was no Government notification given to the officials to adopt the new regulations. This was not a case where such notification was necessary.

Mr. William Walker, H.M. chief inspector of mines for Scotland, who accompanied the previous witness on his visit to the colliery on April 16, corroborated what Mr. Nelson had stated with regard to the electrical apparatus. He found that the cages were not sufficiently covered so as to prevent any falling material hitting occupants of the cage on the head. Nor were the cages adequately fenced at the sides. The sides were only protected 3 ft. up, and above that there was quite another 3 ft. of space with only skeleton bars. He had had cases in which a man's arm had been broken under similar circumstances. He did not consider that the gates of the cages were in accordance with the regulations. They were not rigid enough, being too easily pushed out to a distance wide enough to allow persons or other things to project beyond the sides. He saw the electrician and the acting manager and drew their attention to these points. At three of the engine houses there was only one means of egress, which was insufficient.

Mr. William Loudon, sub-inspector of mines, Dunfermline,

gave a report of his visits to the colliery on April 1, 2, 3, 4, 7, 8 and 9, on all of which dates he made a full inspection of the colliery. He discovered what he alleged to be a large number of contraventions of the various sections of the Mines Act, which he ultimately reported to Mr. Walker. He made notes as he went along and the various points were brought to the notice of the manager. The cages, he held, were not sufficiently covered or enclosed; in the main incline haulage road in the surface mine, and in the Kiltongue main haulage road in No. 1 pit there was not a sufficient number of refuge holes in portions measuring 30 yards and 56 yards respectively, while a number of refuge holes in the colliery were not marked with a distinctive number. There was failure to provide with at least two proper means of egress the surface engine-house, the screening plant engine-house, the fan engine-house on the surface, and the motor-room in Blackband seam in No. 1 pit.

Evidence similar to the above was given by Mr. R. G. M. Prichard, H.M. inspector of mines.

Mr. George Livingstone Kerr, the first witness for the defence, said that he was a qualified mining engineer and secretary of the Mining Institute of Scotland. During the past 12 years he had acted as inspector of accidents in mines for the Scottish Mine Owners' Association. In the course of his duties he had visited Dalziel and Broomside Colliery on several occasions. He thought he could say on the whole that it was pretty well conducted. All reasonable and careful precautions were taken to prevent accidents, in his view. On September 18 he made a special visit to the colliery in connection with the complaint against Messrs. Dron and Dalgleish, and he was accompanied by both these gentlemen. He was shown one of the cages, the covering and fencing of which formed one of the charges. He thought it was sufficiently covered for the safety of the men, and that it complied with section 40 of the Coal Mines Act, 1911. What he saw had been accepted in his experience for 30 years. The space of 8½ in. left uncovered around the side was in his view necessary for putting down long timber and rails. If clause 47 of the Act was to be strictly adhered to, it would not be permissible to have a complete cover with a hinged door, because it would be breaking the regulations to open that door. The sides of the cage, consisting of plates 2 ft. 5 in. in height, with skeleton bars above, complied, in his view, with the provisions of the Act. In all his 12 years' experience he knew of only one case in which a man had got his arm injured by putting it out over the side of a cage similar in construction to this one. The collapsible gate was also safe, and was one very largely in use throughout the country. He considered it sufficiently rigid and stable. He never saw a gate enclosing the whole front opening of the cage. That was wholly impracticable. Rigidity in a gate was only a comparative term. Dealing with the complaint about the insufficient size of certain manholes in the Pyotshaw main haulage roadway of No. 2 pit, witness said he had been shown by Messrs. Dron and Dalgleish a number of manholes in an abandoned road which had not been altered since the inspectors' visits. He measured these refuge holes, and, in his view, they complied with section 44 subsection 3 (a) of the Coal Mines Act. They varied from 2 ft. 11 in. in width to 4 ft. 3 in. The depth varied from 3 ft. to 4 ft. 9 in. He traversed another haulage road in No. 1 pit, and found the manholes in splendid condition. Regarding the charge of failing to mark certain manholes with a distinctive number, witness said it was quite a common custom to chalk the manholes. In regard to the manholes generally, he thought Mr. Dalgleish had gone to a great deal of trouble in his construction of them. He might have complied with the Act with far less work and far less expense. There were over 1,200 manholes in the colliery, and he thought the work he had seen accomplished in regard to them was creditable to the management, who had done everything in the time at their disposal to meet the wishes of the inspectors. He did not think that signal wires placed across a refuge hole 4 ft. from the pavement would impede ingress thereto, and some of the roads were only that height. If signal wires had to be conveyed along a haulage road it was impossible to keep them clear of manholes. The only other method would be to cut a gutter for them in the roof, and this was wholly impracticable. He examined the surface mine engine-house, and saw there a door 18 ft. square and an opening 16 ft. square. The ropes for the drum passed through the latter, but a man could go out and in by it quite easily. In the screening plant engine-house there was also an opening in addition to the door, and under certain conditions this aperture was a proper means of egress. A new fan engine-house was being erected, and this was the reason why a second means of egress had not been provided. He was of opinion that two proper exits were in existence in the motor-room in the Blackband seam. From his reading of the regulations he thought that the apparatus mentioned in the seventh charge was exempt under the Act.

Cross-examined, he had gone very carefully over the 52 complaints mentioned in Mr. Walker's letter to the owners, and was of opinion that some of them were of the most trivial character. He could go down almost any pit, and get together 52 contraventions of a similar nature. He was

of opinion that if the cover of the cage was over the men in the cage the requirements of the Act were fulfilled. Considering the extent of the workings and the age of the colliery, he was of opinion that the management were bringing the equipment into conformity with the new Act as quickly as possible.

Mr. James Hamilton, mining engineer, of Messrs. McCreaths and Stevenson, Glasgow, president of the Mining Institute of Scotland, said he had 30 years' experience of mining and the inspection of collieries. He had inspected the colliery in question on September 20 last. He was then shown a cage not now in use, but which was one of those complained of by the mines inspectors. It was in the same condition as when it had been complained of. The cover was 3 ft. 7 in. and the distance between the gates 3 ft. 10 in. In his view the cage was sufficiently covered for the safety of persons travelling up and down, and it complied reasonably with the Act. In his opinion the collapsible gates with which it was fitted were quite sufficient to ensure safety. Regarding the refuge holes, the provision of these entailed a large amount of labour, and for the last twelve months the number of men skilled in this work was very limited. Besides, cutting refuge holes could only be done when the haulage was idle. He had examined those in the Virtuewell haulage road in No. 2 pit and in the pony levels in the same seam, and he found them all of the requisite depth. The greatest width was 3 ft. 3 in., but that was only in one instance, and the least width 2 ft. 10 in., also only in one instance. To his mind the provision here fully met the requirements of the Act. Even with signal wires across a manhole 4 ft. from the pavement there was a sufficient opening for a person to enter. Witness supported the testimony of Mr. Kerr with regard to the means of egress from the engine houses, and from what he had seen he believed that all reasonable means were taken by the management to enforce the provisions of the Act.

Mr. David Martin, A.M.I.E.E., Glasgow, stated that he visited the colliery on September 20, and saw the distribution box complained of. In his opinion there was no risk of shock with reasonable care, and in any case the installation of the box suggested by the inspectors would have involved new apparatus which would have come under the exempting clause of the Act allowing an extension of time for its installation. The suspension of cables on nails was an accepted temporary expedient until suspenders were obtained. A manager would not look after a detail of that kind. That was the electrician's duty. He did not think also that the manager could be expected to detect the absence of insulating cover at certain parts of the cables. That could only have been detected by a close visual examination. In other respects he thought sufficient precautions had been taken by the manager. Referring to the twelfth charge, viz., failing to have a flexible cable for portable apparatus, witness stated that that was the system in use prior to the 1911 Act, and as the bringing of this up to date involved new apparatus, it came under the exempting clause 20. In cross-examination, witness admitted that with the distribution box fuses complained of there was a possibility of live contact.

Mr. James Dalgleish, the manager of the colliery, said that ever since the Coal Mines Act of 1911 had been passed he had been engaged in getting everything up to the requirements of the Act, at the same time attending to his duties as manager of the colliery. He had been carrying out alterations and improvements consistent with the carrying on of the colliery, and that, as he understood it, was "taking all reasonable means." Had he done any more he would have had to stop the colliery or hinder it very much. He was hampered by the fact that he could not get experienced men to do the work required so as to get it completed within the specified time. He thought under the circumstances they were making good progress. It was not true, as had been alleged, that nearly all the work had been done since the inspectors' visits. When Mr. Loudon, the sub-inspector of mines, visited the colliery in July 1912 he made no objection to the cages. He knew a colliery where the cage gates were exactly the same, yet Mr. Walker, the inspector, had taken no objection to them.

Mr. R. W. Dron stated that he was a civil and mining engineer in Glasgow, and had been employed as such by the Wishaw Coal Company for a period of 30 years. The workings of Dalziel Colliery covered about 4 square miles. His duties were to consult with the company regarding all operations in connection with mining work, and he was not and never had been agent for the company. He regarded himself as an outsider, giving technical advice and criticism of the company. Since 1911 there had been over 1,000 different rules issued with regard to electricity in mines, and it was getting almost beyond human endurance to understand these and to carry them out. He had been in close touch with the manager of the colliery, and was satisfied he was doing what he could to meet the requirements of the Act. Witness was thereafter taken over the charges in detail, and, generally speaking, denied that the conditions alleged by the inspectors existed in the colliery.

Witness was cross-examined at considerable length, particularly in regard to his relation to the Wishaw Coal Company.

Sheriff Shennan has made a *avizandum* on the evidence led.



## MINING AND OTHER NOTES.

The winter programme of the thirty-third session of the activities of the Junior Institution of Engineers has now been prepared, and once again shows that the council of that body are unremitting in their endeavours to make the institution indispensable to the younger, and attractive to the senior, members of all branches of the profession. The weekly informal discussion evenings, that have been a popular feature during the last two or three years, will be recommenced on Friday, October 3, when Mr. W. A. Tookey, M.I. Mech.E. (vice-chairman), will lecture upon the subject of "Gas-engine Testing," at the offices of the institution, 39, Victoria-street, Westminster, S.W. On Monday, October 20, the first monthly ordinary general meeting will be held at the Lecture Hall of the Institution of Electrical Engineers, Victoria-embankment, W.C., when a paper by Mr. G. S. Cooper, upon "Modern Coke Ovens," and embodying notes upon the recovery of sulphate of ammonia, will be read and discussed. A smoking concert will be held early in November. This will be followed by the annual general meeting and election of officers, on Monday, November 17, on which occasion a paper will be read by Mr. Ernest King (member of council), upon "The Junior Institution of Engineers, and its Aims and Objects." The incoming president, Sir Boverton Redwood, will deliver his presidential address on Friday, December 5, and will deal with "The Future of Oil Fuel." At this meeting Sir A. Trevor Dawson, the retiring president, will present the Canet gold medal to Dr. Dugald Clerk, for his lecture delivered in June last—"The Working Fluid of Internal Combustion Engines," and the silver and bronze institution medals will also be awarded to Mr. Arthur Ross and to Mr. E. E. Jeavons, respectively. Arrangements for the annual conversazione and dance in December are well in hand. Amongst the papers down down for discussion in the new year are the subjects of "Modern Gearing" and "Lighting of Factories," which will be introduced by two members who specialise in these important matters. The numerical strength of the institution is still steadily progressing. A local section, with Manchester for its centre, is now in process of formation. The first local section is flourishing in the Midlands, with Birmingham as its centre. A pamphlet has recently been issued, giving particulars of the Junior Institution of Engineers, for the benefit of prospective members and associates, and copies can be obtained upon application to the secretary, Mr. A. Clifford Swales, at 39, Victoria-street, Westminster, S.W.

The contract for the erection of the Cumberland Mining Rescue Station at Brigham has been let to Mr. Thomas Armstrong, timber merchant, Cockermouth, who has commenced with the excavations of the ground work.

Messrs. Reavell and Co. Limited, of Ipswich, inform us that the Grand Prix has been awarded to them for general excellence in their air compressors exhibited at the Ghent Exhibition, as well as diplomas of honour for their three-stage air compressors and for the latter attached to Diesel engines for marine work.

The Board of Trade announces that Sir John Prescott Hewett, G.C.S.I., C.I.E., has been nominated by the Secretary of State for India in Council to succeed Col. D. G. Pitcher as Indian member of the managing committee of the Imperial Institute.

A correspondent says that the Wirrall Colliery Co. Limited, who now own the Neston Collieries, Cheshire, are initiating considerable improvements in connection with those properties, both on the surface and below, with a view to increasing the output. These mining developments are now finding employment for a fair proportion of the male population of Neston; many of the officials and a number of workmen, however, belong to the Wigan district.

After lengthy tunnelling operations the Plodder seam has just been reached at the Earl of Ellesmere's Ashton Field Colliery, Little Hulton, near Bolton. It is understood that additional compressed air coal-cutting machines are to be introduced in the working of this seam. Efforts to reach the Arley measures at the Ashton Field pit are to be made at an early date. Extensive tunnelling operations, which have been in progress for the last two years, are now approaching completion at his lordship's Bridgewater collieries, Worsley, near Manchester, where new and extensive seams are to be tapped and preparations are being made for an increased output. Arrangements are also practically completed for the sinking of a new Arley mine at the Mosley Common Collieries, Tyldesley, the largest of Lord Ellesmere's group of collieries.

Mr. Charles H. Luke advises us that he has severed entirely his connection with the *Engineering Review* both as a director and manager, and in future will devote himself entirely to trade and other exhibition work. He is connected at the present time with schemes in London, Paris, Glasgow, Manchester, Sheffield, &c. Mr. Luke is joint managing director of Walter Cawood Limited, a firm whose business is that of organisers of exhibitions of all classes in any country.

At a meeting of the North Staffordshire Chamber of Commerce last week, Mr. S. W. Wheatly, chairman of the Railway Committee, entered a protest against the advances recently made by railway companies. He stated that the increases had had a serious effect upon the coal trade in the district.

There was a very interesting ceremonial at Denaby on Saturday last, when the annual presentation took place of medallions, labels and vouchers to students of the Denaby Main ambulance classes. The large hall at Denaby was requisitioned for the purpose, and Mr. W. H. Chambers (managing director of the Denaby and Cadeby Colliery Company) presided, the chief inspector of mines for the Yorks and North Midland district (Mr. T. H. Mottram) being among those present. Mr. Chambers asked Mr. Mottram to make the presentation, remarking that the latter was carrying out his work in the district very efficiently. Denaby, he said, had a bigger ambulance corps than either Sheffield or Leeds. Mr. Mottram expressed his pleasure in making the awards. Associated with the function was the presentation of medallions for the York, shire Miners' Association (Denaby and Cadeby branches) to 40 nursing sisters in recognition of their noble work at the Cadeby Colliery disaster of last year.

Lord Scarborough's generous offer to build and equip a hospital for the mining district of Maltby, which now has to depend upon Doncaster and Rotherham, has been the subject of a meeting at Maltby to consider the question of ways and means of supporting such an institution. It was pointed out that the annual cost of maintenance of 12 beds would be £750. Of this amount one-third would be contributed by the miners, one-third by the Maltby Main Colliery Company, leaving the remaining one-third to be raised by the other residents. The raising of £250 by the village residents was thought to be too large an amount, and the opinion was expressed that at the most only £50 or £60 could be raised from the latter source in annual subscriptions. Eventually it was decided to ascertain the actual support likely to come in from outside, so that definite figures may be placed before Lord Scarborough, and his advice sought as to the best means of giving effect to his desire.

In furtherance of the sinking of a new coalmine by the Flimby Colliery Company, officials and workmen have been busy this week pegging out the route of the new tramline to the scene of operations. The line has been pegged out starting from the railway above Fothergill, cutting across the gardens behind, crossing to the south-east of the Mission Room, and then making to Mawson's Lanning, whence it sweeps up the field near to the edge running parallel with the lanning. The scene of operations will thus be on the land between the by-product works and Flimby Lodge. It is understood that the royalty in the Flimby district is as yet untouched.

After drifting operations, the Harrington seam has been struck at the Watgate Colliery, near Maryport. The coal is a little over 3 ft. in thickness, and of a good quality.

The battery of 40 by-product ovens which has just been completed at Oughterside Colliery, near Maryport, were lighted last week, after considerable delay caused by the non-arrival of a connecting main. The lighting of these new ovens is another proof of the rapid growth of the coking industry in West Cumberland, where during the short space of five years a total of 330 have been erected. The new industry has been of much benefit to West Cumberland. It has made local smelters largely independent of Durham coke; it has given birth to the new chemical industry at Rishow and Workington; it has given the local collieries a profitable outlet for the small coal, and made the working of some of the poor seams profitable. Moreover, small cargoes of Cumberland coke have been shipped from Maryport to Belfast, and it may be that in the near future the Cumberland article may find an outlet outside the county. The creosote oil is shipped from Maryport to the United States.

Mr. A. S. E. Ackermann, B.Sc. (engineering), A.M.I.C.E., has returned, after an absence of nearly three months, from Egypt, where he made a series of 35 trials of the Suman-Boys sun heat absorber.

The question of providing a technical college in Middlesbrough was considered at Monday's meeting of the Middlesbrough Education Committee. The Secondary Committee recommended that a portion of the scheme, to meet the immediate requirements of the borough, be proceeded with. Councillor Calvert declared that a technical college was necessary in Middlesbrough, and that it was desirable that a scheme, to cost some £30,000, should be considered. The matter was referred back for further consideration.

Councillor Johnstone Wallace, head of a firm of coal and iron merchants in the city, has been chosen to be Lord Mayor of Newcastle.

The monthly meeting of the Northern Undermanagers and Colliery Officials' Mutual Aid Association was held on Saturday night at the Crown Hotel, Newcastle. A letter was read from the secretary of the North of England Institute of Mining and Mechanical Engineers intimating that the association would be granted the use of the Coal Trade Hall for their monthly meetings, and satisfaction was expressed at this arrangement. Thirty-two new members were elected, the chairman, in answer to a question, stating that the membership now stood at about 380.

A cage accident occurred at Felling pit, near Gateshead, last week, by which seven workmen were injured. A cage-load of men and lads, who had been working night shift, was riding to bank, when the cage suddenly stopped and fell heavily to the bottom of the shaft.

At the Newcastle-under-Lyme County Police Court, on Monday, a miner named Harry Salt was fined 40s. and cost—£4 14s. in all—or one month's imprisonment in the second division, for travelling along an unsafe road in a pit belonging to the Madeley Colliery Company. The road had been rendered unsafe by a fall of roof, and defendant had been instructed not to use it. He had, however, disobeyed the instruction.

Another important addition to the developments of the Tyne will be made when the North-Eastern Railway Company's new staiths at Dunston are completed. It was hoped that the work would be finished this year, but, owing to the lack of workmen, the company do not expect the work to be completed before next summer. The new staiths will be called "West Dunston staiths," and are about a mile and a-half to the west of the older staiths. They extend some 600 yards along the river front, and will provide three places for the shipment of coal. It is stated to be probable that, after the completion of the work, the company will form, as was done at Dunston, a tidal basin on the inner side of the staiths, and provide another set of three shipping places. The tidal basin, part of which is excavated, will have a depth of 30 ft., so that, if this work is completed, there will be facilities for shipping coal on both the land and the river side of the staiths. There are nearly 20 acres of ground set apart for the tidal basin. Between 8 and 10 miles of permanent way have had to be constructed in connection with the work, and the lines to the staiths a from Derwenthaugh on the west and Whickham Junction on the east. A large number of reception sidings have also been made.

Between eight and nine o'clock on Saturday morning smoke and flames were observed issuing from a shaft at Pannier pit, Dunnikier Colliery, Kirkcaldy. The fire, however, was soon extinguished by the pithead workers.

Among the reasons which the Commissioners of Prisons and the Directors of Convict Prisons in their report for the past year put forward for the cause of a decline in the prison population the present general trade prosperity given a prominent place.

Twelve separate charges were brought against John Herman Merivale, agent for the Broomhill Colliery Limited, and Allan Musket Morrison, manager of Broomhill Colliery, at Alnwick, on Saturday, for having contravened sections of the Coal Mines Act, 1911, at the colliery on August 5. The Bench imposed penalties upon Mr. Merivale as follows—£5 and cost for having allowed explosives which were not provided by the owners to be taken into Broomhill Colliery; £1 and costs for having failed to indicate the direction of the bole, prior to a shot being fired, by a mark upon the roof or other convenient place; £1 and costs for having permitted an iron scraper to be taken into the mine; £1 and costs for not having provided a suitable place of storage above ground for explosives intended to be used in the mine. The eight other charges against Mr. Merivale were withdrawn, and all the charges against Mr. Morrison were dismissed.

The King has been pleased to approve of the appointment of Prof. John Dewar Cormack, D.Sc., M.I.C.E., M.I. Mech. E., Professor of Engineering in University College, London, to the Chair of Civil Engineering and Mechanics in the University of Glasgow, vacant by the resignation of Prof. Barr.

Shortly before eight o'clock on Sunday morning flames were discovered proceeding from the lamp cabin at Beamish air pit. Although the flames were subdued in about an hour, considerable damage was done in the lamp cabin. The interior was practically gutted, and the lamp-stand and a portion of the roof were destroyed, whilst between 200 and 300 lamps were damaged.

The Valuation Appeal Court for the Lower Ward of Lanarkshire gave judgment on the 30th ult. on an appeal by the Carron Company against being entered as occupiers of houses in the Cadder district occupied by their workmen. The company admitted paying the tenants' taxes, but they objected to being entered as occupiers, on the ground that they were thus prevented from obtaining the benefit of the 2½ per cent. to which they were entitled from the rating authorities under the House-Letting Act. The Court refused the appeal, so far as it referred to that contention. There was no warrant in the Valuation Acts, the Registration Acts, or the Local Government Acts which would entitle them to leave the occupiers' column in the valuation books vacant, as was proposed. On the second contention, that each dwelling-house should be entered separately, the Court agreed with the view of the appellant.

Mr. T. W. Ward has been installed Master Cutler of Sheffield in succession to Mr. J. Rossiter Hoyle.

On Monday, at the National Gas Exhibition, Shepherd Busb, Mr. Henry O'Connor gave an address on "From Coal Field to Burner." He took a piece of coal and produced purified gas.

At a late hour on Sunday night an explosion of gas, which injured three miners, one fatally, occurred in the underground workings of the Frances Pit, Dysart, belonging to the Earl of Rosslyn's Collieries Limited.

Mr. A. E. Brotherton, head of the firm of Messrs. Brotherton and Co., ammonia and tar distillers, has been offered the Lord Mayoralty of Leeds.



**LABOUR AND WAGES.****North of England.**

Sir Robert Romer, on the 2nd and 3rd inst., presided at a meeting of the Joint District Board for Durham, under the Coal Mines Minimum Wage Act, held at the Coal Trade Office, Newcastle. The meeting was held for the purpose of revising the minimum rate of wages and district rules. Application had been made on behalf of the miners for increases, and amendments had been proposed for various rules. One of the questions debated was a suggested alteration in the scale of payment for boys, and also the raising of the minimum wage for hewers from 5s. 6d. to 7s. 2d. In regard to the revision of the rules generally, the men challenged nearly all of them, especially those relating to the percentage of time lost. The miners also asked for an alteration to be made in the age at which a man is not entitled to the minimum wage. The age limit in Durham is 57 for hewers and 63 for other workers, but in other counties the age limit is higher. These were the principal alterations sought, the remaining objections of the men referring to matters of detail. At the close of the sitting Sir Robert Romer announced that he would communicate his decision on the various matters at an early date.

The Cumberland Winding Enginemen and Boiler Firemen's Association has accepted the recommendation of the joint committee of the winding enginemen and the coalminers to refer their wage dispute with the Whitehaven Colliery Company to arbitration.

**Federated Area.**

A special delegate meeting of the North Staffordshire Miners' Federation, held at Burslem on Wednesday, decided to endorse the action of their representatives who had met the coalowners in consenting to postpone the strike notices for a month, in consideration of the coalowners' promise to advise the non-union men to join the unions. The decision has also been approved by the three other unions concerned—the Engineers and Stokers' Union, the Firemen, Examiners, and Shot-lighters' Association, and the Navvies and General Labourers' Union.

It was announced at the beginning of the week that the threatened stoppage at Messrs. A. Knowles and Sons' collieries, in the Pendleton and Pendlebury districts, on account of certain men having seceded from the union, will be avoided, as the workers complained of have recommenced paying their subscriptions.

An amicable settlement of the differences at the Trowell Moor Colliery has been arrived at. A conference was held at the colliery offices on Friday, October 3, between Mr. A. E. Hewlett, general manager, and Mr. Ratcliffe, manager, and Mr. W. Carter, assistant secretary of the Notts Miners' Association, and Mr. R. Dakin, checkweigher. After considerable discussion on the question of surfacemen's wages, Mr. Hewlett agreed to make a substantial increase in the wages paid to the men and boys working on the bank and also to reduce the hours of bank workers. The manager expressed a desire that the men would be more regular in their attendance, especially on Mondays. He asserted that absentees were responsible for the reduction in the output of as much as 100 tons of coal on a Monday. The miners' representatives promised to do their utmost to secure regularity.

**Forest of Dean.**

Mr. David Organ, speaking at a colliery workers' mass meeting at Bream, near Coleford, on Saturday, said they had got to negotiate with the owners both as to a new general agreement and as to the minimum wage agreement, as notices to terminate these present arrangements had been sent in. The factor which had operated in the district occasioning the need for review of the agreements was the rapid development of the seams of steam coal. They had all worked on an arrangement designed to suit the case of house coal colliers, but that did not by any means meet the case of the steam coal worker. Hitherto the steam coal men had had to put up with it, but there were now more steam coal workmen than house coal colliers, and they were moving in the matter. It was clear, he said, if they were to have peace, that there must be two agreements.

**Scotland**

A serious dispute has arisen in the Old Orbiston Colliery, Bellshill, owned by the Summerlee Iron and Coal Company, and which gives employment to over 300 men. As a result, the men declined to resume work on the 6th inst. The dispute is over the wages paid to the drivers, the men alleging that they are not all paid at the same rate.

A meeting of the Scottish Coal Trade Conciliation Board was held on the 3rd inst. in Glasgow to consider a proposal to reduce the wages of miners by 18½ per cent on the basis of rates prevailing in 1888. No decision was arrived at, and the matter will now be referred to Lord Balfour of Burleigh as neutral chairman of the Board. The most recent advance was granted about three months ago, when Sheriff A. O. M. MacKenzie, K.C., acting as neutral chairman of the Board, decided that the workers were entitled to an increase of 6¼ per cent on basis rates, which is equivalent to 3d. per day. Generally speaking, miners' wages in Scotland at present stand at 7s. 6d. per day. The proposed reduction of 18½ per cent. now asked for by the masters is equal to about 9d. per day. Mr. Adam Nimmo, chairman, presided over the meeting of the Conciliation Board, which lasted fully three hours. A prolonged discussion took place, and in the course of the proceedings there were numerous adjournments in order to give both sides an opportunity of considering separately the points raised.

At the last monthly meeting of the executive board of the Fife and Kinross Miners' Association, held in Dunfermline, it was stated that reports from the districts regarding the question of increasing the con-

tributions from 3½d. to 6d. per week showed that, by an overwhelming majority, the members were in favour of the increase.

**Iron, Steel, and Engineering Trades.**

The ironmoulders in Cumberland, with the exception of those at Carlisle, after serving a week's notice, came out on strike on Saturday for an advance of 2s. per week in wages. The principal centres affected are Workington, where the bulk of the men are employed by the Workington Iron and Steel Company, and at several engineering works in Whitehaven, Maryport, and Cleator Moor. At Workington and at Maryport, the moulders are paid the highest wages in the district, being 1s. per week above those paid at Carlisle. At Messrs. Wharton's foundry at Maryport the moulders get 37s. per week, and they claim the standard rate of 39s.

The average net selling price of No. 3 Cleveland pig iron for the three months ending September 30 last has been certified at 57s. 8½d. per ton, compared with 63s. 7½d. for the previous quarter. There was thus a reduction in price of 5s. 11½d. per ton in the third quarter of the year. This means a reduction in blast-furnacemen's wages of 7½ (7½) per cent., which brings wages from 39½ per cent. above the standard to 32 per cent. above the standard.

**THE DANGER OF COALDUST AND ITS PREVENTIVE.**

The above was taken by Prof. E. L. Hummel, the new head of the mining department in the University of Leeds, as the subject of his inaugural lecture at the Philosophical Hall, Leeds, on September 13, 1913.

In the first place he dealt with the question of coaldust, its production in the mine, and its distribution throughout the mine. He said there was not much data at present regarding the rate of accumulation of the coaldust deposit, and in all parts of the mine except the older portions of main haulage roads, the rate would vary with the advance of the faces, with the opening out of new districts and the stopping of worked-out areas. For this reason it was not necessary to determine the rate of coaldust deposition, at a particular place, over a long period. The composition and degree of fineness of this deposited coaldust also varied very considerably.

Turning next to stonedust, Prof. Hummel referred at some length to the Altofts experiments, illustrating his remarks with the lantern. He then showed how stonedust was applied as a preventive at Altofts Collieries.

Dealing next with some of the advantages of stonedusting compared with other methods, he said it could not get out of order, is simple in application and renewal, for stonedusting, to be efficacious, did not rely on any apparatus or machine for its application. All methods for dealing with coaldust, no matter how efficacious, which relied on apparatus, such as vacuum cleaners, water or fluid spraying devices, or compressed-air jets, depended certainly on the device; and unless this device was self-contained, would depend on a power installation firstly, and also on a water, electric or air supply of a machine, being kept in working order. Further, the comparatively small accumulation of stonedust removed all worry. It required the minimum amount of supervision during application; a couple of lads, that is, unskilled labourers, could be set on flinging the dust at the sides and roof, and at the timbers of a road, and left at it. The most cursory examination told an official if the lads had done their work well, or whether to renew an old application of stonedust. He merely scraped round the roof, sides and timbers with a stick, and, if plenty of light grey dust was there, passed on. Stonedusting was permanent in its action, a stretch of roadway once done was done for several months at least, perhaps a year or more. The dust lay there, in place of the coaldust it had dislodged (and even this the excess of stonedust diluted), heaped up to the steep angle of repose, on the ledges and timbers, waiting for the coaldust that might settle on it during the next few months, to dilute it and thus render it harmless. This was not so if the coaldust was absolutely removed by any method whatever. Not only had the whole process of removal to be repeated, laboriously and at great cost, as soon as even a small quantity of coaldust had collected, but there was no diluent lying waiting for this fresh coaldust. After every application the pit was gradually rendered safer and safer, for the stonedust had a cumulative safe-making effect, until the point was reached when the stonedust became rich enough in coaldust to require renewal. It not only rendered accumulated coaldust non-explosive, but prevented propagation of a gas explosion; it rendered the illumination by safety lamps and electric light more effective, on account of the light grey roof, sides and floor; it did not affect the strata like water, there was no danger of dislodging bits of roof or sides as with compressed air jets and vacuum cleaners, leaving a lot of fallen stone to clean up; and it required very little time, was a speedy process, quicker than spraying (under spraying, including all chemical fluids and water) or compressed air or vacuum cleaning.

Speaking of the elasticity of stone-dusting, the lecturer said one was not tied down to renew an application of stonedust at a definite time within a week or a month, as one was in the case of watering or complete removal. The stonedust already lay at a steep angle of repose due to its binding qualities, and rendered it very difficult for any large accumulation of coaldust to collect even after a considerable time, several months. One could start stonedusting at any time, without much consideration of expense, for no great outlay of capital was required as with other methods.

The lecturer dealt afterwards with some of the objections that had been raised to the application of stonedust as a preventive. Some objected, he said, to the cost of the installation to produce the necessary supply of stone-

dust. This cost need only be the cost of an ordinary mortar-mill. Then the cost of application had been objected to. It was the case of the Silkstone seam at Altofts. There the total length of mechanical haulage roads was 6,100 yards, and about 800 yards of junctions. If the whole of this length were dressed twice a year, the cost of application worked out at ¼d. per ton of coal raised. For the second and third dusting the cost was only 0·20d. per ton. The total cost in a normal case, for a first application, put in other words, was only 1 85d, that is, less than 2d. a yard of road.

Some said that the traffic would stir up the stonedust. This was only true in some instances. Where there was a fast, main and tail, or main-rope haulage, and the seam was, from its nature, one which easily made dust, the amount of coaldust produced was enormous. Not only so, but the coaldust was stirred up every time a load tore along the road. Even in such a case an application of stonedust would lay the lighter coaldust. But this was an extreme case. Where the haulage was by means of slow-moving endless rope the coaldust was not stirred up and the stonedust still less. It had been stated that the method is not efficient, but the coaldust committee's report refuted this objection. It had been stated by some that the stonedust was dangerous to the health of those underground. Dr. Haldane had declared that the dust used at Altofts was certainly not of such a nature as to give rise to any anxiety concerning the effects produced, particularly as the amount inhaled would be very small. Dr. Beattie had also proved, by experiments on the lungs of guinea pigs, that stonedust was not any more injurious than coaldust.

After describing some other preventive methods that had been suggested, Prof. Hummel said it would take some time to make a special determination of the requisite amount for the dust of each individual colliery, and it would seem very unwise to wait any longer before applying the principles now adequately proved. All the criticisms of the method that he had heard or read had been, or could be, satisfactorily answered, but the fact remained that the method was only being practically applied in a few instances. It was usually a mistake to prophesy, but, in the light of the evidence already available, he thought they might say that the man who looked forward to any cheaper or more effective method making its sudden appearance was not justified in this hope by past experience. Some people seemed unwilling to try this method, even experimentally, to study its practical application, until much more research had been done in this subject. That attitude was understandable in the case of any other proposal almost, with the exception of life-saving apparatus. Every coalmine which had any gas whatever, or where shot-firing was carried on, which was not naturally wet or efficiently watered throughout, was running a risk at the present moment.

**The Armstrong College, Newcastle.**—The calendar of the Armstrong College, Newcastle-upon-Tyne, for 1913 is a bulky volume extending to over 500 pages. As in former years, the head of the department of mining and surveying is Prof. Henry Louis, with the collaboration of Mr. Harry Dean as lecturer and of Mr. G. H. S. Kent as prize demonstrator. Naturally, the college caters largely for mining students, and numerous exhibitions, scholarships, &c., are open to them in connection with the Bachelor of Science. Of these, mention may be made of the Surveyors' Institution scholarships of £60 and £50, the Charles Mather scholarship of £40, the Osbeck exhibitions of 10 guineas each, the English travelling fellowship of £120, and the mining scholarship of the Institution of Mining and Metallurgy of £50. The curriculum includes a three-year course in mining for the degree of B.Sc., approved by the Home Secretary, and special diploma courses of two years in mining and mine surveying, also approved. Special one and two year courses can also be arranged to meet the requirements of individual students. During the present session a special course on coal and coalfields will be delivered by Prof. G. A. Lebour, in addition to the course of 60 lectures on the theory and practice of mining, which is supplemented by practical demonstrations and visits to mines and collieries. There is also a course of 30 lectures on the dressing of minerals, and special courses of instruction will be given for firemen, miners and colliery engineers on Saturdays during the winter term. In connection with the course on surveying, advanced students will be able, through the permission of the Barradon and Cuxlodge colliery companies, to practise surveying in these pits, and during the Easter vacation a special field class for practice in advanced surveying will be conducted. Brief mention may also be made of the courses in allied subjects, such as chemistry, metallurgy, geology, and mechanical, civil and electrical engineering. The Armstrong College has also, in recent years, done much to advance the study of business methods and offers a diploma of Bachelor of Commerce, the subjects comprising the study of international trade, railway economics, &c., statistics, economic history, accounting, the economics of the coal and iron industries, shipping, insurance, &c. A special course on the economics of industry is given for students in the engineering, metallurgical and mining departments. The foregoing relates to the day classes. In most of the above subjects there are also evening classes during the Michaelmas and Epiphany terms. A course of lectures and demonstrations in ambulance work is given by Mr. C. F. M. Saint. In connection with the special Saturday course in mining, a three years' syllabus has now been drawn up; during the present winter series of lectures on the steam engine, theoretical electricity, the geology of the coalfields, the chemistry of mine gases and explosives and haulage and winding will be given, and these will be followed (in 1914-15) by lectures on geometry, transmission of power, pumping ventilation, trigonometry, mine surveying, the management of horses; and (in 1915-16) by lectures on machine drawing, the chemistry of fuel, boring and shaft sinking, the principles of geology, experimental mechanics and drifts and levels. The special course for colliery engineers also covers three years, this having been instituted on the initiative of the North of England Institute; with a few alterations, the syllabus is the same as that quoted above.



## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**The New School of Mines—Generous Provision by the Coalowners—An Institution of National Importance—South Wales and the Miners' Federation of Great Britain—Drastic Proposals for Wage Increase—"Standard" Desired to be Higher—The Revolutionary Prospect of Combined Strikes—Further Combination in Colliery Ownership—Wagon Shortage in Sight—Dead-Buffer Stock Shunted—Closing of Morfa Colliery—Banksmen's Grievances and their Remedy.**

On Wednesday the new School of Mines, to which frequent reference has previously been made in these columns, was formally opened. It is one of the most important institutions in the country, having the promise of rendering incalculable service to the coal-field, and its organisation and maintenance embody features of the highest importance. It is essentially a coalowners' establishment, yet working in conjunction with the University College at Cardiff, with the education authorities of Glamorgan, Monmouth, and the autonomous areas; and it has enlisted the sympathy and secured promise of help from the Miners' Federation. The governing authority is a Mining Board composed of representatives of colliery proprietors whose total output is 20 millions of tons, they having agreed to a levy of one-tenth of a penny per ton for support of the School. Sixteen companies are associated in the scheme, Sir Clifford Cory, Bart., M.P., being chairman, and the trustees being the Earl of Plymouth, Lord Merthyr and Mr. David Davies, M.P. (Ocean). Forest House, at Treforest, near Pontypridd, was acquired, and £16,000 has been spent in alterations and additions.

The distinctive feature of the work is that it will be practical as well as technological, and that the school will be available for all classes of students who can pass the entrance examination, the fees being very low. A working arrangement with the University College, Cardiff, provides that whilst the College will teach science, the School will instruct pupils in its practical application to coalmining. At the other end of the scale it is sought to co-ordinate with the system of the School the mining instruction in the evening classes of the different local councils, so that pupils may proceed thither without a break; ultimately going to University College.

There will be four courses, to be followed by a post-diploma course at the College, when students desire to specialise in any particular science subject. At the School the arrangement is:—

**First Course.**—Three years full time; 30 hours per week for a 30 weeks session each year. Students in this course will have to get four months' practical experience underground each year; and arrangements will be made enabling them so to do.

**Second Course.**—Four years part-time, for those who cannot give full time. One day of eight hours per week for mine managers, chemists, electricians, and mechanics. Also, three years of one day per week for mine surveyors.

**Special Courses (for Colliery Officials).**—Engineering subjects, valuation, mining law, electrical equipment, colliery management, and course for surface foremen.

Most elaborate provision, without stint of outlay, has been made for carrying on the work of the School: laboratories, electrical and mechanical workshops, the latest and best machinery, gas-testing and other apparatus, geological and chemical equipment, as well as the usual lecture rooms, drawing offices, &c.

For encouragement of students possessing special aptitude, the Mining Board will give five studentships of £50 a year each, enabling the holders to take the fourth year (or post-diploma) course at University College.

A strong staff has been brought together. The principal is Prof. Knox, formerly at Wigan College, and with him are associated—as assistant-director, Mr. J. Samuel, formerly mining lecturer under Glamorgan Council; as senior lecturer in electrical engineering, Mr. F. H. Downie, B.Sc., from Glasgow College; senior lecturer in mining chemistry, Mr. E. C. Evans, B.Sc., previously chief chemist at Lewis Merthyr collieries; mechanical engineering, Mr. R. James; and the assistant lecturer in mining and geology will be Mr. R. Richards. The secretary of the Mining Board is Mr. H. M. Ingledew, Cardiff.

During an interview with the Rhondda Education Committee, on Friday, when their support and approval of the school at Treforest was sought, Mr. Ingledew mentioned that it was proposed to open schools also at Crumlin (Monmouthshire) and at Swansea. The committee promised sympathetic consideration to the idea that the evening mining classes should have their work so arranged as to co-ordinate with that of the school.

Seven candidates went to the ballot for three representatives of South Wales on the national executive of the Miners' Federation of Great Britain, and in the result the three retiring members were re-elected—Mr. W. Brace, M.P. (president of the South Wales Federation), with Messrs. Vernon Hartshorn and George Barker. The two latter are, it may be noted, leaders in the advanced section; another Socialist was fourth; and the treasurer of the Federation (Mr. Onions), with Mr. R. W. Morgan, of the Rhondda, were fifth and sixth.

This election gives emphasis to a recent pronouncement by Mr. Hartshorn upon the policy of national

strikes. He was dealing, by way of warning, with what he regarded as a threat that employers might "fight to a finish" against proposals they regarded as excessive, and he outlined the present situation and future possibilities as he views them. "We have begun," he states, "an era of national strikes, and these will develop, I believe, into national strikes by several industries working together on a common understanding. . . . Refusal on the part of employers to try and negotiate a settlement and a determination on their part to fight to a finish will be attended in future by much greater possibilities of danger than has ever been the case in the past. The effects of a strike must reach a point at which industrial organisation gives rise to revolutionary conditions." Such conditions "develop more rapidly with a strike of railwaymen, and there is no doubt that a combined strike of miners, railwaymen and transport workers would develop revolutionary conditions almost immediately. . . . The national federated strike of the future will render early negotiation 'imperative in the interests of the country' (adopting Mr. Asquith's phrase when introducing the Minimum Wage Bill), and will render all talk of fighting to a finish, without any attempt at negotiation, wild and reckless in the extreme."

Read in this connection, the proposals of the South Wales men, brought up this week in the annual conference of the Miners' Federation of Great Britain at Scarborough, acquire peculiar significance. These are, that the minimum wage for each grade be raised 6d. per day; that the Act shall apply to all surface workers; that rules in the district award shall not apply to day-wage men; that, in fixing average earnings, only one week be taken; and that, in disputed cases, the onus of proof shall be on the employers.

In addition, it has to be noted that there are other proposals for wage-rate increase; that the extinction of existing standards is suggested—a new standard 50 per cent. higher being substituted; and that the South Wales resolution would merge into that new standard "all bonuses and percentages recognised by the present Boards." For their political action as a union the ballot gives approval which, with a membership of 660,000 and a levy of 1s. per year, would yield over £30,000 of annual income for that purpose, reckoning on the full membership.

Messrs. D. Davis and Sons (Ferndale) having added to their previous holding the interest which Furness, Withy and Co. held in the Griffin-Nantyglo Collieries, are now in full control. The output of this undertaking is 1½ millions of tons per annum; the Ferndale properties yield 1¼ millions of tons, and the Welsh navigation 500,000 tons. So that Messrs. D. Davis and Sons' total is now 3,750,000 tons yearly. Mr. F. L. Davis, the principal, is chairman of the employers' side of the Conciliation Board. He is understood to have an interest also in Kent mining.

The question to which we directed attention last week is exercising many minds, for the disuse of all dead-buffer wagons at the end of the year cannot be averted, the deputation to the Clearing House a few days ago having failed to discover any way of escape. It is said to affect more than 10,000 wagons in Wales, and anywhere from 30,000 to 40,000 in the country as a whole. Substitution cannot be achieved, for sufficient new wagons do not exist, and cannot be constructed in the time available, even if capital were forthcoming; nor can all the dead-buffer stock be converted in less than three months, which is all the time that remains. It is stated that the railway companies are issuing instructions, complying with the Board of Trade regulation, to stop all dead-buffer stock at the close of the year. With vast increase of shipments in sight, this enormous reduction in carrying power cannot but be viewed very seriously.

The Abergorky Colliery team were successful on Saturday in the competition for Lady Vaughan Williams' ambulance challenge cup which is offered for Rhondda teams. They beat Maindy and Eastern, Cwmpark, Ystrad Rhondda, and Cambrian Colliery; and their success is the more noteworthy because they won the Sir Charles Warren shield a week previously.

The sinking of a new pit has been commenced at Mardy, Ferndale; and it is anticipated that the steam coal seams will be reached at about 400 yards. Locket's Merthyr Company are the owners of the colliery; and Messrs. Harris and Son, Pengam, have undertaken the work of sinking.

Mr. R. W. Morgan, colliery proprietor, Ystalyfera, who died in July, at the age of 70, after being thrown from his horse, has left an estate of £13,563.

At Penrikyber Colliery, over 2,000 men came out on strike, non-unionists being objected to. As these were, however, beginning to pay up, the stoppage was not expected to last long, seeing that only 150 were said to be "out of compliance."

An American telegram states that a Welsh syndicate, "believed to be headed by Mr. D. A. Thomas, chairman of the Cambrian Combine," has taken an option on 100,000 acres of coal land in West Virginia, and that the deal will "involve a sum of 10 million sterling." The telegram is probably an echo of intelligence already published on this side of the Atlantic, it being common knowledge that Mr. Thomas has visited this and other American coalfields and that he would acquire an interest in Virginia. He has, however, declined to make any statement on the matter beyond what has already been published, and warned an

interlocutor that American reports are often "very much exaggerated."

It having been decided to close the Morfa Colliery—which is situated among the sandhills near Port Talbot, and has workings extending under the sea—some of the labour leaders have met in conference the representatives of the owners of the colliery (Messrs. Vivian and Sons) and the landlord's agent in order to discover the practicability of continuing work. No statement was issued concerning the proceedings, which were private, but the effort is watched with keen interest, the village of Taibach being largely dependent upon this colliery and upon Messrs. Vivian's works. Little result has, however, since attended the efforts of those initiating the conference.

Banksmen's grievances have for some time been under investigation by a joint committee appointed by the Conciliation Board, and evidence has been taken as to the hours of labour, wages, &c. Allegations have been made as to 12-hour shifts, or even longer; and also as to wide differences of wage-rates. An offer from the owners' side would have established a fixed time per shift; but the men's representatives could not accept without reference to the Federation. The employers' representatives had plenary powers to settle; and desired that the other side should be similarly empowered. To that end, last Friday's meeting was adjourned till October 17. It is understood that the employers' offer is nine-hours' shift for week-days, and eight hours for Sunday; and that this is acceptable to the men's side.

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

## Abstracts of Contracts Open.

**ABERGAVENNY, OCTOBER 13.**—Good house coal, for the Council Schools. Tenders to Mr. Fred Baker Gabb, clerk to the Group.

**BARNES, OCTOBER 13.**—For the Urban District Council of Barnes, about 120 tons of best Yorkshire Silkstone. Tenders to Mr. Wm. Thos. Goodale, clerk, Council House, Mortlake, S.W.

**BRUSSELS, OCTOBER 14.**—About 1,500 tons of coal briquettes, required by the Marine Department of the Belgian Congo, to a specification that may be obtained on application at the Ministère des Colonies, 27, Rue des Ursulines.

**GRANARD (IRELAND), OCTOBER 13.**—About 150 tons best Wigan or Whitehaven coal, free from slack, for the Guardians. Tenders to Mr. John Kiernan, clerk of Union, Boardroom, Granard.

**HAMMERSMITH, OCTOBER 15.**—Anthracite coal and mechanical stoker coal, for the Borough Council. Forms from Mr. G. G. Ball, borough electrical engineer, Electricity Department, 85, Fulham Palace-road, S.W.

**MORLEY, OCTOBER 27.**—House coal, for the corporation. Forms from Mr. F. Tackray, town clerk.

**MOTHERWELL, OCTOBER 13.**—Coal, dress, and tripping to the County Hospital, Motherwell, county of Lanark (District of the Middle Ward). Schedules from Mr. W. E. Whyte, district clerk, Hamilton.

**NUNEATON, OCTOBER 15.**—Coal for the education committee. Forms from Mr. F. S. Clay, Education Offices, Nuneaton.

**SHEERNESS, OCTOBER 14.**—About 400 tons washed slack, for the Urban District Council. Forms from Mr. Vincent H. Stallon, clerk of the Council, Council Offices, Sheerness.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &amp;c.

**CANBERRA (AUSTRALIA), NOVEMBER 24.**—*Pumping Plant.*—Tenders are invited by the Commonwealth Department of Home Affairs for the supply of waterworks pumping plant for Canberra, the new Federal capital in New South Wales. The contract is divided into two sections, viz.:—(1) Pumps, motors and switchboards; (2) transformers and transformer switchgear. Forms, &c., from the works director for New South Wales, Custom House, Sydney.\*

**CHRISTIANIA (NORWAY), DECEMBER 1.**—*Coal Discharging Machinery.*—Tenders are invited by the Norwegian Main Railway for the supply of two coal-discharging machines, each capable of discharging at least 50 tons per hour.\*

**DROGHEDA (IRELAND), OCTOBER 14.**—*Pump.*—For the deepening of the pump well at Waterunder, Mell, and the erection thereon of a new pumphead, for the Louth Rural District Council of Drogheda Union. Tenders to Mr. Thomas Dowdall, clerk of the council, council offices, workhouse, Drogheda.

**DROGHEDA (IRELAND), OCTOBER 14.**—*Pumps.*—For the sinking of well holes and the erection of pump heads thereon at Mullaghteeing and Ratholland, for the Meath Rural District Council and Drogheda Union. Tenders to Mr. Thomas Dowdall, clerk of the council, clerk's office, workhouse, Drogheda.

**DUNDEE, OCTOBER 27.**—*Tar Distillation Plant.*—Erection of tar distillation plant, &c., for the Corporation. Forms from Mr. Alex. Yuill, engineer's office, gasworks, Dundee.

**HASTINGS (NEW ZEALAND), DECEMBER 18.**—*Turbo Pumps, &c.*—Tenders are invited by the Hastings Borough Council for the supply and erection of two sets of high-lift turbo pumps and electro motors, together with suction and delivery piping, &c. Specification, &c., may be obtained on payment of £2 2s. (returnable), from the Town Clerk, Hastings, New Zealand.\*

**JOHANNESBURG, OCTOBER 28.**—*Boiler Tubes.*—Tenders are invited by the South African Railways Administration for

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.



the supply and delivery of iron and steel boiler tubes. Copies of the specification and form of tender can be obtained from the office of the High Commissioner in London for the Union of South Africa, 32, Victoria-street, S.W.\*

LONDON, OCTOBER 13.—*Switchgear, &c.*—For the 20,000 volt high-tension switchgear, low-tension switchgear, and accessories, for the power-station and sub-stations to be constructed in connection with the electrification of the Melbourne Suburban Railways. Specification and form of tender may be obtained from the Agent-General for Victoria, Melbourne-place, Strand, W.C.

LONDON, OCTOBER 14.—*Steel Rails, &c.*—For the directors of the Bombay, Baroda and Central India Railway Company:—Steel rails and fishplates, dog spikes and bearing plates. Forms from Mr. C. Crommelin, secretary, Offices, Gloucester House, 110, Bishopsgate, London, E.C.

LONDON, NOVEMBER 3.—*Corrugated Sheets.*—Galvanised corrugated sheets to the Egyptian War Department. All particulars obtainable from Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.

MELBOURNE (AUSTRALIA) NOVEMBER 3.—*Galvanised Iron Pipes.*—Tenders will be received at the office of the Deputy Postmaster-General, Melbourne, for the supply and delivery of 900 galvanised iron pipes.\*

METHLEY, OCTOBER 18.—*Gas Main Trenching.*—Digging and filling in of about 890 yards of trenches for gas mains, for the Urban District Council. Forms from the Council's surveyor, Mr. Thomas Thompson, Red House, Methley.

PONTARDAWE.—*Shaft Sinking.*—For the sinking of a shaft 14 ft. in diameter to a depth of about 150 yards, for the South Wales Primrose Coal Company Limited, Pontardawe. Specification and other particulars can be obtained on application to Messrs. Wight and Fido, consulting mining engineers, Atlas-chambers, James-street, Cardiff.

ROCHDALE, OCTOBER 13.—*Mechanical Filtration Plant.*—Supply and erection of the necessary filters, chemical apparatus, oil engine, turbine or water motor, gearing, shafting, pipe connections, valves, &c.; also electric lighting plant on the trunk main from Ramsden Reservoir at North Ramsden, Walsden, for the Corporation. Specification and form of tender may be obtained on payment of a deposit of three guineas (returnable) from Mr. F. H. Brunt, A.M.I.C.E., engineer and manager, Waterworks Office, Lord-street, Rochdale.

SOUTH SHIELDS, OCTOBER 15.—*Turbine.*—Erection of one 2,000-kw. turbine, direct coupled to two three-phase generators in tandem, together with condensing plant, rotary converters, transformers and switchgear, &c., for the corporation. Specification and forms from Mr. Harry S. Ellis, borough electrical engineer, South Shields, on payment of £1 ls. (returnable).

SYDNEY (AUSTRALIA).—*Steel Bridge.*—Tenders are invited by the Department of Public Works of New South Wales for a steel bridge for the Wilson River, in the fifth section of the North Coast Railway.

WARRINGTON, OCTOBER 11.—*Gas Compressor, &c.*—(a) A gas compressor, (b) building for above, for the Corporation. Full particulars on application to Mr. W. S. Haddock, general manager.

WONTHAGGI (VICTORIA, AUSTRALIA), NOVEMBER 12.—*Haulage Engine.*—Tenders are invited by the Victorian Railways Commissioners for the supply and delivery of a haulage engine (mechanical portion only), and a 200-horse power electric motor and equipment, for the State coalmine.\*

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

**South Wales Institute of Engineers.**—A special general meeting will be held at the Royal Institution of South Wales, Swansea, on Tuesday, October 14, 1913, at 5 o'clock p.m., when the following papers will come up for discussion; "Latest Developments in connection with Mechanical Puddling," by David E. Roberts, M.Inst.C.E.; "Recording Instruments for the Scientific Control of Iron, Steel and Tin-plate Works," by Sidney B. Haslam, M.I.E.E., M.I.Mech.E.; "Underground Conveying," by Sam Mavor, M.I.E.E.; "Machine Mining in the South Wales Coalfield," by G. D. Budge and W. E. Jayne; "The Sinking and Equipping of the Bedwas Colliery," by E. L. Hann. A council meeting will also be held the same day and place at 4.15 p.m.

**Doncaster's Water Supply.**—Great interest has been aroused in the Doncaster district by an arrangement which the Corporation has just arrived at with the City Council of Leeds to deliver water in bulk to supplement the present available supply of the Doncaster Corporation. Doncaster already draws a large supply from Sheffield, but so great are the demands of the present, to say nothing of the future, owing to the expansion of the district entirely as the result of colliery enterprise, that further provision has of necessity had to be made. An adequate supply of water for the new mining districts has, in fact, been a problem that for a long time past has been engaging the earnest and anxious attention of the various local authorities into whose areas the crowds of miners and their families are flocking. The Doncaster Corporation have now agreed to take from Leeds, in perpetuity, 500,000 gallons per day, the whole of which will be paid for, whether it is used or not, at a flat rate payment of 8d. per 1,000 gallons. Doncaster is empowered, if necessary, to take up, without notice, two million gallons per day at the same price. If in the future it should be desired to go even beyond this, Leeds agrees to give an aggregate supply up to four million gallons, after at least seven years' notice has been given. The total cost of the scheme the Leeds Corporation are undertaking is about £110,000, and in addition the Corporation has agreed to contribute £2,000 to the expenses of the mains within the Doncaster water area.

## THE FREIGHT MARKET.

The outward freight market has been fairly active during the past week. On the north-east coast loading turns are very much congested, prompt coal supplies are very scarce, and tonnage is in ample supply—hence, rates are inclined towards weakness. Coasting business is being done at about 3s. 7½d., Tyne to London, and 4s. to Hamburg, with Havre at 5s. The Baltic is based on 4s. 6d. to Memel, and from 5s. 9d. to 5s. 10½d. to Sundsvall. The Bay is worth about 6s. to Bordeaux. The Mediterranean is quoted at from 9s. 4½d. to 9s. 6d. to Genoa. At South Wales the volume of business done is a fair average, but rates, especially for large vessels, are weaker. The Clyde is dull, at rather easier rates. The Humber is moderately active, and easier. Homewards, the Black Sea demand has fallen off, and rates are in charterer's favour. America has very little enquiry for any position. The River Plate is less firm. India is quiet, and nominally steady. Australian charterers have ample tonnage. The Mediterranean and ore trades are unaltered. The Baltic is steady.

Tyne to Algiers, 1,700, 8s. 6d.; 2,900, 8s. 1½d.; Bayonne, 2,900, 6s. 6d.; Boulogne, 1,000, 5s. 3d.; Bordeaux, 2,900, 6s.; 2,300, 6s.; Civita Vecchia, 4,500, 10s. 10½d.; 3,800, 10s. 6d.; Caen, 750, 6s.; Cherbourg, 950, 6s.; Constantinople, 3,500, 11s.; Carthagena, 1,100, 11s.; Genoa, 3,800, 9s. 9d.; 5,400, 10s.; Pelaw loading; 6,500, 9s. 6d.; 5,100, 9s. 6d.; Gibraltari, 2,000, 10s. 9d.; 500; Gibraltar, 2,300, 8s. 6d.; Harnaes, 1,600, 5s. 10½d.; Helsingfors, 2,700, 5s. 9d.; Havre, 1,600, 5s.; 2,000, 5s., from Dunston; 1,300, 5s., from Dunston; Hamburg, 2,500, 4s.; 2,000, 4s.; Königsberg, 1,200, 5s. 3d.; Karabekminde, 1,300, 6s. 3d.; Kiel Canal, 1,650, 5s. 3d.; 2,300, 5s.; London, 2,000, 3s. 7½d.; Mariager, 1,300, 6s.; Memel, 2,300, 4s. 6d.; 1,300, 4s. 6d.; 3,600, 4s. 6d.; Marseilles, 5,400, 9s. 3d.; 4,000, 8s. 9d., 600, from Dunston; Norrköping, 1,700, 6s.; Naples, 4,400, 9s. 6d., 700; Nantes, 1,700, 6s., from Dunston; Oporto, 1,200, 10s. 3d.; Pillau, 2,000, 5s.; Port Said, 5,600, 9s. 6d.; 5,600, 9s., 400; Portland (Or.), sail, 18s.; Rochefort, 2,100, 6s.; Rotterdam, 2,000, 4s., 700; Reval, 2,200, 5s. 6d.; Sundsvall, 1,900, 5s. 10½d.; 1,700, 5s. 9d.; Savona, 5,100, 9s. 6d.

Cardiff to Algiers, 3,100, 10½ fr.; Ancona, 5,500, 11s. 3d., October 13; Arzew, 2,400, 11 fr.; Alexandria, 5,800, 9s. 3d., October 14; 5,200, 9s. 3d.; Barcelona, 5,200, 10s. 1½d.; Brest, 2,600, 4s. 9d.; Bahia, 4,200, 17s. 9d., October 15; Buenos Ayres, 20s.; Cronstadt, 3,000, 7s. 6d.; Cherbourg, 1,700, 5s. 9d.; Calais, 1,100, 5s.; Civita Vecchia, 4,300, 10s. 3d., 500, October 13; 4,500, 10s. 9d.; 3,300, 10s. 9d.; Caen, 700, 5s. 9d.; Cromarty, 3,200, 4s. 3d., Admiralty; Cagliari, 2,700, 10s. 3d.; Cadiz, 2,100, 8s. 10½d.; Corunna, 900, 8s. 6d.; 900, 8s. 3d., 250; Catania, 4,000, 10s. 6d., October 13; Danube, 3,000, 11s. 6d.; Dundee, 530, 5s. 3d.; Devonport, 2,900, 3s. 9d.; several steamers, 2,000-3,000, 2s. 9d., option Portland or Portsmouth 2s. 10½d., Admiralty; Ferrol, 1,400, 8s. 3d., 250; 1,500, 8s. 6d.; Genoa, 9s. 10½d., October; 4,500, 9s. 9d., October 13; 6,600, 9s. 6d.; 5,000, 9s. 7½d., October 13; 3,600, 9s. 7½d.; 5,600, 9s. 6d., October 17; 4,400, 9s. 6d.; 5,100, 9s. 4½d.; Gibraltar, 3,200, 5s. 6d., Admiralty; 2,400, 8s., 500, October 13; Havre, 2,000, 5s.; 2,800, 5s. 1½d., 500, 5s. 3d.; Huelva, 1,000, 9s.; Islands, 6,000, 9s. 3d.; 4,000, 9s. 7½d.; 4,200, 9s. 3d., October 16; Kustendje, 3,100, 10s. 9d.; 3,000, 11s.; Leghorn, 4,800, 9s., 800; 2,800, 9s. 7½d.; 4,000, 9s. 10½d.; 5,500, 10s.; 4,500, 9s. 9d., October 13; 3,500, 10s., Genoa terms; 5,000, 9s. 7½d., October 13; 3,600, 9s. 7½d.; Lisbon, 2,100, 7s. 6d., 300; 2,800, 7s. 4½d., 350; 1,500, 7s. 9d., 300; 5,000, 7s. 3d., 500, October 15; La Rochelle, 2,200, 6½ fr.; Lamash, several steamers, 3s. 3d., October 22-23, Admiralty; Leixoes, 1,450, 8s. 6d.; Las Palmas, 5,200, 9s. 3d., October 7; 6,000, 9s. 3d.; 4,200, 9s. 7½d.; 4,600, 9s. 3d.; Messina, 5,000, 8s. net, October 13; Malaga, 1,500, 9s.; Mostaganem, 2,400, 11 fr.; Malta, 5,000, 7s. 9d., October; 2,000, part cargo, 7s. 9d.; 4,000, 7s. 6½; Marseilles, 5,600, 11 fr.; 6,300, 11 fr.; 5,500, 11 fr., October 16; Naples, 4,900, 10s., 500, October 13; Oporto, 1,450, 8s. 6d.; Perim, 5,500, 11s. 6d., November; Piræus, 4,500, 9s. 4½d.; Port Said, 6,600, 9s. 4½d., October 13; 6,200, 9s. 6d.; 5,200, 9s. 6d.; 6,000, 9s. 3d.; 5,600, 9s., October 18; Palma, 2,100, 10s. 6d., 300; Pernambuco, 4,200, 17s. 9d., October 15; Palermo, 4,000, 10s. 6d., October 13; Rouen, 850, 5s. 10½d.; 1,000, 6s.; Reggio, 3,500, 11s., October 13; Rio de Janeiro, 19s. 6d., October; 5,600, 18s. 6d.; 5,600, 18s., 500, October; 6,000-6,500, 19s., October; 4,700, 18s. 6d., 300; 5,000, 18s. 6d., 300; Rio Grande do Sul, 29s. 6d., October; Rosario, 3,700, 20s. 6d., 200; 5,000, 20s. 6d., 250; River Plate, 4,500, 19s. 9d., November 5 cancelling; 7,000, 20s. 9d., October; 7,200, 20s. 6d., October reported; 20s. 3d., early October; 6,000, 20s., early October; Savona, 9s. 10½d., October; 4,500, 9s. 9d., October 13; 5,000, 9s. 7½d., Oct. 13; 3,000, 9s. 7½d.; 4,000, 9s. 6d.; Spezzia, 9s. 10½d., Oct.; 4,500, 9s. 9d., Oct. 13; 5,000, 9s. 7½d., Oct. 13; 3,000, 9s. 7½d.; St. Nazaire, 2,800, 6½ fr., 2,800, 7 fr.; St. Servan, 1,500, 5s.; St. Malo, 1,300, 5s. 3d.; Sveaborg, 2,200, 5s. net terms; Torre Annunziata, 4,500, 10s. 9d.; 3,300, 10s. 9d.; Teneriffe, 5,200, 9s. 3d.; 6,000, 9s. 3d.; Tarragona, 2,400, 9s., October 15; Taranto, 4,200, 9s. 6d., 600, October 20; Venice, 4,500, 11s., 500, mid-October; 2,000, 11s., October 13; 4,600, 11s. 6d.; 4,100, 11s. 3d., October 13; 5,600, 11s. 4½d., October; 5,500, 11s. 3d., October 13; 4,800, 10s. 10½d., reported; Varma, 4,300, 11s. 3d. on d.w.; Valencia, 1,700, 9s. 4½d., fuel; 2,600, 9s.; Wei-hai-wei, 5,500, 17s. 6d., October 13, Admiralty; West Coast South America, about 22s. 6d.

Newport to St. Malo, 680, 5s. 9d.; Vigo, 2,000, 7s. 3d.; Seville, 1,700, 9s.; 1,400, 9s., October 20; Marseilles, 3,800, 11 fr., 800, 11½ fr., 600; Genoa, 3,800, 9s. 9d.; Savona, 3,800, 9s. 9d.; Spezzia, 3,800, 9s. 9d.; La Goulette, 3,300, 14½ fr.; Brest, 3,800, 7s. 6d.; Bahia Blanca, 19s. 6d.; Aquilas, 1,700, 11s.

Port Talbot to Nantes, 2,200, 7½ fr.; 2,600, 7½ fr.; Rouen, 1,200, 5s. 10½d.; 1,000, 6s.; St. Nazaire, 1,300, 7 fr.; Marseilles, 4,500, 11½ fr.

Swansea to Trapani, 2,600, 11s., October 14; Nice, 1,800, 10s. 6d.; St. Nazaire, 1,400, 7½ fr.; Tunis, 2,400, 14½ fr.; Barletta, 3,400, 11s. 3d., 400; Charente, 1,700, 8 fr.; Stettin, 2,900, 5s. 6d.; Alexandria, 4,400, 9s. 9d.; 3,500, 10s. coal, 10s. 9d. fuel; Genoa, 2,800, 10s.; Barcelona, 2,000, 10s. 3d.; Lisbon, 1,300, 8s. 9d.; Cherbourg, 7,300, 6s.; Rouen, 1,200, 6s.; 750, 6s.; 1,900, 5s. 9d.; 1,800, 6s.; 730, 6s. 1½d.; Honfleur, 750, 5s. 6d.; 1,100, 5s. 9d.; 1,200, 5s. 6d.; Nantes, 320, 7½ fr.; Port Said, 5,000, 9s. 9d., reported; Sables, 1,200, 8½ fr.; Havre, 780, 5s. 3d.; 650, 5s. 9d.; Calais, 1,600, 5s.; 1,000, 5s. 6d.; Civita Vecchia, 3,800, 10s. 9d., coal, 11s. 6d. fuel; Marseilles, 2,600, 12½ fr.; Torre Annunziata, 3,100, 9s. 6d. coal, 10s. 3d. fuel; Boulogne, 1,000, 5s. 6d.; Bizerta, 2,100, 14½ fr.; 3,100, 14½ and 15½ fr.

Partington to Buenos Ayres, 5,000, 19s. 3d., 250, Oct. Hull to Cronstadt, 2500, coal, 5s. 6d., 600, coke, 8s. 3d.;

2,500, 5s. 9d.; Nicolaieff or Odessa, 7,000, 9s. 10½d., Oct.; Buenos Ayres, 5,500, 18s. 3d., 250, Nov. 10-25; Monte Video, 5,300, 18s. 6d., 225, 1s., Nov.; Libau, 1,700, 5s. 6d.; Riga, 2,000, 5s. 9d.; Nicolaieff, Odessa or Theodosia, 5,000, 10s., 550, Oct.; Reval, 3,200, 5s. 3d.

Wales to Monte Video, sail, 16s. 3d.; Mexillones, sail, 19s. 3d., fuel; West Coast South America and home to United Kingdom-Continent, sail, 42s. on the round.

Tyne or Hull to Marseilles, contract, 80,000 tons, 8s. 3d., voyages over 1914.

Wear to Havre, 1,600, 5s.; Bayonne, 2,900, 6s. 6d.; Reval, 2,000, 6s.

Seaham Harbour to St. Nazaire, 3,300, 6s. 6d.; Valencia, 3,400, 9s. 6d.

Methil to Genoa, 3,000, 10s. 3d.

Hartlepool to Hamburg, 2,000, 4s.

Fife port to Elsinore, 1,200, 5s. 9d.; Kotka, 1,500, 5s. 9d.; Genoa, 2,700, 9s. 10½d.; 2,900, 10s. 3d.; Savona, 2,700, 9s. 10½d.; 2,900, 10s. 3d.; Leghorn, 2,900, 10s. 3d.; 2,700, 9s. 10½d.

Immingham to Horsens, 1,300, 5s. 9d.; Nicolaieff or Odessa, 7,000, 9s. 10½d., October.

Blyth to Pillau, 2,280, 4s. 10½d.

Forth to Horsens, 950, 6s. 6d.; Königsberg Town, 1,200, 6s. 6d.; Ornskoldsvik, 3,200, 5s. 10½d.; Cronstadt, 2,700, 5s. 9d.

Grangemouth to Helsingfors, 1,400, 5s. 7½d.; Kolding, 1,500, 6s.

Goole to Boulogne, 1,050, 5s.

Ardrossan to Monte Video, sail, p.t.

Newport River to Algiers, 2,500, 14½ fr., fuel.

Rotterdam to Bagnoli-Porto Ferrajo, 3,300, 9s. 1½d.; 5,800, 9s. 1½d., October 10-15; St. Nazaire, 3,300, 6s. coal, 6s. 9d. fuel; Leghorn, 4,000, 9s. 6d. coal, 10s. 3d. fuel, 11s. 6d. coke; Barcelona, 3,600, 9s. 3d., October 15; Marseilles, 4,800, 11½ fr.; 600, 11 fr., 900, October 13; Venice, 4,600, 11s. 4½d., 2,000 tons steam coals, filling up cokes 14s. 9d., October 16-18; Bordeaux, 2,550, 6s.

Llanelly to Caen, 850, 5s. 6d.

Homeward charters: Nicolaieff or Odessa, 8,000, Rotterdam 11s., Weser 11s. 3d., Hamburg 11s. 6d., with 3d. less barley, option Kherson and Nicolaieff or Odessa, two ports, 3d. more, ppt.; 6,800, do., do.; Azof, 3,600 max., 14s. 6d. n.c. or any, 15s. Hamburg, cancelling November 5; 5,000, Rotterdam, 12s. 6d., Emden or Weser 12s. 9d., Hamburg, 13s., 3d. less barley, October; 5,300, Rotterdam 12s., Emden or Weser 12s. 3d., Hamburg 12s. 6d., 3d. less barley, October-November; 5,200, do., do., October; 7,200, Rotterdam 12s., Weser 12s. 3d.; Hamburg, 12s. 6d., 3d. less barley, 700 tons middlings 3s. extra, October-November; 3,500, 10 per cent., 14s. n.c. or any, 14s. 6d. Hamburg, option Sulina or South Russia 1s. less, November 5-20; Nicolaieff or Odessa and Horli, two ports, 5,600, Hamburg, 11s. 9d., 3d. less barley, ppt.; Poti, 5,200, Rotterdam, 13s. 6d., October 20; Bombay, 2,723 net, Barrow, 19s., ore, October; Delagoa Bay, 2,500 net, Bombay, 7s. 6d., October; Philadelphia, Baltimore or New York, 2,499 net, Avonmouth or Rotterdam 2s. 3d., Leith, Hull, Antwerp, 2s. 4½d., October; 2,408 net, Avonmouth or Rotterdam, 2s. 6d., with options, November 20-December 15; Bougie, 2,300, Rotterdam, 9s. 6d., October; Villaricos, 4,500, Rotterdam, 7s., ppt.; Benisaf, 1,660 net, Tyne Dock, 8s. 9d., option Middlesbrough 9s., f.t., October; Santander, 1,800, Rotterdam, 6s. 6d., ppt.; 1,200, 6s. 3d., ppt.; Huelva, 5,000, New York or Boston, 10s. 3d., Tinto terms, mid-October; 5,500, ditto, ditto, ppt.; 7,600, Rotterdam, 6s. 9d., Tinto terms, end October; 5,500, 7s., Tinto terms, October; 10s., Baltimore, Tinto terms; time charter, Transatlantic trade, 5s., one trip, delivery Philadelphia, redelivery United Kingdom-Continent; 5s. 6d., one trip, delivery Northern States, redelivery Gulf of Mexico; time charter, Transpacific trade, 6s. 9d., one trip, delivery North Pacific, redelivery China or Japan; time charter, States and River Plate trade, 6s. 6d., one trip, delivery Norfolk, redelivery River Plate; 3s. 6d., one trip, delivery Northern States, redelivery Gulf of Mexico; South Australia, Melbourne, Geelong or Sydney, N.S.W., 32s. 6d., United Kingdom-Continent, January; Danube, 3,450, 13s. n.c. or any, 13s. 6d., Hamburg, November; Sulina, 5,500, Antwerp or Rotterdam, 10s. 9d., 3d. less Barley, up to half-cargo, 1,000 tons oats 2s. extra, October; 5,500, Rotterdam 10s. 9d., Antwerp 11s., October-November; 3,500, 13s. 6d. n.c. or any, 14s. Hamburg, ppt.; 5,500, Rotterdam, 10s. 3d., option 2,000 tons oats 2s. extra, October; Kherson, Nicolaieff or Horli, 5,100, Norway, basis 13s. 6d., October 20-November 10; Novorossisk, 18,000 qrs., 10 per cent., 13s. 9d. n.c. or any, 14s. 3d. Hamburg, October 10-25; Sydney, N.S.W., 2,935 net, United Kingdom-Continent, 32s. 6d., with options, January; Marmagosa, about 6,000, Barrow, 19s. 9d., ore, November; Norfolk, Va., 600, La Plata, 18s., October 15-31; San Lorenzo, 5,200, 10 per cent., United Kingdom-Continent, 13s. 9d. o.c., less 6d., less a further 3d. if Villa Constitucion loading; 5,600, 10 per cent., 13s. 6d. o.c., less 6d., October; 4,700, 10 per cent., 16s. 6d. o.c., less 6d., January 12-February 15; Garrucha, 7,000, Rotterdam, 6s. 9d., October; time charter, Calcutta coal trade, 4s., 12 months, delivery January 1914; Cuba, 9s. 3d., Northern States, ore; Narvik, 7s., Northern States; Port Arthur, basis 27 c. one port, Philippines; Nicolaieff, 6,800, Rotterdam, 10s. 6d., Weser 10s. 9d., Hamburg 11s.; 3d. less barley, October-November; Odessa, 4,200, Rotterdam, 10s. 6d., spot; Galatz and/or Braila, 5,000, Rotterdam 11s. 6d., Antwerp, Liverpool or Glasgow 3d. more, with options, October-November; 5,100, Marseilles, 12½ fr., option 2,000 tons, oats 2 fr. extra, ppt.; Vladivostok; 5,300-5,600, United Kingdom-Continent, 31s. 3d., December; 8,500, 30s. 6d. one port, 31s. 6d. two ports discharge, 1,500 tons hemp seed 2s. 6d. extra, December-January; Melbourne, 3,018 net, U.K.-Cont., 32s., January; La Plata, 5,500, 10 per cent., U.K.-Cont., 11s. 6d. o.c., no reduction direct, October; Northern Range, 20,000 qrs., 10 per cent., Limerick, 3s., October-November; 24,000 qrs., 10 per cent., Lisbon, 3s. 1½d., October; Bilbao, 2,400, Calais, 6s. 3d., ppt.; 3,600, Rotterdam, 5s. 4½d., ppt.; Alexandria, 6,800, Hull 9s., Hamburg 9s. 6d., October-November; Archangel, 600 stds., Sharpness, 62s. 6d., d.b. and b., ppt.; Gulf timber port, 1,300 stds., 10 per cent., River Plate, about 143s. 9d., November-December; Kherson, Nicolaieff, Odessa or Horli, 20,000 qrs., 10 per cent., 480, Belfast, 11s., October-November; Calcutta, 2,725 net, United Kingdom-Continent, p.p., 22s., d.w. basis, spot; Melbourne, Geelong or South Australia, 7,800 max., United Kingdom-Continent, 31s. 9d., with options, January; Calcutta, 2,401 net, Bombay or Kurrachee, Es. 6, December; Fremantle, 2,100 net, United Kingdom-Continent, 31s. 3d., less 6d. direct, December 20-January 20; Baltimore, 2,612 net, Avonmouth or Rotterdam 2s. 4½d., Hull 2s. 6d.,



EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During September and the first nine months of 1911, 1912 and 1913.

To	September, 1913.						September.					
	Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
	Tons.	£	Tons.	£	Tons.	£	1911.	1912.	1913.	1911.	1912.	1913.
Russia .....	78,906	51,686	41,868	23,861	547,698	406,855	585,649	592,060	668,472	336,573	389,588	487,418
Sweden .....	92,407	55,742	27,534	17,823	274,323	188,853	369,463	474,974	394,314	181,975	286,242	262,418
Norway .....	49,550	25,917	7,623	5,003	117,683	81,329	136,183	184,739	174,861	66,081	106,261	112,249
Denmark .....	82,731	50,202	49,032	32,478	143,961	97,552	275,643	273,030	275,724	138,871	166,353	180,232
Germany .....	336,513	195,068	290,451	172,910	206,362	135,682	809,503	826,208	833,326	372,594	434,995	503,680
Netherlands .....	64,319	35,470	52,224	35,055	38,361	25,333	171,019	165,984	154,904	84,509	93,945	95,855
Belgium .....	74,493	38,079	36,823	22,708	53,127	36,179	129,633	132,118	164,448	51,450	66,467	96,966
France .....	422,588	215,850	279,823	173,713	338,073	268,581	853,509	918,275	1,040,489	453,033	535,485	658,144
Portugal, Azores, and Madeira .....	15,582	8,455	20,264	13,156	64,994	53,523	79,770	92,717	100,810	50,386	62,214	75,134
Spain and Canaries .....	31,016	16,260	76,458	49,425	163,204	130,228	240,740	260,910	270,678	148,810	169,490	195,913
Italy .....	138,059	62,133	214,435	136,410	458,500	374,007	714,500	760,006	810,994	409,874	482,650	572,570
Austria-Hungary .....	13,542	7,917	9,012	5,631	31,207	22,524	105,428	65,104	53,761	53,286	40,603	36,072
Greece .....	7,867	4,965	16,875	11,082	51,349	46,231	56,353	45,140	76,091	29,874	27,440	62,278
Turkey .....	7,644	6,755	3,543	2,215	40,314	33,310	46,953	47,482	51,501	31,228	34,727	42,280
Egypt .....	27,463	15,892	31,370	18,839	199,399	156,640	267,303	258,775	258,232	167,478	172,299	191,421
Algeria .....	15,475	8,571	24,026	13,625	29,004	22,951	88,021	92,442	66,505	47,976	54,639	45,147
United States of America .....	—	—	—	—	2,963	2,406	1,153	103	2,963	710	121	2,406
Chile .....	1,470	1,651	—	—	25,734	21,110	44,967	31,112	27,204	33,425	24,972	22,761
Brazil .....	4,240	3,453	8,970	5,936	145,686	139,583	140,850	137,842	158,896	112,109	112,773	139,977
Uruguay .....	2,970	2,480	—	—	62,672	54,953	83,440	106,144	65,642	64,459	86,536	57,438
Argentine Republic .....	11,037	8,745	4,400	3,025	251,705	212,197	297,497	303,924	267,142	219,964	237,137	223,937
Gibraltar .....	604	348	2,279	1,517	12,057	10,005	29,843	32,941	14,940	18,898	20,282	11,870
Malta .....	7,611	3,826	15,708	10,974	12,930	10,113	42,297	36,658	36,249	26,708	23,661	24,913
British South Africa .....	407	526	—	—	1,220	895	4,443	5,265	1,627	3,071	3,879	1,421
India .....	511	456	—	—	8,316	6,570	14,847	12,935	8,827	8,726	10,879	7,026
Straits Settlements .....	433	616	—	—	—	—	11,449	1,135	433	7,773	1,614	616
Ceylon .....	—	—	—	—	25,601	21,586	23,946	30,869	25,601	17,717	24,233	21,586
Other countries .....	36,473	21,838	5,901	4,152	149,972	124,452	163,243	188,667	192,516	115,819	144,539	150,412
Total { Anthracite .....	123,036	91,059	—	—	134,775	114,844	217,319	237,015	254,811	161,771	193,673	205,903
Steam .....	1,126,485	585,303	236,255	145,233	3,104,371	2,405,415	4,239,349	4,439,596	4,467,111	2,473,595	2,846,986	3,135,956
Gas .....	83,482	49,793	313,145	512,265	99,531	71,672	918,305	963,176	996,158	446,673	527,603	633,730
Household .....	61,998	38,333	379	284	112,645	76,770	124,479	154,705	175,022	65,745	92,542	115,932
Other sorts .....	129,180	78,428	166,805	106,806	8,093	5,952	238,198	283,067	304,078	113,643	153,365	191,186
Total .....	1,524,181	842,926	1,216,584	764,588	3,456,415	2,674,653	5,787,650	6,077,559	6,197,180	3,261,427	3,814,169	4,282,167
Total (September 1912) .....	1,488,098	765,571	1,169,820	632,544	3,419,641	2,416,054	—	—	—	—	—	—
Total (September 1911) .....	1,301,254	571,261	1,141,537	551,583	3,344,859	2,138,583	—	—	—	—	—	—
Coke .....	—	—	—	—	—	—	94,493	97,679	125,357	70,500	85,817	113,660
Manufactured fuel .....	—	—	—	—	—	—	118,799	125,373	179,041	87,078	103,443	158,600
Total of coal, coke & manufactured fuel .....	—	—	—	—	—	—	6,000,852	6,300,611	6,501,578	3,419,005	4,003,429	4,554,427
First nine months of 1913.							First nine months.					
Total { Anthracite .....	1,021,448	714,378	339	339	1,167,704	1,028,615	1,762,204	1,770,490	2,189,491	1,316,549	1,408,224	1,743,332
Steam .....	9,677,385	5,281,961	2,649,973	1,646,703	27,428,115	21,176,996	34,735,081	32,810,201	39,755,473	20,021,628	21,113,841	28,105,660
Gas .....	738,220	412,207	6,964,257	4,225,331	881,235	621,783	7,743,871	7,755,023	8,583,712	3,764,593	4,102,010	5,259,521
Household .....	395,976	243,190	2,425	1,722	937,432	629,021	1,098,581	1,146,393	1,335,833	574,306	678,518	873,933
Other sorts .....	1,185,069	737,783	1,387,041	854,633	81,169	57,294	2,278,953	2,263,316	2,653,279	1,087,932	1,209,616	1,649,710
Total .....	13,018,098	7,389,519	11,004,035	6,728,928	30,495,655	23,513,709	47,618,690	45,750,423	54,517,788	26,764,918	28,512,209	37,632,156
Total for nine months of 1912 .....	10,463,748	5,162,499	9,623,859	5,080,524	25,662,816	18,269,186	—	—	—	—	—	—
Total for nine months of 1911 .....	10,701,824	4,723,865	9,752,846	4,686,509	27,164,020	17,354,544	—	—	—	—	—	—
Coke .....	—	—	—	—	—	—	711,697	680,713	838,055	540,182	556,323	800,023
Manufactured fuel .....	—	—	—	—	—	—	1,236,582	1,115,631	1,542,365	861,565	871,234	1,323,714
Total of coal, coke & manufactured fuel .....	—	—	—	—	—	—	49,566,969	47,546,767	56,898,208	23,166,665	29,939,766	39,755,893

November; Savannah, &c., 2,760 net, Liverpool or Bremen 33s. 9d., Havre, 36s. 3d., November; Barreiro, 1,400, Antwerp, 8s. 3d., October; Portland, Or., sail, 77s. 6d., United Kingdom-Continent, lumber.

COAL, IRON AND ENGINEERING COMPANIES.

Arnfield (J. and E.) Limited.—This private company has been registered, with a capital of £15,000 in £1 shares (5,000 preference) to acquire the business of engineers, now carried on by Thomas Owen Arnfield at New Mills, Derby, under the style of J. and E. Arnfield, and to carry on the business of iron, steel and brass founders, smelters, forgers, metal workers, metallurgists, galvanisers, colliery owners, and electricians, &c. First director, Thomas O. Arnfield, Globe Engineering Works, New Mills, Derby. Qualification, £100.

Asta Engineering Company (1913) Limited.—This company has been registered, with a capital of £80,000 in £1 shares, to purchase and take over the business of the Asta Engineering Company, and to carry on the business of mechanical engineers, &c., also to enter into an agreement with the Asta Engineering Company. First directors: J. B. West, M. Cheronnet, F. H. Meade, A. Monard, G. M. Bertault, S. D. Begbie and A. M. Willoughby. Qualification, £100. Registered office, Wembley, Middlesex.

Babcock and Wilcox Limited.—Interim dividend of 7 per cent. on the ordinary shares.

Callender's Cable and Construction Company Limited.—The directors announce an interim dividend at the rate of 10 per cent. per annum, less tax.

Cardiff Collieries Limited.—The directors have paid an interim dividend on both the preference and ordinary shares of 7½ per cent. A notice convening an extraordinary meeting has been issued, when it will be proposed that the articles of association of the company be altered by the insertion of special articles as follow: The company may by special resolution (a) Consolidate and divide its share capital into shares of larger amount than its existing shares; (b) subdivide or consolidate its shares in any manner; (c) cancel any shares which at the date of the passing of the resolution have not been taken or agreed

to be taken by any person; (d) reduce its share capital in any manner and with and subject to any incident authorised and consent required by law. Other articles provide authority enabling the company to capitalise undivided profits standing to the credit of reserve, depreciation, suspense, contingency or other like funds or accounts, and distribute the same as a bonus, free of income-tax, amongst the holders of preference and ordinary shares.

Cleveland and Durham Electric Power Limited.—This company has just made an issue of £130,000 5 per cent. first mortgage debentures in registered debentures of £100 each, at the price of £97½. The share capital of the company is £491,305, composed of 333,705 5 per cent. £1 non-cumulative preference shares and 157,600 ordinary shares of £1 each.

Continental Mining Company Limited.—This private company has been registered, with a capital of £50,000 in £1 shares, to search for and deal in copper, lead, coal, iron and other metals, and to carry on the business of colliery proprietors, ironmasters, steel makers and converters, miners, smelters, brass and iron founders and engineers, &c. Signatories: H. F. Adkins and R. A. Keen. Registered office: 4a, Cockspur-street, S.W.

Continuity Joint and Tube Company Limited.—This private company has been registered with a capital of £5,000 in £1 shares, to carry on the business of electrical engineers, &c. First directors, James H. Jackson, Percy H. Farrington and Frank Verheyden. Registered office, 27, St. Mary Axe, E.C.

Cory (William) and Son Limited.—Warrants for the half-yearly interest to September 30, 1913, on the 4 per cent. first mortgage debenture stock and the 4½ per cent. debentures have been posted.

Croggon and Sons Limited.—This private company has been registered with a capital of £2,000 in £1 shares, to acquire the business now carried on by William Richard Raymond Croggon at Victoria Bridge, Manchester, under the style of Croggon and Sons, and to carry on the business of iron and brass founders, engineers, and galvanisers, &c., also to enter into an agreement with W. R. R. Croggon. Permanent first directors, M. H. Croggon and S. W. R. Croggon. Registered office, Victoria Bridge, Manchester.

Derbyshire Fluor Spar Company Limited.—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of fluor spar, zinc and lead ore merchants and miners, lately carried on by Drabill Greenwood and Co. Limited, and to carry on the business of ironmasters, colliery proprietors, miners, smelters, engineers and ironfounders, &c. First directors: F. Wilkins, Tinsley Park-road, Sheffield; B. O'Dowda, Matlock; and William F. Smith, Sheffield.

Drake and Gorham Limited.—The report for the year ended June 30 last states that, after payment of all charges there remains a net profit of £10,268, which, with £1,696 brought forward, makes £11,966. This it is proposed to appropriate as follows:—By payment of a dividend at the rate of 5 per cent. per annum, £6,250; by writing off balance of underwriting commission, £4,000; by carrying forward £1,716.

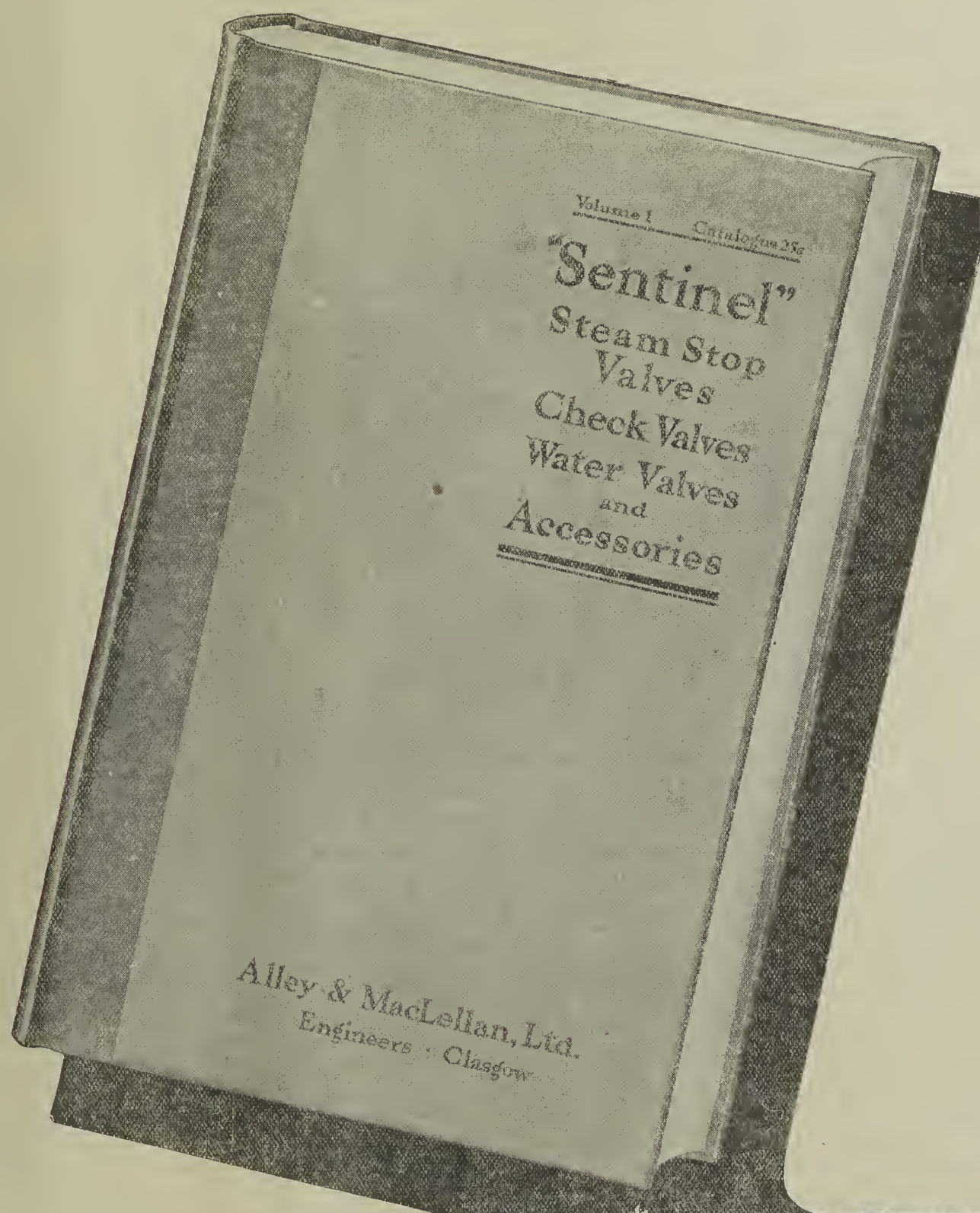
Duffryn Rhondda Colliery Co. Limited.—At a recent meeting of the directors the position of the undertaking was considered in view of the inadequate response of the shareholders to the appeal for additional capital. After consideration, it was decided that the company was no longer able to carry on the colliery. The directors will at any early date convene a meeting of the shareholders to propose a voluntary liquidation. About two and a-half years ago Mr. D. A. Thomas and Mr. Leonard Llewellyn accepted the invitation to join the board. Mr. D. A. Thomas himself has furnished the capital (about £20,000) for carrying on the undertaking over the last six months. Natural conditions, such as dislocations of the strata and high labour cost, have proved too formidable for the management in this case, although the property is undoubtedly valuable, the coal being exceptionally good and near the port of shipment.

Fluid Pressure Pumps Limited.—This private company has been registered, with a capital of £4,000 in £1 shares, to carry on the business of ironfounders, mechanical engineers, manufacturers of agricultural implements and other machinery, toolmakers, brassfounders, metal workers and iron and steel converters, &c.; also to enter into an agreement with George H. Smart, William M. Melmore, Henry Charles Jones, and Pioneer Pump Patents Limited. First directors: George H. Smart (chairman), William M.



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COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES  
During the month of September 1913, compared with the corresponding month of 1912.\*

Port.	September 1913.		September 1912.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle	936,722	20,226	879,147	19,785	57,575	—	441	—
North Shields	63,738	896	72,734	108	—	8,996	788	—
South Shields	160,387	1,623	115,641	1,672	44,746	—	—	49
Sunderland	281,144	3,581	212,316	3,935	68,828	—	—	354
West Hartlepool	126,998	953	109,914	1,314	17,084	—	—	361
Goole	131,067	2,360	145,842	3,958	—	11,775	—	1,598
Blyth	330,190	1,250	364,775	955	—	34,585	295	—
Newport	353,120	608	374,286	1,601	—	21,166	—	993
Liverpool	34,871	2,262	24,923	2,361	9,948	—	—	—
Methil	233,600	1,069	197,226	1,745	36,374	—	—	99
Glasgow	181,511	3,417	173,310	1,715	8,201	—	1,702	—
Kirkcaldy	13,560	—	8,407	—	5,153	—	—	—
Burntisland	171,490	905	193,047	703	—	21,557	202	—
Cardiff	1,673,142	5,323	1,587,815	5,104	85,327	—	219	—
Borrowstoness	54,582	904	48,845	1,732	4,087	—	—	828
Llanelli	22,449	—	13,559	—	8,890	—	—	—
Middlesbrough	1,297	10,153	2,007	6,766	—	710	3,387	—
Seaham	81,510	—	78,439	—	3,071	—	—	—
Swansea	292,957	724	270,721	3,106	22,236	—	—	2,382
Granton	13,610	876	10,607	1,449	3,003	—	—	573
Port Talbot	149,470	1,535	149,360	254	110	—	1,281	—
Alloa	9,470	—	15,758	—	—	6,288	—	—
Grangemouth	127,421	2,972	118,355	9,192	9,066	—	—	6,220
Neath	19,999	—	16,138	—	3,861	—	—	—
Hull	298,320	8,309	395,897	6,842	—	97,577	1,467	—
Amble	45,229	—	36,092	—	9,137	—	—	—
Troon	10,438	—	10,913	—	—	475	—	—
Grimsby	116,417	1,217	118,568	613	—	2,151	604	—
Ayr	7,012	—	4,147	—	2,865	—	—	—
Greenock	—	—	—	—	—	—	—	—
Leith	158,175	—	161,197	—	—	3,022	—	—
Ardrossan	5,290	—	2,855	—	2,435	—	—	—
Stockton	—	—	—	—	—	—	—	—

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.\*

Port.	Sept. 1912.		Sept. 1913.		Port.	Sept. 1912.		Sept. 1913.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle	399,857	45	385,682	387	Ayr	55,621	—	56,666	—
North Shields	104	—	—	—	Irvine	3,438	—	5,312	—
South Shields	5,560	—	—	—	Alloa	885	—	2,355	—
Blyth	24,968	—	20,460	—	Whitehaven	21,726	—	17,352	—
Amble	7,689	—	3,270	—	Liverpool	161,780	—	149,498	172
Sunderland	120,103	—	136,400	—	Grimsby	4,681	—	3,855	—
Seaham	90,701	—	2,774	—	Granton	12,835	—	20,408	—
Hartlepool	57,877	—	58,840	—	Borrowstoness	12,365	23	15,133	21
Stockton	—	—	—	60	Burntisland	41,554	—	25,345	—
Middlesbrough	—	25	—	—	Kirkcaldy	3,611	—	2,785	—
Hull	80,249	491	65,463	505	Methil	24,090	—	35,630	—
Goole	132,832	—	131,735	—	Port Talbot	27,103	729 300 p.f.	8,992	574 650 p.f.
Swansea	36,430	440	28,010	30	Glasgow	35,230	582 100 p.f.	27,969	913
Cardiff	247,560	1,310	279,199	60	Grangemouth	17,500	430	9,655	600
Llanelli	7,071	—	7,332	—	Greenock	1,740	100	1,688	—
Newport	61,068	17	73,572	20	Neath	5,814	—	12,611	—
Troon	19,363	—	15,907	5	Leith	3,724	6	5,251	—
Ardrossan	7,462	—	7,158	—					

\* From Browne's Export List.

Melmore, Henry Charles Jones. Qualification, £300. Registered office, 17 and 18, Basinghall-street, E.C.

**Forward Electric Company Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of electrical engineers and suppliers of electricity, toolmakers, brassfounders, metal workers, ironfounders, and machinery manufacturers, &c. First directors: Charles Howard Twigg, Charles Cutt, and Harry H. Hooper. Registered office, the Fountain Works, Lennox-street, Birmingham.

**Hinchliffe Green Manufacturing Company Limited.**—This private company has been registered, with a capital of £13,500 in £1 shares, to acquire the business of hardware merchants and engineers now carried on by John H. Hinchliffe and George Green at 7, Aire-street, and Low Hall Mills, Holbeck-lane, Leeds, under the style of the Hinchliffe Green Manufacturing Company, and to carry on the business of iron and steel merchants, brassfounders, manufacturers of and dealers in iron, copper, brass and other metals, also to enter into an agreement with J. S. Hinchliffe and George Green. First directors, J. S. Hinchliffe, 36, Moor-road, Far Headingley, Leeds, and George Green, 77, Cowper-road, Leeds.

**Lancaster (John) and Co. Limited.**—It is officially announced that the sole management of Messrs. John Lancaster and Co. (Griffin Nantyglo Collieries) is now vested in Messrs. D. Davis and Sons Limited, who recently acquired the interest in that company which was held by Messrs. Furness, Withy and Co. The directors of Messrs. John Lancaster and Co. are now: Mr. Fred. L. Davis, chairman; Mr. T. Vivian-Rees, managing director; Mr. David Hannah, consulting engineer; Mr. H. L. Warner and Mr. J. Bell White.

**New Dunderland Co. Limited.**—This company has been registered, with a capital of £350,000 in £1 shares, to carry into effect a scheme of arrangement between the Dunderland Iron Ore Co. Limited, to purchase mines and mining rights, to carry on the business of miners of metal and mineral substances of all kinds, &c., and to enter into an agreement with the above-mentioned company. Minimum cash subscription, seven shares. Signatories, J. A. Selway, 15, Westover-road, Wandsworth Common, S.W.; S. P. Allison, Melrose-street, James's-avenue, Hampton Hill, Middlesex; J. Wilson, 51, Gorst-road, Wandsworth Common, S.W.; W. H. Bear, 8, Old Jewry, E.C.; E. C. Scott, 14, Kenilworth-gardens, Goodmayes, Essex; W. A. Bryant, 4, Southwold Villas, Stowley-road, South Woodford, Essex; and A. D. Julius, 8, Old Jewry, E.C. Remuneration of directors (not yet appointed) £100 each per annum (chairman, £150).

**Oldbury Spring Company Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of spring makers, now carried on under the style of the Oldbury Spring Company, and to enter into an agreement with the above-mentioned company.

founders, machine tool makers and galvanisers, &c. Signatories: William Jones and William Draper. Registered office, Fountain-lane, Oldbury.

**Parsons Marine Steam Turbine Company Limited.**—The report for the year ended June 30 states that since the last report David Rowan and Co., of Glasgow, the Rotterdamsche Droogdok-Maatschappij, of Rotterdam, and the Seattle Construction and Dry Dock Company, of Seattle, Washington, U.S.A., have taken licences to manufacture marine steam turbines on the Parsons system. The directors have also decided to increase the sum provided for experimental and pioneer work to £30,000. The profits for the year, after providing for depreciation on buildings, plant, machinery and office furniture, upkeep of patents, &c., transferring £33,734 to the experimental and pioneer work account, and £5,000 in reduction of patent rights account, amounted to £32,182, making, with the amount brought forward, £50,993. The directors recommend a dividend at the rate of 10 per cent. per annum (free of tax), of which an interim dividend of 5 per cent. was paid on January 25 last, and also a bonus of 5 per cent. (free of tax), leaving £19,301 to be carried forward.

**Peacock and Brown Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of engineers, iron and brass foundry, and metal workers, &c. First directors: Herbert George Peacock, Percy Cooper Peacock, and Frederick Thomas Brown. Registered offices: 93A, Askew-road, Shepherds Bush, W.

**Scottish Iron and Steel Company Limited.**—The directors have resolved not to declare a dividend on the preference shares for the half-year ended June 30 last.

**Steel Company of Canada Limited.**—The directors have declared the usual quarterly dividend of 1½ dols. on the preferred shares.

**United National Collieries Limited.**—Interim dividend of 5s. per share, free of income tax.

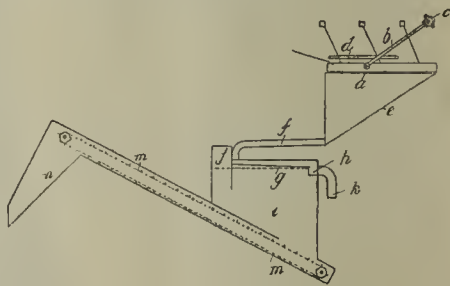
**Vulcan Foundry Company Limited.**—The report for the year ended June 30 last states that, in order to make improvements in the works and for other contingencies, the board has decided to transfer from revenue account the sum of £18,000 to reserve for maintenance and renewals, &c. The sum of £24,815 has been charged to revenue in respect of repairs, renewals and depreciation of the company's premises and plant during the year. The board recommends the payment of a final dividend of 2½ per cent. on the preference shares, making 5 per cent. for the year, and a dividend of 10 per cent. on the ordinary shares.

**Watson (T. H.) and Co. (of Sheffield) Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of manufacturers of and dealers in all kinds of iron and steel, &c. First directors: Thomas Henry Watson and Frank Hodson. Qualification, 100 shares. Registered office, Lancaster-street, Neepsend, Sheffield.

ABSTRACTS OF PATENT SPECIFICATIONS  
RECENTLY ACCEPTED.

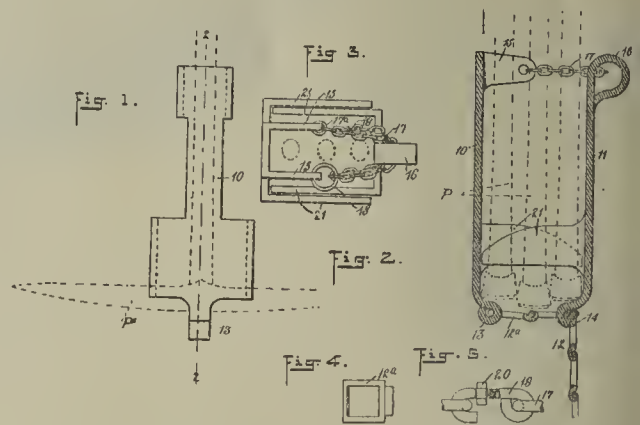
4293 (1913). *Improvements in or relating to Compressed Air Locomotives.* Rudolf Meyer Aktien-Gesellschaft für Maschinen- und Bergbau, of 31, Aktienstrasse, Mülheim Ruhr, Germany.—In known compressed air mine locomotives the pressure in the storing tank is first reduced to much lower pressure in order to allow it to be utilised in the engine. Owing to this reduction of pressure a great portion of the energy accumulated in the storing tank is, however, always lost. According to this invention, this useless reduction of pressure is avoided as far as possible. The compressed air is introduced into the engine with the pressure of the tank or at least with greater pressure than was hitherto possible, and several intermediate heaters heated by the mine air, and a number of engine cylinders, are arranged behind each other in the engine so that the pressure of the air is gradually reduced, the said air being constantly reheated by the mine air and work performed at each stage (One claim.)

12913 (1913). *Improvements in Apparatus for Washing Coal and the like.* Clifton and Kersley Coal Co. Limited of Clifton, near Manchester, Lancashire, and H. V. Hart Davis and J. Greenhalgh, both of the same address.—Relates particularly to that class of apparatus in which coal is separated from fine clay slimes by means of a vibrating screen or sieve which is agitated by cranks or other convenient means, and from this screen the tailings pass down a chute or delivery pipe. The present improvements consist in combining with the above apparatus a washing box and screen or sieve for treating the tailings delivered from the said apparatus and so further separating the fine clay slimes from the small coal. The accompanying



drawing is a front elevation of the improved coal washing apparatus. In operation the water and matters in suspension enter the washing box i through the trough or pipe f, and flow on to the inclined screen or sieve g. The clay and fine matter and a certain proportion of water pass through this sieve g, while the greater portion of the water overflows into the trough h and away by the discharge pipe k. The pulsating movements in the water in the washing box i caused by the plunger or air pressure or equivalent means cause the lighter particles in suspension to overflow between the screen or sieve g and the trough h while the heavier particles pass down to the bottom of the box and are taken away by a travelling scraper conveyor m and discharged through a chute n. (Two claims.)

16362 (1913). *Improvements in Pick Holders.* S. Young, Cedar Point, LaSalle Co., Illinois, U.S.A.—Has particular reference to a device whereby a number of picks may be clamped together in a bundle and handled in large numbers without danger of breakage of the handles or otherwise damaging the picks. The device also provides a means whereby each miner, who is personally responsible for the identification of his own tools, may readily locate his own picks, even when associated with many other picks as is usually the custom in sending the picks into or out of the mine, the repairing of the picks always being required by law to be done above the surface of the earth. Fig. 1 is an elevation of a holder; fig. 2 is a vertical section on the line 2—2 of fig. 1; fig. 3 is a plan view; and figs. 4 and 5 are details. At 1 and 11 a pair of rigid side plates each have means whereby they are connected at their lower ends by means of a flexible connection such as a chain 12 having links 12a preferably of uniform length and substantially equal in length to the

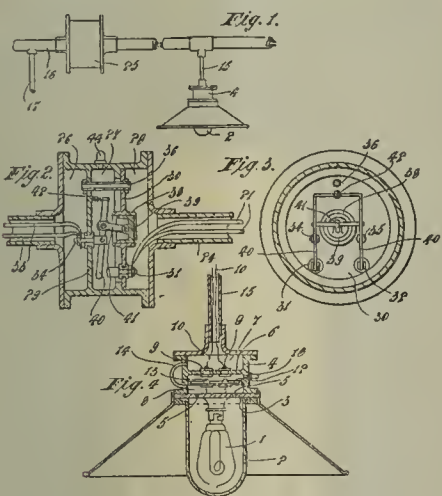


width of the picks to be held by this device. The plate 1 is provided with a hook 14 adapted to engage that link of the chain determined by the number of picks to be held. A tie chain as used in clamping a small number of picks P is passed through the loop 16 and through a ring 18 secured permanently to the second mentioned ear 15. The free end of the tie chain is thence passed back through the loop and is connected by means of a hook 19 to the proper link of the first part of the chain. The hook 19 is provided with a runner 20 in the form of a nut, which, when run toward the end of the hook, constitutes a lock to prevent unauthorized release of the chain, as indicated in fig. 5. Each of the side plates is shown provided intermediate its ends with a pair of parallel integral guards 21 which embrace the pick handles and are so arranged with respect to the bottoms of the side plates as to substantially embrace the pick head P so as to bind both the handles and the pick heads in place. (Two claims.)

23344 (1912). *An Improved Method of, and Means for Preventing Explosions in Mines by Damaged Electric Lamp and Motors.* F. Palmer, of 25, Marion-street, Wellington New Zealand.—Relates to a device for preventing the firing of explosive gas mixtures in mines through the breaking of an electric lamp or the sparking of a commutator or the

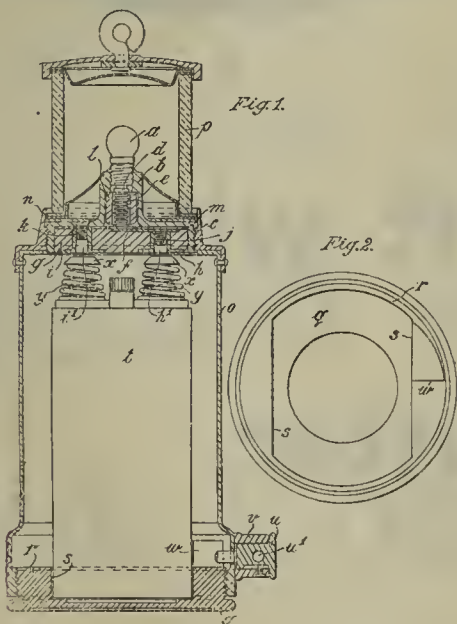


breakdown of electric cables, the device being of the type wherein the cables, switches, motors and other accessories are enclosed within airtight pipes or casings filled with compressed air or an inert gas, while the switches are opened when there is an escape of the compressed fluid caused either by leakage or breakage of a pipe or casing surrounding the mechanisms or cables. The invention relates particularly to that type of device in which the switches are closed by a pneumatically operated piston or diaphragm acting against a spring or spring member. According to the invention a construction is employed wherein the cables, motors, lamps and so forth are all enclosed in airtight casings communicating with pipes through which air under pressure is caused to circulate, switches being arranged in the airtight casing system adapted to keep the circuits closed so long as the pressure is maintained, but to break the circuits when the pressure falls through any defect or breakage on the system. Fig. 1 shows the arrangement of the system as applied to electric lighting in mines; fig. 2 is a sectional elevation through a switchbox employed in the invention; fig. 3 is a cross-sectional elevation upon line A A, fig. 2; fig. 4 is a sectional elevation through the chamber for controlling the contacts to the electric bulb. The operation of the device is as follows:—Compressed air passing along the tubing 15 from the conduit 16 enters the compartment 7 of the



chamber 4 and leaks through the by-pass 14 into the chamber 8 and through the perforations 5 into the interior of the glass globe 2. The compressed air acting upon the diaphragm 12 brings the terminals 9 and 13 together and completes the circuit to the lamp 1. The terminals will be kept in contact as long as air pressure is maintained in the compartment 8. If the glass globe 2 should be broken, air will escape through the perforations 5 from the compartment 8 below the diaphragm. The compartment 8 being thus released of the full air pressure the diaphragm will descend and separate the terminals 13 from the terminals 9, thus breaking the circuit to the lamp. When the glass globe 2 is broken, and should the bulb also be broken, the escaping air from the globe 2 and the perforations 5 will prevent inflammable gas coming in contact with the filament while hot, thus the danger of a broken lamp igniting inflammable gas is avoided. A lightly loaded valve 18 allows air to escape from the space between the partition and the diaphragm in case of a leakage of compressed air to this space. When the means for cutting off the current is not employed, the wires 10 are led directly to the bulb 1, the flexible diaphragm being dispensed with. The compressed air passes through the holes 5 and surrounds the bulb 1, and upon the lamp becoming broken the compressed air escaping from the hole 5 prevents the inflammable mixtures coming into contact with any sparking which may take place. (Six claims.)

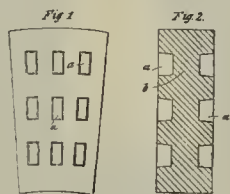
24438 (1912). *Improvements in Miners' Electric Safety Lamps*. O. Oldham, of Hyde-road, Denton, near Manchester, Lancashire.—Has for its main object to provide a lamp in which a battery is enclosed within a lamp casing and supported by a screw cap free to turn, to a certain amount, in the bottom of said casing whereby the electric battery is turned in the casing so that its terminals make and break contact with the terminals of the lamp bulb fixed at the top of the casing. Other objects are to provide improved means whereby the cap is locked against withdrawal from the casing; improved lamp terminals and improved means for



carrying the lamp bulb and its terminals. Fig. 1 is a vertical sectional view of the lamp complete; and fig. 2 is a plan view of the screw cap. As shown, the lamp bulb *a* is screwed into the top portion *b* of a hollow metal cap member *c* and engages with a metal contact piece *d* carried on one end of a metal spring *e*, the other end of which spring is secured to a metal plate *f*. A block of insulating material *g* secured within the hollow cap member *c* by means of two screws carries or contains two metal discs *h* and *i* forming the negative and positive terminals of the lamp bulb, the disc *h* being electrically connected to the plate *f*, carrying the

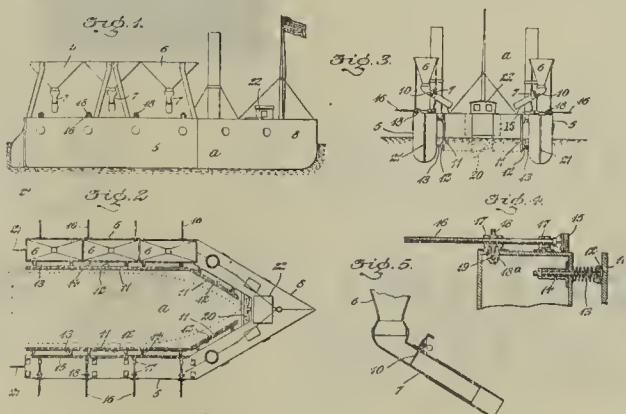
spring and contact piece, by means of the screw *j*, whilst the other disc *i* is electrically connected with the outside terminal plate of the lamp bulb *a* by means of a metal screw *k* engaging said disc through the cap member *c*. The spring *e* and contact piece *d* and the plate *f* are further insulated from the cap member *c* by means of a sleeve member *l* and disc *m* of insulating material interposed between them. The periphery of the cap member *c* is screw-threaded and said member is adapted to screw into the top end *n* of the metal gastight lamp casing *o*. The cap member may be adapted to screw against the glass cylinder *p* or to grip the rim of a glass dome or cover between its upper face and a flange formed on the top end *n* of the casing, thus securing the dome in position around the lamp bulb. This dome may be made double, that is, of a small dome arranged concentrically within a larger one, and water or other liquid may be contained between the two domes. The two discs *h* and *i* carried by the insulating block *g* are preferably provided with holes or recesses *h'* and *i'* in their bottom faces to receive projections or teeth on a suitable tool by means of which the member *c* may be screwed into and out of the top *n* of the casing *o* from the inside of same. A bottom cap *q* having an externally screw-threaded flange *r* is adapted to screw into the bottom of the casing, and is shaped internally at *s* to accommodate and fit the bottom end of a battery *t* in such manner that when the cap is turned and screwed up or down the battery is turned also and is slightly raised or lowered inside the casing. A spring-pressed, magnetic or other suitable bolt *u* is fitted and adapted to slide in a housing *v* at the bottom of the casing *o* and to engage with a projection or lug *w* formed on the flange *r* of the screw cap in such manner that when the cap and battery are in position in the casing, the former can be screwed up to lift the terminals *x* of the battery into engagement with the contact discs *h* and *i* of the lamp bulb to light the latter, or be screwed down to remove them and extinguish the lamp, but the projection *w* will prevent the complete withdrawal of the cap and battery in an unauthorized manner by engaging with the lock bolt *u* after the cap has turned a certain amount. The two terminals *x* of the battery *t* are preferably fitted on coil springs *y*, thus forming spring terminals for engagement with the contact discs *h* and *i* of the lamp bulb. When the screw-cap locking bolt *u* is non-magnetic, as shown in fig. 1, it may be held and sealed in its locked position by means of a lead plug passed through a hole *u'* formed in it and through holes in the housing *v* in which it is fitted. (Six claims.)

26251 (1912). *Improvement on and in connection with Bricks for the Construction of Chimneys and the like*. The Coke Ovens and By-Products Co. Limited, St. Stephens House, Westminster, and N. Schuster, of 181, St. Stephens House, Westminster. According to the invention, in lieu of perforations extending completely through the brick from side to side, a plurality of cavities or indentations of suitable size and shape, and preferably about 1 in. in depth, are



formed in those opposite sides of the brick which will constitute its upper and under faces when laid; thus the brick, if of ordinary depth, has a solid intact and substantial mid-section or core, about one-third of its thickness, unpenetrated and unaffected by the said cavities. Figs. 1 and 2 show a radiated brick in accordance with this invention in plan and sectional side elevation respectively. (One claim.)

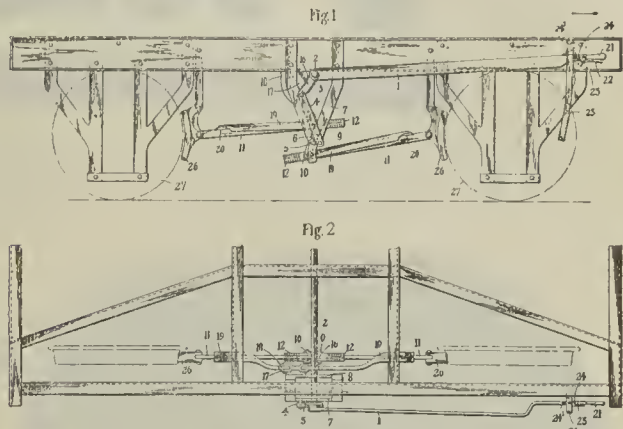
26590 (1912). *Improvements in and relating to Colliers*. C. Pasquier, of 253, West 55th-street, New York, U.S.A.—Relates to an improved collier for coaling a ship whilst at sea and under way, or while in a harbour and at anchor. The primary object is the provision of apparatus having a series of independent non-communicating coal pockets or hoppers which are superposed on side floats connected by a bow float forming part of the apparatus and fitted with adjustable delivery pipes to direct the coal into the ship disposed between said side floats, each of said delivery pipes being provided with a gate or valve. A further object is



to provide buffers which are yieldingly held in spaced relation to the inner faces of the side floats and a bow float and contact with the sides of the ship. A still further object is to provide improved means for clamping the ship in place, and for projecting said clamping means into contact with the sides of the vessel arranged between the side floats or portions. Fig. 1 is a side elevation of the collier; fig. 2 is a plan; fig. 3 is an end elevation; fig. 4 is a sectional detail of one of the clamps and of a fragment of one of the buffers; and fig. 5 is a detail section of one of the delivery pipes or conduits. (Five claims.)

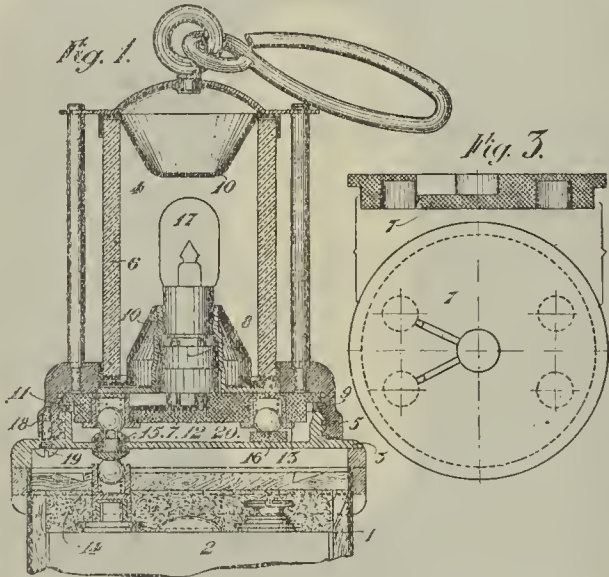
27301 (1912). *Improvements relating to Brakes for Railway Wagons and the like*. T. Smith, G. T. Edwards and O. B. Steward, all of the Darwent Valley Water Board Offices, Bamford, Derbyshire.—Has reference to railway brake rigging of that kind in which, after the power applied to the rigging has moved the brake shoes into contact with the wheel treads, the leverage of the system of levers of the rigging is further compounded, whereby the main or braking pressure is applied to the wheels. The essential feature resides in the fact that upon applying power to the rigging auxiliary levers first

apply the brake shoes to the wheels, while the main or braking pressure is then applied by a main pressure lever having a fixed fulcrum. Fig. 1 represents a side elevation of a railway wagon brake embodying the invention; fig. 2 is a plan view. Upon the handles 21 and 22 being grasped preparatory to depressing the lever 1 the catch 24 is withdrawn, thus releasing the lever 1 and allowing it to be lifted from the stop 25 in which it rests and lowered to any desired position in the guard 25. Upon depression of the lever 1 shaft 2 will be rotated, thus causing the shaft 6 to be also rotated through the cranks 3 and 5 and the link 4, thereby moving the cranks 9 and 10, which, as above stated, are keyed to the shaft 6, and so bringing the brake blocks 26



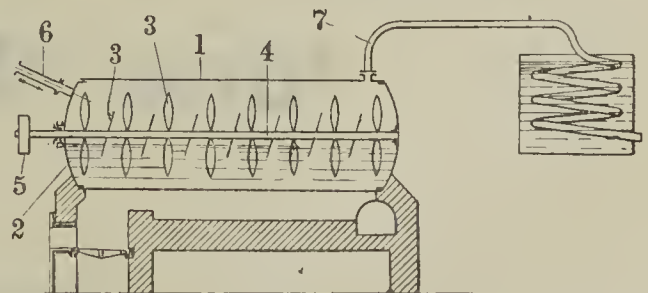
into contact with the wheels 27. Any downward movement of the lever 1 after contact between brake block and wheels will be taken up by the springs 13. During this movement the pawls 19 will be caused to slowly approach the wheels 27 owing to the actuation of crank 16, link 17 and main pressure lever 18 by shaft 2. The motion of the brake rods 11 is, however, faster than the movement of the pawls 19, and when the travel of the brake rods 11 is arrested by contact of the brake blocks 26 with the wheels, the pawls 19 engaged in the rack 20 will apply the braking pressure. When the lever 1 is lifted the reaction of the springs 13 effects a rapid release of the brake locks. (Four claims.)

28816 (1912). *Improvements in Electric Lamps for Mines*. H. Joris, of Loncin, Liège, Belgium.—Relates to electric lamps for mines of that type in which the head of the lamp, containing the lamp bulb, is mounted upon a body part or chamber containing the accumulator, and in which the lamp is adapted to be switched into and out of circuit by the rotation of the head of the lamp so as to cause suitable terminals connected to the lamp to be taken into and out of contact with terminals which are connected to the accumulator and which are situated in a closed chamber formed in the cover of the accumulator casing; the rotation of the said head being limited by a stop engaging with a groove



or slot in a base-plate carrying the head. The object is to provide an improved construction of this type of lamp which ensures the contact chamber being sealed both to the outside gas and to the accumulator gases in a more efficient and reliable manner than hitherto. According to the invention the base plate which carries the head of the lamp is screwed upon a raised part of the cover of the accumulator chamber so as to seal the contact chamber formed in the top of said cover; said base plate being only capable of rotating to a small extent to switch the lamp on and off so that a perfect gas-tight joint is preserved. Fig. 1 is a vertical section through the lamp; fig. 3 shows in section and in plan the ebonite disc which carries the terminals. (Two claims.)

29897 (1912). *Process for Simultaneously Oxidising and Evaporating Hydrocarbons*. Société Anonyme "Cava," of 76, rue Adolphe Renson, Montegnée-Liège, Belgium.—The process accomplishes both the oxidation and the distillation, or more exactly evaporation, of the hydrocarbon



in one operation, by the use of large surfaces which serve to receive thin, continually renewed films of hydrocarbon, while they are slowly moving through a current of air, and the hydrocarbon is subjected to heat. The surfaces provided for the purpose of carrying the hydrocarbon pass continuously through the liquid, and are so arranged that at the same time they operate as agitators or stirrers, which greatly enhances the action of the heat and the evaporation

(Continued on page 758.)



# **THE RECORD**

# **840**

**square feet in one shift with  
one "Siskol" Coal-Cutter.**

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**INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.**



The OFFICIAL figures recently published by H.M. Home Office show that in the Manchester District, for 1910, there were 152 Coal Cutters, of eleven different types, in use, of which 81, or more than half of the total number, were "SISKOL" machines.

Is any further proof needed as to which is the best Coal Cutter?

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INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.



The surfaces, by passing through a current of air, by reason of their comparatively large surface area, enable an effective oxidation of the liquid adhering to them to take place, and also a rapid evaporation of the lighter constituents of the hydrocarbon. The apparatus for carrying out the process is illustrated by a drawing herewith. (Two claims.)

### NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

#### Applications for Patents.

21890. Apparatus relating to the withdrawal of air and water from steam condensers. D. B. Morison.  
21891. Marine cableways. T. S. Miller.  
21892. Steam engines using superheated steam. M. Churchill-Shann.  
21897. Rabble shafts for mechanical ore-roasting furnaces. J. Harris.  
21929. Annealing or muffle furnace. D. Davies.  
21933. Steam turbines. K. Andersson.  
21957. Construction of boilers or the like. J. E. Pollak (Steam-power Devices Company, United States).  
21973. Hand coupling devices for railway vehicles. A. J. Gray.  
21978. Producer-gas apparatus. J. A. Seager.  
22006. Detachable haulage hooks or couplings. P. Gill and R. W. Spencer.  
22054. Apparatus for lubricating the axles of colliery tubs and similar vehicles. J. Cook, Sons and Co. Limited and C. F. Cusson.  
22135. Centrifugal pumps and the like apparatus. E. S. G. Rees.  
22139. Reciprocating or rotating pumps. P. Kestner.  
22148. Steam turbines. H. Mensforth.  
22167. Melt or compound for use in hardening or tempering steel. S. N. Brayshaw and E. R. Brayshaw.  
22189. Method of and apparatus for draining and concentrating coal and other slimes and materials of a like nature. S. Hunter and Simon-Carves By-product Coke-oven Construction and Working Company Limited.  
22191. Check feed valve for marine and other boilers. J. Green.  
22194. Combustion of solid fuel. P. St. G. Kirke.  
22196. Safety valves for steam boilers and the like. David Auld and Sons Limited, J. Auld and J. Graham.  
22198. Connecting up of electric cables or conductors and the protection of their exposed ends and terminals. St. Helens Cable and Rubber Company Limited and J. C. White.  
22199. Coupling shackles and pins and appliances for the automatic interlocking of the same. D. Lewis.  
22202. Means by which long trough conveyors operating in mines receive and discharge their loads. J. Adair.  
22256. High-speed rotating bodies. Soc. Anon. pour l'Exploitation des Procédés Westinghouse Leblanc.  
22268. Geared hoisting machinery. Herbert Morris Limited, and J. A. Butterworth.  
22277. Briquetting machines. C. Korte.  
22282. Safety suspension mechanism for mining cages or the like. J. Horsley.  
22283. Tubes, tubular bodies, or the like, and the manufacture of same. E. Perry.  
22327. Machines for charging and discharging gas retorts. J. G. W. Aldridge.  
22346. Method and apparatus for concentrating ores. Minerals Separation Limited. (Gustaf Emil Ohn, Sweden).  
22364. Safety catches for colliery pit-cage in case of rope breaking. G. R. Nevitt.  
22384. Automatic axle lubricator. P. Burrill.

#### Complete Specifications Accepted.

To be published on October 23, 1913.

21815. Hoists or lifts for conveying loads of all kinds. Schlösser.  
21904. Construction of tunnels and the like. Calthrop and Lynde.  
22342. Plant for purifying water and removing the iron contained therein. Lantzsch.  
22357. Disintegrators. Buckley.  
22457. Rotary grinding machine. Erste Offenbacher Spezialfabrik für Schmirgelwarenfabrikation Mayer and Schmidt.  
22612. Water-tube boilers. Ross and Maxted.  
22738. Safety electric lamps, more especially intended for use in mines. Hanson, Langston and Electrical Power Storage Company.  
22958. Manufacture of artificial fuel. Armstrong and Mordan.  
28960. Regenerative open-hearth furnaces for metallurgical purposes. Albert.  
1913.  
2085. Centrifugal fans. Ludikar and Dobrovsky.  
3028. Centrifugal air-compressors. British Thomson-Houston Company. (General Electric Company).  
3557. Apparatus for charging containers of respiratory apparatus. Mellersh-Jackson (Dragerwerke Heinrich and Bernh. Drager, Firm of).  
4707. Miners' lamps. Heaton.

6568. Power drills. Hartel.  
7223. Automatic conveyers or feeding apparatus. Bartels and Miech.  
7892. Furnaces for roasting ore. Dohet.  
15027. Piston distributing valve for compound steam engines. Wolf.  
15036. Chain or chain coupling. Irons and Bowden.  
17201. Labyrinth packing for gas or steam turbines. Aktiebolaget Ljungstroms Angturbin.  
Complete Specifications open to Public Inspection before Acceptance.  
1913.

1515. Furnaces and fuel-feeding devices therefor. Greenstreet.  
5783. Water softening or purifying substances and process of obtaining same. De Brunn.  
10887. Process for determining the nature of the sub-soil, and apparatus therefor. Schlumberger.  
17307. Manufacture of explosives of the Sprengel class. Hawkins.  
18493. Method of and means for controlling furnaces by simultaneous induced and forced draught. Prat.  
21553. Steam generators for gas producers. Pierson and another.  
21857. Furnace grates. Compagnie d'Incineration Industrielle.

### CATALOGUES AND PRICE LISTS RECEIVED.

The Chicago Pneumatic Tool Company send bulletins relating to power-driven compressors and electric grinders.

The British Aluminium Company Limited (109, Queen Victoria-street, S.W.) issue a handy sheet of weights and dimensions of aluminium sheets, in comparison with brass, copper, steel and tin.

Messrs. Bruce Peebles and Co. Limited (Edinburgh) send us a new pamphlet of open-type continuous-current dynamos and motors, giving full detailed specification, approximate weights and dimensions, ratings, &c., and illustrated by numerous photographs.

A comprehensive catalogue has reached us from Messrs. Schafer and Budenburg Limited (Whitworth-street, Manchester), dealing with iron, steel and gunmetal valves, the "Concentra" oil pump, and Jena "Durobax" water-gauge glasses. The firm make a speciality of stop valves for high pressures and superheated steam.

"The Renold Roller Chain Tooth Form" is the title of an address delivered by Mr. Hans Renold at a meeting of the chain and cutter manufacturers at New York during the present year. It gives an admirable statement of the advantages of the Renold new tooth form. The pamphlet, containing the address, has been sent to us by Messrs. Hans Renold Limited, of Manchester.

A handsome bulletin has been issued by the Phoenix Dynamo Manufacturing Company Limited (Thornbury Works, Bradford) describing by means of detailed photographs the design and special construction of large alternating current motors for driving colliery fans and compressors. These motors embody many points of interest. A special feature in three-bearing machines is the fitting of a cast-steel coupling shrunk on to the shaft and in between the rotor and its pedestal, enabling the rotor to be removed if necessary without taking the ropes off the pulley. There is an arrangement also whereby the stator may be slightly raised or lowered in order to ensure perfect alignment with the rotor. The slip-rings are of the wheel type, and, as at other points in the entire motor, evidently represent the most careful attention to detail. These motors, which are made in sizes up to 1,000-h.p., are specially adapted for use with exhaust steam turbines. A few installations are the following:—Rother Vale Collieries (400-horse power, 415 revolutions per minute, 3,000 volts, and 775-horse power, 247 revolutions per minute, 3,000 volts); Barrow Colliery (600-horse power, 365 revolutions per minute, 550 volts); Gwaun-cae-Gurwen Colliery (eight 300-horse power, 485 revolutions per minute, 3,000 volts); Manvers Main Colliery (two 500-horse power, 485 revolutions per minute, 3,000 volts); Carlton Main Colliery (350-horse power, 485 revolutions per minute, 3,000 volts).

North of England Institute of Mining and Mechanical Engineers.—A general meeting will be held in the Wood Memorial Hall, Newcastle-upon-Tyne, at two o'clock to-morrow (Saturday), October 11. The business will be purely routine. The presentation will be made of a G. C. Greenwell bronze medal to Mr. W. Hutton Hepplewhite, H.M. inspector of mines, for his paper on "The Action and Control of Differently Constituted Coal Roofs."

### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

Consular Reports, 1912: Index for 1912, 6d.; China Foreign Trade, 4d.; Panama, 3d.; Japan, Nagasaki, 3d. Italy, Leghorn, 2d.  
COAL MINES, General Regulations, 9/9/13 (No. 974) 1d.; Ditto, Rule, 11/9/13 (No. 986), 1d.  
Inland Revenue Commissioners' Report, 1912-13, 1s. 9d.  
Secondary Education (Scotland) Report, 1913, 5d.  
Carriage of Explosives on Board Ship, Circular 1541, 1d.  
Pauperism: Statement for January 1, 1913, 8d.

### PUBLICATIONS RECEIVED.

ELECTRIC CIRCUIT THEORY AND CALCULATIONS. By W. Perren Maycock. 1913. London: Whittaker and Co. Price 3s. 6d. net.

DEPARTMENT OF MINES, INDIA: REPORT OF THE CHIEF INSPECTOR OF MINES IN INDIA, 1912. By G. F. Adams. 1913. Calcutta: Superintendent Government Printing India.

VICTORIA: ANNUAL REPORT OF THE SECRETARY FOR MINES. 1912. Melbourne: A. J. Mullett, Government Printer.

FIRST SERIES OF COALDUST EXPLOSION TESTS IN THE EXPERIMENTAL MINE (U.S. Bureau of Mines, Bulletin 56). By George C. Rice, L. M. Jones, J. K. Clement and W. L. Egy. 1913. Washington: Government Printing Office.

INVESTIGATIONS OF DETONATORS AND ELECTRIC DETONATORS (U.S. Bureau of Mines, Bulletin 59). By C. Hall and S. P. Howell.

SAFETY ELECTRIC SWITCHES FOR MINES (U.S. Bureau of Mines, Technical Paper 44). By H. H. Clark.

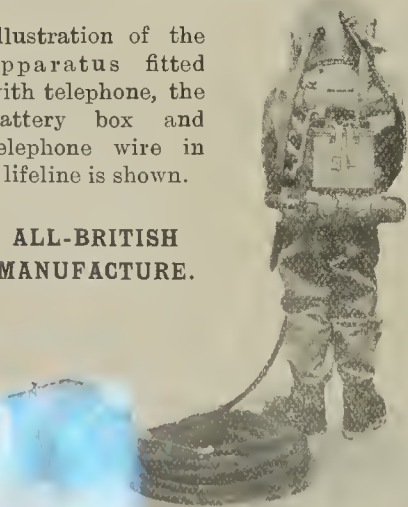
PORTABLE ELECTRIC MINE LAMPS (U.S. Bureau of Mines, Technical Paper 47). By H. H. Clark.

"United States Geological Survey" (Bulletin 525), "A Geologic Reconnaissance of the Fairbanks Quadrangle, Alaska," by L. M. Prindle, with "A Description of the Fairbanks District," by L. M. Prindle and F. J. Katz, and "An Account of Lodemining near Fairbanks," by B. S. Smith; (Bulletin 526), "Coastal Glaciers of Prince William Sound and Kena Peninsula, Alaska," by M. S. Grant and D. F. Higgins (Bulletin 528), "Geology and Ore Deposits of Lembi Co. Idaho," by J. S. Umpleby; (Bulletin 523), "The Koyukul Chandalar Region, Alaska," by A. G. Maddren; (Bull. 533), "Geology of the Nome and Grand Central Quadrangles, Alaska," by F. H. Moffit; (Bulletin 534), "The Yenina District, Alaska," by S. R. Capps; (Bulletin 535), "A Geologic Reconnaissance of a Part of the Rampart Quadrangle, Alaska," by H. M. Eakin; (Professional Paper 78), "Geology and Ore Deposits of the Philipsburg Quadrangle, Montana," by W. H. Emmons and F. O. Calkins; (Professional Paper 80), "Geology and Ore Deposits of the San Francisco and Adjacent Districts, Utah," by B. S. Butler; (Professional Paper 85—A), "The Origin of Colemanite Deposits," by Hoyt S. Gale; "Revue Universelle des Mines de la Métallurgie" (tome 3, No. 3, September; "Bulletin and Comptes Rendres Mensuels de la Société de l'Industrie Minérale" (tome 4, No. 9), September; "Le Mois Scientifique et Industriel" (No. 169), price 2 fr.; "Proceedings of the Staffordshire Iron and Steel Institute, Session 1912-13" "The I.C.S. Student" (Vol. 5, No. 10), October, price 2d.

Baths for Colliers.—Messrs. Fletcher, Burrows and Co., colliery proprietors, of Atherton, have just completed the erection of a lofty and spacious building containing 40 spray baths for the use of the 700 colliers employed at the Gibfield pit, Atherton. The water for the baths is supplied from a large tank inside the building capable of holding 500 gallons of water. The collier, after taking off his pig clothes, goes into one of the small recesses, and, pressing on a piece of wood with his foot, causes the water to come over him in the form of a spray at a temperature of 96 degrees. Seven minutes are allowed for a bath, and the collier has to bring his own soap and towel. After rubbing himself down he can put on his clean walking clothes, which have been slung up to the ceiling, and, if they have been in the rain, will be quite dry by the time he needs them. There are 396 of these slings, each numbered and provided with a separate lock and key. The new departure is said to be appreciated greatly, and about 265 employees now use the baths daily.

Illustration of the apparatus fitted with telephone, the battery box and telephone wire in lifeline is shown.

ALL-BRITISH MANUFACTURE.



## SELF-CONTAINED DIVING APPARATUS

(NO AIR PUMPS OR TUBES REQUIRED).

Designed more particularly for work in Flooded Mines and other difficult situations where the use of Air Pumps and Tubes would be impracticable.

This apparatus, in its original form, was used with great success when the Severn Tunnel (Great Western Railway) was flooded in 1880.

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# THE COLLIERY GUARDIAN

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## RUFFORD COLLIERY ACCIDENT.

### Mr. Walker's Report.

The report by Mr. Walker, H.M. inspector of mines, on the causes of and circumstances attending the accident which occurred at Rufford Colliery, Nottinghamshire, on February 7, 1913, from a water barrel falling down a sinking shaft has just been published as a White Paper [Cd. 7045.].

Mr. Walker held a formal investigation under section 83 of the Coal Mines Act, 1911, into the causes and circumstances of the accident by which 14 persons were killed and four injured.

Two shafts—No. 1, 21 ft. diameter, and No. 2, 18 ft. diameter—about 5 miles to the north-east of Mansfield, are being sunk on Lord Savile's estate, of which an area of 5,000 acres of the well-known Top Hard and other seams has been leased to the Bolsover Colliery Company Limited. No. 1 shaft, in which the accident occurred, was sunk by means of a steam crane to a depth of 80 ft. in the new red sandstone measures when water was met with. Sinking was then stopped and the permanent headgear pillars, headgear, winding engines and winding engine-houses were erected. When the work of erecting this plant and machinery was completed the sinking was resumed on June 5, 1912, with the permanent winding engines. Considerable trouble was experienced owing to the quantity of water found in the sandstone, but it was eventually dealt with and tubbed off with cast iron tubbing. At the end of last year the bottom of the new red sandstone measures was reached at a distance of 145 yards from the surface. The whole of the water met with was dealt with by means of pumps and a suction barrel, and was tubbed off by eight lengths of tubbing. Sinking was then continued in the magnesian limestone; it was not anticipated that water would be met with in this strata, and for the first 12 yards they were perfectly dry. A feeder of water of 260 to 300 gallons per minute was then met, which was dealt with by means of a suction barrel. After sinking a few yards further, or until the depth was 162 yards, a crib was put in the limestone and a length of tubbing of between 20 and 21 yards was being put in; all except the two rings at the top had been placed in position when the accident occurred. A scaffold was suspended about 18 yards from the bottom of the shaft and 3 ft. above the water, by means of six chains to two ropes, and was raised and lowered by a strong capstan engine. The ropes were also used as guides for the water barrel and hoppits. There was an opening about 6 ft. 4 in. square in the centre of the scaffold through which the hoppit or suction water barrel passed for drawing of dirt or water. The scaffold had been raised to where the segments of tubbing were being placed in position about 18 yards above the bottom of the shaft, and water was being raised through the opening in the scaffold. Eighteen men were on the scaffold, some moving the segments and some cutting the sides of the shaft back to make room for the tubbing.

About 7.30 p.m. the suction barrel, full of water and weighing about 5 tons 1 cwt., fell down the shaft, smashed the whole of the timberwork of the scaffold to fragments, and 13 of the men were either stunned or injured and thrown into the water, which was at the time about 49 ft. in depth, and they were probably drowned before they could recover consciousness. The remaining five men, though one was severely injured, clung to the remnants of the scaffold, and were rescued in about an hour. The man who was severely injured, however, succumbed to his injuries five days afterwards.

### Cause of the Accident.

On Friday night, February 7, there was a violent gale of wind and rain, and one of the enginemen, named John Hollingsworth, had improvised a shelter over the chair in which they sit while working the engine, about nine days prior to the accident, by nailing two light laths, each 3 ft. 6 in. long by 2½ in. wide by ¾ in. thick, one on each side of the top of his chair. They were each secured by two nails 1½ in. long with a hold of about ¾ in.; these nails were placed 9 in. apart, and the laths

projected beyond the chair without any further support. Across these were placed three or four loose light pieces of wood, and at the time of the accident a horse rug, weighing about 9 lb., was in position over them, with a piece of wood 4 ft. 4 in. long by 6½ in. wide by 1 in. thick, placed by the engineman, Sydney Brown, under it to prevent it from sagging and falling on to his head. The accident occurred during this engineman's shift.

Shortly before the accident occurred a banksman had gone into the engine-house to speak to the winding engineman about the electric light, of which he (the engineman) had complained a few minutes before, and at the time of the accident he was standing by the side of the chair. The engineman was winding a barrel of water, and when it had been raised about half way up the shaft, one of the nails in the lath carrying the improvised canopy, on the right-hand side, appears to have been drawn out, either by the weight of the wet rug or by the wind lifting it, and when it fell again the strain was too much for the nail to sustain. The result was that this lath fell down, the rug enveloped the engineman's head, and the board he had placed under the rug slid down the lath and fell between the levers by which the steam brake and throttle valve were worked. It was necessary, in order to check the speed of the engine and finally to stop it, to push one lever forward and pull the other back, but, owing to the piece of wood being between them, it was impossible to do this. The banksman and engineman attempted

to be pulled towards the outer point of the hook, and on its taking up the tremendous strain of the falling water barrel the leverage was so great that the hook was opened out. The "clivvy" or spring hook was made of Lowmoor iron, in the rough, at Mansfield Colliery, belonging to the Bolsover Colliery Company Limited, and was finished at Rufford Colliery; its dimensions were 3½ in. by 2¼ in. There was no sign of any latent flaw or defect in the iron of which the hook was composed; indeed, under the strain to which it was subjected, the quality of the iron appears to have been excellent.

The design of the hook appears to have been faulty, and did not give anything approaching the factor of safety the management considered they were working with. They estimated, with the load of 5 tons, they had a safety factor of 7 to 1 in the hook; but when a hook of the same design and dimensions was tested afterwards, it began to open with a strain of 22 tons, and finally opened with 28 tons, so that the factor of safety was only 4.3 to 1.

Since the accident a hook has been designed carrying the load nearer to the side opposite to the spring or tongue and with the size of the iron increased to 5½ in. by 2¼ in., and this hook under test commenced to open at 38 tons and finally opened at 64 tons. This gives a factor of safety of 7.6, and although the margin of safety is nearly doubled, it does not appear to Mr. Walker to be sufficient for safe working in a sinking pit.

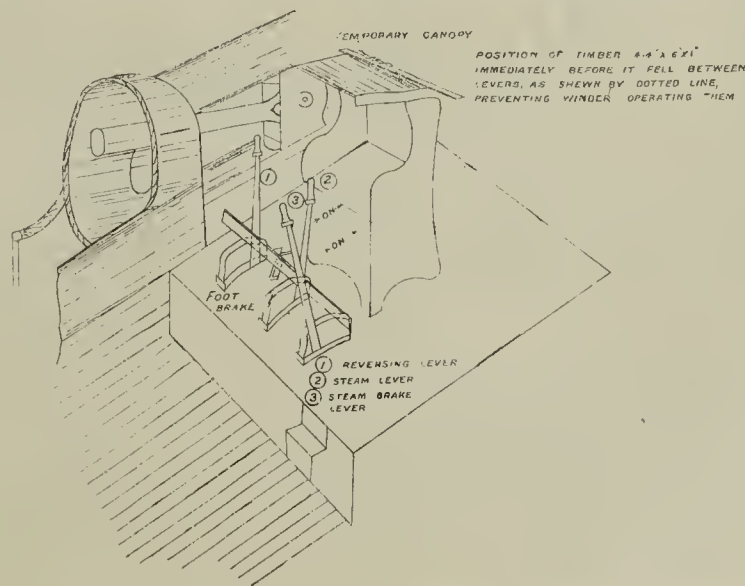


FIG. 1.—PERSPECTIVE VIEW OF WINDER'S CHAIR.

to get the piece of wood from between the levers, and, according to the evidence of both, the engineman got hold of it first and removed it. He then shut off steam and applied the brake, and appears to have succeeded in partially checking the speed—as the rope end did not go into the engine-house—but not sufficiently to prevent a rapid overwind. The Ormerod hook acted satisfactorily in detaching the rope and suspending the water barrel; the momentum, however, was so great that the water barrel flew up and the piston rod with which it was fitted struck the beams carrying the bell of the detaching hook, and it fell back with such force that the "clivvy" or spring hook was pulled open, as shown in fig. 2. The water barrel then, being free, fell down the shaft. In doing so, from the marks on the headgear and doors at the top of the pit, it appears to have struck one of the cross beams of the headgear nearest to the winding engine-house, and was thus deflected to the other side, where it struck the top of one of the doors of the top landing, rebounded to the other side and hit the opposite door at the bottom landing, and after the bottom door was cleared, to have fallen down the shaft on to the scaffold on which the men were working about 156 yards below, with the lamentable results already recorded.

One of the lugs by which the chains were attached to the water barrel was torn off, the rivets all being shorn, and from this fact the management deduced that when the barrel fell back the weight was, for the moment, carried by one chain, and this caused the "D" link attaching the chains to the "clivvy" or spring hook, to

Mr. F. Coulson, who has had a very large experience of sinking, stated in his evidence that he did not like the design of the hook, and thought it was faulty; but if he had seen it prior to the accident occurring he would not, in all probability, have found fault with it, and Mr. Mottram, H.M. divisional inspector of mines, also expressed the same opinion in his evidence. Mr. Coulson produced a plan of a spring hook which he had used for many years, and with which, as far as he knew, there had been no failure or accident (fig. 3).

Sir Arthur Markham urged that when winding water a spring hook should not be allowed to be used, and that a "D" link (see fig. 4) should be substituted for it. Mr. Bingley, the agent of the colliery, while admitting that a "D" link of the same size would have been much stronger, did not agree with this suggestion, because if a hook was not used for raising water it followed that it could not be used when dirt was being raised, and was of opinion the "D" link would be much too slow, and did not give sufficient additional safety to warrant its being adopted. There is no doubt spring hooks are adopted frequently for drawing water when a "D" link could be as conveniently used, and, where it is reasonably practicable to do so, Mr. Walker thinks the "D" link should always be used for this purpose.

Since the enquiry attention has been drawn to a form of double hook devised by Messrs. the Meadow Foundry Co. Ltd., Mansfield, a sketch of which is given in fig. 5. This certainly gives much added strength, and overcomes the objection raised by the management of the Rufford Colliery to the use of a "D" link. This, or a



hook, or the "D" link should be adopted in  
 at sinking pits.

There should, Mr. Walker thinks, be a minimum factor of safety of 10 to 1 required in connection with all ropes, chains, hooks, &c., used in sinking pits.

An automatic contrivance for the prevention of accidents from overwinding had been supplied with both the winding engines, but, unfortunately, it was not coupled up to the engines at the time of the accident. It is probable that if it had been, by the steam being automatically cut off and the brake applied, the accident would have been averted. These contrivances are intended for the prevention of such accidents as occurred on this occasion. The management were of opinion that as the brake was applied suddenly it was not safe to use it in a sinking pit, and, under these conditions, instead of averting an accident it would probably cause one. The use of an automatic contrivance with all winding engines by which persons are lowered to or raised from a depth exceeding 100 yards was not compulsory until the first of this month, and, therefore, there was no legal obligation to have one in use on the date of the accident. Mr. Walker agrees with the management that it is desirable, especially in a sinking pit, that the device adopted should be of the type which, in case of necessity, first reduces the speed and gradually applies

FIG. 2.—CLIVVY AFTER ACCIDENT.

the brakes, and finally, on reaching a predetermined point, all the stopping power should be applied; but as there are contrivances acting in this way to be obtained, the reason given by the management for a controller not having been applied does not appear to be a valid one. One of the patentees of the automatic contrivance supplied with the winding engine at the pit in question gave evidence at the enquiry, and stated the contrivance was usually supplied with an arrangement to prevent its coming suddenly into action, but it had not been supplied with the controller with these engines. The automatic controller as supplied is a speed as well as a limited distance controller, but having only one trip it comes suddenly into action. All controllers should have at least two trips, the first to shut off steam and apply the brake gradually, and the second to bring all the stopping power into action.

### Use of Ladders in Sinking Pits.

Sir Arthur B. Markham, in his evidence, strongly advocated the use of ladders in all shafts during the time they are being sunk through water-bearing strata, and while Mr. J. P. Houfton, the managing director of the Bolsover Company Limited, and the other expert witnesses called on behalf of the owners of the colliery, expressed the view that in this particular case the accident would have been saved if they had used ladders. The expert witnesses agreed that their use would probably result in the saving of life in the event of anything falling down the shaft. Water-

bearing strata usually is not met with beyond a greater depth than 600 to 900 feet, and Mr. Walker thinks the adoption of rope ladders when such strata are being sunk through would be a wise precaution and should be made compulsory. In order to give reasonable facilities for the number of men, which, as a rule, are employed at one time in a large modern sinking there should be at least four such ladders provided, and they should be available from the bottom of the shaft to the surface, or some place of safety in the shaft connected with another shaft or outlet. Adequate means should be taken to protect them from damage during shot-firing and at other times. The cost of providing these ladders would not be excessive.

### Provision of Stand-by Engine.

The provision of a second winding engine by which to reach the persons working in a sinking pit in cases of emergency appears to be an absolute necessity, and should be required by the regulations. The witnesses who were asked whether they considered the provision of an additional means of getting to any part of a shaft after an accident without loss of time necessary, without exception replied that they agreed that such means should be provided and be constantly available. When this accident occurred it was impossible for anyone to descend the shaft until the winding rope was passed over the pulley wheel and a hoppit attached to it, and although the master sinker, Mr. Cook, set about the necessary work with commendable energy, he was unable to reach the five survivors for about an hour.

### System of Lighting in Shaft.

The system of lighting was by means of a cluster of four 50-candle power incandescent electric lamps fitted with a metal cover and suspended by means of the cable

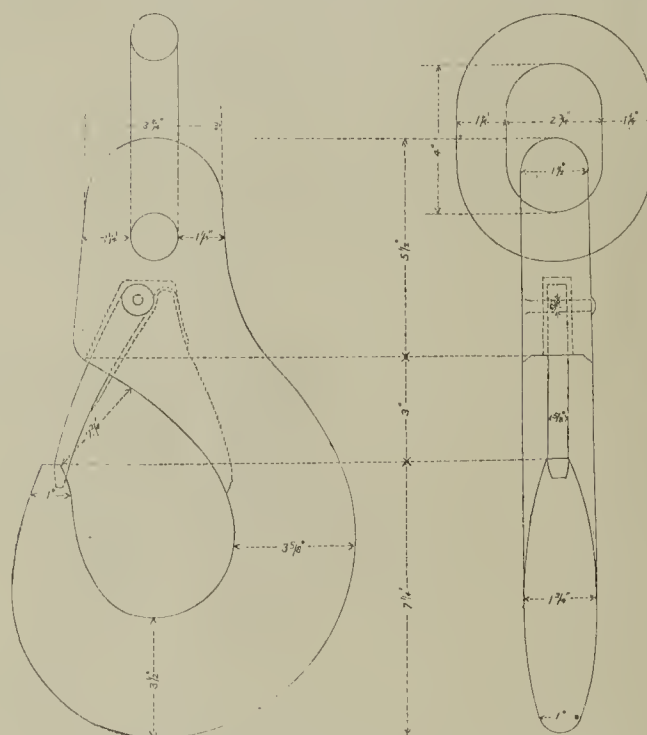


FIG. 3.—SPRING HOOK USED AND ADVOCATED  
BY MR. F. COULSON.

in the shaft, and the cover and lamps were raised or lowered in the shaft when necessary by a hand winch on the surface. When the water barrel fell down the shaft these lights were extinguished, probably by the impact of the barrel and shattered scaffold causing the water to hit the lamp bulbs, thus breaking the glass. The men, who were not instantly killed, were, therefore, left a few minutes without a light until a "torch" lamp was lowered down the shaft from the surface by Mr. Cook, the master-sinker. Sir Arthur Markham, in his evidence, expressed the opinion that the system adopted in this instance was wrong, because if anything strikes the cable the light is inevitably put out, and advocated the use of four or five large portable electric accumulator lamps of the "Fors" type, each of 8-candle power, in each shaft being hung at a distance of 12 or 14 ft. above the men, so that in case of one or two of the lamps being carried away from any cause there would still be light for the men, and Mr. Coulson was also of the opinion that the use of these lamps was preferable to the use of a cable hanging down the pit. The following points in favour of the system of lighting which was in operation at the time of the accident should be stated :—

- (1) The light provided was much in excess of that afforded by the system described and advocated by Sir Arthur Markham—the aggregate light in the latter case of five lamps being only 40-candle power whereas with the lamps in use the total candle-power was 200.
- (2) The system in use allows of the lights being more easily raised or lowered to suit the operations being carried on in the shaft.

and for these reasons Mr. Walker does not think the latter system should be condemned.

Electricity Special Rule 5 (a) requires that in all places lighted by electricity where the failure of the electric light would be likely to cause danger one or more safety or other proper lights shall be kept continuously burning. This rule does not appear to have been considered by the management as applying to this sinking. Mr. Walker thinks it was a place within the meaning of the rule and that other lights should have been kept continuously burning, but, at the same time, he adds, it is only fair to say that he does not think any of the loss of life was attributable to such lights not having been provided. In his opinion the system in use is not attended with undue risk as long as the voltage does not exceed 100, and, in order to prevent the lamps being extinguished in the way they probably were in this instance, each electric incandescent lamp be enclosed in a strong outer covering. Portable electric lamps of the accumulator type could, with advantage, be adopted as the "other proper lights" required by Electricity Special Rule 5 (a).

It was urged that the hanging cable in the shaft was a source of danger, but no instance of an accident due to this cause has been brought forward, nor have any occurred. Instances have occurred of the cable being carried away, but no loss of life resulted. Considering the better light obtained from the cluster suspended

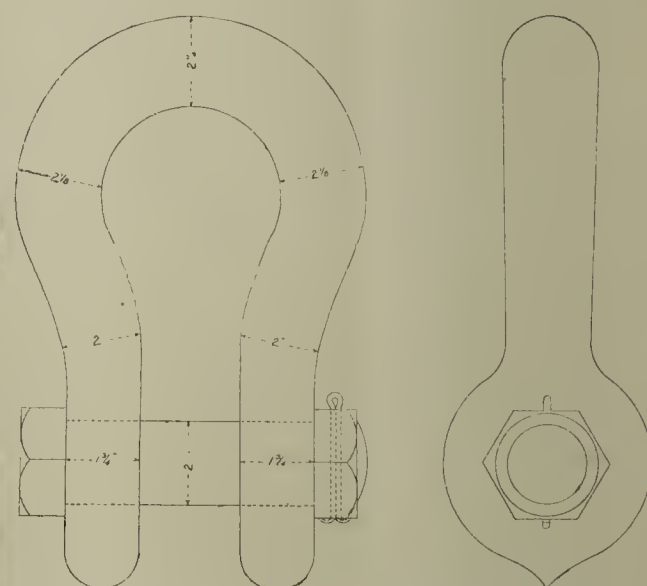


FIG. 4.—PLAN OF "D" LINK WHICH REPLACED CLIVVY WHEN WATER-DRAWING.

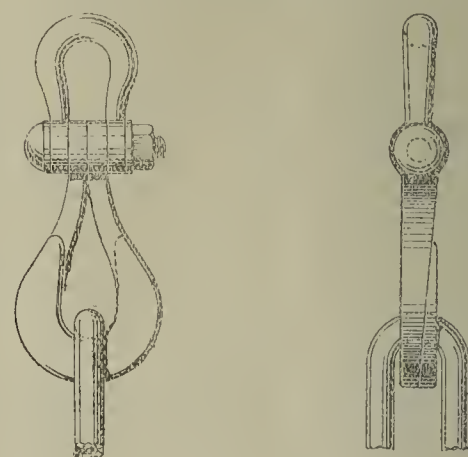


FIG. 5.

from a cable system, and the ease with which it can be raised and lowered as required, Mr. Walker does not think its use in future should be prohibited, but suggests that where the system of lighting is electrical, lamps of the electric accumulator type should be used in conjunction with this system, or that a sufficient number of the latter kind of lights should be provided to afford efficient light at the bottom of or in other parts of the shafts as required.

### Provision of "Kep" Beams in Headgear.

Mr. Coulson, in his evidence, suggested that the question of the erection of "kep" beams in the headgear to prevent a hoppit or water barrel falling down the shaft in the event of it becoming free, as occurred in this case, should be seriously considered. He thought that they could be arranged either to be pushed back by the hoppit as it went through them, and then to fall in so as to be in position when the detaching hook acted and the hoppit fell back, or that they should be fastened back by catches or other means, and the hoppit in passing would release the catches and thus allow the beams to fall in. Such means of preventing the falling of a hoppit or water barrel down a shaft have not been adopted in connection with a sinking shaft in the United Kingdom, but Mr. Coulson stated in evidence that they have been provided at Mines in the Transvaal. Similar appliances are provided in mines in certain coalfields—Lancashire in particular—but only when cages running in guides have been installed. The



provision of such beams at sinking pits is not an easy matter, but the advantages to be gained from the point of safety are considerable.

#### Conclusions.

Mr. Walker's conclusions are as follow:—

Speaking generally, the whole of the arrangements of the surface and in the shafts were all that could be desired; they were well designed and installed. It is all the more to be regretted that the winding engineman erected and continued to use so flimsy and, as it proved, dangerous a covering over the chair, and also that the manager and enginewright allowed it to be used. They were all guilty of an error of judgment, which was directly the cause of the loss of 14 lives, and it is to be hoped that the lessons the accident so forcibly brings home will result in nothing of a temporary or insecure character being used about the winding arrangements at this and other sinking pits in future.

The precautions which, in my opinion, should be taken for the prevention of accidents similar to the one which was the subject of my investigation are:—

(a) A "clivvy" of improved design or a "D" link (see fig. 4) giving a much greater factor of safety should be used in sinking shafts.

(b) The factor of safety in connection with all ropes, chains, hooks, &c., in sinking pits should not be less than 10 to 1.

(c) An automatic contrivance for the prevention of overwinding, designed so as to cut off the steam and gradually apply the brakes and then bring all the stopping power into operation, should be used if the shaft is 100 yards or more in depth.

(d) At least four ladders from the bottom of the shaft to the top, or some intermediary place in the shaft, should be provided when water-bearing strata is being sunk through.

(e) The provision of a second winding engine, by which the persons can be reached, should be made compulsory in all sinking pits.

(f) Where the system of lighting is electrical it should be at a pressure not exceeding 100 volts, either by a hanging cable with incandescent lamps covered with a strong outer covering in conjunction with lamps of the accumulator type (the latter to comply with Electricity Special Rule 5 (a)), or by a sufficient number of the accumulator type to give efficient light in the bottom or other parts of the shaft as may be required.

(g) The question of the provision of "kep" beams in the headgear to prevent a hoppit or water barrel falling back on to the chains and hooks with excessive force should be seriously considered and, if a satisfactory type can be devised, adopted.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, October 7, 1913, is as follows:—Amsterdam, 769 tons; Antwerp, 348; Buenos Ayres, 5,785; Bona, 2,347; Bordeaux, 2,700; Bruges, 654; Brunsbittel, 1,379; Bremen, 1,985; Copenhagen, 329; Christiania, 9,588; Constantinople, 436; Dahlsbrnk, 2,779; Drontheim, 201; Gafle, 1,896; Gothenburg, 766; Ghent, 1,648; Hamburg, 7,089; Harlingen, 1,041; Königsberg, 1,504; Kallundborg, 2,773; Libau, 4,117; Malmö, 809; Moss, 945; Marianople, 4,579; Newfairwater, 680; Oxelosund, 1,785; Odessa, 10,442; Port Said, 4,786; Rotterdam, 725; Rouen, 3,855; Riga, 4,507; St. Petersburg, 10,103; Stettin, 2,119; Stockholm, 559; Sevastopol, 5,581; Trelleborg, 1,291; Wyk, 107. Total, 102,497 tons. Corresponding period October 1912, total, 77,165 tons.

**Capels for Winding Ropes.**—The winding ropes manufactured by Messrs. William Cooke and Co. Limited, of Sheffield, have earned a deservedly high reputation wherever minerals are raised, and the capels and sockets made by them have also proved their efficiency on frequent occasions. Messrs. Cooke and Co. have just sent us a card showing the results of a number of tests of winding ropes carried out by them with capels in use at various collieries. The ropes ranged from 1½ in. diameter up to 6½ in. circumference, and were fitted with different types of split capels, with from three to seven rings, some of which were studded. As a matter of interest we give the particulars in a condensed form:—

Size of rope.	Breaking strain.	Holding power.	Type of capel.
Dia. of rope.	Tons.	of capel.	
In.			
1½	50.31	16.7	Split, 3 rings
1½	48.59	32.32	" 4 " shackle and pin
1½	59.66	33.68	" 4 " studded
1½	60.20	23.60	" 9 rivets through
1½	76.09	51.80	" 4 rings
1½	66.80	29.70	" 3 " 1 rivet through
1½	103.18	53.80	" 4 "
1½	72.41	36.56	" 11 rivets through
1½	67.5	48.8	" 7 rings
1½	82.0	36.1	" 4 "
1½	87.18	55.8	" 5 "
1½	81.47	49.59	" 1 "
1½	85.98	49.01	" 6 "
1½	85.90	58.70	" 5 "
1½	91.40	48.70	" 5 "
6½ cir.	147.68	76.28	" 4 " 3 studded

The third column shows the strain at which the rope drew out from the capel described in the fourth column; the second column shows the strain at which the rope broke when the original capel was replaced by one of Cooke's solid forged capels fitted with white metal—indicating a factor of 100 per cent. in every case!

#### MINING INSTITUTE OF SCOTLAND.

A general meeting of the Mining Institute of Scotland was held on Saturday last in the Heriot-Watt College, Edinburgh. Mr. JAMES HAMILTON, the president, in the chair. There was a large attendance of members. At the outset the following gentlemen were admitted to membership:—Messrs. Andrew Farquhar, mining engineer, Koro Cocha, Peru; Peter King, surveyor, Tunisia, North Africa; Manmath Nath. Roy, general manager, Barakur, Bengal, India; John Wilson Rigg, oversman, Cardenden, Fife (associate); and A. C. Rankin, apprentice surveyor, Hillhead, Glasgow (student member).

#### The Testing of Fans.

Mr. JOHN B. THOMSON (Hamilton) introduced a discussion on the paper by Mr. JOHN WATSON on "The Testing of Fans: a Plea for Standardised Test Conditions." Mr. Thomson said he agreed with the author as to the advisability of having a standard method of testing fans. He did not think it was at all necessary to enlarge upon this, as there was scarcely any subject in mining upon which there were so many divergent views. Should a committee be formed, as suggested by the writer of the paper, and a standard agreed upon, he had no doubt it would lead to more valuable data relating to fans being published in the *Transactions*. Incidentally, fan makers would be enabled to draw out a list of their fans, and what they could actually do, so that when one wanted a fan for a given duty he would choose the type he wanted, order the size he required, and rest assured that when it was

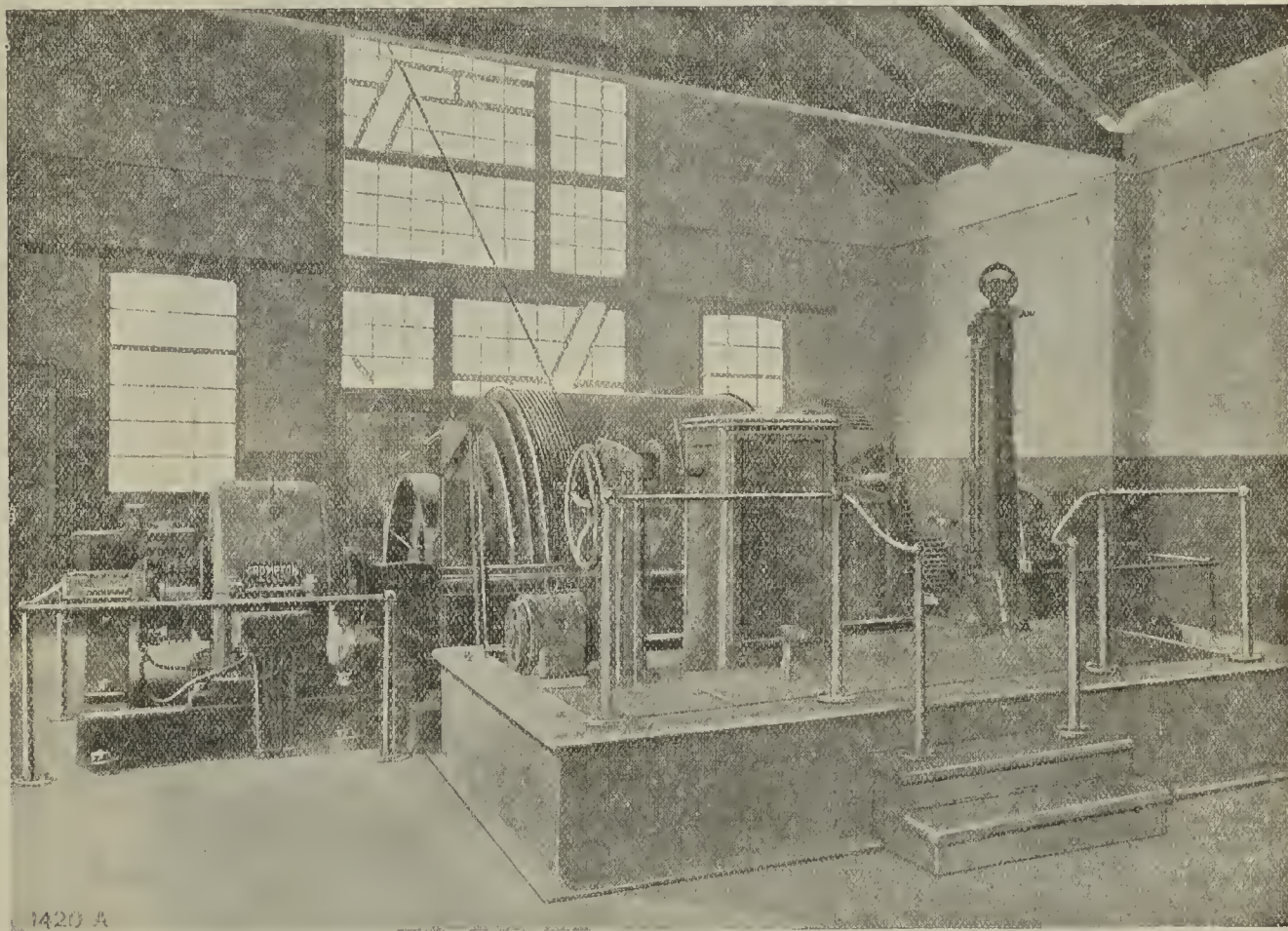
water-gauge irrespective of the quantity passing. Hence when double the quantity passed, natural ventilation would contribute twice the horse-power to the air.

Mr. F. G. ALLAN, in the course of a written communication, said that during his experience he had found that when measuring the quantity of air being passed by the mine the test should be conducted (a) when the mine is not at work, so that there may be no interruption of the air-current by the cages; (b) that the area of the mine should be considered and the fan be at work for some time before any measurements are taken; (c) where the conditions are favourable, embracing a large air-drift without curves or bends and giving an air velocity of about 2,000 ft. per minute, he had always found the velocity readings to be fairly constantly uniform, and provided always that the point of measurement was sufficiently distant from the fan inlet as to ensure a uniform flow; (d) like other things in Nature, air takes the line of least resistance, and he had found that fact demonstrated in a very marked degree with double inlet fans.

Further discussion on the paper was adjourned.

#### Electrical Winding Gear at South Kenmuir Colliery.

Mr. WILLOUGHBY M. DUNN read an interesting paper descriptive of the "Electrical Winding Gear at South Kenmuir Colliery." At the outset the author said he wished to make it clear that he did not intend to make very general claims for the electric winder under all conditions and in all cases, and, least of all, to make any general estimate of savings to be derived from winding by electricity. Every case should be carefully



ELECTRIC WINDING ENGINE AND DRIVERS' PLATFORM AT THE SOUTH KENMUIR COLLIERY.  
(Made by Messrs. Crompton and Co. Limited.)

erected it would be the correct size and going at the correct speed. In his paper the author had given the objects of fan-testing, but he would put these differently and say that the object of fan-testing was to ascertain the efficiency of the fan. To arrive at this it was necessary to measure (a) the quantity of air per minute passed by the fan, (b) the water-gauge, and (c) the power taken to drive the fan.

Mr. JOSEPH PARKER (Cowdenbeath) said it was most important that a standard method of testing a fan should be adopted, as it was well known to all who had experimented with the fan that results of the most widely divergent nature might be obtained by some slight alteration of method. Naturally, the problem was to determine the true volume and depression. Probably the best determination of the velocity and volume could be obtained by using a double Pitot tube. The effect of natural ventilation was not quite so simple a matter as would appear from the discussion on this paper. It was quite correct to say that the fan creates only that depression credited to it by a water-gauge of proper form and correctly placed, but the disturbing quantity consisted in the changing power of the natural ventilation with change of quantity. This arose from fact that in an extensive mine the temperature of the return air was not changed by comparatively large changes in the volume of the air passing through the mine. The practical constancy of the temperature of the upcast involved the maintenance of the natural

considered on its own merits. Given favourable conditions, combined with a low price for electrical power, it could be shown that electric winding could be performed as safely and at no greater cost than with steam. In how far other advantages inherent to electric driving—such as saving in labour and in space—might turn the balance in favour of electricity, the writer said he wished to leave these to the sound judgment of those mining engineers who approached the question with an open mind.

When it was determined by the firm, of which the writer was a member, to reopen and equip South Kenmuir Colliery for winding coal, a difficulty arose from the fact that the space available for the usual steam plant was too limited. In the circumstances, and as electricity could be obtained at a reasonable figure from the Clyde Valley Electric Power Company owing to the proximity of their mains, the idea of utilising this power for winding, &c., presented itself. Before anything definite was decided regarding the winding, however, it was considered advisable to make an approximate comparison between the relative plants. For this purpose an estimated cost was made out of a steam-winding plant necessary for the work, and at the same time a schedule of particulars was sent to the various manufacturers of electric winders for their prices and guarantees. The system which found most favour was that put forward by Messrs. Crompton and Co. Limited, Chelmsford, and with them the order was finally placed. From tests made and figures ascertained, the writer believed that the winding gear installed was capable of winding 720 tons per shift or 180,000 tons per annum from a depth of 76 fathoms at the following cost:—



of three enginemen, £373; oils, waste fuel, &c., £18. 5d.; winding minerals, men and stores, £362 10s.; depreciation (5 per cent. on £2,460), £123; difference between first cost of steam and electric winder (5 per cent. on £825), £41 5s.; giving a total of £909 11s. 5d., equal to 1.213 pence per ton. The time taken to wind 17 cwt. from the 76 fathom level is 24 seconds plates to plates, and with 10 seconds allowed for banking, the winder, if it were kept running without a halt, is capable of raising 720 tons from that depth in eight hours.

The safeguards in the winder which has been installed are unique, and are four in number. (1.) There is an electro-magnetic brake which comes into operation at the end of every wind. The moment the controller cuts off the current to the winder this brake comes into operation, and remains in operation until current is again introduced. Further, there are limit switches fixed on the indicator pillar, which come into operation to cut off the power and apply this brake should the winding be pursued beyond a predetermined point above banking level. (2.) On the indicator column there are mechanical trips which come into operation

#### Magnesite Deposits in Eubœa, Greece.

It was announced that the paper by Mr. JAMES HOGG on "Magnesite Deposits in Eubœa, Greece," had not yet been printed, and consequently it was also decided to adjourn the discussion till next meeting.

#### Underground Fires.

Discussion was afterwards resumed on the paper by Mr. HENRY ROWAN, Cowdenbeath, on "Underground Fires," a summary of which has already appeared in our columns.

Mr. JOHN MASTERTON, H.M. inspector of mines, who led off the discussion, said they had had underground fires arising spontaneously very much before their notice during the past year or two, and from these there had been some serious accidents. Fortunately, in Scotland—so far, at any rate—spontaneously-generated fires had been in seams where there had been little danger from gas, and nearly all of them had been in mines which are

down, it was to be hoped that the Committee now sitting on the subject would be able from the selected wisdom of the country to give them guidance both for the present and the future. He trusted that the new method Mr. Rowan had for working the Lochgelly split would be successful, and he agreed with the author's suggestion that hydraulic stowing would be the best method of avoiding fires. He would go further so far as Fife was concerned—if he might digress a little—and say that it would help to reduce the accidents from falls of roof and sides both at faces and on roads. He observed that Mr. Rowan found birds more useful than mice for underground work. He wondered if he ever had cases where the men were affected as soon as the birds. Personally, he had thought since it might be of value to have underground cages so made that the birds could at will be made to exert themselves if the carrier was doubtful of his atmosphere.

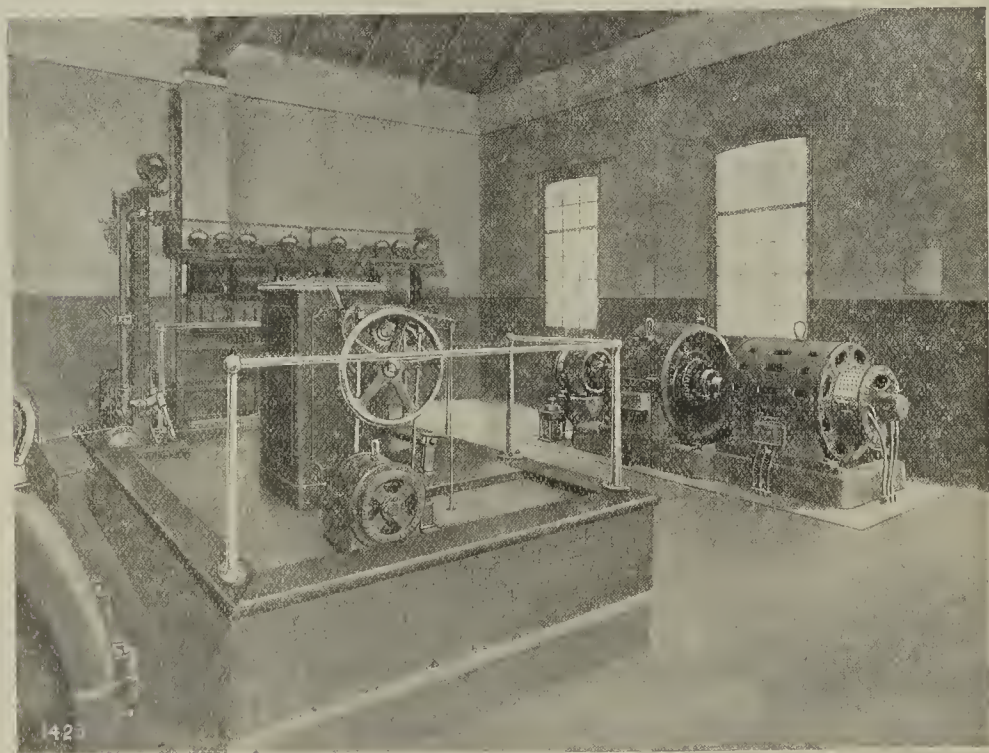
Mr. G. L. KERR (secretary) said he would like if Mr. Rowan would say whether he considered it always a wise plan to use water at a fire, and particularly a fairly large fire. As the result of the effectiveness of water at a surface fire which he had seen a few months ago, he would like some light thrown on this question if possible.

Mr. A. H. STEELE, H.M. inspector of mines, said there was something to be said for the point Mr. Masterton had made about the cages. With some cages the birds got down to the bottom where the air was pure while the atmosphere over the top of the cages, and over the top of the birds might be unbreathable. He believed it was the suggestion of Dr. Haldane that these birds should be in a special type of cage with a completely open front down to the bottom.

Messrs. PARKER (Cowdenbeath) and WILSON (Giffnock) with the PRESIDENT joined in the discussion, which was adjourned till next meeting.



SURFACE PLANT AT THE SOUTH KENMUIR COLLIERY.



VIEW OF WINDING ENGINE SHOWING SWITCHBOARD AND CONTROLLER.

immediately after the limit switches are tripped, and apply the mechanical brake, which is of the post type, by the release of a heavy weight. (3.) This heavy weight is also released to apply the mechanical brake by means of a solenoid connected direct on to the supply mains. This solenoid comes into operation in the event of the current supply failing. (4.) The mechanical brake is operated by means of a cramp at the engineman's foot. The controller is so constructed that the man in charge can put the handle straight to the "full on" position, and yet the driving motors accelerate gradually to their maximum speed, owing to the manner in which these motors are wound.

In conclusion, the writer said it might be stated that no difficulty had been experienced in training men to work the winder—ordinary winding enginemen being employed—and so simple, indeed, was the operation that he (Mr. Dunn) had himself wound coal for the greater part of a shift.

It was also admitted on all hands by those who had been in the cage that the ride was a much more comfortable one than that experienced with the steam winder.

It was agreed to postpone the discussion on the paper

—or were under the last Mines Act—naked-light mines. With much of what the author said in his paper one was bound to agree, although there was one thing he mentioned twice with which he (Mr. Masterton) disagreed—namely, that the apparent cause of the fires was the grinding of strata in the small pillars or heaps of coal left. He did not think the grinding was the cause of the fires at all, as there was scarcely a pit of any depth or extent of workings where there was not such grinding. What did happen, he thought, was that the small pillars or heaps got crushed, and ever so much more surface was exposed to the limited amount of air sucking through the waste, and if the coal was one which absorbed oxygen rapidly it did so and heat was generated, while if the coal was one in which finely-disseminated pyrites changed chemically the same result followed. Of course, as the heat accumulated, it was only a matter of time till fire occurred. When a fire occurred underground it was like nearly every other mining problem, it required a solution for itself. While no general rule could be laid

#### NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

The general meeting of members of the North of England Institute of Mining and Mechanical Engineers, held at the Wood Memorial Hall, Westgate-road, Newcastle-upon-Tyne, on Saturday afternoon last, was of record brevity. The business was purely routine, time not having allowed of certain new papers being approved by the Selection and Editing of Papers Committee, and the proceedings were over in less than one minute.

Mr. JOHN SIMPSON, vice-president, occupied the chair.

The following were admitted into the institute:—Members: Mr. Geo. B. Burchell, mining engineer, 505, McGill-building, Montreal, Quebec, Canada; Mr. Fredk. Jas. Price, colliery manager, Collie, Western Australia; Mr. Jas. Edward Riddle, colliery manager, West Denton Colliery, Scotswood, Northumberland; and Mr. Fredk. Horton Wynne, H.M. inspector of mines, 2, Pimlico, Durham. Associate members: Mr. Wm. Edwin Gray, 17-19, Archer-street, London, N.W.; and Mr. Gordon Geo. Thos. Poole, Tredon, 13, Kent-street, Lincoln. Associate: Mr. Federico de la Cruz y Diaz, assistant mining engineer, Minas de Ribas, Provincia de Gerona, Spain. Student: Mr. John Payne Gallwey, mining student, Hylton Colliery, near Sunderland.

Mr. W. Hutton Hepplewhite, H.M. inspector of mines, was presented with a G. C. Greenwell bronze medal for his paper on "The Action and Control of Differently Constituted Coal Roofs."

The meeting then ended.

A new colliery is being opened at Fishburn, a village between Coxhoe and Sedgefield, by Messrs. H. Stobart and Co., who also own collieries in Chilton and Ferryhill districts. Two shafts have been sunk, and three good seams of coal found—one of the shafts being practically ready now for full work, and being used for coal-drawing on a small scale, just sufficient for firing and workmen's needs. Sinking has been in progress since March 1911. Many difficulties have had to be fought against, the principal being water, and hitches encountered in both shafts, the work being delayed for some time through these causes. The cementing process had to be adopted to enable sinking to be carried on. The two shafts are 40 yards apart, and 16 ft. in diameter each. They have both been sunk to a depth of 90 fathoms, which is as far as it is intended to go at present. A sump of 25 ft. has been made at the bottom of No. 2, or the upcast shaft, a 42 ft. sump being nearly finished in No. 1 shaft. The completion of the work will probably take place in about seven or eight weeks' time. The sinking has been carried out by Messrs. J. Johnson and Son, of Boldon. The seams found are the Low Main, 2 ft. 10 in. of clean coal, at a depth of 68 fathoms; the Hutton, 3 ft. 6 in., with a thin band in the bottom at 75 fathoms; and the Harvey, of about 6 ft., with a 9 in. middle band at 90 fathoms.



## MANCHESTER GEOLOGICAL AND MINING SOCIETY.

### Sir Thomas Holland's Presidential Address.

The annual meeting of the Manchester Geological and Mining Society was held last Tuesday afternoon in the society's rooms, 5, John Dalton-street, Manchester. Sir THOMAS HOLLAND, Professor of Geology and Palæontology at the Manchester University, was in the chair, and gave his presidential address. The address covered a wide field, but dealt in the main with the question of how best could a mine manager be fitted for his responsible duties.

Sir THOMAS HOLLAND said two incidents would serve to distinguish the past year from those of normal advancement. The visit of members representing the other six institutes of the federation gave them an opportunity of forming new and of renewing old friendships; and the Manchester meeting of the institution would also be a definite landmark in the history of the institution, for it was there that the council formally adopted the president's proposal to reorganise the constitution preparatory to petitioning for a royal charter. The following is the address, somewhat condensed:—

### Desire for a Royal Charter.

Before dealing with the main subject of my address, I should like to take the opportunity of putting on record my views on this question, as the fundamental idea underlying the action taken by the president possibly appeals to me, with my experience of extra-British conditions, even more strongly than it does to those of you who are accustomed at home to regard as sufficient the standards required and maintained by Government regulations among the coalmining community, to which most of you belong. At present, as you know, every one of the seven federated institutes has the power to elect not only its own members, but to appoint by the same process such newcomers to be full members of the Institution of Mining Engineers. A very large majority of the candidates for election are men who are obviously qualified under the Act to be mine managers, having passed through the necessary training, followed by the examination prescribed by the Home Office. For such men membership of the institution does not necessarily alter in any appreciable way their professional status; among the minority, however, may be men who are not in regular practice in this country. Their admission to membership does not, of course, give them authority under the Act to manage mines, but that does not matter; their use of the privilege of membership is quite of another kind. It is not difficult to pick out from among the members a small number engaged in countries where there is no special standard of professional qualification prescribed for mine management; and, in view of the fact that some institutions of a corresponding nature in other professions demand a strict technical qualification before the admission of the candidates to membership, the general public is likely to imagine that a member of the institution must necessarily be a professionally qualified mining engineer, fit to manage a mine or to act generally as a mining expert. The ease with which membership can thus be obtained is obviously open to abuse, and to my knowledge the privilege has been abused abroad. Although the members of the institution are mainly interested in coal and allied forms of mining, the title of the institution is so general in its nature as to give rise to the impression in other countries that its membership may equally well indicate a high technical standard of quality in metalliferous mining or even in mining geology. So far in this country there is no prescribed Government standard of qualification required to manage a metal mine as there is for a coalmine. Metal mining has accordingly in the past lent itself easily to the multiplication of that class of pseudo-experts whose standard of professional knowledge is entirely of their own prescription. The more respectable members of the metalliferous mining profession, however, have banded themselves together to define a standard of professional competence, and the Institution of Mining and Metallurgy—which is now but little over 21 years old—has so made its influence felt that its membership has become recognised throughout the world as a very definite standard of competence and integrity. I think it is not unfair to say that the Institution of Mining and Metallurgy, largely through force of circumstances, has been far more careful about its admission to membership than has been the Institution of Mining Engineers; and this is due to the fact that, in the metalliferous world, no independent official filter is provided; among the metal mining community the need for care has been greater.

It is obviously unfair to the investing public to permit the use of a name without reasonable safeguard as to its meaning; and, by reforming the constitution of the institution, therefore, in such a way as to provide a strict control over the conditions for admission to membership, the institution will establish a high and generally recognised technical standard, marked by a definite code of professional etiquette, which will result in the membership becoming ultimately an acknowledged hall-mark of quality. There will then be in future no longer the same danger of the hall-mark being stamped on electro-plated goods.

The President then referred to the establishment of the Mining and Geological Institute of India, and said the reasons given in his inaugural address to that institute might be quoted as applicable to present conditions. Continuing, he said:—

The market value of the title of membership must

depend wholly on our members; but it is only by Royal Charter that you will secure the legal power to prevent the abuse of your good name, and neither will be effective without a substantial financial foundation.

### Appeal to Royalty Owners.

It is important to remember that, while you members already contribute both in time and money to the progress of the technology of mining, there are two other classes who benefit directly by the work of the institution and are even more indebted to the profession. These are the mining companies and the royalty owners, and of these there can be little doubt that the royalty owners reap the greater benefit with smaller risk. Of the total fund of £15,000 required, this society is responsible only for £1,263. We draw our members from a much wider area than the county of Lancaster; but, even if we limit the field to the county and take into consideration only the mineral coal, it will be seen that our contribution would be barely appreciable as a tax on output. The annual production of coal in Lancashire is now about 25 million tons. It would probably not be unsafe to assume that in direct royalty alone this output brings the owners of mineral rights about 6d. a ton, or £625,000 a year. The sum we require would be but one five-hundredth of this amount, or less than one-twentieth of a farthing per ton of coal produced for one year only. If the royalty owners alone put together the capital fund required they would still be heavy "debtors to the profession." It ought to be sufficient to know that, as a simple matter of business, the institution will return to them its capital fund many times over.

### Multiplication of Rules.

We have heard much recently of the multiplication of rules and regulations prescribed by Government for the control of mines. It is, however, important to remember that the great progress which has been made in increasing the safety and general amenities of the miner, as well as the more economical production of the mineral, are due, not to rules, but to the general development of the technology of mining, due in fact to your own support of institutes like this. Where, however, human lives are endangered by any system of operations, rules of some sort are necessary to reduce, as well as to fix the responsibility for, dangerous modifications of methods found by long practice to be the safest. But when the mastery of rules requires more study than the technical problems that confront the mine manager, they themselves become a greater danger than those they are intended to forestall. I am not qualified to offer an opinion on this point; but, judging by the numerous complaints one hears, one would imagine that Government rules had recently shown a power of multiplication not exceeded by the lowest forms of life.

Although it is true that rules of precaution can be so numerous as to defeat their own ends and "fetter reason," yet most of you will agree that when, as mine managers, you are suddenly confronted with a problem which demands immediate action, it is your experience or the simple recollection of a technical practice that guides you more often than any reasoning from the fundamental principles of science.

### Prof. Cadman.

I am led to make this remark, because I find that what I thought to be an innocent remark in an after-dinner speech about the education of mine managers has recently been condemned by the president of one of our federated institutes in what he calls "the strongest terms possible." In his presidential address to the South Staffordshire and Warwickshire Institute of Mining Engineers, Prof. Cadman selected for special censure the following two sentences from a report in the *Colliery Guardian* of a speech which I made at the annual dinner of the Indian Mining and Geological Club in 1912, to the effect that: "A mine manager, like a master mariner, is made only by a long and often painful practical apprenticeship, and the University life of freedom makes a serious inroad on the unrelenting force of discipline which is essential for every man responsible for the lives of his subordinates," and that "the mine manager should be trained in the mine, supplemented by evening classes." It would have been of more interest to me, and more satisfying to the mining community, if Prof. Cadman had given the reasons and facts on which his strong language was based. No one could possibly welcome more than I should a reasoned refutation of my conclusion that our universities are generally unsuitable, under existing conditions, for the training of the average mine manager. I am, of course, quite well aware of the fact that a university graduate might become an excellent manager; indeed, I know of some. I was not thinking of exceptional specimens, but of average representative samples, and on the results of these I based my conclusions.

Last year the Secretary of State for India appointed a committee to enquire into the system of State technical scholarships established by the Government of India in 1904; and, in giving evidence before this committee, Prof. Cadman again quoted my offending speech, with a similar condemnation in "the strongest terms possible," whatever such words may mean when standing alone. The committee, being embarrassed by our complete divergence of views, invited what was assumed to be the independent opinion of Mr. R. A. S. Redmayne, the Chief Inspector of Mines, although the Report (pp. 40-41) fails to call attention to the fact that it was Mr. Redmayne who organised the system at the Birmingham University which Prof. Cadman finds it necessary now to defend. However, the dicta of authorities impress me far less than the reasons, when such are obtainable. Now, Mr. Redmayne told the committee that it was quite hopeless for a man to become an efficient mining engineer unless he has had a high education, and he could not see how that education could

be obtained unless a man had a thoroughly good technical education at a University "of a kind that they insist on in America." This conclusion comes as rather a shock to one who has been accustomed to divide his admiration between the British master mariner and the mine manager. There are in this country, actively employed as managers and under-managers, over 2,000 holders of the first-class certificate of competency. How many of them are University graduates? Not many more than those who were vainly wanted to save the Cities of the Plain. I should like to see the mining engineer who would have the stupid temerity to say that they are hopelessly inefficient as mining engineers, or the university graduate who would have the effrontery to say that our mine managers are not in the best of all senses educated.

Mr. Redmayne holds up the American training as a commendable example. Well, the only large-scale comparison that can fairly be made between British and American conditions is in coalmining, and on the two main counts—economic and humanitarian—there is not much doubt about the superiority of the British manager. The alarming waste of coal in America, which was admitted at Mr. Roosevelt's well-known conference on conservation in May 1909, ought to convince anyone of the state of American mining; while, as for the workers, it ought to be sufficient to point out that the death-rate from accidents at coalmines in the United States is always more than double of that in the United Kingdom.

It is hardly possible, as Emerson said, to state any truth strongly without apparent injustice to some other truth, and I have no doubt that in pointing out, what he regards as a way of improvement, Mr. Redmayne did not intend to reflect on the shortcomings of the class which he adorns. But the real questions for us to face soberly are these: Would the mine manager, generally be a better manager if he were forced to graduate at a university? In any case, is it practicable, in view of the number and kind of recruits obtainable and required, to insist on graduation?

It seems to me that, in referring to this question, Prof. Cadman confused in a most surprising way the terms "technical" and "scientific." In his evidence before the Indian Committee referred to before, he states that "mine managers of the future must possess a sound technical training in all the branches of science applied to mining." The word "sound" has of course no quantitative value in any case, and is an equally desirable attribute of both Sunday schools and universities.

I understand what is generally meant by the various branches of science, and have seen much training in technical methods which involve, and are sometimes founded on, the principles of physical science. But "a sound technical training in all branches of science" seems to me a confusion of terms about equivalent to a sound English education in all forms of the classics from which English has descended. It is possible that a common understanding in terminology will reveal the fact that we are all working to a common end, and with this faint hope I will restate my views as to where the university might be a help and where a hindrance in the education of the various forms of mining engineer.

### The Purpose of Universities.

In the first place, we probably all agree that for a training in the more advanced branches of pure science the university is the appropriate place; and if it were possible to spare three years from the life of a young mining engineer, a graduation course in science might do him no serious harm. But we must remember that there is another side of the time table, and that these three years might also be devoted to a training in the various technical processes that the mining engineer must meet daily in actual practice. Before saddling a young man with the university course in science one would like to know if those of you who have taken a university degree and are also now in practice as managers have introduced substantial economies in ventilation or improved the working conditions of your men by reason of your familiarity, for instance, with Avogadro's hypothesis that equal volumes of gases under the same conditions of temperature and pressure contain the same number of molecules. How often does a knowledge of Ferrari's classical experiment on the alternating current come to your mind when the electric motor breaks down? What comfort do you derive from theories of earth movements when your seam is found to be cut off by a fault? You know perfectly well that it is by purely technical methods that you face your daily problems, and that your knowledge of the foundation principles of science is not only, as a rule, useless, but may be even dangerous, in 99 per cent. of your troubles. It is true that your technical methods are explained by science. Many of them are the direct outcome of purely scientific research, and all of them have been improved by scientific students. There is no industry more directly indebted to science than is mining. There is no industry more likely to respond with benefit to scientific research, and for such research the modern university is ideally suited. But all this is apart from the practical question as to whether it is advisable for the average young man, anxious to be a mine manager, to be forced through the university graduate's course in science.

By far the largest fraction of the mine manager's work is dependent on familiarity with empirical technical processes that can be learnt only at the mines, and I contend that the requirements of discipline are such that the free life of the university becomes a serious menace to the career of the mining student. In any case, it is generally impracticable for the young mining apprentice to cut out three years of his career and to break his professional connection in order to join the full-time day courses at a university.

At the time I was not thinking either of Prof.



...n or of Birmingham. Nevertheless, whether we have the Calcutta University with the technical departments of the Bengal coalfields, or English universities with the local technical schools as instruments for the training of mine managers, the relief of light and shade is about the same. It is common knowledge that, while the out-of-shift classes in the technical schools flourish, the mining departments of our universities in most cases languish. Even the certificated mine managers trained at the Birmingham University, which was so lavishly equipped under Mr. Redmayne's direction two years ago, can be estimated without employing more complicated calculating machinery than the accustomed metacarpal appendages of primitive man. The Birmingham University has attracted students from various parts of the world, and, according to the official calendar, 22 of these, up to and including 1912, passed the degree of B.Sc. in mining. Most of these are excellent young men, but some, to my knowledge, have not obtained, and never will obtain, the certificate of competency. A comparison of the results obtained at the University with those of first-class technical schools in the same district would, for the University, be as "odious" as a comparison between, say, the record of the Manchester University and that of the Wigan Mining School.

Even an extension of the comparison which I made for Bengal merely accentuates the disadvantage of the University. In 1904 the Government of India commenced to send scholars to the technical departments of English universities, and those selected for mining were sent to Birmingham, which was chosen for no better reason than that of the lady in *Punch*—"the advertisements speak so well of it." At a cost of just £10,000 we sent home 16 scholars to be trained in mining; and, so far as I can find, only two of these have since obtained the certificate of competency in India. At the same time, and for just about the same cost, evening classes were started on the Bengal coalfields, while a mining department was organised in the University Engineering College, near Calcutta. By the end of 1909, 105 certificates of competency were granted by examination in Bengal, and of these 88 were students in the evening classes, while only 11 had been trained in the Calcutta College. Later results published by the Chief Inspector of Mines are in the same order of ratio. In addition to those who have proved their competence as managers, a small number of scholars have proved to be of value in other ways, and no small credit is due to them for the success secured, in spite of their English university education.

#### "Forms of Cant."

That the university in its own sphere is necessary and good may be accepted as axiomatic; but much of the talk about the value of university education, as if it were the cure for all troubles, or one of the worth-a-guinea-a-lecture institutions, has the unsavoury taste of all forms of cant. If the chief end of education is mental discipline, or, as Frederick Denison Maurice puts it, efficiency in action, the ordinary article pupil in mining gets a more satisfactory education than is obtainable in the modern university, where, with the help of lantern slides, diagrams and costly apparatus, every fence that might test a student's jumping powers is carefully removed. If Prof. Cadman insisted on his "sound technical training" in all branches of *classics*, the idea might be worth consideration, for there are still some traces of discipline to be found in our classical schools, and, after all, the confusion of terms would not be greater than a "technical training in all branches of science."

#### Technical Schools.

There are evident tendencies in many of our universities to usurp the functions of the technical schools. Competition has driven them to respond to the gallery call for a practical "turn" in their variety entertainment. For those universities that are still young, the financial nourishment is insufficient to meet the metabolic requirements of rapid growth. Little wonder, therefore, that "a sound technical training in all the branches of science" becomes necessary to qualify for a Government grant on a scale more generous than that prescribed by the Board of Education for technical schools. The principals of technical schools are so busy with their overcrowded classes that they have little time to call attention to this unfair division of public funds, and far too few among them are granted opportunities for advertising their glories from presidential pulpits. While the lower scale of grants made to technical schools results in an underpaid staff, it has brought with it a blessing in disguise, for our technical schools are unable to afford, like the universities, that form of front-window dressing which one sees modestly described as an "up-to-date fully-equipped plant for practical work." As a means for alluring the parent, who is anxious to secure a really "practical" education for a son too fond of sport, nothing is so seductive as a display of machinery in the illustrated articles on our universities. Yet there is hardly an installation of the kind that is not out of date before the sporting youth scrapes through the "intermediate," and not one that is not working under conditions so artificial and so unreal as to give only a false idea of the actual practice. In no form of technology is the costly university plant so dangerously misleading as in mining, and with plant of this class I would group such a shallow subterfuge as a toy mine in the university grounds. Every form of tradesman seems to find window-dressing necessary to attract the innocent customer, but no shopkeeper who hopes for what he calls a continuance of esteemed favours would sell the materials for research experi-

ments, for to him the real and the false are clearly distinguished. But the student who wants to be an efficient manager can get his training only in the atmosphere of a mining community, where the scientific theory is kept in due subordination to the technical method. From the point of view of simple education the technical schools in the mining districts are of far more use to the industry than our universities. A close approach to the requirements of young mining apprentices is, however, obtainable at universities which, like that of Glasgow, has its session cut down to six months in the year. The increase of time thus provided for practical work is so much to the good; but even this, like Falstaff's accounts, shows but one half-penny worth of practical bread to an intolerable deal of intoxicating sack.

There is, however, a small number of young men in a country like this who can afford the time and cost of the ordinary university session, and it is possible that there is room in this country for one full-day college of mining in a coal district, with another of the kind for metaliferous mining in a district like Camborne, in Cornwall. It is at Camborne that I should like to see established the Mining Department of the Imperial College of Science. One of the northern universities might supply the wants of day students in coalmining if the corresponding departments of the other universities were suppressed by the Board of Education.

#### A "Freak Title."

There are few educational courses that do not contain some feature of value to the student; but I really cannot find one commendable feature in the latest and most flagrantly advertised of our now bewildering variety of university degrees, the "B.Sc., Petroleum Mining," at Birmingham. The young man who takes up technical problems in connection with the exploitation of petroleum must specialise on one of the three distinct lines: he becomes a driller, or a refinery chemist, or an oil-geologist. The candidate for this new species of B.Sc. degree is required in three years, not only to "possess a sound technical training in all the branches of science applied to mining," but to play with different varieties of drills which he will never handle again; to pass through a course of the chemistry of petroleum refining which ought, at any rate, to fit him to be a paragraph writer for an oil magazine; to study the structure of anticlines and the geology of oil occurrences; and, most wonderful of all, to attend lectures on shaft sinking, the art of laying out collieries underground, of coal-cutting, blasting and timbering. There is not one of the three main technical aspects of oil exploitation that does not require a full apprenticeship to make the training other than dangerous. It is grossly unfair to entice young men into a blind alley and saddle them with a freak title that will handicap every attempt they make in after-life to specialise in a recognised branch of technology; they are obviously not mining men in spite of the title; if they are to be of real value as oil geologists, they ought to take the most advanced courses in stratigraphy and palaeontology; if they are to be refinery chemists they might undertake the full course of chemistry; if they want to be drillers they might wisely avoid the university altogether.

#### Conclusions.

My resurvey of the situation merely convinces me the more that for a training in mining methods, as distinct from the sciences on which those methods are based, our universities have proved to be by results comparative failures; they cannot, and they ought not, to compete with properly-organised technical schools that can provide out-of-shift classes. But there is, as pointed out in the speech which has been so badly condemned, a very necessary member of the mining community who can be trained most conveniently in institutions of university rank, and that is the mining geologist. While the training of the mine manager should be about three parts of purely technical methods supplemented by about one part of scientific principles, in the education of the mining geologist the ratio of these ingredients should be inverted. One is a technical man: the other is a technologist. One is trained mainly at the mine, supplemented by out-of-shift classes; the other may be educated at the university and given a smaller practical experience at more than one class of mine. The mining geologist need not be able to handle as an expert every form of machinery at a mine; but he should know enough of the methods of mining to know how to direct his prospecting operations in an undeveloped area in such a way as to take into account the conditions that may or may not make subsequent mining operations possible. His experience of mining methods would be more general and less intensive than that of the man trained to be a manager, while his knowledge of economic mineralogy would naturally be wider than that of the manager who handles but one or two kinds of products. He would bridge the embarrassing gap that now exists between our purely academic geologists and our technically-trained miners. For the training of this class little has so far been accomplished by English universities; but it is the outturn of men approximately of the kind just defined that has mainly made the good name of the Royal School of Mines.

As explained at the outset, this excursion into the unsatisfactory jungle of educational controversy would not have been undertaken if my views had not been gratuitously dragged into this new arena; and if my remarks about universities in general had not been, without any provocation on my part, connected with that of Birmingham.

The offending speech which has been so emphatically condemned referred to an experience obtained in India; it was delivered to mining men quite able to estimate its practical value, and was made at a dinner where Prof. Cadman was a welcome guest. Criticisms by him or by anyone I would welcome, for thus are our ideas moulded. To criticise is the established privilege of everyone; but, without the justification of a well-

established degree of experience and seniority, without a position of recognised authority, and, above all, the almighty power to enforce judgment, the summary condemnation of another man's reasoned views is an impertinence as well as a sign of weakness.

#### Annual Report.

The report submitted by the council showed a year of remarkable progress, 56 new members having been added, raising the total membership to 379, against 278 in 1905. The finances were also said to be very satisfactory.

#### Officers.

The officers for the next year were appointed as under:—President: Sir Thomas H. Holland, K.C.I.E.; vice-presidents, Messrs. H. Stanley Atherton, L. R. Fletcher, Owen R. Jones and William Pickup; honorary treasurer: Mr. Geo. H. Hollingworth; honorary secretary: Mr. Sydney A. Smith; other members of the council: Messrs. W. T. Anderson, C. F. Bouchier, Vincent Bramall, Hugh V. Hart-Davis, W. H. Murray, W. Ollerenshaw, A. J. A. Orchard, J. Drummond Paton, H. B. Pilkington, N. T. Williams, Percy L. Wood, and T. H. Wordsworth. Honorary auditors: Messrs. H. Stanley Atherton and Vincent Bramall. Trustees: Sir Lees Knowles, Bart., C.V.O., and Mr. John S. Burrows, F.G.S.

New members were elected as follows: Mr. Augustus Henry Wheeler, Graylwyd Hall, Penmaenmawr, North Wales; Mr. Rhys Williams, H.M. inspector of quarries, 2, Garfield-terrace, Garth-road, Bangor; Mr. Israel James, mineral valuer, 21, Calum-road, Cardiff; Mr. Rowland Jones, 16, Heathfield-place, Gabalfa, Cardiff. Associate member (federated): Mr. John William Evans, Nantyffin, near Farmers, Llanwnda, Carmarthenshire.

### NORTH STAFFORDSHIRE INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

#### Annual Meeting.

The annual meeting of the North Staffordshire Institute of Mining and Mechanical Engineers was held on Monday evening at the North Stafford Hotel, Stoke-on-Trent, the president, Mr. HUGH JOHNSTONE, H.M. divisional inspector of mines, presiding.

Mr. R. A. Passmore, of the Shelton Iron, Steel and Coal Company Limited, and Mr. A. J. B. Atkinson, of the Brampton, Newcastle, were elected as members, and Mr. J. E. Henshaw, of Talk-o'-th-Hill, as a student.

#### The Annual Report.

The annual report of the council called attention to the increasing amount of subscriptions in arrear. It is particularly to be regretted (stated the report) that the associates are failing to pay their subscriptions promptly. The council have to report a decrease in membership as follows: Ordinary members, seven; hon. member, one; associates, two—the total membership on July 31 being: 107 members; 12 associate members; 37 associates; and 15 students. The institute has to regret the loss of their secretary, Mr. F. R. Atkinson, who after a short illness passed away on June 14. Mr. Atkinson had held the position of secretary since October 1900, and he spared neither time nor trouble in furthering the interests of the members. The institute has also to regret the sudden death of the treasurer, Mr. G. E. Lawton. The building of the school of mining and pottery is nearing completion, and it is hoped that early in the coming year the structure will be ready for occupation. The report proceeded: The council of the institute have invited the Institution of Mining Engineers to visit North Staffordshire at their autumn meeting next year.

The annual statement of accounts for the year ending July 31 showed a balance brought in of £72 17s. 2d., and a balance carried forward at the end of the year of £98 18s. 5d. Subscriptions amounting to £275 had been received.

The report and balance-sheet were unanimously adopted.

#### The Use of Concrete in Mines.

A discussion followed on Mr. JOHN GREGORY's paper on "Practical Examples of the Use of Concrete in Mines," which was read at a previous meeting. The PRESIDENT said he was sorry not to have been present when the paper was read, but he had since perused it with great interest, and, he hoped, some profit. It was a most practical paper, and Mr. Gregory had gone thoroughly into detail not only as to the manufacture of concrete, but as to the cost of manufacture—details which were not always given in a paper of that kind. It was a subject which should appeal to them all very closely, because, as years went on, concrete, reinforced or otherwise, was coming more into use in mines, and he thought that in the early future a very great deal of concreting, with or without reinforcement, would be used in the erection of pithead buildings.



With regard to the making of concrete, there was a good deal of diversity of opinion as to the proportion in which the cement should be used. He found that the proportion of cement introduced varied within very wide limits. His own experience convinced him that the strength of concrete depended not so much upon the proportions of cement used as upon the choice of the materials which were incorporated with the cement and upon the condition of these materials. He did not wish to be understood to say that the strength of concrete was altogether independent of the amount of cement, but that the concrete he had seen made at some collieries, in which the cement was used in the proportion of one to three, was very much less strong than concrete he had seen made at other collieries in the proportion of one to 11. In one case the materials used were dirty and badly proportioned; in the other case they were carefully selected and carefully mixed, and the result proved to be most satisfactory. It had been suggested, he thought, by Mr. Gregory, and certainly by a former writer on this subject, that concrete, with or without reinforcement, might be most advantageously used in the lining of shafts. In applying concrete in that way, one got up against conditions which were very apt to give trouble; for example, while it was the case that Portland cement, which was usually used for making concrete, was an hydraulic cement, and would set equally well—in fact, better—below water than in the open air, one must not forget that the conditions in using concrete in lining a shaft were somewhat peculiar. One had to face the difficulty of water in motion flowing through the concrete. It was a difficulty which it was almost impossible to overcome. If they could prevent the motion of the water, the difficulty would not exist. Another difficulty with regard to the use of concrete in the lining of shafts was that, if by any means there should be crushing and the concrete lining got fractured, the repairs would be very difficult of execution. It was one thing having a mould in forming the contour of the whole shaft. It was quite another thing to inset a mould to be used to do patchwork. If the shaft was fixed up with buntons and fixed guides the difficulty was enormously increased. But apart from its use in shafts, there was enormous room for the use of Portland cement concrete, or hydraulic cement concrete, in the making of shaft bottoms, in the lining of cruts, and in a thousand-and-one other ways which would readily occur to them as practical mining engineers. Not very much of this work had yet been done in North Staffordshire; but the day was certainly coming when more would have to be done.

Mr. GREGORY remarked that it was a conversation which he had with Mr. Johnstone many years ago which first interested him (the speaker) in the scientific mixing of concrete, and at that time Mr. Johnstone gave him a good deal of useful information which he had since applied with great benefit to the works at his colliery. He was in perfect accord with the president when he said that the mere proportion of cement to aggregate was not so important. If the concrete were badly chosen—say, for example, if it consisted of large lumps without any smaller material—large voids were formed, and a good deal of cement was taken up in filling these voids. If, on the other hand, the material was properly graded, and the voids in the larger stones were filled up by fragments of smaller stones, and those in turn filled in with sand, a very small proportion of cement would suffice—in the case of Sneyd it was about one in  $6\frac{1}{2}$ . At the time the pits were sunk at Sneyd the question of lining with cement had not come to the fore. His experience had simply been in repairing shafts which had been lined with brickwork and which had crushed. The large fault which was described in the paper crossed the shaft at an acute angle, and considerable difficulty had been experienced in retaining the sides even with brickwork 4 ft. 6 in. in thickness. In several cases at Sneyd girder rings had been used for this repair work. A length of brickwork had been cut out, rings put in, and made solid with concrete; and although several years had elapsed since this was done it was still perfectly satisfactory. For new work Mr. E. B. Wain had described a method he saw in the north of England. Instead of using bricks large concrete blocks were cast and hardened on the surface—accurately shaped to the circle of the shaft. These were lowered by the winding engine and placed in position, concrete being afterwards put at the back to make it solid with the ground. He was convinced there was a great future before this method of shaft lining. In repairing shafts they had not experienced the difficulty Mr. Johnstone seemed to expect. They had in most cases found it possible to take out small sections of damaged brickwork and replace it without tackling the whole circle. Some of this work had now stood the test of five or six years. Very little difficulty

had been experienced by the ordinary shaft repairers in effecting it. The lining had been fixed in position by getting bent iron bars, securing these to the sides and putting wooden laggings in about 1 in. thick. The concrete did not exert great pressure on the laggings, and by putting big special “dogs” into the side it had been found sufficient to secure the lagging until the cement was set. He was rather disappointed that they had not had more examples of the work done at other collieries in the district. There had been a good deal of it done, and he was sure the methods adopted would be useful to members.

Mr. BARBER said so far as his knowledge went, concreting had not been carried on to any great extent in that district. What he should be glad to know was whether concreting could be done at anything approaching the cost of brickwork underground.

Mr. JOHN HEATH said he should not anticipate any difficulty in using concrete in repairing shafts. He would take out either brickwork or concrete and put in a new lining without stopping the pit, and he thought he should make a stronger job of it with concrete than with brickwork. The lining of cruts with a light casing of cement could, in his view, be done quite as cheaply as brickwork, when one took into account the high cost of the latter. For shaft lining he advocated making concrete blocks to the circle of the shaft and filling in with 6 or 8 inches of concrete behind. The difficulty of running water could be avoided by inserting a piece of tubing and draining it into the sump.

Mr. SALT asked whether Mr. Gregory advocated putting the concrete right against the strata or putting some packing behind.

Mr. STATHAM attributed the lack of discussion to the fact that Mr. Gregory was the first in the field in this matter.

Replying to the discussion, Mr. GREGORY dealt first with the question of cost. He remarked that the costs given in his paper were much increased owing to the heavy steelwork which was put in. In roads where it had been possible to do without the steelwork and where 4 or 5 inches of concreting was put in, the cost had, if anything, been less than brickwork, whilst at the same time it was stronger. As regards repairs to concrete, he had no experience in this direction yet, but he was convinced that, should the necessity arise, it would be no more difficult than repairing brickwork; in fact, of the two, he preferred to repair concrete. With regard to Mr. Salt's question, he advocated putting the concrete solid up to the strata.

#### Election of Officers.

The following officers were elected for the following year:—President, Mr. Hugh Johnstone; vice-presidents, Messrs. J. T. Stobbs, J. Gregory and W. Statham; hon. secretary, Mr. G. P. Hyslop; assistant-secretary, Mr. A. J. B. Atkinson. Members of the council (other than those named), Messrs. J. R. L. Allott, W. Barber, F. E. Buckley, Dr. John Cadman, Messrs. John Heath, A. S. Heath, N. R. H. MacGowan, Wm. Tellwright, Jos. Wain, Amos Daniels, W. G. Salt and E. P. Turner.

The PRESIDENT thanked the institute for re-electing him.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

#### LOW-TEMPERATURE CARBONISATION.

SIR,—With reference to Mr. A. Rollason's letter, my statement was: “Beyond mere traces, there are no hydrocarbons in coal—at least, I have failed to find any evidence of hydrocarbons, and should be very interested to hear of any.” The gases your correspondent refers to are the mere traces mentioned—mere traces, that is, from the point of view of carbonisation, as the 180 cubic centimetres of marsh gas in 100 grammes of coal only amounts to a little more than one-tenth of 1 per cent., or 1 in 1,000.

In my paper, “Firedamp in Coalmines,” *Trans. Inst. M.E.*, vol. xlv., p. 269-278, I report as much as 200 cubic centimetres for 100 grammes of coal. I have since had coals with as much as 500 cubic centimetres, but even this—from the point of view of carbonisation—is a mere trace.

Since writing the above statement, a paper by Clark and Wheeler has been published in the current number

of the *Journal* of the Chemical Society “On the Volatile Constituents of Coal,” which practically settles the question in favour of the view that, beyond mere traces, there are no hydrocarbons in coal.

This is quite an important point, for one book on coal, published only a few months ago, contains the sentence, “Coal consists mainly of hydrocarbons.”

Most well-known authorities on coal put hydrocarbons as an important constituent, but I have failed to find any evidence to justify it. All the products which have been separated from coal, by means which indicate that they were in the coal in the same chemical condition, contain, besides carbon and hydrogen, oxygen as well, and also nitrogen and sulphur. JOHN HARGER.

Chemical Laboratory, Liverpool University,  
October 10, 1913.

P.S.—I hope the above satisfies your correspondent, Mr. A. Rollason, and that he will now let the correspondence end.

#### THE MANUFACTURE OF BY-PRODUCTS.

SIR,—We shall be glad to know if you can give us particulars of any literature obtainable in regard to the manufacture of benzole, and the recovery of other by-products; also whether you can recommend us a cheap textbook dealing with this subject. D. A. C.,

The Pooley Hall Colliery Company Limited,  
October 8, 1913.

#### THE KOEPE SYSTEM.

SIR,—I should be interested to know if any of your readers have had experience in this country of the Koepe system of winding, and where it can be seen in operation. MINING ENGINEER.

#### COALDUST EXPLOSIONS AND THEIR PREVENTION.

SIR,—In reference to your leader writer's remarks on my lecture on “The Danger of Coaldust and Its Preventive” in your issue of October 10, I must say the following:—

In my lecture as delivered I did refer to the work done at Eskmeals, but I avoided making any quotable reference thereto, as this could only be unauthoritative on my part.

As regards your statement that apparently I base my “calculations upon the employment of a 9 to 1 mixture of stonedust and coaldust,” I can only say that I regret you have so misrepresented my actual words, which were:—“In the normal endless haulage road it is easy to apply such dressings of stonedust that the coaldust will be diluted to a 10 per cent. of coaldust mixture, without in any way becoming a nuisance.”

Read along with the context, this means that if stonedust is applied in a practical way—that is, by hand—the coaldust will ultimately be so diluted as to form only 10 per cent. of the mixture of dusts, without the applied stonedust becoming a nuisance. This state of dilution will be the natural result of a practical application of stonedust underground unless particular care is taken to avoid it. This is very different from your inference.

E. L. HUMMEL.

Mining Department, The University, Leeds,  
October 15, 1913.

**Institution of Mechanical Engineers.**—The first monthly general meeting of the coming session will be held in the meeting hall of the institution on Friday evening, October 24, at eight o'clock. In addition to the ordinary general meeting in London on November 21, a general meeting of the institution will be held in the Memorial Hall, Albert-square, Manchester, on Thursday, November 20, at 7.30 p.m. The following paper will be read and discussed at both meetings:—“Cutting Power of Lathe Turning Tools,” by Prof. William Ripper, D.Eng., of Sheffield.

**The Valuation of Minerals in Yorkshire.**—The referee (Mr. H. Eustace Mitton, of Codnor, near Derby) under the Finance (1909-10) Act, who sat at London on July 11 to hear an appeal by the Earl of Lonsborough against the valuation placed by the Commissioners of Inland Revenue on certain minerals contained in the Selby estate, Yorkshire, has given his decision. The appeal related to 10,984 acres of the estate. The western area, 3,807, had been settled at £24,480, but the eastern area, 7,177 acres, was in dispute. The Commissioners valued the minerals at £42,636, but Lord Lonsborough contended that the figure should be £72,000, based on a valuation by Mr. D. N. Turner of Nottingham, in December 1911, putting the value of the minerals on the estate at £72,798. The referee has found that the value of the minerals on April 30, 1909, was £57,726, and he orders that the costs be paid by the Commissioners of Inland Revenue.



## THE COAL AND IRON TRADES.

THURSDAY, OCTOBER 16.

## Scotland.—Western District.

## COAL.

There has been a slight falling off in the coal trade of the west of Scotland during the week. Tonnage has been scarce, and collieries have lost time owing to an inadequate supply of trucks, in consequence of the late arrival of steamers. The demand for ell coal has not been quite so strong, and prices are somewhat easier, while splint coal is also quieter. Business in steam and navigation qualities is, however, well maintained. In smalls, treble nuts are in great request, but doubles and singles are much more plentiful. Shipments are well up to the average. The clearances were at Glasgow 69,492 tons, Bowling 157, Greenock 2,266, Ardrossan 3,249, Troon 6,635, Irvine 1,321, and Ayr 16,473—total 99,593 tons, compared with 99,046 tons in the previous week and 104,045 tons in the corresponding week of last year. Prices generally are very firm.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/	13/ to 13/3
Splint.....	13/ to 15/	13/ to 15/3
Treble nuts .....	13/9	13/9
Double do. ....	12/3 to 12/6	12/6 to 12/9
Single do. ....	11/ to 11/6	11/ to 11/6

## IRON.

Business in the Glasgow pig iron warrant market has been decidedly flat throughout the week. Even although the turnover in Cleveland warrants reached to about 20,000 tons, prices have fallen from 54s. 3d. to 52s. 6d. per ton. This state of affairs is evidently owing to a want of confidence in the market, and buyers are still holding off. There is, however, a continuance of the withdrawals from the public stores, and a change in the feeling of the market would likely lead to a sharp recovery. It is noteworthy that the prices of Cleveland iron have not touched such a low level since April 1912. Reports from abroad are not very encouraging. The number of furnaces in blast is 84, compared with 85 last week and 88 in the corresponding period of the preceding year. The imports of pig iron into Grangemouth from Middlesbrough and district amounted to 7,348 tons. Prices of Scotch makers' iron are reduced a further 6d. per ton. Monkland is quoted f.a.s. at Glasgow, No. 1, 67s. 6d., No. 3, 66s.; Govan, No. 1, 65s. 6d., No. 3, 64s.; Cambro, No. 1, 71s., No. 3, 67s.; Clyde, No. 1, 72s. 6d., No. 3, 67s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 73s., Nos. 3, 68s.; Glegarnock, at Ardrossan No. 1, 73s., No. 3, 68s.; Eglinton, at Ardrossan or Troon, No. 1, 67s. 6d., No. 3, 66s. 6d.; Dalmellington, at Ayr, No. 1, 69s., No. 3, 67s.; Shotts at Leith, No. 1, 73s., No. 3, 68s.; Carron at Grangemouth, No. 1, 73s. 6d., No. 3, 68s. 6d. per ton. Scotch hematite is quoted 69s. per ton west of Scotland delivery. The manufacturing branches of the trade are in an unsatisfactory position. The home market is extremely dull, and only a few orders are passing for export, mostly on contract where British material is specified. Malleable iron makers have reduced their prices 7s. 6d. per ton, and the basis price is now £7 2s. 6d. per ton, less 5 per cent. for crown bars Glasgow delivery. Makers are finding great difficulty in keeping works employed, as they are practically unable to produce iron at a profit in competition with Continental makers. It is hoped that the latest reduction will prove efficient enough to encourage buyers. Wrought iron makers are in much the same position, consumers only purchasing against immediate requirements.

## Scotland.—Eastern District.

## COAL.

The coal trade of the Lothians is fairly active. The demand for all large coal is strong, and collieries are well booked until the end of the month; some collieries are over-booked. Treble nuts are in good request, and though there is no pressure for doubles and singles they are being well cleared. At Grangemouth 39,211 tons were shipped, Granton 9,426, Leith 40,587, and Bo'ness 18,797 tons—total 108,021, compared with 114,144 tons last week, and 105,248 tons in the corresponding week of last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/ to 14/	13/ to 14/
Secondary qualities .....	11/9 to 12/3	11/9 to 12/3
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/6 to 12/9	12/6 to 12/9
Single do. ....	11/ to 11/3	11/ to 11/3

There is a very firm tendency in the Fife coal trade. Collieries are being pressed for all qualities. A large amount of tonnage has accumulated at the various ports, and some difficulty is experienced in getting vessels away without delay. Shipments are practically normal, and amount to 123,078 tons, compared with 126,721 in the previous week and 121,216 tons in the corresponding week of last year. Prices remain firm.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	17/	17/
Unscreened do. ....	15/	15/
First-class steam coal.....	13/9 to 14/3	13/9 to 14/3
.....	11/3 to 12/	11/3 to 12/
.....	13/9 to 14/3	13/9 to 14/3
.....	12/3 to 12/9	12/3 to 12/9
.....	11/ to 11/3	11/ to 11/3

The aggregate shipments from Scottish ports amounted to 330,692 tons, against 333,911 in the previous week and 330,509 tons in the corresponding week of last year.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 136,790 tons of coal and 3,458 tons of coke were despatched from Tyne Dock, an increase of 1,972 tons of coal and 2,414 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 64,798 tons of coal and 929 tons of coke, an increase of 1,120 tons of coal and a decrease of 2,362 tons of coke. The Blyth shipments aggregated 90,150 tons of coal and coke, a decrease of 4,714 tons. The bunker coals of which over half a million tons were announced last week to have been sold to coaling stations for delivery over next year were Townely unscreened qualities. In addition to these some 50,000 tons of superior West Tyne bunkers have been sold for delivery over 1914 at 14s. 6d. per ton f.o.b. The quantities of ordinary bunkers mentioned last week as having been sold to the coaling stations are reported to total quite 200,000 tons, sold at from 12s. 3d. to 12s. 6d. per ton f.o.b. So far as can be ascertained little, if any, of the contract to supply the Paris, Lyons and Marseilles Railways with fuel over next year is likely to come to this district. The latest news indicates that some 140,000 tons of Welsh smalls, 80,000 tons of Newport large coal, and 60,000 tons of Westphalian smalls and briquettes have been arranged for. It is reported that a quantity of Durham coking smalls has been booked, but confirmation is still required. The Durham fuel was tendered at 26 francs and over per ton c.i.f., and the Welsh smalls, it is said, at 25 francs. There was a rumour that the French State Railways had placed the order for their requirements of up to 380,000 tons of coal for delivery over next year with Wales and Westphalia. It would appear, however, that the contract is not yet settled, the railways wanting the coals at about one franc per ton less than the Welsh collieries are prepared to take. The one thing that seems clear is that no considerable portion of the order is coming to this district. A Newcastle firm is stated to have secured the contract to supply the Palermo gasworks with 30,000 tons of Holmside and special Wear gas coals, shipment over next year, at about 13s. per ton f.o.b., for the Holmside coal. There are enquiries for several large cargoes of Northumbrian steams for shipment to Egypt this month. An enquiry for 250,000 tons of steams is reported from Russia, but this is believed to be simply a Russian merchants' enquiry for coal already contracted for. The prompt coal trade is in a very strong position. Loading turns are very much congested, and collieries are booked up for a considerable period ahead. One of the best South Northumberland collieries is stated to be sold out until Christmas. F.o.b. quotations for prompt shipment have been wonderfully constant, the only changes being the following:—Blyth steam seconds are 6d. advanced; unscreened, 6d. dearer; gas seconds, weaker; gas specials, 3d. increased; coking coal, 3d. to 6d. reduced; smalls, easier; and foundry coke 1s. higher.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	14/9 to 15/	14/9 to 15/
Do. Tynes (Bowers, &c.) ..	15/ to 15/3	15/ to 15/3
Secondary, Blyths .....	12/6 to 13/	12/6
Do. Tynes (Hastings or West Hartleys) .....	12/9 to 13/3	12/9 to 13/3
Unscreened .....	12/ to 13/	11/6 to 12/6
Small, Blyths .....	8/ to 8/3	8/ to 8/3
Do. Tynes .....	6/9 to 7/	6/9 to 7/
Do. specials .....	9/3 to 9/6	9/3 to 9/6
Other sorts:—		
Smithies .....	14/	14/
Best gas coals (New Pelton or Holmside) ...	15/3 to 15/6	15/3 to 15/6
Secondary gas coal (Pelaw Main or similar)	13/9 to 14/	14/
Special gas coals .....	15/6 to 16/3	15/6 to 16/
Unscreened bunkers, Durhams	12/9 to 13/9	12/9 to 13/9
Do. do. Northumbrians	12/6 to 13/	12/6 to 13/
Coking coals.....	13/3 to 13/6	13/3 to 13/9
Do. smalls .....	13/ to 13/3	13/3
House coals .....	15/6	15/6
Coke, foundry .....	19/ to 21/	19/ to 20/
Do. blast-furnace.....	17/6	17/6
Do. gas .....	17/ to 18/	17/ to 18/

## Sunderland.

## COAL.

The exports last week amounted to 79,410 tons of coal and 1,190 tons of coke, as compared with 88,575 tons of coal and 835 tons of coke for the corresponding period of 1912, being a decrease of 9,165 tons of coal and an increase of 355 tons of coke. In view of the scarcity of best steam and gas coals, the market is firm, and for very prompt shipment higher prices are readily obtainable. The demand is also extending to November, for which position holders are firm in their ideas of value. Second gas qualities and coking unscreened are a little easier, and can be bought at slightly lower prices. Small steams are also somewhat easy, the production being very heavy. Household coals are quiet. Bunkers are in better demand at higher prices. Foundry coke is more enquired after, and gas coke is strong. A contract has been placed for 50,000 tons of special Durham unscreened bunkers for shipment to the coaling stations over next year, and although the price has not transpired, it is said to be about 15s. per ton f.o.b., and a further quantity of 30,000 tons of best bunkers have been sold at, it is reported, about 14s. 6d. f.o.b. for shipment over next year—20,000 tons of secondary bunkers have realised 12s. 9d. over next year. It is reported that the Central Midi Gasworks, which receives deliveries at C-ette, Bordeaux and Bayonne, have contracted for about 60,000 tons of coking smalls at 13s. 6d. f.o.b. over next year; and the Palermo Gasworks are stated to have contracted for 30,000 tons of Holmside at 13s. f.o.b. Approximate quotations for shipment f.o.b. are as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/9	15/9
Secondary do. ....	14/	14/3
House coals:—		
Best house coals .....	17/	17/
Ordinary do. ....	16/6	16/6
Other sorts:—		
Lambton screened .....	15/9	15/9
South Hetton do. ....	15/6	15/6
Lambton unscreened .....	13/9	13/9
South Hetton do. ....	13/6	13/6
Do. treble nuts .....	16/6	16/3
Coking coals unscreened ..	13/3	13/6
D. smalls .....	13/	13/3
Smithies .....	15/6	15/6
Peas and nuts .....	16/3	16/9 to 17/
Best bunkers .....	14/3	14/
Ordinary bunkers ..	13/9	13/6
Coke:—		
Foundry coke .....	19/6	20/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	18/6	18/9
Gas coke .....	17/	18/

The difficulty in securing loading turns is having a weakening effect on the freight market. Coasting is easier on the basis of:—London 3s. 4½d., Havre 5s. 3d., Hamburg 4s. Bay is weak: St. Nazaire 5s. 9d., Bordeaux 5s. 9d. With fewer boats offering, the Baltic has a better feeling: Pillau 5s., Riga 5s. 6d., Libau 5s. 3d. Mediterranean is on the quiet side; recent fixtures include: Piræus 9s. 3d., Genoa 9s. 6d., and 9s. reported for a large boat, Sulina 10s. 6d., Port Said 8s. 9d., Venice 10s. 9d., Civita Vecchia 10s. 4½d., Algiers 7s. 3d., and Marseilles 8s. 9d.

## Middlesbrough-on-Tees.

## COAL.

The fuel trade is steady and firm. So strong is the pressure for best gas qualities that any coal available for this week has realised high prices. The general market quotation however for best Durham gas coal is 15s. 6d., seconds 14s., and specials up to 16s. Bunker coal continues in fairly good request. Ordinary Durhams are 12s. 9d. to 13s. f.o.b.; superior kinds 14s. to 14s. 3d., and specials 15s. to 15s. 3d. Household coal is in improving demand at 15s. 6d. to 15s. 9d., coking coal is well taken up at 13s. 3d. to 14s. All descriptions of coke are in good demand. Best foundry kinds are in the neighbourhood of 20s. f.o.b., and gashouse coke is round about 18s. Coke continues in good request for local consumption notwithstanding the reduced needs due to the recent blowing out of blastfurnaces. It had been anticipated that coke prices would fall before now, but reduced output has kept supply barely adequate, and quotations are as strong as ever. Nothing under 18s. is named for medium blast-furnace kinds delivered at Teesside works, and up to 19s. is quoted for special sorts.

## IRON.

Rather more disposition to buy pig iron, and especially Cleveland sorts, is shown, but business is still on only a very limited scale, traders continuing to act with much caution. There is still an undoubted feeling of uncertainty, and the dearness of money assists materially in checking speculation. The Cleveland pig iron sold to America some little time ago appears to be being taken up, for it is understood that three steamers have been fixed at 8s. 6d. Middlesbrough to Philadelphia. It is, however, difficult to understand how Cleveland pig can under existing conditions, successfully compete with America in United States markets. Some business in No. 3 g.m.b. Cleveland pig has this week occurred at 53s. f.o.b., but the price has now settled to 52s. 9d., whilst No. 1 is 55s. 3d. to 55s. 6d., No. 4 foundry 52s. 6d., No. 4 forge 52s. 3d., and mottled and white iron each 52s.—all for early delivery. East coast hematite pig shows no change, Nos. 1, 2 and 3 standing at 65s. for either early or forward delivery. Foreign ore was a little easier. Market rates were on the basis of 19s. ex-ship Tees for rubio of 50 per cent. quality. Business was reported to have been done at that price, and sellers are now prepared to make contracts at it. Freight to Bilbao—Middlesbrough are 5s. 7½d. The manufactured iron and steel industries are quiet, and quotations all round are unaltered.

## South-West Lancashire.

## COAL.

So far as regards inland house coal, the demand is rather upon quiet lines. This is only what could be anticipated after the pressure for supplies during the latter half of September and the present mild weather. With regard to shipping, steam coal is only in moderate demand, some of the regular lines being rather quiet. This is partly attributable to the continued unsettled state in the Balkans, as, owing to this, the financial position remains unsatisfactory and tends to limit the volume of trade. There is not much outside enquiry and the quieter aspect has had a tendency to weaken prices and, in some cases, for spot lots to clear wagons, as low as 13s., and even a little less, has been taken for the lower grades of bunker coal. The prices for ordinary Lancashire steam coals are now being quoted at about 13s. to 13s. 3d. f.o.b. up to 14s. f.o.b. for the very best quality. Household coals, and particularly those of better quality, for the coastwise and cross-Channel trade, continue in good demand, Dublin, of course, being the exception, owing to labour troubles there. With a full output of slack and scarcely as yet a winter consumption, there is some little overplus, and in odd cases small quantities are being put on the floor.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/	17/
Do. (f.o.b. Garston, net) ..	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net) ..	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal.....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/3 to 14/	13/3 to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/



**South Lancashire and Cheshire.****COAL.**

There was a full attendance of members on the Manchester Coal Exchange on Tuesday. The demand for house coal is not quite so good as last week. Prices are generally firm, though in some cases soft coal from outside counties is being offered at somewhat lower prices to clear loaded wagons. Furnace coal still meets with steady enquiry, and there is a good demand for shipping coal. Slack has a fairly good appearance.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 14/	13/3 to 13/4
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

**IRON.**

There was a fairly good attendance on 'Change in Manchester on Tuesday last, and pig iron remains much as previously reported. Forges are not too busy, and are still asking £8 for Crown bars, £7 10s. second quality, £8 7s. 6d. hoops, sheets £8 12s. 6d. Steelworks are fairly busy on bars at £7 to £7 5s. less 2½ per cent., and £5 5s. net. Engineers and foundries are rather slack. Wagon works would like to see more enquiry coming forward.

**Yorkshire and Derbyshire.****Leeds.****COAL.**

The Yorkshire Coal Exchange presented a busy appearance on Tuesday afternoon, as the attendance of merchants and exporters was unusually numerous. The market altogether was fairly good, the chief demand being for secondary qualities of steam coal for export, and small parcels of house coal for prompt delivery. It was reported that the pits had worked full time, but that empty wagons had been somewhat scarce. Stocks are practically non-existent, except for the smaller classes of manufacturing fuel.

**House Coal.**—The distant markets continue to take full supplies of the higher grades, both ex-contract and in the open market. Haigh Moor selected and the best brands of Silkstone house coal are considerably in arrear as regards deliveries, and prices are very firm. Reports from London indicate a much quieter state of things in the retail trade, but so far, the effect has scarcely been felt at the pits. In the coastwise trade, supplies of secondary grades are fairly plentiful, and there has been some easing of prices in this direction. Freights are also slightly weaker, small boats being done at 3s. 9d. per ton from Hull to London, and 4s. 3d. from Goole to London. In the local markets merchants report a falling off in the demand from the public, except in the Leeds districts, where the recent carters' strike has caused deliveries to fall into arrear. Current pit prices for the West Riding markets average as under:—Haigh Moor selected, 18s. 6d. to 19s. 6d.; Wallsend and London best, 17s. 6d. to 18s. 6d.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other sorts, 14s. to 15s. 6d.

**Gas Coal.**—There are a fair number of enquiries circulating for spot lots of gas coal, but practically all the output is needed to satisfy current contracts. It is reported that a big parcel of West Riding unscreened gas coal has been sold for export over the whole of next year at the f.o.b. Hull price of 12s. 3d. per ton.

**Manufacturing Fuel.**—There is no improvement in this branch of the trade. Overtime is no longer being worked in the Bradford and Huddersfield districts, and the consumption of works fuel is much below the average of recent months. In consequence, special prices are frequently met with, especially for the smaller grades of fuel, small slacks being offered exceptionally cheap. In spite of the low current rates, several contracts have recently been renewed at prices quite equal to those of the expiring commitments.

**Washed Furnace Coke.**—The further break in the price of iron has reacted unfavourably on the coke market and buyers are refusing to contract forward even at present low figures. Best brands of patent oven washed coke are said to have been sold this week at 12s. per ton at the ovens and some of the lower grades as low as 11s. 6d. The output of the ovens is less by 25 per cent. than it was six months ago, but even with the reduced output stocks are in evidence almost everywhere.

	Current prices.	Last week's prices.
House coal:—		
Prices at pit (London):		
Haigh Moor selected ...	15/	15/
Wallsend & London best	14/ to 14/6	14/ to 14/6
Silkstone best .....	14/ to 14/6	14/ to 14/6
Do. house .....	12/6 to 13/6	12/6 to 13/6
House nuts .....	11/6 to 12/9	11/6 to 12/9
Prices f.o.b. Hull:		
Haigh Moor best .....	17/6 to 18/6	17/6 to 18/6
Silkstone best .....	16/6 to 17/6	16/6 to 17/6
Do. house .....	15/ to 16/	15/ to 16/
Other qualities .....	14/6 to 15/	14/6 to 15/
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/9	12/ to 12/6
Gas nuts .....	11/ to 12/	11/ to 12/
Unscreened gas coal ...	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	10/9 to 11/6	10/9 to 11/6
Large double-screened engine nuts .....	10/ to 10/6	10/ to 10/6
Small nuts .....	9/6 to 10/	9/6 to 10/
Rough unscreened engine coal .....	9/9 to 10/3	10/ to 10/6
Best rough slacks .....	8/ to 8/6	8/ to 8/6
Small do. ....	6/6 to 7/	6/9 to 7/
Coking smalls .....	6/6 to 7/	6/9 to 7/3
Coke:—		
Price at ovens:		
Furnace coke .....	12/	12/ to 12/6

**Hull.****COAL.**

There is in the Humber coal market a continuance of the brisk demand for export, though there are not wanting signs that the requirements of exporters, at any rate so far as the northern Baltic ports are concerned, are nearly satisfied. With the approach of winter, the usual rush to get cargoes intended for Cronstadt and neighbouring ports despatched has been strongly in evidence during the past few days, when unusually large quantities have been shipped for the upper Baltic. Under the present active demand best Yorkshire steam hards remain steady at about 16s. for prompt shipment, though in view of a slackening demand they can be purchased at 3d. per ton less than this for next month's delivery. Secondary steams and washed smalls show a better tendency, and house and gas coals are both improved in value. Slacks are aglut in the market and are much lower than they were a few weeks ago, owing to over production and a lessened industrial demand. Shipments from the docks at the Humber ports are still on a large scale, but there is no undue pressure, and loading turns are consequently easier. The freight market is on a lower basis, Baltic business being done at 5s. 7½d. Cronstadt, 5s. 3d. Riga, while the Mediterranean quotation is 9s. 3d. to 9s. 6d. Genoa. Tonnage continues to be taken up for Black Sea ports, fixtures recorded during the week being at 9s. 6d. and 9s. 9d. Odessa or Nicolaieff from the Humber. The following are the approximate prices for prompt shipment, f.o.b. Hull, &c.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	16/	16/ to 16/3
Washed double-screened nuts .....	13/9	13/6
Unwashed double-screened nuts .....	12/9 to 13/	12/9
Washed single-screened nuts .....	13/ to 13/3	13/
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls .....	10/6 to 10/9	10/3 to 10/6
Unwashed smalls .....	9/3 to 9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys .....	14/3	14/
Rough slack .....	9/ to 9/3	10/3
Pea slack .....	8/3 to 8/6	9/
Best Silkstone screened gas coal .....	14/3	14/
Best Silkstone unscreened gas coal .....	12/ to 12/3	12/6
Derbyshire:—		
Best steam hards (Hull) .....	15/6	15/6
Do. (Grimsby) .....	15/	15/
Derbyshire nuts (doubles) .....	12/	13/
Derbyshire nuts (doubles) (Grimsby) .....	12/9	12/9
Derbyshire large nuts ...	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	15/3 to 15/6	15/3 to 15/6
Do. do. (Grimsby) .....	15/	15/

**Barnsley.****COAL.**

Business on export account continues to be of a very active character, particularly for steam coal, which has caused the market to retain its firmness. The volume of trade at this period of the year is unusually heavy, and a strong enquiry is met with for spot lots, but would-be buyers are finding the quest is not of so fruitful a character as of late. The shipments for the Baltic ports, though there is every prospect of shipping being available for an unusually long period yet, are particularly brisk, and this may explain the absence of any rush of enquiry for fuel required by way of the Black Sea ports. The business in this direction, of course, can be dealt with at any time, and obviously in the present state of the market merchants are not rushing business which has yet to be placed for these ports. Sellers, however, are able to keep their quotations firm, especially for the best class of hards, and as an indication of the position of affairs the fact is to be recorded that the Great Northern Railway Company have renewed several contracts in this district for supplies of best steam until next June at 12s. 6d. per ton. This figure is an increase of 1s. per ton on the price fixed last December, and it will arouse a good deal of interest in the renewal of the contracts generally which expire in December next. So far as is known at the present there has been no enquiry by the other railway companies, and no doubt, in the present state of the market, the quest will be delayed as far as possible. At the present, for current delivery the best hards are making about the same as a week ago, though from 3d. to 6d. per ton extra is being paid to secure immediate tonnage which may be required to complete the loading of vessels at Hull. In regard to secondary sorts, the values are stronger owing to less tonnage being on hand, and about 3d. per ton more is being realised for delivery in the ordinary course. On forward account little is being fixed up—coalowners holding out for present prices, whereas exporters prefer to risk the operations of the market. Though there is no material change in regard to small steam coal, the tone is rather stronger in respect of certain grades of fuel. Washed nuts are meeting with a good demand, with prices stiffening a little, but there is a good bulk of secondary sorts on offer. Pea nuts are fully taken on contract account, and there is less difficulty felt than in some districts in dealing with slacks. Best qualities still maintain a firm position, though there appears to be a quieter demand from the cotton districts and on coke-making account, but rougher sorts are still rather plentiful, and prices are of a more competitive character. The demand for gas coal is of a remarkably active description, both for export and on home account. Surplus lots of the best class of fuel are readily disposed of, and prices for current rates show a slight advance on contract rates. Generally the demand for house coal is well sustained, though in regard to the best kinds of fuel the after-effect of stocking is beginning to be felt. Other grades are being well taken, and prices are firmly maintained, though the weather does not encourage any big rush of orders. The business in secondary descriptions for London and Lancashire markets is above the average, and the lower production is affecting business. There appears to be no prospect of an improvement in regard to coke,

which, despite all attempts at restriction, appears to be very plentiful. Buyers are still showing no desire to fix up long contracts, and prices are still on the weak side.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone .....	16/	16/
Best Barnsley softs .....	15/3 to 15/6	15/3 to 15/6
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	13/ to 13/3	14/ to 14/3
Secondary do. ....	11/ to 12/	12/ to 14/
Steam coals:—		
Best hard coals .....	12/9	12/9 to 13/
Secondary do. ....	11/6 to 12/	11/6 to 11/9
Best washed nuts .....	10/6 to 11/9	10/6 to 11/9
Secondary do. ....	10/3 to 10/9	10/3 to 10/9
Best slack .....	8/ to 8/3	8/ to 8/3
Rough do. ....	6/6 to 7/	6/6 to 7/
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/ to 12/	11/6 to 12/
Gas nuts .....	12/ to 12/6	12/ to 12/6
Furnace coke .....	12/ to 12/6	12/6 to 13/

**Chesterfield.****COAL.**

The demand for house coal shows a slight falling off, which is no doubt due to the mildness of the weather. The orders on hand, however, are sufficient to enable the collieries to work full time, and to prevent an accumulation of stock. Prices remain firm. Fuel for manufacturing purposes continues in good request, and not the slightest difficulty is experienced in disposing of the output. Cobbles and nuts for steelmaking purposes are in active demand, and prices are well maintained. The best classes of slack for boiler firing are as much wanted as ever, but the supply of secondary qualities is, at the moment, greater than the demand, and, for these, prices are a shade weaker. Provided the cotton industry is not disturbed, as is now threatened, by a lock-out of the whole of the Lancashire operatives, there will probably be an early improvement in the demand for slack for boiler firing. The autumn and winter months usually witness the greatest demand of the year for this class of fuel. Steam coal for locomotive use is in steady request, while the demand for gas coal is brisk. There is considerable activity in the export trade, and steam coal is in strong demand notwithstanding the approaching close of the shipping so far as Cronstadt is concerned. The extraordinary requirements for the Russian railways, for which the shipments will be made to the Black Sea, is having a beneficial effect upon the steam coal trade, and a brisk state of things is likely to prevail for several months to come. Prices remain firm at 15s. to 15s. 3d. per ton delivered free alongside steamer at Grimsby. There is, however, still some difficulty in obtaining supplies outside contract commitments. A fairly satisfactory business continues to be done in cobbles for near Continental ports. Washed fuel finds a ready sale, but prices are stationary. The coke market continues depressed. The demand is slow and prices are weak. The outlook for this branch of the trade is not very cheerful. Coking fuel is in slower request than it has been for several months past.

**IRON.**

Pig iron is in poor demand, and, unless there is an early improvement, it is feared that some furnaces will have to be blown out. The finished iron trade is very quiet, and the orders coming to hand are few in number, and are by means sufficient to enable the works to be fully occupied. Engineers and wagon builders are fairly well placed for orders.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	9/	9/

**Nottingham.****COAL.**

The improvement in the coal trade in Nottinghamshire, noted a week ago, has been fully maintained during the last few days, the general demand being of such a character as to justify the owners in keeping the pits making practically full time. In reference to the household section, while a good steady business is being done, increased activity is not anticipated until the weather displays a colder turn, the mild spell during the week having a set back on sales at the local landsale depots. Merchants, however, are taking fair supplies, so as to keep their stocks up in case of a sudden rush. In the present state of trade, prices are firm, especially for best and ordinary qualities. There is a very satisfactory tone in the steam coal branch, the demand showing an improvement compared with two or three weeks ago. The value of best hards is likely to have an upward tendency, whilst second-rate fuel is in active request. A good amount is being sent away for shipment, and industrials in the home market are going out of hand moderately well. The slack market does not show much alteration, best qualities being in good request, but common sorts are not readily disposed of. Trade in gas fuel is active.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	14/ to 14/6	14/ to 14/6
Good house coals .....	13/ to 14/	13/ to 14/
Secondary do. ....	11/6 to 12/6	11/6 to 12/6
Best hard coals .....	11/9 to 12/6	11/6 to 12/6
Secondary do. ....	10/9 to 11/6	10/9 to 11/6
Slacks (best hards) .....	8/ to 8/6	8/ to 8/6
Do. (seconds) .....	7/ to 7/9	7/ to 7/9
Do. (soft) .....	7/3 to 8/	7/ to 8/

**Leicestershire.****COAL.**

There is considerably more quietness in this district; in the last week business has contracted. The continuance of fine weather has had a marked effect on the demand for



hold coals. The enquiry for these coals has much increased in practically all descriptions. Local merchants have been very quiet and their business done has been mainly supplying steam coal. The collieries are still fairly busy in the steam coal department; cobbles and slacks are in pretty good enquiry and placed orders are taken. The lull in business which is now being felt has caused a reduced output and also stocks as a whole are heavier. The outlook is not at all one which induces pessimism. There is a very good amount of business on hand in the aggregate and a spell of really autumnal weather would soon be felt in the speeding-up of business. Meanwhile quotations remain firm and there is no disposition on the part of sellers generally to go below the current rates.

### South Staffordshire, North Worcestershire and Warwickshire.

#### Hednesford.

##### COAL.

There has been no material alteration since last report in the general condition of the Cannock Chase district. There is a steady demand for nearly all descriptions of coal and consequently the collieries are being kept fairly busy, most of them working full time. The demand for coal for manufacturing purposes is much the same as when last reported, and the house coal trade is steadily improving. The enquiry for slack is not particularly brisk. Railway sales are fairly brisk and at the landsale depots a more lively business is being done.

#### Birmingham.

##### COAL.

The development of the house fuel department is hampered by present mild weather. Probably not more than half the consumption generally associated with this period of the year is going on. For all kinds of works fuel a steady trade is experienced.

##### Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/6
Do. seconds deep.....	16/	16/
Do. best shallow.....	14/9	14/9
Do. seconds do.....	14/	14/
Best hard.....	15/	15/
Forge coal.....	11/	11/
Slack.....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked cobs.....	14/	14/
Best hard spires.....	15/	15/
Forge (steam).....	11/	11/
D.S. nuts (steam).....	10/	10/
Small (do.).....	8/3	8/3

##### IRON.

The business passing amounted to a moderate aggregate, but the extreme caution which is still exercised by consumers has a depressing effect on the market. A number of orders which were held up until the new quarter are now being given out. There is, however, a notable absence of anything like speculative buying. Orders are limited to immediate requirements and although producers are fairly well employed for the time being, there is keen competition for business, which effectually prevents any appreciation. Since the quarterly meeting, marked bars were reduced from £9 10s. to £9, bringing them into more normal relation with the price of unmarked iron. This is the second drop of a like amount since July. Makers of best bars have booked enough business on the new basis to ensure present regularity of employment, as they have still some uncompleted contracts at the old rate. Merchant bars sell at £7 5s. to £7 7s. 6d. delivered in the district, and common nut and bolt qualities are quoted at £7 delivered Darlaston, but 5s. below that figure is not refused for good orders. There is a big output of galvanised sheets which is going regularly into consumption, the export trade being particularly active. Owing, however, to the great extent to which productive capacity has been increased in recent years, and to the diversion caused by the slump in the tin-plate trade of South Wales, there is keen competition for business, and inland manufacturers complain that the export business is so severely cut by their rivals on the coast that business can only be done at unremunerative rates in many cases. The market quotations are £11 to £11 5s. for 24 gauge f.o.b. Liverpool, but a considerable amount of business is done at £10 17s. 6d., and even less money has been accepted for special orders. Black sheets for galvanising are maintained on the basis of £8 for doubles delivered in the district. Trade in gas strip is rather slow at £7 5s. to £7 10s. delivered in lots of 25 tons and upwards. Pig iron shows little material change. Values are only kept up by restricting the output, and the absence of special buying is harassing producers. Staffordshire forge qualities make 51s. and upwards, and part mine 53s. Northamptonshire smelters quote 52s. to 54s., and Derbyshire about 54s., but business is done at lower rates. Steel manufacturers have still a substantial amount of work in hand, and the readjustment of prices has brought into circulation a fair amount of additional business, but current trade still lacks any marked impulse. In demi-products the competition of Continental houses is increasingly felt. Some very low prices are accepted for good orders, targets and billets being still at £4 10s. to £4 15s. Home makers generally quote £5 for Bessemer and £5 2s. 6d. for Siemens, but business can be negotiated at £4 17s. 6d. for Bessemer.

### Forest of Dean.

#### Lydney.

##### COAL.

The steam coal producing pits are still experiencing a scarcity of orders and all of them are not fully employed. Prices of the whole are unsatisfactory, concessions having been made to prompt buyers to secure the business. The enquiry for house coals of the district does not show much improvement, the pits are engaged five to six days in the week and prices are not excessive. Shipments are not so

active, railborne trade steady. Slacks are hard to place at 7s. 6d. at pit.

##### Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block.....	17/6	17/6
Forest.....	16/6	16/6
Rubble.....	16/9	16/9
Nuts.....	15/	15/
Rough slack.....	7/6	7/6
Steam coal:—		
Large.....	12/ to 13/	12/6 to 13/
Small.....	8/ to 9/	9/ to 10/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

### THE WELSH COAL AND IRON TRADES.

THURSDAY, OCTOBER 16.

#### North Wales.

#### Wrexham.

##### COAL.

The general aspect of the market here is unaltered from last week. Household coal is in fair demand, the railway companies are taking good quantities against contracts, and orders are fairly numerous for the various works that take their supplies from this coalfield. The usual average quantity of gas coal is being de-patched under the existing contracts, and nuts are particularly scarce. Slack finds a fairly good demand and prices are pretty much the same as what were ruling when writing last week, being as follow:—

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal.....	15/ to 16/	15/ to 16/
Secondary do.....	14/ to 15/	14/ to 15/
Steam coal.....	12/6 to 13/	12/6 to 13/
Gas coal.....	13/ to 13/9	13/ to 13/9
Bunkers.....	12/ to 12/6	12/ to 12/6
Nuts.....	11/ to 11/9	11/ to 11/6
Slack.....	6/ to 7/9	6/3 to 7/6
Gas coke (at works).....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal.....	17/6 to 18/4	17/6 to 18/4
Seconds.....	16/8 to 17/6	16/8 to 17/6
Slack.....	10/ to 12/6	10/ to 12/6

### Monmouthshire, South Wales, &c.

#### Newport.

##### COAL.

An uneventful week has passed in the shipping side of the coal trade, a week so terribly imprinted upon the coalfield calendar by the Senghenydd blast. Business has ruled comparatively slow, and so far as can be foreseen, the market exhibits few signs of improvement. Chartering has not been up to a standard to aid sellers, the enquiry for tonnage being quite moderate and owners inclined to hold off. There is little enquiry about for forward business, colliery salesmen's quotations depending very largely upon their particular necessities, rendering the market very irregular and buyers independent. Practically all grades may be said to be weaker except the very best, sustained by a less attenuated stem. As yet the reduction of output caused by the dread attraction at Senghenydd, where curiosity and sympathy have drawn thousands upon thousands of colliers from around the neighbouring hills, has not affected the market to any extent, and the interruption of production is not likely to be prolonged. Pitwood has been in fair demand, with ample supplies, and good wood is quoted 21s. to 21s. 6d. ex-ship.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	16/9 to 17/	16/9 to 17/
Western-valleys, ordinary	15/6 to 15/9	15/6 to 15/9
Best Eastern-valleys.....	15/3 to 15/6	15/3 to 15/6
Secondary do.....	15/ to 15/3	15/ to 15/3
Best small coals.....	7/9 to 8/	7/9 to 8/
Secondary do.....	7/3 to 7/6	7/3 to 7/6
Inferior do.....	6/6 to 7/	6/6 to 7/
Screenings.....	8/	8/
Through coals.....	11/6 to 11/9	12/ to 12/3
Best washed nuts.....	13/ to 13/3	13/3 to 13/9
Other sorts:—		
Best house coal.....	18/ to 19/	18/ to 19/
Secondary do.....	17/ to 18/	17/ to 18/
Patent fuel.....	19/ to 20/	19/ to 20/
Furnace coke.....	20/ to 21/	20/ to 21/
Foundry coke.....	24/ to 25/6	24/ to 25/

##### IRON.

There is very little change to report in the local conditions of the iron and steel trades. All departments are fairly well employed, but very little fresh business is being transacted. At bar mills work is reported good, and prices remain steady at last quoted figures. Imports of foreign bars for the week total 6,200 tons, quotations showing only slight alteration. Rail mills continue to be better off than any other department. A few large orders have quite recently been booked, and works are well placed for some time to come. Quotations remain as last reported. At blastfurnaces there is no alteration to record. Work remains fairly good, but only little forward business is being done and quotations are slightly easier on the week. There is no improvement in the tin-plate trade. If anything, this market is a little easier, but official quotations remain unaltered. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tin-plate bars: Bessemer steel, £4 15s., Siemens steel, £4 16s. 3d. to £4 17s. 6d. Tin-plates: Bessemer primes, 20 x 14, 13s. 3d., Siemens primes 20 x 14, 13s. 3d. Finished black plate, £9 15s. Pig iron: Welsh hematite, 72s. 6d. to 73s., delivered locally. Iron ore: Best Rubio, 19s. to 19s. 6d. c.i.f. Newport.

#### Cardiff.

##### COAL.

Matters in this market remain much about the same as last week. Collieries producing best steam coals are for

the most part greatly pressed for supplies under contracts, and are therefore not in a position to accept but a very small amount of current business, for which they are obtaining round about 20s. 3d. net. The tonnage position is more satisfactory, and so far as this month is concerned at any rate there is little doubt but that the best collieries will be very busy, and therefore even for November business they are showing no indication of modifying their views as to prices. Collieries producing second-grade coal are not so favourably situated, with the result that low prices are being taken for prompt business in order to get wagons cleared and provide work for their men. Outputs are still much below what they usually are at this time of the year, and in addition to this a considerable quantity of coal is being lost to the market through stoppages, mostly in connection with the non-unionist question. The Penrhin-geiber miners, who to the number of 2,500 have been on strike for over a week because 209 workmen were out of compliance with the Federation, resumed work on Tuesday morning, the last of the defaulters having been gathered into the fold the previous day. But stoppages are threatened at other pits. About 600 notices will terminate at the Bedwas Navigation Colliery to-morrow (Saturday). At the time of writing a strike was also threatened at the Glanavon Colliery, Blaengarw, because of the refusal of a workman to apologise for alleged erasures on his Federation card; and notices on the non-unionist question have also been given at the Ferndale collieries. It is evident that a special effort is being made to clear up all arrears due to the Federation, and that those who have paid their contributions are determined not to resume work until every man is brought into compliance with the union. Our correspondent understands, however, that the notices given at the Ferndale collieries, which expired on Saturday last, have been deferred until the 25th inst., when, unless a settlement is arrived at in the meantime, it is more than probable that a stoppage of some 7,000 or 8,000 men will ensue. There is no doubt that this unrest in the coalfield has not a little to do with the firmness of prices. The disastrous explosion at the Universal Colliery, Senghenydd, belonging to the Lewis-Merthyr Consolidated Colliery Company, has also occasioned much concern amongst buyers, as it means the withdrawal of a large quantity of coal from the market for some time to come. Amongst sellers of best steam coals there is only a difference of 6d. per ton, the prices ranging from 19s. 9d. to 20s. 3d., but there is a wider margin in other grades. Superior second Admiralties are quoted at 19s., but ordinary seconds are offering at 17s. 6d. to 18s. There appears to be a lull in contracts for next year. Buyers are still holding off in the belief presumably that there may be a temporary depression, owing either to a shortage in the arrival of tonnage or some other reason, which may possibly influence the ideas of sellers. Up to the present however, there is no indication that the optimistic views which the sales agents of several collieries entertain as regards next year's business will be modified. There have been a number of rumours concerning the contracts for the Paris, Lyons, and Mediterranean Railways, but according to the latest information the Vulcan Coal Company have secured the order for 90,000 tons of large coals, and Messrs. Pyman, Watson and Company the order for 100,000 tons of small. The prices accepted are said to be 30 to 30½ francs for the large, and round about 25 francs for small, delivered into trucks at Marseilles over a period of eight months from January to August. It is understood that the large coal to be supplied will be Monmouthshire Western Valleys. One or two of the Irish railways are also reported to have arranged for the supply of about 200,000 tons of Monmouthshire coal for next year on the basis of about 16s. 3d. f.o.b. There has been a good deal of negotiation going on in reference to small coal. The French State Railways have been enquiring for 380,000 tons for delivery over next year, but though it is said they have received tenders as low as 18 francs delivered at North France and Bay Ports, they consider them too high, and are as usual counter-acting for further offers. Their idea is said to be about 17 francs, which, after allowing for freight, tax, etc

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals.....	19/9 to 20/3	20/ to 20/3
Superior seconds.....	19/ to 19/3	19/ to 19/6
Ordinary do.....	17/6 to 18/	17/9 to 18/
Best bunker smalls.....	10/3 to 10/6	10/6
Best ordinaries.....	10/	10/ to 10/3
Cargo qualities.....	7/3 to 7/6	7/3 to 7/9
Inferior smalls.....	6/6 to 7/	7/
Best dry coals.....	18/ to 18/6	18/ to 18/6
Ordinary dries.....	15/6 to 16/	15/6 to 16/
Best washed nuts.....	16/ to 16/6	16/ to 16/6
Seconds.....	15/	15/
Best washed peas.....	14/3 to 14/6	14/6
Seconds.....	13/ to 13/3	13/6
Dock screenings.....	11/3 to 11/9	11/9
Monmouthshire:—		
Black Veins.....	16/9 to 17/	16/9 to 17/
Western-valleys.....	16/ to 16/6	16/ to 16/3
Eastern-valleys.....	15/9 to 16/	15/9
Inferior do.....	15/ to 15/3	15/3
Bituminous coals:—		
Best house coals (at pit)	20/6	20/6
Second qualities (at pit)	17/6 to 18/	17/6 to 18/
No. 3 Rhondda:—		
Bituminous large.....	16/6 to 17/	17/
Through-and-through...	14/6 to 15/	15/
Small.....	12/ to 12/3	12/3 to 12/6
No. 2 Rhondda:—		
Large.....	13/ to 13/3	13/ to 13/6
Through-and-through...	10/6 to 10/9	11/
Small.....	8/3 to 8/6	7/6 to 8/
Best patent fuel.....	22/6	22/3
Seconds.....	20/ to 21/6	20/ to 21/6
Special foundry coke.....	28/ to 29/	28/
Ordinary do.....	23/ to 26/	26/
Furnace coke.....	19/ to 21/	20/ to 21/
Pitwood (ex-ship).....	21/3	23/

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.



would only leave between 7s. and 8s. per ton f.o.b., but it is extremely doubtful if they will get any collieries to accept so low a figure. Messrs. Morgan, Wakley and Co. have secured a contract for the supply of 35,000 tons of small coal to the Belgian State Railways over the remainder of this year, but at what price is not known. Current business in small coal is very sluggish, but that is usually the case in October, owing to so many trucks being required for the fruit harvest in France, Italy and Spain. Bunkerings for prompt shipment are quoted at 10s. 3d. to 10s. 6d. and cargo qualities are 7s. 3d. to 7s. 6d. per ton. Charterings last week were again on a satisfactory scale, no less than 400,000 tons being fixed, and as nearly the same quantity was taken up during the previous six days, a very busy period is looked forward to. The extra tonnage will be gladly welcomed by the Monmouthshire collieries, who have experienced considerable difficulty in arranging for their shipments. The result is that there has been plenty of free coal on the market, which, of course, has had a depressing effect in prices. Black Veins are selling at 16s. 9d. to 17s., western-valleys 16s. to 16s. 6d., and best eastern-valleys 15s. 9d. to 16s., in each case f.o.b. Cardiff. In fancy house coals there is no change. Rhondda bituminous coals are slightly easier, No. 3 large selling at from 16s. 6d. to 17s. and No. 2 ditto at 13s. to 13s. 3d. per ton. Shipments of patent fuel for the week amounted to 26,744 tons, of which the Crown Company shipped 6,153 and other local makers 7,300 tons and Swansea 13,291 tons. Best brands still realise 22s. 6d. The contract for the supply of patent fuel to the North Spain Railways has been arranged. The quantity asked for was 17,000 tons, to be delivered into trucks at Tarragona and Barcelona, but the only order which has come to South Wales is for 10,000 tons, which has been placed with Cory's Trading Company, the fuel to be supplied being the Arrow Fuel. The price accepted is said to be between 42 fr. and 43 fr. It is reported that the contract for 54,000 tons of patent fuel for the Paris, Lyons and Mediterranean Railways has gone to Germany, whose lowest tender was 7 fr. below any received from South Wales. There is no change in the coke market. Special foundry is still quoted at 28s., ordinary 23s. to 26s., and furnace coke 19s. to 21s. Pitwood has fallen to 21s. 3d.

# IRON.

There are as yet no signs of abatement or depression in the tin-plate trade. Though a number of mills still remain idle, employment is fairly good in the Llanelly district, but shorter shifts are worked at some of the mills. Shipments last week amounted to 111,418 boxes as against 108,085 boxes received from works, so that stocks had been reduced to 345,407 boxes. Although many of the mills are badly in want of orders it is difficult for buyers to obtain any concession on the 13s. basis, as makers declare that they cannot work at a profit at this price. Americans claim that they have secured contracts for 300,000 boxes of tinplates for Canada, but if so, they must have quoted exceptionally low prices. Trouble has arisen over the wages of risers at the Cwmfelin and Cwmbwrla tin-plate works. Hitherto they have been paid at so much per box, but the employers now offer 4s. 6d. per day of 12 hours. The tinnermen and risers generally work 8 hour shifts, and the risers object to the day rate. About 300 hands are at present idle, but it is feared that if the strike continues it will eventually bring about a stoppage of 25 or more mills. Imports of iron and steel plates, bars, billets, &c., during the week exceeded 13,000 tons. This, with the starting of the new Pynea Steelworks, has had a depressing effect on works in the Swansea district. There is no change, however, in the prices of tin-plate bars, which still rule at from £4 15s. to £4 16s. 3d. Business in the galvanised sheet trade is very quiet. There is but little enquiry coming through, but as works generally are well booked ahead, there is little cause for anxiety. Prices, however, are rather easier, £10 15s. being readily accepted for 24-gauge corrugateds. The rail mills are well employed, and the quantity of finished iron and steel shipped during the week has been exceptionally large, being about 9,000 and 10,000 tons. Heavy rails are £6 10s. to £6 15s. There is a persistent rumour that a German firm is enquiring for land at Newport upon which to erect works for the manufacture of patent steel tubes for engineering and constructional purposes, but nothing definite has yet been decided upon. It is said that the firm in question are compelled to take action by the Patents Acts, but as enquiries have been made by them in many other directions, it would be premature to indulge any sanguine hopes in reference to the matter. Welsh pig iron is lower, being 69s. to 70s. f.o.t. Best Rubio iron ore is still quoted at 18s. 6d. to 19s., but very little buying is going on.

# Llanelly.

## COAL.

The coal market of this district should be fairly strong over the next few months. The demand for most coals even now is good, and as the weather gets colder there is every reason to expect further increases in orders. There is very little improvement in the arrival of tonnage, and stocks for several kinds are heavy waiting the arrival of boats. The busiest part of the market just now appears to be in the horticultural qualities; and most collieries are fully sold, and in some places over-sold. This, so early in the season, should see prices very firm as the winter arrives. Shipments of these qualities have been very heavy of late.

Prices f.o.b.

Anthracite:—	Current prices.	Last week's prices.
Best malting large .....	20/6 to 22/6	20/6 to 22/6
Secondary do. ....	19/ to 21/	19/ to 20/
Big Vein large.....	18/ to 19/	17/6 to 18/6
Red Vein do. ....	14/ to 15/	13/6 to 14/6
Machine-made cobbles ...	19/6 to 20/6	19/6 to 20/6
German nuts .....	23/ to 25/	23/ to 25/
French do. ....	23/ to 25/	23/ to 24/
Paris do. ....	23/ to 25/	23/ to 25/
Machine-made beans .....	18/ to 20/	18/ to 20/
Do peas.....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	5/9 to 6/3	6/ to 6/3
Duff .....	4/6 to 6/6	5/ to 7/
Other sorts:—		
Large steam coal.....	17/ to 18/	17/6 to 18/
Through-and-through ...	11/ to 11/6	11/ to 11/6
Small .....	9/ to 10/	9/ to 10/
Bituminous small coal ...	11/ to 12/	10/ to 11/

and inland orders have had to wait. All the anthracite kinds with the exception of beans and culm are going well, with every prospect of improvement. Steam and bituminous coals are still weak, and unfortunately no great improvement can be expected for a while. Prices are being cut very low to keep pits going.

## Swansea.

### COAL.

There was considerable activity in the trade of the port last week. The coal trade displayed more activity, but patent fuel exports were below the average, the shipments of coal and patent fuel amounted to 110,093 tons. There was a good attendance on 'Change this morning, and the undertone of the anthracite coal market was firm. Swansea Valley large continued to be in good, and the better qualities were firm and difficult to obtain. Red Vein large maintained its strong position. Machine made nuts and cobbles were in slightly better request. Rubbly culm was a little easier, whilst duff was also easy and plentiful. There was no movement in the steam coal market; this department continued easy.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/6 to 20/6	19/6 to 20/6
Big Vein large (less 2½ per cent.) .....	17/6 to 18/6	17/6 to 18/6
Red Vein large do. ....	14/6 to 16/	14/6 to 16/
Machine-made cobbles (net) .....	21/6 to 23/	21/6 to 23/
Paris nuts (net) .....	23/6 to 26/6	23/6 to 26/
French do. do. ....	23/6 to 25/6	23/6 to 25/6
German do. do. ....	23/6 to 25/6	23/6 to 25/6
Beans (net) .....	16/6 to 18/6	16/6 to 18/6
Machine-made large peas (net) .....	12/6 to 13/6	12/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	6/ to 6/3	6/ to 6/3
Duff (net) .....	4/6 to 5/3	4/6 to 5/3
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	14/ to 15/	14/ to 15/
Bunkers do. ....	11/ to 12/	11/ to 12/
Small do. ....	7/9 to 8/6	7/9 to 8/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) .....	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

## IRON.

During the past week the trade of the district was fairly brisk, and the outlook for the immediate future is more promising. The tinplate industry exhibited a brighter aspect, and there was a slight increase in the production. A fairly satisfactory output of pig iron was registered at Messrs. Baldwin's blast furnace. The output of steel bars showed an increase, and the demand for home-rolled tin bars was quite equal to the production. The large amount of repairing and the extensive alterations and improvements to machinery at the various tinplate establishments were responsible for regular employment at the engineering shops and foundries. The shipments of tinplates were 111,418 boxes, receipts from works 108,085 boxes, and stocks in the dock warehouses and vans 345,407 boxes.

## GAS PROBLEMS.

### Should Gas Companies Acquire Collieries?

The following extracts from the presidential address delivered by Mr. Ernest F. Hooper, of Sunderland, to the half-yearly meeting of the North of England Gas Managers' Association, held at Armstrong College, Newcastle, on Saturday last, should prove interesting to those engaged in the coal trade:—

"At the risk of labouring the question, we are furthermore endeavouring to achieve one of the most beneficial acts possible to mankind now and in the future by attempting to conserve the naturally magnificent resources of the country of which we are the happy inheritors. In the midst of prosperous times now, we should not forget that it is our present bounden duty to hand down to our descendants the best possible conditions, so that they, in their turn, may not suffer from our—shall I say?—ignorant prodigality. Is there not a tendency nowadays to look on coal and water as two necessary materials of some equivalent character produced by Nature, for which we pay in some ratio. We are liable to forget that water is practically indestructible, but every ton of coal used is an expenditure of our national capital wealth. There is probably no question of greater moment before us as a nation than the proper husbanding of our natural resources.

"With the gas industry, the problem of supplies and the cost is of vital interest and moment. From time to time, the high price to which coal has advanced causes enquiries to be made into the methods of the coal trade, and it has been suggested that some of the larger gas companies should buy and work their own pits. Looking at the question broadly, taking the experience gained from colliery balance-sheets, the question is a very important and debatable one. Firstly, taking the working results of a colliery over a period of years, which, of course, is the only fair way of estimating its value—the period should not be less than a decade—one arrives at the net and gross profit. Many important points arise requiring the closest consideration. Would a gas company be prepared to risk the vast necessary capital in securing mineral rights, boring, sinking shafts, providing the expensive plant, making railroads and

shipping facilities, when one has to consider that, over and above this, the capital outlay may be idle for many years before any material return can be obtained? Secondly, there is the ever-present risk of the original capital being quite insufficient to complete the opening of the pit properly, owing to unforeseen trouble—such as running sands, faults, varying composition of the coal in different seams, and many other lesser factors which go to make coal-winning a hazardous speculation, sometimes, undoubtedly, very profitable, and at times very much the reverse.

"If the proposition was accepted that a colliery in full working order should be purchased, would the price required not be such as to largely submerge the additional chance of cheaper coal? The only way, apparently, such a scheme could be worked would be by several gas companies joining together and taking an interest in a well-established and not too old colliery. This is a matter possibly worthy of consideration. It may well be a matter for dispute as to whether a reasonably capitalised gasworks, well managed, does not give an equal return on its capital to an average colliery, with a very much lower hazardous risk over a period of years, because it must be remembered that the life of a colliery is by no means indefinite.

"The outlook as regards coal supplies—if one may venture to speculate—would lead one to look to the future (unless some new mechanical devices can materially lower the cost of winning) for high prices, not necessarily using the term on, say, to-day's figures, which may be deemed somewhat abnormal. As to the trend of costs, the charges of labour and everything affecting coalmining are being raised, and he would be considered unwise who thought by any means the limit had been reached. Owing to the increase in the price of commodities, the rise is not abnormal and may go still further. Almost every building material, as well as plant, has been raised in cost of production recently; and it is improbable that, even with a set-back to trade, which is bound to come sooner or later, the low-water mark of wages and cost of material will touch the low prices of past experiences. These facts, increasing the responsibilities and care of those controlling gasworks, have been, to a certain extent, neutralised by closer attention to working costs, as well as the installation of economies and by the higher prices of residuals, without your officers having to resort to the unsatisfactory and last recourse of raising the price of gas to the consumers.

### Coal Analysis.

"A few words on the analyses of coal. It has been brought very closely to my notice during recent years that Continental buyers and consumers of coal are bringing a great deal of scientific investigation into their acquisition of this product. Some of the most complete information as to ultimate analyses, calorific values and gas-producing qualities of Durham coals, not only from various pits but from separate seams, came to me from, and were prepared by, a technical professor at Riga, with whom I became intimate when he was on a visit to England to attend the International Chemical Congress. This, as a solitary instance, points to the fact that users of coal on the Continent are able to pass a shrewd judgment as to value when coal is offered. I understand also that in America a great deal of the sale of coal is conducted on the results of analyses. While one may reasonably assume that our engineers have a fair knowledge of the capability of the coal they admit to their works, it might well be considered whether further information, such as it appears is largely obtained on the Continent, might not often come to the aid of a buyer at home and save him something financially as well as technically.

"Without treading too closely on what must necessarily be very debatable ground, it is probably well known to many of you that several Continental towns are now being mainly, if not entirely, illuminated by means of coke-oven gas. This naturally applies to areas of population reasonably adjacent to the by-product ovens. If my information is correct, already one town, if not more, on our own north-east coast is adopting a similar scheme. The question of uncertainty of production appears to me to be the main argument against the principle of the use of coke-oven gas. Otherwise many gas companies running near to the limits of their production with present plant, in the vicinity of by-product ovens, might well consider the oven gas as a welcome auxiliary to their own supply, as there would be no serious obstacle to its being associated with a normal gasworks output. In this district, as you are no doubt all well aware, much of the coke-oven gas is already being used to generate power which is being utilised for the production of electricity.

"Has not the time arrived for our engineers and chemists to consider very fully whether the best economic results are compatible with a maximum good gas supply and a minimum of attention to the by-product possibilities? It is well within the bounds of possibility that we have reached the turning point in the industry and that a lower gas yield per ton, with a corresponding improvement in by-products, may be a sign of further progress."

The Bolsover Colliery Company propose to start boring shortly on the site of their new Clipstone Colliery near Mansfield, and are asking the Mansfield Corporation to lay on a water supply from their main.



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(A Classified List appears on page 812.)

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\* \* For other Miscellaneous Advertisements see Last White  
Page.



The Colliery Guardian.

LONDON, FRIDAY, OCTOBER 17, 1913.

The six months during which Mr. Allan Greenwell agreed to continue as editor of the *Colliery Guardian* expire on the 31st inst., and Mr. Greenwell does not propose to continue his editorship of the paper.

The total exports for the first nine completed months of the present year reached 56,898,208 tons, valued at £39,755,893, as against 47,546,767 tons, valued at £29,939,766, and 49,566,969 tons, valued at £28,166,665 respectively, in the corresponding periods of 1912 and 1911.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during September was 14s. 0½d. per ton, as compared with 12s. 8½d. in September 1912 and 11s. 4½d. in September 1911.

The value during the first nine completed months of the present year is 13s. 11½d. per ton, as compared with 12s. 6½d. and 11s. 4½d. respectively in the corresponding periods of 1912 and 1911.

Of the total exports of coal during September, the mean value of the large coal exported was 15s. 5½d.; through-and-through (unscreened) coal, 12s. 6½d.; and small coal, 11s. 0½d. The average value of all kinds of coal exported was 13s. 9½d., an increase of 0½d. as compared with the preceding month. Otherwise divided, it fetched the following values:—Steam coal, 14s. 0½d.; gas coal, 12s. 8½d.; anthracite, 16s. 1½d.; household coal, 13s. 2½d.; and other sorts of coal, 12s. 6½d. The value of the coke exported was 18s. 1½d. per ton, and of the manufactured fuel 17s. 8½d. per ton.

The Institution of Mechanical Engineers will hold a meeting in London on Friday next.

The annual meeting and dinner of the North Staffordshire Institute of Mining and Mechanical Engineers was held on Monday at Stoke-on-Trent. Discussion took place on the use of concrete in mines.

Sir Thomas Holland, delivering his presidential address at the annual meeting of the Manchester Geological and Mining Society at Manchester on Tuesday, dealt with educational problems, and severely criticised the university system.

A meeting of the Mining Institute of Scotland took place on Saturday at Edinburgh. A paper on "The Electric Winding Plant at South Kenmuir Colliery" was read by Mr. Willoughby M. Dunn. A discussion took place on the question of underground fires.

The meeting of the South Wales Institute of Mining Engineers, which should have taken place on Tuesday, was abandoned on account of the Senghenydd explosion.

The annual report of the Board of Trade on changes in rates of wages and hours of labour in the United Kingdom for 1912 has been issued. The advance per week in the rates of wages in the coalmining industry was £76,905.

What must be set down as the most disastrous mine calamity in all the annals of the British coalfields occurred early on Tuesday morning at the Universal Colliery, Senghenydd, in the Uver Valley, Glamorganshire.

The Midland Counties Institution of Engineers held their annual meeting at Nottingham on Saturday last. The annual dinner of the institute was held afterwards.

A further meeting of the owners' and miners' representatives of Northumberland will take place on Saturday, the 25th inst., to consider the application of an advance in wages for surface-men.

Lord Mersey, chairman of the Joint District Board for Northumberland under the Coal Mines (Minimum Wage) Act, will report at an early date on the recent conferences between the owners and the men on the questions of the revision of rules and the raising of the minimum rates of wages.

The conference of the Miners' Federation of Great Britain came to a close on Friday last. During the day a resolution in favour of agitating for a five days week was defeated on a card vote. A resolution in favour of the nationalisation of land, mines, minerals and railways was unanimously adopted.

At a conference of employers and workmen in the Lancashire and Cheshire coalfield held in Manchester on Tuesday the owners accepted the principle of a minimum wage for surface workers and agreed to the adoption of a wages list.

Lord Balfour of Burleigh will sit as arbiter at Edinburgh, on Monday next, in the reference of the Scottish Coal Trade Board of Conciliation on the subject of a claim by the employers for a reduction of 18½ per cent. from the basis price of 1888. The present wage ruling is 7s. 6d. per day, and the reduction claimed equals 9d. per day.

A special general meeting of the Mining Institute of Scotland will be held in the rooms of the institute, 39, Elmbank-crescent, Glasgow, on Tuesday, October 28, 1913, at 5 p.m., to consider the proposed application by the Institution of Mining Engineers for a royal charter and the the draft by-laws and rules in connection therewith.

A Stricken Valley.

So terrible is the disaster at the Universal Colliery, which lies near a tributary of the Rhymney, amongst the barren hills of East Glamorganshire, that the whole industry must be reduced to a numbed silence. The immensity of this calamity—the greatest, numerically, that has ever visited the British coalfields—coming at a time when science has half promised us that to-morrow shall see the end of all colliery explosions, stuns and bewilders. Pity and grief for the time must be supreme; but the energy and heroism of the rescuers, some of the best stuff that Wales possesses, give the first trumpet-call to renew the battle, and, whatever errors may lie hidden for the present with the dead men behind the wall of fire at Senghenydd, we can at least hope that they may direct us nearer the truth, and so be the means of saving generations of pitmen yet to come.

Below is given a list of the most serious explosions that have occurred in British collieries since 1851:—

Mine.	Date of explosion.	No. of deaths.
Ince Hall (Lancashire) .....	Feb. 18, 1854 ..	89
Cymmer (South Wales) .....	July 15, 1856 ..	114
Lund Hill (Yorkshire) .....	Feb. 19, 1857 ..	189
Burradon (Northumberland) ..	March 2, 1860 ..	76
Risca (South Wales) .....	Dec. 1, 1860 ..	142
Oaks (Yorkshire) .....	Dec. 12, 1866 ..	361
Talk-o'-th'-Hill (Staffordshire) ..	Dec. 13, 1866 ..	91
Ferndale (South Wales) .....	Nov. 8, 1867 ..	178
Moss Pit (Lancashire) .....	Sept. 6, 1871 ..	70
Swaithe Main (Yorkshire) .....	Dec. 6, 1875 ..	143
Blantyre (Lanarkshire) .....	Oct. 22, 1877 ..	207
Haywood Wood (Lancashire) ..	June 7, 1878 ..	189
Abercarn (South Wales) .....	Sept. 11, 1878 ..	268
Risca (South Wales) .....	July 15, 1880 ..	120
Seabam (Durham) .....	Sept. 8, 1880 ..	164
Naval (South Wales) .....	Dec. 10, 1880 ..	101
Trimdon Grange (Durham) ..	Feb. 16, 1882 ..	74
Clifton Hall (Lancashire) .....	June 18, 1885 ..	178
Mardy (South Wales) .....	Dec. 23, 1885 ..	81
Udston (Lanarkshire) .....	May 28, 1887 ..	73
Llanerch (South Wales) .....	Feb. 6, 1890 ..	176
Morfa (South Wales) .....	March 10, 1890 ..	87
Park Slip (South Wales) .....	Aug. 26, 1892 ..	112
Thornhill (Yorkshire) .....	July 4, 1893 ..	139
Albion (South Wales) .....	June 23, 1894 ..	290
Universal (South Wales) .....	May 24, 1901 ..	81
National (South Wales) .....	July 11, 1905 ..	119

Mine.	Date of explosion.	No. of deaths.
Maypole (Lancashire) .....	Aug. 18, 1908 ..	75
West Stanley (Durham) .....	Feb. 17, 1909 ..	167
Whitehaven (Cumberland) .....	May 11, 1910 ..	136
Hulton (Lancashire) .....	Dec. 21, 1910 ..	344
Cadeby (Yorkshire) .....	July 9, 1912 ..	87
Universal (South Wales) .....	Oct. 14, 1913 ..	427

It will be seen that this ill-fated colliery has already been the scene of a disastrous explosion, which occurred in the early morning of May 24, 1901. That explosion was even more violent than the last, practically every part of the workings being penetrated, and 81 of the 82 men at work in the pit at the time were killed. In the light of after events, it is a notable fact that Prof. WILLIAM GALLOWAY, who made a report following the explosion, urged that it was a conspicuous example of a coaldust explosion. He says:—

The intake airways contained pure air and inflammable coaldust, but no firedamp; the return airways contained air mixed with all the firedamp produced in the workings, and unflammable stonedust, but no coaldust; and as the return airways, speaking generally, were untouched by the explosion, the conclusion that the coaldust when mixed with air played the part of an inflammable quasi-gas in the explosion seems to be irrefragable.

He added:—

It is evident that an explosion of coaldust in a confined space like the workings of a mine is of a totally different nature from the conceptions of it that have been published from time to time both in this country and on the Continent.

Prof. GALLOWAY considered that the explosion was due to a shot igniting coaldust, but no very positive evidence was available. At the same time he pointed to the dry and dusty condition of the mine, and particularly called attention to the faulty construction of the trams. The jury added a rider to their verdict, asking that Parliament should make watering compulsory in all mines of this character.

Read now, after the lapse of 12 years, these quotations from Prof. GALLOWAY'S report give food for thought. Have we travelled very far in that time? It is a question which we scarcely care to answer. The original cause of Tuesday's explosion cannot yet be even surmised, but there is abundant evidence that, if coaldust was not ignited in the first instance, it was largely responsible for the propagation. The course of the explosion wave against the current is a familiar phenomenon of coaldust explosions, and the impressions of survivors within the area are consistent with the supposition. Why the force of the explosion emerged with such violence up the downcast instead of traversing the eastern workings has yet to be explained; it may have been due to the condition of the roadways, or again to some of those divergent forces which have been studied so carefully by the French investigators. This divagation of the explosive wave to the upper air, at any rate, probably saved the lives of half the men in the pit.

It has never been the policy of the *Colliery Guardian* to hazard reckless opinions as to the cause or incidents of an explosion upon the morrow of its occurrence. Such speculations should always be left until the facts are ascertained. There are many points upon which it will be of great interest to have information in the present case—such as the steps that had been taken at this colliery to prevent or mitigate explosions and their efficacy in the light of actual experience; the utility of the breathing appliances employed in the work of recovery; the bearing of the accident upon such latter-day questions as the reversal of the air-current, the construction of stoppings, &c. It seems probable that the condition of the mine may afford valuable evidence on all these subjects, to the ultimate advantage of all those



reliability is bound up with the getting of the facts. It cannot pass from this phase of the Universal explosion without remarking that once again the upholders of the high-barometer theory are claiming its substantiation. On this occasion they are guilty of a definite misstatement of fact. Any of our readers who care to examine the weather charts for the past week will see that for some time prior to Tuesday a low-pressure system was advancing from Iceland towards these islands after a period of tolerably high barometer. To say, as does the *Morning Post*, that "at the time of the explosion the barometer was declining slowly at the scene of the accident, but it was still as high as 30½ in. over the estuary of the Severn, a height considerably above the normal for the district," is directly to ignore the fact, well known to mariners and others for whom the barometer is more than a toy, that it is not the height but the tendency of the mercury column that matters. Of course, we do not go to the extremes of our contemporary and conclude summarily that this falling glass in itself was the cause of the Senghenydd explosion, but possibly it formed a link in a chain of coincidences.

It may at once be stated that, in this case, shot-firing can be removed from the list of suspects, as blasting was only carried out at week-ends. The explosion appears to have been strictly limited in its effect, so that had it not been for the outbreak of fire before the rescue parties could reach the working faces, it is probable that accurate data would even now be in the possession of the experts. This malignant fire seems to have selected a site of all the most unfortunate, effectually barring entrance to a wide network of workings beyond; it does appear, indeed, that after we arrive at the point when it is possible to control the dynamic consequences of an explosion, we have still an even more potent enemy in fire. In every disaster of recent years—Whitehaven, Hulton, Cadeby Main and Cadder—the fire element has been predominant. This seems to indicate the absolute necessity of preventing the initial ignition, instead of setting dubious traps to ensnare the explosive wave after it has started on its errand of death. Further, it is becoming increasingly obvious that if the trained rescue brigade is to fulfil its natural function, it must be better equipped for dealing with the fire peril. In this way, experience is once more bringing us back to original intentions.

#### Trade Summary.

The London coal trade for the past week has been very quiet. The impetus given to the house coal trade by the colder weather has to a large extent evaporated, and the regular contract supplies are coming forward sufficient to satisfy all the current needs. The depot trade is slow, and the general public are ordering very sparsely just now. Factory coals are steady, but slacks and small nuts are over-plentiful, and prices are very weak. The seaborne market continues well supplied, but, so far, all the vessels arriving in the Thames are under contract. Bakers' nuts and kitcheners cobbles are fairly firm. Coke is difficult to sell.

The market at Newcastle continues strong. Loading turns are congested, and colliery order books are full. Steam coals are dearer. Coking coals and smalls are less, but foundry coke has risen appreciably in price.

Best Durham steam and gas coals are scarce, but secondary sorts and smalls are easy. House coals are quiet.

The Lancashire coal trade is quiet and steam coal is only in moderate demand. Slack is plentiful.

The demand in West Yorkshire is fairly good, there being a firm call for secondary steam coals for export. The immediate enquiry for house coals is satisfactory.

In South Yorkshire steam coals continue active. Small coals are better, and the demand for house coals is good. Coke is still dull.

The pressure for Derbyshire house coal, and steam coals generally continue in

The market at Cardiff shows little change, and the tonnage situation is more satisfactory. There are good enquiries for small coals, but current business is rather sluggish. Monmouthshire coals are depressed. Rhondda bituminous coals are slightly easier.

The Scottish coal trade is scarcely so strong, owing mainly to traffic difficulties and the shortage of tonnage.

#### OBITUARY.

The death occurred at his residence, Llanfrehfa Grange, near Newport (Mon.), on Saturday, after a long illness, of Mr. Frank Johnstone Mitchell, F.G.S., F.S.A., brother-in-law of the late Lord Llangattock. In 1853 deceased became one of the partners of the Dos Nailworks. Afterwards he was chairman of Messrs. J. J. Cordes and Co. Limited, but he retired from business when the present company took over the works 10 years ago.

Mr. Edward Holden died at his home, Park-avenue, Southport, on the 11th inst. He was chairman of the directors of the West Lancashire Railway (which ran between Southport and Preston) until it was acquired by the Lancashire and Yorkshire Railway Company.

The death is announced of the Right Hon. James Stuart, Privy Councillor. Born in 1843, James Stuart, whose father owned the Balgonie Ironworks, went first to the University of St. Andrews, and afterwards to Cambridge, where, in 1875, he became first Professor of Applied Mechanics.

The death has occurred of Mr. T. Frame Thomson, the well-known civil engineer. Deceased was chairman of the Otis Steel Company of America.

The death took place recently at his residence, Main-street, Frizington, of Mr. A. Wright, a well-known Cumberland mine manager. The deceased, who was 55 years of age, came to Frizington in his eighteenth year, and since then he had been engaged in the principal mines in the district. He was manager of the New Parkside Mines, under Messrs. Walker and Peile, and when it stopped he became engaged at Lonsdale mines, and since that time he acted as deputy under Mr. T. Williams, being held in the highest esteem by both the management and the employees.

The death has occurred at Hyrst House, Batley, of Mr. Robert Illingworth Critchley, head of the firm of James Critchley and Sons Limited, Batley, and of the West End Collieries, Batley, two concerns which were founded by his father. Mr. Critchley was also a director of the Soothill Wood Colliery Company Limited, a director of the Mirfield Gas Company, a director of the Calder and Hebble Navigation Company, vice-chairman of the Yorkshire Guarantee and Securities Corporation, and closely identified with several other business interests. He was the oldest magistrate in the heavy woollen district, had been a member of the Dewsbury Town Council and of several educational authorities. Mr. Critchley had been in ill-health for a number of years. He was 77 years of age, and leaves one married daughter.

#### CONTINENTAL MINING NOTES.

##### France.

According to the report of M. Leprince-Ringuet, the boring undertaken at Port-sur-Seille, Lorraine, with which a start was made in 1911, has reached the coal measures at 712 metres and has been discontinued at a depth of 1,066 metres. The coal measures are sharply inclined, and no seam of coal has been encountered. An ascertainment of temperature was made at 1,044 metres of 55.8 degs., a figure surpassing all previous ascertainment at the same depth.

##### Germany.

*Official Coal Prices on the Düsseldorf Exchange.*—Gas and open-burning coals: Through-and-through, 12.25 to 13.25 marks per ton. Bituminous coals: Through-and-through 12 to 12.75 marks, best mixed 13 to 13.50 marks, coking coals 13.25 to 14 marks. Lean coals: Through-and-through 11.25 to 12.75 marks, best mixed 13.25 to 14.75 marks, anthracite nuts II. 22 to 22 marks. Coke: Foundry coke 19 to 21 marks, blast-furnace coke 16.50 to 18.50 marks, broken coke I. and II. 21 to 24 marks. Briquettes, 11.50 to 15 marks.

*Coal Market in Upper Silesia.*—The September traffic returns show an increase of about 35,500 wagons over the corresponding month last year, bringing the total increase up to nearly 62,000 wagons for the nine months. The demand is increasing progressively, and cannot be fully satisfied. The pits find difficulty in obtaining a sufficient amount of labour, and therefore the output is retarded, and customers complain all the time of delays in delivery. Stocks are practically non-existent, though they would be very useful just now. All grades of fuel are well sought after, especially industrial and house coals. The export trade is also active, Russian-Poland suffering from a scarcity of coal which this district cannot supply fully, owing to the requirements of the home market. The same applies equally to Austria-Hungary, gas and coking coals being particularly scarce.

*Coal Market in South Germany.*—The continued mild weather has an adverse influence on the house coal trade, so that autumn business is delayed, more particularly since

retailers are taking only just as much as they can dispose of direct. Broken coke III. is the only sort in really active request, and, as the supply is short, deliveries are getting into arrear. Industrial coals are also going off slowly, business being quiet in many branches, and consumers therefore averse to increasing their stocks. The river traffic is hampered by fog and low water, and stocks at the transshipment harbours are not very large.

*Ruhr Coal Market.*—The situation remains unaltered, the volume of traffic being still large and the supply of railway wagons sufficient up to the present. Waterborne traffic has been somewhat impeded by the low state of the river, but the stocks already existing in South Germany are sufficient to prevent inconvenience. On the whole, business is not bad, but the prospects of improvement are not very bright in view of the present high output. The iron industry continues depressed, and this reacts on the demand for fuel, especially coking coals. The export trade affords a welcome outlet, which relieves the tension in the home market, though the Belgian iron industry seems in a bad way, and consequently is not an active buyer of coal. In other markets, however, the demand continues heavy, and there is little competition by English coals, the difference in price being too high. The coke market is unsatisfactory, the production being out of proportion to the actual consumption.

#### LABOUR AND WAGES.

##### North of England.

In accordance with the terms of the Mines (Minimum Wage) Act, under which, after sufficient notice, the owners or the men's representatives can be heard on the question of minimum rates of wages after the Act has been in operation for 12 months, a meeting of the coalowners of Northumberland and the men's representatives was held on Tuesday at the Coal Trade Office, Newcastle, under the presidency of Lord Mersey, the chairman of the Northumberland Joint District Board. The men made application for an advance all round in the minimum rates of pay. The cases for the hewers, deputies and enginemmen were put before his lordship by Mr. Wm. Straker, Mr. S. Couthard and Mr. Weighall respectively. In each case the application was to raise the minimum from 5s. 6d. to 6s. 6d. per day. It is understood that Lord Mersey will give his award within three weeks and at the same time submit his decisions on the rules, on which subject the conference sat a few weeks ago.

A joint meeting of the Cleveland mineowners and miners' representatives was held in Middlesbrough on Monday to discuss the question of wages for the ensuing quarter. The chairman (Sir Hugh Bell, Bart.) pointed out that the ascertained price of Cleveland pig iron for the past quarter was 57s. 8.08d. per ton, as against 63s. 7.51d. for the preceding quarter. According to the formula adopted for many years past, the employers were entitled, under the reduced price, to claim a reduction in wages of 8½ per cent. The deputation promised to put the claim before the men in the district, and a further meeting was fixed for the 27th inst.

##### Federated Area.

The question of surfacemen's wages in Lancashire and Cheshire collieries was further discussed at a joint meeting of representatives of the Lancashire and Cheshire Coal Association and of the Lancashire and Cheshire Miners' Federation held on Tuesday in the Queen's Hotel, Manchester. The employers will report to the Lancashire and Cheshire Coal Association, and a further conference may be held.

Some of the men employed at the Orgreave Colliery, near Treeton, handed in their notices on the 10th inst. The notices will take effect in a fortnight's time, but it is hoped that in the meantime the difficulty—one affecting the allowance for "dirt" brought up with the coal—will be settled, as at the present moment the matter in dispute is in the hands of two of the Yorkshire Miners' Association officials at Barnsley.

A dispute respecting working conditions has arisen at the Westhoughton Coal and Cannel Company's Collieries, near Bolton, whereby 360 men are affected. The trouble arose over the demands of 26 men employed in the Yard mine, they contending that, owing to the extension of the workings, they have to draw their coal an unreasonable distance, and ask that a penny per ton extra shall be paid on the field rate for every 50 yards or fractional part thereof which coal has to be drawn over 200 yards, and that they shall be paid for all "fast sides." The company offers to pay on all coal drawn over 250 yards, and to pay for one "fast side." This offer the men have refused, and have decided to send in notices terminating their contracts. There are 280 men employed at the Westhoughton Colliery, and 80 at the Starkie pit. They will be supported by the Federation.

##### Scotland.

Once again the services of Lord Balfour of Burleigh are to be given to the Scottish coalmasters and miners in connection with the claim by the former for a reduction of 18½ per cent. from the 1888 basis rates. The present wage is 7s. 6d. per day, and the demand represents 9d. per day or thereby. It was arranged on Monday that the meeting of the Coal Conciliation Board will take place on Monday the 20th inst. at Edinburgh.

A meeting of the executive council of the Scottish Colliery Enginemmen and Boilermakers' Association was held on Saturday at Glasgow. It was agreed that an active campaign be begun to secure an eight hours day.



## Iron, Steel, and Engineering Trades.

At the quarterly meeting of the Cleveland and Durham Blastfurnacemen's Association, held at Middlesbrough, it was stated by Mr. T. McKenna, the general secretary, that they now had 6,670 members, the highest figure they had ever reached. The non-unionist was practically non-existent at the blastfurnace and coke oven plants in the Cleveland and Durham districts. An application which had been made to the Cleveland Ironmasters' Association asking that the rate paid to adult able-bodied non-scale labourers at the blastfurnaces and coke ovens should be increased to 4s. a shift had not been conceded. The secretary was directed to apply for an interview to discuss a claim of 4d. a day advance on the base rate of sliding-scale labourers. It was decided that the association should urge the National Federation of Blastfurnacemen to join the new Iron and Steel Trades Federation.

Serious trouble is brewing in the iron trade on the West Coast. Concerted action is being taken by the blastfurnacemen in the district to enforce a demand upon the ironmasters for the payment of time and a quarter for Sunday work. The masters, on the other hand, have pointed out that in no district is the standard upon which the sliding scale regulating wages is based so high as on the West Coast. The firms affected by the dispute are the Workington Iron and Steel Company, with 10 furnaces in blast; Distington, Cleator Moor, and North Lonsdale, with two furnaces each; Barrow, with five; Millom, with three; and Carnforth, one.

## COAL SMOKE ABATEMENT.

A conference on the above was held recently in connection with the National Gas Exhibition at Shepherd's Bush. Sir W. H. Bennett read a paper on coal fires as a cause of fog, and their waste in health and money. Dealing with the extravagance and waste entailed in the use of coal for domestic fires, he said in the ordinary open coal fire not more than 25 per cent. at the most of the heat units was utilised in warming the room. There was, therefore, an immediate loss of 75 per cent. (three-quarters) of the heating power of the fuel consumed. In the same way, there was an immediate loss of between six and seven per cent. of the actual fuel in the form of soot thrown off with the smoke—so that, assuming the amount of coal used in this country to be 35 million tons, or thereabouts for domestic purposes, the actual loss could hardly be less than £2,000,000 annually. It was estimated, he continued, that in London something like 200,000 tons of sulphur were poured out into the atmosphere in the course of a single year. A rather sensational statement had recently been made by Mr. C. E. Green to the effect that there was a distinct relation between the occurrence of cancer and the kind of fuel used for domestic purposes. His investigations seemed to establish a clear relationship between the incidence of cancer in the districts covered by the researches and the sulphur content of the fuel used. Should these results be confirmed in other quarters, they would form a terrible indictment of coal as ordinary fuel which would require the most serious consideration. If smoke was to be greatly diminished or abolished, the only means at present for obtaining heat for domestic purposes were oil, gas, and electricity. Dealing with the relative advantages and costs, he came to the conclusion that the most perfect system for an ordinary house would probably be provided by the use of electricity for lighting, gas being employed for all purposes of heating. Prof. Vivian B. Lewes dealt with the gas industry in relation to smoke abatement. He added figures to show that only one-fifth of the heat units in the coal were utilised in the domestic grate, and the enormously higher efficiency of the gas stove reduced the difference in cost between coal and gas to a point at which the economies obtained by the use of gas far outweigh the slight extra expense. Dealing with the use of coke as a smoke preventive, he said the limits of economical gas production were being rapidly approached. The gas companies should adopt some more elastic systems of carbonisation, so that by chamber carbonisation they might make a true hard coke for metallurgical and power generators, so increasing the local market in that direction, whilst at the same time adopting lower temperature carbonisation to fill the domestic market with a soft coke containing 3 per cent. of volatile matter. It was on these lines that the gas companies would solve the great question of the purification of our town air. Mr. F. W. Goodenough, controller of the Gas Light and Coke Company, took exception to the statement that the limits of economical gas production were being rapidly approached. That anticipation was not shared by those responsible for the gas lighting of London. They were helping to solve the smoke problem by popularising the use of coke by working people. A paper by Sir William Richmond, entitled "A Curse of Civilisation," was also read. His remedy was to put a tax on smoke. Dr. A. H. des Vœux read a paper on the "Coal Smoke Abatement Society," showing how great an improvement it had effected in the atmosphere of the Metropolis, and telling how its work had been taken up.

## THE IRISH COAL TRADE

THURSDAY, OCTOBER 16.

## Dublin.

Although there are hopes of an early settlement of the labour disputes, the shipping in the port continues to be seriously affected, and notably so in the case of the coal vessels, some of the steamers held up now being eight weeks out of service and some with cargoes still undischarged. The canal harbours are also congested with boats, owing to the men still being out, and deliveries to the country districts are greatly interrupted. A noticeable increase has taken place in deliveries of coal in the city and suburbs during the past week, both by merchants' own carts and motor lorries, the prices charged for best house coal (as delivered by the latter), being about 30s. per ton. Ordinary prices ruling are about 28s. per ton for Orrell, Abram 27s., Wigan 25s. per ton delivered, steam coals from 22s. to 23s. per ton, coke 23s. per ton, delivered in the

city. With regard to some of the coal boats lying up at the quays, the owners are now making their own arrangements to have the cargoes discharged. In addition to the orders now being booked, merchants have still a number previously received awaiting fulfilment. The number of coaling vessels arriving during the past week amounted to 29, as compared with 28 the week previously, chiefly from Point of Aire, Garston, Newport, Glasgow, Preston, Ayr, West Bank, Partington and Manchester. The total quantity of coal discharged upon the quays was 11,166 tons.

## Belfast.

Business, both locally and inland, shows a marked improvement, prices for the latter being firmer, although there have been no advances in the city as yet. Quotations are as follow:—Giant's Hall Arley coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Rates for steam coals ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton. Cargoes arriving during the week were chiefly from Ayr, Glasgow, Maryport, Garston, Partington, Preston, Ardrossan, Ellesmere Port, Troon, Girvan, Workington, Sharpness and Manchester. From September 14 to October 4, the total number of colliers entering the harbour was 180.

## THE LONDON COAL TRADE.

THURSDAY, OCTOBER 16.

The London coal trade for the past week has been quiet. The weather, however, has been cooler, but the increase in the consumption has not been sufficient yet to warrant any appreciable difference in the buying. The contract quantities are coming forward regularly, and the merchants are contenting themselves largely with these consignments, as they fully meet the public demand, and the retail trade is very slow. Factors have bought a little more freely, but only when the prices have been very favourable. Prices are held firmly just now by all colliery representatives, but the practical outcome of it all is that very few orders on the market are obtainable. Outside London, however, and in the provinces the demand is distinctly favourable, and the continued activity in the shipping trade is keeping the pits working fully. The seaborne market also shows a little more activity. Prices are recorded the same, viz., 21s. 6d. best Wallsend, 20s. 6d. seconds. Thirty-six vessels arrived in the Thames for Monday's market, and 15 for Wednesday's, but as all were sold under contract, the prices returned are largely nominal. Manufacturing qualities are steady, with the exception of small coal and slacks. These continue to be over-abundant, and as the various factories are full of stock, the current quotations are very uneven and lower prices are given. The Continental trade is reported as very depressed, and for both coal and iron the demand is considerably curtailed. The question of the supply of railway wagons is becoming daily a more acute problem. So many of the collieries are suffering from the want of empties, and it is found that the principal railway companies have been obliged to withdraw very large numbers of their wagons from the mineral traffic in order to cope with the extra demand for carriage of market and farm produce and other goods and merchandise. The large number of wagons standing loaded at the principal centres has also added to the difficulty of empties. The dealings in house coal are very moderate, and coke prices are exceedingly weak. The British Coalite Company has been under discussion for reorganisation. The first mortgage debentures remain untouched, but a new issue of 6 per cent. debentures will be created. The ordinary share capital it is proposed to reduce from £721,000 to £103,000 at 10 per cent. dividend, and the deferred shares from £500,000 to £183,000 at 8 per cent. dividend.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal	13/	13/
Do. nuts	12/	12/
Birley cube Silkstone	12/6	12/6
Do. branch coal	16/	16/
Do. seconds	11/	11/
Barnsley Bed Silkstone	13/6	13/6
West Riding Silkstone	13/	13/
Kiveton Park Hazel	13/	13/
Do. cobbles	13/	13/
Do. nuts	12/	12/
Do. hard steam	12/	12/
New Sharlston Wallsend	15/	15/
Wharfedale Silkstone coal (cubes)	14/6	14/6
Do. Flockton Main	15/6	15/6
Do. Athersley house coal	12/	12/
Newton Chambers best Silkstone	17/	17/
Do. Grange best Silkstone	15/6	15/6
Do. Hesley Silkstone	14/	14/
Do. Rockingham selected	14/	14/
Do. Rockingham Silkstone	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best	12/6	12/6
Do. large nuts	12/3	12/3
Do. small nuts	10/	10/
Do. kitchen coal	10/6	10/6
West Hallam Kilburn brights	12/6	12/6
Do. do. nuts	12/3	12/3
Do. London brights	11/	11/
Do. bright nuts	11/	11/
Do. small nuts	10/	10/
Manners Kilburn brights	12/6	12/6
Do. do. nuts	12/	12/
Shipley do. brights	13/	13/
Do. do. nuts	12/6	12/6
Mapperley brights	12/6	12/6
Do. hard steam	11/6	11/6
Cossall Kilburn brights	12/6	12/6
Do. do. nuts	12/	12/
Trowell Moor brights	12/6	12/6
Do. do. nuts	12/	12/
Grassmoor Main coal	13/	13/
Do. Tupton	11/6	11/6
Do. do. nuts	11/6	11/6

## Derbyshire—(cont.).

Clay Cross Main coal	13/	13/
Do. do. cubes	13/	13/
Do. special Derbys	12/	12/
Do. house coal	11/6	11/6
Pilsley best blackshale	13/	13/
Do. deep house coal	11/6	11/6
Do. hard screened cobbles	11/	11/
Hardwick best Silkstone	13/	13/
Do. Cavendish brights	12/6	12/6
Do. cubes	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards	12/6	12/6
Do. small hards	12/6	12/6
Do. deep large steam	12/	12/
Annesley best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Linby best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Digby London brights	13/	13/
Do. cobbles	13/	13/
Do. top hards	13/	13/
Do. High Hazel coal	14/6	14/6
Bestwood hard steam coal	13/	13/
Do. bright cobbles	11/9	11/9
Hucknall Torkard main hards	12/9	12/9
Do. do. cobbles	11/3	11/3
Do. do. nuts	11/	11/
Do. do. High Hazel H.P.	14/9	14/9
Do. do. London brights	12/3	12/3
Do. do. large nuts	12/3	12/3
Do. do. bright nuts	11/3	11/3
Sherwood H.P. hards	12/6	12/6
Do. hard steam	11/6	11/6
Do. brights	11/3	11/3
Do. cobbles	11/3	11/3
Do. large nuts	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal	11/	11/
Do. screened cobbles	11/6	11/6
Do. bakers' nuts	11/3	11/3
Do. loco Two Yard hards	14/6	14/6
Do. Ryder nuts	11/9	11/9
Do. do. cobbles	13/	13/
Nuneaton steam coal	11/	11/
Do. screened cobbles	11/6	11/6
Do. nuts	11/3	11/3
Haunchwood steam	11/	11/
Do. screened cobbles	11/6	11/6
Do. nuts	11/3	11/3
Wyken steam coal	11/	11/
Do. screened cobbles	11/6	11/6
Do. nuts	11/3	11/3
Exhall Ell coal spires	14/3	14/3
Do. brights	12/6	12/6
Do. large steam coal	12/	12/
Do. best screened cobbles	12/3	12/3
Do. large nuts	12/3	12/3
<b>Leicestershire.</b>		
Snibston steam	10/	10/
Do. cobbles	10/6	10/6
Do. nuts	10/6	10/6
South Leicester steam	10/	10/
Do. cobbles or small hards	10/6	10/6
Do. nuts	10/6	10/6
Whitwick steam	10/	10/
Do. roasters	10/6	10/6
Do. cobbles	10/6	10/6
Do. nuts	10/6	10/6
Netherseal hards	18/	18/
Do. Eureka	12/6	12/6
Do. kitchen	10/6	10/6
Ibstock kibbles	9/9	9/9
Do. large nuts	9/6	9/6
Do. bakers' nuts	9/	9/
Do. Main nuts	9/6	9/6
Do. hards	9/3	9/3
Granville New Pit cobbles	11/	11/
Do. Old Pit cobbles	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best	13/	13/
Sneyd best, selected	14/6	14/6
Do. deeps	14/	14/
Silverdale best	14/	14/
Do. cobbles	13/	13/
Apedale best	13/	13/
Do. seconds	12/9	12/9
Podmore Hall best	13/	13/
Do. seconds	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London	11/	11/
Do. brights	11/	11/
Do. shallow one way	11/6	11/6
Do. deep nuts	11/6	11/6
Cannock steam	10/9	10/9
Coppico deep coal	14/6	14/6
Do. cobbles	14/	14/
Do. one way	12/	12/
Do. shallow coal	13/6	13/6
Cannock Chase deep main	16/	16/
Do. Deep kitchen cobbles	11/6	11/6
Do. best shallow main	13/	13/
Do. shallow kibbles	13/6	13/6
Do. best brights	13/	13/
Do. yard cobbles	13/6	13/6
Do. yard nuts	12/6	12/6
Do. bakers' nuts	10/3	10/3
Do. screened hards	11/9	11/9

## From Messrs. Dinham, Fawcett and Co.'s Report.

Friday, October 10.—The seaborne house coal market was without alteration to-day, but a little better enquiry was noticeable. No Durham or Yorkshire cargoes on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 17.

Monday, October 13.—There was a moderate enquiry for seaborne house coal to-day, but no cargoes pressing for sale. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 17.

Wednesday, October 15.—The seaborne house coal market was very quiet to-day, with no cargoes reported sold. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 15.



## COLLIERY ACCIDENTS.

## Senghenydd.

At the Universal Colliery, Senghenydd, owned by the Lewis-Merthyr Consolidated Collieries Limited, of which Lord Merthyr of Senghenydd is chairman, a terrible explosion occurred at 8.30 a.m. on Tuesday. So terrible was the force that the sheaves at the downcast pit top were smashed and the huge galvanised roofing overhead hurled off the structure. The senior banksman was actually decapitated, and his assistant was very seriously injured. The cage was projected out of the shaft, which is known as the Lancaster pit, with the force of a cannon. As the whole of the day-shift, numbering nearly a thousand, were at work at the time, the utmost consternation reigned.

The Universal Colliery is one of seven owned by the company and is situated in the Aber Valley, an offshoot on the western side of the Rhymney Valley. The pits are worked exclusively for the production of steam coal for the Admiralty and employ about 2,200 men. The colliery has already been the scene of a serious explosion, 81 lives having been lost from that cause on May 24, 1901.

Steps were taken at once to organise rescue parties, and the men working in the Six-foot and Nine-foot seams in the east district, which is a separate ventilating district, their number being 489, were quickly removed by the York Pit. In the meantime trained brigades from all parts of the coalfield arrived as well as officials from all the neighbouring collieries, including Messrs. Leonard Llewellyn, T. Griffiths, F. Gregory, H. Jenkins, John Rees, Howell Jones, David Hannah, A. Brown, Hugh Bramwell, David James, A. Edwards, T. H. Deakin, and Col. Pearson, H.M. inspector of mines.

Immediately after the accident, the general manager, Mr. Edward Shaw, went at the head of a rescue party, for which there were many volunteers, to the bottom of the shaft. A hundred yards away, on the main haulage road in the next district, he found a fire blazing and barring further progress. Mr. Shaw, however, rushed into the midst of the smoke and fumes, the better to carry on his work of succour, and when he came out he could not see. He lost the use of his sight for the greater part of the day.

At 2.30 p.m. an official report was issued by Mr. Shaw, in which he stated that there was a fire to the west of the downcast pit bottom and no workmen had yet been brought out from the west side workings. Efforts were being concentrated on the extinction of the fire. A further report was issued at 8.30 p.m., stating that the fire was then well under control. Shortly before Mr. R. A. S. Redmayne, H.M. Chief Inspector of Mines, Dr. W. N. Atkinson, H.M. Chief Inspector of Mines for the South Wales Division, Col. Pearson, Mr. Clem. Edwards, M.P., and Mr. Watts Morgan, miners' agent, went down the mine, remaining below about half-an-hour. On his return, Col. Pearson said that considerable progress had been made, but work was much hampered by falls. There was then thought to be some hope of saving some of the men. The work of fighting the fire in the main intake was greatly hampered by the scarcity of water, whilst the smoke and heat were intense. Further, the demolition of the cages in the downcast prevented the raising of debris to bank. Both water and fire extinguishers were used to combat the fire, on the other side of which were over 400 men.

Eighteen men were found alive, in the early hours of Wednesday morning, in the Britannic district of the colliery; 42 dead bodies were also recovered. Soon after midnight the underground fire in the main intake had been brought under sufficient control to enable the members of the rescue brigades to proceed to the nearest working place. The fire had not been entirely suppressed, and the air was still so foul as to make it too dangerous for any but men equipped with the Meco and Draeger breathing apparatus to enter far into the workings. These trained workmen belonged to the Crumlin (Monmouthshire), New Tredegar (Rhymney Valley), and the Porth (Rhondda Valley) rescue stations, and were under the command of instructors J. H. Thorne, Sergeant Wimborne, and J. M. Kitto.

The pit is divided into five main ventilating districts, viz.:—The East, from which the men were recovered on Tuesday; the "Ladysmith" or No. 2, comprising the workings on the north; No. 3, comprising the workings on the west in two separate areas, known respectively as the "Kimberley" and "Mafeking" districts; the "Pretoria" or No. 4, containing the workings on the south-west; and No. 5, the Six-foot workings on the extreme south-west. The first of the districts to be explored by the rescuers was that known as the East Mafeking (Britannic) district. There were two means of access, one through a by-road on the left side of the main intake, some 70 or 80 yards distant from the bottom of the Lancaster or downcast shaft, and the other by a circuitous way from the main east road. Till nearly midnight on Tuesday night fire, smoke, and falls blocked the entrance from the main intake, and the heat and foul air the access from the east. The success which had attended the efforts of the rescuers employed in the suppression of the fire and the fall in the main intake had by that time diminished considerably the dangers of the by-road, and it was in that direction that the rescue workings were entered through an opening made some weeks ago. The entrance was not far from the bottom of the shaft, and the rescuers were wearing Draeger or Meco appliances,

but by men carrying canaries and lamps. The air had been temporarily cleared by a reversal of current. Here they came across both live and dead. The other dead and living were discovered in the No. 1 North and York East districts, the living numbering 18 and the dead six. Four bodies were not far from the bottom of the York shaft; they were those of men working in the off district, and apparently were coming back when overcome. Mr. Hubert Jenkins, the miners' agent for the district and a member of the executive council of the South Wales Miners' Federation, stated:—"We have been into that part of the workings whence they brought out the bodies last night. We had to cross over a big fall. We also went into the east side of the pit and found everything in its normal condition. We then proceeded towards a heading connecting the east with the west, and here we were informed they had found several bodies in the 4ft. seam. This led in the direction of the Britannic district. There were no dead bodies there, and practically the whole of the district was in good condition. Our main object was to take dimensions of the airway, Mr. Redmayne being very anxious to get them, and the evidence we obtained was indisputable as to the accuracy of its dimensions." After two o'clock bodies were brought out of the pit at intervals of from five to ten minutes. They were found in the York East, York West, and Mafeking districts. Those discovered nearer to the shaft had to all appearances struggled desperately for their lives. In one instance a man was found with his lamp still burning. One young man was eating his breakfast in a manhole at the time of the explosion. The bread he was eating was torn from his hand by the blast, sparks flew past him, but he was virtually unhurt. He remained in his manhole until help came.

During Wednesday morning the gangs of rescuers succeeded in isolating the fire, and parties were able to get round it by other roads and work behind it. Further progress, however, was barred by falls and afterdamp. As the day wore on the efforts to subdue the fire proved unavailing.

On Wednesday night the Home Secretary visited the mine. During his stay he had a conference with the colliery owners and managers and the miners' agents of the district, and it was decided that, in order to improve the ventilation in the western workings, a staple should be cut through on the east side and the workings pierced at a point beyond the fire zone. At nightfall, however, the operations had to be temporarily abandoned and all hope of further rescues was given up.

During Thursday no further discoveries were made. Owing to the continual recrudescence of the fire, work below ground was seriously interrupted, and was attended at all times with great difficulty. A heavy fall was discovered some 600 yards up the main intake, and attempts will be made to isolate this by means of sand stoppings. In order to provide an efficient supply of water, 2 in. mains were led from the reservoir on the surface down the upcast. At the same time it was decided that an effort should be made to reach the area, at present inaccessible, by means of the Britannic district from which the 18 men were rescued on Wednesday morning. There is no question at present of flooding the mine.

The official figures are as follow:—Descended, 935; rescued from eastern workings, 489; rescued from western workings, 18; dead bodies recovered, 55, including the banksman and a rescuer killed by a fall of timber; unaccounted for, 379—giving a total death-roll of 434.

The following telegram was sent immediately after the accident by the King to Dr. W. N. Atkinson, H.M. inspector of mines in charge of the South Wales district:—

"The Queen and I are appalled at the news of the terrible disaster which occurred this morning in the Universal Colliery at Senghenydd, in Glamorganshire, and are all the more shocked, having visited that district only last year. We trust that the loss of life may not be so great as was at first anticipated. We deeply sympathise with the families who have lost their dear ones, and will be grateful for any particulars regarding the condition of the injured. GEORGE R.I."

Funds have already been opened by the Lords Mayor of Cardiff and London for the relief of the dependants. Amongst the first contributions were £500 from H.M. the King, £1,500 from the Marquis of Bute, £1,050 each from Messrs. Guest, Keen, and Nettlefolds, the Lewis-Merthyr Colliery Company, and the trustees of the Hulton Relief Fund, and £250 from Powell's Tillery Colliery Company. A committee that has been appointed for the purpose has already investigated the cases of 305 men, and it has been found that 204 widows and 390 children are dependent upon them; it is probable, therefore, that the full list of dependants will exceed 900. The colliery company have advanced £10 to the relatives of each dead or missing person to tide them over immediate difficulties.

The Graigola Merthyr Company Limited, of Swansea and Paris, opened a branch office at 23, Leadenhall-street, London, on the 1st inst., for the sale of their well-known smokeless coals and patent fuel "Locomotive Brand," in conjunction with Messrs. Cleaves and Co., of 23, Lime-street, London, E.C., who have been their agents for some years past, and will continue so. The Graigola coals, being produced in large, cobbles, hand-picked nuts, and bean sizes, are particularly adapted for the Welsh coal trade in London.

## THE BY-PRODUCTS TRADE.

*Tar Products.*—Things are rather quiet generally. It is true both pitch and benzols continue to hold their own well, but naphthas are quiet, and creosote is inclined to be easier. Carbolic also have not held to their position as well as might have been looked for. Nearest values are:—

Benzols, 90's .....	1/1½
Do. 50's .....	1/0½
Do. 90's North .....	1/1
Do. 50's North .....	1/1½
Toluol .....	1/10½
Carbolic acid, crude (60 per cent.) .....	1/2 to 1/3
Do. crystals (40 per cent.) .....	4½
Solvent naphtha (as in quality and package) ...	9½
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	2½
Pitch (f.o.b. east coast) .....	44/6 to 45/
Do. (f.a.s. west coast) .....	43/ to 44/6
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

*Sulphate of Ammonia.*—The recent improvement is fairly well maintained, and prices are moving in favour of sellers. For forward makers' ideas are naturally firm. The open weather should assist the propagandising work at present in progress to bear fruit, especially if the price of nitrate of soda does not fall too rapidly. Closing prompt prices are:—

London (ordinary makes) .....	£12/11/3
Beckton (certain terms) .....	—
Liverpool .....	£13/10
Hull .....	£13/6/3
Middlesbrough .....	£13/7/6
Scotch ports .....	£13/13/9 to £13/15
Nitrate of soda (ordinary) per cwt. ...	10/9

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

## THE TIN-PLATE TRADE.

## Liverpool.

The tone of the market continues very unsatisfactory. Business is exceedingly quiet, and the outlook as gloomy as it well can be. Prices, however, remain pretty much about the same, makers, one and all, declaring that current rates do not leave them any margin of profit at all. The figures quoted below are about what works are quoting just now for shipment over the next two or three months. Coke tinplates: I C 14 × 20 (112 sh. 108 lb.), 13s. to 13s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 3d. to 26s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 6d. to 13s. 7½d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 6d. to 13s. 7½d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 6d. to 13s. 7½d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. 3d. to 19s. 6d. per box; I C squares and odd sizes, 13s. 6d. basis for approved specifications. Charcoal tins are in quiet demand at 15s. 3d. basis and upwards according to tinning. Coke wasters are in quiet but steady request. Quotations:—C W 14 × 20, 12s. 3d. to 12s. 4½d. per box; C W 28 × 20, 25s. 3d. to 25s. 6d. per box; C W 14 × 18½, 11s. 1½d. to 11s. 3d. per box; C W 20 × 10, 15s. 9d. to 16s. 3d. per box—all f.o.b. Wales, less 4 per cent.

Robinson (J. H.) and Co. (Liverpool) Limited.—This private company has been registered, with a capital of £12,000 in £1 shares (6,000 preference and 6,000 ordinary), to acquire the business carried on at 74, North Hill-street, Liverpool, under the style of "J. H. Robinson and Co.," and to carry on the business of mechanical engineers, tool makers, iron and brass founders, metal workers, metal-lurgists and electrical engineers, &c.; also to enter into an agreement with Joseph Henry Robinson. First directors: J. H. Robinson (governing director), and Sandford Robinson, both of 74, North Hill-street, Liverpool.

Rescue Training in Scotland.—Mr. William Adamson, M.P., speaking at a demonstration of Red Cross and mining rescue work, given in Dunfermline recently, said that the necessity for ambulance work was quite apparent when they considered that about 1½ million persons were more or less seriously injured annually, in Great Britain, and that about 17,000 persons died annually from accidents. In the mining industry alone 500 men and boys were more or less seriously injured every working day, and four deaths from accident occurred every working day in the mines. Modern legislation had embodied in an Act of Parliament—the Coal Mines Act, 1911—a provision insisting upon ambulance appliances and training and rescue appliances and training. At Cowdenbeath they had a completely equipped rescue station, which, to the credit of the coalowners of that part of the country, was built and equipped prior to the law making such provision compulsory. One of the largest coal companies was also building and equipping an auxiliary station, and 60 brigades had been trained and were ready in case of emergency to take the opportunity of engaging in rescue work in a scientific manner. He trusted that the time was not far distant when the law would compel employers of labour, particularly those engaging men in dangerous occupations, to provide and maintain ambulance appliances and to train a certain number of their workpeople in ambulance knowledge.



## MIDLAND COUNTIES INSTITUTION OF ENGINEERS.

### Annual Meeting at Nottingham.

The annual meeting of the Midland Counties Institution of Engineers was held at the University College, Nottingham, on Saturday last, under the presidency of Mr. W. H. HEPPLEWHITE, H.M. inspector of mines, Tanworth.

The SECRETARY (Mr. G. A. Lewis) announced the election of the following.—Members: Hubert Barnes, engineer, Broad Oaks Ironworks, Chesterfield; Wilfrid Bertram Creswick, mining engineer, Heath, Wakefield; W. H. McMillan, B.Sc., professor of mining, University College, Nottingham; Arthur Egbert Spear, colliery manager, The Elms, Brislington, Bristol; Frank Tatham, colliery manager, Coleorton Colliery, Ashby-de-la-Zouch. Student: Henry Havelock Vallancey, mining student, The Main, Walsgrave, near Coventry.

### Annual Report.

Mr. Lewis then read the annual report, which stated that a larger number of members was elected during the past year than for several preceding years. There are now 376 members, including 257 full members, nine

there would be no difficulty in obtaining the full amount within the next 12 months.

Mr. J. MEIN (South Normanton) urged upon the members to do their utmost to secure a Royal Charter, to which he considered that, as the older institution, they had a prior claim.

The PRESIDENT moved and Mr. B. McLAREN (Pye Hill) seconded the adoption of the annual report and accounts, the resolution being carried unanimously.

### Election of Officers.

The scrutineers reported that the ballot for the election of officers for the ensuing year had resulted as follows:—President, W. H. Hepplewhite; vice-presidents, J. W. Fryar, Major R. P. Leach, H. E. Mitton, D. N. Turner, G. S. Bragge and R. H. F. Hepplewhite; councillors, P. Beaumont, H. O. Bishop, E. E. Bramall, F. Chambers, T. G. Lees, B. McLaren, W. E. Walker, J. Bingley, R. W. Cuthbertson, R. H. Ferens, J. Mein and G. Spencer; *ex-officio* members of the council for ensuing year, J. A. Longden, W. Spencer, M. H. Mills, W. D. Holford, Maurice Deacon, W. B. M. Jackson, W. G. Phillips, G. J. Binns, W. Hay, J. Piggsford, J. P. Houfton, C. R. Hewitt and G. H. Fowler.

it but what a practical ordinary working colliery manager could understand, and it laid down no hard and fast rules, which were sometimes impossible of execution. He was one of those who were afraid that when Mr. Nelson was appointed he would be purely theoretical and irksome, but he was greatly surprised to discover that he was one of the most practical electricians they had in the country.

The PRESIDENT observed that the paper was not one likely to cause much discussion, but they would find that the hints given as to what to avoid and what to adopt were most useful.

### Self-contained Breathing Apparatus and Colliery Recovery.

A discussion followed on Mr. J. R. L. ALLOTT's paper on "The Reopening of Norton Colliery with Self-contained Breathing Apparatus after an Explosion."

The PRESIDENT said that it was a remarkable thing that the explosion took place when no one was in the mine, no electricity left on, and no gob fires were known. The only other instance he could remember was an explosion during a week-end at a colliery in the vicinity of Chesterfield. In that case the fan had been slowed



GENERAL VIEW OF THE UNIVERSAL COLLIERY, SENGHENYDD, FOLLOWING THE EXPLOSION, OCTOBER 14, 1913.

[Photo., Topical Press.]

associate members, 48 associates, and 42 students. The financial position of the institution shows considerable improvement, there being a bank balance of £442 14s. 2d.

Mr. Lewis reported that the proportion due from them towards the capital fund now being raised in connection with the Institution of Mining Engineers was £1,500, and he had been able to report that day to the council that £1,000 had been already promised.

Mr. P. STRZELECKI (assistant secretary of the Federation Institution) said that the expenses in London were from £400 to £500 a year more than at Newcastle-on-Tyne, and it was felt that it was not a satisfactory arrangement to ask the local institutions to provide the amount of the deficiency. Each had its own work to do, and in the case of the North of England Institution he knew that certain investigations had had to be delayed because of the want of money, due to the large amount they had had to contribute to the Federated Institution. Of the total sum aimed at, he believed that about two-thirds, or £10,000, had been promised; so that excellent progress had been made since the proposal was launched. It seemed to him that

Major LEACH (Tibshelf) moved a vote of thanks to Mr. Hepplewhite for the way in which he had fulfilled his duties as president during the past year, and the resolution was heartily adopted.

Mr. HEPPLEWHITE acknowledged the vote of thanks, and also expressed his obligations to the members for having elected him for a second term. One of the least satisfactory features of last year had been the dearth of papers read. Perhaps it was because they had had a good deal of Government literature, which had taken a little digesting, and had occupied a good deal of their time; but now they had got the Special Rules, he hoped that they had come nearly to the end of that stream of literature, and that they would be able to devote a little time to the preparation of papers for that institution.

### Electricity for Colliery Managers.

A short discussion took place on Mr. ROBERT NELSON's "Short Paper Addressed to Colliery Managers," on the subject of electricity.

Mr. J. MEIN said that Mr. Nelson's contribution was one of the best little papers on the subject that he had ever had the pleasure of reading. There was nothing in

down for repairs, and the electric pump stopped. No one was in the mine, but on the fan and pump being restarted a very serious explosion occurred. The cause in that case was traced to the fusing of wires. At Norton Hill it was not known how the explosion originated, and not one of the various theories suggested by Mr. Allott seemed to furnish a quite satisfactory explanation.

Mr. G. A. LEWIS confessed that he was one of those who had not thought much of self-contained breathing apparatus as a means of saving life; but at a colliery with which he was connected in Warwickshire they had an underground fire, as a result of which practically half the pit had to be cut off. They obtained a squad of men and the necessary apparatus from Lancashire, and they were enabled to recover the pitmouths before they could have done it by any other means—if, indeed, they could have done it at all. This experience had altered his views very considerably as to the value of this apparatus under such conditions. He might add that they had now their own apparatus at the colliery.

Mr. P. BEAUMONT (Church Gresley) said that, like Mr. Lewis, he had been very doubtful about the value of



apparatus, and for saving life he still had his but for the purpose of recovering a mine or mining any particular district, then undoubtedly it had proved to be very effective. He was much struck with the precise and accurate report which the first squad were able to bring after only 25 minutes underground. The method adopted to recover the mine was an extremely clever one. With regard to the gas supplied to the men while at work, he did not believe that the time was far distant when the breathing apparatus would be fitted with some arrangement to give a man the amount of oxygen the work demanded and no more. Dr. Haldane gave some useful illustrations of the consumption of gas under different conditions of work, and it struck him (the speaker) that there was a field for improvement in a device regulating automatically the amount of gas to the needs of the man.

#### Underground Fires.

The next paper for consideration was one on "Underground Fires," by Mr. H. ROWAN.

The PRESIDENT said that this subject had interested them for many years, but its importance had increased since the Doncaster district began to be developed.

Mr. P. BEAUMONT said that the paper brought forward many statements which some of them might be inclined to object to rather strongly. He recalled that when sinking a shaft some time ago through an old goaf which had been subject to fires, they passed through the section of an old wall made of tempered clay. It was evident that it had been put there about the middle of the last century, during the period when timber was used, just as it came off the trees, because the prop was there with its branches on. It must have been considerably before 1840, and with a knowledge of the nature of the seam extreme care was taken to prevent any out-breaks of fire. Still, within about two months—nine weeks, he thought, was the exact time—fire broke out in the shaft. It was an upcast shaft and the fire had obtained a good hold and was in full blaze before communication could be established with the downcast shaft. Although some 200 yards of heading had to be cut off, the question of ventilation did not raise any serious difficulty, while, of course, the position of the fire in the shaft was very different from tackling one at the coal face, because water could easily be poured down the shaft and soon extinguish the flames. All the shaft side had to be cut out, an area of 12 or 14 feet taken away, and carefully re-stowed. They came across many traces of former fire there in doing so. To say that hot mines were almost the only mines where gob fires might be expected was a hold statement. Gob fires were met with at temperatures which could not be considered hot. Mr. Rowan also stated that the apparent cause on several occasions where heating took place was the grinding of subsiding strata on the small pillars which had been left. He (Mr. Beaumont) did not agree with that. He considered that no amount of grinding would produce a gob-fire. It might give rise to a state of affairs which would produce a gob-fire, but he did not think that the grinding action of strata would be of itself sufficient to cause a gob-fire. They had not, in their part of the country, met any cases where it had actually caused a fire, but instances had been come across where the coal underneath had been crushed by the grinding, and so exposed a larger area to the oxidation of the air, and so started a gob-stink. With regard to the use of water at high pressure, he (the speaker) believed they would think twice before they put water on a fire that was all hot, because in that case the water would be a source of danger. Mr. Rowan went on to remark that building a wall and claying it over had at times been successful, but success could only be expected if the strata overlying the waste had come to rest. They did not in that part of the country get gob-fires with a roof entirely in a state of rest, because they usually occurred in a moving face or in solid coal.

The PRESIDENT described the outbreak of a fire in a bolthole in a Yorkshire colliery near the main haulage road. It was in the solid coal which had been untouched for 20 years. It seemed, however, that they had put down a different kind of haulage, main-and-tail being substituted for endless haulage, and his conclusion was that the increased rapidity in the running of the tubs had sucked the air out of the crevices and so caused the fire.

This concluded the meeting.

#### The Annual Dinner.

Following the meeting, a dinner (which it is hoped to make an annual one) was held at the Royal Victoria Hotel, London. Mr. HEPPLEWHITE presided, and the company included Principal Heaton, Messrs. W. Hay, J. Piggford, C. R. Hewitt, C. Fowler, B. McLaren, P. Beaumont,

T. G. Lees, E. E. Bramall, D. Bayley, J. Mein, G. Spencer, G. A. Lewis, P. Strzelecki, C. W. Dickinson, R. Laverick, W. Maurice, R. F. Percy, H. Stevenson, &c.

#### THE TAXATION OF MINES.

The 56th report of the Commissioners of H.M. Inland Revenue for the year ended March 31, 1913, contains an account of the administration of the various duties upon land values imposed by Part I. of the Finance (1909-10) Act, 1910, as well as the amounts collected as income-tax, estate duty, &c.

##### Increment Value Duty.

The annual increment value duty is not chargeable in respect of minerals which were, on April 30, 1909, either comprised in a mining lease or being worked by the proprietor, so long as the minerals continue to be so leased or worked; consequently hardly any cases of liability to this duty can arise in the first years of the operation of the Act. The following table shows the amount of duty paid to March 31, 1913:—

Year.	Paid on or before March 31, 1912.	Paid in year ended March 31, 1913.	Total paid to March 31, 1913.
	£	£	£
1910-11.....	3	7	10
1911-12.....	—	179	179
1912-13.....	—	552	552
Total .....	3	738	741

Of the total paid last year, £505 was paid in England and Wales, and £233 in Scotland. In the three years there have been 50 assessments of a total amount of £1,045, the figures for last year being 21 and £757 respectively.

##### Mineral Rights Duty.

Reference was made in the last report to certain legal questions which, at the time of writing, prevented the collection or the discharge of a considerable amount of outstanding duty, and the ascertainment of figures showing the yield of the tax. These questions were still unsettled at the close of the year under review, and consequently no progress could be made towards disposing of the outstanding sums. The principal matters in dispute were, however, the subject of decisions in the Court of Appeal on May 7, 1913 (Duke of Beaufort v. Commissioners of Inland Revenue and Marquis of Anglesey v. Commissioners of Inland Revenue) and, unless a further appeal to the House of Lords should be taken, the Commissioners anticipate that a close approximation to the final yield of this tax for the years 1909-10 to 1912-13 will shortly become available.

The following table gives particulars of the assessments made for each of the four years 1909-10, 1910-11, 1911-12 and 1912-13, and particulars of the duty actually collected to March 31, 1913:—

NUMBER OF ASSESSMENTS AND AMOUNT OF DUTY ASSESSED.					
	Assessed on or before March 31, 1912.		Assessed in year ended March 31, 1912.		Total
	No.	Amt. £	No.	Amt. £	
1909-10—					
England and Wales .....	8,667	284,587	165	941	8,832
Scotland .....	1,413	52,806	4	10	1,417
Gt. Britain .....	10,080	337,393	169	951	10,249
1910-11—					
England and Wales .....	8,640	283,998	255	1,553	8,895
Scotland .....	1,456	52,525	27	73	1,483
Gt. Britain .....	10,096	336,523	282	1,626	10,378
1911-12—					
England and Wales .....	8,404	277,052	470	7,699	8,874
Scotland .....	1,131	48,833	100	897	1,231
Gt. Britain .....	9,535	325,885	570	8,596	10,105
1912-13—					
England and Wales .....	—	—	—	8,315	236,823
Scotland .....	—	—	—	1,450	39,061
Gt. Britain .....	—	—	—	9,765	275,884

The reduction in the amount of duty assessed for the year 1912-13 as compared with previous years, is due in part to the fact that the statistics are incomplete, certain assessments not having been made until after the close of the year, and in part to (a) a reduction in amounts returned for assessment owing to the loss of mineral royalties during the coal strike of 1912, and (b) a similar reduction due to the assessments being based on the net rents and royalties after deduction of income tax instead of on the gross rents as in previous years. This latter deduction, which was made in consequence of the decision of the High Court in the case of the Duke of Beaufort v. the Commissioners of Inland Revenue (since confirmed in the Court of Appeal), will be permanent in character, and with income tax at 1s. 2d. in the pound, will adversely affect the yield of mineral rights duty to the extent of about 6 per cent. per annum. Considerable repayments of tax overpaid for the years 1909-10, 1910-11 and 1911-12 will also be made during the year 1913-1914.

The following shows the amount of duty paid to March 31, 1913:—

Year.	Paid on or before March 31, 1912.	Paid in year ended March 31, 1913.			Total paid to March 31, 1913.
	Great Britain. £	England & Wales. £	Scotland. £	Great Britain. £	Great Britain. £
1909-10...	320,195 ...	1,465 ...	457 ...	1,922 ...	322,117
1910-11...	321,911 ...	2,713 ...	355 ...	3,068 ...	324,979
1911-12...	298,982 ...	18,762 ...	2,983 ...	21,745 ...	320,727
1912-13...	—	218,148 ...	28,516 ...	246,664 ...	246,664

The difference between the aggregate amount of duty assessed shown in the first tables and the amount of duty paid shown in the foregoing table, is made up of—

(a) Adjustments made as the result of claims for allowances, &c., received or allowed after issue of the notices of assessment.

(b) Amounts the subject of correspondence or appeal at the end of the year, including amounts standing over pending the decision of certain legal questions mentioned above.

(c) Arrears not collected by the end of the year.

The Commissioners have in recent years based their annual statistics of income-tax and inhabited house duty assessments on the figures relating to assessments made during the 12 months covered by the year under review. They have followed the same practice as regards increment value duty and reversion duty (which are not annual duties and have no reference to particular years of assessment), and propose to introduce it in regard to the mineral rights duty, the assessment of which is now proceeding normally, leaving the undeveloped land duty to be similarly treated as soon as the assessment of that duty has reached a normal condition.

In Ireland the amount of mineral rights duty paid in the four years was as follows:—1909-10, £499; 1910-11, £470; 1911-12, £510; 1912-13, £432. Last year the number of assessments was 217 the amount being £518.

##### Estate Duty.

Under the above heading analyses are given of capital values brought under notice in the course of administration of the Acts relating to the estate duty. The figures have been arranged in such a manner as to indicate as nearly as possible the relative capital values of the several kinds of property contributing to the duty, whether in lump sums or in yearly or half-yearly instalments.

From these statistics it appears that in 1912-13 property in mines, minerals and quarries, subject to duty, had a total gross capital value of £1,201,122, covering 149 properties; the deduction therefrom amounted to £98,789, or 8.23 per cent., leaving the net capital value £1,102,333. The following shows the gross capital value in each year:—1902-03, £758,554; 1903-04, £581,175; 1904-05, £1,017,158; 1905-06, £1,381,361; 1906-07, £1,501,298; 1907-08, £1,358,437; 1908-09, £469,749; 1909-10, £477,866; 1910-11, £607,319; 1911-12, £872,863; 1912-13, £1,201,122.

##### Income Tax.

The total assessment of gross income under Schedule D in respect of coalmines for 1911-12 was as follows:—Metropolis, £1,004; Rest of England, £16,401,229; Scotland, £1,936,728; Ireland, £8,748—total, £18,347,709. The gross assessments on profits of coal and other mines in the United Kingdom for each year have been as follows:—1902-03, £20,253,907; 1903-04, £21,194,470; 1904-05, £21,235,729; 1905-06, £19,999,972; 1906-07, £16,371,678; 1907-08\*, £16,400,000; 1908-09, £16,614,322; 1909-10†, £18,460,036; 1910-11†, £19,342,747; 1911-12, £19,680,637. The assessments made in each year represent the average of the profits of the preceding five years.

The following table distinguishes the counties in which the more important assessments on the profits of coal mines were made in the year 1911-12:—

County.	Amount. £	County.	Amount. £
Cumberland .....	119,144	York .....	2,343,780
Derby .....	1,086,697	Brecon .....	100,119
Durham .....	3,170,676	Carmarthen .....	198,913
Lancaster .....	1,894,188	Glamorgan .....	3,627,510
Leicester .....	129,879	Ayr .....	121,935
Monmouth .....	818,997	Edinburgh .....	130,304
Northumberland .....	977,144	Fife .....	730,599
Nottingham .....	471,400	Lanark .....	616,362
Stafford .....	710,941	Stirling .....	122,341
Warwick .....	329,797	Other counties .....	646,983

Total .....

The gross assessments on profits of ironworks in the United Kingdom in each year have been:—1902-03, £4,020,621; 1903-04, £3,414,896; 1904-05, £3,134,867; 1905-06, £2,683,637; 1906-07, £3,030,532; 1907-08, £4,500,000; 1908-09, £5,101,350; 1909-10,† £3,850,141; 1910-11,† £3,233,472; 1911-12, £3,429,170. Broadly speaking, the figures may be said to include the profits of that section of the iron trade which is concerned with the smelting of the ore, whether such profits arise solely

\* Estimate for the full year.

† Net produce lower, owing to the delay in passing the Finance Bill.



from smelting or from smelting carried on conjointly with other industries. The assessments are made on the basis of the profits of the preceding year.

The following judicial decisions may be noted during the year:—

*Bonner v. Bassett Mines Limited.*—One of the main pit shafts in a section of a tin mine constituted the main outlet for a large area. This shaft—a vertical one—had been sunk about 260 fathoms below the adit, which was 20 fathoms below the surface; but as the available ore in this section had become practically exhausted and could no longer be worked to advantage, the company sank the shaft some 50 fathoms further down. Such extension, together with the old portion, was used as a ventilating shaft, and as a centre from which levels and roads could be cut for the purpose of discovering lodes or pockets of ore at a level below those portions of the mine which had been wholly or partially exhausted, and also for the purpose of raising and lowering men and materials, but not for the purpose of winning ore from a vertical lode. Twenty-one fathoms of the new portion of the shaft were sunk in 1908 and 29 in 1909, at a total cost of £2,940. The company claimed, in ascertaining the amount of their profits for assessment, to deduct the said sum; and on appeal to the Commissioners for the General Purposes of the Income Tax, the deduction was allowed, the Commissioners being of opinion that the expenditure was proper working cost, and that the sum in question could not be properly dealt with as capital. It was held, on December 5, 1912, by Mr. Justice Horridge, in the King's Bench Division that there was no evidence to support the finding by the Commissioners, that the expenditure was capital expenditure and not working expenditure, and that the company were in effect opening up a new mine, and accordingly that the deduction was not permissible.

*Darngavil Coal Company Limited v. Francis.*—The appellant company, in order to obtain wagons for the purposes of their business, entered into agreements with a wagon company for the supply of wagons, and bound and obliged themselves and their successors to pay a certain sum quarterly during the respective periods of the agreements as rent or hire for the use of the wagons. Instead of delivering up the wagons to the wagon company at the expiration of the terms, the appellant company had the option of purchasing the same at the price of 1s. for each wagon. In the appellant company's accounts, the whole of the annual payments paid under the agreements were treated as an expense of carrying on the business, and were debited to the wagon revenue account. No portion of the payments was debited to capital, and there was no asset in the appellant company's balance-sheet in respect of the wagons to which the agreements referred. In their returns for income-tax assessment the appellant company divided the payments between revenue and capital, and deducted as a trading expense that portion only of the annual payments which the wagon company certified had been treated by them as revenue, and had entered into the computation of their profits for income-tax assessment. It was held, on January 31, 1913, by the First Division of the Court of Session in Scotland, that in ascertaining the profits of the appellant company for the purpose of income-tax, deduction was allowable in respect of that portion of the yearly payments which represented the consideration paid by the appellant company for the use of the wagons, but not in respect of that portion which represented the consideration paid for the option to purchase.

*Lochgelly Iron and Coal Co. Limited v. Crawford.*—The appellant company was a member of a coalowners' association which consisted of 13 collieries. The association was originally purely mutual, voluntary, and informal, possessing no rules, regulations, or constitution of any kind, and had no legal power to recover payment of any levy from its members. The appellants, together with the other members of the association, subsequently adopted certain rules and regulations, which were embodied in a deed of agreement. From this deed, which became operative as from January 1, 1912, it appeared that the objects of the association were to provide mutual protection to its members in matters affecting their general interests, and to indemnify members for loss of output in case of a strike, or restriction of output on the part of workmen. The appellants claimed deduction from the amount of the assessment of certain contributions made by them to the association, which were debited in the profit and loss accounts of the appellants, and which represented levies made by the association upon the appellants. The levies were expended *inter alia* (1) in defraying the expenses of the Conciliation Board (Scotland), (2) in paying subscriptions to the Mining Association of Great Britain, and (3) in experimenting with coaldust with a view to preventing explosions in mines. It was

held on March 18, 1913, by the First Division of the Court of Session in Scotland that in ascertaining the amount of the appellant company's profits assessable to income tax, the levies so far as they were applied in defraying the expenses of the Conciliation Board were admissible as a deduction, but so far as applied to the other two purposes were not admissible as deductions.

## INDIAN AND COLONIAL NOTES.

### India.

*The Shortage of Rolling Stock.*—At a recent meeting of the committee of the Indian Mining Association it was pointed out that the Railway Administration Report for 1912 revealed the fact that 311 wagons only had been added to the East Indian Railway's rolling stock during the year 1912. At the meeting held on February 12, 1912, which was attended by the late Sir William Dring, and the present general traffic and coal managers of the East Indian Railway, it was there stated that the East Indian Railway had sanction for 1,000 wagons to be put on the line during the coming financial year. In reply to a question as to whether the wagons were to replace worn-out stock, or were to be an actual addition to the rolling stock, Sir William Dring is reported then to have replied that they would be an actual addition. He also stated that about 450 of the wagons were being put together and would be running shortly.

### Africa.

*Shortage of Rolling Stock.*—The South African Railways Administration has been generally blamed for its short-sighted policy in cutting down the estimates for coal wagons, and at the Coronation Colliery meeting Mr. Alexander Aitken, who presided, had some trenchant remarks to make concerning the attitude of the Railway Administration towards the coal industry. He declared that the nascent trade with the East through the Delagoa Bay had been dislocated, and was liable to be cut off through the failure of the association to deliver as required, and, further, the colliery had lost more than a month's work out of the 12. Nothing short of action in Parliament would stir the Railway Board to a sense of their duty and to successful activity. The suggestion was made that the Coalowners' Association should publish periodically the number of working hours lost by the collieries through shortage of trucks. Over a year ago, says the *South African Mining Journal*, Mr. Gordon Sandilands, acting on behalf of the Coalowners' Association, laid before the Chamber a lengthy document, in the course of which he stated that the total loss of working hours far exceeded the total number of working hours of any single pit during the current month, assuming 25 working days of 10 hours. The aggregate monetary loss entailed upon collieries was greater than if a single colliery were entirely closed down for a month, because during intermittent stoppages of work natives had to be paid whether they were working or idle. The Administration had, he said, failed to supply the association with its estimated requirements of trucks since April 9, 1912. In addition, a strongly-worded statement on behalf of the Victoria Falls and Transvaal Power Company Limited and the Rand Mines Power Supply Company Limited, regarding shortage of trucks for dealing with the coal traffic on the South African railways in the Transvaal, was received by the Chamber of Mines. These statements were laid before the Minister of Railways by the Chamber of Mines, which, at the same time, pointed out that within the 12 months difficulties had arisen in the transport of coal over the railway system on at least two occasions to such an extent as to cause the great risk of milling operations on the goldmines being curtailed owing to short supplies of coal trucks, thereby entailing great loss to the goldmining industry and the community at large. In July of last year a deputation from the Chamber met the general manager of railways and pressed for an amelioration of the conditions. The general manager admitted that there was a shortage of rolling stock, but expressed the hope that the position would be shortly improved. Notwithstanding the fact that the tension was removed and relief was temporarily afforded, difficulties again rose at the end of the year, and a good deal of correspondence passed between the Victoria Falls and Transvaal Power Company and the general manager in regard to shortage of trucks. Apparently, says our contemporary, it is futile to criticise the South African Railways, because its very size and unwieldy bulk render it impossible to fix or fairly distribute the blame.

*Coal in Southern Nigeria.*—A colonial report on Southern Nigeria contains a report on the results of the mineral survey of that place in 1911 by Prof. Wyndham R. Dunstan, director of the Imperial Institute. Details are given both of field work in Southern Nigeria and of the investigation, at the institute, of the mineral specimens collected by the surveyors. During the period under review, the surveyors were principally engaged in examining the Udi-Okana coalfield. A large number of new outcrops were discovered, and the preliminary work showed that the field was large. The coal appeared to be of fairly uniform quality. Prof. Dunstan says: "It is a sub-bituminous coal, similar in type to coals which are now largely mined in North America for

industrial purposes. There can be no question that in the Udi-Okana coalfield Southern Nigeria possesses an asset of great value for the further development of transport and industry in West Africa."

### Australia

*New South Wales Mining Laws.*—The Coal Mines Regulation (Amending) Bill, 1913, proposes to amend the consolidated Act of 1912 in some important respects. After defining the explosives permitted to be used, it provides for the appointment of certificated deputies in all mines required to be under the control of a certificated manager, or in which safety lamps are used, or which are dry and dusty. Deputies must be at least 23 years of age and have had at least five years' practical experience in mining, and must show that they can accurately test inflammable gas. It is proposed to permit the holder of an ordinary engine-driver's certificate to take charge of a hauling engine on a plane or road at any mine. Colliery owners are to furnish corrected plans from time to time. Managers are to allow a representative of the men to inspect a place where any accident has occurred, and provision is made for notification of minor accidents to machinery, &c. When wages are paid on quantity of coal produced, the coal is to be weighed before screening. There are other provisions bringing the Act into conformity with the British Act. The restriction hitherto placed on mining engineers acting as inspectors on behalf of the men is removed. The Mines Inspection (Amendment) Bill, 1913, amends the Mines Inspection Act, 1901. The Mining (Amendment) Bill, 1913, is designed to remove certain anomalies that experience in administering the Act of 1906 has shown to exist. Provision is also made for further facilitating prospecting operations on both Crown and private lands. All Crown lands, leases (other than pastoral leases), homestead and irrigation farms, and suburban holdings are made private lands for the purposes of the Act.

*Coal Trade of the Philippines.*—The New South Wales Premier has received from Mr. F. B. Sutton a report giving particulars of the Philippine Coal Consumers' Association. The report states that the object of the formation of the Philippine Coal Consumers' Association, which is composed of the Government of the Philippine Islands, Manila Electric Railroad and Light Company, Manila Railroad Company and the Philippine Railway Company, was for the purpose of purchasing fuel in large quantities in the open market at a lower unit cost than it could be purchased by any of the individual members separately; to ensure constant and regular shipments of coal; to reduce handling charges; and to employ a manager and fuel expert, whose duties will not only be to recommend the purchase of certain kinds and quantities of coal, but also to advise the consumers thereof the best methods whereby the highest efficiency in combustion can be obtained, and to supervise the inspection and analysis of such coals purchased, the distribution, stevedoring, &c. At the present time the association contemplates the purchase of about 137,000 tons of coal, as follows:—

	Tons.
Government of the Philippine Islands .....	36,000
Manila Railroad Company .....	35,000
Manila Electric Railroad and Light Company...	40,000
Philippine Railway Company .....	10,000
Compania General de Tabacos de Filipinas.....	16,000

The organisation of the association is the result of the exhaustive investigations and report of Mr. E. Randolph Hix, as coal expert for the Government, who is now on a visit to the coalmines of China, Manchuria, and Japan, to take the preliminary steps for the placing of the 1914 orders; 25,000 or 30,000 tons of coal will be purchased to tide over the deficiencies for the present year, and steaming and chemical tests of coal which have not heretofore been tried, will be made.

*The Fuel Question.*—At a meeting of the Association of Automobile Engineers on Wednesday, Mr. J. S. Critchley, the president, gave an address on "The Fuel Question." Referring to petrol, he said it was about the most expensive fuel that could be employed commercially for power production. It was expected that 100,000,000 gallons would be consumed in Great Britain during the current year. The employment of benzol was a question which had come very much to the front during the past year, and it was stated that by the end of 1915 some 70,000,000 gallons would be produced each year. Before the question of the suitability of alcohol as a fuel could be fully decided, a tremendous amount of research work would be necessary, and he thought it useless to contend that alcohol could be made at a competitive price from potatoes or beet in this country. If the motorists of this country were serious in endeavouring to provide a fuel of unlimited quantities and not subject to market fluctuations, they should devise a scheme to solve the alcohol problem. He would suggest that the whole question of fuel supply should be taken in hand by a body of expert with a large sum of money to carry out research work so as to decide matters now in doubt which could only be proved by trials and experiments of a costly nature. The solution of the difficulty affected every inhabitant in this country.



## IMPROVED SAFETY LAMPS FOR MINES.\*

(Continued from page 737.)

## Teale's "Protector" Lamp, No. 1.

This lamp, the general design of which is shown in fig. 21, is a double-gauze, flame, spirit lamp, with air-feed through vertical holes in the middle ring. It consists of the following essential parts:—

(1.) *Bonnet or Shield*, of riveted steel, with a separate securely riveted crown, furnished with outlet holes immediately below the crown, provided that the bottom of the holes shall not be less than  $\frac{3}{16}$  in. above the top of the outer gauze. Fitted or not with a deflector, with or without a baffle ring.

(2.) *Middle Ring* of brass, steel or iron, riveted to bonnet, and provided with vertical air-inlet holes of total area not exceeding 1.1 square inches. The inner flange, prolonged or not, to form a baffle ring.

*Pillars*, of brass, steel or iron, five, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Outside Bottom* of brass, steel or iron, carrying the locks.

(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with flametight, double-folded lap seams, with or without a metal liner, formed to fit flanges of the inner and outer base rings, the gauzes being so secured to the base rings by punch indentations, or by being riveted or spun on, or by being gripped between the rings which are screwed together, as to make secure and flametight joints.

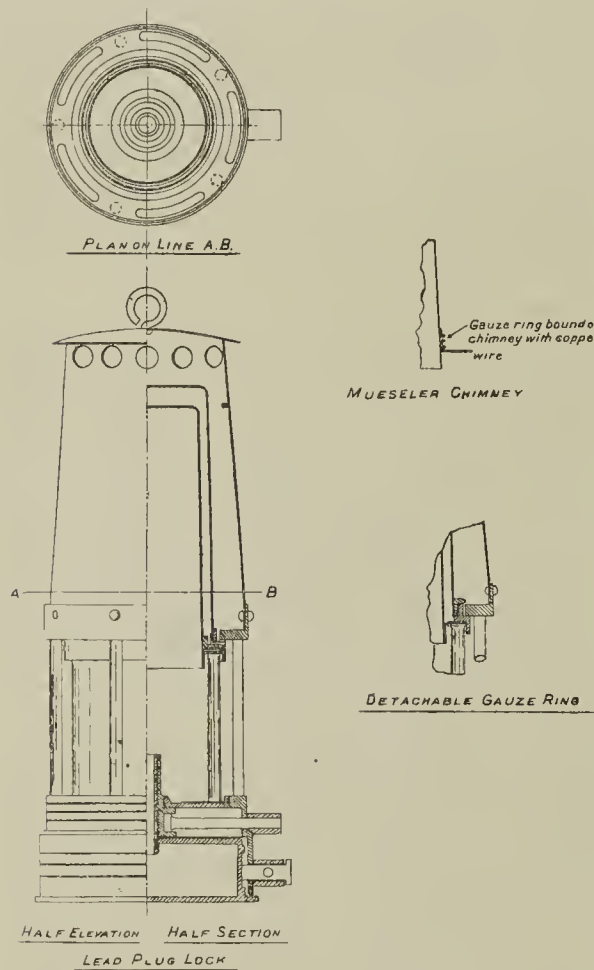


FIG. 21.—TEALE'S "PROTECTOR" NO. 1 LAMP.  
(Teale and Co.)

The arrangement of the gauzes is one of the arrangements shown in figs. 21, 22 and 23, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without a gauze.

Internal dimensions.	Inner gauze.	Outer gauze.
Height to shoulder of base ring .....	$3\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.	$4\frac{1}{8}$ in. $\pm \frac{1}{8}$ in.
Diameter at top .....	$1\frac{1}{16}$ in. $\pm \frac{1}{8}$ in.	$1\frac{1}{8}$ in. $\pm \frac{1}{8}$ in.
Diameter at bottom .....	$1\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.	$2\frac{1}{8}$ in. $\pm \frac{1}{8}$ in.

There is provision for the use of a Mueseler chimney with the same dimensions as in the case of the Rothwell lamp.

(4.) *Glass*, of an approved type, furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring; furnished also or not with additional loose brass glass rings.

External diameter .....	60 mm. $\left\{ \begin{array}{l} +0 \text{ mm.} \\ -1 \text{ mm.} \end{array} \right.$
Height .....	60 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	60-60

Provided that the lamp may also be made to take glasses of the following dimensions:—

External diameter .....	60 mm. $\left\{ \begin{array}{l} +0 \text{ mm.} \\ -1 \text{ mm.} \end{array} \right.$
Height .....	57 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	60-57

or— External diameter .....	$58\frac{1}{2}$ mm. $\left\{ \begin{array}{l} +0 \text{ mm.} \\ -1 \text{ mm.} \end{array} \right.$
Height .....	60 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	$58\frac{1}{2}$ -60

(5.) *Glass Retaining Ring*, of brass, screw-threaded externally to fit in the "outside bottom" and internally to take

(6.) *A Brass Extinguisher* recessed to fit a locking bolt held by a flat spring which retains the extinguisher in position. The extinguisher is screw-threaded internally to take the burner.

(7.) *Oil Vessel*.—A casting of brass, with burner securely screwed and soldered in, and a brass or iron

bottom securely soldered on; of capacity sufficient to provide the required light for the required time, as specified.

The burner takes a wick of about  $\frac{1}{4}$  in. diameter. The spirit vessel is capable of being unscrewed, when the lamp is locked, to an extent sufficient for the adjustment of the wick, but not sufficient to impair the safety of the lamp.

(8.) *Locking Device*.—One or other of the following:—

- A magnetic lock of the type shown in fig. 22.
- A lead-rivet lock of the type shown in fig. 21.

The lamp must have been made by Messrs. W. E. Teale and Co. Limited, at their Sindsley Works at Swinton, near Manchester.

## Teale's "Protector" Lamp, No. 2.

This lamp, the general design of which is shown in fig. 22, is a modification of Teale's "Protector" Lamp, No. 1. It is a double-gauze, flame, spirit lamp, with air-feed through vertical holes in the bonnet ring, and consists of the following essential parts:—

(1.) *Bonnet and Bonnet Ring*, of riveted steel, with a separate securely riveted crown. It is of the "screw-off" type, and is riveted to a brass bonnet ring which fits the pillar ring, and is locked thereto by means of a sliding pillar, kept in position by the oil vessel; the bonnet ring is provided with vertical air-inlet holes of total area not exceeding 1.1 square inches.

(2.) *Middle or Pillar Ring* of brass, steel or iron, provided with vertical and horizontal air-inlet holes.

*Pillars*, of brass, steel or iron, five (one sliding), so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

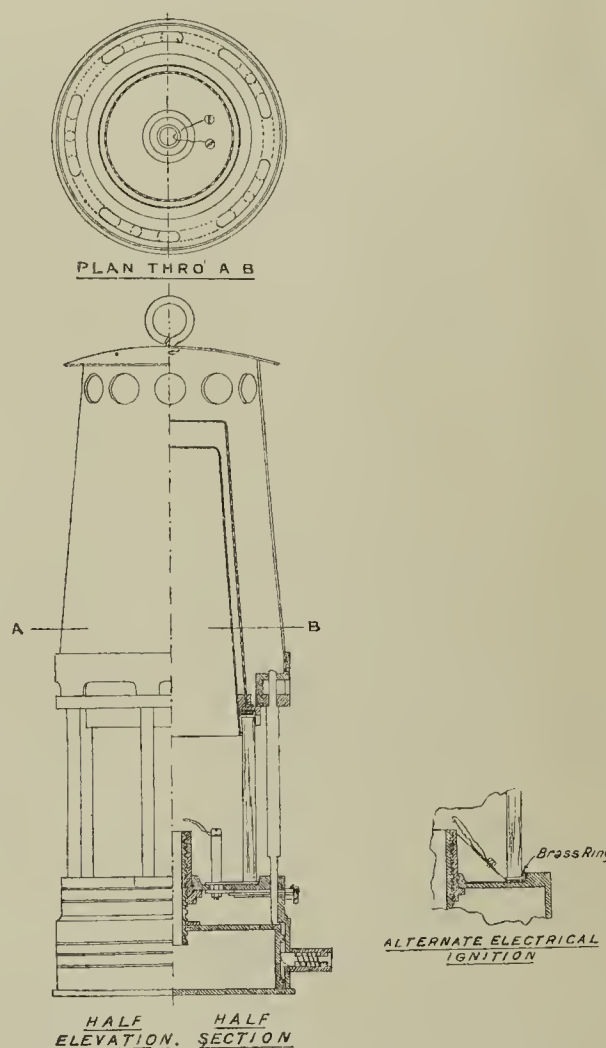


FIG. 22.—"TEALE'S" "PROTECTOR" NO. 2 LAMP.  
(Teale and Co.)

*Outside Bottom*, of brass, with a fixed glass plate fitted with an extinguisher, which is screw-threaded to take the burner; furnished or not with an electric igniter of either of the types shown in fig. 22, so fitted as not to cause the lamp to be dangerous in an explosive atmosphere.

(3.) The particulars as to *Gauzes* are similar to those in the case of the No. 1 lamp, and there is also the same provision for the use of a Mueseler chimney.

(4.) The requirements as to *Glass* are also similar.

(5.) *Spirit Vessel*.—A casting of brass, with burner securely screwed and soldered in, and a bottom securely soldered on, the vessel being of capacity sufficient to provide the required light for the required time, as specified. The burner takes a wick of about  $\frac{1}{4}$  in. diameter. The spirit vessel is capable of being unscrewed when the lamp is locked, to an extent sufficient to allow for the adjusting of the wick, but not sufficient to impair the safety of the lamp.

(6.) *Locking Devices*.—These are similar.

Messrs. W. E. Teale and Co.'s Standard Bonneted Marsaut Lamp No. 4.

This lamp, the general design of which is shown in fig. 23, is a modification of Teale's "Protector" lamp, No. 1. It is a flame, oil lamp, with air-feed through vertical holes in the middle ring. It consists of the following essential parts:—

(1.) *Bonnet or Shield* of riveted steel with a separate securely riveted crown, or of seamless steel, the bonnet and crown being in one piece. Furnished with outlet holes immediately below the crown: provided that the bottom of the holes shall not be less than  $\frac{3}{16}$  in. above the top of the outer gauze. Fitted or not with a deflector, with or without a baffle ring.

(2.) *Middle Ring* of brass, steel or iron, riveted to bonnet and provided with vertical air inlet holes of total area not exceeding 1.1 square inches. The inner flange prolonged or not to form a baffle ring.

*Pillars*, of brass, steel or iron, five, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom Ring* of brass, steel or iron.

(3.) The particulars as to *Gauzes* are similar, with the exception that the diameter of inner gauze is to be  $1\frac{1}{8}$  in. ( $\pm \frac{1}{8}$  in.) and that of outer gauze  $1\frac{1}{2}$  in. ( $\pm \frac{1}{8}$  in.).

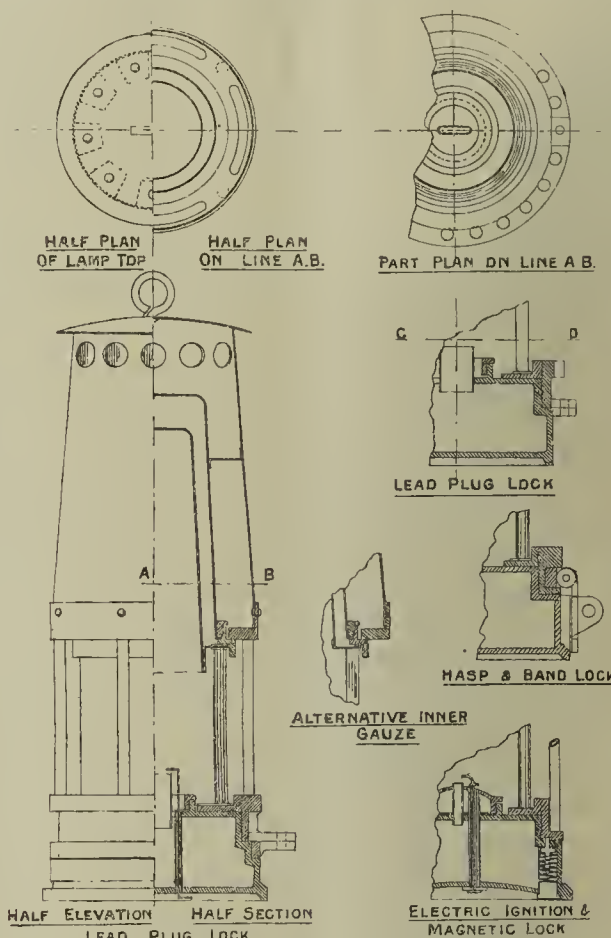


FIG. 23.—STANDARD BONNETED MARSAUT LAMP, NO. 4.  
(Teale and Co.)

There is the same provision for the use of a Mueseler chimney.

(4.) *Glass*, of an approved type. Furnished with top and bottom asbestos washers to ensure flametight joints with the gauzes and retaining ring.

External diameter .....	57 mm. $\left\{ \begin{array}{l} +0 \text{ mm.} \\ -1 \text{ mm.} \end{array} \right.$
Height .....	57 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	57-57

Provided that the lamp may also be made to take glasses of the following dimensions:—

External diameter .....	57 mm. $\left\{ \begin{array}{l} +0 \text{ mm.} \\ -1 \text{ mm.} \end{array} \right.$
Height .....	60 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	57-60

or— External diameter .....	$58\frac{1}{2}$ mm. $\left\{ \begin{array}{l} +0 \text{ mm.} \\ -1 \text{ mm.} \end{array} \right.$
Height .....	60 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	$58\frac{1}{2}$ -60

External diameter .....	57 mm. $\left\{ \begin{array}{l} +0 \text{ mm.} \\ -1 \text{ mm.} \end{array} \right.$
Height .....	67 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	57-67

or— External diameter .....	$58\frac{1}{2}$ mm. $\left\{ \begin{array}{l} +0 \text{ mm.} \\ -1 \text{ mm.} \end{array} \right.$
Height .....	67 mm. $\pm \frac{1}{4}$ mm.
Size mark .....	$58\frac{1}{2}$ -67

(5.) *Glass Retaining Ring*, of brass, screw-threaded to fit the bottom ring, the clearance between the retaining ring and the oil vessel being such that it shall not be possible, under reasonable working conditions, to loosen the glass by forcing it round in its seating to such an extent as to impair the safety of the lamp.

(6.) *Oil Vessel*.—A casting of brass, of capacity sufficient to provide the required light for the required time as specified; fitted with a burner with or without a domed reflector, using a  $\frac{5}{16}$  to  $\frac{9}{16}$  inch flat wick; provided or not with an electric igniter of the type shown in fig. 23.

(7.) *Locking Devices*.—One or other of the following:

- A magnetic lock of the type shown in fig. 23.
- A lead-rivet lock with a hasp or lug secured to the bottom ring, and a staple or lug securely soldered to the oil vessel.

Teale's Protector Lamp No. 3 and Messrs. W. E. Teale and Co.'s Standard Deflector Marsaut Lamp No. 5.

These lamps, the general design of the upper portions of which are similar to those shown in fig. 20, are modifications of Teale's "Protector" lamp No. 1 and Messrs. W. E. Teale and Co.'s Standard bonneted Marsaut lamp No. 4 respectively, and are similar to them in all but the following respects:—

(1.) *The Bonnet* is either removable, in which case it is locked at the crown by a lead-rivet lock; or fixed, in which case it is secured by the base being turned in underneath the middle ring.

(2.) *The Crown* is of brass, steel or iron, and is supported by three or four steel or iron pillars.

(3.) *The Pillars* may be fitted or not with a deflector ring.

(To be continued.)

The Edinburgh Collieries Company have had their pits at Tranent equipped with all up-to-date appliances, electric coal-cutters, haulage and pumping.



## MINING AND OTHER NOTES.

A conference took place at the National Gas Exhibition, Shepherd's Bush, on Tuesday, when the question of hygiene of lighting and heating was discussed. Papers were read by Dr. S. Rideal; Prof. Leonard Hill, who described a new thermometer for the purpose of estimating the rate of heat loss in order to obtain a true measure of the comfortable and healthy physical conditions of the atmosphere of a room; and Prof. Vivian B. Lewes, on "Modern Improvements in Gas Lighting and Heating Appliances."

The question of the closer relation of the University of Edinburgh with the Heriot-Watt College for the purpose of establishing a degree in mining has been considered by a special committee of the Heriot-Watt College Committee, and the convener, Councillor Harrison, has prepared a report on the matter, in which he suggests that any difficulty might be surmounted in a way similar to that which has brought about the affiliation of Glasgow Technical College with the University of Glasgow. The report says it is most important that the Heriot-Watt College should be recognised as ranking equally high among the institutions of Scotland. The committee recommend that the question be remitted to a committee to confer with the Edinburgh University authorities. This recommendation the governors of the George Heriot's Trust have adopted.

The workers employed at Townhill Colliery have recently presented Mr. Wm. McGarrity, manager, with a handsome dining-room suite on the occasion of his leaving to fill a similar position at Largoward.

At the meeting of the graduate section of the North-East Coast Institution of Engineers and Shipbuilders, at Newcastle, the chairman (Mr. E. Leslie Champness) urged that engineers did not know enough of the commercial side of the business, and that courses of training in this respect should be established.

Mr. George E. Young, the manager of Benwell Colliery, has received a handsome silver medal awarded by the Royal Humane Society, London, in recognition of his courageous action in attempting to save the late Capt. W. H. Ramsay, who was overcome by gas and lost his life while experimenting with some breathing dresses in a disused drift at Benwell Colliery on June 6.

The statue of Lord Kelvin, which has been erected in Kelvingrove Park, Glasgow, was unveiled on the 8th inst. by Mr. Birrell, M.P.

It is stated in the report of *Lloyd's Register of Shipping* that at the close of the year ending June 30, 10,466 merchant vessels, registering over 22½ million tons gross, held classes assigned by the committee. During the year classes were assigned to 651 new vessels. Their registered gross tonnage amounted to 1,664,667 tons. With reference to the increasing employment of the Diesel engine for seagoing vessels, at the present time there are in service 12 seagoing vessels, classed with the society, which are propelled by Diesel engines, and there are 25 others being dealt with under the inspection of the surveyors. In some vessels fitted with Diesel engines, there have been minor difficulties with details, such as pistons, cylinder covers, &c., but these appear to have been overcome. The society's surveyors are noting the result of the experiences which are being obtained from the engines now at work, and the facts are being collated and analysed by Mr. Milton, the society's chief engineer surveyor.

A deputation from the Newcastle Chamber of Commerce, representing trades in the north-eastern district, waited on Mr. Kaye Butterworth, general manager of the North-Eastern Railway Company, at Newcastle, on Monday, to complain of delays in the transit of goods. It was complained that the traders, who were now paying increased rates, had a right to an efficient service. Whereas some time ago goods could be brought from Birmingham to Newcastle in two or three days, it now took from 12 to 14 days. The loss to traders in consequence of the delay was considerable, and they had been obliged to send much of their goods by carrier. The representative of a large firm declared that 60 per cent. of their outward traffic was lost to the railway company because of delays. Mr. Kaye Butterworth promised to investigate the matter carefully.

It is reported that cinematograph films are being taken in which every phase of coal production will be depicted. In America considerable advantage has been taken of the camera as an educational medium.

On Monday the Divisional Court of the King's Bench, consisting of Justices Ridley, Scrutton, and Bailhache, heard an *ex parte* motion in the matter of the Denaby and Cadeby Main Collieries Limited v. Lambert Brothers. Counsel said the matter had been before that Court, and taken from there to the Court of Appeal and to the House of Lords. He now asked that the order of the House of Lords should be made an order of that Court. Their lordships agreed.

Mr. John S. Glen Primrose, A.I.M.M., of the Royal Technical College, Glasgow, has just been appointed to the position of research metallurgist and chemist in charge of the material-testing department of the Consolidated Diesel Engine Manufacturers Limited, of London and Ipswich. His brother, Mr. H. S. Primrose, who was until recently metallurgist to Messrs. Weir, Cathcart, has now been appointed to a similar position in the firm of Carels Frères, Ghent, the builders of Diesel engines in Belgium.

At a meeting of the Manchester Association of Engineers on Saturday last, Dr. Hopkinson, in his presidential address, spoke of the influence which had been exercised by electrical engineering on mechanical engineering. He remarked that the subject was one which would repay examination—not only for the light it threw upon the past, but for its guidance for the future.

A deputy named Elliott, was summoned at Walsall on Friday for being a person authorised to fire shots in the Bloxwich Colliery Company's mine, and not keeping the detonators used by him in a suitable box securely locked. The complaint was that, a shot having misfired, he committed a breach of the regulations by trying a detonator in the main road. It was suggested that it was simply an error of judgment. He gave the usual warning, but another workman named Charles Hawley was slightly injured by the explosion. The Bench ordered him to pay the costs without a conviction.

It is stated that a large German firm of steel tube manufacturers have decided to take an option of upward of 100 acres of land on the east side of the River Usk, at Newport, just below Messrs. Lysaght's works. If the scheme matures and the works are erected they will find employment for something like 10,000 men.

In the course of a discussion, at a quarterly meeting of the Bradford Chamber of Trade, last week, on a demand for cheaper coke for the bakery trade—a subject which was referred to the Parliamentary Committee—Councillor W. H. Brocklehurst referred to an experiment which was recently tried by the Corporation as a result of pressure by the Socialists for cheaper coke for the poor. A quantity of special small bags to hold 28 lb. of coke, to sell at 2½d., said Mr. Brocklehurst, had been obtained, and orders were given that none but poor people were to be supplied with them. He had now learned that during the first two months after the establishment of this scheme exactly 2 cwt. of coke had been sold under these conditions, meaning that eight persons had taken advantage of the opportunity of buying coke at twopence-halfpennyworth at a time.

It may be remembered that in 1907 the Durham Collieries Electric Power Company Limited arranged with the Newcastle-upon-Tyne Electric Supply Company Limited and the associated companies to operate and maintain the Philadelphia power station, increasing the capacity from 6,000 kw. to 10,000 kw. The Philadelphia station has now been purchased by the Lambton and Hetton Collieries Limited, and the colliery company is removing five of the turbines and installing three A.E.G. machines, each of 6,000 kw. capacity, at 0.75 power factor running at 2,400 revolutions per minute. It is anticipated that the thermal efficiency of the station, when operating these new sets, will be at least as favourable as at any other station operating under similar conditions, the steam consumption figures guaranteed being exceptionally low. An interesting feature of this scheme is that an arrangement has been entered into with the Newcastle-upon-Tyne Electric Supply Company Limited whereby they are to supply the labour for the operation of the station, and also to provide a stand-by supply to the colliery company from the network of cables at Philadelphia. Hitherto, the Lambton and Hetton Collieries Limited have purchased the power for their important group of collieries from the Durham Collieries Electric Power Company, and in order to ensure greater reliability, the stand-by required at the station is to be provided from the network of the Newcastle-upon-Tyne Electric Supply Company and its associated companies, instead of putting down additional spare plant at the Philadelphia station. The boiler plant is to be completely re-arranged and enlarged, but the contracts for this work have not yet been placed. The new arrangement will come into force in January 1915.

Messrs. Manning, Wardle and Co. Limited, of the Boyne Engine Works, Hunslet, Leeds, inform us they have appointed Messrs. Scrivener, Breffit and Co., 34, Park-place, Cardiff, to be agents for the sale of their locomotives, &c., in South Wales.

At their Waleswood Collieries, near Sheffield, Messrs. Skinner and Holford Limited are extending their electrical plant, consisting of two 250-k.w. B.T.H. mixed pressure turbo generators by the installation of a 750-k.w. mixed pressure turbo generator of the same type, whilst a central condensing plant, capable of dealing with the exhaust steam from these turbines, of the barometric jet type, is being provided by Messrs. Mirrlees, Watson, of Glasgow. The turbines will be operated by exhaust steam from the winding engines, compressors, fan engine, &c., and the whole installation, when completed, will represent a plant of considerable size. It is anticipated that the cost of the production of current will not exceed 0.15d. per unit, after providing for interest and depreciation. The electrical output obtained from this generating plant will be utilised for operating two main rope haulage gears which have recently been installed, each of 350 effective horse power, and for driving the motors in connection with the new Simon-Carves coke oven plant which has recently been erected at the Waleswood Collieries. The scheme is being carried out according to the specification and under the supervision of Mr. William C. Mountain (late Messrs. Ernest Scott and Mountain Limited), consulting electrical and mechanical engineer, Newcastle-upon-Tyne.

A silver tea and coffee service on a silver mounted sal tray, together with a purse of gold, were presented to Mr. and Mrs. John Kelly by the workmen of the Cleator Moor Iron Works, on Friday of last week. Mr. Kelly, who for a quarter of a century has been secretary to the men's union, is departing with his wife for Australia, where two sons and a daughter are already settled.

A joint meeting of the Kent branch of the National Association of Colliery Managers and the London branch of the Association of Mining Electrical Engineers will be held at the Hotel Metropole, Dover, on Saturday, October 18. A paper entitled "Large Prime Movers and Boilers for Power Houses" will be read by Mr. E. Kilburn Scott.

Since the inception of the Hickleton Main mining classes an inspector of mines, two colliery managers, two colliery underground managers, one rescue station instructor, and one mining surveyor have been appointed to their positions from the ranks of the students. The mining classes at Hickleton were commenced in 1905 with 40 students, but this number has now increased to 117 in three classes. There have been 2,315 homework papers worked during the last six months of the mining class session. Last year there were 16 deputies employed at the colliery, but this year the number has been increased to 30. Prof. Armstrong, of Sheffield University, speaking at the annual meeting of the classes, said that after perusing the reports of the various mining classes in the West Riding he had come to the conclusion that those at Hickleton Main were first and foremost. He found that the Hickleton Main mining classes had during the last six years enrolled more members than any other class in South Yorks. Prof. Armstrong likened the mining classes to a sort of feeder to the university, and remarked that no instruction could be given like that at the universities, for the simple reason that there they had all the necessary apparatus. He advised intending university mining students to polish up their arithmetic and other subjects before entering upon the university course. He was very pleased to see the students from Hickleton Main at the university. The West Riding County Council, he pointed out, had now launched out into a new departure in the granting of scholarships for mining. For the first time in the history of mining these scholarships had been offered, and he was very pleased to see the names of students from that colliery on the list. Mr. Talbot then presented the prizes to the successful students, and Mr. Minnikin presented the medals to the winners of the Wood challenge shield. It was stated that Mr. Moore had left the district to take up the responsible position of a rescue instructor at a station near Bristol.

In July of last year, during their tour of industrial Yorkshire, King George and Queen Mary visited the mining village of the Woodlands, near Doncaster, and inspected the Institute and some of the houses. Last week a bazaar was held at All Saints Church, Woodlands, and there was a pleasant reminder from Queen Mary that she has not forgotten her visit. From the Royal Gardens at Windsor her Majesty sent carnations, orchids, pears and apples, accompanied with a note "To show my continued interest in Woodlands." The flowers and fruit were sold for the benefit of the church, and the mining population greatly appreciated the Royal courtesy shown them.

The Sherwood Colliery Company, the successors to the Hucknall Colliery Company, Notts, have for some 18 months past been concentrating their energies in locating a new seam of coal—the Deep Soft—from the shaft of the No. 2 pit at Hucknall. Their efforts have just met with reward, inasmuch as the sinkers have reached the new seam, which, it is stated, was found to be 2 ft. 9 in. to 3 ft. in thickness, and of a good quality.

The new Barleyside Colliery, near Slamannan, belonging to the Callendar Coal Company, Falkirk, is now nearing working order. Three seams of coal and fireclay have been reached. The most modern electrical machinery is to be installed for cutting, pumping and lighting, and a large output is anticipated.

In the course of his inaugural lecture on "Social and Industrial Statistics," at the London School of Economics, Dr. A. L. Bowley, commenting on the Wage Census of 1906, said it was an extraordinary thing that in spite of the enormous amount of attention that has recently been given to the minimum wages and piece rates of miners, there is no official or general information whatever as to their daily or weekly earnings. Since mining is the industry which has grown most rapidly of all in recent times, and now competes with agriculture on equal terms for numerical importance, it was evident that till this gap was filled our information as to earnings was essentially deficient. The wage census of 1906 gave a fairly adequate account of wages and earnings in that year if it were not that there were no statistics as to coalmines.

Mr. George Lammie, who has been for some years underground manager at South Longrigg Colliery, Netherburn, Lanarkshire, has been presented, on the occasion of his marriage, with a handsome gold watch and albert, together with a gold bracelet watch for his bride.

Under the auspices of the Cambuslang and District Mining Association, Mr. A. Aird, manager of Gilbertfield Colliery, Cambuslang, read an instructive paper on "Some Notes on Gases Found in Mines." The paper gave rise to a profitable discussion.



**MINERS' FEDERATION OF GREAT BRITAIN.****Conclusion of Conference.**

The concluding sitting of the annual conference of the Miners' Federation of Great Britain was held at the Clarence Gardens Hotel, Scarborough, on Friday, October 10. Mr. ROBT. SMILLIE, London, president, was in the chair.

At the outset, Mr. ALBERT STANLEY, M.P. (Cannock Chase), moved that the conference had heard with deep regret that the Post Office Telegraph Department had apparently failed to make adequate arrangements for the transmission of newspaper reports of its proceedings, and to call the attention of the Postmaster-General to this failure by the department.

Mr. HERBERT SMITH (Yorkshire) seconded, and it was unanimously carried.

**The Cornish Clay Workers.**

The PRESIDENT said it was reported that the clay workers in Cornwall who had been on strike had resumed work, having been starved into submission after a long and severe struggle. There had been dire distress, and the executive asked them to give £200 to the relief of the distress.

The executive's recommendation was unanimously adopted.

**Pithead Baths.**

The PRESIDENT mentioned that certain draft rules had been issued by the Home Office for baths at mines. The public were asking whether anything had been done to get baths at mines. The rules had only been out for a fortnight, and they were open for objections. The miners objected very strongly to Rule 9, which stated that if the employer put the estimate of the cost at an amount beyond which the workmen could contribute, then the workmen had to force the employer to arbitration, and, it might be, pay the whole cost of the arbitration. When the objections had been considered they were going to carry on a strong agitation for baths at mines. He was glad to know that in Lancashire a large employer had erected very splendid baths without waiting for the law, and his people were taking advantage of it. He wished the other coalowners would do this out of the large amount of money they were earning.

**Eight Hours for Surface Workers.**

Mr. A. ONIONS (South Wales) moved that the Federation take action to secure the application of the Eight Hours Act to all surface workers employed in the mining industry. He said a number of surfacemen handling coal had their hours reduced in South Wales from nine to eight and a-half hours as a result of the coming into operation of the Eight Hours Act; so this proposal was a thoroughly practical one.

Mr. D. WATTS MORGAN (South Wales) seconded the resolution, which was carried.

**Five Days' Working Week.**

Mr. MURDOCH (Scotland) proposed that the conference recommend that a working policy of five days per week be observed throughout the British coalfields, and that the executive devise means of putting the matter before the men. He observed that the result of the ballot taken of the men was a hopeful sign that the matter had taken root and would before long become an accomplished fact in all the mining districts.

Mr. JOHN ROBERTSON (Hamilton), who seconded, pointed out that this resolution was carried at the Swansea conference. Wages had moved away from the minimum, and advances had been conceded in all the districts of the Federation. What would again bring about reductions in wages? There was no doubt the production of more coal than there was a market for, thus putting surplus supplies in the hands of the owners to bring the men back to the minimum again. Therefore this policy of a five days working week was one of the most powerful weapons that the miners could have in their hands.

Mr. W. E. HARVEY, M.P. (Derbyshire), said his objections to this were the same as last year, that the men had not had an individual ballot on the question. He was not opposing the resolution, but he asked that the full consent of the men be given to it before it was put into operation. They once tried the five days week in Derbyshire, and the banksmen and onsets rose against it and they were defeated—not by the employers but by the men. Once bitten twice shy, and they had better have the consent of the men and a bigger majority than 23,000 before they made this change.

Mr. ROBERTSON said a ballot of the men was actually taken, and the voting was 253,541 for, 209,826 against—majority 43,715.

Mr. HERBERT SMITH (Yorkshire) said that what they realised in Yorkshire was that they might be rather making a rod for their own backs. Their men did not work five days a week. And when men were working in a temperature of 90 degs. it was not likely that they would work five days a week. What would happen would be that Saturday would be picked by the employers as the play day. They only worked six hours on Saturday, and the men would not have that as the play day.

The PRESIDENT remarked that Mr. Harvey could not sit there and say that the individual ballot of the men had been taken, and the voting was 253,541 for, 209,826 against—majority 43,715. Mr. Robertson had said, was larger than the Swansea conference. But the executive had led that the majority in the ballot did not

justify them in taking steps to put the five days policy in force, and a conference confirmed that decision.

Mr. W. STRAKER (Northumberland) said that as the ballot vote had confirmed the vote of the Swansea conference, he asked whether it was not their duty to seek to establish that policy in practice. In Northumberland they had a five-day working week in the seventies, but they gave it up because of the competition they met with from other districts. One of the greatest competitors they had in Northumberland at the present time was Yorkshire, especially the Doncaster district where they were opening out a new coalfield, and if that competition was allowed to go on and to take the trade from them by reason of working on a Saturday while they were idle, it would be an impossibility for them to establish a five days week.

The resolution was put and rejected on a card vote, 301,000 voting for and 326,000 against.

**Colliery Enginemen.**

Mr. ALBERT STANLEY, M.P. (Cannock Chase) withdrew a resolution asking for two enginemen to be in attendance at the engine when workmen were descending or ascending the shaft on the promise that it would be considered by the executive.

**Nationalisation of Mines.**

Mr. S. ROEBUCK (Yorkshire) moved that all land, mines, minerals and railways be nationalised in the interest of the community. He said that the national strike of last year aroused in the public mind a consciousness of the necessity of the nation owning and controlling mines. It was the most potent nationalisation propaganda in industrial history.

Mr. HOBBS (Cleveland) seconded the motion, which was carried unanimously.

**Nightmen's Bonus Turn.**

Mr. NOAH ABLETT (South Wales) moved that action be taken to secure that the week of workmen employed by night be considered a week of five shifts, and that the present wage be apportioned thereto. He said that 50 per cent. of the men employed at night got six days' pay for five shifts, but if they worked four shifts they only got four days' pay. They were of opinion that there was something undignified in a bonus payment. They asked that five night shifts should be regarded as a week's work and paid for as such.

Mr. A. ONIONS (South Wales) seconded, and it was carried.

**Improvement of Waterways.**

Mr. ALBERT STANLEY, M.P. (Cannock Chase), proposed that they urge the Government to take immediate action upon the report of the Royal Commission on Canals by introducing a Bill to give effect to the same. He said that while they might talk about nationalisation, here was a means of communication for heavy traffic at a fraction of the cost of the railways.

Mr. H. SMITH (Yorkshire) seconded, and it was carried.

**The Minimum Wage.**

The following resolution from Scotland was carried:—

"This conference is of opinion that a minimum wage of not less than 7s. per day should be secured for all miners employed at the coal face, or in ripping, and pledges itself to render all assistance possible to any district deserving assistance upon the employers attempting to reduce wages below that point."

The question of raising a suitable memorial to the past presidents of the Federation, the late Mr. Ben Pickard and Mr. Enoch Edwards, was considered, and on the motion of Mr. ALBERT STANLEY, M.P., to take this matter in hand and raise memorials to their memory,

Mr. John Wadsworth, M.P., was elected a trustee to fill the vacancy caused by the death of Mr. James Haslam, M.P.

A meeting of the miners' section of the Coal Conciliation Board for the Federated area was held immediately following the Federation conference. Mr. W. E. HARVEY, M.P., Derbyshire, presided. The election of officers resulted as follows:—Mr. Stephen Walsh, M.P., vice-president of the board; Mr. Thomas Ashton, joint secretary; and Mr. John Wadsworth, M.P., treasurer of the workmen's section. The committee were elected as follows:—Levi Lovett (Leicestershire), E. Hughes (North Wales), F. Hall and Barnet Kenyon, M.P. (Derbyshire), C. Bunfield and J. G. Hancock, M.P. (Nottinghamshire), H. Smith, J. Wadsworth, M.P., and J. Hosking (Yorkshire), T. Greenall, H. Roughley and S. Walsh, M.P. (Lancashire), A. Stanley, M.P. (Cannock Chase), and S. Finney (North Staffordshire). Mr. Stephen Walsh takes the place of Mr. Harvey, M.P., as chairman of the men's section and vice-chairman of the board.

In presiding at the meeting of the Shell Transport and Trading Company Limited on Friday last, Sir Marcus Samuel, Bart., said the position in the oil world to-day was a very curious one. In two great producing countries—Mexico and California—production was in excess of the present demand, and the price of oil as compared with coal was actually less. He was convinced that such a state of things could not remain permanent. With the rapid strides which are being made in improvements in the internal-combustion engine, oil should be worth at least a ratio of 4 to 1 of coal.

**NOTES FROM SOUTH WALES.**

[FROM OUR OWN CORRESPONDENT.]

**The Great Disaster at Senghenydd, Worst ever Experienced in the Coalfield—Ownership of the Undertaking—Interesting Point as to Compensation Liability and Insurance—Grave Outlook Created by Miners' Conference—Advanced Attitude of South Wales Representatives—The Decision as to Political Procedure—Some Capital Re-arrangements and Striking Success of Companies—University College and the Mining Board—Enginemen and the Federation: a Deadlock—Swansea's Increasing Prosperity.**

The Senghenydd Colliery of the Lewis-Merthyr undertaking, wherein the terrible explosion and fire took place on Tuesday, is at the head of the Aber Valley, near Caerphilly. The original company, formed in 1881, held properties in the Rhondda district, and it was in 1900 that the existing Lewis-Merthyr Consolidated Collieries Limited was formed, taking over the Lewis-Merthyr, the Coedcae, and the Hafod collieries; and since then, the Senghenydd, in the more easterly area, has been acquired. This latter is the concern which was held by (amongst others) the late Sir Thomas Morel and Philip Morel, of the large shipowning firm at Cardiff, chiefly engaged in the iron ore trade. Lord Merthyr is chairman of the present company; and associated with him as directors are the Hon. H. C. Lewis, and Messrs. W. T. Rees, E. O. Jones, J. J. Jones, and C. Smith; Mr. W. H. James being the secretary. The accounts are not made public. The annual output from all the company's collieries is about 1,750,000 tons per annum; and the capital of the undertaking is £668,700.

As would naturally be expected, with such a directorate, the Senghenydd Colliery was equipped with the best and latest appliances, and there was electrical traction in part of underground workings. It is under the management of Mr. Edward Shaw, and has two pits. Each shaft is 18 ft. 6 in. diameter, going to a depth of 650 yards, and intersecting the 2 ft. 9 in., the upper 4 ft., the 6 ft., the 9 ft., and the upper 5 ft. seams. Ventilation was by a Walker fan, 24 ft diameter. Over 2,000 men are employed. A previous explosion, in May 1901, occasioned the death of 81 men.

One interesting point has occasioned remark—that referring to compensation. The coalowners of this district have an indemnity society, of which Mr. H. Gray (Nixon's) is chairman and Mr. W. G. Dalziel is secretary, the society now holding a strong position, most of the chief companies being associated. Each company carries its own risk up to four deaths; the indemnity society takes the risk up to 15 deaths; and higher risk is insured. But the Lewis-Merthyr is not connected with this indemnity society. The liability of the company, however, is, it is understood, insured at Lloyds.

The heaviest calamities here in previous years were:—In 1905, Wattstown, 119 lives; 1901, Senghenydd, 81; 1896, Tylorstown, 57; 1894, Albion, 236; 1892, Park Slip, 110; and, in the same year, Great Western, 61; 1890, Llanerch, 176; also Morfa, 87. In 1878, 268 lives were lost at Abercarn.

Although temporarily obscured by the striking events of the past few days, the decisions of the miners' national conference still hold the field in matters industrial. For South Wales the situation created is productive of extreme concern, the resolutions displaying a fundamental change of policy, embodied in immediate procedure. Not only is the wage standard to be immensely raised, if the miners have their way, but also the statutory minimum wage. Not alone will trade-union action be taken to achieve these ends, but also Parliamentary. Nor are the Federation and the Legislature combined to be relied upon; the declared policy of the sympathetic strike by other industries is to supplement both.

No part of the country stands to lose so much as South Wales does, because so large a proportion—it used to be two-thirds, and now it is about three-fourths—of our output goes abroad. Hence the serious view which is taken here by observers who look beyond the immediate prospect of the present. Prosperous now, with a bright outlook for many months ahead, what will be our position when the hugely-increased output now in sight comes upon a market gravely unsettled by labour troubles? What will be our relation to foreign purchasers (whose chief desire is assurance of delivery) just when the Federation is threatening great things upon termination of the present agreement.

At a meeting of the council of University College, Cardiff, on Friday, provisional approval was given to the agreement with the Mining Board concerning the joint diploma course in mining, to which reference was made in this column last week. The council appointed Mr. C. F. Galloway, B.Sc., as assistant lecturer and demonstrator in mining.

According to the rules of the South Wales Association of Colliery Enginemen and Stokers, a general dissolution of the society can take place only when three-fourths of the members ballot in favour. Upon the proposal to amalgamate with the Miners' Federation, 3,146 voted "for" and 2,117 "against" (there being 2,265 papers unused). The necessary three-fourths was not, therefore, obtained, and the position created after prolonged negotiation and discussion is a deadlock. Another conference of the association is to be called, Mr. Brace, M.P., president of the miners, being invited to attend.

Swansea Harbour Trustees had a satisfactory report submitted on Monday. The nine months' general trade



this year showed an increase of practically 900,000 tons, or 20 per cent.; and, during last month, coal exports were 13,000 tons and patent fuel 21,000 tons higher than in the corresponding period of 1912.

Penrhwi-ceiber men to the number of 2,500 came out on strike against about 200 non-unionists, but resumed on Tuesday after a week's stoppage.

At a meeting of Carmarthenshire Joint Committee, on Tuesday, the question was raised as to the advisability of sending extra police to Garnant on the occasion of the recent strike, which one member declared to have been "quite unnecessary." The Chief Constable of the county stated that the drafting of more police into the district had been necessary because officials' houses had to be protected. Some discussion followed, and ultimately a resolution expressing confidence in the police was carried *nem. con.*

### THE HULL COAL TRADE.

According to the return made by the Hull Corporation's coal inspector, Mr. W. Herbert Truman, 630,034 tons of coal were imported into Hull during September—588,078 tons by rail, and 41,956 tons by river. This compares with 615,792 in September 1912. The total importation for the first nine completed months of the present year amounted to 6,081,058 tons, as against 5,156,234 for the corresponding period of the previous year. The following were the quantities consigned from the principal shipping collieries during those periods:—

Name of Colliery.	January to September, 1913.	January to September, 1912.
Allerton Bywater	100,725	61,550
Allerton Main (Bowers)	41,357	40,094
Aldwarke Main	168,269	170,324
Ackton Hall	81,823	48,514
Askern Main	11,331	—
Barnsley Main	12,684	25,735
Birley	60,523	49,009
Bestwood	25,620	19,680
Brodsworth	157,198	131,096
Barrow	40,244	28,081
Bentinck	24,783	18,887
Bentley	243,743	228,206
Bullcroft	200,072	22,157
Cortonwood	47,576	62,711
Carlton Main, Grimethorpe and Frickley	369,204	449,737
Clay Cross	29,152	3,888
Clifton	17,229	11,376
Dalton Main	191,029	200,943
Dearne Valley	6,974	17,205
Denaby and Cadeby Main	734,458	502,380
Darfield Main	35,593	22,445
Dinnington	128,064	171,083
Elsecar	121,884	115,568
Glapwell	60,485	55,621
Garforth	89,982	79,592
Glass Houghton	241,375	166,625
Grassmoor	14,156	13,032
Gedling	15,997	3,090
Goldthorpe	26,912	12,535
Houghton Main	72,283	53,312
Hoyland Silkstone	26,892	32,154
Holbrook	10,268	6,749
Hodroyd	13,599	2,554
Hardwick	55,421	31,767
Hickleton	133,415	125,523
Kilnhurst and Thrybergh	70,629	73,221
Kiveton Park	34,653	26,274
Kirkby	9,827	12,630
Lofthouse	24,686	33,627
Low Laithe	97,428	53,210
Langwith	31,044	26,272
Manvers Main	199,843	193,110
Mitchell Main	80,419	75,159
Monkton Main	33,432	46,002
Monk Bretton	43,196	63,106
Manners	22,393	9,744
Maltby	115,633	49,551
Mansfield	74,620	93,725
New Hucknall	17,066	1,549
North Gawber	12,991	14,841
New Sharlston	33,378	26,143
Old Silkstone	12,596	16,557
Prince of Wales' Castle	80,513	51,111
Pilsley	11,987	11,649
Park Hill	21,738	8,372
Peckfield	111,477	91,306
Rothervale	58,561	49,638
South Hiendley	18,230	19,844
Staveley	77,451	71,820
Shireoaks	28,430	31,014
St. John's (Locke's)	14,269	8,874
South Kirkby, Featherstone and Hemsworth	191,119	131,990
Shirebrook	19,964	14,587
Sherwood	40,227	53,831
Shipley	10,106	5,948
Shaw Cross	14,243	6,429
Thorncliffe	86,385	85,292
Tinsley	15,101	21,270
Wharnciffe Silkstone	44,474	64,105
West Riding and Silkstone	73,502	55,217
Wombwell Main	143,928	127,852
Whitwood	136,638	89,181
Wheldale and Fryston	125,083	115,887
Woolley	20,553	14,787
Wath Main	78,014	102,351
Waleswood	2,117	12,605

Coastwise shipments in September amounted to 65,463 tons and exports to 393,026 tons. In the corresponding month of 1912 the exports were 512,529. During the first nine months of the year, the quantity despatched coastwise was 748,631 tons, whilst the exports for the same period were 3,357,691 tons, as compared with 2,671,174 tons in the corresponding period of 1912.

During September, the Denaby and Cadeby Main Company sent 93,341 tons, as compared with 42,844 tons in September 1912, and the Carlton Main, Grimthorpe and Frickley Collieries contributed 32,420 tons, as against 45,505 tons. Other collieries sending quantities exceeding 10,000 tons were the following (arranged in order of aggregate tonnage): Glass Houghton, Bentley, Bullcroft, Dalton Main, South Kirkby, Featherstone and Hemsworth, Manvers Main, Brodsworth, Wombwell Main, Whitwood, Elsecar, Wheldale and Fryston, Dinnington, Hickleton, Maltby, Aldwarke Main and Peckfield.

### THE FREIGHT MARKET.

The outward freight market on the north-east coast has been fairly active during the past week. Tonnage has been plentiful—although, at the time of writing, supplies are less good—and, despite the fact that loading turns are very much congested, a fair amount of chartering has been done at somewhat weaker rates. Coasting business is based on about 3s. 4½d. to London, from the Tyne, for handy steamers, whilst Hamburg commands from 3s. 9d. to 4s. The Baltic has Riga at 5s. 6d. The Bay has been done at from 5s. 7½d. to 5s. 9d. to Bordeaux. The Mediterranean has Genoa at from 9s. to 9s. 4½d. At South Wales an average number of transactions is recorded. Mediterranean rates are weaker, although there is now a better enquiry for medium-sized vessels. South America is steady. The Bay and coasting ports are rather firmer. At the Clyde, a quiet business is being done at fairly steady rates. The Humber is quiet for the Baltic, and not especially active in any direction. Homewards, Odessa advices report an easy feeling at the Black Sea. With little pressure in the grain market, there has not been much demand for tonnage. Rates are weak, and very much in favour of shippers. The Eastern market is quiet and unaltered. The Mediterranean and ore trades are steady. The Baltic is unaltered. America is rather steadier for cotton freights, and generally unchanged otherwise. The River Plate is dull, but little altered.

Tyne to Algiers, 3,600, 8s. 3d.; Boulogne, 1,800, 5s. 3d.; 1,700, 5s., from Dunston; Bordeaux, 3,500, 5s. 7½d., river loading; 3,500, 5s. 9d., from Dunston; 2,800, 5s. 9d.; Christiania, 600, 6s. 3d.; Civita Vecchia, 4,800, 10s. 4½d.; 500; Genoa, 4,400, 9s. 4½d.; 6,500, 9s. 6d. coal, 12s. 6d. coke, from Dunston; 5,500, 9s. 4½d.; 6,500, 9s., reported; Gibraltar, 2,100, 8s. 6d.; 500; Gefle, 2,100, 5s. 6d.; Havre, 1,400, 5s. 3d.; 1,400, 5s. 1½d.; Hamburg, 3,000, 3s. 9d.; 2,000, 4s. 1½d.; 1,900, 4s.; 2,400, 3s. 9d.; 2,100, 4s., from Derwenthaugh; Kiel, 2,300, 5s. 3d., 400; London, 3,000, 3s. 4½d.; 1,300, 3s. 10½d.; 2,500, 3s. 4½d.; Libau, 2,500, 5s. 3d.; Malmo, 1,800, 5s., three voyages; Marseilles, 4,300, 8s. 9d., 600, from Dunston; Monaco, 1,300, 11s. 3d.; Norresundby, 5s. 6d., reported; Oxelosund, 2,000, 5s. 6d.; 1,700, 5s. 10½d.; Pillau, 1,200, 5s. 6d.; 1,900, 5s.; Port Said, 4,600, 8s. 9d.; Piræus, 5,600, 9s. 3d., 500, 11d.; 5,800, 9s. 6d.; Riga, 2,700, 5s. 6d.; Rockhampton, sail, 23s. 9d., coke; Reval, 2,500, 5s. 6d.; Syra, 5,600, 9s. 3d., 500, 11d.; 5,300, 9s. 6d.; St. Nazaire, 2,800, 6s. 9d.; Venice, 4,800, 10s. 9d.; 5,800, 10s. 9d.; 4,200, 10s. 9d. coal, 13s. 3d. coke; Wisby, 1,250, 6s. 6d.; Zeebrugge, 2,700, 3s. 4½d.; Zee, 5,600, 9s. 3d., 500, 11d.; 5,800, 9s. 6d.

Cardiff to Alexandria, 4,300, 9s. 3½d., November 4; 5,400, 9s.; 5,200, 9s. 3d., reported; 4,300, 9s. 1½d.; Algiers, 4,000, 10fr.; 5,000, 10fr.; 3,200, 10fr.; Azores, 2,800, 9s. 6d., 250, end October; 2,000, 9s. 6d., 250, end October; Aden, 6,000, 11s. 6d., end October; Barcelona, 2,400, 10s., 400; 4,000, 9s. 9d.; 4,500, 9s. 6d., October 20; 3,500, 9s. 6d., October 21; 9s. 6d., 700, October; 4,200, 8s. 9d.; Bordeaux, 3,400, 7½ fr.; Buenos Ayres, 20s.; Caen, 1,600, 5s. 3d.; Chantenay, 2,200, 7½ fr.; Cape Verdes, 5,200, 9s. 6d.; 1,400, 8s. 9d., December; Chatham, 2,200, 3s. 3d., Admiralty; 1,500, 3s. 1½d.; Calais, 2,200, 5s.; Dakar, 5,500, 10s. 6d.; 2,200, 8s. 6d., January; 2,000, 8s. 6d., December 10 cancelling; Devonport, several steamers, 2s. 9d., Admiralty, usual options; Djibouti, 5,800, 11s. 10½d., November 10 cancelling; Genoa, 5,200, 9s. 3d.; 5,100, 9s. 3d., October 20; 3,400, 9s. 6d., October 20; 3,700, 9s. 6d.; 4,600, 9s. 6d.; 4,000, 9s. 4½d.; 4,600, 9s. 3d.; 5,300, 9s., October 21; 4,200, 9s. 7½d.; Gibraltar, 2,600, 8s.; Honfleur, 1,450, 5s. 4½d.; Havre, 2,400, 5s.; Islands, 5,800, 9s. 3d.; 6,000, 9s., October 28; 5,000, 9s., November 1; 4,800, 8s. 9d., November 15; Las Palmas, 5,800, 9s. 3d.; 6,000, 9s.; 5,000, 8s. 9d.; Libau, 3,200, 5s. 1½d.; La Rochelle, 3,000, 6½ fr., October 21; Lisbon, 1,500, 7s. 9d.; 2,800, 7s. 3d., 400; 1,700, 7s. 6d., 500, 7s. 9d., 350; voyages over next year, 7s. 1½d., 350; Leghorn, 5,000, 8s. 9d., 800, October 27; La Pallice, 2,400, 6½ fr.; Marseilles, 5,000, 11 fr.; 3,000, 11 fr.; Nantes, 1,400, 7½ fr.; 2,900, 7½ fr.; Naples, 5,000, 8s. 9d., 800, October 27; Oporto, 1,400, 8s. 3d.; Port Said, 5,200, 9s., October 20; 5,500, 9s., October; Pembroke, 380, 3s.; Palermo, 3,500, 10s., October 24; River Plate, 5,500, 20s. 3d.; 5,200, 20s. 6d.; 4,800, 20s., end October; Rio de Janeiro, 7,000, 17s. 6d., 300, October 23; 18s. 6d., October; 7,300, 17s. 9d., 300, 2m., October 23; Reval, 2,300, 5s.; Rosario, 3,500, 20s., Oct. 25; Rouen, 1,800, 5s. 9d.; Sheerness, 2,000, 3s. 3d.; 1,500, 3s. 1½d.; St. Vincent, 5,000, 9s. 6d.; 1,400, 8s. 9d.; 5,500, 9s. 3d., November 3; Sicily, 5,000, 10s., October 22; Sables, 1,300, 7½ fr.; Spezzia, 4,200, 9s. 7½d.; Soussé, 2,100, 13½ fr.; 3,000, 13½ fr., October 20; Seville, 2,000, 8s. 7½d., October 20; St. Nazaire, 2,800, 7 fr.; 1,800, 7 fr.; Santos, 7,300, 17s. 9d., 300, 2m., October 23; St. Malo, 2,400, 5s.; Savona, 5,100, 9s. 3d., October 20; 3,700, 9s. 6d.; 4,600, 9s. 3d.; 5,300, 9s.; 4,200, 9s. 7½d.; Tunis, 2,100, 13½ fr.; 3,000, 13½ fr., October 20; time charter, 3,200, 10s. 6d. monthly on gross register, Admiralty; Teneriffe, 6,000, 9s.; 5,000, 8s. 9d.; Tarragona, 2,000, 9s., reported; 2,600, 9s.; Volo, 3,000, 10s. 6d.; Vigo, 2,900, 7s. 3d.; Valencia, 1,500, 10s.; Venice, 2,100, 11s.; 6,800, 10s. 6d., 500; 5,500, 10s. 6d., 500; West Coast South America, 5,500, 22s. 6d.

Newport to Alexandria, 5,400, 8s. 9d.; Venice, 4,300, 10s. 7½d., October 20; Ancona, 4,300, 10s. 7½d., October 20; Aguilas, 11s.; Palermo, 5,200, 10s.; Messina, 5,200, 10s.; Catania, 5,200, 10s.; Bahia Blanca, 7,000, 19s. 3d., October; Genoa, 6,000, 9s., October 25; 4,200, 9s. 3d., October 20; Savona, 4,200, 9s. 3d., October 20; Marseilles, 5,100, 14 fr.; 3,000, 11 fr.; Nantes, 2,900, p.t.; Bordeaux, 1,800, 7½ fr.; Bona, 1,800, 14 fr.; Gibraltar, 2,600, 8s., October 27; 1,800, 8s. 3d., 500; 2,600, 6s., 900, f.d., October 29.

Swansea to Algiers, 3,100, 10½ fr. and 11½ fr.; Charente, 1,300, 7½ fr.; Rouen, 1,200, 6s.; Trapani, 2,600, 11s.; Catania, 2,100, 10s. 6d. coal, 11s. 3d. fuel; Tunis, 3,000, 14½ fr. coal, 15½ fr. fuel; 2,200, 14½ fr.; Genoa, 1,300, 10s. 3d., 500, 6½d.; Savona, 1,300, 10s. 3d., 500, 6½d.; Marseilles, 3,700, 12 fr.; 2,600, 12 fr., October 22; Honfleur, 800, 5s. 6d.; St. Malo, 870, 5s. 6d.; Stettin, 2,000, 5s. 9d.; Spezzia, 1,300, 10s. 3d., 500, 6½d.; Naples, 3,300, 9s. 6d. coal, 10s. 3d. fuel; Alicante, 900, 11s. 3d., October 22; Bordeaux, 1,800, 8½ fr.; Bayonne, 1,600, 8½ fr. coal, 9 fr. fuel; Dieppe, 1,200, 5s. 6d.; Calais, 2,100, 5s., November 1; La Pallice, 1,700, 7 fr.; Fecamp, 650, 5s. 6d.; St. Petersburg, 2,400, 7s. 4½d.

Wear to Piræus, 5,600, 9s. 3d.; Genoa, 6,500, 9s. 6d.; Sulina, 5,300, 10s. 6d.; St. Nazaire, 2,800, 6s. 9d.; Bordeaux, 2,800, 5s. 9d.

Blyth, Hull or Immingham to Nicolaieff or Odessa, 6,000, 9s. 9d.

Hartlepool to Cetta, 2,700, 9s. 9d.; Barcelona, 3,200, 9s. 9d., 400; Pillau, 1,950, 4s. 9d.

Blyth to Havre, 1,400, 5s. 1½d.; Pillau, 1,950, 4s. 9d.; Reval, 2,500, 5s. 6d.; Malaga, 2,200, 10s., 300. Hull to Reval, 2,300, 5s. 6d.; 3,200, 5s. 3d.; Libau, 4,200, 5s. 3d.; 1,700, 5s. 6d.; Veile, 900, 6s. 3d.; Riga, 4,200, 5s. 3d.; 2,000, 5s. 3d.; 2,000, 5s. 9d., 500, 3,200, 5s. 4½d., October 20-25; Nicolaieff, Odessa or Theodosia, 5,500, 10s.; Odessa or Nicolaieff, 5,500, 9s. 8d., 750; Fredericia, 1,000, 5s. 10½d.

Grimsby to Veile, 900, 6s. 3d.; Graao, 3,200, 5s. 3d.; Sound, 1,300, 5s. 9d.

Warkworth to St. Petersburg, 2,300, 6s. 3d.

Boston to Bordeaux, 700, 6s.; Drammen, 625, 6s. 10½d.; Christiania, 800, 6s. 3d.

Methil, Burntisland or Immingham to Christiania, contract, 30,000 tons coal, 5s. 1½d., October-March shipment; North Norway, 2,000, 6s.

Grangemouth to Cronstadt, 2,600, 5s. 6d.; 2,600, 5s. 9d.; Bordeaux, 2,200, 8 fr.

Wales to Mexillones, sail, 19s., fuel; West Coast South America and home, sail, 42s. 9d. in and out, 43s. 3d. stiffened; West Coast South America, sail, 42s.

Goole to Bruges, 750, 4s. 6d.

Hamburg to Far East, six ports, 28s. 9d., October; San Francisco, sail, 20s.

Immingham to Reval, 2,500, 5s. 6d.

Partington to Odessa, 10s.

Glasgow to Barcelona, 10s.; Buenos Ayres, 19s. 6d. October-November.

United Kingdom to West Australia, 25s.

Methil to Venice, 3,600, 11s. 6d.

Newport River to Bona, 1,600, 14 fr., fuel.

Port Talbot to Rochefort, 1,900, 7½ fr.; Nantes, 1,300, 7½ fr.; Genoa, 9s. 7½d., October; Savona, 9s. 7½d., October; Spezzia, 9s. 7½d., October.

Forth to Genoa, 3,500, 10s.; Savona, 3,500, 10s.; Leghorn, 3,500, 10s.; Arandal, 800, 6s. 6d.

London to Cape ports, sail, £2,650.

Fife to Genoa, Savona or Leghorn, 2,000, 10s.; 3,500, 10s.; Reykjavik, 1,200, 11s.

Rotterdam to Bordeaux, 2,550, 6s.; 5,150, 6s., steam coals, 6s. 9d. fuel; 3,750, 6s.; Bilbao, 3,800, 5s. 6d., end October; Porto Vecchio di Piombino, 4,600, 9s. 3d.; Marseilles, 3,800, 11 fr., 600, 10-70 fr., 900, 300 tons coke at same freight, 4,800, 11 fr., October 22-25; Boulogne, 2,700, 5s. 11½d.; Bagnoli-Ports Ferrajo, 5,000, 9s., October 23; Naples, 5,000, 9s., October 20.

Homeward charters:—Azof, 6,000, basis Rotterdam 10s. 7½d., with options, 3d. less barley, October-November; basis 10s. 7½d. Rotterdam, with options, cancelling November 5; Kherson, Nicolaieff or Odessa, 6,900, Rotterdam 9s. 6d., Weser 9s. 9d., Hamburg 10s. 6d., 3d. less barley, October; 5,000, Rotterdam 9s. 6d., Emden or Weser 9s. 9d., Hamburg 10s., 3d. less barley, October 20-28; 6,500, London or Rotterdam 9s. 3d., Antwerp or Weser 9s. 6d., Hamburg 9s. 9d., 3d. less barley, November 10-30; Odessa, 5,800, Weser 10s., Hamburg 10s. 3d., on d.w., October-November; Novorossisk or Theodosia, 6,900, berthed Hamburg, 10s., October-November; Port Pirie, 7,500, Antwerp, 30s., ore, November-February; Christmas Island, 2,347 net, Fiume, 27s., November; 28s., Gothenburg or Stockholm; Kohsi-chang, 2,771 net, United Kingdom-Continent, p.p., 25s. 6d., November; Gulf, 1,100 stds., 10 per cent., Bordeaux, Bayonne or Tyne, 11s. 3d., November; Calcutta, 3,322 net, Bombay or Kurrachee, Rs. 6, November; 2,305 net, Colombo, Rs. 4.12, October; 2,455 net, Kurrachee, Rs. 6, November; Sulina, 3,700 max., Belfast, 11s., October-November; 3,500, 10 per cent., 10s. 6d., November-December; 3,850, 11s. 3d. n.c. or any, 11s. 9d. Hamburg, October; Bilbao, 2,900, Rotterdam, 5s. 3d., ppt.; 4,400, 5s. 1½d., ppt.; 1,800, Middlesbrough, 5s. 9d., ppt.; 3,000, 5s. 7½d., October 23; 1,350, 5s. 7½d., October 24; 2,400, Newport, 5s. 3d., ppt.; Savannah, 2,500 net, Liverpool or Bremen, 33s. 9d., November-December; 34s. 3d.; 1,959 net, 158 ft., Liverpool or Bremen 37s. 6d., Havre 38s. 9d., October-November; Bombay, 2,953 net, London, 52s. 6d., November; 2,140 net, Bagnoli, 20s. 6d., ore, October; Aden, 2,669 net, Rangoon, Rs. 6.4, November-December; Saleef, 3,036 net, Calcutta, Rs. 6.6, spot; 2,440 net, Rs. 6, November; Alexandria, 2,036 net, London, 9s., end October; 2,780 net, Hull 8s. 3d., London 8s. 9d., part general, October; 2,179 net, Harburg, 9s., part general, October-November; Western Australia, sail, 52s. 6d., London; time charter, Mediterranean trade, 2,700, £650, six months' delivery and re-delivery United Kingdom-Continent; time charter, Transatlantic trade, 5s. for 30 days, balances at 4s. 3d., delivery at New Orleans, re-delivery United Kingdom-Continent; Bunbury, 52s. 6d., London; Western Australia, 4,000 loads, New Zealand, 32s. 6d. two ports, 33s. 6d. three, discharge, November; 6,600, London, lump sum equal to 52s. 6d., December; Saigon, 5,500, Reunion, 21s. 6d., Mauritius 21s., option both ports, 22s., November; 7,330, Liverpool, 26s. 6d., rice meal, November; 2,492 net, Marseilles, Havre or Dunkirk, 26s. 9d. one port, 27s. 6d. two ports, October; Kustendje, 4,100, Rouen, 14s. 6d., oats, October-November; Carthage, 6,500, Rotterdam, 6s., October; 5,000, Rotterdam, 6s., option Emden, 6s. 3d., ppt.; Algiers, 4,000, Cardiff, 5s. 3d., early November; 4,000, Rotterdam, 6s., ppt.; Tunis Coast, 4,000, Sunderland, 17s. 6d., esparto, October; Melbourne, sail, 23s. 9d., Cape, November; time charter, Australian and Eastern trade, 5s. 3d., one round trip, delivery and re-delivery Newcastle, N.S.W., via Java; Tampa, 17s. 6d., Venice; Poti, 7,000, Antwerp 12s. 9d., Rotterdam 12s. 6d., ppt.; 5,400, Antwerp or Rotterdam, 12s. 6d., October; Ghenitshesk, 3,500, Riga, 20s., salt, October; Danube, 4,850, L.H.A.R. 11s., Hamburg 11s. 6d., 3d. less barley, 1,000 tons oats 2s. extra, Sulina 1s. less, October-November; Moji, 2,995 net, Colombo, 8s. 6d., December; Burmah, 6,700, United Kingdom-Continent, 25s. o.c., February-March; Northern Range, 25,000 qrs., 10 per cent., Mediterranean, 3s. 4½d. one port, 3s. 6d. two ports, November; 17,000 qrs., Havre or Bordeaux, 2s. 9d., October-November; Mobile, 1,960 net, 163 ft., United Kingdom-Continent, p.p., 40s., cotton, November; Bahia Blanca, 2,579 net, United Kingdom-Continent, 16s. 9d. o.c., less 61, January; La Goulette, 2,400, East Coast United Kingdom, 9s. 6d., f.t., November; Santander, 1,600, Rotterdam, 6s., ppt.; British Columbia, sail, 37s. 6d., Sydney, N.S.W.; Columbia River, sail, 43s. 9d., Valparaiso or Pisagua Range; Gulf timber port, sail, 15½ dols., River Plate, option Bahia Blanca 16 dols.; time charter, Eastern trade, 4s. 3d., one round trip, delivery Tyne, re-delivery United Kingdom; Novorossisk, 3,800, Denmark, basis 14s. 3d. one port, oilcake, November; South Australia, 6,600, United Kingdom-Continent, 30s. 9d., October-November; Philadelphia, 50,000 qrs., 10



Liverpool or Bremen, 39s., November; San Lorenzo, 5,200, 10 per cent., United Kingdom-Continent, 13s. 6d. o.c., less 10 per cent., October-November; San Juan, 3,500, Rotterdam, 7s. 9d., 10 per cent., October-November; Seriphos, 4,000, Glasgow, 7s. 3d., ppt.; Sifnor, 3,300, Middlesbrough, 6s. 7½d., ppt.; Cuba, 7,000, Northern States, 9s. 3d., ore, September; North Australia, sail, 31s. 3d., United Kingdom-Continent; Wallaroo, sail, 31s. 3d., United Kingdom-Continent; time charter, European trade, £3,800, 32 months; Vladivostok, 31s., United Kingdom-Continent, January.

COASTWISE SHIPMENTS DURING AUGUST.

According to the monthly coal tables, the following were the quantities of coal shipped coastwise during the month of August:—

From	Total cargo.		Total bunker.	
	1912	1913.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.
Bristol Channel ports .....	328,417	305,794	22,583	20,753
North-western ports .....	287,029	261,892	76,626	72,551
North-eastern ports .....	690,913	627,938	22,758	32,668
Humber ports.....	208,036	200,077	15,210	9,212
Other ports on east coast.....	19,050	5,340	7,876	7,530
Other English ports .....	3,228	2,461	7,400	7,280
Total from England and Wales .....	1,536,673	1,403,502	152,453	149,994
Ports on east coast of Scotland .....	128,938	112,261	19,022	15,449
Ports on west coast of Scotland.....	144,962	121,373	39,136	42,576
Total from Scotland .....	273,900	233,634	58,158	58,025
Irish ports .....	—	12	2,878	3,708
Total from United Kingdom .....	1,810,573	1,637,148	213,489	211,727

The destination of cargo shipments was as follows:—

To ports in	August 1912. August 1913.	
	Tons.	Tons.
England and Wales .....	1,253,382	1,130,945
Scotland .....	135,577	108,978
Ireland .....	421,614	397,225

Shipments to London amounted to 684,933 tons.

COAL, IRON AND ENGINEERING COMPANIES.

**Anglo-African (Oran) Coaling Company Limited.**—This private company has been registered, with a capital of £24,000 in £10 shares, to carry on coaling stations or depôts, and the business of coal merchants, coal factors and contractors, and dealers in coal and other fuel. First director, Charles Edward Evans. Registered office, 101, Leadenhall-street, E.C.

**Baldwins Limited.**—The profits on the 12 months ended June 30, including balance of interest and dividend account, amounted to £275,128, as against £132,998. Against this sum the following charges have been made:—£14,746 for management expenses, including income-tax, directors' and trustees' fees, solicitors' and auditors' charges, &c.; £3,360 for expenditure on alterations, improvements, and development of mines, and £39,000 for depreciation. The payment of premiums on sinking funds for the redemption of leaseholds and debenture stock absorbs £11,357, and payment of the debenture interest £22,500. The amount required for the preference dividend is £13,750, which includes the dividend payable on August 1, 1913. To the balance thus left of £170,414 has to be added the sum of £48,826 brought forward, making £219,241. The directors have appropriated £115,186 to reserve (against £60,000), and they recommend a final dividend of 7½ per cent., free of tax (making 10 per cent. for the year) on the ordinary shares, leaving £49,055 to be carried to the credit of next year's account. After transferring the above-mentioned sum of £115,186 to reserve, making the total reserve £415,186, the directors have written off the sum of £165,186, being the amount hitherto standing in the balance-sheet for goodwill, still leaving at the credit of reserve £250,000.

**Bede Metal and Chemical Company Limited.**—An extraordinary general meeting will be held on Tuesday, October 21, at Newcastle, for the purpose of confirming as a special resolution the following motion which was unanimously passed at the extraordinary general meeting of the members of the company, held on September 30 last, viz.: "That the capital of the company instead of being divided into 229,120 shares of 10s. each, be divided into 114,560 shares of £1 each by consolidating every two of the existing 10s. shares of the company into one new £1 share."

**Blackburn (Thomas) and Sons Limited.**—This private company has been registered, with a capital of £10,000 in £10 shares, to carry on the business of engineers, iron and steel founders, smelters and galvanisers, &c., and to enter into an agreement with Thomas Blackburn, John Blackburn, Henry Blackburn and James Blackburn, who are the first directors. Qualification, 50 shares. Registered office, Hermon Forge, Hermon-street, Preston.

**Blaencorrgw Colliery Company Limited.**—This private company has been registered, with a capital of £8,500 in £1 shares, to acquire the benefit of an agreement for the lease of certain mines or seams of coal and other minerals lying beneath Blaencorrgw Farm, near Glyncorrgw, Glamorgan, and to carry on the business of ironmasters, steelmakers, colliery proprietors, coal shippers, smelters, engineers, miners and ironfounders, &c. First directors include William Henry Renwick and George Renwick, jun., both of 69, The Exchange, Cardiff.

**Canadian Car and Foundry Company Limited.**—The directors have declared a dividend on the ordinary shares of £1 per share payable December 1.

**Canadian Explosives Company Limited.**—A dividend of £1 per share has been declared on the preference shares.

**Canary Colliery Limited.**—This private company has

been registered, with a capital of £1,000 in £1 shares, to acquire and deal with any copper, lead, tin, coal, iron and other mines, and to deal in all kinds of metals and minerals; also to take over an agreement made between the Cumbrian Mining Company Limited, Charles S. Beale and Anthony Wilson. First directors include William H. Hudson, St. Andrews-place, Penrith.

**Cleveland and Durham Electric Power Limited.**—The report for the year ended June 30 last states that during the year the capital expenditure on works has amounted to £12,396. The gross profits amount to £33,225, as compared with £25,784 for the previous year, an improvement of £7,440. After providing for debenture and other interest there remains a net profit of £14,225 (as compared with £6,720 last year), which, together with £3,589 brought forward, gives an available balance of £17,814, which the directors propose to deal with as follows:—In payment of a dividend of 4 per cent. on the preference shares, £13,348; in

transferring to depreciation and renewals account, £2,000; and carrying forward £2,466.

**Crowther and Osborn Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of electricians and mechanical, electrical and general engineers. Signatories, George V. Drakin and Henry James Osborn. Registered office, 7, Blackfriars-street, Manchester.

**Frodair Iron and Steel Company Limited.**—The report for the year ended June 30 last states that the profit, after charging all the usual expenses of carrying on the business, amounts to £12,448. To this has to be added the balance of £154 brought forward from the preceding year, making a total of £12,602, out of which have been paid or provided for: Balance of income-tax written off, £123; interest at 5 per cent. per annum on £40,000 (a temporary loan contracted in respect of new works pending issue of preference shares), £1,000. The amount now to be disposed of is therefore £11,479, which the directors recommend should be applied as follows:—Dividend on 5,875 preference shares of £1 each at 6 per cent. per annum from February 12 to June 30, 1913, £133; dividend on 50,007 ordinary shares of £1 each at 15 per cent. per annum, £7,501; transfer to general reserve, £2,000; balance to be carried forward to the next account, £1,844.

**Hampton (A. B.) and Co. Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of manufacturers, importers and dealers in iron and steel, ironmasters, smelters, founders, metal workers and electrical and general engineers. First directors: Arthur Bernard Hampton and C. Peel. Registered office, 63, Rodgers-chambers, Norfolk-street, Sheffield.

**Hunt, Nelson and Co. Limited.**—The gross profit amounted to £61,057. The directors recommend that the preference share dividend be paid to November 11, 1913, that £5,650 be reserved to provide for the following half-year's dividend, that £10,000 be carried to special reserve fund for security of dividend on preference shares, and a dividend of 5s. per share paid on the ordinary shares, free of tax, leaving £22,257 to be carried forward.

**Indian Collieries Syndicate Limited.**—The report for the year ended June 30 last states that the net revenue in India amounts to £26,236, and after paying home charges £1,939, debenture interest £3,984, and depreciation £4,119, there is a net surplus of £16,234, which, with the balance of £4,993 brought in from the previous year, gives a sum of £21,227 available for distribution. This the directors recommend be disposed of as follows:—To reserve for redemption of debentures, £3,000; dividend on preference shares, 7 per cent., £1,050; dividend on ordinary shares, 10 per cent., £7,500; directors' commission, £427; leaving to be carried forward, £9,250. Interim dividends of 3½ per cent. on the preference and 4 per cent. on the ordinary shares have already been paid, leaving respectively 3½ per cent. and 6 per cent. still to be distributed. A revised estimate has recently been made by the manager of the coal underlying the company's property, excluding the Patiya Mouzah, and the area west of the Dungri fault. It results, after reduction of 30 per cent. for loss in working, in a computation of 100,000,000 tons first-class quality and 44,000,000 tons second-class Jherria quality down to a depth of 1,500 ft. The current half-year's output has been reduced, in consequence of an exceptional rainfall which took place in August, flooding some of the workings and damaging some of the surface works.

**Nantyglo and Blaiva Ironworks Company Limited.**—The directors announce a dividend of £3 per preference share on account of arrears.

**Newcastle-upon-Tyne Electric Supply Company Limited.**—The above company have just made an issue to the public of £400,000 5 per cent. second mortgage debenture stock at the rate of £95 per £100 stock. This is part of a total authorised issue of £500,000. The bonds are due and repayable at par on March 1, 1949.

**Newthorpe Collieries Limited (Nottingham).**—Subscriptions have been invited by the above company for an issue of £27,993 in £1 shares at par. The capital of the company is

£50,000, of which 14,500 will be issued in payment of the properties. The company has been formed primarily to acquire and work the colliery and freehold minerals known as the Newthorpe Colliery, situated at Newthorpe, near Nottingham, and mining properties adjoining thereto. The area, states the prospectus, contains about 2 million tons of coal, and comprises the following properties:—Freehold minerals under an area of about 75 acres, to a depth of about 190 yards from the surface, containing the coalseams and other minerals. It is estimated that the provision of some £18,000 for development work will be sufficient to ensure an output of coal up to 100,000 tons per annum, and provide the necessary floating capital for trade purposes.

**Northern Colliery Supply Company Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to acquire the business previously carried on by the Northern Colliery Supply Company, and to carry on the business of coal and iron merchants and general dealers in colliery and ironworks requisites. First directors: George L. Wye, James Mitchell and Guy S. Phillips. Registered office, Lloyd-street, Middlesbrough.

**Oran Coal Company Limited.**—This private company has been registered, with a capital of £50,000 in £10 shares, to acquire the business of coal and fuel merchants, contractors and agents, and coal dischargers, carried on in partnership at Oran by F. C. Strick and Co. Limited, of London, and La Société Commerciale d'Affrètements et de Commission, of Paris, under the style of the Oran Coal Company, and to establish and carry on coal depôts, also to enter into an agreement with F. C. Strick and Co. Limited and La Société Commerciale d'Affrètements et de Commission. Signatories: F. C. Strick, Baltic House, E.C., and J. R. Ellerman, 12, Moorgate-street, E.C. First directors: J. Mesnier, F. Gorchs-Chacou, F. C. Strick, F. G. Jonas, A. L. Thomson, Henry C. Albino and E. Brodrick.

**Ostend Foundries Limited.**—This company has been registered, with a capital of £60,500 (60,000 preference shares of £1 each and 10,000 ordinary shares of 1s. each), to carry on in Ostend, Belgium, the business of ironfounders, engineers, ironmasters, steelmakers and converters, miners, smelters and engine makers, also to enter into an agreement with Rodolphe Ghesquiète. Signatories: Thomas Greenhill, Max Adan, N. Cieminson, A. L. Lambert, J. Macadam, H.W. Sidley and S. F. Walker. Registered office, Queen's-buildings, 52, Queen Victoria-street, E.C.

**Quinnells Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire the business of coal merchants, formerly carried on by Ellen L. Quinnell, S. E. Quinnell and George Quinnell at Sevenoaks, Kent, under the style of F. Quinnell and Sons, and to carry on the business of coal factors and coal agents, &c., also to enter into an agreement with E. L. Quinnell, S. E. Quinnell and George Quinnell. First directors include H. Woodall, 4, Kurle Paddock, Sevenoaks; James Outram, 63, High-street, Sevenoaks; E. J. Payne, 78, High-street, Sevenoaks; and Edward Cordy, Endsleigh, Sevenoaks.

**Rogers and Co. (Cardiff) Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business of ironfounders, mechanical engineers, metal workers, manufacturers of agricultural implements, brassfounders, iron and steel converters, &c. First directors: William A. Rogers, Rosebank, Dinas Powis, Glam.; and Frederick George Robbins, The Grove, Birchgrove, Whitechurch, Glam.

**Schute Bros., Brentnall and Co. Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire the business now carried on at Victoria Works, New Bridge-street, Manchester, under the style of "Schute Bros., Brentnall and Co.," and to carry on the business of ironfounders, electrical and mechanical engineers, &c.; also to enter into an agreement with Herbert G. Schute, John Brentnall and Alec W. Schute, who are the first directors, and who reside at 526, Dialstone-lane, Stockport; 44, Gardner-road, Prestwich, Lancs.; and Graythwaite, Alderley Edges, Cheshire, respectively.

**Sneyd Collieries Limited.**—A final dividend at the rate of 15 per cent. per annum (15s. per share) on the ordinary shares, making 10 per cent. for the past year, has been declared. The sum of £6,473 has been allocated for special expenditure, £10,000 placed to the reserve, £15,000 to a special expenditure suspense account, and £26,717 carried forward.

**United National Collieries Limited.**—The directors have issued a circular to the shareholders stating that, as a result of a recent revaluation of a portion of the assets of the company, the directors find that the value of the company's assets exceeds the amount of its liabilities and issued capital by a substantial sum. They have therefore transferred to reserve account the surplus ascertained on such revaluation, together with such a sum from the amount carried forward on December 31 last as will enable them to carry out alterations in the capitalisation of the company which they have for some time past considered desirable. They propose that the capital shall be increased to £800,000 by the creation of 200,000 additional ordinary shares of £1 each and 200,000 6 per cent. cumulative preference shares, also of £1 each, and that 331,780 of the new shares (in equal moieties of preference and ordinary shares) shall be issued as fully paid up to the holders of the existing shares, by way of capitalisation of the greater part of the sum standing to reserve account as above mentioned. The directors also propose that each of the present £10 shares shall be divided into 10 shares of £1 each. The result of these proposals will be that the holders of the existing shares will, in respect of each such share of £10 held by them, become the holders of 10 ordinary shares of £1 each, and, in addition, will receive, on the proposed capitalisation of the greater portion of the sum standing to reserve account, five ordinary shares of £1 each and five 6 per cent. cumulative preference shares of £1 each in respect of each £10 share of their present holdings.

**Wilkes (Samuel) and Sons Limited.**—This private company has been registered, with a capital of £3,000 in £1 shares, to acquire the goodwill of the business of iron and brass manufacturers, and general hardware merchants, formerly carried on by S. Wilkes under the style of S. Wilkes at Bloxwich, Staffs., and to enter into an agreement with Samuel Wilkes. First directors: S. Wilkes, 37, Park-road, Bloxwich; Jonah Wilkes, "The Brades," Lichfield-road, Bloxwich; and Alfred Wilkes, 65, Lichfield-road, Bloxwich.



## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

## Abstracts of Contracts Open.

ARDEE (IRELAND), OCTOBER 21.—About 250 tons best Scotch coal (screened free from slack), for the Guardians. Tenders to the presiding chairman of the Board of Guardians.

BARROW-IN-FURNESS, OCTOBER 27.—Coal, for the Corporation. Forms from the Director of Education, Town Hall.

BEDFORD, OCTOBER 20.—Coal and coke, for the Bedfordshire Standing Joint Committee. Tenders to Mr. W. W. Marks, clerk of the Peace, Shire Hall, Bedford.

CARDIGAN, OCTOBER 31.—Best Staffordshire screened coal (cobble size), for the Cardigan District Education Committee. Tenders to Mr. Ivor Evans, district clerk, District Education Office, Cardigan.

DUBLIN, OCTOBER 29.—Coal for outdoor relief, by the bag, for the South Dublin Guardians. The coal to be best Wigan, and each bag to contain 10 stone. Tenders to Mr. John P. Condon, clerk of the Union, 1, James's-street, Dublin.

MORLEY, OCTOBER 27.—House coal, for the Corporation. Forms from Mr. F. Thackray, town clerk.

NEATH, OCTOBER 28.—Between 2,000 to 2,500 tons of through-and-through or small steam coal for the Electricity Generating Station at Court Sart, for the Rural District Council. Forms from Mr. G. H. Thompson, electrical engineer and manager, 12, Green-street, Neath.

STOKE-ON-TRENT, OCTOBER 22.—Coal, slack and coke, for the Education Committee. Forms from Dr. W. Ludford Freeman, director of education, Town Hall, Hanley, Stoke-on-Trent.

TREDEGAR, OCTOBER 21.—Coal, for the Bedwellty Guardians. Forms from Mr. H. J. C. Shepard, clerk to the Guardians, Union Offices, Tredegar.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &amp;c.

ALTOFTS (NEAR WAKEFIELD), OCTOBER 27.—Sludge Filters.—Construction of sludge filters at their sewage works, for the Altofts Urban District Council. Specifications obtained from Mr. J. C. Coates, surveyor, Council Office, Altofts.

ASHCHURCH, NOVEMBER 18.—Water Main.—For laying of a water main for a distance of about 4½ miles in the parish of Ashchurch, and other works in connection therewith, for the Tewkesbury Rural District Council. Specification obtained, on payment of £1 ls. (returnable), from Mr. H. A. Badham, clerk to the Council, Tewkesbury.

BRUSSELS, OCTOBER 25.—Rolled Steel.—About 150 tons of galvanised rolled steel and 36,183 galvanised mild steel bolts, for the Post and Telegraph Service of the Belgian Government. Information at the Hôtel des Postes, Place de la Monnaie.

CANBERRA (AUSTRALIA), NOVEMBER 24.—Pumping Plant.—Tenders are invited by the Commonwealth Department of Home Affairs for the supply of waterworks pumping plant for Canberra, the new Federal capital in New South Wales. The contract is divided into two sections, viz.:—(1) Pumps, motors and switchboards; (2) transformers and transformer switchgear. Forms, &c., from the works director for New South Wales, Custom House, Sydney.\*

CHRISTIANIA (NORWAY), DECEMBER 1.—Coal Discharging Machinery.—Tenders are invited by the Norwegian Main Railway for the supply of two coal-discharging machines, each capable of discharging at least 50 tons per hour.\*

DUNDEE, OCTOBER 27.—Tar Distillation Plant.—Erection of tar distillation plant, &c., for the Corporation. Forms from Mr. Alex. Yuill, engineer's office, gasworks, Dundee.

HASTINGS (NEW ZEALAND), DECEMBER 18.—Turbo Pumps, &c.—Tenders are invited by the Hastings Borough Council for the supply and erection of two sets of high-lift turbo pumps and electro motors, together with suction and delivery piping, &c. Specification, &c., may be obtained on payment of £2 2s. (returnable), from the Town Clerk, Hastings, New Zealand.\*

IVYBRIDGE (DEVON), NOVEMBER 7.—Reservoir, &c.—Construction of a reservoir on Harford Moor, and the providing and laying of about 2 miles of cast iron pipes, for the Ivybridge Urban District Council. Specifications at the office of the engineer, Mr. H. Francis, M.I.C.E., 12, Lockyer-street, Plymouth.

JOHANNESBURG, OCTOBER 28.—Boiler Tubes.—Tenders are invited by the South African Railways Administration for the supply and delivery of iron and steel boiler tubes. Copies of the specification and form of tender can be obtained from the office of the High Commissioner in London for the Union of South Africa, 32, Victoria-street, S.W.\*

KETTERING, OCTOBER 27.—Cast Iron Pipes, &c.—Cast iron pipes and specials, for the Urban District Council. Forms obtainable from Mr. T. R. Smith, Market-place, Kettering.

LONDON, OCTOBER 29.—Turbines, &c.—Steam turbines and condensers, &c., and turbo-alternators, for the directors of the East Indian Railway Company, as per specification to be seen at the company's offices. Tenders to Mr. C. W. Young, secretary, Nicholas-lane, London, E.C.

LONDON, NOVEMBER 3.—Corrugated Sheets.—Galvanised corrugated sheets to the Egyptian War Department. All particulars obtainable from Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.

LONG MARSTON, OCTOBER 25.—Water Mains.—For the provision, laying and jointing of about 873 yards of 3 in. cast iron water mains, together with valves, hydrants and other fittings, for the Marston Secca Rural District Council. Forms may be obtained at the offices of the engineers, Messrs. Willcox and Raikes, 63, Temple-row, Birmingham, on payment of a deposit of £2 2s. (returnable).

LOUGHBOROUGH (LEICES.), OCTOBER 21.—Irrigation Works. Provision and construction of cast iron distributing mains, together with manholes, controlling valves, and other appurtenant works on the sewage farm, for the Corporation.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

Specification from Mr. A. H. Walker, A.M.I.C.E., borough surveyor, Town Hall, Loughborough, on deposit of £1 ls. (returnable).

MELBOURNE (AUSTRALIA) NOVEMBER 3.—Galvanised Iron Pipes.—Tenders will be received at the office of the Deputy Postmaster-General, Melbourne, for the supply and delivery of 900 galvanised iron pipes.\*

MELBOURNE (AUSTRALIA), DECEMBER 3.—Steel Blooms.—Tenders are invited by the Victoria Railway Commissioners for 25 steel blooms for piston rods for engines.\*

PENTRE, OCTOBER 21.—Steelwork.—For the Rhondda Urban District Council, steelwork for sheds at Ferndale depot (about 16 tons). Specifications obtained at the Council Offices, Pentre, on payment of a deposit of £1 ls. (returnable).

RESOLVEN, NEAR NEATH.—Headings.—For driving two hard headings from No. 1 Rhondda seam to No. 2 Rhondda seam, each about 200 yards long, at Glyn Merthyr Colliery, Resolven, near Neath. Particulars obtainable from Mr. Evan Lewis, mining engineer, Atlantic-buildings, Swansea.

SHEFFIELD, NOVEMBER 4.—Purifier Boxes.—Supply and erection of eight purifier boxes, each 40 ft. by 37 ft. by 6 ft. deep, with luteless steel covers, for the directors of the Sheffield United Gaslight Company. Specifications and drawings can be obtained upon application to the engineer, Mr. J. W. Morrison, M.Inst.C.E., Commercial-street, Sheffield.

SOFIA (BULGARIA), NOVEMBER 17.—Electric Power Plant.—Tenders are invited for the supply and erection of the machinery required for a central electric generating station at the "Pernik" State coalmine. The estimated value of the contract is 200,000 fr. (£8,000), and includes three water-tube boilers, two double-expansion horizontal engines of 250-horse power each, two three-phase dynamos, switchboards, transformers, &c., and a centrifugal pump of 500 litres per minute capacity driven by electric motor.\*

VALENCIA (SPAIN), NOVEMBER 18.—Crane.—Tenders invited for supply of an electric crane for discharging coal at Valencia Harbour.\*

WARRINGTON, OCTOBER 28.—Turbo-alternator, &c.—One 2,000 kw. turbo-alternator condensing plant, pumps, piping and fittings; and one water-tube boiler, mechanical stokers, superheaters, &c., for the Electricity Committee of the Corporation. Specifications obtained on payment of 1 guinea (returnable) from Mr. F. V. L. Mathias, borough electrical and tramways engineer, Howley, Warrington.

WESTHOUGHTON, NOVEMBER 1.—Steel Tank.—For a steel tank of the capacity of 220,000 gallons, for the Urban District Council. Specifications obtained on application to Mr. Geo. Hayes, surveyor to the council, Town Hall, Westhoughton, on payment of 10s. 6d. (returnable).

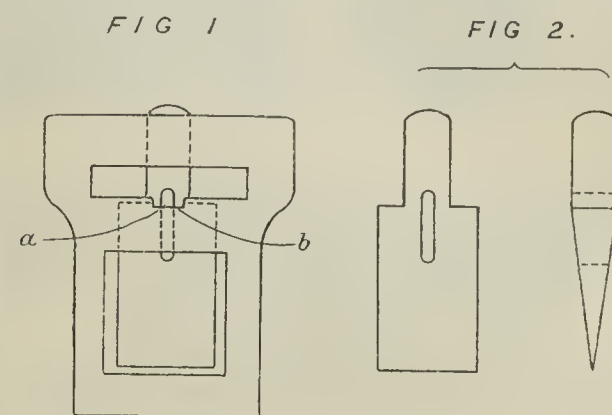
WONTHAGGI (VICTORIA, AUSTRALIA), NOVEMBER 12.—Haulage Engine.—Tenders are invited by the Victorian Railways Commissioners for the supply and delivery of a haulage engine (mechanical portion only), and a 200-horse power electric motor and equipment, for the State coalmine.\*

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

Value of Land in the South Yorks Coalfield.—Statements of considerable interest to the Doncaster district, as showing the effect of colliery development upon it, were made last week at an arbitration court held at the Surveyors' Institute to decide the claim for compensation of Lady Battie Wrightson, of Cusworth Hall, Doncaster, for land compulsorily acquired for the Hull and Barnsley and Great Central Railway Joint Committee through the Cusworth estate, Doncaster. The claim was said to be £23,564. In the course of the evidence it transpired that it was stated at a previous hearing the output of the Yorkshire Main Colliery at Edlington was about 4,500 tons per week. It had now increased to 5,000 tons weekly. Mr. P. N. Blundell, architect and surveyor, superintending the colliery village of Bentley, stated that Doncaster was over-populated. The principal development had been towards Bentley and Balby. He estimated that the total output of Edlington Colliery when it came to full working order would be 1,000,000 tons per annum, and for this 4,000 men and boys would be required. Two thousand houses would be wanted for their accommodation, allowing for two in each house. As there was accommodation for 1,223 houses only, 800 more would be required, while there would be accommodation needed for shopkeepers, &c. The annual output of the brickworks in the Doncaster district was about 14 million bricks, which did not meet the demand at the present moment. If the output was increased by 6 millions it would be consumed. After the colliery villages were finished there would still be a big demand for bricks in Doncaster and the district. —Mr. Edward Holmes, in cross-examination, said that not necessarily all the people employed at the colliery would live in the immediate neighbourhood. The deputies and others might prefer to live in Doncaster, as was the case at other collieries. His total valuation for the land, &c., taken was £7,456.—Mr. Alfred Smith Denton submitted a like valuation. Although he could not speak definitely, he estimated that the depth of soil between the Barnsley seam of coal and the Shafton seam was 400 yards. There was no physical difficulty in working these two seams simultaneously. The Dearne Valley Colliery were working the Shafton seam only. He did not know that coal from the Shafton seam was used specially in potteries for glazing, and that a good deal of it was exported to Sweden and other places. He agreed the colliery housing question was becoming more difficult every year. Colliery companies did not like to face the expenditure of erecting about 2,000 houses at £200 each. He could give a case now in which a colliery company had refused to take on lease houses that were erected, and now they had to build their own houses because no one else would touch them. Take the Maltby main, for instance, or any of the colliery villages. At Maltby the colliery company arranged with the contractor to build, say, 500 houses. As a rule, the contractor agreed to build houses on the conditions that the colliery company took them on lease for 40 years, kept them in repair, and paid all outgoings and everything else. The man was financed as a rule.—The award of the arbitrators will be made known in due course.

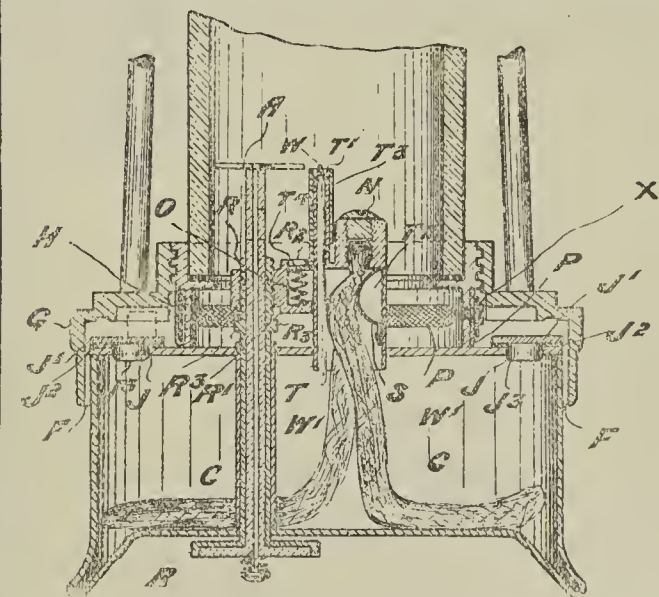
## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

1649 (1913). *Improvements in Miners' Picks.* W. E. Williams, 9, Glen View, Crumlin, Monmouthshire.—This improvement on the invention described in Specification No. 21651, A.D. 1911, consists in providing a slot-hole in the iron shank of the wedge, instead of making the shank long enough to allow it to be bent over side of the shaft head, thereby facilitating the withdrawal of the wedge to release



the shaft, by inserting of the pick blade in the slot-hole. The blade being used as a lever forces the wedge from the shaft, a recess in the shaft head allowing the point of the blade to reach the slot-hole in the iron shank wedge. Fig. 1 shows slot-hole (a) in wedge arranged in position in pick head with its recess (b) to permit insertion of pick point; fig. 2 shows wedge with slot-hole. (One claim.)

3973 (1913). *Improvements in and Relating to Miners' Safety or like Lamps.*—E. A. Hailwood, of 7, Gladstone-terrace, Morley, near Leeds.—Has for its objects to provide means whereby burning wicks may be operated and set by the lamp man or like so as not to give too large a flame after being so set, and when set the miner may regulate the size of his flame so as to reduce same, but not to increase it beyond the limits set by the lamp man, and so the miner cannot obtain a flame sufficiently large enough to reach the gauze and allow him to ignite a cigarette or the like. Also improved means for inserting the cotton wool or like into the lamp container as not to disturb the permanent wicks and other improvements. The accompanying drawing represents a sectional elevation of the lower portion of a miner's safety lamp constructed according to the invention. The wick tube T is formed in several portions in such a manner that the wick W<sup>1</sup> is passed up one portion such as T, then clamped to the side of such portion or folded over and stitched, the lower end of W<sup>1</sup> rests within the container C or is assembled as it were with the cotton wool or sponge (and benzine when the latter is used). In another portion T<sup>1</sup> of the wick tube is placed an upper piece of wick W in such a manner that the lower portion presents a broad surface to a portion of the wick W<sup>1</sup> in order that a mating joint may be formed, the wick drawing its supply of benzine or the like from wick W<sup>1</sup>. The ends or sides of the carrier will preferably be turned over to grip a portion of the wick W and for serving the purpose of a guide when inserting the carrier B into the

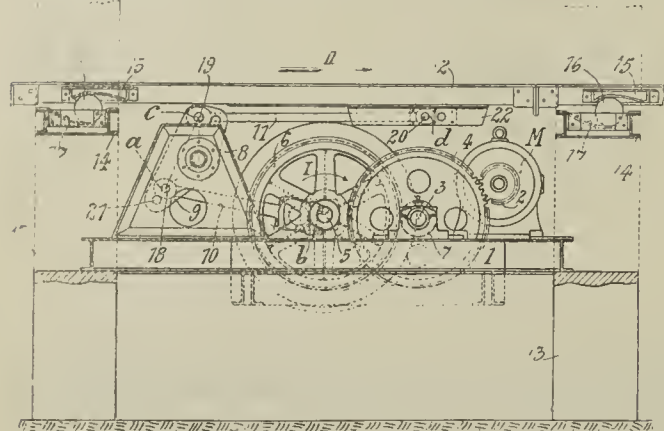


wick tube T<sup>1</sup>, the wick tubes T and T<sup>1</sup> communicating; and such carrier B being provided with dimples, holes or like, to enable it to be secured in and withdrawn from the upper wick tube by a suitable instrument such as a hook or like. The lower or permanent wicks W<sup>1</sup> housed in a box like structure T<sup>2</sup> in the wick tube are preferably of circular section and are caused to press against the wick W by means of a spring such as S, or other means. Apertures are formed in the structure T<sup>2</sup> through which wicks W<sup>1</sup> may be withdrawn and replaced, the apertures being closed by screwed plugs N or the like. To adjust the flame at wick W the upper wick tube T<sup>1</sup> is surrounded with an outer tube T<sup>3</sup>, which may be raised and lowered by a screwed rod or tube R passing through the lamp vessel or container C, such rod having a cranked or jaw-like bracket R<sup>1</sup> connected thereto and cut away to embrace a flange T<sup>4</sup> on outer tube T<sup>3</sup>, a spring or springs O being placed between the lower portion of the bracket and under edge of flange T<sup>4</sup>, which serves to keep the outer tube T<sup>3</sup> upwards. The miner may, however, lower his flame by operating the adjusting screw R so as to raise the tube T<sup>3</sup>, but he cannot unduly raise the flame, because the outer tube T<sup>3</sup> and bracket R<sup>1</sup> are limited in their downward travel by the threaded part of the bracket R<sup>1</sup> coming in contact with a shoulder R<sup>2</sup>, or the tube T<sup>3</sup> coming in contact with a fixed portion of the box structure T<sup>2</sup>, or with a stop or like thereon as will be seen from the drawing. To adjust the wick, the lampman may press down the outer tube T<sup>3</sup> against the action of spring O and expose some of the wick W, which he may grasp and pull upwards as desired. On releasing the tube T<sup>3</sup> it will spring back to the up position. (Nine claims.)

10913 (1913). *Improvements in Jig-conveyors.*—A. Eiskhoff, of Bochum, Germany.—Relates to electrically actuated

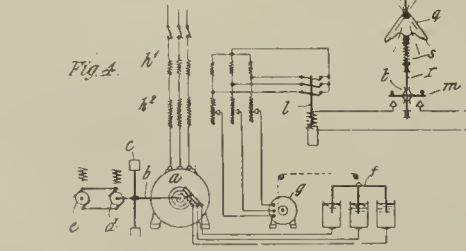
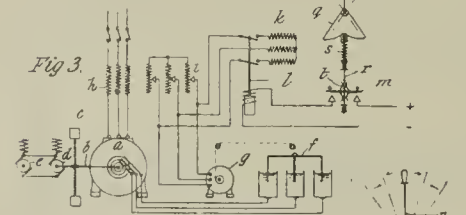
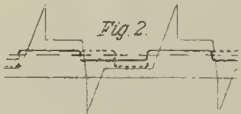
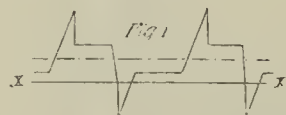


of the jig type, and consists in making one or more of the pivotal connections adjustable for the purpose of altering the throw of the conveyor. The accompanying drawing is an elevation, partly in section, of part of the conveyor mechanism. Rotation of the crank by the motor M, in the direction indicated by the arrow I, rocks the link, and a pin 18, passing through the link and the eye at one end of the rod 10, presses at a against the inner wall of the eye while the crank pin is travelling through the upper half of its path, equal pressure being produced at b where the crank pin passes through the eye at the other end of the rod. The direction of conveyance is indicated by the arrow II, and the conveyor tends continuously to travel in this direction, so that in the case of the pins 19 and 20 at the ends of the rod 11 pressure is exerted at c and d



respectively. These positions of pressure are not changed when the crank passes its right-hand dead centre, because at that moment the weight of the conveyor and its load acts as a driving force, exerting a pull on the rod 11 in the direction of arrow II, this pull being communicated by the link 9 to the rod 10. There being no change of pressure, there is also no noise such as accompanies such change. For shortening the throw of the conveyor the pin 17 is transferred to a hole 21 nearer the lower end of the link; there may be more than two alternative holes for the pin. To allow of altering the position of the surfaces 15 in relation to the run-ways 17, the upper end of the link, or the flange 22 on the conveyor, or both, may have several alternative holes for the pins 19 and 20 respectively. (Two claims.)

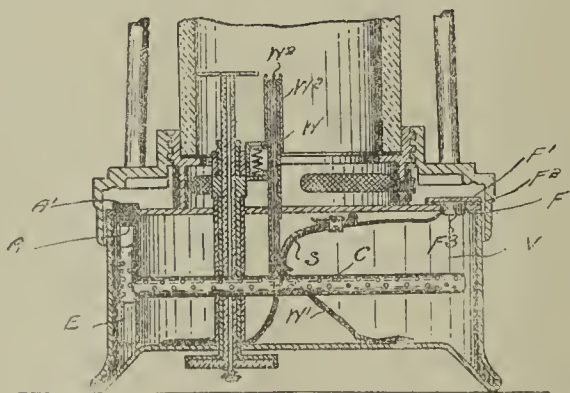
11007 (1913). *Improvements in or relating to Flywheel Storage Arrangements such as used in the Electrical Driving of Hauling or Winding Machinery.* Siemens-Schuckertwerke, G.m.b.H., 3, Askaniischer Platz, Berlin, S.W. 11, Germany.—Is especially applicable to circuit-control arrangements having a motor-generator set working on the well-known Ilgner system in which a flywheel compensates for variations should the load rise above or fall below a definite mean value. In some cases, where such a system of control is used, it is desired to keep the flywheel as small as possible, thus allowing a bigger drop in speed to compensate the load peaks, whilst during the subsequent acceleration period the flywheel will absorb energy from the central station to a corresponding extent. In this connection, however, the following difficulty arises:—It is necessary that the device, usually a relay, which has to control the current of the driving motor of the Ilgner set, should be designed to alter the speed for currents which exceed the mean current demand to the same extent or ratio that the flywheel is



reduced in size. For this reason after each hauling or winding operation or cycle, the motor-generator after quick speeding up and re-energising of the flywheel has occurred, will for the remaining part of the rest period take only a very slight current—viz., the no-load current. Consequently larger periodically-recurring fluctuations in the load on the network are liable to occur. The present invention is designed to reduce these fluctuations as far as possible, this being done by adjusting the automatic speed-regulating device in such a manner that during the acceleration period of the working motor driven by the Ilgner set, it is set to the necessary higher degree, whereas during the retardation period and interval of rest, it is set on the contrary to a smaller degree of load absorption, so as to produce a more gradual acceleration of the flywheel. Whilst, however, the fall of current absorbed by the Ilgner driving motor has previously taken place after the flywheel was completely energised and the current fell to the no-load value, according to the new method the adjustment to a lower current input is made, or as near as possible to the beginning of the retardation period of the working motor. Hence it is possible to supply the Ilgner set with a lower current during these continued periods, which, although

reduced, is still fairly high. Figs. 1 and 2 are diagrams illustrating the different working cycles of a hauling or winding machine when using respectively a large and a small flywheel. Fig. 3 is a general view of an arrangement according to this invention for permitting the economical use of a small flywheel. The driving motor a of the flywheel motor-generator set is connected through the shaft b with the flywheel c, whilst d is the variable-voltage generator that supplies the working motor e, which effects the hauling or winding. The driving motor a may be a three-phase motor having its speed regulated by a slip-resistance f under the control of a motor-relay g, in such a manner that the power taken from the mains remains constant within the one or the other part of the winding cycle. The motor relay g is fed by a current transformer h, the transformation ratio of which is adjustable in any suitable manner by means of a switch i. The machines d e are regulated by a controller (not shown) worked from a handle n. A further adjustment for the power input (regulated by the motor-relay g) is effected by a group of parallel resistances k, which is controlled by the two-pole switch l. The closing of this switch is dependent upon a contact m which are closed when the main controlling lever or handle n is moved away from the middle position (either to the right or left) thus exciting the contactor coil controlling l and closing the same, and are opened when it is moved towards the middle or zero position. To permit of this, a cam-piece q is adapted to press down the slide rod or plunger r of the switch m, when the lever is moved out of the central position, and to allow it to move up again under the action of a spring s when the lever is returned to the zero position. The contact bar or bridge of the switch m is not shown rigidly connected with the slide rod but has merely a frictional connection therewith, by means of a spring-grip device t, for instance. The contact m is therefore closed when the lever begins to move sideways, and remains in its closed position during any further sideways movement and also when the lever is stationary. When, however, the lever is moved back towards the middle position, the contact m is opened. Instead of the frictional-operating arrangement for the contact m, other devices may be employed, such as a tilting contact which is closed on the outward movement of the controlling lever and opened on the return movement, care, however, being taken that the opening of the contact is not effected at the end of the outward movement of the lever but only when the return movement thereof begins. It will be seen that a portion of the secondary current of the current transformer h passes through the parallel resistances k, the remainder going to the motor-relay g. When the parallel resistance k is switched out of circuit a smaller current flowing in the supply mains is sufficient to actuate the motor-relay g, which behaves, therefore, as if it were more sensitive and consequently regulates so as to cause a lower-current input to the driving motor a than when the resistance k is in parallel and diverting part of the current induced in the transformer secondary winding. As the motor-relay g requires under certain circumstances to be of rather large dimensions, and consequently causes an appreciable loss of energy, it is desirable that this loss of energy should not be further increased by that which is due to the parallel resistance k. In the device illustrated in fig. 4, any such additional loss of energy is avoided. For this purpose the current-transformer is divided into two parts h' and h'', the latter of which can be short-circuited through the switch l. The current-transformers, therefore, only need have the dimensions necessary in each case to give the precise amount of power requisite for supplying the motor-relay g. In addition to this, fig. 4 contains a device which is desirable in certain circumstances. For instance, when manoeuvring at the pit bank a varied operation of the controlling lever n is generally required, whereas it is undesirable that the adjustment of the motor-relay should be repeatedly altered. In this case, therefore, the cam q is constructed as shown so that in proximity to the zero position of the controlling lever n it causes no movement of the contact m, but that this movement is only initiated when the controlling lever is moved further out. (Five claims.)

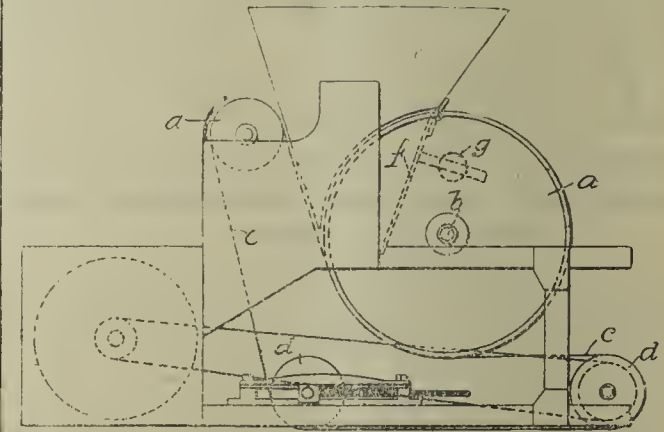
11428 (1912). *Improvements in or connected with Benzine or Oil Lamps and Filling Apparatus in connection therewith.* E. A. Hailwood, of 7, Gladstone-terrace, Morley, near Leeds.—The objects are to arrange and construct improved means for filling the containers of oil or benzine lamps with their contents, in lamps of that type which have a filling plug or tube and means for distributing the benzine to various parts of the packing medium. The accompanying drawing shows a lamp vessel constructed according to one form of the improvement. The accompanying illustration shows modified forms of filling devices. The interior of the lamp vessel or container V is provided with, in one



form, a perforated or slotted coil or tube C having means for the introduction of the oil or spirit such as aperture A, which may be closed by a threaded plug having a squared or like aperture A' to receive a key or like for purposes of insertion or withdrawal. The coil or like C will be so placed in the vessel as to surround or be surrounded by the cotton wool, sponge or the like, and so ensure the thorough and even saturation thereof. To fill the lamp vessel it will by preference be placed under or above a pressure operated pump filler in such a way that the operation of a handle will allow the benzine or oil to force its way into the lamp vessel. Various forms of coils or the like may be used. Usually the coils or like will be supported somewhat centrally in the vessel as shown, and one or more extensions may dip from the coils or arms towards the bottom of the vessel to act as a support, and these extensions E shown dotted may be perforated, as may

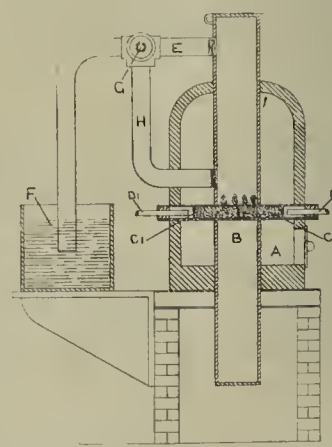
the inlet tube or the like. The various devices may each have any suitable inlet and may be provided with outlets or escape devices, although in many cases the wick tube W may act as an escape. For the purpose of renewing the cotton wool or wicks in the lamp vessel, one or more preferably slot-like apertures F may be formed covered by a metal or like plate F', said plate having indiarubber or like packing F<sup>2</sup> to make a joint with the lamp vessel, the plate F' being dimpled down at F<sup>3</sup> with gauze or like projections to distance off the cotton wool or like from the rubber or like packing. The wick tube W will by preference have a wick W<sup>2</sup>, to mate with a wick W<sup>1</sup>, the lower end of which terminates in the cotton wool or like; access to this wick W<sup>1</sup> is gained through the aperture F, and a spring or the like S is used to press the wick against the upper renewable and adjustable wick W<sup>2</sup> through an aperture cut in the wick tube; the said upper wick W<sup>2</sup> may be carried in a carrier or tube which can be inserted in the fixed wick tube W. The renewable wick W<sup>2</sup> will by preference take the form of asbestos so as to be of a more permanent nature. The spring S may be attached to the plate F' as shown, and so be readily removable, and the plate F' and aperture F will allow of inspection and repair of the coils or like within the vessel. The coils may be in spiral form and may be arranged horizontally or vertically as to thoroughly intermingle with the filling material in the vessel. (Seven claims.)

20938 (1912). *Improvements in Charging Apparatus or Projectors for Coat or other Solid Materials.* R. A. Williams, 63, London-road, Retford, and W. J. Jenkins and Co. Limited, of Beehive Works, Retford, Nottinghamshire.—The improvement consists generally in the use of two separate drums or pulleys mounted at a suitable distance apart, with a guide plate arranged between them so as to regulate the feed aperture through which the material that



is being dealt with may pass on to the projector band or apron. The guide plate is hinged and kept in place by means of a suitable weight or spring, or any other convenient means, so that when large lumps of the material pass through the plate may give way, automatically reducing the feed aperture again to its normal size after the lump has passed. The accompanying drawing is a side view of the whole apparatus showing the general arrangement. (Three claims.)

21304 (1912). *Improvements in or Connected with the Manufacture of Ammonia, and its salts.* T. Winstanley, 19, Old Hall-lane, Levenshulme, Manchester, and F. H. Williams, 47, Church-road, Urmston, Manchester, Lancashire.—By this process nitrogen and hydrogen are brought together whilst in their nascent or uncombined state. To further aid the correct combination, a strong electric current of, say, 150 volts 12 amperes may be employed to pass through or across the retort at the top, an electric spark is formed, and the gases thereby subjected to electrical influence combined with the heat of distillation within the retort. And to further assist the liberation of the gases a small amount of alkali may be added to the refuse being calcined, or the anode can be arranged below the electrolyte and cause the current to pass through it to reach the cathode, in which case a low voltage and increased ampere will suffice. The form of apparatus or plant used for



carrying out this process and invention consists of a retort vertically arranged in which the distillation or calcining is carried out, such retort being circular except where the hydrogen generating arrangement is placed, here the retort is preferably made square so as to accommodate the hydrogen generating tubes conveniently, as these pass across the retort with suitable holes through them, from which the hydrogen can escape as it is generated and come in contact with the gases given off in the process of calcination; such an arrangement allows of a clear passage of the waste material through the retort. The whole of this retort and hydrogen generator is set in brickwork and adapted to be externally heated between the centre and bottom where it is made rectangular, and the two tubes, suitably perforated, and containing the iron turnings and chippings, shall pass horizontally through the retort here. Steam will be admitted at the ends of these tubes to pass through the incandescent iron turnings and cuttings which will oxidise, and set free the hydrogen to escape through the perforations into the mass in the retort, to combine as described with the nitrogen liberated. The gases are led out of the chamber or retort through a pipe or pipes into a hydraulic main or the like, where the ammonia is absorbed by the water. Or they (the gases) may be dried and directly fixed with acid to form a salt such as ammonium sulphate. This process may in some



BRUSSELS EXHIBITION: "GRAND PRIX."

ROUBAIX EXHIBITION, 1911: "GRAND PRIX"

# HOPKINSON'S

## "RDS" Steam Trap

PATENT

SUITABLE FOR ANY PRESSURE.

A large number of these traps have been in use for several years, and our experience has been so satisfactory that we have every confidence in recommending them to steam users. The workmanship and material are of the highest quality, and is altogether a far superior article to the many cheap bucket traps now on the market.

### SPECIAL FEATURES.

SIMPLICITY.

RELIABLE.

QUICK IN ACTION.

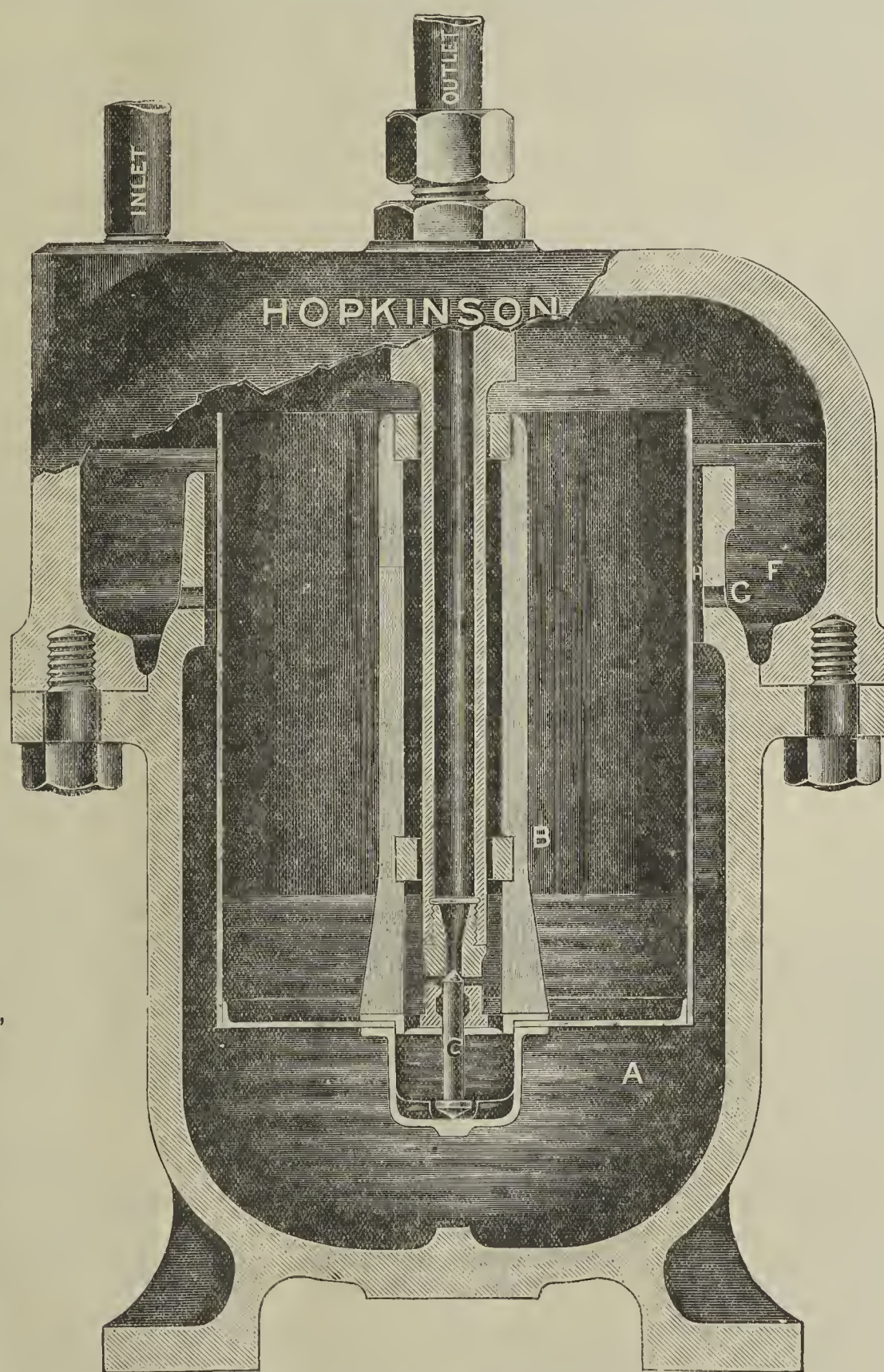
NO DRIBBLING.

STRONG INTERMITTENT  
WATER DISCHARGE.

QUICK CUT-OFF.

WILL LIFT ITS WATER  
2 ft. FOR EVERY 1 lb.  
STEAM PRESSURE.

FITTED WITH VALVE  
AND SEAT OF . .  
HOPKINSON'S 'PLATNAM'  
METAL, which is five  
times harder than .  
bronze and admirably  
suitable for with-  
standing the cutting  
action of the water.



CAST IRON BODY AND LID,  
HOPKINSON'S "PLATNAM" METAL VALVE AND SEAT.

### DESCRIPTION.

This steam trap is of the open float type, and consists in its simplest form of a Water Chamber A, Float with central guide B, Valve C, Water Inlet Pipe, and Water Discharge Pipe. The discharge pipe forms the guide for the float.

The valve remains on its seat until the float has sunk low enough to touch the collar on valve; it then immediately begins to discharge.

The Gallery or Water Pocket F is an important feature, as it fills with water when the Float is at rest; when the Float begins to rise from its lowest position, the water thus collected flows through the hole C into the body A, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most valuable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

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For High-pressure Superheated Steam, High-class Exhaust and Water Sluice Valves for Condensing Plants, &c., Automatic Exhaust Valves, Reducing Valves, Steam Traps, &c., &c.

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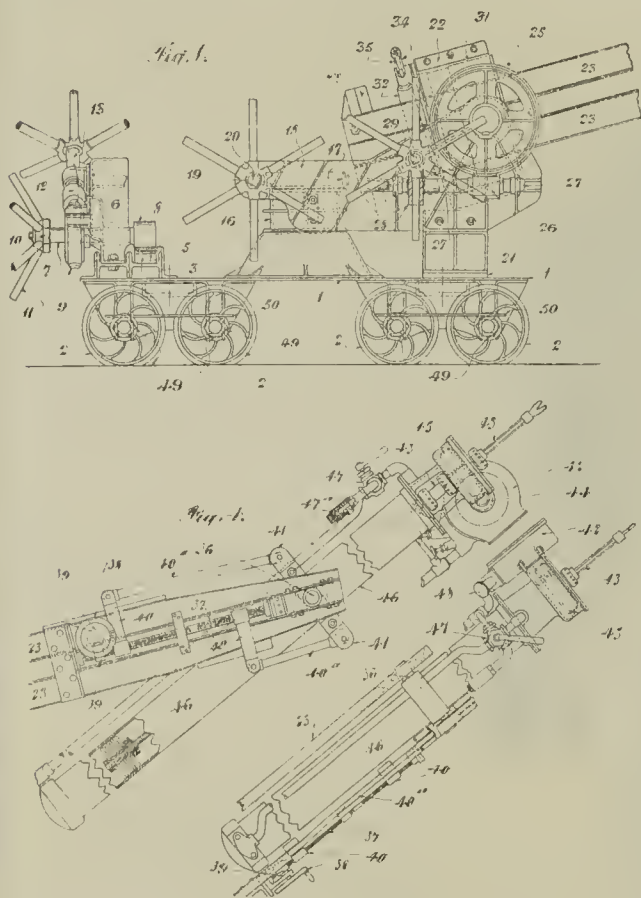
# J. HOPKINSON & CO. LTD.,

## HUDDERSFIELD.



be worked in conjunction with an existing ammonia plant, such as, for instance, an ammonium sulphate plant, where the ammonia is obtained from gasworks liquor. In such a case the products of distillation from the retorts are led into a receptacle containing the gasworks liquor and thereby enrich it with ammonia, and its manufacture is therefore cheapened. The apparatus is shown in the accompanying drawing. (Four claims.)

21305 (1912). *Improvements in Rock Boring Apparatus and Carriages therefor.* May Mining Company Limited, of 3, York-street, Manchester, and C. H. Stocks, of 37, Deansgate Arcade, Manchester.—Relates to and consists of a new or improved construction of rail-travelling or portable hydraulic rock boring apparatus. Fig. 1 illustrates a side elevation of a rock boring machine constructed according to the invention; fig. 4 illustrates a side elevation, and fig. 5 a plan of the drill and drill-operating parts of the machine. According to the invention, the improved machine comprises a carriage or capstan bogie 1 fitted front and back with flanged wheels 2, and having the wheel-axle-bearing frames designed to strengthen the carriage structure where the loads and strains are greatest. At the rear end of the carriage is the locking arrangement, which consists of the strong thrust bars 3, 4, one to be thrust against each side of the tunnel. By the rotation of the shaft 7 by the hand wheel 11 or by the worm 12 when the worm wheel 9 is locked to the shaft, a powerful mechanical force is set up to force and simultaneously lock the thrust bars 3, 4 against the walls of the tunnel to hold the carriage rigidly fixed during the drilling operations. In lieu of locking the carriage by the thrust bars bearing against the sides of the tunnel, it may be locked by the thrust bars bearing against the roof and floor of the tunnel. Pivotaly mounted between the two side cheeks of the capstan 18 is a rotating capstan head 22 in which is rotatably carried a twin boom or jib 23. At the forward end of the twin boom is a swivelling boring tool and feed mechanism, while at the rear end of the twin boom are counterbalance weights 24. The capstan head 22 is preferably constructed as an outer shell in two halves, bolted where split, and one half with a plain trunnion, while the other half has a fixed worm wheel 25 upon an extended trunnion. This outer shell is moved and set in a locked



position by the worm wheel 25, which is operated through a worm screw 26 on shaft 27, said shaft also carrying the large wheel 28 of a pair of skew gears, whilst a pin 29 on the side cheek of the capstan 18 carries the small skew gear 30, which, on being rotated, rotates the capstan head 22 about the trunnions and holds it locked at all times. Within the split outer shell of the capstan head 22 is a rotatable inner split shell 31 machined to receive the thrust reaction of the boring tool and also machined to carry the twin boom and its counterweights. Such inner shell is also provided with mechanism of rotation, consisting of a worm wheel 32 secured to said inner shell 31, and a worm 33 on a shaft 34 with handle 35 in bracket bearings fixed to the capstan head 22. The swivel motion preferably comprises a screwed rod 37 with right and left hand threads. This screwed rod revolves, on motion being given to it through a hand wheel 38 and skew gears 39, and operates, or causes to move, the approaching or retreating screwed pitmans 40, which are connected by links 40\* to the extremities of a cross-bar 41 fixed on the boring engine. The boring engine will comprise a Pelton wheel or water turbine 42 mounted to rotate the boring bar 43 through worm 44 and worm wheel 45. A powerful forcing feed is given to the revolving boring bar, to provide which a long cylinder 46 is used with a piston ram; said piston ram traversing the cylinder and the boring bar being fed forward against and into the rock, or moved backwards away from the rock. The water for operating the ram is controlled by valve 47, which admits the water first to one end of the cylinder and then the other. A portion of the water is admitted to the Pelton wheel under the control of further valves 48. (Five claims.)

**Grimsby Coal Exports.**—The quantity of coal exported from Grimsby to foreign destinations during the week ending Friday, October 10, totalled 20,696 tons, compared with 29,314 for the corresponding week last year. The shipments were: To Ahus, 1,141 tons; Antwerp, 556; Dieppe, 908; Hamburg, 927; Gefle, 5,285; Halmstad, 954; Hamburg, 908; Malmö, 2,331; Malmo, 2,004; Otterlacken, 267; Rotterdam, 632; Riga, 1,623; Skien, 102; Ystad, 1,854. There were no coastal exports.

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

22435. Improvements in band-brakes, particularly applicable to electrically-operated band-brakes for electric cranes and the like. Lancashire Dynamo and Motor Company Limited, R. S. McLeod, and H. B. Whitmore.
22440. Reversing regenerative furnaces. J. S. Atkinson and Coke Oven Machinery Company Limited.
22444. Shaft and iron to be used in hauling trams in and about mines. J. T. Jones.
22476. Mills for grinding, crushing, and pulverising ores and the like. E. S. King and Head, Wrightson and Co. Limited.
22479. Apparatus for casting metals. C. W. Seymour.
22499. Pocket theodolite. Francis Barker and Son Limited and E. W. Barker.
22522. Boring and drilling apparatus. V. Petit.
22532. Chains. W. J. Mellersh-Jackson. (American Chain Co., Inc., United States.)
22551. Coupler for pipes. C. Martin.
22553. Manufacture of axles and appliances employed therein. H. Beaumont.
22568. Tubes or the like, and the manufacture of same. H. Joyce.
22585. Regenerative furnaces. H. Rehmann and H. Bangert.
22597. Adjustable boring tools. S. Blocksom.
22604. Rock-drilling tools. G. A. Chalkley.
22615. Forging machines and the like. W. J. Mellersh-Jackson. (J. Geo. Leyner Engineering Works Co., United States.)
22618. Apparatus for generating or producing gas. W. R. Degenhardt.
22623. Oil-burning forges. W. J. Mellersh-Jackson. (J. Geo. Leyner Engineering Works Co., United States.)
22632. Power gas installations. C. H. T. Alston and P. T. Houston.
22633. Gas washers and dryers. C. H. T. Alston and P. T. Houston.
22647. Means for softening water. G. Buchner.
22654. Method for preventing dust particles escaping from boreholes in mines. W. Alderson.
22657. Furnaces for melting metals. T. Ratcliff and W. Ratcliff.
22675. Steam valves for direct-acting pumps. G. and J. J. Weir Limited and W. Weir.
22692. Manufacture of pig iron. C. A. Keller.
22707. Portable electric lamps. J. Neu.
22712. Bolt and rivet heating furnaces. C. D. McCourt and Bonecourt Surface Combustion Limited.
22723. Electric furnaces. E. Stassano.
22724. Electric furnaces. E. Stassano.
22735. Jig for use in drilling holes. A. H. Bagnold.
22738. Manufacture of fuel and other briquettes and of briquette and other binders. D. J. Davis, J. T. Armstrong, J. Mordan and Petroleum Solid Fuel (Parent) Company Limited.
22740. Fixing turbine blades. A. V. T. Uffelman and G. Baily.
22752. Drilling and boring apparatus. V. Petit.
22763. Process of and apparatus for charging furnaces. W. Puschmann.
22776. Apparatus for automatically opening and closing the gates of pit cages, hoists and the like. J. Fraser.
22830. Shuttle valves for steam pumps and the like. J. W. Harrison.
22849. Elastic fluid turbines. Warwick Machinery Company Limited. (General Electric Company, United States.)
22852. Trucks, more particularly for use with coke furnaces. C. Schnackenberg.
22861. Apparatus for oiling the axles and bearings of coal tubs and the like. A. C. Renton.
22862. Apparatus for oiling the axles and bearings of coal tubs and the like. A. C. Renton.
22873. Working blastfurnaces. C. Semmler.
22874. Utilisation of the heat of slag. C. Semmler.
22875. Utilisation of waste heat in the manufacture of iron. C. Semmler.
22890. Tubes or the like, and the manufacture of same. H. Joyce.
22944. Free dust breathing for mining and other plants. C. Travers.
22981. Steam boilers. Circulators Limited and H. Schofield.
23004. Process and apparatus for smelting metal, metal ores and the like. S. Guggenheim.
23010. Excavators, grabs and similar apparatus. S. H. Priestman and S. Prince.
23021. Apparatus for the resuscitation of asphyxiated persons. R. H. Davis and L. E. Hill.
23025. Furnaces. H. McPhail.

### Complete Specifications Accepted.

To be published on October 30, 1913.

1912.

15963. Free piston compressors or pumps. Akt.-Ges. Brown, Boveri et Cie.
22382. Supply of secondary air to furnaces. Gibbons, Gibbons, Masters and Dann.
22715. Extraction of metals. Pape.
22792. Machine for testing the physical properties of metals. Richards and Bradley.
22815. Toothed wheel gearing. Parsons.
22909. Process for the extraction of gold and silver remaining in iron ores which have already been treated for the removal of sulphur, copper or other metals. Leslie.
22983. Pumps. Zwicky.
23055. Hydraulic pumping engines. Dawson and Horne.
23127. Apparatus for feeding fuel to furnaces. Fine Cotton Spinners' and Doublers' Association Limited and Baron.
23968. Testing chambers for miners' safety lamps or the like. Hailwood.
25198. Steam-condensing plant working under vacuum. Morison.
25601. Sinking or driving shafts, wells, or the like in soft or running strata, and apparatus therefor. Crompton.
26201. Centrifugal machines. Richardson.

27264. Apparatus for testing gas with miners' safety lamps. Baxter.
28626. Weight-recording devices for weighing machines. Denison.
28993. Steam-boiler furnaces. Thornton.
29243. Controlling device for preventing overspeeding and/or overwinding for use in connection with winding or hauling engines and the like. Kirkby.
30079. Operation of regenerative furnaces adapted more especially for the manufacture of steel. Maccallum. 1913.

3037. Rotary air-compressors. Kinney.
3408. Pump. Constantinesco.
5320. Boring or excavating apparatus. Estes.
6822. Rotary pumps. Hansen-Ellehammer.
8550. Apparatus for promoting circulation in steam-generators or the like. Hughes.
8733. Haulage clip for endless ropes. Galloway.
9082. Controlling tapped steam turbines. Bergmann Electricitats Werke Akt.-Ges.
9448. Coal-cutting machine. Scharf.
11353. Car-couplers. Imray. (National Malleable Castings Co.).
12912. Turbines, rotary pumps, and the like. Cartwright.
13072. Manufacture of fire bricks or blocks. Burley.
15102. Hand-operated moulding machines for foundry use. Rudman, Lancey and Craven.
18565. Blades for propellers and turbines. Langen.
19378. Apparatus for controlling supply of fuel to steam-boiler or other furnaces. Fine Cotton Spinners' and Doublers' Association Limited, and Baron.

### Complete Specifications open to Public Inspection before Acceptance.

1913.

19955. Process of and apparatus for recovery of tar from hot distillation gases. Strommenger.
21465. Automatic grab with counter levers. Weigner.
22059. Automatic filling, weighing and measuring machine. Larnle.

## CATALOGUES AND PRICE LISTS RECEIVED.

"Lighting News (No. 2)" is a 16 pp. illustrated booklet, which is issued free on application by the British Thomson-Houston Company Limited. It consists of a number of short, readable articles dealing with various aspects of the illumination question.

In a brief notice, which appeared in the *Colliery Guardian* of October 3, of the "Thermo-feed" regulator, made by Messrs. Ronald Trist and Co. Limited (Coronation House, 4, Lloyd's-avenue), it was inadvertently stated that the makers guarantee that these regulators will maintain the working level with an altitude fluctuation not exceeding  $\frac{1}{2}$  in. from a predetermined point (or, in the case of a water-tube boiler,  $\frac{1}{2}$  in.). The former figure should have been  $\frac{1}{4}$  in. This practically unvarying level, it may be added, ensures the heating of a uniform body of water at all times, no plunging of an unnecessary quantity of cold water into an already heated boiler to cause forced firing, undue expansion and contraction of the plates, and the consequent straining of rivets and seams.

Users of coal-cutting machinery must be familiar with the "data cards" issued monthly by Messrs. Mavor and Coulson Limited, of Mile End, Glasgow, giving particulars of actual conditions under which their "Pick-quick" coal-cutters are working. The whole series, extending over seven years, has now been collected in book form, and rearranged with a view to convenience and reference. These detailed particulars, illustrated, as they are, by clear diagrams, should assist in the practical solution of many difficult coal-cutting problems. They illustrate the work of the "Pick-quick" in longwall work in a wide variety of conditions, in different thicknesses of seams—in steep seams, with bottom, intermediate and high holings, in wide headings and openings out, &c., whilst descriptions are given of the varied types of machine, together with practical hints as to their management. We must congratulate the firm on their enterprise.

## GOVERNMENT PUBLICATIONS.

\* \* Any of the following publications may be obtained on application to this office at the price named post free.

- Southern Nigeria: Report on Mineral Survey, 1911, 1½d.
- Trade and Navigation Returns for September, 1s. 9d.
- Trade Boards Provisional Orders Confirmation Act, 1913, 6½d.
- Report on Changes in Rates of Wages and Hours of Labour, 1912, 1s. 3½d.
- Consular Report: Netherlands, Curacao, 1912, 7½d.

## PUBLICATIONS RECEIVED.

"The Engineering Magazine" (Vol. 46, No. 1), October, price 1s.; "The Journal of the Chemical, Metallurgical and Mining Society of South Africa" (Vol. 14, No. 2), August, price 3s.; "Cassier's Engineering Monthly" (Vol. 44, No. 4), October, price 1s.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnership:—A. Hine and J. S. Richardson, carrying on business under the style of the County Garage and Engineering Works, at Victoria Garage, King's-road, Hove, and High-street, Lewes, in the business of motor garage works, motor-car agents, and engineers and motor body builders.



# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY OCTOBER 24, 1913.

No. 2756.

## EXPLOSION AT AUCKLAND PARK COLLIERY

A report on the causes of and circumstances attending an explosion which occurred at Auckland Park Colliery, Durham, on October 27, 1912, by Mr. R. A. S. Redmayne, C.B., H.M. Chief Inspector of Mines, and Mr. A. D. Nicholson, H.M. inspector of mines, has been issued as a White Paper [Cd. 7087].

This mysterious explosion occurred on the early morning of October 27 of last year, and the delay in furnishing a report has been due to the fact that as there was, fortunately, no one in the seam at the time of the explosion, there were no lives lost, and little or no evidence of witnesses was available. It was, therefore, the more necessary that every possible indication

nearly half of which is obtained from the Harvey seam, the thickness of which at the shafts is 3 ft. 5 in.

The ventilation was induced by means of a Waddle fan situated near the top of the upcast pit, and the last measurement prior to the explosion showed it was exhausting 52,450 cubic feet per minute from the Harvey seam at a pressure of 1.7 in. water-gauge. In addition to this a small portion of the Harvey seam air-current, amounting to 6,960 cubic feet per minute, was drawn to the Westerton Sirocco fan situated at the South pit.

Firedamp has been met with in every district in the Harvey seam at some time or other, but not in such quantities as to create any difficulty in the ventilation. The most recent entry of "gas" in the report books

About 1.55 a.m. the banksman on duty, who was in the weigh cabin about 6 yards from the north pit, saw a flash come out of the shaft with a cloud of dust, accompanied by a loud report. The headgear was slightly shaken, and the dust cleared away very quickly. He tried, but found it impossible, to telephone down the pit. The waiter-on at the Brockwell seam was in the inner cabin about 1.55 a.m. and heard a loud report, and was instantly covered with smoke and dust. Shortly afterwards he was joined by the pumpman, and an examination by them showed that some jackets and a notice board had been blown 30 to 40 yards away. The shaft signals were broken, and it was impossible to communicate with the surface. The dust cleared away



FIG. 1.—PLAN OF WORKINGS IN THE HARVEY SEAM, AUCKLAND PARK COLLIERY.

respecting force and burning, abrasion of electrical cables, &c., as shown on the roadways of the mine should be noted, and this necessitated the careful clearing of the roads, work which has taken months to accomplish. The explosion took place in the Harvey seam, the damage being practically confined to that level. So considerable was the explosion that, had it occurred while persons were at work in the seam, the loss of life would, without doubt, have been very great.

The Harvey seam exists at a depth of 636 ft. from the surface at the shafts, and the workings in this seam are very extensive. There are two coal-drawing shafts, both of which are sunk to the Brockwell seam at a depth of 900 ft. from the surface. In addition to the Brockwell seam, the Busty, Harvey and Low Main seams are worked, the total output being about 1,200 tons a day,

showed that it had been detected on September 11, 1912, in the Drift Way.

In the south or upcast pit, drawing of coal did not take place below the Harvey seam; the Busty, Brockwell and Low Main seams being worked from the north or downcast shaft. The Harvey seam workings extend about 2½ miles towards the north-east, and about eight months previous to the explosion were holed through to Westerton Colliery, belonging to the same firm. There was also a holing through to Leasingthorne Colliery, but its use as a travelling road had been discontinued, although a small air current still passed through to Leasingthorne Colliery.

The explosion occurred at about two o'clock in the morning, and it was rather unusual for no one to be at work in the Harvey seam at this time.

in about 15 minutes. The pumpman in the Brockwell seam corroborated the evidence of the waiter-on, and stated that everything was just as usual until he heard a deafening report and the lights went out, and the electric pump at once stopped. He noticed a rush of wind, accompanied by a cloud of coaldust and thick smoke. The master-shifter, who was at the time of the explosion in the Brockwell seam workings, did not notice anything unusual inbye; there was no disturbance there at all. There were 24 men in this seam, all of whom were got out safely. The master-shifter in the Low Main seam, when about 160 yards from the shaft, heard a heavy "bump," which was followed by a rush of wind and dust. There were ten men at work in this seam, and all were got safely to the surface within three hours of the explosion. According to the switchboard



on the surface, the only motor which was at underground at this time was one working a pump in the Brockwell seam, but the current was on all the other cables, and the three-core single-armoured cable in the Harvey seam for a distance of over two miles to the Eden Way pump was therefore "live" at a pressure of 2,400 volts. A few minutes before 2 a.m. all the pit fuses were blown, and the fault detectors showed there was an "earth" on.

#### Condition of the Workings.

A descent was made by the upcast shaft, which was undamaged. In the shaft siding, however, both sets of double doors were dismantled and blown outbye towards the shaft. Considerable damage had been done to empty tubs. The iron self-acting doors belonging to the inbye set of doors, together with masonry from an air-crossing, had been blown a distance of over 20 yards, and one of the 9-in. partition walls against the travelling doors was practically demolished. Just beyond the second set of doors the overman's cabin was wrecked. Almost opposite was a stenton, through which passed the electric cable supplying current to the motor working the endless rope haulage near the shaft. This cable had been jammed against one of the partition walls of the self-acting doors and bent outbye. Between this point and the old disused South Way empty tubs were overturned, in one case the box being partly displaced in an outbye direction from the tram. The coals in two full tubs which were off the way were also piled up in the same direction. The master-wasteman's cabin in the immediate vicinity was wrecked. Proceeding inbye along the engine plane it was found that little damage had been done to the empty tubs, but there was a little coked dust on the outbye ends of some of them. As the party proceeded further inbye it was observed that the coked dust gradually took the form of thin bands on the outbye side of the props and narrow thick bands on the opposite side. On a tub full of chocks, coked dust was observed on the iron bands on the outbye side. Passing the intake crosscut from the downcast shaft, along which road the electric cable passed to the main haulage road, an examination showed that the force of the explosion had only penetrated a few yards into the 1st North Way, but considerable damage had been done along the crosscut and the whole of the intake airway back to the downcast shaft. At this point the cables entered the Harvey seam, and these were found to have been torn in two by the force of the explosion. The actual damage in the shaft did not extend above the Low Main seam level. The electric distribution board in the Harvey seam, close to the downcast shaft, was wrecked, and the fuses had been knocked off (one being broken), but they had not been blown. The shaft stables were a short distance from the main intake, and the force of the explosion extended into them, several stalls and the air-current regulator being damaged, but none of the 40 ponies were killed, although one died some time after from injuries received from the explosion. Returning to the main engine plane again and proceeding inbye past the 1st North Way end, tubs on both lines of rails were found to have been smashed into all sorts of shapes; in some cases the tub bodies had been forced 2 ft. outbye beyond the trams to which they belonged. Coked dust was again found on the inside of tubs on that part facing outbye. Seventy yards from the 1st North Way end an air-crossing had been demolished, the bricks being blown into the return air-road. Close by was a prop on which the thin dust bands on the outbye side covered some coked dust. The signs as to force along this portion of the road pointed conclusively to the explosion having taken an out-by direction. From the 1st North Way end to the Drift Way end the distance is 440 yards, and the latter portion had fallen heavily.

The main return parallel to the engine plane was in no way damaged, and showed no signs of the result of the explosion up to the Drift Way air crossing, which was demolished. Subsequent examinations proved conclusively, in spite of a few cases of contradictory evidence, that the force of the explosion had gone into the Drift Way, and that the explosion had not originated in that district. On many of the props on this road there were very thick deposits of coked dust on the inbye side of the props. There was also on some portions of the road a sooty deposit of an interlacing network character, which had evidently been deposited in a still atmosphere some time after the actual explosion. The props supporting the check rail at the second curve all pointed clearly to the force of the explosion having passed inbye, but between the curve and the landing a drum-sheave had been carried a short distance in an outbye direction. The "drags" in the

majority of the tubs had been moved

in an inbye direction. The most striking piece of evidence, however—proving the explosion had not come out of the Drift Way—was a full coal tub which had been blown 12 yards inbye and jammed hard and fast between the roof and a bottom catch\* which it had mounted. (See figs. 2 and 3.) This tub was badly damaged and was found at the junction of two roads. A further examination showed that the tub had been turned completely round.

Returning to the main engine plane, the only way of proceeding in the direction of the 3rd North Way was by means of the return airway, which at that time was acting as an intake from Auckland Park to Westerton South Pit. A short distance beyond the Drift way the main engine plane was heavily fallen, one fall being

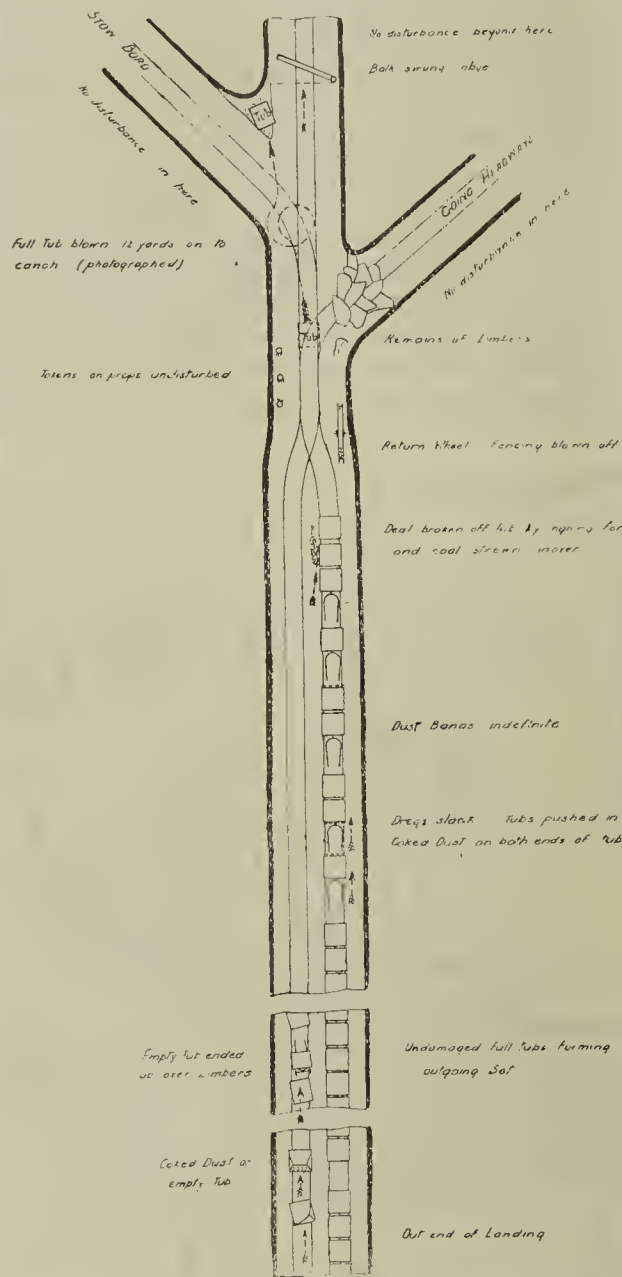


FIG. 2.—SKETCH SHOWING INDICATIONS AND DIRECTION OF EXPLOSIVE FORCE IN THE DRIFT-WAY LANDING.

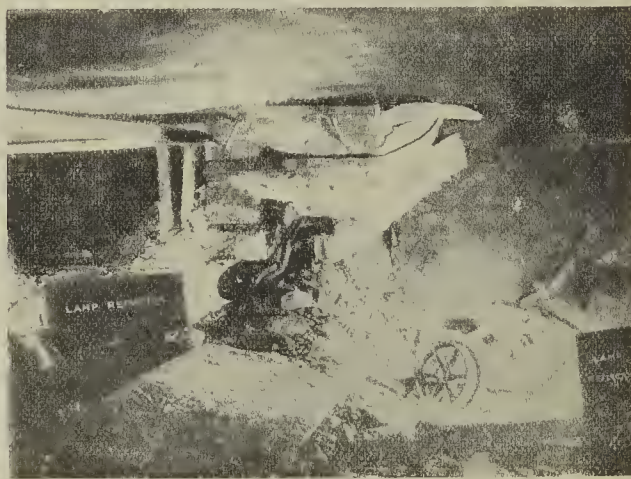


FIG. 3.—PHOTOGRAPH OF TUB BLOWN INBYE IN DRIFT-WAY.

about 20 yards long, and in some places 5 to 6 feet thick. On passing down a stenton and through a stopping on to the engine plane, it was observed that an old tail rope haulage winch gave very unmistakable evidence of the direction taken by the blast. One of the uprights was broken, the winch drum and pinion were disengaged from their bearings, and the chain was blown into the stenton. Proceeding further inbye two heavy baulks were found, both a few feet nearer the shaft than when they had supported the roof. A light ladder, which had previously been lying on a packwall, had been displaced and carried a few yards outbye, while a prop at the side was smashed and bent over a pack in the same direction. Beyond this a long and heavy fall was encountered, estimated at 110 to 120 yards in length, and 3 to 6 feet in thickness. This fall was evidently

the result of the explosion, and it was underneath it that a fault on the cable was afterwards located. Still proceeding along the main engine plane in the direction of the 3rd North Way end, several cases were met with of props and balks being broken in two, one half remaining *in situ* and the other portion being carried a few yards outbye. One of the most interesting pieces of evidence of this character was a balk which at one time had been sawn into by the tail rope carried near the roof. This balk had been broken where it had been partly cut through. A great many of the props showed thin broad dust bands on the inbye side, and narrow thick bands on the outbye side. In one case coking was found to have taken place on the outbye side of a prop underneath a narrow thick band of dust, and there was also a narrow thick band of dust on the opposite side. The engine plane for a considerable distance showed fewer signs of damage—except for a fall of about 50 yards long, followed at a short distance by a smaller fall opposite two stenton ends. In the left side stenton the remains of a door were found blown against a stopping, but on the opposite side in a crosscut stenton the stopping was quite intact. Near these stentons there were several instances of portions of props having been blown a short distance to the outside side of the portions left standing. Such evidences of the direction of force continued up to within a few yards of a joint box J (see fig. 1) in the cable, 246 yards to the outbye side of the 3rd North Way end. This joint box was at one time suspected of being a possible cause of the explosion, but the box was proved to be intact and in perfect order. Within a few yards, on the inbye side of this joint box, the evidences of the direction of force at once changed, all indications pointing most strongly to the explosive force having travelled inbye—in fact, it seemed quite unusual for so much violence to be shown in opposite directions in so short a distance. Close to the joint box there was a stenton in which the stopping remained untouched. Beyond the joint box a roller was found 9 yards further inbye than the frame in which it had been set. A crossing-balk was blown into a refuge hole and a portion of the roughly-built pack was swept into two adjoining refuge holes in such a way that it could only have been carried by a force moving inbye, and in both cases the position of the timber left lying against the corner of the refuge holes afforded similar evidence. Just beyond the grease hole there was a stenton which communicated with the air road on the low side of the engine plane, and it was thought that gas might have been given off from the low side goaf into this airway and then leaked up the stenton on to the engine plane. Assuming this to be the case, the final explosion, if there was more than one, most decidedly passed down the stenton from the engine plane and all trace of any previous gas explosion was obliterated. The debris of the two stoppings was found blown a considerable distance down the stenton, and the remains of a door had been carried a distance of 60 yards. A few yards beyond this stenton the bell-cabin was a complete wreck, everything being jumbled together in a chaotic mass. At the 3rd North Way curve unmistakably there was evidence pointing definitely to the direction of the force of the explosion. Three heavy long balks which had supported the roof at the curve were in each case broken in two, and the portions across the straight on part of the road were blown several yards further inbye, leaving the remaining portions supported by props on the curve side. An examination of the fractures was interesting as showing how the fibre of the wood had given way to the force from outbye, the fracture in the case of balks, which were secured at both ends, being quite distinct from the fracture where one end was free to be moved. Sufficient force had passed up the 3rd North Way engine plane to destroy the air-crossing at the main return, but the steel girders forming the sides of the overcast were found to be still in position. Any evidence of force gradually died out along the 3rd North engine plane, and ceased before reaching the landing. Everything was found to be coated with fine dust. Twenty-two ponies in the 3rd North Way stables, a considerable distance beyond the landing, were found, when reached on the day following the explosion, to have succumbed to the effects of after-damp. Continuing along the main engine plane from the 3rd North curve towards the north crosscut, a fall of considerable extent was encountered, and all indications of the direction of force pointed to the blast having passed inbye. Beyond the North Crosscut all evidence died out over a distance of about 100 yards in the direction of Leasingthorne. Along the north crosscut the indications of force gradually became weaker, and ceased about halfway between the commencement of the cross-cut and the electric pump near Westerton. Sufficient force had passed into the 4th North engine plane out of the north crosscut to



demolish the air-crossing, and the tubs standing in this landing gave evidence of having been slightly moved inbye, as the sprags (drags or lockers) in the tubs were all loose. In the 4th North, north crosscut, and on the old engine plane towards Leasingthorne, the timber was coated with fine coaldust. On the north crosscut road the explosion probably died out for want of coal-dust, as owing to the inbye portion of this engine plane having become rather low, a bottom canch had been taken up, and consequently, in addition to there being part stonedust, no coaldust had been deposited, as coals had not been drawn along the part of the road where the bottom canch had been taken up. In no case was there evidence of force in any of the return airways, except in the vicinity of demolished air-crossings.

#### Possible Causes of the Explosion.

In the absence of any direct or conclusive evidence as to the cause of the explosion, it only remains to review all possible causes and then eliminate those which are improbable. There is no doubt in the minds of the inspectors that the chief element, in at any rate extending the explosion, was coaldust; but they are of the opinion that the explosion itself was initiated by the ignition of firedamp.

*Presence of Firedamp.*—It is hardly conceivable that "gas" could be present on the main intake haulage road in such quantity as to constitute an explosive mixture, for the main air current of 23,260 cubic feet of air was passing along this road. A reference to the plan of the workings (fig. 1) will show, however, that there existed two large goaves on the low side of the main engine plane, which, provided they had not been rendered tight by heaving up of the floor or pressing down of the roof, might constitute reservoirs of gas ready to be liberated on a reduction of atmospheric pressure. Owing to the soft thill (floor) of the Harvey seam and the facility with which the roads and goaf "heave" close, it was at first considered that there would be little or no open goaf space when the coal had been extracted several years previously. At the time of the explosion the atmospheric pressure was fairly steady, and the mercurial column of the barometer stood at a medium height of 29.05 in. On a subsequent occasion, on March 19, after an abnormal fall in pressure amounting to 1 in. in 15 hours (28.42), Mr. Hay (junior inspector of mines) examined the edges of these goaves, and also the airway between them and the main engine plane. At this time both roads were acting as intake airways, and in spite of the fact that a current of 2,000 cubic feet of air per minute was passing along the low road nearest the goaf, gas was detected at the demolished old south air-crossing, in the return airway from this district at the regulator, and, in fact, at all the open holings from these goaves to the airway. At the time of the explosion this road was not looked upon as a return airway, and a current of only about 2,000 cubic feet per minute was allowed to pass along it through a regulator at the point R (see fig. 1), which was kept about 3 in. open. The conditions existing at the time of this examination (on March 19, 1913) were, of course, very different from those on October 27, 1912, but the results are interesting as proving that there was a gas space existing in these old goaves. It should also be borne in mind that, owing to the position of the regulators and the feeble current of air in this road, there was nothing to prevent gas ascending from the goaves towards the engine-plane stoppings. Assuming the firedamp to be present in an explosive mixture on the date of the explosion, there are several ways in which it might be the means of initiating an explosion.

*By Sparks caused by the Friction of Rocks.*—The Harvey seam roof in this area is frequently formed of strong sandstone, and there is the possibility, perhaps remote, that masses of this rock in falling in the goaf might by friction cause sparks sufficient to explode a mixture of firedamp and air. There are several authentic cases of sparks having been so produced in other mines. No evidence has been found to suggest this as a probable cause of the explosion.

*By Matches.*—There is always the possibility of flames from matches which may, in order to avoid detection, have been thrown into the goaf at some remote period. It is probably only a coincidence, but the point where the explosion on the engine plane commenced—if the deduction from the evidences of force is correct—was the place where the workmen daily left a portion of their clothing after getting out of the set or train which brought them inbye to their work from the shaft. Jackets and other portions of clothing were usually placed on the rough packwall at this point. However, no remains of matches or match boxes have been discovered, though a most careful search has been made from time to time since the explosion. If they were present at the time they might have been destroyed by the force of the explosion.

*Electricity.*—At an early stage of the investigations the electric cable in the Harvey seam was looked upon with suspicion as a very probable cause of the explosion, and when it was found that one of the three cores was faulty, this suspicion was intensified. The cable consisted of a three-core single armoured cable, suspended at suitable points by straps fixed to props near the roof by pieces of tarred cord, except in two cases where iron straps were bolted to iron eye-bolts knocked into holes in the roof. When it was found that there was a fault on one of the cores, the cable was cut in the shaft sidings, and at other points, with a view to discovering its whereabouts; finally, the fault was found to be under a large fall about 120 yards long, commencing 180 yards beyond the Drift Way end. The exact point was subsequently located, and on ridding down to the cable it was found that an iron spike, such as is used for nailing down crossings, had penetrated through the armouring and come in contact with one of the cores. As no one remembered having seen this piece of wood with the iron plate lying about, it is probable that it had been used as "lofting" on some balks, and had been blown by the force of the explosion, and had lain on the floor with the spike points protruding an inch through the wood and pointing upwards. A short length of the cable containing the damaged portion was cut out, but a most minute and microscopic examination of both the nail and the hole it had made failed to show the slightest sign of burning or arcing, and it was quite evident that the fall was a result of the explosion, and the spike had entered the cable after the current had been cut off, when the shaft cable was severed further out-by. A further examination of the haulage road proved that the direction of the explosion was from inbye out towards this long fall, and by following up this evidence it was possible to piece together portions of props and baulks which had been broken and part of them blown outbye. This was done in a large number of cases, the distance from the half prop or balk which had been left standing varying from 1 to 6 yards. Up to a certain point on the haulage road the direction as to force was constant, and no contradictory evidence of this kind was found. At a point 111 yards on the outbye side of the 3rd North Way end the direction of force at once changed, and the evidence of broken and displaced timber was uniformly in the opposite direction, the heavy balks at the 3rd North Way end showing this in a very marked degree. It appeared at first to be more than a coincidence that at the very point where this change in direction of force occurred there should also be a joint-box in the cable which had been suspended from the roof by iron hangers. There was, however, nothing wrong with the box or cable, and the inspectors are of the opinion that the joint-box could not have been the source of the explosion.

A circumstance was brought to their notice which at one time led them to think that possibly a similar occurrence at Auckland Park might account for the origin of the explosion. This incident occurred at Black Boy Colliery, belonging to the same firm. One morning in the summer of 1912—prior to the explosion at Auckland Park—the foreshift men at this colliery were walking inbye when they saw a sudden burst of flame from a joint box in the Hutton seam landing, and at the same time the main electrical supply failed. An examination of the box showed that there was a small hole at one side of the filler cap, but whether it had been there before the burst or was caused by it was not determined. The roof immediately above the hole was splattered with the bituminous compound, and a large sooty streak extended from the box right across the roof of the roadway. This was evidently the result of the escape of bituminous vapour at the horizontal joint, which was formed of round packing and would not offer any great resistance to a sudden internal rise of pressure. (It should be remarked the joint boxes at Auckland Park were of a much stronger pattern than those at Black Boy, and it is probable that under similar conditions sufficient vent might be obtained at the joint without bursting the box.) On the box at Black Boy being opened, it was found that the cause of the breakdown was a loose terminal screw. Very little bitumen had been lost, and there was no sign of arcing on the terminals. Other circumstances of interest were (1) the pit bottom fuses did not blow; (2) the cable was live but no motor was running; (3) the joint box only broke down, as will be seen directly, under abnormal conditions. Black Boy, Auckland Park and Shildon Lodge collieries are all coupled together electrically, the common supply being generated at Auckland Park. The cause of the flashing from the joint box at Black Boy Colliery was afterwards found to have been the result of some water from a three-way tap in a motor house at Auckland Park being accidentally allowed to impinge on a live lead at a switchboard. This caused a

dead earth and a sudden rise in pressure, which found vent at the joint box in Black Boy Colliery. The bituminous compound in the joint box would, by a sudden rise in temperature, be readily converted into an inflammable vapour, and possibly very little sparking would be sufficient to ignite this vapour. It is worthy of remark that a case of an explosion of vapour given off by heat from bituminous compound recently occurred in connection with a lighting installation in a dwelling-house at Hebburn. As previously pointed out, a close examination of the interior of the joint box at Auckland Park gave no evidence of any defect or arcing. The case at Black Boy is important as confirmation that a joint box is the weakest part in an electric circuit, and probably if no one had witnessed the occurrence at Black Boy the flashing would never have been suspected. If flashing such as took place in the landing at Black Boy on a longwall road, where there was little or no coaldust, had occurred at the joint box on the main engine plane at Auckland Park, there would have been little difficulty in accounting for the explosion.

*By Electric Signalling Apparatus.*—The system of signalling was by means of electric bells, arrangements being provided for cutting out the several landings as required. The principal bell cabin was midway between the grease-hole and the 3rd North Way end, but everything in it was in such a wrecked state that no deductions could be made as to whether there had been any sparking or fusing of the wires. It was stated by the management that there was no current in the signal wires from the shaft to the bell cabin at the time of the explosion. The current was on from the bell cabin into the 3rd North and North Crosscut Way. If there was any sparking in connection with the electric signalling installation, we are still met with the same difficulty as to the presence of an explosive mixture of firedamp and air in the main haulage road, on which a current of over 23,000 cubic feet of air per minute was passing.

*Fire Caused by Friction of Rollers, &c.*—A careful examination was made of all roller frames on the main engine plane, but there was no evidence of any charring or burning. It was suggested that a roller frame might have taken fire owing to friction caused by a roller. Such cases are known to have occurred, and the grease and dust round about bursting into flame after smouldering for a considerable time. At Auckland Park the last set travelling along the engine plane was that by which the back shift hewers were conveyed outbye about 1 p.m. on October 26. About an hour afterwards some horsekeepers traversed the same road, and if there had been any smouldering it is probable they would have noticed it. In any case the smouldering or burning would have to continue until 2 a.m., a period of over 12 hours, and then, in order that the conditions necessary to produce an explosion should be provided, a fall of roof on the outbye side must have occurred in order to raise a cloud of inflammable dust. In the absence of any charring or signs of burning, this theory may be regarded as very problematical.

*Water Blast.*—A suggestion made by Mr. W. C. Blackett contains the elements of possibility, and should, therefore, not be lightly put on one side without the due consideration which a theory proposed by an expert of Mr. Blackett's wide experience deserves. In reviewing his theory of a water blast, it must be remembered that one of the old goaves on the dip side of the main engine plane had been the receptacle for water pumped from another portion of the Harvey seam. This goaf may be regarded as a bottle lying on its side, and the lower portion of it being to the dip, there would probably be large upper spaces lying above which remained free from water, and would therefore form receptacles for gas. Owing to changes of barometrical pressure, gas would occasionally be discharged, and this would pass to the rise into the more or less stagnant return, and might possibly pass across it and so leak on to the main haulage road, where there was practically no pressure on the intake side of the stoppings. If such a thing did occur, and gas made its way through a stopping on to the main intake haulage road in such quantity as to form an explosive mixture, the igniting cause has still to be found, as in several of the previous theories.

*Spontaneous Combustion.*—Spontaneous combustion may be regarded as a possible cause of the explosion, and it is quite likely that considerable heating and oxidisation could take place as a result of the water which was pumped into the goaf on the low side of the engine plane. No peculiar odour or "gob-stink" had ever been noticed either before or after the explosion, which one would have supposed as probable on the road between the main engine plane and the low side goaf in the event of a gob-fire occurring in the low side goaf. Cases of spontaneous combustion in coalmines in the county of Durham are extremely rare, but that Durham



are not immune from underground fires due to cause is evidenced by the following record of spontaneous combustion supplied by Mr. S. Hare, which occurred at the Ravensworth Shop pit during his management of that colliery in 1901:—Certain winnings were being driven in the Low Main and Six-quarter seams, which in that part of the mine were only separated by an inch of band. The Six-quarter seam was 4 ft. thick, and the top portion contained several small bands and pyrites, and owing to the bad "roof stone" above and the inferior quality of the upper part of this seam, a foot of coal was left as a roof. The Low Main seam consisted of 4½ ft. of good coal. As one of the winnings 6 ft. in width was known to be approaching an old water-level, one front and two flank holes were kept in advance, and boring was also carried out in the other places. Two straight holes had been bored, one 9 yards long and the other 14 yards, but neither holes proved the existence of the old water-level, but a hole bored near the bottom of the seam did so at 5½ yards. It was afterwards found that the water-level had been driven chiefly in the floor, only about 1 ft. of the road being in the coal. The pressure of water was from 50 to 60 pounds per square inch, and the water was gradually run off at intervals when it could be conveniently dealt with. About six months after the holing, the water having been run off, the winning was again started, and having been driven 15 or 20 yards beyond the old level it was found that the coal on one side was very hot, and a narrow crosscut was put into it for about 3 ft., when it holed into an old board running parallel to the winning. In this old board only the Low Main or bottom seam had been worked, the top or Six-quarter seam being kept up for a roof. Part of this coal had fallen, and it was found that the mass was very hot and ready to break into flame. About 15 tons of this hot mass was filled up and sent to the surface. No other cases of heating were met with, although the old level was crossed and re-crossed many times. The heating was no doubt due to the water from the old level acting on the pyrites in the fallen coal, assisted by the oxygen which had gained access through the boreholes.

**By Explosives left in the Mine.**—No shot-firing took place in working the coal in the Harvey seam, and shots were therefore only fired in connection with stonework. Apparently no shots had been fired anywhere near the seat of the explosion for a considerable time, so that it was hardly likely that any explosives or detonators were hidden away in the vicinity. In the stenton just on the inbye side of the grease hole there were two doors, and both these were blown away from the engine plane towards the return airway. It was suggested that possibly some explosive might have been left between the doors at some time, as this space was, apparently, occasionally used as a rough sort of cabin for keeping gear. A careful search, however, did not disclose anything that might suggest this as a probable cause of the explosion.

#### Conclusions.

The conclusions arrived at by the inspectors are as follow:—

**The Point of Origin and Cause of the Explosion.**—An examination of the plans on which are given the indication as to the direction of force conclusively proves that the point of origin of the main explosion was at or within 10 yards on either side of the joint box marked J on the plans. The explosion was without doubt in the main a coaldust explosion, and, although it cannot be positively ascertained, we are convinced that it was initiated by a previous explosion of firedamp and air. All direct physical evidence of such an initial explosion was subsequently destroyed by the principal explosion. As to the igniting cause, we are at a loss to explain it, but we think that by a process of elimination the most probable was spontaneous combustion in the low side goaf.

**Ventilation.**—If the air road on the low side of the main engine plane had been utilised as a regular return airway, and a considerable quantity of air allowed to pass along it, instead of simply a scale of 2,000 cubic feet per minute, throttled down by means of a regulator only 3 in. open, any likelihood of gas discharged from the low side goaves being able to rise up to the engine plane stoppings would have been removed.

**Coaldust.**—The Harvey seam main engine plane had been used for many years for hauling coal at high speeds. There was therefore considerable dust on certain portions of the road, notably in old pack walls, which the means adopted were insufficient adequately to cope with. Cleaning up was resorted to, and watering by means of pipes laid along the engine plane. But once an explosion was started, there was ample dust to be carried on an increasing intensity. The explosion passed more than a few yards into the returns, and the inbye portion of the north cross-

cut engine plane soon died out on reaching the area where bottom had recently been taken up. These facts, in our opinion, point to the advisability of dusting with inert stonedust the floor, sides and roof of the haulage roads and such other parts of the mine where coaldust is liable or likely to accumulate, as well as of removing the dust from time to time. On the question of the proportion of stone to coal dust which is necessary to render the latter innocuous, as this matter is still under consideration by the Departmental Committee on Coaldust and Colliery Explosions, we forbear to make any suggestions.

**Joint Boxes.**—The occurrence of the flashing at the joint box at Black Boy and the vaporisation of the compound inside the box serves to remind us that the joint boxes may be regarded as more likely to break down under abnormal conditions, such as a sudden rise of pressure, than the cable itself. To meet such a danger, we suggest that all joint boxes should be securely built in with brickwork and well filled with sand. This has been done at several large collieries in the county.

**Grimsby Coal Exports.**—The quantity of coal exported from Grimsby during the week ended Friday, October 17, was shown in the official returns to total 32,164 tons foreign and 1,925 tons coastal, compared with 25,912 and 1,248 respectively for the corresponding week last year. Shipments:—Foreign: To Ahus, 1,581 tons; Antwerp, 714;

#### A COAL-HANDLING PLANT AT CREWE.

Owing to the growth of traffic and the heavier loads which have to be hauled at the present time, it has been found necessary to adopt at the extensive running shed of the London and North-Western Railway at Crewe more expeditious method than "man-handling" for loading engines with coal, and after much consideration the mechanical coal-handling plant illustrated in the photographs was installed. This plant is the joint design of Mr. C. J. Bowen Cooke, the chief mechanical engineer of the London and North-Western Railway, and of Messrs. Babcock and Wilcox Limited, of Renfrew, by which firm the plant was manufactured and erected. A description of the plant was given in a paper read by Mr. Cooke before the Institution of Civil Engineers, last year.\* The quantity of coal dealt with at this installation is considerable, for here no fewer than 150 locomotives are coaled every day, and the amount transferred from truck to tender averages 450 tons per day. A good idea of the leading features of this plant will be gathered from the photographs. It may be pointed out that there are two engine roads, so that tenders may be loaded on both sides of the plant at the same time.

There is one coal-wagon road which leads over an underground pit. In this are a receiving hopper, a coal-breaker, and a delivery hopper, into which dips the lower end of an elevating conveyor. So that all kinds of wagons, including those with no doors, might be



GENERAL VIEW OF COAL-HANDLING INSTALLATION AT CREWE.

Cronstadt, 2,620; Drammen, 1,897; Dieppe, 1,262; Esbjerg, 729; Gefle, 2,010; Gothenburg, 2,940; Hamburg, 470; Helsingborg, 4,176; Hargshamn, 1,428; Hoganas, 482; Limhamn, 2,045; Malmo, 858; Pernau, 1,548; Rotterdam, 762; Riga, 2,597; Skien, 206; Sundswall, 371; Sodertelje, 1,214; and Trelleborg, 2,254. Coastal: London, 314 tons; Lowestoft, 1,004; Whitstable, 512; and Kingsbridge, 95.

**Test of Minimum Wage Rule.**—A case affecting thousands of colliers was mentioned in the Court of Appeal on Thursday, 16th inst., to Lords Justices Vaughan Williams, Buckley, and Kennedy, when Mr. Leslie Scott, K.C., asked that the trial of the action Davies and others v. the Glamorgan Coal Company Limited should be expedited. There was a cross-notice by the plaintiffs. His application (said counsel) was not opposed by Mr. Sankey, K.C., who appeared for the respondents. It was a case of great general importance coming under the Coal Mines Minimum Wage Act. It affected the whole body of miners and coalowners in South Wales and Monmouthshire. The trial came on before Mr. Justice Pickford, and he decided that one of the rules made by Lord St. Aldwyn, as chairman of the District Board under the Act, was *ultra vires*. The effect of the rule, according to the contention of the coalowners, was to cause a large number of the men in certain cases to be paid twice over for the same work. A similar rule was contained in the great bulk of the sets of rules made by all the other districts, so it was not only the South Wales miners who were affected. The Court decided to take it not before Monday fortnight.

dealt with, a tippler device has been provided over this pit.

This device is made up of steel rings, 12 ft. in internal diameter, to which the wagons can be secured. The apparatus is revolved by a small electric motor, and the time taken to carry out the whole operation and to free the wagon is about five minutes, two men being necessary to carry out the work. The hopper holds about 20 tons, and the coal passes from it by means of a jiggling tray through an adjustable opening to a breaker, where the larger lumps are reduced in size. Both the jiggling tray and the breaker are worked by a 10-horse power motor. The coal, which is reduced to too fine a powder for use in locomotives, is caught separately and is used for foundry purposes.

The conveyor, which delivers the coal into overhead coal bunkers, is of the Babcock and Wilcox tipping tray type, and it was designed to raise 60 tons per hour to the required level. It is driven through gearing by a 9-horse power motor. At the top of the conveyor there is a special arrangement to prevent the coal falling from too great a height into the hopper. By this it is actually retained on the conveyor till the latter has begun its downward journey, so that the coal has only got to fall about a foot on to an inclined shoot

\* "Mechanical Handling of Coal for British Locomotives." By C. J. B. Cooke, M.Inst.C.E. *Colliery Guardian*, December 20, 1912, p. 1240.



leading to the storage bunkers. Baffle plates or spiral shoots are arranged in the hoppers, so that the coal never has to fall far even when the bunkers are in a more or less empty condition. So as to have sufficient coal in the storage bunkers to enable the elevating machinery to be shut down during the night time, the capacity of the bunkers was made as much as 300 tons. As the capacity of the elevator is 60 tons per hour, and since the coal can be delivered from the wagons at this speed to the underground hopper, and as the total amount of coal fed on to tenders is only about 450 tons in the 24 hours, it is clear that matters can be so arranged that at the end of a day's shift the overhead bunkers can be left practically full and a storage considerably in excess of that required for the night hours provided. In actual practice the machinery is kept at work for 10 hours. The overhead bunker is divided into two parts, one containing 100 tons being for Welsh coal, and one of 200 tons capacity for hard coal, as both kinds are used on the company's engines. There are four delivery shoots, two on each side, one of each coming from each division of the bunkers. Two kinds of coal can, therefore, be delivered on each side at one time. The coal

The rate at which engines can pass through the coaling plant is governed by a number of other things besides the mere putting of the coal on the tenders. At present an engine coming from the turntable will first have the ashes cleared from its smoke-box, which occupies 4 minutes. Clearing the tubes will represent  $4\frac{1}{2}$  minutes, and filling the tank another  $3\frac{1}{2}$  minutes, while dropping the fire will account for another 8 minutes. These times make up together 20 minutes, and the coaling will take 4 minutes, making the total detention 24 minutes.

Under the old method it would have been more. There has been a saving of money not only in the actual cost of handling, but from several other causes, among which may be mentioned this reduction of the time of detention of engines, the quicker release of the coal trucks, decreased cost of haulage as coaling stations might be placed on the most economical and satisfactory positions.

Mention should also be made of the fact that in connection with this coaling plant there is an ash-removing plant and a compressed air tube-cleaning plant. The latter consists of a specially designed pipe,

## SOUTH STAFFORDSHIRE AND WARWICKSHIRE INSTITUTE OF MINING ENGINEERS.

The forty-sixth annual meeting was held at the University, Birmingham, on October 20, Mr. G. M. COCKIN, vice-president, in the chair.

Before the business of the meeting commenced, the CHAIRMAN gave expression to the feelings of the members in asking them to pass a vote of condolence and sympathy with the relatives of those who had lost their lives in the terrible disaster in South Wales.

Mr. ALEXANDER SMITH, who seconded, said that as a past-president of the institute he would like to associate himself thoroughly with the chairman in the way the latter had given expression to the feelings of those they represented. He did not like making suggestions that might add to the cost of getting such an essential as fuel, as the legislation of the last six years for improving the conditions and safety of the miners had increased the cost of getting coal by about 10d. per ton. However, the main object of that and all kindred institutions and of mineowners was the prevention of accidents, and he would urge the Government to press forward with the Commission for considering spontaneous combustion and gob-fires.

A vote of condolence and sympathy was passed in silence.

### Annual Report.

The forty-sixth annual report of the council for the year was then read. It stated that there were now 158 members on the roll, as against 150 last year. The financial position of the institute continues to improve. The actual net balance on the year's working is £25 14s. 3d. The council are pleased to be able to state that several interesting and important papers have been promised for the coming session, and it is hoped that members will endeavour to be present at the meetings and take part in the discussions.

At the unanimous request of the vice-president and council, Dr. Cadman has consented to be re-nominated as president for the coming year.

It was moved by the CHAIRMAN and seconded by Mr. HUGH JOHNSTONE that the report be adopted. Carried unanimously.

### Election of Officers.

The SCRUTINEERS (Messrs. John Hughes and F. G. Meachem) reported that the following officers had been elected for the year 1913-1914:—President, Dr. J. Cadman (for the second year); vice-president, Mr. G. M. Cockin (for the second year). As ordinary members of the council, Messrs. J. T. Brown, J. Hunter, A. I. James and T. A. O'Donahue.

The following, having been approved by the council, were elected:—As a member, Mr. P. S. Lea, H.M. assistant inspector of mines, Birmingham. As associate members, Mr. S. F. Bates, Barr Common, Walsall; Mr. H. K. Sen, Sibpur, Calcutta. As subscribers, the Staffordshire Education Committee, Chasetown; the Cannock Education Committee, Hednesford.

The CHAIRMAN asked the secretary to read a letter from the Institution of Mining Engineers with regard to the application for a charter, which was as follows:—

"At the meeting of the council of this institution, held at Manchester on September 24, the following minute was passed:—12 Charter. The president presented a statement respecting the proposed application for a charter, copies of which it was resolved should be sent to the councils of the federated institutes; and on the motion of Mr. J. H. Merivale, seconded by Mr. John Gerrard, the following resolutions were unanimously agreed to:—

1. The council having heard the statement made by the president, that in the view of the committee appointed on June 5, 1913, it is desirable to obtain a Royal charter for the institution, approve of the suggestion;

2. That in the meantime the question of applying for a charter be submitted to the several federated institutes for consideration, along with the proposed new by-laws and all available information already collected; and

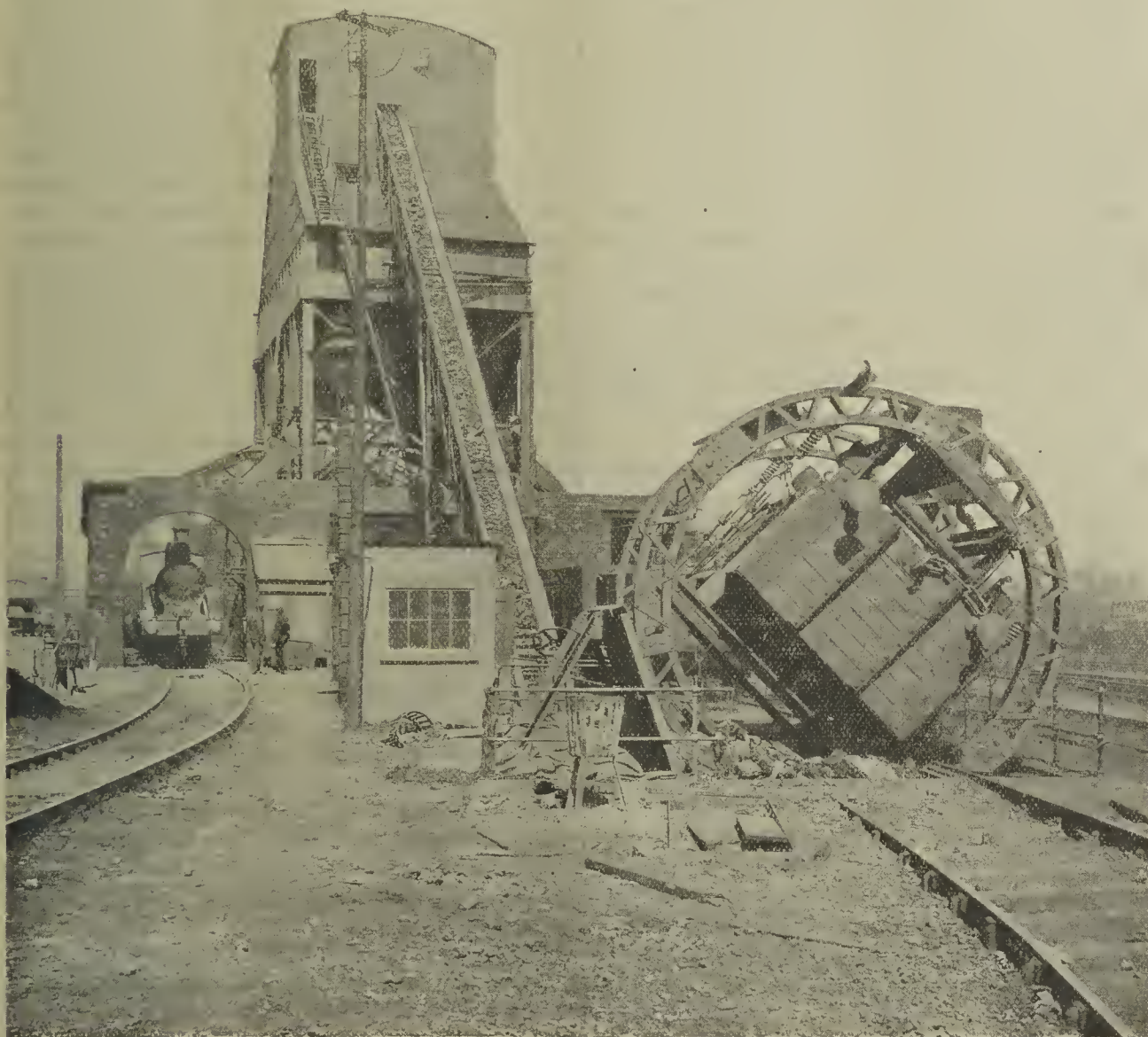
3. That a special meeting of the council be called at Leeds on Tuesday, November 4, 1913, at 3 p.m., to consider the foregoing resolutions.

In accordance with the above minute copies of the president's statement and the suggested by-laws sufficient for the members of your council are being sent."

The CHAIRMAN said that the council had fully considered this, and were of the opinion that the acquisition of a charter was highly desirable, and he now moved that the suggestion be adopted subject to any alterations suggested as to the by-laws.—This was seconded by Mr. HUGH JOHNSTONE and carried unanimously.

### Concrete Reservoirs for Water and Petroleum.

A short paper on the above subject was read by Mr. J. L. JEFFERY, A.R.S.M., M.Inst.M.M. The author said the mining engineer was often called upon to do work which is really outside his sphere of knowledge, such as the construction of concrete reservoirs (often of considerable size) for the storage of water either



VIEW OF CONVEYOR AND TIPPLER IN OPERATION.

before being loaded on to the tenders passes through a calibrating box containing 10 cwt. This method of measuring the coal has been found to be wonderfully accurate. During a month's working the difference between the known weight of the coal sent up to the bunkers and the weight as measured on to the tenders by the calibrating boxes was only 81 cwt. Taking the average coal passed through the apparatus as 450 tons and the month as 30 days, the total passed in a month is, say, 13,500 tons, or 270,000 cwt., and of this quantity the 81 cwt. would form a negligible percentage. This method of weighing has the advantage of being expeditious, and it is claimed that as much as 6 tons can be put on a tender in three minutes, so that the 10 cwt. calibrating boxes must be filled and emptied 12 times during that period. As a comparison of what could be done under the old and new systems, it may be explained that under the most favourable circumstances it took 15 minutes to load 5 tons by the old method. As a matter of fact, about 2 tons are put on the tenders per minute.

which is held against the smoke-box end of the tube, and through which air at 100lb. pressure is made to issue. This has been found to work exceedingly well. The apparatus is automatic in its action. As soon as the pressure in the air receiver falls below 100lb. the motor driving the compressor is automatically started, and when the pressure is restored it is stopped again. All the motors employed are of the direct current type, and work at 600 volts.

At a meeting of the Thorne Rural District Council a communication was received from the West Riding County Council, stating that the Public Health and Housing Committee had had before them the mining developments now taking place in Thorne, Stainforth and Hatfield. In view of the colliery operations, it was desirable under the circumstances that the Rural District Council should consider a town planning scheme. The Rural Council were anxious to know what expense would be likely to be entailed by the scheme, and it was decided to ask for further information regarding it, some members declaring that building operations in the rural districts are at a standstill.



boiler or for ore-dressing purposes, and, in the case of the petroleum miner, for storing the crude oil as it is pumped from the oil well before it is refined. Coal-mining engineers are, fortunately, not often called upon to construct large concrete reservoirs, but are able to erect cast iron tanks of large dimensions, built up with the usual segment plates, which are often cheaper and more satisfactory than the same size of reservoir would be if constructed of concrete. The paper gives a few practical hints on the construction of concrete reservoirs in order to render them proof against the percolation of either water or oil.

When reservoirs for retaining water in any considerable quantity are to be built, the question of a suitable site is of the utmost importance, and every endeavour should be made to obtain a firm foundation, preferably upon solid rock. The rock should be previously levelled up, and any weathered surface should be removed. When, however, it is not possible to obtain a rock-foundation, great care should be exercised in so designing the reservoir as not to subject the material on which the reservoir has to rest to a greater pressure than it is able to bear.

For the purpose of calculation, the weight of a cubic foot of well-rammed concrete may be taken as from 150 to 160 pounds, according to the aggregate used. Wet clay and loam as foundations should be avoided if possible. If one is compelled to build on such material, a large mattress foundation of cross timbers, giving an ample factor of safety, should be employed. Should there then be any subsequent subsidence, the structure as a whole will settle, probably without sustaining any serious damage. The writer is strongly opposed to piling, as it has been found from experience of such foundations that subsequent subsidence takes place unevenly, thus imperilling the whole structure.

With regard to the question of making the concrete watertight, there are several methods employed in practice, the most common being to mix the cement and sand in suitable proportions—namely, 1 part of cement, 1 to 2½ parts of sand and 2 to 4½ parts of broken stone, according to the nature of the sand and stone available. Where good sharp sand and broken hard rock, such as limestone, granite, or "trap," can be obtained, the usual proportions by volume are 1 of cement, 2 of sand and 4 of broken rock. For the purposes of experiments on making concrete proof against oil, the writer used 1 part of Portland cement well mixed with 2 parts of sharp quartz sand obtained from gravel crushed through the stamp battery at Birmingham University, and passed through a 20-mesh screen. This was found to be quite waterproof. It is important that the concrete should be properly mixed and rammed into forms, so as to avoid any possibility of the formation of cavities. Sufficient water should be mixed with the aggregate to produce a quaky consistency, and, if possible, enough concrete for the entire structure should be made in one continuous operation, by working both day and night shifts, so as to avoid the necessity of joints. When it is not possible to avoid joints, then the old surface must be cleaned and roughened, and finally moistened with neat cement and water before the rest of the work is proceeded with.

Mr. F. W. Taylor advocates a V-shaped piece of timber being laid in the concrete on discontinuance of the work, so that a groove may be left into which the new concrete may be rammed. There is always danger, however, of the concrete contracting on setting, causing the joints to open out. In heavy walls this contraction often continues for several months. In the case of large reservoirs, where it is perhaps impossible to avoid joints, it is better to lay the wall in sections in such a manner that the joints are vertical. This is effected by leaving a board, measuring 1 by 6 inches, in the concrete while it is setting, and placed in such a manner as to leave a groove 1 in. wide and 3 in. deep, in each section of the concrete. The board is subsequently removed and the groove filled in with hot pitch or other suitable substance, thus giving a watertight joint, unaffected by subsequent shrinkage of the concrete.

The thickness of the walls of a square or rectangular reservoir depend largely on the size of the reservoir and the head of water which it is required to retain, and on other conditions for which it is difficult to lay down a hard-and-fast rule. Generally, it is safe to construct the sides 1 ft. thick at the top, increasing in thickness by 3 in. for every foot of vertical depth. Properly-laid concrete is watertight for a much smaller thickness than this, and Mr. F. W. Taylor cites the case of a circular filtration tank at Little Falls, New Jersey, which has to retain water against a head of 41 ft. at the bottom, and of which the concrete walls at the bottom are only 15 in. thick.

Another method of making the concrete watertight, which is perhaps cheaper if not quite so satisfactory, is to construct the reservoir of ordinary concrete, using large stone as fillers, and afterwards to face the inner surface with a waterproof grout of neat cement or 1 part of cement mixed with 1 part of sharp sand. This mixture should be laid on immediately after the concrete has set sufficiently to allow the forms to be removed, and before it has had time to dry and harden properly. Before the grout has properly set, it should be smoothed and polished with a metal float. This operation prevents the grouting from scaling.

Other methods of rendering concrete watertight have been advocated by different writers, namely, the admixture of various ingredients, such as pulverised rock, ground to the fineness of cement; and by the use of chemicals, such as soap and alum mixtures in various proportions. In the Sylvester process, which was employed in New York Harbour, the mixture consisted of 1 part of cement to 2½ parts of sand, with ¾ lb. of powdered alum to each cubic foot of sand, moistened with ¾ lb. of soft soap to the gallon of water, and dissolved. As, however, it is generally considered for the average mining engineer to make use of these mixtures, the writer will not discuss them

further. Care must be taken when mixing the ingredients for waterproof cement to measure the cement, sand and stone in proper measuring frames for each batch of concrete, and to moisten the materials with the necessary amount of water by means of a rose or sprinkler, and not in the slipshod manner of throwing water on them out of a bucket, which tends to wash the cement out of the aggregate.

The construction of reservoirs for petroleum, especially for the lighter distillates, presents a much more serious problem, because concrete which may be perfectly watertight will allow petroleum to percolate through it very readily. With regard to ordinary kerosene, there is the additional disadvantage that it is also a solvent of most ordinary paints, and corrodes iron to a great extent. The author tried a few experiments with small concrete tanks (or moulds) made of a mixture of 1 part of cement with 2 parts of sand. After several tests of other preparations, one of these was painted with a thin glue solution; but, before the glue had quite set, it was painted over with a 5 per cent. solution of potassium bichromate. After 10 days there was only a loss of 20 per cent., which was due entirely to evaporation, as there was no evidence of percolation, and the glue coating was as hard as it was before the oil was poured in.

It would seem possible, then, at very little extra cost, not only to construct reservoirs of concrete which will retain petroleum, by painting the interior with glue and a 5 per cent. potassium bichromate solution, but also to line the interior of iron tanks with a thin coating of cement treated in the same way.

Unfortunately lack of time prevented the writer from carrying out experiments on the same lines with the heavier oils, or crude petroleum; but it would appear that no greater difficulties would exist in their case than in that of the more volatile kerosene used in the experiments described.

#### Discussion.

The CHAIRMAN, in opening the discussion, said he had noticed in connection with the American use of concrete for the purposes of reservoirs, grain bins, and gas tanks that they almost invariably used reinforcement, but the author had said nothing about this. It seemed to him that unless he was referring only to small tanks for experimental purposes, there must necessarily be reinforcement, and he believed it was essential, to prevent rust, that there should be a covering of over ½ in. to 1 in. of concrete over steel. It was also necessary for the sake of cohesion that the steel should have a broken surface. The proportion of steel to concrete was a matter of careful consideration, so that they might secure the necessary degree of elasticity.

Mr. S. F. SOPWITH asked what means were taken in the tank steamers to prevent the leakage of the oil from the tanks, and to prevent corrosion.

Mr. JEFFERY, in reply to the discussion, said it was not necessary to make the tanks of reinforced concrete, as with the thicknesses given in his paper the walls were strong enough with any sized tank in reason to withstand the pressure, which of course depended on the head of oil or water. Tanks were often wanted in remote places abroad, where it would be impossible to get men skilled enough to undertake the reinforcing of concrete, and also the freightage on the necessary steel, &c., would be very high, making it an expensive matter, so that it was on the average better to make the concrete of a sufficient thickness, and do without the reinforcement. With regard to Mr. Sopwith's question as to corrosion and leakage on tank steamers, they did have that trouble and did nothing for it, except in some cases they had water-filled bulkheads to prevent the fumes reaching the engine-rooms. They also tried painting with a special paint made up of pitch and carbon bi-sulphide, but with not much success.

The CHAIRMAN proposed a vote of thanks to Mr. Jeffery, which was seconded by Mr. HUGH JOHNSTONE, and carried.

**Contraventions of Explosives Order.**—Before Interim Sheriff-Substitute Forbes, in the Falkirk Sheriff Court, George Thom, clayminer, appeared on a charge of having at a fireclay mine at Roughcastle Brickworks, Falkirk parish, occupied by Campbell and Co., brick manufacturers, removed the stemming from a shot-hole which was charged with four bullets of compressed powder, contrary to the Explosives in Coal Mines Order, 1912. The Depute-Fiscal explained that the shot had not gone off as was expected. The accused drew his drawer's attention, and the latter looked in. The shot afterwards went off, and the drawer and accused were injured. The sheriff imposed a fine of 5s.—William Craig, miner, also pleaded guilty to a breach of mines regulations. The charge was that on September 12, in No. 3 mine, Craigend Colliery, occupied by the Carron Company, he being the person firing a shot consisting of a charge of gelignite by other means than electricity—namely, by a lighted fuse—and said shot having missed fire, approached the shot before the interval of an hour had elapsed. The Depute-Fiscal said accused went back within a minute or two, and the shot went off and he was injured. A fine of 5s. was inflicted.

#### THE WAGES OF COALMINERS IN 1912.

In the annual report of the Labour Department of the Board of Trade on changes in rates of wages and hours of labour in the United Kingdom in 1912 [Cd. 7080], it is observed that the number of changes in rates of wages in 1912, and the number of workpeople affected thereby, were far in excess of the highest previously recorded by the Department, although the amount of the change per week was exceeded in 1900 and in 1907. The changes were, with three insignificant exceptions, all increases. This upward movement in wages was common to all groups of trades, but was especially marked in the building trades, in the textile trades, and in mining and quarrying. In the case of the transport trades, while the increases recorded were much above the average, they did not reach the exceptional figures of 1911. The number of workpeople reported to the Department as affected by changes in rates of wages during 1912 was 1,818,240.\* Of these, 1,806,444 received net increases amounting to £139,410 per week, and 46 sustained decreases amounting to £6 per week; whilst the remaining 11,750 had upward and downward changes leaving their wages at the same level at the end as at the beginning of the year. The net result of all the changes was thus an advance of £139,404 per week, as compared with one of £34,578 per week in 1911.

The statement that the changes occurring in 1912 resulted in an increase of £139,404 per week means that the total wages bill of the country, in the industries covered by the returns, for a full ordinary week's work at the end of 1912 would exceed that for the corresponding week at the end of 1911 by the amount stated. The average weekly wages paid during the whole of 1912 did not, however, exceed those paid during 1911 by this sum, as the actual changes took place at various dates during these years, and due allowance would have to be made on this account in comparing the average wages paid in 1912 and 1911. To arrive at the changes in the total wages bill in the two years it would also be necessary to ascertain, for each of the trades affected, the variation in the number employed, and the exact amount of time lost owing to slackness of trade, labour disputes and other causes. The data for such an exact calculation are not available, but an attempt has nevertheless been made to estimate approximately the total amount of additional wages paid in 1912 as compared with 1911—that is, the amount by which the aggregate wage bill in 1912 of the industries covered exceeded what it would have been if wages had remained at the same level as at the end of 1911. In this calculation, each change is given its full effect from the time when it occurred until the end of the year, or until it was cancelled by another change, and no allowance is made either for time lost or overtime. The total additional amount of wages paid in 1912, calculated on this basis, amounted to nearly three million pounds (£2,964,678). If the changes had been in operation the whole year, this amount would have been £7,249,008.

The outstanding feature is the preponderance in 1912 of the changes in the coalmining industry, which accounted for 55 per cent. of the total amount of the increase in that year. Further, in 1912, increases in wages, probably amounting to considerable sums, resulted from the adoption of the Coal Mines (Minimum Wage) Act; but neither the exact amounts of these changes nor the numbers affected thereby can be stated.

The proportion of the industrial population† affected by ascertained changes in rates of wages in 1912 was 18·0 per cent. During the previous nine years the highest percentage (13·1) occurred in 1907, and the lowest (5·6) in 1910. The proportion of workpeople affected by the changes in 1912 was, as usual, highest in the coalmining industry (51·0 per cent.).

Of the 953,441 workpeople whose changes were arranged by conciliation, mediation, arbitration, &c., 853,600 were engaged in coalmining, an industry in which wages are largely controlled by conciliation boards.

The number of workpeople whose changes were preceded by stoppage of work was higher in 1912 than in any of the previous nine years, with the exception of 1909 and 1911.

The changes in hours of labour reported as taking effect in 1912 affected 105,317 workpeople, of whom 1,013 had their aggregate working time increased and 104,304 had it reduced, the net effect of all the changes being a reduction of 210,556 hours in the weekly working time of the workpeople affected.

The most important reduction took place in 1909, almost entirely as the result of the adoption of the eight

\* Changes affecting agricultural labourers, seamen, and railway servants are not included, as the numbers affected are not known.

† Exclusive of agricultural labourers, seamen, and railway servants.



SUMMARY SHOWING BY DISTRICTS THE PERCENTAGE CHANGES IN COAL-HEWERS' WAGES.

District.	Percentage of wages above standard at end of 1896.	Percentage increase (+) or decrease (−) on or off hewers' standard rates in the years						Percentage of wages above standard at end of 1912.
		1897-1900.	1901-1905.	1906-1907.	1908-1909.	1910-1911.	1912.	
Northumberland .....	3 <sup>3</sup> / <sub>4</sub>	+ 57 <sup>1</sup> / <sub>2</sub>	− 46 <sup>1</sup> / <sub>4</sub>	+ 32 <sup>1</sup> / <sub>2</sub>	− 17 <sup>1</sup> / <sub>2</sub>	− 2 <sup>1</sup> / <sub>2</sub>	+ 11 <sup>1</sup> / <sub>2</sub>	38 <sup>3</sup> / <sub>4</sub>
Durham.....	15	+ 50	− 37 <sup>1</sup> / <sub>2</sub>	+ 26 <sup>1</sup> / <sub>4</sub>	− 8 <sup>1</sup> / <sub>2</sub>	− 6 <sup>1</sup> / <sub>4</sub>	+ 7 <sup>1</sup> / <sub>2</sub>	46 <sup>1</sup> / <sub>4</sub>
Cumberland ..	30	+ 30	− 22 <sup>1</sup> / <sub>2</sub>	+ 17 <sup>1</sup> / <sub>2</sub>	− 7 <sup>1</sup> / <sub>2</sub>	—	+ 7 <sup>1</sup> / <sub>4</sub>	55
Federated districts*	30	+ 20	− 10	+ 15	− 5	—	+ 5	55
South Staffordshire and East Wor-	30	+ 20	− 10	+ 15	− 5	—	+ 5	55
cestershire (parts of).....								
Forest of Dean .....	15 <sup>+</sup>	+ 35	− 25	+ 20	− 10	+ 5	—	35 <sup>+</sup>
Bristol .....	17 <sup>1</sup> / <sub>2</sub> , 22 <sup>1</sup> / <sub>4</sub> <sup>†</sup>	+ 22 <sup>1</sup> / <sub>2</sub>	− 10	+ 15	− 5	—	+ 5	45, 50 <sup>†</sup>
Somersetshire (Radstock district) ...	15	+ 27 <sup>1</sup> / <sub>2</sub>	− 15	+ 17 <sup>1</sup> / <sub>2</sub>	− 5	—	+ 5	45
South Wales and Monmouthshire ...	10	+ 63 <sup>3</sup> / <sub>4</sub>	− 43 <sup>3</sup> / <sub>4</sub>	+ 30	− 12 <sup>1</sup> / <sub>2</sub>	+ 2 <sup>1</sup> / <sub>2</sub>	+ 7 <sup>1</sup> / <sub>2</sub>	57 <sup>1</sup> / <sub>2</sub>
Fifeshire and Clackmannanshire ...	8	+ 97 <sup>1</sup> / <sub>2</sub>	− 60	+ 50	− 37 <sup>1</sup> / <sub>2</sub>	—	+ 18 <sup>3</sup> / <sub>4</sub>	68 <sup>3</sup> / <sub>4</sub>
West Scotland .....	12 <sup>1</sup> / <sub>2</sub>	+ 87 <sup>1</sup> / <sub>2</sub>	− 62 <sup>1</sup> / <sub>2</sub>	+ 50	− 37 <sup>1</sup> / <sub>2</sub>	—	+ 18 <sup>3</sup> / <sub>4</sub>	68 <sup>1</sup> / <sub>2</sub>

\* Comprising Yorkshire, Lancashire, Cheshire, Nottinghamshire, Derbyshire, Leicestershire, Warwickshire, Shropshire, Staffordshire (parts of) and North Wales. † At certain collieries the percentage above standard was 5 per cent. more. ‡ The lower percentage was on the Gloucestershire side of the district, the higher on the Somersetshire side. § At standard.

hour day in coalmines under the Coal Mines Regulation Act (1908). With the exception of 1911, in which year there were reductions affecting large bodies of transport workers and of printing trade operatives, especially in London, the reductions in 1912 exceeded those in any of the remaining years. There were no changes of outstanding importance in 1912; but it may be mentioned that, of the total number affected, more than half were engaged in the building and in the engineering and shipbuilding trades.

During the first eight months of 1913 rates of wages continued to rise in all groups of trades, and the net increase in weekly wages was greater than the increase in the whole of 1912. More than half of the increase in 1913 was in the coalmining industry. The total number of workpeople reported to have had their wages changed was 1,546,944, and of these 1,543,444 received a net advance and 3,500 sustained a net reduction. The net effect of all the changes was an increase of £145,724 per week. During the eight months, 5,445 workpeople had increases in their hours of labour amounting in the aggregate to 2,582 hours per week, and 72,158 had an aggregate reduction of 158,435 hours per week.

Apart from any changes in wages resulting from the adoption of the Coal Mines (Minimum Wage) Act, there were in 1912 percentage changes in every coalfield in Great Britain. In all cases, with the exception of the Forest of Dean, where the increases and decreases counterbalanced each other, these changes resulted in net increases. The total number of workpeople affected by the changes was 927,293, and of these 921,793 had net increases amounting to £76,905 per week. In 1911 390,793 workpeople sustained a net decrease of £9,553 per week, and in 1910 383,586 received an increase of £5,488 per week.

The following table shows the number of workpeople affected and the amount of change in weekly wages for each of the last 16 years:—

Year.	Workpeople affected.*	Total.
		Net increase (+) or decrease (−) as compared with each preceding year.
1897 .....	240,331	+ 6,553
1898 .....	659,919	+ 56,595
1899 .....	652,654	+ 51,164
1900 .....	680,518	+ 164,474
1901 .....	704,681	− 57,081
1902 .....	735,524	− 73,872
1903 .....	752,190	− 32,488
1904 .....	658,390	− 31,294
1905 .....	200,746	− 13,471
1906 .....	427,156	+ 27,188
1907 .....	806,339	+ 173,613
1908 .....	661,750	− 47,085
1909 .....	869,870	− 56,150
1910 .....	383,586	+ 5,488
1911 .....	390,793	− 9,553
1912 .....	927,293	+ 76,905

\* Including those workpeople whose wages were changed both upwards and downwards during the year, and at the end of the year stood at the same level as at the beginning.

The years 1897-1900, 1906-1907, 1910 and 1912, were years of rising wages, whilst 1901-1905, 1908-1909 and 1911 were years of falling wages. Over the whole period of 16 years the net increase amounted to £241,006 per week. The wages fluctuations in this industry are further illustrated in the above summary showing by districts the percentage changes in coal-hewers' wages in the years of rising and falling wages, and also the percentage of wages above "standard" at the end of 1896 and at the end of 1912. The general percentage changes are calculated by percentage additions to, or deductions from, the standard rates of wages prevailing in each of the districts at some given time, e.g., in 1888 in the Federated districts and in Scotland; in November 1879 in Northumberland and Durham; and in December 1879 in South Wales and Monmouthshire.

In all cases wages were higher at the end of 1912 than at the end of 1896, but, with the exception of

the Federated districts, South Staffordshire and East Worcestershire, Bristol and Somersetshire, they were still below the high level attained in 1900.

An examination of the methods by which the changes in wages in the coalmining industry were arranged in 1912 shows that of the total of 927,293 affected, 853,600, or 92 per cent., had their changes arranged by conciliation boards. The most important exception to this method of settlement was in Northumberland, where the Conciliation Board had ceased to operate during 1911, and the changes were effected by direct negotiation between representatives of the two parties.

The decisions of these boards as regards wages are based largely on the selling price of coal; but in only one case—viz., Durham—were particulars published of the ascertained selling prices in 1912. For this district the average prices for the four quarters of the year were 8s. 1·47d., 8s. 0·65d., 8s. 7·18d., and 8s. 11·8d. per ton; the increase in price in the first and third quarters resulting in an increase in rates of wages of 3<sup>3</sup>/<sub>4</sub> per cent. in each case.

The changes in hours of labour affected 4,079 workpeople, whose hours were reduced by 47,723 per week. Out of this number, 3,649 were enginemmen, &c., in Durham, South Yorkshire and Lancashire and Cheshire, who were affected by rearrangement of shifts.

CONTINENTAL MINING NOTES.

Austria.

Official Wholesale Coal Prices, Vienna Exchange.—Pilsen coals, large, 33 90 kronen per ton in truck loads, ex Franz-Josefs Bahnhof. Ostrau-Dombrau-Karwin coals: Large 30-31 kr., cubes 29·60-30·60 kr., nuts 29-30 kr., small 23-23·20 kr., washed smithy coals 30-30·50 kr., coke 38-40 kr. per ton net cash, ex shutes Nordbahnhof. Rossitz-Zbeschau-Oslawan coals: Washed smithy coals, coarse or fine, 30·50-31·50 kr., coke 30-32 kr. per ton, ex shutes Nordbahnhof. Upper Silesian coals: Best large or cubes 32·90-33·70 kr., intermediate large or cubes 32·10-32·90 kr., seconds large or cubes 27·30-28·40 kr., best nuts I. 33·30-34·10 kr., II. 29·60-30·10 kr., best small 23·50-24 kr., seconds 22·50-23 kr. per ton net cash, ex shutes Nordbahnhof. In truck loads: Best large or cubes 31·30-32 kr., nuts 31·70-32·30 kr. per ton, ex Nordbahnhof. Gas coke from Vienna Gasworks, 32·40-34 kr. per ton ex works, according to grade. Lignite: Dux large 22·10-23·60 kr., Bräx or Dux cubes 22·10-23·20 kr., nuts 21·60-23·10 kr., Mariaschein cubes 24·10-25·60 kr., nuts 23·60-25·10 kr. per ton, ex shutes Franz-Josefs or Nordwest Bahnhof.

Germany.

Coal Syndicate Report for August.—Total coal raised 8,670,083 tons (8,501,212 tons in 1912), or 333,465 tons (314,860 tons) per working day. Calculated distribution, 7,027,435 tons (7,032,269 tons), being 270,286 tons (260,454 tons), or 98·35 per cent. (99·15 per cent.) of the participation. Total coal distribution from syndicated pits, 8,679,624 tons (8,589,166 tons), or 333,832 tons (318,177 tons) per working day. Total deliveries, including local sales, miners' house coal, and supplies to pits' own ironworks: Coal, 5,630,938 tons (5,604,140 tons), or 216,575 tons (207,561 tons) per working day; coke, 1,787,077 tons (1,751,238 tons), or 57,648 tons (56,492 tons) per working day; briquettes, 390,402 tons (401,208 tons), or 15,015 tons (14,860 tons) per working day.

Ruhr Coal Market.—So far the present month has not witnessed any important modification of the situation, the characteristic feature of which is the unfavourable condition of the iron industry and the shrinking demand for industrial coals. The house coal trade is improving, of course, but hampered by the continuance of mild weather. The Syndicate's policy of leaving the output percentage on

the same level as before may be justifiable by reason of the time of year; but it must not not be forgotten that the demand has for some time fallen below the supply, and that short time has already been introduced. Still worse is the state of affairs in the coke market, and the reduction of the output to 65 per cent. is of considerable importance to the "pure" collieries. The export traffic affords a welcome outlet for coal, and Holland, Belgium and France are taking large consignments, though prices have had to be reduced to a low level, which leaves very little profit. Shipments up the Rhine have been affected by the low state of the river; but little harm has been done, the up-river stocks being very large. Enquiries are increasing for house coal and broken coke, but industrial coals are neglected.

Coal Market in Upper Silesia.—The demand continues sufficiently large, not only to take up the entire output, but also to cause deliveries to fall into arrear; and complaints of delay are frequent. The labour question is a very serious one, and the capacity of the pits is already strained to the utmost, whilst stocks are non-existent, useful as they would have been. House coal is naturally in increasing request, and the same applies to gas coal, whilst the trade in industrial coals leaves nothing to be desired. So great are the requirements of the home market that it is impossible to satisfy those of Russia and Austria. The coke market, too, is in a very flourishing condition, there being no perceptible decline in the demand for blastfurnace coke, despite the recent unfavourable change in the pig iron market.

COLLIERY ACCIDENTS.

Senghenydd.

The work of recovering the Universal Colliery has proved a long and arduous work. On Friday, the 17th inst., further progress was made in the crosscut to the right of the main haulage road (both of these were blocked by fire), but the work was greatly endangered by the large quantities of gas. On the previous day an examination had been made by a number of experts of the situation in the pit. The party consisted of Dr. Atkinson (the chief inspector), Mr. Thomas Griffiths, Mr. Watts Morgan, Mr. Leonard Llewelyn and Mr. Shaw. A proposal had been made to block up the fire zone by stopping up the straight road, so as to allow explorers to get around to the district where the 18 men were found alive on the previous Wednesday morning. When the experts returned they were immediately closeted in conference with the other mining inspectors and engineers, with Lord Merthyr presiding over their deliberations. It was then decided that, in addition to trying to approach the main west level behind the fire by means of the north cross-cut, an attempt should also be made to approach the position behind the fire by carrying fresh air with them from the main west return to a point near the air bridge. This work was placed in charge of Mr. S. Tallis, of Tredegar. In one place nine members of a rescue brigade wearing breathing apparatus were overcome, and were with difficulty brought out by men not so protected. Late in the day three dead bodies were found in a stable behind a fall.

On Saturday morning an official report was issued by the Consultative Committee stating that the smoke had nearly all abated, and the temperature was much lower. After the bodies of the four men were found the party penetrated as far as the main west intake. The committee decided to continue the policy laid down from the beginning, as being the most expeditious to reach the districts beyond.

The party consisted of Mr. Tom Griffiths, Cymmer; Mr. Leonard Llewelyn, Mr. D. Hannah, Mr. A. G. Brown, Clydach Vale; Mr. Edward Shaw, Mr. W. Ernest Llewelyn, Mr. D. Watts Morgan, Mr. Hubert Jenkins, and Mr. Morris, the overman.

During the week-end a few more bodies were found in the neighbourhood of the stables and the lamp room. The same plan of operations was pursued, namely, to penetrate into the farther districts by way of a cross-cut diverging to the right of the main road so as to "stop" the fire on all sides. Three of the rescuers were "gassed" on Saturday, and seven on Sunday. All were brought round, but to make sure that there were enough competent men on the spot to deal with any emergency a fresh brigade from New Tredegar was telegraphed for.

Col. Pearson, H.M. inspector of mines, in a statement made on Sunday night, said he saw no hope of any men being rescued alive. He explained that the fire in the cross-cut had been practically conquered by the use of water and by a sand-bag barrier built on the inside of the fire at a point which was reached with difficulty from another ventilating district. A similar scheme was now being carried out to cope with the fire still existing in the main road. He was then satisfied that there was not another fire in the mine.

On Monday morning rescuers were able to advance a short distance along each of the three main roads, but in each case they found further progress barred by gas. The rescuers were then about two-thirds of a mile from workings in the Ladysmith, Kimberley, Mafeking, and Pretoria districts. Two bodies were brought up during the day.



be mentioned that the expert committee have the following precautionary notice:—  
The following instructions must be strictly adhered to by persons during the work of exploration:—

1. All exploration work must, as far as is practicable, be carried on through the intake airway.
2. No person, except officials of the mine or responsible leaders of shifts, shall enter any return airway or unventilated place.
3. When unexplored roads are about to be entered it must be done with fresh air.
4. All roads which are unexplored must be "crossed off" for the time being.

On Tuesday a search party which included Mr. Leonard Llewellyn and Mr. Watts Morgan penetrated into the main west level in the Mafeking district. Five or six bodies were seen, but they were not brought to the surface. Some of the bodies discovered bore marks of a great deal of violence. One was completely naked, the clothes having been torn away.

On Wednesday, however, it was decided that the work of exploration should be suspended for two or three days owing to the dangerous nature of the pit. A large number of bodies have been seen, and their appearance points to the probability that the men were killed outright by the explosion. Early on the same morning some of the explorers had a trying experience. An advance party in the Kimberley district was being followed at some distance by a repair gang. One member of the advance party carried a canary, which it was thought would give due warning of danger, but no such indication was observed, and the party advanced sufficiently far to discover that all the men in the Kimberley district had either been killed by the force of the explosion or died from the effects of afterdamp. Presently, some of the repair gang became seriously ill from gas poisoning, and a message was sent to those in front advising them to return at once. There was no response, and two further messengers were despatched, but still no reply was received. In response to an urgent message, the Aberaman rescue brigade, wearing the Draeger apparatus, hurried down the pit and into the Kimberley district. Meanwhile 15 of the repair gang had been removed to the surface, all more or less overcome. The rescue brigade with great difficulty conducted all the explorers to the bottom of the shaft, whence they were conveyed to the surface. In the colliery offices they were attended to by nurses and ambulance men until they recovered.

There has been a most generous response to the appeals for pecuniary assistance, and large sums have been contributed to the funds opened by the Lord Mayors of London and Cardiff. The Cardiff committee has decided to make immediate grants to the bereaved families.

At the same time the question of amalgamating existing surpluses and founding a fund on a national basis has again been discussed. In forwarding a donation to the Lord Mayor of London, Sir Lees Knowles addressed the following letter to his lordship:—

"Westwood, Pendlebury.

October 20, 1913.

"To the Right Honourable Sir David Burnett, Knt., &c.,  
"Lord Mayor of London.

"The Mansion House, London, E.C.

"MANSION HOUSE FUND FOR THE RELIEF OF  
"MINERS.

"MY DEAR SIR,—In sending you my cheque as a contribution to the fund which you are raising at the Mansion House so kindly for the relief of miners and their dependants, I should like to take the opportunity of making some remarks which, I hope, may be of use with the view of relieving distress which may arise from coalmining accidents in general.

"The awful calamity which has occurred in South Wales draws attention to the need which has long been felt by those who have tried to help the widow and orphan, of a central organisation.

"At the present time, whenever a disaster resulting in the loss of a large number of lives occurs, the generous feeling of the nation is aroused at once, and a relief fund is raised, to which the amount subscribed may or may not be proportionate to the extent of the consequent distress, the sympathy of the country being attracted naturally by the heroic bravery of the rescuers, and especially by the sacrifices of workmen for their fellow-workmen, rather than by the result of the loss of life, with its thought of the morrow. Thus it happens that the amount subscribed is sometimes too much, and sometimes too little, and there can be no common basis of relief. While one committee is able to be generous, another committee is able only to be rigidly economical.

"In making this statement, I am writing about my own personal experience, for I am interested still in the working of a fund which a good-hearted public raised nearly 30 years ago.

"I would suggest, therefore, for your consideration, the foundation of a National Fund for the relief of mining accidents. In my opinion, would have, among others, the following instructions must be strictly adhered to by persons during the work of exploration:—

"The following instructions must be strictly adhered to by persons during the work of exploration:—

"2. The collection of information as to the amount of relief required in each specific case.

"3. The power to apply surplus funds for the relief of individual cases.

"4. The centralisation of donations, subscriptions, legacies and other contributions, &c.

"I do not think that any objection can be raised as to the expense of administration. Often have I sat as chairman, presiding over a large committee of miners, and, if each mining district had its central office, I feel sure, from personal experience, that each individual case would be well watched and well tended by the Miners' Permanent Relief Society.

"Of course, it would be hoped earnestly that the formation of a centre for relief would not interfere with the expression of public sympathy in special cases. If a central fund were established, contributions might be made to it generally or specially by ear-marking them. I would, however, emphasise the fact that often large calamities overshadow the small calamities which constantly occur, leaving the widow and the orphan with little or no provision.

"There is another phase of the question upon which I would wish to touch. When the Workmen's Compensation Act (1897) was before Parliament, I argued for a larger inclusion in it than that only of workmen connected with mining and with the building trade. For instance, it appeared to me that the sailor was entitled to compensation equally with the miner; but I was met with the objection that shipwreck was, in legal terms, due to *vis major*, or the act of God.

"I argued that mining accidents were also due frequently to *vis major*, and I thought that assistance should be given by Parliament in cases such as that now in South Wales. I remember arguing, in effect, that if upwards of 300 lives were lost in an explosion, and that if for each life a sum of £300 were paid as compensation, it would be necessary to find something like £100,000, which, without elaborating the statement, would cripple any undertaking. It is well known that insurance companies will not, as a rule, take a mining-disaster-risk of more than £50,000, and, if that be so, it seems to me that some assistance should be provided by Parliament for loss by *vis major*, in the case, as a rule, of a disaster resulting in a loss which exceeds some such amount.

"Apologising for the length of my letter, which I hope however, may be of use to you,

"I remain, my Lord Mayor,

"Yours faithfully,

"LEES KNOWLES, Bart."

To this Sir Lees Knowles has received the following reply:—

"Mansion House, London,

"October 21, 1913.

"DEAR SIR LEES,—The Lord Mayor desires me to thank you for your kind donation to the 'Colliery Fund,' and the interesting letter enclosing it. Before replying to the latter, he will try to get some information as to the present condition of things, and especially as to the balance unappropriated of preceding funds, for he thinks that these details may have an important bearing on the suggestion.

"Yours truly,

"(Signed) WILLIAM SOULSBY.

"Sir Lees Knowles, Bart., C.V.O."

The Times of Monday also prints a letter from Mr. Ralph Fletcher, for many years an active member of the Board of Management of the Lancashire and Cheshire Miners' Permanent Relief Society, to the same effect. He states that there is still some £100,000 in hand of this Hulton explosion fund, and the interest of this is nearly (if not quite) enough now to meet the present annual expenditure, which, of course, decreases each year. Besides this huge sum available at Hulton (now mostly invested, at 3½ per cent., with the Bolton, Liverpool, and Manchester Corporations) there are various other balances, now lying unused in banks up and down the country of other similar funds. He strongly urges that advantage should be taken of the present sympathy with South Wales to form a "Central Fund."

To this letter Sir J. S. Harwood Banner, Lord Mayor of Liverpool, has replied, pointing out that the last published account of the Hulton Colliery Fund shows that whilst payments to the extent of £6,714 were made last year, the interest only reached £3,735. In order to carry out the scheme of benefits on the liberal scale which at present obtains it is necessary that part of the principal shall be utilised along with the interest every year. An actuarial calculation has been prepared which shows that the greater part of the fund will be required to meet the wants of so many widows and children, besides other dependents. With regard to the estimated balance, he states that a proposition much upon the lines of Mr. Fletcher's suggestion of a national fund composed of balances of colliery explosion funds has been seriously considered by a sub-committee, whose decision is given below.

The proposal was made at a meeting of the Hulton Colliery Relief Committee at Bolton by Mr. J. E. Sutton, M.P. A deputation was appointed to discuss the matter with the Home Secretary and to inform him that the committee is prepared to consider the handing over

of the balance of its funds if it is given representation in the administration of the National Fund. Lord Derby, Mr. S. M. Hutchinson (Liverpool), Sir Charles Behrens (Manchester), Ald. Cooper (Bolton), and the town clerk of Bolton (honorary secretary) were chosen to form the deputation. The committee made a grant of 1,000 guineas for the relief of the sufferers at Senghenydd, subject to the approval of the Court of Chancery.

## THE IRISH COAL TRADE

THURSDAY, OCTOBER 23.

### Dublin.

During the past week considerable impetus has been given to the coal trade by the staffing of the carts with free labour, and the motor lorries, under police protection, have also distributed a large quantity of coal to the customers of the firms involved in the labour disputes. There are plenty of enquiries, but the orders now coming in are not numerous—those in course of fulfilment being already on hand. There is still considerable congestion on the quays, although some of the coal boats are now being unloaded under the owners' personal supervision. There has been a large falling off in port dues, more particularly in the case of the coal trade, and a great deal of the traffic has been diverted to Newry, Belfast and Waterford. The prices charged by the small factors are about 6s. per ton more, but as regards the principal firms, no further change is anticipated until the strikes are over. City prices are about as follow:—Best Orrell, 28s. per ton; best Wigan, 26s.; best Whitehaven, 26s.; best kitchen, 25s.; steam coals, from 22s. to 23s. per ton; coko, 23s. per ton delivered in the city. One company that is benefiting by the present situation here is the new Irish Mining Company, at Wolfhill, Queen's County, as owing to the difficulty of obtaining English and Scotch coal the coal raised at these mines is now very largely in request in the inland districts, both for private use and for public institutions. City stocks are considerably run down, owing to the small quantity of coal coming into the port since the commencement of the labour troubles. During the past week the coaling vessels arriving amounted to 34, as compared with 29 the week previously, chiefly from Garston, Newport, Liverpool, Runcorn, Glasgow, Preston, Maryport, West Bank, and Ellesmere Port. The total quantity of coal discharged upon the quays was 13,652 tons. Early this week a large number of men in the employment of the Dublin Port and Docks Board left work, the reason stated to be the result of a request that the men should load coal for a firm affected by the industrial disputes.

### Belfast.

The local coal trade is unchanged, except that demand for household requirements is not quite so good, owing to fine weather. Stocks of all qualities are a fairly good average, and there is no change in any of the quotations. City prices are:—Giant's Hall Arley coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Rates for steam coals ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton. Cargoes arriving during the week were chiefly from Ayr, Garston, Workington, Preston, Girvan, Neath Abbey, Glasgow, Maryport, Partington, Ardrossan, Whitehaven, Irviue, Saundersfoot, and Point of Aire.

## THE TIN-PLATE TRADE

### Liverpool.

There has been rather more enquiry the last few days and a moderate business has resulted, but prices are exceedingly low and cannot cover cost of manufacture. Transactions are confined almost entirely to near dates, neither sellers nor buyers being disposed to book ahead. Below are the figures makers generally are quoting for shipment over next three months:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 13s. to 13s. 1½d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. 3d. to 26s. 6d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 6d. to 13s. 7½d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 6d. to 13s. 7½d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 6d. to 13s. 7½d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. to 19s. 3d. per box; I C squares and odd sizes, 13s. 4½d. to 13s. 6d. basis for approved specifications. Charcoal tins rule easy at 15s. 6d. basis and upwards according to tinning. Coke wasters are in moderate request and are quoted:—C W 14 × 20, 12s. 3d. to 12s. 4½d. per box; C W 28 × 20, 25s. 3d. per box; C W 14 × 18½, 11s. 1½d. per box; C W 20 × 10, 15s. 9d. to 16s. per box—all f.o.b. Wales, less 4 per cent.

The Prevention of Coal-dust Explosions.—Sir Arthur Markham, M.P. for the Mansfield Division, speaking to a gathering of his constituents at East Kirby last week, dealt at some length with the subject of explosions in mines and the best way to prevent them. He was convinced that the remedy was the compulsory stone-dusting of all roads in every mine in the United Kingdom except where the roads were naturally wet throughout; 50 per cent. of stonedust would arrest an explosion. The report of the Royal Commission on this subject had now been presented, and it would doubtless be issued to the public in a few days. He should give the Home Office no peace until the necessary legislation was passed, rendering stonedusting compulsory in all mines. Dealing with the question of naked lights in pits, Sir Arthur said the Scottish coalowners and the Miners' Federation of Great Britain were jointly responsible for the deaths of men in Scotch pits recently, because they voted against the compulsory use of safety lamps in mines. He strongly urged North miners to press upon their association the necessity for the compulsory use of electric safety lamps. The cost to scrap the oil lamps and buy new ones for electricity would be about one million sterling, but the added safety would be worth the expense. It was his intention to put electric lamps into every pit with which he was connected.



## THE MOTHERWELL PROSECUTION.

## Important Judgment.

Sheriff Shennan, in the Hamilton Sheriff Court, has now issued his judgment in regard to the complaints against Robert Wilson Dron, mining engineer, Bearsden, and James Dalgleish, manager of Dalziel and Broomside Colliery, Motherwell, who were charged with having between March 15 and April 16 last failed to take certain precautions in connection with the mechanical and electrical apparatus at the colliery. In our issue of the 10th inst. we gave a *résumé* of the evidence.

## What is an Agent?

It was admitted that the charge was properly directed against Mr. Dalgleish as manager, but Mr. Dron denied that he was agent of the colliery. This is the first matter with which the Sheriff deals.

After citing section 122 of the Coal Mines Act, 1911, he says: The Wishaw Coal Company Limited, who are the owners, have an office in Glasgow where its commercial affairs are managed by the secretary. The managing director lives in Leicester, and is in daily communication with the office. He visits the colliery once every month or six weeks. Mr. Dron has certainly not been appointed agent expressly. The question is whether the position which he occupies is *de facto* that of agent. Certainly the excerpt from the minute of the directors' meeting of September 12, 1901, might suggest express appointment:—"The directors also agreed to confirm the appointment of Mr. R. W. Dron, M.E., to supervise the management of the colliery on terms stated in letter from the managing director to him of date July 5, 1901." But there is no evidence that this minute was ever communicated to Mr. Dron. All that he received was this letter of July 5, 1901, in which the managing director at that time wrote confirming the arrangement "to assist me in supervising the management of our colliery at Dalziel." Obviously, that appointment was for the purpose of obtaining his professional assistance in the work of the colliery. But in itself it is far from conveying any authority to Mr. Dron to act as the representative of the owner. The appointment is "to assist" the managing director in supervising the management. In July 1902 Mr. Dron was appointed to do the surveying, which had previously been done by the landlord's mining engineer, and his salary was increased. On May 28, 1903, his salary was again increased, and on May 23, 1906, "it was resolved that Mr. Dron and Mr. M'Bride receive the following additional amounts for management, &c." The terms of this minute were not communicated to Mr. Dron, and indeed it would not matter if they had been, for the character of his services remained the same all along. Nor do Mr. Dron's own receipts solve the question. They are usually for "supervision and surveys of collieries." But the word "supervision" does not necessarily mean that he was "agent" representing the owners. And the extra charges paid under some of the receipts go far to show that he was not an official of the company, but merely a technical adviser.

On the other hand, it is plain that Mr. Dron was very intimately acquainted with the whole working of the colliery and advised the managing director on every conceivable matter connected with the practical administration of the pit. Every requisition passed through his hands and was initiated by him before it was sanctioned by the managing director. Certain incidents during the visit of the mines inspector were spoken to, showing that Mr. Dron found fault with certain things. It is not proved that he directly gave any orders, but in any event the Sheriff says he should hesitate to lay great stress on these incidents, since they took place at a time when the manager was off through illness. But the important point is that he can find no evidence of Mr. Dron acting as the owners' representative. There is no evidence that he ever gave an order or had power to bind the owner in any way, nor that Mr. Dron occupied the superior position of agent which would have justified him in giving directions to the manager. The Sheriff cannot regard Mr. Dron as other than the managing director's technical assessor. Passing requisitions and drawing up specifications fall under the category of skilled advice. They imply no power to issue orders.

Accordingly, as the Sheriff holds that Mr. Dron was not the agent of the mine, he dismisses the complaint as against him.

## The Responsibility of the Manager.

Sheriff Shennan proceeds to consider the charges against the manager. At the outset one general observation is made:—

"A manager cannot be expected to be conversant with minute technical details in connection with the working of a mine. He must trust to subordinates to attend to these and, if he appoints duly qualified subordinates, his personal responsibility for such matters will be small, so long as he takes reasonable means to assure himself that these subordinates are doing their duty. He cannot wash his hands of responsibility by appointing qualified subordinates. He must also exercise a general supervision over them. Accordingly, when he is, for instance, required to sign the electrician's log book, he does so not to authenticate the electrician's signature, but to show that he has applied his mind to the daily reports. The signing is not a mere

formality. It is intended to show that the manager has intelligently considered the report, and he should consider it critically with the view of satisfying himself that the electrician is duly performing his duties. It is in recognition of the manager's position that section 75 of the Act allows him, when a contravention is charged, to prove that he had taken all reasonable means by publishing and, to the best of his power, enforcing these provisions to prevent that contravention or non-compliance. Section 90 contains a similar provision with regard to regulations.

## Protection of Cages.

The first charge related to the cages in use in the colliery and narrated three contraventions of section 40 (subsection 7) of the Coal Mines Act. In regard to these, the Sheriff thinks the requirement of the Act is unequivocal in respect of the covering at the top. The cage must be *completely* covered in. He gathers that Mr. Walker, H.M. inspector of mines, does not interpret this as meaning that the full width of 5 ft. 2 in. should be covered, but rather that the actual floor space used by the men—i.e., between the two gates—should be completely covered. Whichever view be taken, there was plainly a contravention, for in all cases the line of the gates was outside the line of the covers, so that falling material might have struck the men.

As to the protection of the sides, the manager did make an effort to comply with the Act. The question is, whether plates 3 ft. high were sufficient to prevent persons or things from projecting beyond the sides. The Sheriff had no doubt whatever that they were not. As regards the provision of gates, again the manager tried to meet the requirements of the Act. Previously there were no gates, and he designed these specially. They were collapsible, of lattice pattern, each containing 12 rods. When extended the outer end slides into a lug at the side of the cage, and is fixed by a pin at the top, being also caught in the centre at the top by an iron rod, but not caught similarly at the foot. The width, when extended, is 6 ft. 3 in., and as it is a single lattice there are gaps of a foot wide at top and bottom. It reaches only to within 2 or 3 inches of the floor. In the Sheriff's opinion these do not comply with the Act. If gates, they are not suitable gates. If, as he prefers to hold, they are fences, they are not rigid fences. He is unable to pronounce any opinion as to the height which such gates ought to be.

Accordingly he convicts the manager on the first charge, but adds that his default is not a very serious one.

## Manholes.

The second charge was for failing to provide manholes at 10-yard intervals at two places in the surface mine in contravention of section 44, subsection 1, but the Sheriff is not prepared to convict on this charge. In the first case the road was being widened, so that the existing manholes were being destroyed, and over a space of 18 yards there was one manhole only 18 in. deep, but the work of widening was not completed and the manholes were being made as the work progressed. In the second case there were sufficient manholes on alternate sides, and the work of transferring them all to the one side, as required by section 44, subsection 3, was in progress. He thinks that when the work was actually in progress it would be oppressive to convict. In any case, by tying himself down to subsection 1 of section 44 the prosecutor had barred himself from founding on subsection 3. It would probably have been sufficient for him to libel section 44.

There was also a charge of failing to mark with a distinctive number a number of refuge holes. The Sheriff says he would not be prepared to hold that chalk numbers satisfied the statute, unless there was very clear evidence that they were always kept white. He has carefully checked the numbers and finds the charge proved, except as regards one manhole in the main road haulage, and one in the side dook haulage road in the surface mine, and three in the splint main haulage road of No. 2 pit.

A further charge was that there was failure to have certain manholes of the proper size and marked with a distinctive number, and this is found proved.

The fifth charge was that two refuge holes specified were not marked with a distinctive number, and that signal wires were placed across their entrance so as to impede ingress. It was proved that there was a contravention of the Act in respect that on a road 5 ft. 6 in. high signal wires were carried across the two manholes at a height of 4 ft. from the pavement. But this is a contravention of which the Sheriff was not prepared to convict the manager. "It is a matter on which he must trust to subordinates. He cannot satisfy himself that every one of 1,200 manholes is in such condition that ingress is not impeded. It is not for me to say who should be charged or whether anyone else could be charged for this contravention. All I decide is, that in appointing capable under officials to attend to such matters, the manager in this case discharged himself of responsibility."

## Means of Egress.

It was charged that there had been a contravention of Section 59 of the Act, which provides that "every steam engine room and boiler gallery and motor room in or about a mine shall be provided with at least two proper means of egress." Between March 15 and April 15, 1913, nothing had been done to carry out this provision, though it applied to four buildings. This is clearly a matter for which the

manager cannot escape responsibility. The Sheriff holds that the defence in respect of the surface mine ought to be that the screening plant engine house is one which *must* be provided with two means of egress. In the former, there is a space of 4 ft. square opposite the haulage drum to allow the wire rope which is wound round the drum to issue and return as the drum revolves. In the latter there is an opening of 1 ft. 8 in. by 2 ft. 9 in. across where the belt issues. How any competent adviser can regard these as proper means of egress he is totally unable to understand. As regards the motor house, the position is somewhat peculiar. It was 22 ft. 6 in. long by about 12 ft. broad, and one end was entirely open to allow of the haulage rope issuing and returning. In the centre of the open end stood a post. Can it be held that the portions of this open end separated by the post and the ropes were two proper means of egress. It is an arguable point, but the Sheriff comes to a conclusion in the negative. Accordingly, he convicts on the whole of the sixth charge.

## The Electricity Rules.

It next deals with the alleged contraventions of the electricity rules and adds that here, undoubtedly, the manager's position is more favourable. He is required to appoint a competent electrician and he must trust to that official seeing that matters involving technical knowledge are properly attended to. It was argued that, according to a recent decision of his Honour, the electrician had not been competently charged with these contraventions, and therefore, if the manager was not responsible, then no one could be prosecuted. "There are two answers to this:—(1) It is quite possible that no provision has been made for prosecuting for such contraventions, but (2) I have never decided that a way could not be found of bringing home responsibility to an official who has neglected his duty in these matters."

"Charge 7 relates to the unprotected condition of four fuses in a distribution box. Rule 10, which it is founded on, undoubtedly relates to construction, and accordingly Rule 20 would apply. But if there is an inexpensive remedy for this defect (as one witness suggested), it would be simple for the inspector to require the matter to be remedied in virtue of his powers under Rule 20. In any event I could never hold the manager responsible for these defects. It is not his duty to inspect minutely the fuses in the distribution boxes. That is the duty of the electrician."

Charge 8, says his Honour, is a much more serious one. It is one of failure to have covered with insulating material certain unarmoured cables—one at six parts, one at three parts, and two at 25 parts each. He says the evidence in support of this charge is overwhelming and he cannot acquit the manager of responsibility here. His duty of general supervision surely extends to observing the condition of the cables as he passes, and the evidence is that, where a cable is so defective, the manager ought to have noticed its condition. The manager made the mistake of thinking that, on all matters relating to electricity, he was absolved from responsibility. He evidently signed the log-book as a matter of routine.

The four remaining charges relate to matters of detail, for which the Sheriff says he cannot hold the manager responsible. The ninth charge complains that certain cables were found resting on iron nails. They had been properly enough installed, but where the suspending material had given way the cable had been fixed up so as to rest on iron nails. The manager was justified in assuming that such matters would be attended to by his subordinate officials. Charge 10 is founded on the fact that the signal wires were found in contact with the cables. Here, again, the original installation was efficient and the manager was entitled to trust to his officials, seeing that it was maintained so. Charge 11 relates to a matter of small detail—the soldering of an earth conductor into a lug, for which the manager could never be held responsible. And in the case of Charge 11 and Charge 12 the charges relate to the construction of apparatus which was in use before June 1, 1911. The apparatus satisfied the requirements of the rules then in force and the inspector has not required it to be altered. Accordingly, it is impossible to convict under these charges.

Sheriff Shennan, in convicting the respondent Dalgleish on certain of the charges, said he did not regard the offences as serious, but merely technical. They were not such as required the imposition of a punitive fine, but the penalty would require to be more in the case of a manager than it would be for an ordinary miner. The fine would be £5 or 20 days' imprisonment.

**Null Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, October 14, 1913, is as follows:—Abo, 994 tons; Antwerp, 263 tons; Amsterdam, 4,304; Barcelona, 2,195; Bilbao, 1,547; Bona, 2,347; Braila, 1,000; Bruges, 1,057; Bremen, 1,202; Copenhagen, 1,872; Cronstadt, 23,885; Drontheim, 50; Galatz, 3,631; Gelfe, 2,115; Guernsey, 291; Gothenburg, 4,442; Ghent, 1,084; Harburg, 1,925; Hamburg, 5,801; Harlingen, 1,112; Kiel, 1,134; Königsberg, 265; Libau, 399; Malmö, 1,710; Middlefart, 1,298; Naples, 505; Newfairwater, 823; Oxelosund, 2,612; Pernau, 1,561; Rotterdam, 861; Rønne, 2,734; Riga, 4,288; St. Petersburg, 3,652; Stockholm, 2,411; Sandefjord, 415; Stettin, 2,438; Theodosia, 4,788; Wismar, 1,654; Wyk, 214; total, 100,812 tons. Correspondence for October 1912 total, 109,815 tons.



## THE COAL AND IRON TRADES.

THURSDAY, OCTOBER 23.

## Scotland.—Western District.

## COAL.

The position of the coal trade in the west of Scotland continues satisfactory, although the demand for several qualities is not so pressing as in the last few weeks. The general tone of the market is quieter, being affected by the late arrival of steamers and the consequent shortage of wagons, which are being held up. Ell coal is in a little better demand than last week at firm prices. Business in the better qualities of splint coal is brisk, but the secondary qualities are much quieter. Steam coals are very active and are moving off in large quantities. In smalls, the demand for the best brands of treble nuts is strong, but cheaper qualities are not commanding much attention. Doubles and singles are weaker, and are not being cleared as expected. Shipments from the ports are practically normal. At Glasgow 72,250 tons were shipped, Bowling 341, Greenock 341, Ardrossan 5,547, Troon 8,286, Irvine 1,650, and Ayr 14,950 tons—total 103,365 tons, compared with 95,593 in the previous week, and 113,328 tons in the corresponding week of last year. Prices in some cases are a trifle easier.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/	13/
Splint .....	13/ to 15/	13/ to 15/
Treble nuts .....	13/9	13/9
Double do. ....	12/3 to 12/6	12/3 to 12/6
Single do. ....	11/ to 11/6	11/ to 11/6

## IRON.

The Glasgow pig iron market has been extremely dull throughout the week. The state of the market is largely due to discouraging reports from abroad and severe foreign competition. The total turnover in Cleveland warrants only amounted to 13,000 tons, and prices have fallen about 9d. per ton. Owing to the exceptionally low price for Cleveland a fair business has been done with consumers, the closing rate being 51s. 8½d. per ton cash. There are 84 furnaces compared with the same number last week, and 88 in the corresponding week of the previous year. Of the total, 35 are producing ordinary, 45 hæmatite, and 4 basic iron. The imports of pig iron into Grangemouth from Middlesbrough and district amounted to 11,174 tons. Prices of Scotch makers' iron are as follow:—Monkland is quoted f.a.s. at Glasgow, No. 1, 67s., No. 3, 65s. 6d.; Govan, No. 1, 65s., No. 3, 63s. 6d.; Carnbroe, No. 1, 71s., No. 3, 67s.; Clyde, No. 1, 72s. 6d., No. 3, 67s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 73s., Nos. 3, 68s.; Glengarnock, at Ardrossan, No. 1, 73s., No. 3, 68s.; Eglinton, at Ardrossan or Troon, No. 1, 67s. 6d., No. 3, 66s. 6d.; Dalmellington, at Ayr, No. 1, 69s., No. 3, 67s.; Shotts at Leith, No. 1, 73s., No. 3, 68s.; Carron at Grangemouth, No. 1, 73s. 6d., No. 3, 68s. 6d. per ton. Scotch hæmatite is quoted 63s. per ton for west of Scotland delivery. The position of the manufacturing branches of the trade cannot be called satisfactory. Black sheet makers are managing with great difficulty to keep works employed. The demand is principally for thin gauges. In view of the approaching close of navigation the shipments to Canada are being completed, while the finishing up of Indian contracts is also providing a fair amount of employment. Business in the galvanised sheet trade is at the moment fairly good, works generally being well employed, but future prospects are not very bright. The malleable iron trade continues in a depressed condition. The latest reduction of 7s. 6d. per ton has enabled makers to secure a better supply of specifications against old contracts, but employment is still unsatisfactory, and it is likely that if no improvement takes place in the near future, works will be closed down. Prices quoted by local makers, as compared with those at which foreign material is being offered, are still so much higher that competition is practically impossible. Belgian makers are quoting £4 16s. per ton net f.o.b. Antwerp for No. 2 bars, compared with local makers' quotations of £7 2s. 6d. per ton, less 5 per cent. for local delivery, and £6 10s. per ton net f.o.b. Glasgow.

## Scotland.—Eastern District.

## COAL.

A brisk business is being done in the coal trade of the Lothians. The pressure at the collieries is considerable and two or three qualities are well booked ahead, notably, secondary steams and treble nuts, for which a strong demand is being experienced. With the exception of trebles the demand for smalls has fallen off, but prices generally are on the same level as last week. The clearances were, at Grangemouth 39,737 tons, Granton 9,461, Leith 52,719, Byness 9,855—total 102,772 tons, compared with 108,021 in the preceding week, and 141,873 tons in the corresponding period of last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/ to 14/	13/ to 14/
Secondary qualities .....	11/9 to 12/3	11/9 to 12/3
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/6 to 12/9	12/6 to 12/9
Single do. ....	11/ to 11/3	11/ to 11/3

The Fife coal trade is very active. All classes of coal are in urgent request and supplies are difficult to arrange. Best quality steam coal is particularly in demand, finding it difficult to secure adequate quantities of double nuts. Shipments are fully cleared. At Leith 51,050 tons were despatched, 17,000 tons at Port 90, Tayport 543, Alloa 950,

Dysart 1,982, and Wemyss 1,403—total 123,935 tons, against 123,078 in the preceding week, and 114,951 tons in the same period last year. Prices are unchanged since last report.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	17/	17/
Unscreened do. ....	15/	15/
First-class steam coal .....	13/9 to 14/3	13/9 to 14/3
Third-class do. ....	11/3 to 12/	11/3 to 12/
Treble nuts .....	13/9 to 14/3	13/9 to 14/3
Double do. ....	12/3 to 12/9	12/3 to 12/9
Single do. ....	11/ to 11/3	11/ to 11/3

The aggregate shipments from Scottish ports for the week amounted to 330,072 tons, compared with 330,692 in the preceding week, and 370,152 tons in the corresponding week of 1912. For the year to date the shipments amount to 13,189,635 tons, against 12,358,915 tons, an increase of 830,720 tons over the same period last year.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 143,345 tons of coal and 3,902 tons of coke were despatched from Tyne Dock, an increase of 5,418 tons of coal and 2,692 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 61,580 tons of coal and 153 tons of coke, an increase of 231 tons of coal and a decrease of 1,256 tons of coke. The Blyth shipments aggregated 97,922 tons of coal and coke, an increase of 913 tons. The St. Petersburg merchants who recently secured the contracts for the supply of steam coals to the northern portion of the Russian State Railways are now definitely enquiring for about 100,000 tons of Northumbrian, Durham, or Yorkshire coals for delivery to Baltic ports over the next two months. There is also an enquiry for 15,000 tons of steams for shipment to Mariupol up to the end of the year. About 15,000 tons of Durham smalls are wanted for shipment, in small cargoes, to Rouen over next year. The Lisbon gasworks are enquiring for 20,000 tons of gas coal, and the Oporto gasworks for 11,000 tons, for shipment during next year in each instance. It now appears that the Palermo gasworks have not, as previously reported, allotted the order for their next year's requirements of 30,000 tons of Durham gas coal, but have asked for amended tenders to be in by November 5. The Turin gasworks want 30,000 tons of gas coals for October-May delivery. Tenders of 100,000 tons of local steam primes have been forwarded to the Chilian State Railways for delivery over next year, but little hope is entertained of the order coming to this district. The qualities specified by the railways include Northern, Welsh, Indian, Australian and Japanese coal. A quantity of Blyth small steams has been sold for delivery over next year at 7s. 3d. per ton, f.o.b. Best Blyth large steams have been sold for January-March delivery at 13s. 6d., f.o.b. Fifteen thousand tons of Durham gas bests have been sold for November-January shipment at 15s. 1½d. per ton, f.o.b. The contract to supply the Dantzic gasworks with 30,000 tons of similar fuel over next year is stated to have been closed, but the price has not transpired. The Trondhjem gasworks have contracted for 8,000 tons of Durham gas bests over next year at 17s. 10½d. per ton, c.i.f. Prompt supplies of many descriptions of fuel are exceedingly scarce, practically unobtainable, in fact. The loading turns continue very much congested, and tonnage supplies are not so plentiful as recently. F.o.b. quotations for prompt shipment have undergone very little alteration on the week, the only changes being as follow:—Blyth steam smalls are 3d. reduced; Tynes, 3d. cheaper; specials, similarly fallen; gas bests, 3d. down; seconds, easier; specials, 9d. lower; unscreened bunkers, Northumbrians, in buyer's favour; and coking smalls, 3d. decreased. These alterations are more apparent than real, for, as a matter of fact, very little prompt business is possible at present. However, for what they are worth, the prompt market is easier. Forward business is being negotiated at slightly weaker figures also.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	14/9 to 15/	14/9 to 15/
Do. Tynes (Bowers, &c.) .....	15/ to 15/3	15/ to 15/3
Secondary, Blyths .....	12/6 to 13/	12/6 to 13/
Do. Tynes (Hastings or West Hartleys) .....	12/9 to 13/3	12/9 to 13/3
Unscreened .....	12/ to 13/	12/ to 13/
Small, Blyths .....	7/9 to 8/	8/ to 8/3
Do. Tynes .....	6/6 to 6/9	6/9 to 7/
Do. specials .....	9/ to 9/3	9/3 to 9/6

## Other sorts:—

Smithies .....	14/	14/
Best gas coals (New Pelton or Holmside) ...	15/3	15/3 to 15/6
Secondary gas coals (Pelaw Main or similar) .....	13/6 to 14/	13/9 to 14/
Special gas coals .....	15/6	15/6 to 16/3
Unscreened bunkers, Durhams .....	12/9 to 13/9	12/9 to 13/9
Do. Northumbrians .....	12/ to 13/	12/6 to 13/
Coking coals .....	13/3 to 13/6	13/3 to 13/6
Do. smalls .....	13/	13/ to 13/3
House coals .....	15/6	15/6
Coke, foundry .....	19/ to 21/	19/ to 21/
Do. blast-furnace .....	17/6	17/6
Do. gas .....	17/ to 18/	17/ to 18/

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 96,435 tons of coal and 95 tons of coke, as compared with 85,975 tons of coal and 2,665 tons of coke for the corresponding period of 1912, being an increase of 10,460 tons of coal and a decrease of 2,570 tons of coke. The coal market is quieter. The prompt demand has somewhat subsided, but as soon as present turns get cleared off an improvement is looked for and some enquiries are circulating. Mean-

while, steam coals are a shade easier, but best gas coals continue fairly strong and second qualities are also a steady market. Coking coals are unchanged, bunkers are more readily obtainable at about the same prices, and household coals are in better demand. Coke is scarcer and prices are stiffer. One of the Turin gasworks is in the market for 30,000 tons of Durham coal, to be delivered up to March next, while the Palermo Gas Company want fresh offers of 30,000 tons of best gas. The Chilian Railways are also in the market for 100,000 tons of steam coals. Current quotations are about as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/9	15/9
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	17/6	17/
Ordinary do. ....	16/6	16/6
Other sorts:—		
Lambton screened .....	15/9	15/9
South Hetton do. ....	15/6	15/6
Lambton unscreened .....	13/9	13/9
South Hetton do. ....	13/6	13/6
Do. treble nuts .....	16/6	16/
Coking coals unscreened ..	13/	13/3
Do. smalls .....	12/9	13/
Smithies .....	15/6	15/6
Peas and nuts .....	18/	16/3
Best bunkers .....	14/	14/3
Ordinary bunkers ..	13/9	13/9
Coke:—		
Foundry coke .....	20/	19/6
Blast-furnace coke (dlvrd.) .....	18/6	18/6
Teesside furnaces) .....	17/6	17/6
Gas coke .....	17/6	17/6

Outward freights are on the easy side, recent fixtures including coasting:—London 3s. 4½d., Hamburg 4s. 1½d., Havre 4s. 9d., Rouen 5s., Boulogne 5s. Bay: St. Nazaire 7s. 6d., Bordeaux 5s. 9d., Rochefort 6s., Lisbon 7s. Baltic: Cronstadt 5s. 9d., St. Petersburg 6s., Pillau 4s. 9d., Windau 5s. 6d., Stockholm 5s. 7½d. Mediterranean: Genoa 9s. 6d., Algiers 7s. 9d., Port Said 9s. 6d., Constantinople 11s. 6d., Piræus 9s. 6d., Varna 11s. 3d.

## Middlesbrough-on-Tees.

## COAL.

On the whole, the fuel trade is steady and firm. Gas coal is generally strong and in good demand at this season of the year, but at present it is remarkably firm. The heavy squeeze in the best section is quite the feature of the market, and with very little indeed to be had over next week, the consequence is that second quality is appreciated and is well taken up. A Turin gasworks is in the market for 30,000 tons of Durham coal to be delivered up to May next. Best gas coal is 15s. 6d., seconds 14s., and specials up to 16s. The fairly good demand for bunker coal is met by a very ample supply and ordinary Durhams run from 12s. 9d. to 13s., f.o.b., whilst superiors are 14s. to 14s. 3d., and specials 15s. to 15s. 3d. Household coal is steady and in growing request at 15s. 6d. to 15s. 9d. Coking coal is well taken up at 13s. to 14s. Supply of coke is short, and needs, especially for local consumption, are not easily dealt with. The price of average blastfurnace coke is fully 18s. 6d., delivered at Teesside works. Foundry coke for shipment is round about 21s., f.o.b. Gashouse coke is 17s. 9d. to 18s.

## IRON.

Buyers of Cleveland pig iron are now coming forward with the much delayed orders to meet fall of the year requirements, but business is still anything but brisk. A steadier feeling, however, prevails, and substantial buying of Cleveland iron is looked for over the next week or two. There are complaints that current pig iron quotations are unremunerative to makers and unless relief comes in the shape of reduced cost of coke and ore, or advance in pig iron prices, more blastfurnaces may be blown out. No. 3 g.m.b. Cleveland pig is steady at 52s. 6d., f.o.b., at which figure a fair number of transactions have been recorded, whilst No. 1 is rather scarce, and is firm at 55s., No. 4 foundry is 52s., No. 4 forge 51s. 9d., and mottled and white iron each 51s. 6d.—all for early delivery, but doubtless contracts a little way ahead could be made at round about these figures. Extreme weakness characterises the east coast hæmatite branch of the staple industry. Buyers are not disposed to pay further reduced quotations, and there is very little business passing. Both makers and merchants offer Nos. 1, 2 and 3 freely at 64s. 6d. As a matter of fact, mixed numbers have been sold at 64s. 3d., and many buyers are not disposed to offer more than 64s. Business in foreign ore is at a standstill. Nominally market rates remain on the basis of 19s. ex-ship Tees for rubio of 50 per cent. quality, but consumers will not pay such a figure, and it is understood that purchases could be made on lower terms. There are no new features in finished iron and steel. Manufacturers keep well employed on running contracts, but orders are very scarce. Quotations all round are unaltered.

## South-West Lancashire.

## COAL.

There is nothing notable to report with regard to the inland household trade. Since the beginning of the month the demand has been much quieter than at the latter end of September, and the trade is waiting for a drop in the temperature. Only a restricted quantity of screened coal is going into consumption for forge and manufacturing purposes, forges generally not taking maximum quantities. Bunker fuel is only in moderate request, and the quantity being taken on contract is hardly up to average. There is little enquiry for outside steamers at the moment, and nominally prices are about the same as last week—viz., for ordinary Lancashire steam coal 13s. to 13s. 3d. f.o.b., to 14s. f.o.b. for best qualities. Business in slack for shipment is quiet, and medium quality rough slack is being offered at 9s. 6d. f.o.b. The coastwise and cross-Channel household trade at the moment is rather quieter, the curtailment of the supplies to Dublin being one of the contributory causes. The demand for slack for inland manufacturing purposes is on the increase, and there is every expectation that the consumption will return to its usual winter quantity.



Prices at pit (except where otherwise stated).		
	Current prices.	Last week's prices.
House coal:—		
Best .....	17/	17/
Do. (f.o.b. Garston, net)	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net)	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal.....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/ to 14/	13/3 to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

**South Lancashire and Cheshire.**  
**COAL.**  
The Manchester Coal Exchange was well attended on Tuesday. The demand for house coal is considerably quieter, but prices remain steady. Furnace coal continues in good demand, and there is good enquiry for shipping coal. The slack trade is quiet, plentiful supplies offering and prices rather easier. Now that the mills—which have been stopped for many months—have re-started, there should be an appreciable increase in the requirements of slack, which will no doubt strengthen the market.

Prices at pit (except where otherwise stated).		
	Current prices.	Last week's prices.
House coal:—		
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 14/	13/3 to 14/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington)	14/	14/
Best slack.....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

**IRON.**  
Business conditions are very slack, and show no life at all. There is not much enquiry in pig iron, and no alteration is recorded. The Associated bar makers have reduced their price of bars 5s., making the price £7 15s. and £7 5s. for Crown and second quality respectively. The foreigner has secured a fair amount of orders for bar iron, and he has also secured a considerable amount of billet orders at very much under the English makers' price. Steelworks are moderately busy with billets at 5 guineas and bars £7 5s. The general trade of the district is only moderate. Wagon builders could do with more work. Foundries are not overburdened with orders. Textile machinists are fairly well off.

**Yorkshire and Derbyshire.**  
**Leeds.**  
**COAL.**  
The market was well attended on Tuesday, there being an unusually large number of exporters from the Humber ports and also a fair muster of local merchants, with one or two representatives of the London market. Business, on the whole was satisfactory, although there was a good deal of complaining about the lack of demand for small fuel. The pits have worked practically full time and although the demand for house coal has fallen off to some extent, siding stocks of this quality are very light. Empty wagons have been fairly plentiful and complaints are again being heard about the delay in the transit of loaded trucks.

*House Coal.*—The London market continues to absorb all the available supplies of the best qualities, but sales of the secondary sorts in this direction are limited. It is reported that some of the best brands have been sold during the past few days at as high as 16s. per ton at the pit. Generally, the retail trade in London is dull and there is not much buying apart from contracts. The coastwise trade is fairly good, the chief call being for secondary qualities from the Silkstone and similar seams. Freights are about as last week, small boats averaging 3s. 9d. per ton from Hull to London and 4s. from Goole to London. In the West Riding markets merchants report a considerable falling off in the demand from the public, the only sorts selling at all readily being the cheaper grades, suitable for bagging. Current pit prices:—Haigh Moor selected, 18s. 6d. to 19s. 6d.; Wallsend and London best, 17s. 6d. to 18s. 6d.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other sorts, 14s. to 15s. 6d.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	15/ to 16/	15/
Wallsend & London best	14/ to 14/6	14/ to 14/6
Silkstone best .....	14/ to 14/6	14/ to 14/6
Do. house .....	12/6 to 13/6	12/6 to 13/6
House nuts .....	11/ to 12/9	11/6 to 12/9
Prices f.o.b. Hull:		
Haigh Moor best.....	17/6 to 18/6	17/6 to 18/6
Silkstone best .....	16/6 to 17/6	16/6 to 17/6
Do. house .....	15/ to 16/	15/ to 16/
Other qualities.....	14/6 to 15/	14/6 to 15/
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/9	12/ to 12/9
Gas nuts .....	11/ to 12/	11/ to 12/
Unscreened gas coal ...	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	10/6 to 11/6	10/9 to 11/6
Large double-screened engine nuts .....	9/9 to 10/6	10/ to 10/6
Small nuts .....	9/3 to 9/9	9/6 to 10/
Rough unscreened engine coal .....	9/9 to 10/3	9/9 to 10/3
Best rough slacks .....	7/9 to 8/6	8/ to 8/6
Small do. ....	6/ to 7/	6/6 to 7/
Coking smalls .....	6/6 to 7/	6/6 to 7/
Coke:—		
Price at ovens:		
Furnace coke .....	12/	12/

*Gas Coal.*—Spot lots of gas coal are very scarce, as practically the whole output is needed to satisfy contract requirements. One or two sales over next year are reported at prices which average 9d. per ton below current quotations. The demand for rough unscreened gas coal for export to the nearer Continental ports is still brisk, several sales being mentioned lately in the neighbourhood of 12s. 9d. per ton f.c.b. Hull.

*Manufacturing Fuel.*—There is a ready outlet for washed nuts and also for unwashed small nuts, but slacks of all descriptions are a drug just at present. There is much short time in the Bradford and Huddersfield districts, while the Lancashire demand is far from being as good as is customary. Small slacks have been offered this week freely at 6s. per ton at the pit. The collieries, however, decline to quote these special prices over next year as there is a feeling that the depression is only temporary.

*Washed Furnace Coke.*—There is no improvement in this market and although the output has been considerably reduced through working the ovens on short blast, supplies are very plentiful. Spot sales are reported at under 12s. per ton at the ovens and short term contracts are also mentioned as having been booked at about the same figure.

**Barnsley.**  
**COAL.**  
Though the demand on export account may be rather quieter owing to shortage of tonnage, the tone continues to be a healthy one so far as large steams are concerned. The output is fairly well cleared, and coalowners are in a position of not having to make many clearance offers. At all events, so far as the best quality of fuel is concerned, as a further evidence of the firm character of values, the Midland Railway Company, who had a few contracts expired, have followed the action of other companies in renewing for twelve months on the basis of 12s. 6d. per ton for the best grade fuel. Not unnaturally, little is yet heard from the railway companies in regard to the bulk of next year's supplies, but there are indications that the coalowners will hardly be satisfied with 1s. per ton advance on last year's rates, as is being now paid for renewals. Forward business otherwise is also quiet, though there are good enquiries circulating. At the present, values are a little weaker owing to the varying tonnage, and about 3d. per ton represents the difference on the week. Though there is a stronger tone in regard to secondary descriptions of fuel, there is a keener feeling shown with the extra tonnage for South Russian ports which remain to be placed. On home account, however, the position of the coalowners remains strong, but in sympathy with the best class of fuel, quotations are a little easier. With regard to small steam fuel, screened nuts are still good to sell, and the best brands are still rather scarce, with values well maintained. Secondary sorts are also fairly well placed, but pea slacks and rougher slacks are still very plentiful, with the house coal collieries now making about full time along with the others. Slacks were 3d. to 6d. per ton less than a few weeks ago, but with the settlement of the Lancashire cotton districts greater confidence is expected to be shown by buyers in the near future. The gas coal collieries find full working necessary to keep up contract deliveries, and little fuel is on offer for current sale. The demand for house coal of all grades has fallen away in a perceptible degree, and no doubt merchants have good stocks in hand which will require a little time before they are worked off. A spell of colder weather, however, will quickly stimulate business, and with stocks low the collieries appear able to face the position with equanimity. Values in every instance are well maintained, and the increased rates appear to be well established. The enquiry for coke continues to be of a very quiet description, and there is still a complete lack of confidence for the future. Despite the substantial reduction made in the output, stocks are still considerable, and buyers find plenty of offers, and prices are again very low.

Prices at pit.		
	Current prices.	Last week's prices.
House coals:—		
Best Silkstone .....	16/	16/
Best Barnsley softs.....	15/3 to 15/6	15/3 to 15/6
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	13/ to 13/3	13/ to 13/3
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/6 to 12/9	12/9
Secondary do. ....	11/6 to 11/9	11/6 to 12/
Best washed nuts .....	11/6 to 11/9	10/6 to 11/9
Secondary do. ....	10/3 to 10/9	10/3 to 10/9
Best slack.....	7/9 to 8/	8/ to 8/3
Rough do.....	6/6 to 7/	6/6 to 7/
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/ to 12/	11/ to 12/
Gas nuts .....	12/ to 12/6	12/ to 12/6
Furnace coke .....	12/ to 12/6	12/ to 12/6

**Hull.**  
**COAL.**  
There is very little change to report in the condition of the Humber coal trade except that in face of a lessened demand best Yorkshire steam hards are slightly lower on the week. Generally there is a fair amount of business in progress and best Derbyshire and Nottingham steams are, if anything, a little dearer. Secondary sorts and smalls are in fair request, but slack is very weak. House and gas coals are in moderate demand, and values are maintained. There is an increased interest in forward buying now that some of the railways are reported to have secured some portion of their requirements at about current rates, but one does not hear of much business resulting. The shipments from all the Humber ports are very large, and very little now remains to go to the upper Baltic ports. For the lower ports it is different, and additional work is also provided by the continued shipments to Black Sea ports to meet South Russian requirements. The freight market has taken an easier turn, and shippers are not at all keen on chartering tonnage at present. In the Baltic direction, Riga, Reval or Libau is worth about 5s. 3d., and Swedish Sound ports a little more. No Mediterranean business has transpired, steamers being on offer at 9s. Genoa. Further large bottoms have been taken for Odessa and neighbouring ports at 9s. 9d., while 11s. 9d. has been

paid for Mariupol. A large steamer has been chartered at 17s. 9d. Hull to Buenos Ayres, November loading, 250 delivery; Grimsby to Barcelona is recorded at 9s. 9d., and Hull to East Norway at 9s. 3d., the latter being for coke. The following are the approximate prices for prompt shipment f.o.b. Hull, &c.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards.....	15/9	16/
Washed double-screened nuts .....	13/9	13/9
Unwashed double-screened nuts .....	12/9 to 13/	12/9 to 13/
Washed single-screened nuts .....	13/ to 13/3	13/ to 13/3
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls.....	10/6 to 10/9	10/6 to 10/9
Unwashed smalls.....	9/3 to 9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys .....	14/3	14/3
Rough slack .....	9/ to 9/6	9/ to 9/3
Pea slack .....	8/3 to 8/6	8/3 to 8/6
Best Silkstone screened gas coal .....	14/3	14/3
Best Silkstone unscreened gas coal .....	12/ to 12/3	12/ to 12/3
Derbyshire:—		
Best steam hards (Hull)	15/6	15/6
Do. (Grimsby)	15/ to 15/3	15/
Derbyshire nuts (doubles)	13/	12/
Derbyshire nuts (doubles) (Grimsby).....	12/9	12/9
Derbyshire large nuts ...	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby)	14/	14/
Nottinghamshire hards ...	15/6	15/3 to 15/6
Do. do. (Grimsby)	15/ to 15/3	15/

**Chesterfield.**  
**COAL.**  
The demand for house coal is quieter at the moment, but the pits are able to work full time without having to resort to stocking. Prices recently advanced are firmly maintained. Gas coal moves freely. Fuel for manufacturing purposes continues in good demand, and the prospects for the next few months are encouraging. The requirements of the steel trade are heavy, cobbles and nuts suitable for gas-producers being particularly brisk. Slack for boiler-firing is in steady request. The best sorts are much sought after, but secondary qualities are more plentiful, and prices of these are a shade weaker. The demand for steam coal for locomotive use is well maintained, and the various railway companies are taking their full contract quantities. An exceptionally good business is being done in steam coal for export, and the extraordinary Russian demand is sustaining the tone of the market, which usually at this time of the year becomes somewhat dull owing to the closing of the northern Russian ports. Considerable quantities of Derbyshire coal has been purchased for the Russian railways, in addition to the heavy tonnage from South Yorkshire, and the collieries of the two counties will almost certainly be kept actively employed for some time to come. No contracts have yet been entered into by any of the collieries for next year. Buyers are not prepared to pay present prices for such coal as they may require over the shipping season, while the strong position in which colliery owners find themselves justify them in holding out for what they consider the true value of their fuel—that is, 15s. 3d. per ton delivered free alongside steamer at Grimsby. In the meantime, shipments are proceeding briskly. Washed nuts are in better demand, but washed slack is quieter. Cobbles and large nuts are in good request for near Continental ports. The coke market is dull. Consumers fight shy of entering into contracts for forward delivery, being content to buy only for their current requirements.

Prices at pit.		
	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	9/	9/

**IRON.**  
The iron trade continues in a depressed condition, and pig iron prices show no signs of improvement. Finished iron is in poor request, and there is difficulty in finding sufficient work to enable the mills to run more than about four days per week.

**Nottingham.**  
**COAL.**  
Although the weather recently has not been favourable to the coal trade, there is a satisfactory amount of business being transacted in this county, and the outlook is distinctly promising. The house fuel section retains an active tone, but the mild state of the weather keeps trade from becoming really brisk. Within the past week the demand for best qualities has declined somewhat, but owners regard it as a temporary set-back, and one which will quickly disappear when a colder period comes. For other qualities a fair sale is being done. On the whole the position is not unfavourable to the owners, as values are being fully maintained. A feature in the steam coal section is the export branch, a considerable tonnage being despatched to the east coast ports from a number of collieries in Notts. Otherwise

Prices at pithead.		
	Current prices.	Last week's prices.
Hand-picked brights .....	14/ to 14/6	14/ to 14/6
Good house coals.....	13/ to 14/	13/ to 14/
Secondary do. ....	11/6 to 12/6	11/6 to 12/6
Best hard coals .....	11/9 to 12/3	11/9 to 12/6
Secondary do. ....	10/6 to 11/6	10/9 to 11/
Slacks (best hards).....	8/3 to 8/9	8/ to 8/
Do. (seconds) .....	7/ to 7/9	7/ to 7/9
Do. (soft).....	7/3 to 8/	7/3 to 8/



The demand is moderately active, industrials being in best, as also are best quality hards, but second rate is going out of hand steadily. Notwithstanding a large output, stocks at collieries are on a moderate scale. Position in regard to slacks does not show any improvement, and at some collieries stocks are increasing, with the result that special lots are to be obtained at reduced rates. Gas coal is in good request, but coke is selling slowly.

### Leicestershire.

#### COAL.

There is no marked alteration in the condition of business in this district from that which has prevailed for some weeks. But on the whole there may be a little improvement. There is still a very small enquiry for household coal of the best qualities, though there is a brisker enquiry for the middle qualities. Small coals are still quiet. Steam coals are in fairly good request for all descriptions. Coals, cobbles and nuts are being delivered with more freedom, and the demand is for all kinds. The output has increased somewhat, and stocks on hand are generally lighter. Local merchants are a little busier than last week. The prospects are better for a busier time in the immediate future. A more rapid consumption will soon tell here, as there is plenty of business on hand. Quotations continue to be quite firm, and every indication points to a firm position in this respect.

### South Staffordshire, North Worcestershire and Warwickshire.

#### Hednesford.

#### COAL.

In consequence of the local wakes, the output will be interfered with to some extent this week and next, and many of the men appear to be glad to have an excuse for one or two days' holiday, otherwise there is not much change to report in the general condition of trade. The improvement in the house coal trade has been checked to some extent by the continued mildness of the weather. A fairly steady trade is being done in manufacturing coal, but the demand for slack is not particularly brisk. There is not much change in business at the landsale depots.

#### Birmingham

#### COAL.

The household department has received a stimulus from the cold weather, and the pits are making full time. Slacks are plentiful. Prices remain as follow:—

#### Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/6
Do. seconds deep.....	16/	16/
Do. best shallow.....	14/9	14/9
Do. seconds do.....	14/	14/
Best hard.....	15/	15/
Forge coal.....	11/	11/
Slack.....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked cobs.....	14/	14/
Best hard spires.....	15/	15/
Forge (steam).....	11/	11/
D.S. nuts (steam).....	10/	10/
Small (do.).....	8/3	8/3

#### IRON.

The market was fairly well attended, and business was on the quiet side. The best that can be said is that the downward tendency in prices seems for the moment to be checked, though competition is as keen as ever. The selling rates for pig iron are, if anything, steadier. In recent months fourteen furnaces have been blown out in the districts supplying the Birmingham market, notably Northamptonshire and Derbyshire, and output is consequently restricted, though, unfortunately, quite adequate for all the demands. Some lots are obtainable at a cheap rate, but in the main the class of pigs necessary for the production of good quality iron is not obtainable under 51s., and for high-class qualities 53s. is about the price. Derbyshire pigs average 54s. to 55s., and Staffordshire forge qualities fetch 51s. to 52s. No relief is being obtained in the price of cokes. In the finished branches profits are cut to a minimum, though a fair bulk of work is being turned out. The bar and sheet mills, for instance, are averaging four days a week, and the steel mills are going as steadily as ever. Marked bar makers are getting their usual orders for engineering and agricultural purposes, but they could do with more. A considerable quantity of business for merchant bars has been given out since the quarter day, but here again the productive capacity is by no means taxed. They are steady at £7 5s. to £7 7s. 6d. delivered, and a few makers ask £7 10s. for special lots. A steady trade is being done in small rounds, squares, and flats, though producers would be glad to get better prices than £7 10s. to £7 12s. 6d. a ton (three-eighths basis). The orders are mostly for small lots for prompt delivery. The Indian market for galvanised sheets is opening out, and good trade is being done with South America. Despite this, prices keep low, owing to the tremendous competition for orders, and this week has witnessed a drop of 2s. 6d., bringing the level to about £10 15s. For the home trade quotations for substantial orders remain at £11 2s. 6d. Gas strip is unchanged, and steel strip for bedstead makers is sold in the neighbourhood of £7 10s., and hinge strip at £7 5s. The demand for finished steel is on the quiet side, but the works are going steadily.

### Forest of Dean.

#### Lydney.

#### COAL.

The demand for the house coal of this coalfield is about the same as was recently reported. Some of the collieries have been worked with increased orders, and have been able to run in full time but with others doing less, the average has only run to five days in the week. Steam

coal buyers are somewhat scarce just now, and none of the collieries are really busy. Prices are easier than they were last month.

#### Prices at pithead.

House coals:—	Current prices.	Last week's prices.
Block.....	17/6	17/6
Forest.....	16/6	16/6
Rubble.....	16/9	16/9
Nuts.....	15/	15/
Rough slack.....	7/6	7/6
Steam coal:—		
Large.....	12/ to 13/	12/ to 13/
Small.....	8/ to 9/	8/ to 9/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

### Devon, Cornwall, and South Coast.

#### Plymouth.

#### COAL.

Messrs. W. Wade and Son report that there is a little more animation in the demand for house and steam coal at the south coast ports, but on whatever business that is completed concessions have had to be made, as buyers are unable to buy coal at the advanced prices recently proposed. Freight rates are also quoted weaker from various ports. Contract supplies are being regularly received, and retail prices continue to be very low as compared with those in districts situated from one to two hundred miles nearer the collieries.

### THE BY-PRODUCTS TRADE.

**Tar Products.**—The market is variable. As regards benzols they are very firm and rising, while in pitch there is very little change, prices being well maintained. The same may be said of toluol and creosote. Naphthas are quiet. Carbolic, however, are faring badly, and not only is crude much easier, but crystals also have dropped nearly a half-penny. Nearest values are:—

Benzols, 90's.....	1/2
Do. 50's.....	1/1
Do. 90's North.....	1 1/4
Do. 50's North.....	11 1/4
Toluol.....	10 1/2
Carbolic acid, crude (60 per cent.).....	1/1 to 1/2
Do. crystals (40 per cent.).....	4
Solvent naphtha (as in quality and package) ...	9 1/2
Crude ditto (in bulk).....	5
Creosote (for ordinary qualities).....	3
Pitch (f.o.b. east coast).....	44/6 to 45/
Do. (f.a.s. west coast).....	43/ to 44/6
Do. (f.o.b. gas companies).....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—Business is rather quiet, and every endeavour is being made by would-be buyers to depreciate prices as far as possible. In the absence of sales, quotations for both prompt and forward delivery must be taken cautiously, especially when in *extremis*. The American market keeps steady somewhere in the region of 3 10 dols. per 100 lb. Closing prompt prices are:—

London (ordinary makes).....	£12/7/6
Beckton (certain terms).....	—
Liverpool.....	£12/5
Hull.....	£13/3/9
Middlesbrough.....	£13/2/6
Scotch ports.....	£13/12/6
Nitrate of soda (ordinary) per cwt. ...	10/7 1/2

[Sulphate of ammonia, f.o.b. in bags, less 2 1/4 per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

**Railway Rates and Charges.**—The revised regulations issued by the Railway Clearing House on September 30 have been considered by a committee of the Association of Chambers of Commerce, and that committee has come to the conclusion that no concessions have been granted to the general public on the question of demurrage charges, those which have been granted as the result of representations to the general managers in May last affecting only private siding traffic. A request has been made to the general managers of the railways for a further conference on the subject. With regard to the recent increases of railway rates, it has been decided to ask the Railway Department of the Board of Trade to arrange for a conference between representatives of the association and the general managers of the railway companies at an early date. In the meantime, the views of the different chambers of commerce are being asked as to the effects of the new rates.

**Prevention of Overwinding Accidents.**—The prevention of overwinding accidents was dealt with by Mr. A. S. Bratley, of Rotherham Main Colliery, recently, in a paper which he read before the members of the Yorkshire branch of the National Association of Colliery Managers at Wakefield. Mr. Bratley contended that any satisfactory appliance must control the engine during the whole of the wind. It was not sufficient to arrange for the shutting-off of the steam and the instant application of a powerful brake at a fixed point in the wind. If nothing more than this was done, then the brakes must be extremely powerful, because the engine, by the time it reached that point, might have developed a very high speed. He described an apparatus which, by a positive action, exercised control during the whole process of winding. The engine could not attain to more than a predetermined speed, and no matter at what point in the shaft more than that speed was developed, the controller came into action and brought the engine to rest slowly. There was no object in stopping it quickly unless the cages were near the top or bottom of the shaft, and when such was the case the overwinding portion of the appliance came into operation within a predetermined distance from the end of the wind.

### THE WELSH COAL AND IRON TRADES.

THURSDAY OCTOBER 23.

#### North Wales.

#### Wrexham.

#### COAL.

The general state of the coal trade here during the past week has been satisfactory, and most of the collieries have worked good time and disposed of their output, except in the case of small coal, of which there is a slight accumulation. The trade in household fuels is good, both for railborne and landsale trade, and, generally speaking, the prices are well maintained and show no signs of reduction; in fact, it is confidently anticipated that in a little while a general advance in prices will take place. Still the merchants are unperturbed, and hold from making contracts, preferring to buy in the open market; and, singular to say, this seems to be the attitude of sellers, who will only accept forward contracts at higher than the ruling market figures. The railway companies are all taking good supplies of steam coal against their contracts. Labour troubles in and around Liverpool and other parts of the locality have affected the sale of coal for industrial purposes, and the shipping trade at Liverpool and Birkenhead has not been particularly brisk just lately. The usual weekly quantity of gas coal has been supplied under contract, and nuts for this purpose are as usual in great demand, and fetch good prices as a consequence. As stated, slack is at the moment rather weak in demand, and prices are inclined to slacken for this commodity. The prices this week may be taken as follow:—

Prices at pit f.o.r. :—	Current prices.	Last week's prices.
Best house coal.....	15/ to 16/	15/ to 16/
Secondary do.....	14/ to 15/	14/ to 15/
Steam coal.....	12/6 to 13/	12/6 to 13/
Gas coal.....	13/ to 13/9	13/ to 13/9
Bunkers.....	12/ to 12/6	12/ to 12/6
Nuts.....	11/ to 11/9	11/ to 11/9
Slack.....	6/ to 7/3	6/ to 7/9
Gas coke (at works).....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal.....	17/6 to 18/4	17/6 to 18/4
Seconds.....	16/8 to 17/6	16/8 to 17/6
Slack.....	10/ to 12/6	10/ to 12/6

### Monmouthshire, South Wales, &c.

#### Newport.

#### COAL.

Comparatively dull conditions continue to dominate the coal trade, the improvement which is shown by a little better enquiry being not very appreciable. With tonnage arriving in bigger quantities shipments have been heavier, and eased the pressure of stocks of best quality coals, for which sellers show a firmer disposition. No material change has, however, taken place in the market, which remains with an irregular and unsteady tone, with buyers independent in their attitude. Smalls have been equally as difficult as large coals, while house qualities remain unmoved, although the consumption is undoubtedly slowly increasing. Coke, on a weakened demand, rules 1s. easier, patent fuel being unchanged. A remarkably steady tone is maintained by pitwood, which at 21s. to 21s. 3d. for good wood ex ship has only varied 1s. since the middle of July, usually an awkward season. In the freight market there is little apparent change. Prompt handy tonnage is being picked up, but there is little strength in the market.

Prices f.o.b. cash 30 days, less 2 1/4 per cent.

Steam coals:—	Current prices.	Last week's prices.
Best Black Vein large ...	16/9 to 17/3	16/9 to 17/
Western-valleys, ordinary	15/6 to 15/9	15/6 to 15/9
Best Eastern-valleys.....	15/3 to 15/6	15/3 to 15/6
Secondary do.....	15/ to 15/3	15/ to 15/3
Best small coals.....	8/ to 8/3	7/9 to 8/
Secondary do.....	7/3 to 7/6	7/3 to 7/6
Inferior do.....	6/9 to 7/	6/6 to 7/
Screenings.....	8/3	8/
Through coals.....	11/6 to 11/9	11/6 to 11/9
Best washed nuts.....	13/ to 13/3	13/ to 13/3
Other sorts:—		
Best house coal.....	18/ to 19/	18/ to 19/
Secondary do.....	17/ to 18/	17/ to 18/
Patent fuel.....	19/ to 20/	19/ to 20/
Furnace coke.....	19/ to 20/	20/ to 21/
Foundry coke.....	23/ to 25/	24/ to 25/6

#### IRON.

Local conditions of the iron and steel trades are somewhat irregular, for whilst in some quarters a very pessimistic view is being taken of the market, on the other hand there is a considerable amount of fresh business being placed. Nevertheless quotations are inclined to ease all round, and it is very difficult to see any hope of improvement in the immediate future. Work continues moderately good at bar mills, where quotations are unaltered although the trend is downward. Imports of foreign bars for the week total 7,000 tons, and further heavy consignments are expected shortly. At rail mill's work continues good, and full output is reported. There is a fair enquiry, and values remain steady. At blastfurnaces matters are slackier. It is very difficult to arrange fresh business without making some concessions, which cannot be disregarded as unimportant. Tin-plates continue the most unsatisfactory feature of the market. Several mills have again shut down, but only small business is passing, and values are 1 1/2d. to 3d. per box easier. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tin-plate bars: Bessemer steel, £4 15s., Siemens steel, £4 16s. 3d. to £4 17s. 6d. Tin-plates: Bessemer primes, 20 x 14 x 112, 13s., Siemens primes 20 x 14 x 112, 13s. to 13s. 1 1/2d. Finished black plate, £9 15s. Pig iron: Welsh hematite, 72s. 6d. to 73s., delivered locally.

#### Cardiff.

#### COAL.

In consequence of the terrible colliery explosion at Senghenydd, which drew large numbers of minors daily to the scene of the disaster, outputs have been considerably reduced; and this state of affairs is likely to continue for



some time, because as soon as the bodies are recovered numbers of the colliers will doubtless be attracted to the funerals. Reduced outputs have, however, been compensated to a certain extent by the diminished quantity of tonnage chartered, the total number of vessels taken up during the week only representing a net registered tonnage of about 262,000 tons. Shipments for the six days amounted to 380,000 tons, being a decrease of over 40,000 tons as compared with the corresponding week of last year. Very little business is doing, and unless the supply of tonnage falls below the requirements of shippers there is every indication that freights will rather decline than increase—the present rate for large steamers for Genoa not having exceeded 9s., whilst there is a possibility that it may fall even a trifle below that figure. There is no doubt that the large amount of tramp tonnage which has been turned out of the various shipbuilding yards the last few months is at last beginning to affect the market. Supplies are rapidly becoming in excess of the demand, with the usual result. Tonnage arrivals in the Channel over the week-end were fairly satisfactory, considering the somewhat unfavourable weather which prevailed, and prices remained very steady, particularly as regards best steam coals, of which there is, comparatively speaking, only a very small quantity to be had direct from the collieries. For certain named descriptions 20s. 3d. is being paid both for current business, and also for the first half of November, whilst one or two collieries are quoting the same figure firmly for the whole of that month. Some firms, however, which are not quite so heavily stemmed are accepting 19s. 9d. The best of the second Admiralties are from 19s. to 19s. 3d., and ordinary seconds 17s. 6d. to 17s. 9d. Some very large enquiries have come forward the last few days from South America. The Central Argentine Railway Company are asking for tenders of from 250,000 to 300,000 tons for delivery over next year, and the Argentine Government are also in the market for a similar quantity for delivery over the same period. The Buenos Ayres and Great Southern Railways are also asking for tenders for the supply of 340,000 tons of Black Vein Monmouthshire steams for delivery over next year. Colliery people are still quoting very firmly for the future, and as the period within which contracts are usually made draws nearer, buyers show more disposition to increase their offers. The difference between sellers and buyers has lately been considerably narrowed down, so that there is now only a margin of 6d. per ton between them, whilst in some cases it is even less. The British Admiralty are shortly expected to come forward for their requirements for next year, so that a very busy period is looked forward to. Trouble is still threatened in some districts on the non-unionist question. The small coal market still continues depressed, and no improvement is likely to take place until the Italian markets are again opened. Best bunkering smalls are selling at 10s. 6d., ordinary qualities 6d. less, and cargo sorts from 7s. to 7s. 6d. per ton. No definite news is yet forthcoming as to the placing of the French State Railways contract for 380,000 tons of small, although it is reported that several firms have received a portion of the business. It is said that the administrators of the French Midi Railways, who last week received tenders for some 50,000 tons of small coal, are not prepared to pay the prices quoted, and have deferred the matter. The market for Monmouthshire coals is very inactive and prices continue rather weak. Black Veins are 16s. 9d. to 17s., western-valleys 16s. 3d. to 16s. 6d., and best eastern-valleys 15s. 9d. to 16s., in each case f.o.b. Cardiff. The Custom House returns just to hand show that the quantity of coal exported from the Bristol Channel ports to foreign countries in the month of September was 2,510,338 tons, as against 2,387,536 tons in the corresponding month of last year, being an increase of 122,802 tons. From Cardiff alone the shipments amounted to 1,675,361 tons, an increase of 78,759 tons, but from Newport, which exported 352,799 tons, there was a decrease of 183 tons. Port Talbot, with 166,051 tons, shows an increase of 11,463 tons, whilst Swansea, with an export of 292,778 tons, shows an increase of 24,663 tons. The following table gives the chief exports to foreign countries, both in September last as well as in the corresponding month of last year:—

	Sept. 1912.	Sept. 1913.
	Tons.	Tons.
Russia .....	88,007	106,801
Sweden .....	27,128	18,922
Norway .....	12,411	3,661
Denmark .....	3,190	5,932
Germany .....	21,945	32,110
Netherlands.....	13,682	7,408
Belgium .....	27,857	32,116
France .....	563,850	620,411
Algeria .....	39,381	43,581
French Somaliland.....	—	10,411
Portugal .....	46,794	62,523
Madeira .....	21,506	6,754
Spain .....	75,201	118,184
Canary Islands .....	43,620	47,938
Italy .....	435,359	470,390
Austria-Hungary .....	29,548	11,867
Greece .....	21,729	56,936
Rumania.....	44,740	30,103
Turkey (European) .....	15,540	16,263
" (Asiatic) .....	16,761	23,618
Egypt .....	159,507	173,158
Tunis.....	10,260	13,279
China (exclusive of Hong Kong) .....	—	6,888
Cuba .....	3,012	6,668
Peru .....	6,456	—
Chili .....	30,684	14,900
Brazil .....	115,210	127,306
Uruguay .....	87,626	54,386
Argentine Republic .....	251,053	234,349
Channel Islands .....	6,885	4,476
Gibraltar .....	19,124	11,164
Malta .....	29,824	23,087
Aden.....	10,947	22,930
British India .....	10,693	6,116
Ceylon .....	30,869	25,601
Hong Kong .....	6,060	—
West Africa (French) .....	10,735	10,776
" (Portuguese).....	20,757	18,624
" (British).....	3,567	9,443

Fancy house coals still rule from 17s. 6d. to 20s. 6d. No. 3 Rhondda bituminous is nominally 17s., but very little business is being done at that figure. No. 2 Rhondda is 13s.

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	19/9 to 20/3	19/9 to 20/3
Superior seconds .....	19/ to 19/3	19/ to 19/3
Ordinary do. ....	17/6 to 17/9	17/6 to 18/
Best bunker smalls.....	10/6	10/3 to 10/6
Best ordinaries.....	10/	10/
Cargo qualities .....	7/ to 7/6	7/3 to 7/6
Inferior smalls.....	6/ to 6/6	6/6 to 7/
Best dry coals .....	18/3 to 18/6	18/ to 18/6
Ordinary drys .....	15/6 to 16/	15/6 to 16/
Best washed nuts .....	16/	16/ to 16/6
Seconds .....	15/	15/
Best washed peas .....	11/	14/3 to 14/6
Seconds .....	13/	13/ to 13/3
Dock screenings .....	11/9	11/3 to 11/9
Monmouthshire—		
Black Veins .....	16/9 to 17/	16/9 to 17/
Western-valleys .....	16/3 to 16/6	16/ to 16/6
Eastern-valleys .....	15/9 to 16/	15/9 to 16/
Inferior do. ....	15/ to 15/3	15/ to 15/3
Bituminous coals:—		
Best house coals (at pit) .....	20/6	20/6
Second qualities (at pit) .....	17/6 to 18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/	16/6 to 17/
Through-and-through... ..	15/	14/6 to 15/
Small .....	12/ to 12/6	12/ to 12/3
No. 2 Rhondda—		
Large .....	13/	13/ to 13/3
Through-and-through... ..	10/6 to 11/	10/6 to 10/9
Small .....	8/	8/3 to 8/6
Best patent fuel .....	22/3 to 23/	22/6
Seconds .....	20/ to 21/6	20/ to 21/6
Special foundry coke .....	28/ to 30/	28/ to 29/
Ordinary do. ....	23/ to 26/	23/ to 26/
Furnace coke .....	20/ to 21/	19/ to 21/
Pitwood (ex-ship) .....	21/3	21/3

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

Shipments of patent fuel for the week were a little over 28,000 tons, of which the Crown Company shipped 9,596 tons, and other local makers 2,200 tons, and Swansea 16,220 tons. Best brands are 22s. 3d. to 22s. 6d., seconds 20s. to 21s. 6d. The coke market is practically stationary. There is very little demand, and special foundry is 28s. to 30s., ordinary foundry 23s. to 26s., and furnace coke 20s. to 21s. Pitwood remains steady at 21s. 3d.

IRON.

There has been a heavier clearance of stocks of tin-plates during the past week than has been recorded for many months. The shipments totalled 151,383 boxes, whilst receipts from works only amounted to 97,534 boxes, so that to complete the loadings as many as 53,849 boxes had to be withdrawn from stock. These are now down to 291,558 boxes, but they are still nearly 90,000 boxes more than in the corresponding week of last year. The strike of bundlers at the Pontardawe works has been settled. Prices continue to rule low. From some quarters a little better demand is reported, and one or two good sized orders have been received from South America. Prices for plates for quick delivery are fairly steady on the basis of 13s. per box, but buyers appear to be very reluctant to engage in forward business. Oil sizes are 13s. 4½d. to 13s. 6d. It is hoped that shipments will shortly be resumed to Roumania. There is no change in steel bars, Siemens tin-plate bars being still quoted at £4 16s. 3d. with the usual concession for Bessemer bars. Foreign imports for the week were about 6,000 tons. The German Syndicate quote 85s. for large lots of sheet bars, but French and Belgian makers are accepting 2s. 6d. less. It is expected that the American sheet bar makers will shortly be in the market. The galvanised sheet trade is very inactive; £10 15s. is the general quotation for 24-gauge corrugateds, but some works which are in need of orders are taking slightly less. The rail mills are well employed, an order having come to the district for 11,000 tons for South Africa. Welsh pig iron is 68s. 6d. to 69s., f.o.t. There is no change in iron ore. New steel crop ends are 61s. 6d. to 62s. 6d., but other descriptions of scrap steel are without alteration. Heavy wrought has fallen to 50s. per ton.

Swansea.

COAL.

During the past week the returns of the trade of the Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/6 to 20/6	19/6 to 20/6
Big Vein large (less 2½ per cent.) .....	17/6 to 18/6	17/6 to 18/6
Red Vein large do. ....	14/6 to 16/	14/6 to 16/
Machine-made cobbles (net) .....	21/6 to 23/	21/6 to 23/
Paris nuts (net) .....	23/6 to 25/6	23/6 to 25/6
French do. do. ....	23/6 to 25/6	23/6 to 25/6
German do. do. ....	24/6 to 25/6	23/6 to 25/6
Beans (net) .....	16/6 to 18/6	16/6 to 18/6
Machine-made large peas (net) .....	12/6 to 13/6	12/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	5/9 to 6/3	6/ to 6/3
Duff (net) .....	4/ to 5/3	4/6 to 5/3
Steam coals:—		
Best large (less 2½ p.c.) .....	19/ to 20/	19/ to 20/
Seconds do. ....	14/ to 15/	14/ to 15/
Bunkers do. ....	10/6 to 12/	11/ to 12/
Small do. ....	7/9 to 8/6	7/9 to 8/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ p.c.) .....	10/6 to 11/6	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

port continued extremely satisfactory. The coal trade was brisk, but the patent fuel exports were below the average. The shipments of coal and patent fuel together amounted to 111,784 tons. A very good attendance assembled on 'Change this morning, and there was no material alteration in the general conditions prevailing on the anthracite coal market; the undertone was from steady to firm. There was an excellent demand for Swansea Valley large, and values were a shade harder. Red Vein large continued to be a very strong market. Of the machine-made sizes, both Germans and peas were very firm; beans, however, were rather slack. Both rubbly culm and duff were slow. The steam coal market is very quiet, there being little demand, and all classes were freely offered at reduced prices.

IRON.

The iron and steel trades during last week were fairly good. The tin-plate industry also exhibited a brighter aspect; nearly the whole of the mills in the district were operating. The aggregate output for the past week was greater than that of the previous week. The pig iron trade was not quite so flourishing. Steel bars were in fair demand at slightly reduced figures. Briskness continued at the Mannesmann Tube Works, and the foundries and engineering works were busy. The shipments of tin-plates were 151,383 boxes, receipts from works 97,534 boxes, and stocks in the dock warehouses and vans 291,558 boxes.

Llanelli.

COAL.

The coal trade here is in a fairly satisfactory condition, and for the majority of coals made there is a good demand. The weakness in the steam and bituminous market continues, and there is very little hope of an improvement over the next few weeks. Prices are being cut very low, and it is quite certain that some collieries have a difficulty in covering their working costs. Bunkers, too, are down lower than it was thought a little while ago they would get to again. The anthracite market is doing well, and for nearly every sort there is a ready sale with prices that give a fair amount of satisfaction. The prospects of the next few months are promising, and collieries should be able to get good prices. The best large are most difficult to get, and the outputs are all practically sold for some time to come. Horticultural qualities are also going strong and some pits have their output over-sold. The machine-made kinds, more especially nuts and peas, are in good demand, but culm is easier than it has been for some time, and sellers are glad to let parcels go as low as 5s. per ton f.o.b. Prices this week are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	22/ to 23/	20/6 to 22/6
Secondary do. ....	19/ to 21/	19/ to 21/
Big Vein large.....	18/ to 19/	18/ to 19/
Red Vein do. ....	14/6 to 15/6	14/ to 15/
Machine-made cobbles ...	20/ to 21/	19/6 to 20/6
German nuts .....	23/ to 25/	23/ to 25/
French do. ....	23/ to 25/	23/ to 25/
Paris do. ....	23/ to 25/	23/ to 25/
Machine-made beans .....	18/ to 20/	18/ to 20/
Do peas.....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	5/3 to 5/6	5/9 to 6/3
Duff .....	4/6 to 5/6	4/6 to 6/6
Other sorts:—		
Large steam coal.....	16/ to 17/	17/ to 18/
Through-and-through ...	11/ to 11/6	11/ to 11/6
Small .....	9/ to 10/	9/ to 10/
Bituminous small coal ...	11/ to 12/	11/ to 12/

Mr. J. Crawford, J.P., presided at the annual meeting of the Nottingham Engineering Society held at the Welbeck Hotel, Nottingham, on Wednesday evening, October 15, when it was decided to alter the title of the society to that of the Nottingham Society of Engineers. On the motion of Mr. R. F. Perry, seconded by Mr. E. Stevenson, Mr. Crawford was unanimously re-elected president. Major W. E. Walker, general manager of the Clifton Colliery, was elected president-designate. Mr. W. H. Harlow, Mr. R. F. Percy, and Mr. James Smith were appointed trustees, and Mr. A. Beeson, manager of Clifton Colliery, and Mr. C. J. Fox auditors. Twelve new members were admitted, the total membership now being over 200.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—J. Brazen-dale and W. H. Jones, carrying on business as chemical merchants and drysalers, at Harrington-street, Liverpool, under the style of Brazen-dale, Jones and Co.; H. N. Ridgway and W. Cliff, carrying on business as galvanisers and hocket makers, at Green-lane, Hull, under the style of the Kingston Galvanising Company; G. Hibbert and J. C. Cosgrave, carrying on business as motor engineers, at Sandwich, Kent, under the style of G. Hibbert and Co.; L. A. Thomson and K. W. Nield, carrying on business as electrical engineers and contractors, at Brems Buildings, Chancery-lane, W.C., at Cobham, Surrey, and at Cardiff, under the style of Saville and Walton; J. Shaw and T. A. Fuller, carrying on business as land agents and land and engineering surveyors, at The College, All Saints, Derby, under the style of John Shaw, Son and Fuller; C. W. Owles and J. T. Cumming, carrying on business as engineers and smiths, at Macks-road, Bermondsey, under the style of Owles and Cumming; E. B. Leader and T. A. Sergeant, carrying on business as iron merchants and agents, at Gracechurch-street, E.C., under the style of John H. Austin and Co.; N. J. Hill the younger and C. J. Hill, carrying on business as manufacturers and engineers of bookbinders' materials, at Charles-street, Hatton-garden, and Baldwin's place, E.C., under the style of N. J. Hill and Co.



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(A Classified List appears on page 864.)

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\*\* For other Miscellaneous Advertisements see Last White  
 Page.

## The Colliery Guardian.

LONDON, FRIDAY, OCTOBER 24, 1913.

Dr. J. V. ELSDEN, D.Sc. (Lond.), F.G.S., and  
 Mr. HUBERT GREENWELL have been appointed  
 joint editors of the *Colliery Guardian*. The  
 new editors have been associated with the  
 conduct of the journal for over thirteen years.

The Court of Appeal yesterday dismissed the  
 appeal of Sir Oswald Mosley from the declaration  
 of Mr. Justice Eve in *Mitchell v. Mosley* that  
 the plaintiff was entitled as tenant in tail to the



mines and minerals under certain lands in Manchester.

The Divisional Court, on Thursday, heard a rule directed to justices of the West Riding of Yorkshire to show cause why a *certiorari* should not issue to remove to the High Court orders made by the justices dismissing an information preferred against two miners for contravening section 74 of the Coal Mines Act, 1911. The grounds on which the rule was granted were that, *inter alia*, two of the justices were themselves employed in the mines. The justices had dismissed the case and afterwards refused to state a case. Their lordships discharged the rule.

Advices have been received at Baltimore (U.S.A.) that negotiations have been concluded by an English syndicate for the purchase of extensive coal lands in the New River district, West Virginia, at a cost of 50,000,000 dols. (£10,000,000). The area comprises 96 collieries.

Sir Robert Romer, the chairman of the Durham joint district board under the Minimum Wage Act, has made some important variations in the rates and rules contained in his original award.

Upwards of 250 miners have been entombed in the Stag Cañon coalmine at Dawson, New Mexico, by an explosion. It is known that the dead already exceed 40.

The King has approved the appointment of a Royal Commission to enquire into the relationship between the railway companies of Great Britain and the State in respect of matters other than safety of working and conditions of employment, and to report what changes, if any, are desirable in that relationship.

A meeting of the miners' section of the Coal Conciliation Board for the Federated mining districts in England and North Wales will take place on Monday to discuss proposals for a new wage standard in place of the present 1888 basis. The new standard asked for is the present minimum wage level—*i.e.*, 50 per cent. above the old standard.

The Durham Miners' Association have decided to seek a change in the Eight Hours Act, so as to allow workmen to change their shifts if necessary.

The conference of owners and men in North Staffordshire, which was held on Tuesday to discuss the question of non-union labour, has been adjourned until to-day (Friday).

Lord Balfour of Burleigh sat in Edinburgh on Monday as arbiter of the Scottish Coal Trade Conciliation Board in the matter of a claim by the owners for a reduction in wages of 18¾ per cent. on the 1888 standard. His award has not yet been given.

The annual dinner of the Institution of Civil Engineers was held on Wednesday at the hall of the institution in Great George-street, Westminster. The occasion also marked the formal inauguration of the institution's handsome new home.

The annual meeting of the South Staffordshire and Warwickshire Institute of Mining Engineers was held on Monday. A paper on concrete reservoirs was read by Mr. J. L. Jeffery. Dr. Cadman was re-elected president.

An explosion occurred at the Glynea Colliery, near Llanelli, on Saturday, resulting in the death of four miners and injuries to five others. About 150 men were at work in the pit at the time of the accident.

In accordance with an application of the debenture-holders, the Chancery Court have appointed a receiver and manager to the Duffryn Rhondda Colliery Company Limited.

Sheriff Shennan has issued his judgment in

regard to the complaints made against Mr. R. W. Dron and Mr. James Dalgleish, manager of Dalziel and Broomside Colliery, Motherwell, who were charged with having failed to take certain precautions in connection with the mechanical and electrical apparatus at the mine. The Sheriff decided that the former could not be considered the agent of the company and convicted the manager on several of the charges, fining him £5.

A report on the explosion which occurred on October 27, 1912, at the Auckland Park Colliery, Durham, by Mr. R. A. S. Redmayne, Chief Inspector of Mines, and Mr. A. D. Nicholson, H.M. inspector of mines, has been issued. The investigators express the opinion that the explosion was initiated by the ignition of fire-damp, and that the extension of the explosion was due to coaldust.

A band of explorers in the Senghenydd Colliery on Wednesday encountered a large accumulation of gas in the pit, and had a narrow escape of being overwhelmed in another disaster. Eighteen men were overcome by the gas and had to be carried out. It has been decided to postpone further investigations until the conditions are more satisfactory. The united relief funds have now amounted to about £45,000. Sir Lees Knowles has made a suggestion that a national fund for the relief of mining distress be founded. The Home Secretary has promised a full enquiry into the disaster.

A prosecution under the new Coal Mines Act was heard by the Barnsley West Riding Bench, on Wednesday, in which the New Monckton Colliery Company Limited, Charles Chetwynd Ellison (agent) and Arthur C. F. Assinder (manager) were charged with a breach of section 43, subsection 3, with failing to provide in a pass-by a clear space of 2 ft. between the corves and the side of the road, or a clear space of 3 ft. between two trains of corves. It was shown that the company had instituted by-laws, but these had not been approved by the Secretary of State. The Bench decided there had been a technical offence, which would be met by small fines.

Before the Junior Institution of Engineers, on Monday, a paper on "Modern By-product Coking" was read by Mr. G. S. Cooper. The discussion will be reported in next week's *Colliery Guardian*.

A Brussels telegram states that the Colonial Council has approved the issue of a decree fixing temporary import duties as follows: Coal, 12 c. to 15 c. per 100 kilogs.; mineral oils, 20 c. to 35 c. per 100 kilogs.; motor spirits, 60 c. per 100 kilogs.; refined petrol, 2 fr. per 100 kilogs.

#### Miners'

#### Relief.

WE trust that in the flood of sympathy that has been evoked by the terrible disaster at Senghenydd the sensible letter which Sir LEES KNOWLES has addressed to the LORD MAYOR of London will not be overlooked. We say this advisedly because proposals to centralise colliery relief were strongly urged by some highly responsible people at the time of the Pretoria Colliery explosion in 1910, but so far no practical steps have been taken to give effect to views that meet with no serious opposition.

The generous response which invariably follows an appeal to the British people at such a time as the present, in reality springs more from the heart than from the head—not that it is any the worse for that—and exemplifies the truly sympathetic circumstances of grief and heroism that surround a colliery explosion. For the necessity for these huge special funds

is not so obvious. The case of the widow whose husband has been killed by the fall of a stone in the roof is not materially different from that of the widow whose husband has been engulfed in one of these appalling catastrophes, except, perchance, that the general impoverishment of a small community may render the immediate necessity for aid more pressing. But there is no clear reason why the annuity of the one should be greater than the annuity of the other, and for every breadwinner who is cut off by fire or explosion there are five who are killed by falls of roof. The call for special relief is even less cogent in these days, when the Workmen's Compensation Act and a greater sense of social responsibility render the lot of widow and orphan infinitely more secure than in days gone by.

It is true, however, that, for coping with the immediate necessities following a disaster, the existence of funds that may be drawn upon for such a purpose is an advantage. This is rather an argument in favour of the permanent establishment of funds capable of being distributed before the formalities of collection and capitalisation have to be observed.

It is singularly difficult to find out anything very definite about these special funds, and we believe that the LORD MAYOR, who seems to be anxious that this knowledge should be in the possession of the public, will encounter many obstacles before he arrives at all the particulars. The list of such funds given in the *Colliery Manager's Pocket Book*, reproduced in *The Times* on Wednesday, is, we fancy, the only record extant, for a few years ago we instituted enquiries in a number of directions without much success. About the same time the Home Office, we believe, embarked upon a similar investigation, but more important questions have probably intervened. There is probably no department of State to whom the trustees of special relief funds are responsible. Yet on all grounds, under the special circumstances, it is desirable that the administration of the separate funds, or of any amalgamation of funds, should still be vested in those who have so disinterestedly devoted themselves to this duty in the past; but there should be some means of recording the state of the funds, beyond a casual advertisement in some local newspaper.

Many of the funds raised for a special purpose have now been wound up, but the records of some of them provide an interesting chapter in the history of the industry. Thus a wholly admirable memoir prepared by the Hartley Committee, and edited by Mr. T. E. FORSTER, has been published, and this fund, above all others, shows what good use those engaged in the mining industry can make of benefits entrusted to their charge. In 1864, two years after the Hartley disaster, the surplus of £20,000 available after all the needs of the 401 dependants had been satisfied, was, with the consent of Chancery, distributed amongst the various coalfields and formed the nucleus of the permanent relief funds of the present day. The final surplus, when the fund was wound up in 1909, was, after a friendly fight in the Chancery Court, handed over to the associations concerned with the provision of homes for aged miners in the north of England, and the first block of "Hartley Cottages" erected in 1910 stands near the shaft.

From small beginnings the permanent relief funds have grown steadily, although the Workmen's Compensation and National Insurance Acts have, in late years, imperilled their existence. In 1878 the committees of these



Societies formed the Central Association for dealing with Distress Caused by Mining Accidents, over which the late Earl of CRAWFORD presided for many years. There are now seven affiliated societies, and the capital funds amount to a third of a million sterling.

Here then is an authority ready made. Whether a fund should be founded on a purely national basis or existing geographical distinctions preserved is really only a question of detail, but such a fund should differ in one respect from the present permanent funds, which, with one exception, dispense relief in cases of disablement—their weakest point. On the other hand, the contributory basis upon which they are founded is an advantage rather than otherwise, and it is a feature that deserves to be perpetuated: in other respects, the permanent and special funds have separate functions.

In conclusion, we may quote the following resolution passed by the Central Association in 1891:—

That in the opinion of this conference it is exceedingly desirable that public committees having charge of colliery explosion relief funds should in all cases take powers to appropriate any surplus in their hands for the promotion and encouragement of permanent organisations for dealing with mining accidents disasters.

As to the means of applying such funds, Mr. BOOTH, the Secretary of the Central Association, made what we regard as a valuable suggestion at the time of the Hulton disaster. He proposed that moneys so raised should be utilised to erect cottages and orphanages, for the use of those whose natural protectors have fallen in the mine. We have already given it as our opinion that the actual administration can be quite safely left with the industry, and such a course would tend greatly to reduce working and legal expenses, which so often absorb the lion's share of philanthropic donations; but it would seem to be proper that some department of State should be co-opted. When the Oaks fund was reorganised to provide relief for the dependants of the rescuers, it was the Charity Commissioners who took the matter in hand; but possibly the Public Trustee, to whom the "Titanic" fund has been entrusted, would be a better medium. In any case, we can unaffectedly wish that any such fund shall always be solvent, and hope, perhaps vainly, that eventually its *raison d'être* may vanish.

**The Auckland Park Colliery Explosion.** AFTER a long and careful investigation, lasting for about ten months, the Home Office has issued a report by Messrs. REDMAYNE and NICHOLSON upon the somewhat mysterious explosion which took place at Auckland Park Colliery on October 27 last year.

No one was working at the time in the Harvey seam, in which the explosion took place, otherwise its violence would undoubtedly have caused a serious loss of life, but men were at work in the Brockwell seam below, and also in the Low Main seam, and the current being on all the feeder cables, the three-core armoured cable in the Harvey seam at the time of the explosion was carrying a pressure of 2,400 volts.

From the nature of the evidence, there can be no reasonable doubt that this was a typical coal-dust explosion, and there are strong reasons for the assumption that an ignition of gas was the initial cause. But as no men were present, such an ignition must be presumed to have been due to natural agencies, and an unusual interest attaches to this investigation.

On examining the condition of the pit after the explosion it was found that the explosion

wave followed the direction of the main engine plane, and there was a sudden reversal of direction at a point 111 yards on the outbye side of the 3rd North Way. We may reasonably assume, therefore, that the explosion originated at about this point.

At this spot there was a joint-box on the electric cable; but the same place is also adjacent to extensive goaves, known to be gassy, with a dip of 1 in 40 approximately towards the south. The low side goaf had been used as a receptacle for water pumped from another portion of the Harvey seam. These two factors, the joint-box and the low side goaf, are each in turn examined by Messrs. REDMAYNE and NICHOLSON from the point of view of their possible connection with the explosion. The joint-box was quite undamaged, and would possibly not have claimed attention had it not been for a somewhat remarkable occurrence known to have taken place at the Black Boy Colliery shortly before the Auckland Park explosion. Workmen proceeding inbye in the Hutton seam at Black Boy Colliery, which belongs to the same firm and is worked from the same electric supply as Auckland Park, saw a sudden burst of flame from a joint-box, and investigation showed that the cause was traceable to a dead earth due to water from a tap impinging upon the switch-board at the motor house at Auckland Park. This caused a sudden rise in pressure, which found vent at the joint-box in question, which was defective at the time through having a loose terminal screw. The flame was due to the ignition of vapour from the bituminous compound in the joint-box, and a similar occurrence would afford a simple explanation of the Auckland Park explosion if there had been any evidence that sparking had taken place. While dismissing this cause in the present case, however, it is worthy of attention as illustrating the fact that a joint-box is a weak part of an electric conductor, and may become liable to heating and sparking from causes operating even at a remote part of the circuit.

The authors of this report next give their attention to the gas in the low side goaf, in connection with which they refer to Mr. W. C. BLACKETT'S theory of the water-blast, regarding the goaf as a bottle lying on its side, with a varying water level and a large available gas receptacle above. It is not difficult in this way to account for the presence of gas, varying in volume and pressure, and occasionally issuing in dangerous quantities into the main haulage road. Even barometric variations would alone suffice to explain such indications of firedamp, which had, in fact, been previously noted in this same seam during a falling barometer, and was perhaps the more marked as the air road on the low side of the main engine plane was not used as a regular return airway, but carried only a feeble current of 2,000 cubic feet per minute, throttled down by means of a regulator only 3 in. open. But admitting such an explanation of the presence of firedamp we are still left in doubt as to the cause of its ignition. The authors of the report suggest spontaneous combustion, which, although extremely rare in Durham mines, has been known to occur. This explanation, it is true, is admitted to be somewhat tentative, and is arrived at rather by the method of exhaustion than by any direct evidence in its favour. To some it may appear more probable that the cause might be mysteriously connected with the 2,400 volt current in the cable, but we refrain from an expression of opinion upon so debatable a point.

Of other possible, if improbable, causes referred to in this report, but little need now be said.

The question of sparks caused by the friction of rocks is always an interesting point, but the subject was so fully debated in the paper by Mr. J. T. STIRLING and Prof. CADMAN on the Bellevue explosion, Alberta, last year,\* that we need not enlarge upon it on this occasion, especially as there is no evidence supporting such a mode of origin in the Auckland Park explosion.

### What is an Agent?

IN dealing with questions of responsibility the law very frequently comes to grief, because it is almost impossible to devise a formula that will ensure equity in practice. In the mining industry the status and liability of the "agent" has provided an eternal problem from the time the State first took upon itself the duties of guardian-in-chief. It is unnecessary to recall the numerous test cases that were decided under the earlier Acts—cases that left us with no very definite ruling; considerable pains, however, were taken to define the position of the agent, as regards responsibility, when the Coal Mines Act of 1911 was in the making.

The Royal Commission on Mines, although they devoted a considerable portion of their report to a consideration of this question, did no more than express the opinion that the position of the owner and agent as regards responsibility for the observance of the Acts should be made clear, and that an agent who takes an active part in the technical management of a mine should possess a manager's certificate. Parliament subsequently attempted, as usual, to dot the Commission's "i's"—with the usual success. The Bill, as first drafted, proposed that an owner or agent should be debarred from taking part in the "actual"—subsequently altered to "technical"—management of the mine unless he possessed a manager's certificate; but the important sections are Nos. 102 and 103. In section 102 it was finally provided that an owner or agent should not be liable for proceedings if he proved that (a) he was not in the habit of taking and did not in respect of the matters in question take any part in the management of the mine; (b) that he had made all financial and other provision necessary to enable the manager to carry out his duties; and (c) that the offence was committed without his knowledge, consent or connivance. The last provision was added on the Report stage, and it would sometimes appear that the edition of the Act in the possession of the Home Office lacks this final emendation; for the authorities have been singularly unsuccessful in their attempts to enforce the official interpretation of this section.

In Scotland, especially, proceedings undertaken against agents have signally failed—in most cases because the prosecution had omitted to carefully examine the facts of the case before taking action. The result of the Motherwell prosecution, reported in this issue, is another example. In evidence it was clearly proved that Mr. ROBERT DRON, against whom a charge was directed as agent, filled the post of adviser to the managing director: in fact, a position, so far as his responsibility was concerned, comparable with that of the "check-viewer."

We have no sympathy with those who, whilst exercising control, attempt to shift all criminal liability upon the manager. There have been such cases, and the manager is entitled to, and needs, all the protection that the State can afford him. There is, for example, something in Mr. MCKENNA'S contention that an agent taking part in the technical management should be

\* See Colliery Guardian, September 13, 1912, p. 534.



liable, equally with the manager, to have his certificate cancelled. But it was surely not the intention of Parliament to spread the net so far as to draw within its meshes gentlemen occupying such positions as that held by Mr. DRON, unless it could be actually proved that they had assumed authority in regard to certain matters for which their deed of appointment, perhaps, gave no sanction.

On the general question of responsibility, Sheriff SHENNAN'S remarks should be read carefully. Amidst all his cares and worries, the manager may sometimes forget the nature of the charge that is placed upon him—a charge that would not be so burdensome or unreasonable if it was not hedged round with innumerable vexatious restrictions. We have had alarming calculations as to the time which the manager now devotes to signing his name; the burden is not so much the signature as the active responsibility which it denotes.

#### Trade Summary.

The London coal trade for the past week has been very slow, especially for house coals. No change is reported in the wholesale prices, but beyond contract coal very little buying has taken place. The depots and wharves are becoming congested, and the loaded wagons at the different marshalling and relabelling stations are beginning to cause anxiety on account of siding rent, &c. Manufacturing fuel is moving steadily, and there is an improved enquiry for gas coal. Coke, small nuts and slacks are still abundant, and prices are weaker. The seaborne market continues firm. Kitchen coal and bakers' nuts are steady, but prices are low.

At Newcastle there is a general scarcity of fuel for prompt delivery, and loading turns are congested. Prices are slightly weaker both on current and forward account.

There is a quieter feeling in the Durham coal trade, the prompt demand having subsided to some extent. Forward business, however, continues brisk.

The Lancashire house coal trade is rather easier. Special grades of steam and works fuel are also quiet, but the demand for common slack is again on the up-grade.

Business in West Yorkshire is fairly vigorous, although the demand for house coal is quiet, and the consumption of slack is below par.

A healthy tone continues to prevail in South Yorkshire, although the forward enquiry for steam coal is less active. Secondary and graded sorts meet with a fair sale, but slacks are easy. The demand for house coal has fallen away perceptibly. The coke trade is still depressed.

The demand for Derbyshire house coal has fallen off for the time being. Fuel for manufacturing purposes continues in good request.

The Senghenydd disaster has materially affected the output in South Wales, but this has been compensated for by the lack of ready tonnage. Business generally is slack but forward quotations are firm. The small coal market continues dull. Monmouthshire coals are easy, as are Rhondda bituminous coals.

Trade in Scotland continues satisfactory, but the shortage of tonnage has caused an easing off in some directions.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

#### SHEFFIELD UNIVERSITY OF MINING.

SIR,—I notice on p. 803 of your issue of October 17 a reference to some remarks which I made at Hickleton in connection with the very successful mining classes which are held there.

I am afraid that the report throughout does not give a correct impression of what I intended to convey. There are only two points, however, that I need trouble you to correct.

I am represented as saying that these local classes are a "sort of feeder to the university." I do not regard this as by any means their principal function, which is to educate the working miner in the elementary scientific principles which underlie the safety of the pit. The second point refers to the granting of scholarships by the West Riding County Council for courses at the university. The council have for many years sent a large number of exhibitioners to evening classes at the

university; what is, so far as my knowledge goes, a new departure is the grant of a scholarship for part-time day courses at the university.

F. E. ARMSTRONG.  
Department of Applied Science,  
St. George's-square, Sheffield.  
October 20, 1913.

#### THE PETROLEUM MINING COURSE AT BIRMINGHAM UNIVERSITY.

SIR,—In the presidential address of Sir Thomas Holland to the Manchester Geological and Mining Society, reported in your issue of the 17th inst., I find some very remarkable statements. With the merits of his controversy with Prof. Cadman as to the benefits or the reverse of a university training for mine managers, I have no concern, but when he proceeds to attack the petroleum mining course at Birmingham University I am interested.

Among other things, he says: "The young man who takes up technical problems in connection with the exploitation of petroleum must specialise in one of the three distinct lines—he becomes a driller, or a refinery chemist, or an oil geologist. . . . There is not one of the three main technical aspects of oil exploitation that does not require a full apprenticeship to make the training other than dangerous. *It is grossly unfair to entice young men into a blind alley and saddle them with a freak title that will handicap every attempt they make in after life to specialise in a recognised branch of technology*";—(the italics are mine)—"they are obviously not mining men in spite of the title; if they are to be of real value as oil geologists, they ought to take the most advanced courses in stratigraphy and palaeontology; if they are to be refinery chemists, they might undertake the full course of chemistry; if they want to be drillers, they might wisely avoid the University altogether."

This, sir, is surely strange language for a professor at one university to use about a course of study adopted by the authorities of another university; and adopted after consultation with Sir Boverton Redwood, who is probably better acquainted with the needs of petroleum mining than any other man in the country.

It is still stranger language if it be the case, as I am informed, that the authorities of Manchester University had an almost identical scheme for a petroleum mining course in a forward state of preparation when the unexpected publication of the Birmingham scheme caused them to abandon the idea.

As one of the young men who has been "enticed" into taking the petroleum mining course at Birmingham University, I should like to deal with the matter on the facts.

Having recently visited most of the oilfields in the United States, I think I may claim to have some practical knowledge of the sort of training which would be useful. Sir Thomas Holland is quite correct, so far as he goes, in dividing the branches of petroleum mining into geologist, driller and chemist, and all large companies have now, and will have in the future, specialists in these branches attached to their staffs. But besides these large companies, there are hundreds of small companies, not only in the United States, but all over the world—many of them financed with British capital—who require as field managers men with a good engineering training, who know sufficient of geology to be able to locate sites for wells, of chemistry to test the oil they produce, or, if necessary, run a small refinery or topping plant, and of drilling to look after and control the drilling staff or drilling contractor as the case may be. Nearly all these qualifications can, I believe, be acquired from a university course, and at present I know of no better place than Birmingham.

I had an opportunity of discussing the Birmingham course with some of the best-informed practical oil men in the United States, and I found them unanimous as to the advantage such a training would be to any man entering the oil industry; and, in fact, the University of Pittsburg is already giving a somewhat similar course.

A university course of this sort must, I think, admittedly be supplemented by a period of field training, but I hope that this period can be very greatly reduced in the case of a man who has learnt all that the university can teach, and at the end of this period such a man should be in a position greatly superior to that of a man who has only had a practical training in one of the three branches which Sir Thomas specifies.

In conclusion, I may say that I have no idea with what object the university authorities started this course; but I, for one, am satisfied that by taking it I shall get a useful training which I could have got in no other way.

Apologising for the length of this letter,  
The University, Birmingham, T. G. COCHRANE.  
October 21, 1913.

#### OBITUARY.

Mr. Edward Barton, managing director of the Carnforth Ironworks, died at his residence, Warton Grange, near Carnforth, last week. Mr. Barton, who was 82 years of age, was a brother of Mr. Robt. Barton, of Carlisle. He was formerly manager of the blastfurnaces of Messrs. Gilkes, Wilson and Co., of Middlesbrough. On leaving there he undertook the construction and management of the West Cumberland Ironworks at Workington, and later planned and constructed the Carnforth Ironworks, and for the past half-century had guided the career of that company. He was mainly instrumental in the formation of the Carnforth Gas Company Limited and the Carnforth District Waterworks Company over 40 years ago, and had been chairman of both concerns from the first. In 1903 the shareholders of the Carnforth Ironworks, in appreciation of his services, presented him with his portrait in oils. He leaves one son—Mr. A. E. Barton, the present manager of the works—and four daughters.

At Caester Infirmary, last week, the death occurred of Mr. Thomas Edwards, colliery manager, of the Standard Colliery, Buckley. The deceased gentleman had not been well for some time past.

One of the oldest of civil engineers in the country and a pioneer of the Welsh iron and coal industries, Mr. Theophilus Creswick, has passed away. Mr. Creswick learned engineering at Dowlais. After filling a position at Plymouth Ironworks, Merthyr, where he had as a pupil Lord Merthyr—thou Mr. W. T. Lewis—he was for a time an ironmaster and colliery owner in West Glamorgan, and until recent years consultant-engineer to the Cardiff Railway Company.

Mr. Thomas Lee Elwen, who for the last 15 years had been manager of Brandon Colliery, died recently at his residence, Holly Garth, Brandon.

The death has taken place at Torquay of Mr. Arthur Chamberlain, a younger brother of Mr. Joseph Chamberlain. He was chairman of Kynoch Limited, and held the same important office in the Ammonia Soda Company, the Birmingham Trust Limited, Chamberlain and Hookham, and Tubes Limited. He was also a director of the Corringham Light Railway Company.

#### LABOUR AND WAGES.

##### North of England.

At a committee meeting of the Durham Miners' Association at the Miners' Hall, Durham, on Saturday, it was agreed to seek a change in the Eight Hours Act, so as to allow workmen to change their shifts if any urgent necessity should arise. The programme contained a resolution asking that the county be balloted for or against a strike on the hours of fillers, with a view to bringing their hours down to those of coal-hewers, but this was withdrawn.

There is much likelihood of some material change being made in respect of the working of the three-shift system in Northumberland. Some time ago the executive committee of the miners' association, acting on the instructions of a special council meeting, met the coalowners with proposals for a modification of the three-shift system. The owners did not at once agree to the proposals submitted, but they have appointed a sub-committee to go into the whole question, with power to draft alternative proposals to place before the men. It is anticipated that no serious difficulty will prevent some change which will be of advantage to both sides being instituted.

Sir Robert Romer, chairman of the Durham Joint District Board under the Coal Mines (Minimum Wage) Act, has given his award as umpire on the recent application by employers and workmen that variations should be made in wages and rules laid down by him in his award of May 1912. Sir Robert Romer has decided that from October 21 the wages of boys (other than underground enginemen) shall be as follows:—Datal, under 15, 2s.; over 15 and under 16, 2s. 4d.; over 16 and under 17, 2s. 8d.; over 17 and under 18, 3s.; over 18 and under 19, 3s. 4d.; over 19 and under 20, 3s. 8d.; over 20 and under 21, 4s. Piece rates: Under 19, 4s.; over 19 and under 20, 4s. 3d.; over 20 and under 21, 4s. 6d. Under the old award the wages were: Boys under 16, 2s.; not under 16 but under 18, 2s. 9d.; not under 18 but under 21, piece, 4s.; datal, 3s. 6d. The new award also raises the age of exclusion from the right to the minimum in the case of hewers from 57 to 60, and in the case of other workmen from 63 to 65. It is laid down that notice of the cause of failure to perform the work necessary to earn the minimum must be given by a workman before the end of his shift if practicable; if not, as soon as possible thereafter. The workman is to forfeit his right to the minimum rate if he unreasonably delays going to his working place or work at the proper time, or leaves before the proper time; or if he fails through his neglect or default to provide and use the customary tools.

##### Federated Area.

A meeting of the miners' section of the Coal Conciliation Board for the Federated mining districts in England and North Wales will be held in London on Monday next. Mr. Stephen Walsh, M.P., who was elected vice-chairman of the Board at Scarborough, in succession to Mr. W. E. Harvey, M.P., will preside over the meeting. It is understood that the meeting will take into consideration their proposals for a new wage standard in place of the present 1888 standard, and will ask for the new standard to be fixed at the present minimum wage level—viz., 50 per cent. above the old



When the men have prepared their case they will submit their proposals to a full meeting of the Council of the Yorkshire Miners' Association met at Barnsley on Monday, Mr. H. Smith presiding. The council expressed dissatisfaction that no settlement had yet been effected regarding the minimum wage for surfacemen in West Yorkshire. It was reported the applications to take a ballot on the question of giving notice at the Mickfield and Howley Park collieries had been withdrawn, the dispute having been settled. The dispute at the Hoyland Silkstone Colliery had also been arranged.

A dispute at the Whitwell Colliery, which has arisen through the refusal of the management to reinstate a stallman named Wareham after his recovery from an attack of nystagmus, threatens to assume serious proportions.

Representatives of the West Yorkshire Coalowners' Association and the Surfacemen's Unions resumed their conference in regard to the minimum wage on the 17th inst., at the Hotel Metropole, Leeds. After deliberations lasting two hours, the conference was adjourned until October 28, it being reported that some progress had been made towards an eventual understanding.

The recent stoppage at Gedling pit and various questions which have arisen there were discussed at the offices of the Digby Colliery Company in Nottingham, when Mr. C. Bunfield (the secretary of the Notts Miners' Association), with a deputation of colliery workmen, met the management. A suggested agreement for dealing with stoppages of pits by the abstention of boys from work was offered for the consideration of the men's representatives. The suggestions are:—That the boys agree that in future they will not stop the pit without submitting their grievances to the management and having them dealt with by proper constitutional methods. The men will not in any way support or encourage the boys in stopping the pit, but will use their best endeavours on all occasions to get the boys to settle their grievances by constitutional methods only. In the event of the pit being stopped illegally by the boys, the men will, when required by the management, do the work of the boys to assist in keeping the pit going. Any men called upon to work on the roads to be paid by the company at the price-list rate, and not at the boys' rate. These suggestions will be brought before the men shortly for their consideration and acceptance.

After a "straight talk" on Monday by Mr. F. W. Raynor (secretary of the Linby Miners' Association), the youths who had been out since the previous Wednesday resumed work on Tuesday. In a report on a recent examination of the mine Mr. Raynor said they found a shortage of corporals and that small boys were being employed as gangers, which led to an insufficient supply of wagons in the stalls. The manager had promised amendment in this direction. There was no doubt that the new High Main seam would continue to be worked, but much remained to be done before a price list could be agreed upon.

The council of the Derbyshire Miners' Association, at a meeting on Saturday, condemned the action of colliery managers who allowed pits to continue working after a fatal accident had taken place, and a copy of the resolution was ordered to be sent to the Coalowners' Association. It was also decided to make representation to the Coalowners' Federation with respect to a 15 per cent. advance to surface workers. The question of automatic weighing machines at pit banks was again considered, and it was decided to ask the Federation to do their utmost to insist upon the instalment of the machines on all pit banks.

Representatives of the North Staffordshire Coalowners' Association and the four unions which have federated for the purpose of eliminating non-union labour from the North Staffordshire collieries met on Tuesday at Stoke-on-Trent, the only definite decision being to adjourn the conference until to-day (Friday). The notices of nearly 30,000 men employed in the pits expired on October 11, but a postponement of a month was decided upon at the last conference a fortnight ago, and unless other methods can be found before November 8 the men will cease work.

It was announced at the beginning of the week that further negotiations had been opened between the Westhoughton Coal and Cannel Company and the Lancashire and Cheshire Miners' Federation with a view to settling the dispute which had arisen in the Yard mine, respecting working conditions. The dispute affected close upon 400 men and youths at the company's two pits in the Westhoughton area.

#### Scotland.

Lord Balfour of Burleigh sat in Edinburgh on Monday as the arbiter of the Scottish Coal Trade Conciliation Board, and heard parties in regard to the claim by the coalmasters for a reduction in wages of 18½ per cent. on the 1888 basis, the reduction being equal to 9d. per day from the present wage of 7s. 6d. per day. The arbiter reserved judgment.

#### Iron, Steel, and Engineering Trades.

A strike of boilermakers has occurred at the Lilleshall Works, Wellington, on account of a man named Wynn refusing to join the local branch of the Boilermakers' and Iron and Steel Shipbuilders' Union.

In connection with the new colliery which is contemplated at Harworth, just on the borders of Notts and South Yorks, and some 10 miles from Doncaster, the Great Northern Railway Company are making preparations to lay down a line to connect with their main line between Retford and Doncaster. About ½ mile of line will have to

### THE LONDON COAL TRADE.

THURSDAY, OCTOBER 23.

The London coal trade for the past week has been exceedingly quiet, everyone apparently adopting a waiting position. Stocks are high, both at the collieries and in London, and although the time is fully ripe for anticipating the winter's demand, the lack of anything like cold, frosty air has kept back the demand, and the delivery trade is very slow. Colliery quotations are fairly firm, but very little new business is doing. Factories are busy along the Thames-side, so that manufacturing qualities continue in fairly good demand. Taken as a whole, the London market is well supplied with fuel at the present time, and the depots are becoming somewhat congested, so that factors and merchants find increasing difficulty in disposing of the surplus stock, and in consequence are limiting their purchases to very small dimensions. Buying during the week has been at a very low ebb, and in many cases wagon-owners have experienced considerable difficulty in keeping their rolling stock moving. The attendance each market day has been fairly good, but it was clearly apparent that the sellers were far more eager to sell than the buyers were to buy. Pits have been working practically full time, but in many cases the colliery sidings are known to be full of stock coal. The contract quantities are coming forward regularly, but merchants find the utmost difficulty in dealing with the loaded wagons. Gas coals are, however, gradually increasing in demand, and hard steam coals also have been firm. Shippers report that best house coals are still a strong market, and in view of the increasing requirements from Russia this seems likely to continue. Very few collieries will quote for forward deliveries, as the time is now overdue for a firm tone in all the house markets should colder weather intervene. The present mild atmosphere considerably retards any increase in the actual consumption of house coal, and in some cases lower quotations are reported for current or immediate deliveries, but no forward quotations are available. Small nuts and slacks are overplentiful, and the abundance of the supply has tended to weaken the price. The lowest summer prices lasted for 110 days this year, from May 19 to September 6, and this has been the longest period since 1905. Last year the lowest summer prices lasted only 65 days, and the year before 95 days. The unfortunate feature of the present moment is that some of the less prominent merchants are still advertising lowest summer prices. On Monday last the unusual tolling of the beadle's bell led to a complete cessation of the usual "hum" in the middle of the market, and Mr. Geo. C. Locket (chairman of the Coal Merchants' Society), in a few well-chosen words, expressed the sincere regret of all present at the lamentable loss of life in the great colliery disaster in South Wales, and urged that the sympathy should take a practical form in the raising of a relief fund on the London Coal Exchange. This was ably supported by Mr. J. O. Murgatroyd (chairman of the Inland Colliery Owners' Subscription Room), and the list was immediately responded to by a large number of generous subscriptions. The number of vessels reported as arriving in the Thames are 30 for Monday's market and 11 for Wednesday. Seaborne prices remain nominally 21s. 6d. for best Wallsend and 20s. 6d. for seconds, but little or no coal is on offer; all the vessels arriving are on contract. A small amount of speculative coal was dealt with from the Yorkshire district, but at varying prices.

#### Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/	13/
Do. nuts .....	12/	12/
Birley cube Silkstone .....	12/6	12/6
Do. branch coal .....	16/	16/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	13/6	13/6
West Riding Silkstone .....	13/	13/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	12/	12/
New Sharlston Wallsend .....	15/	15/
Wharfedale Silkstone branch .....	16/	16/
Do. Flockton Main .....	15/6	15/6
Do. Athersley house coal .....	12/	12/
Newton Chambers best Silkstone .....	17/	17/
Do. Grange best Silkstone .....	15/6	15/6
Do. Hesley Silkstone .....	14/	14/
Do. Rockingham selected .....	14/	14/
Do. Rockingham Silkstone .....	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best .....	12/6	12/6
Do. large nuts .....	12/3	12/3
Do. small nuts .....	10/	10/
Do. kitchen coal .....	10/6	10/6
West Hallam Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/3	12/3
Do. London brights .....	11/	11/
Do. bright nuts .....	11/	11/
Do. small nuts .....	10/	10/
Manvers Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Shipley do. brights .....	13/	13/
Do. do. nuts .....	12/6	12/6
Mapperley brights .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Cossall Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Trowell Moor brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Grassmoor Main coal .....	13/	13/
Do. Tupton .....	11/6	11/6
Do. do. nuts .....	11/6	11/6

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal .....	13/	13/
Do. do. cubes .....	13/	13/
Do. special Derbys .....	12/	12/
Do. house coal .....	11/6	11/6
Pilsley best blackshale .....	13/	13/
Do. deep house coal .....	11/6	11/6
Do. hard screened cobbles .....	11/	11/
Hardwick best Silkstone .....	13/	13/
Do. Cavendish brights .....	12/6	12/6
Do. cubes .....	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/6	12/6
Do. small hards .....	12/6	12/6
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	13/
Do. cobbles .....	13/	13/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/6	14/6
Bestwood hard steam coal .....	13/	13/
Do. bright cobbles .....	11/9	11/9
Hucknall Torkard main hards .....	12/9	12/9
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. .....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. bakers' nuts .....	11/3	11/3
Do. loco Two Yard hards .....	14/6	14/6
Do. Ryder nuts .....	11/9	11/9
Do. do. cobbles .....	13/	13/
Nuneaton steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Haunchwood steam .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Wyken steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Exhall Ell coal spires .....	14/3	14/3
Do. brights .....	12/6	12/6
Do. large steam coal .....	12/	12/
Do. best screened cobbles .....	12/3	12/3
Do. large nuts .....	12/3	12/3
<b>Leicestershire.</b>		
Snibston steam .....	10/	10/
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	18/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	9/9	9/9
Do. large nuts .....	9/6	9/6
Do. bakers' nuts .....	9/	9/
Do. Main nuts .....	9/6	9/6
Do. hards .....	9/3	9/3
Granville New Pit cobbles .....	11/	11/
Do. Old Pit cobbles .....	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/	13/
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	14/	14/
Do. cobbles .....	13/	13/
Apedale best .....	13/	13/
Do. seconds .....	12/9	12/9
Podmore Hall best .....	13/	13/
Do. seconds .....	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London .....		
Do. brights .....	11/	11/
Do. shallow one way .....	11/	11/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	10/9	10/9
Coppice deep coal .....	14/6	14/6
Do. cobbles .....	14/	14/
Do. one way .....	12/	12/
Do. shallow coal .....	13/6	13/6
Cannock Chase deep main .....	16/	16/
Do. Deep kitchen cobbles .....	11/6	11/6
Do. best shallow main .....	13/	13/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/9	11/9

#### From Messrs. Dinham, Fawcus and Co.'s Reports.

Friday, October 17.—There was no alteration in the seaborne house coal market to-day, no Durham on offer, but a fair enquiry was noticeable for Yorkshire seconds. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 19.

Monday, October 20.—Owing to the mildness of the weather, the seaborne house coal market was generally quiet to-day; no Durham cargoes offering, and Yorkshire very scarce. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 30.

Wednesday, October 22.—There was no alteration in the seaborne house coal market to-day, no cargoes being on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 11.



## INDUSTRIAL AGREEMENTS IN THE COAL TRADE.

(Continued from page 641).

### Evidence of Miners' Leaders.

On January 28, 1913, Messrs. W. Harvey, M.P., J. Robertson, W. Straker, and W. Brace, M.P., gave evidence on behalf of the Miners' Federation of Great Britain.

In the first place, Mr. Harvey dealt with agreements in the Federated area. He said that the national agreement for wages had been loyally carried out, both by the employers and the men. Any owners who had refused to abide by the agreement had been brought into line within reasonable time. Speaking next of local agreements, witness handed in copies of price lists, as well as a copy of the Derbyshire agreement in regard to abnormal stalls. The local agreements, he said, were generally observed, although hitches sometimes occurred. The majority of cases were settled by the men affected and the manager. Speaking for his own district, the only difficulty they had had was in regard to the minimum wage. In some other parts of the area they had had differences and friction with respect to the non-performance of agreements. The difference they had in Derbyshire was with regard to the rendering of certain rules relating to infirmity and inefficiency. They had had 20 cases under one company before the board, who had decided that the men were capable and granted a certificate, but the company refused to pay the minimum wage. At present there was no alternative but to go to law.

Continuing, witness said they favoured taking all the coalfields as one body for general wages questions and other questions of a national character, with district boards for dealing with the making of price lists and matters of a local nature. All coalowners and workmen should be members of their respective associations, so that agreements would cover all the contracting parties within the industry. A national board should be established on a basis through which the fullest and most accurate information was obtainable as regards, first, the earning capacities of the collieries, which meant an enquiry into profits; secondly, the selling price of coal; third, the cost of production; fourth, volume of trade; fifth, cost of living to the workmen; sixth, any other factor relevant to the issue; seventh, there should be a sufficient minimum wage to meet the necessities of the workman and his family as a first charge on the industry. Connected with the board, there should be an independent chairman, with power only to give a casting vote on questions dealing with wages. The local disputes should only come before the country boards when the workmen or their representatives had failed to settle at the collieries. If the board failed to settle, an independent chairman should be called in, and his decision should be final. In the making of such agreements, should there arise any point of difference between the parties, some authority with powers of conciliation only should be in existence to help the parties to arrive at an agreement. They were strongly opposed to any fines or penalties for the non-fulfilment of agreements, but relied rather upon the honour of the contracting parties and the force of public opinion for their carrying out. That statement, he added, represented the views of the federation as a whole.

Mr. Straker followed with an account of the methods adopted in Northumberland and Durham. He said the main reason that the men in the former county had terminated the conciliation board was that the board had no bottom to it; they had no minimum. In both counties the methods of settling general wages adopted had been found highly satisfactory to both sides. The same remark applied to the arrangements for settling local disputes. He could not remember a case where the decision of the conciliation boards and joint committees had not been carried out. The Northumberland joint committee was appointed in 1876, and they regarded it as the most valuable part of their organisation. They had had cases in which the men objected to cases going to the boards to be settled, but usually they got over the difficulty quickly. There had at times been trouble to get non-associated owners to bring their settlements into conformity with the county settlements, but eventually, he thought, they had succeeded. There were some cases, in poor outlying districts almost on the moors, where they had taken the men into the association on condition that they recognised that they could only gradually bring about trade union conditions. They had no difficulty with non-union workmen.

Witness said, of course, disputes arose as to the interpretation of agreements, and where men came out without notice in such cases the union did not support them. As to the alleged violation of the eight hours

agreement, Mr. Straker said they were forced by the threat of a lock-out to accept conditions to which they strongly objected; under the agreement itself there were local arrangements to be made by reason of the altered conditions under the Act, but instead of the managers asking the deputation of the men to meet them in order to settle this, they simply put up notices on the pitheads stating the conditions under which the pits would be opened. The principal reason was the three-shift system, in establishing which the owners were quite within their rights under the agreement, but witness thought that as an association they would have been able to induce the men to accept even that obnoxious system if it had not been for these other local grievances. At one pit the wages of stonemen in many cases were reduced 2s. a day owing to these local matters coming in.

As to the present arrangement for settling wages, witness said they had suffered through the absence of an independent chairman, in the sense that they had had to accept the final offer of the employers.

The next witness was Mr. Robertson, who spoke on behalf of Scotland. He said the question that had arisen there in the settlement of wages was rather as to whether the ton rate at the respective collieries was sufficient to allow them to earn the minimum wage. In Lanarkshire, since 1900, they had spent £100,000 from the association funds in fighting such cases, which could not come before the conciliation board. They had not agreed upon price lists at any of the collieries, but the men and the union representatives, with few exceptions, had access to all the collieries to meet the managers and the employers to discuss any question in dispute. There were other matters about which they entered into agreements, such as deductions for foreign material. They had no trouble with non-unionists. He added that, except in Fifeshire, they worked on day-to-day notices.

Witness said they had approached the coalowners with the view of setting up machinery to deal with local disputes, and during the past 12 months the Lanarkshire Coalowners' Association had appointed some of their number to deal with disputes, but the owners only agreed that that committee should act after the dispute had taken place. In Fifeshire they had no machinery, but they had been in the habit for many years of meeting before any dispute took place.

Evidence was then given by Mr. Brace in regard to South Wales. He said they were in an awkward position in relation to the conciliation board agreement, because the courts had held that the agreement had been abrogated altogether, and instead of giving the employers the day-to-day contract notice which they desired after the stoppage over the minimum wage question or the calendar month's notice which the men's representatives held to be part of the agreement, the court decided that a reasonable notice was 28 days. Consequently he did not look upon this agreement as being the contract under which they worked. With that reservation, the agreements were the conciliation board agreement, minimum wage award and the pricelist at the collieries.

Witness said their experience with regard to the fulfilment of agreements had not been a happy one for some time, and he charged the coalowners with being very largely responsible in many cases for the unrest and failure to observe agreements in the South Wales coalfield. Not all the owners were in the owners' association, but those outside gave no trouble, as they accepted the decisions of the conciliation board on the general wage question. There were very few men outside the Federation, and, on the whole, they had no reason for complaint. Turning to the agreement, witness said the conciliation board was dual in its operations. It first dealt with general wages, for which purpose Lord St. Aldwyn acted as independent chairman, and then, under clause 5, they dealt with disputes of an individual character, in connection with which they had no final tribunal. Under this clause they had a number of customs under which men did work not provided for in the price list, and there was an understanding that when men were in abnormal places their wages should be made up to 4s. 9d. per shift plus the percentages. In 1908 Judge Bryn Roberts decided that there was no obligation provided for in the contract to pay at a different rate for abnormal ground, and that it was a pure matter of gratuity. Following that judgment the coalowners, who had always paid under the customs clause, took the point that, unless there was a distinct provision in the price list, the workmen had no right to any payment. In 1910 the owners were averse to putting into the agreement any such clause, but there was an understanding that, if the agreement was signed, the workmen should be at liberty afterwards to raise for settlement the questions of abnormal places and the lower-paid wagemen. However, when they tried to

settle the point, the employers said it was not in the agreement, and they were ultimately driven to stop work in order to get the abnormal places and lower-paid wagemen's questions settled. Under the minimum wage award they had obtained payment in abnormal places, and also an improvement in the conditions of employment of the lower-paid wagemen. He mentioned that if the coalowners had carried out that customs clause there never would have been a national stoppage of work.

Clause 5, governing colliery disputes, had, witness repeated, worked badly because there was no independent tribunal; while the board might appoint one or more of their number from each side to settle a dispute, the only alternative, if they failed, was a strike or a lock-out, as the owners had always refused to allow anybody to come in. In the case of the conciliation board, the independent chairman had only power to grant or dismiss an application, not to vary it, and, in witness's opinion, limiting the chairman to a casting vote was the best protection that any board could have that both parties would deal honestly with the board. Witness added that, while he was in favour of having an independent chairman as a final tribunal in the administration of an agreement, and also in favour of having an independent tribunal for settling disputes that arose at a colliery where a price list was in operation, he was not in favour of having an independent authority to determine what the price list should be or what an agreement should be. That was a matter that ought to be settled by both contracting parties, and if they were unable to agree they must fight it out. At present the collieries were in a privileged position. Before the workman could make any change in the contract he must either get a mutual agreement with the employer, or he must get the gentlemen appointed by the conciliation board to agree to the change. If they failed to agree then no change could take place. But when the manager wanted a change he made it, and they could only appeal to the board. This was a very serious cause of unrest. In addition to an independent tribunal the employer ought not to be at liberty to make any change unless he had first come to the board and got the latter to sanction the change. Witness said his objection to arbitration was that both parties were tempted to create an artificial condition of affairs in the hope that the independent chairman might be so muddled that in the end he would try to strike a balance.

In reply to questions which were subsequently put to the various witnesses, Mr. Harvey said he was informed that in Yorkshire they had had constant friction with regard to the non-payment of the minimum wage.

Referring again to the alleged breach in Northumberland and Durham in 1910, Mr. Straker said he did not think there was any way of compelling the union to withhold strike pay, if, in their judgment, they thought it should not be withheld. Sometimes it was a question of paying strike pay owing to tremendous provocation or allowing the association to be riven to pieces. If the owner refused to work under a settlement it was an economic necessity and not a violation of agreement. The difficulty was, with any board, to decide whether the owner's statement was genuine, or whether he was simply laying his pit in in order to get the men to agree mutually to his conditions. As to the owners' association extending support to one of its members, he did not think that anybody should have a right to interfere with what a colliery owners' association did with its money, just as he objected to anybody interfering with what the men might do with theirs. With that one exception he had never known what could be fairly termed a violation of agreement by either side. He was opposed to Mr. Taylor's suggestion to penalise the association for breaches committed by a section, for it would mean that these agreements would not be entered into unless the employer forced them at the point of the bayonet, and it would destroy the association altogether. Witness said they had great difficulty in governing the lads, but that nearly all the stoppages by lads had been due to the tactlessness of colliery managers or colliery overmen.

As to compulsory arbitration, Mr. Straker said he agreed with the statement put in by Mr. Harvey. The independent chairman should only have power to settle the point in dispute. The other witnesses here added that the Miners' Federation was uniformly opposed to compulsory arbitration. Mr. Harvey dissented from the view that the Minimum Wage Act was compulsory arbitration; it was the law and only dealt with one phase of mining life, that is that they were not to pay less, and it did not deal with paying more on tonnage rates. Mr. Harvey agreed that it was only since the Government interfered in the national strike that there had been any cases that might be regarded as a breach, and added that if the matter had been left to the



## — PROGRESS. —

*Liquid Air and Rescue Work.*

Liquid air was originally produced by Sir James Dewar and Prof. Linde, and has for many years now been used as the means of producing oxygen. It is not generally known that most of the oxygen is gained through the evaporation of liquid air.

The possibilities of liquid air as an element and a power are still to-day unexplored. Its application for rescue work, however, was a most natural one; and when the first apparatus, in a very primitive form, was constructed in Austria, at about the time of the famous Courrières disaster, it appealed to Messrs. Simonis and Co. so strongly as the element provided by Nature for this work, that they began the development of this system and carried it through several years of experimental stages until, with the assistance of Col. Blakett and Capt. Simonds, the Aerophor apparatus was evolved and the liquid air apparatus had its practical form. It is therefore correct to state that the beginning of the year 1911 saw the commencement of liquid air as a practical and superior proposition, and that the four years previous must be looked upon as the experimental stage.

The difficulties which were surmounted may be divided into three:—

1. The manufacture of the liquid air in a form containing from the outset a large percentage of oxygen.

2. To find means to transport such liquid air in safety when in underground passages, which, of course, was not possible with the glass vacuum bottles.

3. The construction of an apparatus which adequately and in a practical way controlled the liquid air in a breathing dress.

In favour of liquid air, it may be said that it is the most condensed form of carrying air, inasmuch as it represents 800 times its own volume in gas, and secondly that it is cold—in fact, intensely cold—and therefore must by natural law re-evaporate into gas. From these two points it is clear that for the purpose of utilising it for rescue work nothing else was necessary but to construct a breathing dress which adequately controlled this evaporation. That this sounds a good deal easier than it actually turned out to be is another matter, but the fact remains the liquid air apparatus is not a piece of machinery but merely a carrier or pack in which natural forces only come into play. Thus the Aerophor has the merit that it cannot refuse to work, and it cannot be interfered with.

The secondary advantages of the liquid-air system are, again, mostly the merit of the element; its reduced weight is due to the fact that liquid air can be carried at atmospheric pressure and requires no cylinder, and that 10lb. of it in weight represents 3,540 litres of breathable air with about 2,500 litres of oxygen. What this means is realised if it be remembered that the standard cylinders of oxygen as carried on other apparatus only contain about 255 litres. That the apparatus keeps the wearer cool is, again, due to the refreshing temperature at which the evaporating air strikes the wearer—slightly lower than the temperature of the surrounding atmosphere—that there are no valves, no injectors or any other apparatus which the wearer has got to operate or turn on is due to the fact that the liquid air, once poured into the pack, must evaporate by itself, the rate of evaporation being merely controlled by the insulation between the inner pack and the outer atmosphere. The change of temperature in the outer atmosphere of 20 or 30 degrees does not influence this appreciably, as the difference is always some 400 degs. Fahr. A further outstanding advantage is due to the surplus oxygen which is available. This is used in the exhaust fitting, which can be attached to the apparatus itself, and conduct the surplus air to a second man who, thus attached to the apparatus of the rescuer, may safely be conducted through a danger zone or be fed with serviceable air pending the arrival of additional aid.

Into such questions the factor of cost must inevitably enter. The upkeep of a liquid air installation consists almost exclusively of the cost of producing liquid air, as all other ingredients for the working of a central rescue station are covered with the outside figure of £20 per annum. The cost of producing liquid air depends on the cost of power, but will under no circumstances exceed 2d. a litre. The cost per practice in the Aerophor apparatus has been variably given between 8d. and 1s. 2d., a figure which, it is claimed, is anything between one-third and one-fifth of the price per practice with any oxygen apparatus.

The transport of liquid air, which was another great difficulty to overcome, is now an easy matter in metal vessels, double-walled, with vacuum in between, and each vessel holding 50 lb. of liquid air, or enough for a

team of five. It should be added that liquid air cannot be filled in hermetically-sealed cylinders, on account of its enormous expansive force.

The plant for the manufacture of liquid air is by no means a complicated piece of machinery, and does not require a trained engineer for attendance. Its governing factor lies in the patent expansion engine, which, taking the air from the compressor and suddenly expanding it, controls the temperature, to which the air thereby drops to such a nicety that a much greater proportion of oxygen is liquefied and most of the nitrogen allowed to escape; it is thus achieved that the air as it leaves the liquefier has in its evaporating product an oxygen content of 60 per cent., which gradually increases. It must be stated here that nitrogen has a lower critical temperature for liquefaction than oxygen, which fact is utilised. The converse also applies that in wearing a liquid-air apparatus the percentage of oxygen increases all the time, owing to the fact that the nitrogen evaporates slightly faster.

In conclusion, it may be stated that installations are in work or in course of construction at the following rescue stations:—Elswick, Ashington, Crooke, Houghton-le-Spring, Mansfield and Brierley.

**MINING AND OTHER NOTES.**

An alarming accident in the Hard Coal seam of the Moorgreen Colliery occurred on Thursday, the 16th inst. No serious injuries were sustained. A cage containing 12 men ran into the bottom of the shaft through overwinding, but fortunately the automatic apparatus held the other cage at the headstocks.

A meeting of the Coalville Technical Education Committee was held last week to consider the report of an inspector urging the need for the provision of a laboratory for practical mining experiments attached to the Coalville Technical School. Mr. W. A. Brockington, director of education for the county, outlined a scheme. He said technical education in the district had made great strides during recent years. The Derbyshire County Council had intimated their interest in the developments in mining instruction going on in Leicestershire, noting the recent appointment of a permanent instructor, and they were anxious to participate in the provision of the proposed mining institute, and would contribute *pro rata* to the cost. The committee were unanimous as to the necessity of some such provision, and passed a resolution asking the Leicestershire Education Committee to formulate a scheme and submit it to the Coalville committee for consideration.

The Income-tax Committee appointed by the Association of Chambers of Commerce, and presided over by Sir Algernon F. Firth, has submitted a memorandum to the chairman of the Board of Inland Revenue with a request that he will receive the committee at an early date, so that they may explain their views. The committee agreed that representations should be made on the following subjects:—(a) Allowance for depreciation on buildings and other structures; (b) allowance for depreciation on wasting assets, shaft sinking, and developments, furniture, fixtures, and fittings; (c) allowance for expenses of removal and rearrangement of plant and machinery; (d) extra allowance for depreciation of machinery run both day and night; and (e) that a definite effort should be made by the revenue authorities to regularise the rates of depreciation allowed in different trades.

Lord Joicey on Saturday opened the "George Parkinson" Memorial Homes at Sherburn (county Durham), erected in connection with the Aged Miners' Homes movement. The cost of the Homes has been borne by the workmen at the local collieries, which are owned by the Lambton and Hetton Collieries Limited, of which company Lord Joicey is chairman. There are 12 cottages, containing two rooms and a scullery each on the flat. They have been erected on a site given by Lord Joicey, at a cost of about £141 10s. per house.

In the Court of Appeal on the 17th inst., before the Master of the Rolls and Lords Justices Hamilton and Swinfen Eady, Mr. John O. Scott, shipowner and coal contractor, of Newcastle, appealed from a decision of a Divisional Court of the King's Bench, consisting of Justices Phillimore and Bucknill, making a receiving order in bankruptcy against him, thus reversing the decision of the Registrar who had dismissed the petition. The appeal was dismissed with costs.

The council of the West of Scotland branch of the Association of Mining Electrical Engineers have arranged an attractive series of meetings for the present session. Papers on the following subjects are to be read by the undersigned:—"Wireless Experiments," by Mr. James R. Laird; "Electric Winding," Mr. James Gillespie; "Specifying and Buying Mining Electrical Plant," Mr. J. P. C. Kivlen and "Rock Drills" by Mr. C. E. Hart. In addition, at a special meeting, the process of manufacturing electrical cables will be illustrated by the cinematograph. Mr. James McCann, of the Carron Collieries, has been awarded by the council a prize of four guineas for his practical paper on "Coal-Cutters," which was read in the course of last session.

In the area there would have been no Government interference or need for legislation. It was the stupidity of the Scotch colliery owners and the unreasonableness of the Welsh colliery owners that had driven them to it. With the same spirit that prevailed when he was in Wales, on both sides, he did not think anything could be kept.

As to the difficulties of establishing a single conciliation board to cover the whole of the coalfields, Mr. Brace said all the difference between the coalfields was met upon two points: one was by the prices in the standard rates, and the second was by the cost of coal in the particular area. The suggestion was a conciliation board, not to interfere with base wages, but for regulating percentages. The standard would not apply necessarily to the whole country, but be varied, as it was now, in the Forest of Dean, Somerset, Bristol and Cleveland; but there was no reason why the same standard should not apply to the large coalfields, because any difference would be covered in the base wage.

Mr. Harvey said he would not approve of it being made illegal for either association to help those of their members who broke an agreement. In Derbyshire they could not alter the system of getting the coal without first giving prior notice of it; in Wales they altered the system, and, in his opinion, broke the agreement.

Mr. Robertson said that they had frequently found that when they had a local dispute to get the 6s. per day for the miners, after a week or so the owners shut up the section or the pit, which he considered to be unfair; thus a coalowner could go his own way, so far as a penalty was concerned, because they could not compel him to work his pit. Mr. Brace also insisted that if there was a penalty clause it would always be an arithmetical calculation on the part of the employer as to whether it paid him best to evade his obligations and pay the penalty, or to carry out his obligations. To carry out agreements, both parties must have confidence in the instrument; and to do so they must have knowledge, which the men's representatives had not got at the present time. The actual earning capacity of the industry should be placed before the Board and the independent chairman. Mr. F. L. Davis, on the question of penalties, recalled the stop-day action, which Mr. Brace said he considered to be a very disgraceful proceeding on the part of the employers. As a consequence of the series of days on which they stopped, he said, they steadied the market, the price of coal went up and wages went up; but despite the fact that the coalowners got all the advantage and an increase in the selling price, they made the union pay a fine for breach of contract. Under similar circumstances, said Mr. Brace, they would do the same again. He agreed that there had been no further breach of the agreement until the strike of last year, for the simple reason that there had never been any organised rigging of the market to depress prices, but if ever there was another organised attempt to depress prices, which meant depressing wages, he would do his best to bring about the stop days again.

Turning to variations in the term of contract, Mr. Brace complained that under clause 5 of the agreement they had no final tribunal. The employers having altered the terms of contract, they might go to the board and fail, in which case they were driven to strike against something that the employers had done themselves. They had got payment for abnormal places now under the Minimum Wage Act, but the amount in the award was too low. The owners' assertion was that the men would mangle, which witness would not admit. Mr. Davis, at this point, asserted that the actual difficulty in the cases cited was not the company altering their system, but that the men asserted that they had the right to say what was to happen underground. On the general question, Mr. Brace said that, in the event of every effort to effect an agreement, he would approve in principle, before the owners could lock out the men or the men strike, that the question should be brought before such a body as the Industrial Council or some other body appointed for the Government, for a pronouncement on the dispute. Such authority should have powers of conciliation only so as to bring the parties together. As to existing agreements, he would not agree to submit principles underlying an agreement to an independent authority, but once the agreement was come to he would be prepared for an independent person to come in.

A singular mishap at Newbiggin Colliery on Monday caused the night workers to be detained in the pit workings for several hours. In consequence, it is stated, of some fault in the water supply to the boilers, the work of the engine was suspended, and the men in the pit had to remain underground until the water was restored.



Messrs. U. A. Ritson and Sons, owners of Preston Colliery, have erected and equipped a building adjoining the colliery, to be used by the officials for recreation purposes. The premises were formally opened on Saturday afternoon by Mr. U. A. Ritson.

The President of the Board of Trade has appointed the members of the new Advisory Committee to the Board of Trade on Commercial Intelligence, in place of the committee whose term of office recently expired. The new committee includes Sir Hugh Bell, Bart., Lord Joicey, Mr. William H. Mitchell, Mr. Ebenezer Parkes, M.P., and Mr. D. A. Thomas.

Consequent upon the appointment of Mr. T. Y. Greener to the position of chief agent of Messrs. Hedley's South Moor Collieries, Messrs. Pease and Partners have been called upon to fill the vacancy of chief agent to their Crook, Stanley, Bowden Close and Esh Collieries. They have appointed Mr. Herbert Greener, son of Mr. T. Y. Greener, to the position. Mr. H. Greener served his time with Mr. Carnes and Mr. Henry Armstrong, and for the past four years has had charge of Pease's important sinking at Thorne, near Doncaster.

A fire broke out at the pithead of No. 1 Pit, Dixon's Colliery, Blantyre. The engine house was partially destroyed and the damage amounted to about £200.

Important operations in the testing of land at Riddings has been commenced by the Butterley Company Limited, owners of extensive collieries and ironworks. The land belongs to Mr. R. C. A. Palmer-Morewood, of Alfreton Hall. The land forms part of the Alfreton Park estate, under which Mr. Palmer-Morewood's family for many years have worked the coal from their Swanwick collieries. Tests have now been commenced by Messrs. Coulson, of Durham, in regard to the nature of the seams, depth and thickness, and the existence of faults or otherwise.

Three putters were charged at Newcastle Moot Hall on the 15th inst., under the Mines (Minimum Wage) Act, with having fraudulently obtained £1 3s. 9d. from the Coxlodge Coal Company on September 27. The offence alleged against defendants, who were putters, and occasionally hewed, was that on the date of the alleged offence two of them hewed some coal, and instead of putting the coal into tubs of their own they all filled into one tub. If a lad hewed a certain amount and putted a certain amount, his wages were calculated on both. The result of this little trick was that 21 tubs were sent up bearing the tokens of one putter. At the end of the shift the two lads who had been filling into their companion's tub made their claim for short time on putting, and their wages were made up to the minimum wage. The three defendants were each fined £3.

Mr. Peter M'Arthur, colliery manager, on the occasion of his leaving Moss-side Colliery, has been presented with a purse of sovereigns, a walking-stick, and an umbrella for Mrs. M'Arthur.

There is much activity at Tranent, in Midlothian. This very quiet village is now housing a prosperous mining community. Miners' dwellings are being put up, and new building schemes arranged. The Eldstone Coal Company are erecting 144 cottages on modern plans near Tranent. The Edinburgh Coal Company have other 200 miners' houses in contemplation. With the additional railway facilities to be granted by the North British Railway Company the output of coal from the recently re-opened Tranent coalfields will mount into large figures.

The Hull branch of the Coal Trade Benevolent Society held a successful smoking concert on Saturday last, Mr. W. T. Marshall, president, in the chair, supported by Mr. E. J. Adderly (president Humber Coal Exporters' Association), Mr. Erick Ohlson (Sheriff-elect), Mr. Milner (president Hull Coal Merchants' Association), and others. The president stated that though the branch had only been in existence five months they had already a subscription list of £505. Congratulations were extended to Mr. J. H. Hargreaves, J.P., on his selection as Mayor-elect, and to Mr. Erick Ohlson as Sheriff-elect of Hull.

The opening meeting for the session of the East of Scotland Branch of the Association of Mining Electrical Engineers was held on Friday evening, 17th inst., in the Royal Hotel, Dunfermline. The new branch president (Mr. H. Gordon Fraser, Leven), delivered an interesting address in which he regretted the fact that colliery electricians only represented 7 per cent. of their total membership. They were not getting the colliery electricians to join the branch in anything like the numbers they hoped for, and it was their duty to enquire not only why this apparent lack of enthusiasm prevailed, but to co-operate with a view to seeing if a solution of this deficiency could not be found. A paper by Mr. Peat, on "The Electrical Plant at Dalbeath Colliery," was discussed at some length, the discussion being taken part in by the branch president and Messrs. C. A. Carlow, N. A. Wilkie, C. C. Reid, R. G. M. Prichard, H.M.I.M., H. J. Humphrys, H.M.I.M., J. Neillands, J. Gillespie, and R. W. Peters.

At the annual meeting of the South Staffordshire Mines Drainage Commission, held at Dudley recently, Mr. John Hughes presided. Mr. Rupert Smith moved the re-election of Mr. George McPherson as chairman, which was seconded by Mr. G. T. Veitch, and carried. Messrs. J. R. V. Marchant (barrister-at-law) and H. S. Childe (mining engineer) were re-elected arbitrators for the Commission.

In moving the adoption of the annual report of the engineers, the chairman said pumping was now proceeding satisfactorily, and they believed their plant would be able to deal with the water trouble as it arose, even if it was called upon to cope with as great a come as that experienced during last year. They had the greatest output last year since the formation of the Commission, but there were now signs that the water was sinking. On the motion of the chairman, it was agreed that the seal of the Commissioners should be affixed to an agreement between them, the Birmingham Canal Company, and the Public Works Loan Commissioners as to the sale of water to the canal company and other matters, and to provide for the promotion of a Bill in Parliament in the next session for the carrying out of the agreement.

The Cowpen Coal Company Limited, of Newcastle-upon-Tyne, are installing at their Cowpen Isabella Colliery, near Newsham, an electrically-operated winding engine, to raise 150 tons of coal per hour from a depth of 900 ft., the number of trips per hour being 75. Two deck cages are to be arranged, each deck holding two tubs, and all the decking will be performed by the engine itself, ordinary keps being utilised. The contract has just recently been placed with the "A.E.G." Electric Company, and the engine will be operated on the Ward-Leonard system, supply being taken at 3,000 volts from the Newcastle-upon-Tyne Electric Supply Company's mains. It is stated that various improvements have been incorporated in this winder, whereby it is anticipated that the energy consumption of the engine will be extremely low and better results will be obtained, especially when compared with engines now working under similar circumstances. This plant, which will be the first main pit electric winding engine to be installed at any Northumbrian pit, is expected to be in commercial service before the middle of next year.

The new works which are being erected at the head of the Senhouse Dock, Maryport, by the West Cumberland By-product Works, for the purpose of refining and storing benzol are nearing completion, and it is expected that operations will be commenced at a very early date. The building, which is of brick, with a corrugated iron roof, has been erected by Mr. Wm. Marshall, and at present the engineers are busy fitting up the machinery and boilers inside. The benzol in its crude state will be brought from the company's works at Risehow, where, after it has passed through numerous processes, it will be stored in the tank which is now being erected by the Workington Boiler Company. Benzol, which is used as a substitute for petrol for motorists, and creosote oil are products extracted from coal at the company's works. When finished, the company will have three tanks on the Maryport dock, two for creosote oil and one for benzol. Creosote oil is brought from the works at Risehow in oil wagons, and pumped into the huge tanks. In order to load a vessel, pipes are laid from the tanks to the ship's hold, and in this way a vessel carrying 2,000 tons of creosote oil can be loaded in 10 hours by gravitation.

The sinking of the new colliery at Rossington, near Doncaster, is already having a big effect upon the neighbourhood. The Great Northern Railway Company, taking into consideration the growth of the traffic, are about to put in hand a scheme of extension and improvement at Rossington station. In view of the mineral traffic, which in due course will be associated with the colliery, two additional sidings are to be laid on the down side of the line, each accommodating about 40 wagons. New offices are to be erected, and new waiting rooms.

For the third time an application is being made to constitute the Conisboro district an urban district. The last application was granted by the West Riding County Council, but was quashed by the Local Government Board on the ground that the applicants had included the Cadeby Colliery without any right of access to it. The colliery company has no sympathy with the application, and as they represent seven-tenths of the ratable value, the managing director, Mr. W. H. Chambers, believes that any change in administration would be immediately followed by a heavy increase in rates, and he has issued a warning that any such increase will be immediately transferred to the rents of the company's houses, of which there are 1,700, and says that existing privileges granted by the company in the two parishes will be curtailed, if not abolished, should the district become an urban one. The united population of Conisboro and Denaby is 1,600, and the ratable value of the two places about £64,000.

Prior to the transaction of business at the meeting of the Midland branch of the National Association of Colliery Managers, held at the University College, Nottingham, on Saturday, Mr. J. Strachan, of Stanton Hill (branch president), made a touching reference to the terrible colliery disaster in Wales, and, on his suggestion, a resolution was unanimously passed, all the members standing, instructing the secretary (Mr. R. Laverick, Nottingham) to forward a message of sympathy to the colliery owners, managers and representatives of the miners' association with the relatives of the victims. The president urged the members to take the opportunity of attending the course of lectures to colliery managers, arranged to be given at the college, on practical instruction in mine air analysis, coal analysis, fan-esting, &c. It was decided to invite members and colliery

owners to make gifts of books and mining publications to the new reference library which is being formed by the branch. A discussion took place on the regulations under the Coal Mines Act, 1911, and the new Explosives Order of September 1, 1913. The secretary was requested to arrange a joint meeting with the Notts and Derbyshire branch of the Association of Mining Electrical Engineers, for the purpose of discussing Part III. (Electricity), section 60, of the General Regulations. Mr. H. Eustace Mitton, general secretary of the Butterley Company's collieries, was elected a member of the branch.

## APPROVED SAFETY LAMPS FOR MINES.\*

(Continued from page 802.)

The Cambrian Lamps No. 1 and No. 3.

The Cambrian Lamps No. 1 and No. 3, the general designs of which are shown in figs. 24 and 25 respectively, are double-gauze, flame, oil lamps with air-feed through vertical and horizontal holes in the middle ring. Each consists of the following essential parts:—

(1.) *Bonnet or Shield* of riveted steel with separate securely riveted crown. Furnished with outlet holes immediately below the crown so arranged that the bottoms of the holes are not less than  $\frac{1}{4}$  in. above the top of the outer gauze.

In the No. 1 Lamp the bonnet is riveted to the middle ring.

In the No. 3 Lamp the bonnet is riveted to a brass bonnet ring of the type shown in fig. 25, which is screwed

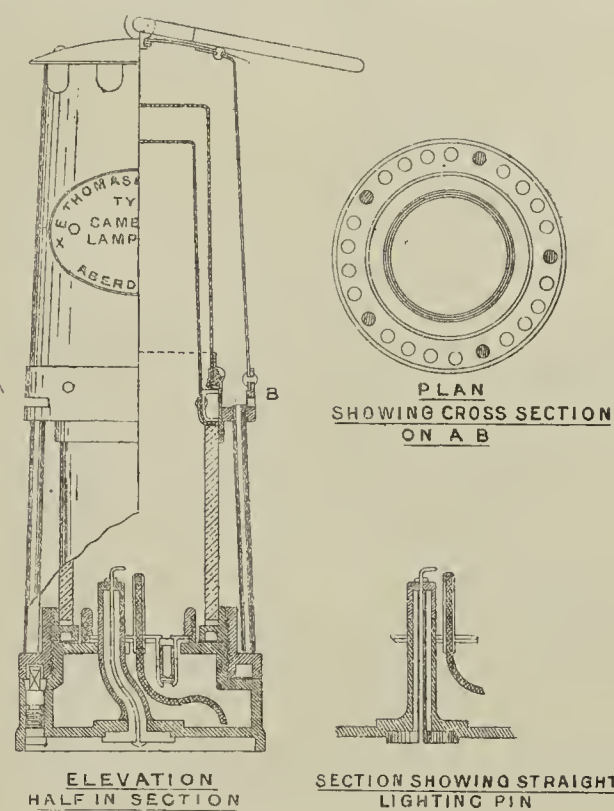


FIG. 24.—CAMBRIAN LAMP NO. 1.  
(Thomas and Williams.)

to the middle or pillar ring and locked thereto by means of a sliding pillar held in position by the oil vessel.

(2.) *Middle or Pillar Ring*, of brass, steel or iron, riveted to the bonnet, with vertical air-inlet holes of total area not exceeding 0.6 square inch, and with additional air-inlet slots of total area not exceeding 0.7 square inch, protected by a baffle ring formed by the prolongation of the inner flange of the middle ring as shown in fig. 25, or by the prolongation of the gauze ring as shown in fig. 24.

*Pillars*, of brass, steel, or iron, four or more (fixed), with or without an additional sliding pillar, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom or Body Ring* of brass, steel or iron, furnished with ratchet teeth to engage the bolt of the magnetic lock.

(3.) *Gauzes* of not less than 28 S.W.G., steel or best charcoal annealed iron wire, 784 meshes to the square inch, with secure and flame-tight double bend seams stiffened with a steel liner, so riveted to brass or copper rings with additional inner flanges as to make strong and flame-tight joints.

The arrangement of the gauzes in the lamps is one of the arrangements shown in figs. 24 and 25, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without the gauzes.

Internal dimensions.	Outer gauze.	Inner gauze.
Height from shoulder of base ring of inner gauze .....	4 in. $\pm$ $\frac{1}{4}$ in. ...	3 $\frac{1}{2}$ in. $\pm$ $\frac{1}{4}$ in.
Diameter at top .....	1 $\frac{1}{2}$ in. $\pm$ $\frac{1}{8}$ in. ...	1 $\frac{1}{4}$ in. $\pm$ $\frac{1}{8}$ in.
Diameter at bottom...	1 $\frac{1}{8}$ in. $\pm$ $\frac{1}{8}$ in. ...	1 $\frac{1}{8}$ in. $\pm$ $\frac{1}{8}$ in.
(4.) Glass of an approved type, cylindrical in form, and within the dimension limits and bearing one of the size marks specified below. Furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring:—		
External diameter .....	57 mm. { + 0 mm. - 1 mm.	
Height .....	67 mm. $\pm$ $\frac{1}{4}$ mm.	
Size mark .....	57-67 or E.T.W. 1.	

Provided that the lamps may also be made to take glasses of the following dimensions:—

\* From the Order dated August 26, 1913. [No. 886.]



Internal diameter .....	57 mm. { + 0 mm. - 1 mm.
Height .....	57 mm. $\pm \frac{1}{2}$ mm.
Size mark .....	57-57 or E.T.W. 3.
or— External diameter .....	59 mm. { + 0 mm. - 1 mm.
Height .....	66½ mm. $\pm \frac{1}{2}$ mm.
Size mark .....	59-66½ or E.T.W. 2.

(5.) *Glass Retaining Ring* of brass, screw-threaded to fit the lock ring.

(6.) *Oil Vessel.* A casting of brass, or of stamped steel or iron, of capacity sufficient to provide the required

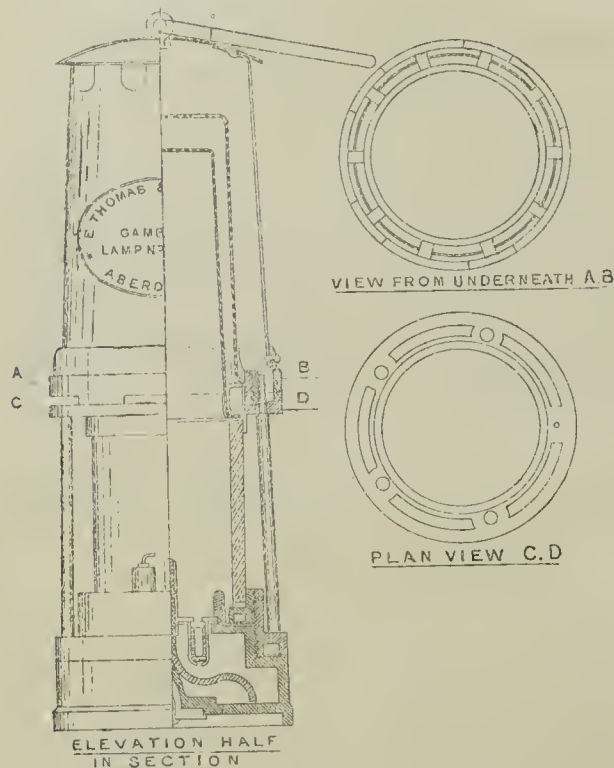


FIG. 25.—CAMBRIAN LAMP No. 3.  
(Thomas and Williams.)

light for the required time as specified; fitted with a flat  $\frac{1}{8}$  in. burner, and with or without an electric igniter of either of the types shown in fig. 24.

(7.) *Locking Devices.*—One or other of the following:—

- A magnetic lock of the type shown in fig. 24.
- A lead-rivet lock with a hinge or lug securely attached to a pillar or to the lock ring, and a second lug or hasp securely soldered to the oil vessel.

(8.) *Reflector.*—The lamps may be fitted with a removable reflector.

The lamps must have been made at the works of Messrs. Thomas and Williams Limited, at Aberdare.

#### The Cambrian Deflector Lamp No. 15.

This lamp, the general design of which is shown in fig. 26, is a modification of the Cambrian Lamp No. 1, and is similar to it in all but the following respects:—

- (1.) *The Bonnet* is removable, and is locked to the crown by a lead-rivet lock.

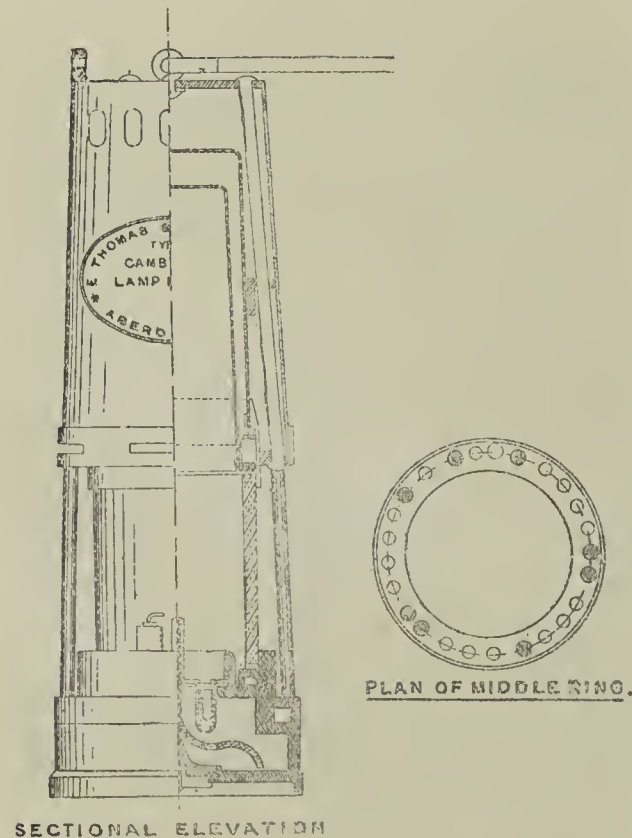


FIG. 26.—CAMBRIAN DEFLECTOR LAMP No. 15.  
(Thomas and Williams.)

(2.) *The Crown* is of brass, and is supported by three steel or iron pillars.

(3.) *The Pillars* are fitted with a deflector ring as shown in fig. 26.

#### Part II.—Flame Safety Lamps Approved for Use by Officials.

##### The Hailwood Lamp, No. O 1A.

This lamp is a modification of the Hailwood lamp No. O 1, and is similar to it in all but the following

(1.) *The Bonnet, Bonnet Ring, Middle or Pillar Ring, Bottom Ring or Bush and Oil Vessel* may be of aluminium.

(2.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

The lamp must have been made at the works of Messrs. Ackroyd and Best Limited, at Morley, near Leeds.

##### The Hailwood Lamps, No. O 6 and No. F 1.

These lamps, the general design of the upper portion of which is shown in fig. 27, are modifications of the Hailwood Lamp No. O 1, and are similar to it in all but the following particulars:—

(1.) *The Bonnet, Bonnet Ring, Middle or Pillar Ring, Bottom Ring or Bush and Oil Vessel* may be of aluminium.

(2.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

(3.) *The Bonnet* in the case of the Hailwood Lamp No. O 6 is of the "screw-off" type, it and the crown

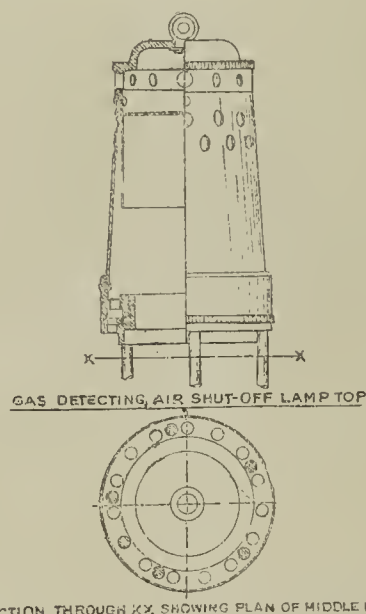


FIG. 27.—HAILWOOD LAMP NOS. O 6 AND F 1 (FOR OFFICIALS ONLY).  
(Ackroyd and Best Limited.)

being in one piece, with outlet holes round the top, so arranged that the bottoms of the holes are not below the top of the outer gauze; furnished also with inlet holes of total area not exceeding 2 square inches, protected by a baffle plate, as shown in fig. 27.

(4.) *The Bonnet Ring* is riveted to the bonnet and screwed to the pillar or middle ring.

(5.) *The Pillar or Middle Ring* is provided with vertical air-inlet holes of total area not greater than 0.6 square inch, fitted with a shut-off ring held in position by an additional sliding pillar.

##### The Cremer Lamp, No. 11A.

This lamp is a modification of the Cremer lamp No. 11, and is identical with it in all but the following respects:—

(1.) *The Bonnet, Middle Ring, Bottom Ring, and Oil Vessel* may be made of aluminium.

(2.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

The lamp must have been made at the works of the Cremer Lamp and Engineering Company Limited, at 32, York Place, Leeds.

##### No. 11 Lamp.—The Davis-Beacatorh.

##### No. 3 Lamp.—The Davis-Boss.

These lamps, the general designs of which are shown in fig. 28, are modifications of the Davis-Marsic Lamp. Each consists of the following essential parts:—

(1.) *Bonnet or Shield* of aluminium, with a separate securely riveted crown, furnished with outlet holes under the crown; provided that the bottoms of the holes are not less than  $\frac{3}{16}$  in. above the top of the outer gauze. Furnished also with two rows of inlet holes of total area not exceeding 2 square inches, protected by a baffle plate, as shown in fig. 28. The bonnet is riveted to an aluminium bonnet ring, which is screwed to the middle or pillar ring, and locked thereto by means of a sliding pillar held in position by the oil vessel. A shut-off ring is provided between the bonnet and pillar rings, as shown in fig. 28.

(2.) *Middle or Pillar Ring* of aluminium, provided with vertical air-inlet holes of total area not exceeding 0.5 square inch.

*Pillars*, of brass, five (fixed), with an additional sliding pillar, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

*Bottom Ring* of aluminium.

(3.) *Gauzes* of not less than 28 S.W.G. steel wire, 784 meshes to the square inch, with double folded lap seams strengthened by a metal liner, formed to fit flanges of the inner and outer brass or copper base rings, and so secured to the same by punch indentations as to make strong and flametight joints. Provided that copper gauzes may be used in the case of lamps used for surveying purposes.

The arrangement of the gauzes is that shown in the drawing of the Davis-Boss lamp, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without a gauze: provided that the arrangement shown in the drawing of the Davis-Beacatorh lamp may be adopted for lamps now in use, and for new lamps brought into use before July 1, 1914.

Internal dimensions. Outer gauze. Inner gauze.

Height from shoulder of hoop ..... 4 in.  $\pm \frac{1}{8}$  in. ... 3½ in.  $\pm \frac{1}{8}$  in.

Diameter at top ..... 1½ in.  $\pm \frac{1}{8}$  in. ... 1½ in.  $\pm \frac{1}{8}$  in.

Diameter at bottom ..... 2½ in.  $\pm \frac{1}{8}$  in. ... 1½ in.  $\pm \frac{1}{8}$  in.

(4.) *Glass* of an approved type: Furnished with top and bottom asbestos washers to ensure flametight joints

with the gauzes and retaining ring, and fitted or not with loose brass end rings.

##### No. 3 Lamp. Davis-Boss.

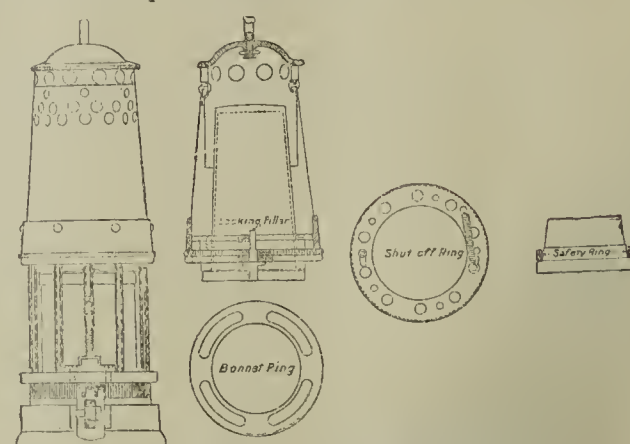


FIG. 28.—No. 3 (DAVIS-BOSS) LAMP AND No. 11 (DAVIS-BEACATORH) LAMP.  
(John Davis and Son (Derby) Limited.)

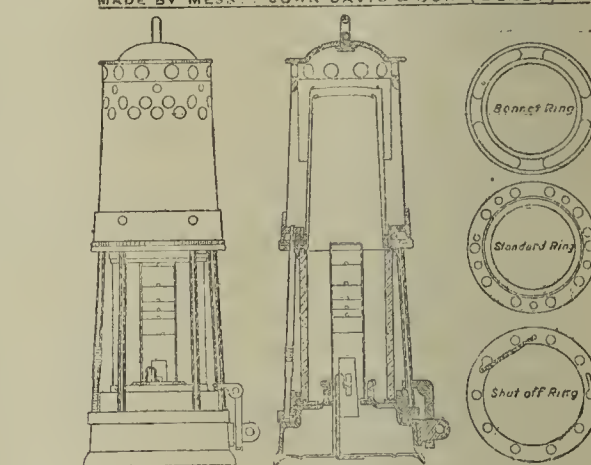


FIG. 28.—No. 3 (DAVIS-BOSS) LAMP AND No. 11 (DAVIS-BEACATORH) LAMP.  
(John Davis and Son (Derby) Limited.)

Provided that the glass may have a vertical opaque band.

In the Davis-Beacatorh lamp.

External diameter ..... 56½ mm. { + 0 mm.  
- 1 mm.

Height ..... 90 mm.  $\pm \frac{1}{2}$  mm.

Size mark ..... 56½-90 or SIVAD. 7.

or— In the Davis-Boss lamp.

External diameter ..... 58½ mm. { + 0 mm.  
- 1 mm.

Height ..... 60 mm.  $\pm \frac{1}{2}$  mm.

Size mark ..... 58½-60 or SIVAD. 1.

or (if the glass is enamelled) SIVAD. 3.

(5.) *Glass Retaining Ring* of aluminium, screw-threaded to fit the bottom ring.

(6.) *Oil Vessel.*—A solid casting of brass, or with a securely-soldered brass bottom, of capacity sufficient to provide the required light for the required time as specified.

*In the case of the Davis-Beacatorh Lamp.*—Fitted with a round  $\frac{3}{8}$  in. burner, with or without a "Beard-Mackie ladder."

*In the case of the Davis-Boss Lamp.*—Fitted with a flat  $\frac{1}{8}$  in. burner and with or without a "Cunynghame-Cadman" or "Briggs-Loop" gas-testing device, and a thumbscrew wick adjuster—each so fitted as not to impair the safety of the lamp.

(7.) *Locking Devices.*—A lead-rivet lock with a hasp or lug securely fastened to the bottom ring by a sliding band or otherwise, or to a pillar, and a staple or lug securely soldered to the oil vessel.

(8.) *Reflector.*—The lamps may be fitted with a reflector. The lamps must have been made at the works of Messrs. John Davis and Son (Derby) Limited.

##### No. 6.—The Davis-Alumthorn.

The Davis-Alumthorn Lamp is a modification of the Davis-Thornley Lamp, and is similar to it in all but the following respects:—

(1.) *The Bonnet, Middle, or Pillar Ring and Bottom Ring* may be of aluminium.

(2.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

##### No. 7 Lamp.—The Davis-Diabl.

##### No. 3 C Lamp.—The Davis-Bossy.

The Davis-Diabl and Davis-Bossy Lamps are modi-

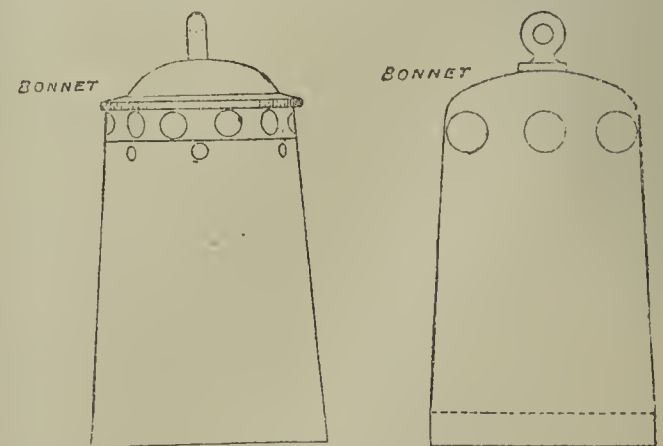


FIG. 29.—No. 7 (DAVIS-DIABL) LAMP. FIG. 30.—No. 3C (DAVIS-BOSSY) LAMP.  
(Davis and Son (Derby) Limited.)

fications of the Davis-Boss Lamp, and are similar to it in all but the following respects:—

(1.) *The Bonnets* are of the type shown in fig. 29, and each is riveted to the middle ring.



## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Senghenydd Explosion and Wiseacres' Criticism—Enquiry called for: Home Secretary's Promise—Remarkable Gathering of Experts—Bravery of the Rescue Parties: their Terrible Risks—Government Inspector's Scathing Retort upon Faultfinders—Carnegie Hero Fund Operation—Some of the Chief Local Subscriptions—Conciliation Board and the Calamity—Another Explosion near Llanelli—Important Decision under the Compensation Act—Swansea's Continued Progress.**

Senghenydd has, of course, been the one subject of the week, discussion of the cause of the explosion being the chief feature. Even more than usual, probably because of the magnitude of the disaster, has been the delivery of opinion, especially of adverse criticism, by outsiders. What "ought" to have been done or left undone; what "might have been"; what could, would, or should have happened in different circumstances or altered conditions; how, when, and where the rescuers should work; who should do the work, and what number of them—all this and much more formed the staple of discourse among wiseacres filled with the latest incidents per hapenny papers. The dockers' union executive solemnly passes a resolution that they are "of opinion that proceedings should be taken against owners and directors of mines in all cases of mine explosions," and they add their reason for this sapient opinion, declaring—"we believe that in cases where gas is reported the men so reporting are systematically boycotted"—rather a reflection upon the protective influence of the Miners' Federation.

The executive council of the South Wales Miners' Federation, which met at Senghenydd on Thursday, passed a resolution desiring the Home Secretary to direct the holding of a full and independent enquiry, so that the cause might be more fully investigated than is possible at a coroner's inquest. Eight members were appointed to represent the Federation, and make such investigation in the mine as they considered necessary. Apart from this, and because of some remarks attributed to Mr. T. Richards, M.P. (secretary of the Federation), Lord Merthyr—on behalf of the Lewis-Merthyr Company, he being its chairman—invited a workmen's representative to join the consultative committee that was dealing with the outbreak and directing the rescue operations; and Mr. T. Richards agreed that Mr. Watts Morgan, miners' agent, should so act. Mr. Morgan, as well as other of the men's agents, has been repeatedly underground for long periods.

The Home Secretary (Mr. McKenna), who visited Senghenydd on Thursday, promised a full enquiry; and he repeated that promise when speaking in Monmouthshire on Monday. There ought to be no doubt as to the fullest and freest investigation, for the Government inspectors have been active in the rescue work—underground day after day; and also daily in consultation with the members of one of the strongest rescue organisations ever seen.

This is the outstanding feature of the situation. From every part of the coalfield, the best and most experienced men—managers and their subordinates—have come together, with the Government officials and men of scientific attainment, in uninterrupted study of the circumstances. Nothing that bears upon the condition of the mine, before or after the explosion, can have been overlooked. They have had with them, in perfect liberty of enquiry and action, several leaders of the workmen—leaders selected by the Federation for that very purpose, and these have been (all credit to them) most energetic in the underground work, encountering its very grave risks, and—what is more important in this particular connection—in a position to discover anything and everything that the mine may now have to show as bearing upon the cause of the catastrophe. With such a combination of expert knowledge, such a diversity of interests represented, there should be no idea—even in the minds of dockers—that the facts will not be disclosed.

Against some critics Col. Pearson, H.M. inspector, found it advisable to utter on Sunday night one of the strongest and most direct protests ever delivered by a responsible official. Like others, Col. Pearson had been continuously on the scene—until Saturday he had not returned home since the explosion, and was without a chance of seeing the newspapers. He said: "I was surprised to see that the rescuers in the mine had been criticised in the public Press by certain prominent individuals. Those criticised had risked their lives in a burning mine, where the dangers are greater than anything ever reported from a battlefield; and criticism of men engaged in such noble work by individuals who had neither the courage nor the manliness to take part themselves in the operations is cowardly, brutal and criminal. . . . The critics ought to hide their heads for very shame."

Rightly to estimate the enormous risks run, it is only necessary to point out that the work of choking the fire had to be done in one-minute turns, as the men could no longer endure the gas and high temperature. Yet there was always a full supply of volunteers; men who well knew the extreme danger—some even made their wills before descending the pit, and many of them wrote "final" letters to their families. Probably, in no other disaster have the dangers been greater, more resolutely faced, more courageously endured.

During Wednesday afternoon conditions became so unfavourable owing to the fumes, with the consequent

necessity of putting in more bashing and doing other work, that exploration had to be temporarily abandoned.

Among the leading men of the coalfield who took part, Mr. Leonard Llewellyn, of the Cambrian Combine, was conspicuous, because of his special experience in dealing with the prolonged fire in Clydach Vale some years ago, as to which he read a paper before the South Wales Institute. Mr. Ed. Shaw, manager at Senghenydd, was of course in the forefront, and was brought to bank on one occasion practically blinded with the fumes and smoke, it being reported that he had actually lost his sight. Yet, a few hours later, after medical attention, despite pain and weariness, he was again below, taking once more an active part.

So with many more. There was no lack of men, and these of the best. Mr. Hannah, jun. (Ferndale), was badly "gassed" at one time. His father, Mr. David Hannah, was with the gathering, which included Mr. T. Griffiths (Insole's), Mr. Hugh Bramwell, Mr. Evan Williams (chairman of the Coalowners' Association) and Mr. Stewart (ex-chairman), Mr. Philip Jones (formerly of Albion, where the great explosion occurred in 1894), Mr. N. Philips, Mr. W. W. Hood, Mr. Howell Jones, Mr. Gregory (Llanbradach), Mr. J. Rees (Windsor), Mr. H. Jenkins, Mr. Routledge, Mr. Creed, Mr. W. Hughes, Mr. E. Sherrah, Mr. W. T. Rees, Mr. A. G. Brown, with many others. In fact, it was a remarkable combination; and the consultations, with Lord Merthyr at the head, were of a nature to ensure the very wisest decision in most difficult circumstances. Mr. Blythe, of Burnley, was summoned for consultation, so that advantage might be gained of his special knowledge through investigations at Wigan, Whitehaven, &c., and it is typical of the general and prompt rally that Mr. McCormack, of Kilmarnock, a student at the Porth Rescue Station, was among the earliest volunteers.

From Dunfermline, on Tuesday, came Mr. R. Burns, under-secretary of the Carnegie Hero Fund Trust, and he has been in conference as to the application of that fund in the present instance. Its income (considerably over £10,000 per annum) has exceeded the amount required for individual heroes, and the trustees have power to make a grant from their surplus towards such a fund as is now being raised in aid of the Senghenydd sufferers. Of their annual income (£12,500), only £4,836 went last year in payments to individuals, and on December 31 they had £33,624 in hand. In this instance, it is expected that the Carnegie Fund will provide for the dependants of one of the rescuers who has been killed.

The principal local contributions (apart from what have gone to the London fund) are:—

Lord Bute .....	1,500 guineas
Lord Merthyr, the Lewis-Merthyr Company, Messrs. Guest-Keen, the Ocean Company, the Hulton Disaster Fund .....	1,000 guineas
Consolidated Cambrian Collieries .....	1,000 guineas
Mr. W. J. Thomas (Ynysir) .....	500 guineas
Lord Tredegar, Messrs. D. Davis and Sons and Messrs. Partridge, Jones and Co. each .....	£500
London and Provincial Bank .....	£500
London City and Midland Bank, United National Collieries Company, Messrs. Burnyeat and Brown .....	250 guineas
Cardiff Collieries Company, Lancaster Steam Coal Collieries and the Earl of Dunraven .....	each £250
Mr. Matthew Cope .....	200 guineas
Ebbw Vale miners (to the Federation list) .....	£210
Messrs. Moxey, Savon and Co. .....	£200
Mr. W. McClean .....	£150
Mr. H. Webb, M.P. (Ocean), Messrs. Worms and Co., Mr. E. Nicholl, Messrs. R. and J. H. Rea, Messrs. Byass and Co., the British Mannesmann Tube Company, Messrs. Morgan and Wakley, J. Bland and Co., Messrs. Watts, Watts and Co, Nobel's Explosives Company, Milburn and Co., Mount Stuart Company, Cory's Trading Company, Foster, Hain and Co., and Mr. P. E. Morel .....	100 guineas
Babcock and Wilson .....	100 guineas
Mr. H. Lewis (Tynant), Mr. Hugo Stinnes, Lord Glanusk, Lord Armistead, Marquis of Abergavenny, Mr. Godfrey Clark, Baroness Cederstrom (Madame Patti, whose Craignos Castle is in South Wales), and Mr. H. Gethin .....	£100
Leigh Disaster Fund .....	£100

The King sent £500, the Queen £200, and Queen Alexandra £100, all with expression of deep sympathy. Nearly £40,000 is the total of subscriptions to Thursday morning.

There is some doubt as to the exact number of lives lost; it is differently stated at 432 and 434. In addition, one of the rescuers has been killed. Estimates of the number of dependants vary from 1,000 to 1,200, but these are merely estimates made without precise enquiry. Temporary grants of 10s. to each widow, with 5s. for each child, are being made from the fund. So far as regards liability under the Compensation Act, this is estimated at from £60,000 to £80,000; but here, again, the figures are doubtful.

Senghenydd calamity has occasioned postponement of general business affecting the collieries as between employers and employed. The Conciliation Board met on Monday, Mr. F. L. Davis (Ferndale) in the chair. That gentleman spoke most feelingly of the occurrence, and proposed a vote of sympathy with the sufferers. After assent had been granted to a request that facilities should be given for deducting levies in

aid of the relief fund, the board decided (as a mark of sympathy with the sufferers) to adjourn consideration of all ordinary business. A similar adjournment had taken place on Friday, when the joint subcommittee concerning the banksmen question met to consider the duties, &c., of that class of workmen.

An explosion in the Glynea pit, near Llanelli, occurred on Saturday morning, occasioning four deaths. About 150 men were in the mine at the time, but, fortunately, the explosion was confined to a section where only 11 were at work.

On Saturday, at Bridgend, a number of colliers had to answer summonses for leaving work without notice. The cases were not gone into, however, because defendants assented to judgment being given against them for 19s. each, including costs.

An important decision under the Compensation Act was given in Merthyr County Court on Friday. The widow of a steelworker at Dowlais claimed compensation, and the issue raised was whether it should be based upon the previous three years' earnings or upon the period subsequent to a strike, which had resulted in an increased rate of pay. It had been agreed that in one case the amount should be £215, and in the other £240. His Honour gave judgment for the smaller amount, holding that no breach of employment had taken place on account of the strike, respondents having condoned the men's conduct in leaving work without notice, and their status having been re-established.

Under action by debenture holders, a receiver and manager has been appointed for the Duffryn-Rhondda Colliery Company.

We have from time to time recorded the steady increase in the trade of Swansea, each month's report to the Harbour Trustees during the current year having afforded gratifying evidence of the wisdom and foresight manifested in providing the large new dock. Swansea is in this respect only first among other South Wales ports in realising the immense prospects of trade development that lie immediately ahead; and is, indeed, experiencing an earnest of the future, for the more easterly ports, which have greater dependence upon coal shipments, have far brighter promise of early increase, the steam coal area by reason of new collieries and greater development of old undertakings, having huge additional output in sight. Swansea business men are, however, determined to keep well ahead of requirements. It is under consideration to equip some hundreds of feet of additional quayage at the King's Dock with cranes, &c., for the whole of the present wharfage is at present in use, the larger steamers requiring so much space. On one day recently there were nine vessels above 6,000 tons, and 10 others over 3,000 tons. Other ports are moving. Barry's new tips, which will handle considerably over another million tons, are being steadily pressed forward, coming into use as each is finished. Newport's great new dock is also being equipped as occasion demands extension; and at Cardiff there is ample room in the Queen Dock for additional facilities.

## COAL, IRON AND ENGINEERING COMPANIES.

**Brearley Manufacturing Company Limited.**—This private company has been registered, with a capital of £8,484 in £1 shares, to carry on the business of engineers, toolmakers and wire workers, &c. Signatories include: Leslie B. Chatwin, 2, Bennett's-hill, Birmingham; and Charles D. Griffiths, 17, Dimsford-road, Bearwood, Smethwick. Remuneration, £50 each per annum.

**British Coalite Company Limited.**—A scheme is proposed for the reorganisation of the capital of the British Coalite Company. It is proposed that the £60,000 of first mortgage 5 per cent. debentures remain untouched, and that £75,000 of second mortgage 6 per cent. debentures will be created, of which about £40,000 will be issued immediately. As regards the share capital, it is proposed to reduce the ordinary shares from £721,082 to £103,858, and the deferred shares from £500,000 to £183,108. The ordinary shares are to receive non-cumulative dividends of 10 per cent. per annum, after which the deferred shares will receive a dividend of 8 per cent.; and as regards any surplus profits, both classes of shares will rank *pari passu*.

**Broomhill Collieries Limited.**—The report for the year ended June 30, 1913, states that the profit amounts to £73,407 4s. 2d., to which has to be added balance brought forward, £7,632 8s. 7d.—£81,039 12s. 9d. Out of this sum have been paid: Interest on debenture stock for the year, £5,795 6s. 8d.; sinking fund instalment, £10,111; leaving a balance of £65,133 6s. 1d., the appropriation of which it is proposed to apportion as follows: To meeting preference dividend for half-year to December 31, 1909, paid July 1, 1913, £4,943 15s.; to depreciation, £35,000; to reserve account, £10,000; leaving balance to be carried forward, £15,189 11s. 1d. Since the last meeting the directors have had to deplore the death of the chairman, Lord Furness of Grantley, who devoted much time and attention to the affairs of the company. The year's profit, £73,407 4s. 2d., compares with £43,105 18s. 11d. for the previous year. The National Insurance (Health and Unemployment) Act cost the company £1,560 8s. 8d. The output was 738,809 tons, against 664,910 tons in 1911-12. The national strike of miners took place in 1912 and lasted six weeks. In 1910-11, when full time was worked, the output was 721,902 tons. The debenture stock purchased and cancelled during the year was £4,181, leaving £135,335 outstanding. The improvement in price has been maintained during the whole period. By June 30 the debt to the bankers was reduced to £15,000, and since then has been extinguished. The company's other liabilities have also been reduced. The steamers have very considerably added to the result of the year's trading. Sir Stephen W. Furness, Bart., M.P., has been appointed a director.



**T.S. Limited.**—This private company has been registered with a capital of £8,000 (4,000 preference shares of £2 each, 20,000 ordinary and 60,000 founders' shares of £1 each) to carry on the business of ironfounders, mechanical engineers, manufacturers of machinery of all kinds, tool-makers, brassfounders, metal workers, iron and steel converters, metallurgists, and electrical engineers, &c. Signatories include A. Moon, Biddington House, Wallington; and Oswald Bird, 5 and 5, Great Winchester-street, E.C.

**Cardiff Collieries Limited.**—Extraordinary general meetings will be held in London, on Thursday next, for the purpose of confirming the resolutions for capital changes, and also to pass the following resolutions:—(1.) That each of the 1,000 ordinary shares of £100 each be divided into 100 ordinary shares of £1 each, each of which shall be credited as being fully paid up. (2.) That each of the 1,000 preference shares of £100 each be divided into 100 preference shares of £1 each, of which the first 95,300 shall be credited as being fully paid up. (3.) That the capital of the company be increased to £300,000 by the creation of 100,000 new ordinary shares of £1 each, ranking in all respects *pari passu* with the existing £100,000 ordinary share capital. (4.) That it is desirable to capitalise the sum of £97,650, being undivided profits standing to the credit of the company's depreciation account, and that accordingly that sum be distributed as bonus (free of income-tax) among the shareholders of the company (both ordinary and preference, and that the directors be and they are hereby authorised, pursuant to the articles of association of the company, to satisfy such bonus by the allotment to shareholders of 97,650 new ordinary shares credited as fully paid up in like proportions.

**Duffryn Rhondda Colliery Company Limited.**—An application was made in the Chancery Court on the 17th inst. for the appointment of a receiver to the Duffryn-Rhondda Colliery. The application was made on behalf of the first debenture holders, who were represented by Mr. Whinney. It arose out of a pending debenture holders' action to foreclose. No opposition was offered, and the judge made the order asked for, and appointed Mr. Thomas Ivor Jones, of Swansea, receiver and manager.

**Indian Collieries Syndicate Limited.**—Proceedings at the annual ordinary general meeting of shareholders held at the registered office of the company, Orient House, New Broad-street, London, E.C., on Wednesday, October 22, 1913, the chairman, Mr. Alfred Simson, presiding. The chairman said the share capital and debentures outstanding remained the same, at £90,000 and £66,410 respectively. In the balance-sheet on June 30 last the reserve stood at £12,000, and they were now bringing it up to £15,000, the whole of which had come out of profits. The reserve had hitherto been utilised to buy and cancel debentures issued for that purpose, and the operation was now saving the company £1,000 a year in interest. This method, however, would not be available after the current year, as all the debentures authorised would have been issued. It would, however, be open to the company to buy debentures in the open market, or to invest the reserve otherwise. The item of sundry creditors showed a reduction of about £900, and bank overdraft and loan from Kilburn and Co. were lower than the previous year by about £2,800. On the other side of the account, colliery development had increased by some £1,300; and buildings, plant, &c., after writing off upwards of £4,000 for depreciation, stood at about £1,300 less. The stock of coal and stores was again very small, amounting to only £2,484, and the coal bills outstanding were some £1,500 less than in 1912. The net revenue, after payment of all charges at the collieries and Calcutta, amounted to £26,236 18s. 7d., against £15,591 10s. 2d. last year; and the surplus in profit and loss account was £16,234 8s. 11d., against £5,778 14s. 6d. The sum available, including the balance brought in, was £21,227 13s. 5d. Work at the colliery had gone on well, and the output of coal showed an increase of 77,000 tons. He was sorry to say, however, that they had opened the current year with the misfortune of floods, which were resulting in considerable anxiety, labour and expense, with a reduction of output. The reparation of the damage done had been taken in hand vigorously, the output was regaining a more normal figure, and they hoped that by the end of December things would be going on as usual. The market was favourable, their coal had an excellent reputation, and as much of the output as they considered prudent had already been sold forward. That there was a plentiful supply of coal in their property for future developments was affirmed by the manager's recent estimate of 100 million tons first-class coal and 44 million tons second-class coal, after deducting 30 per cent. for loss in working. Further deduction had to be made on account of burnt coal, which had been proved to affect one of the seams. Nevertheless, they might safely rely upon a much larger quantity than they were likely to be able to deal with in the lifetime of any of those assembled. The report was adopted. It was proposed by the chairman, seconded by Sir K. P. Ashton, "that the interim dividends of 3½ per cent. on the preference shares and 4 per cent. on the ordinary shares, paid on February 27, 1913, be and are hereby confirmed, and that further dividends of 3½ per cent. on the preference shares and 6 per cent. on the ordinary shares be and are hereby declared payable forthwith, making 7 per cent. and 10 per cent. respectively for the year." Mr. Alfred Simson was re-elected a director and Messrs. W. A. Browne and Co. were reappointed the company's auditors in London, and Messrs. Lovelock and Lewes in Calcutta, for the current year.

**Kamalpur Estates Limited.**—This private company has been registered, with a capital of £75,000 in £1 shares, to search for and dispose of coal, iron, tin and other metals and minerals, and to enter into an agreement with Rungia Estates Limited. Signatories: Ethel Wolseley, St. Clement's House, Bolsover-street, W., and Charles A. Burgess, Toft Lodge, Broxbourne, Herts. First directors: James T. Reade, John H. Williams, and Eugene Digby.

**Nova Scotia Steel and Coal.**—The Royal Bank of Canada, on behalf of the purchasers, have offered for sale £199,500 of 6 per cent. debenture stock at 98 of the Nova Scotia Steel and Coal Company Limited. The stock forms part of a total issue to date of 3,000,000 dols. Of this £199,500 (971,500 dols.) now offered is part of £2,000,000 dols. which has been recently sold in 1,028,500 dols. having been sold in

Canada. The stock is redeemable at the option of the company at 105 per cent. at any time after July 1, 1919.

**Oddy Development Syndicate (Russia) Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of ironfounders, tool makers, brassfounders, metal workers, boiler-makers, iron and steel converters, metallurgists, and engineers, &c. First directors, Thomas Oddy and Peter Joseph Forster. Registered office, 12, Hudson-street, Rochdale.

**Reid-Rlekle Spring Wheels Limited.**—This company has been registered, with a capital of £60,000 in £1 shares, to carry on the business indicated by the title and that of wheelwrights, ironmasters, iron, brass and other metal founders, steel makers, smelters, machine and engineering tool makers, mechanical and electrical engineers, coal merchants and colliery proprietors, &c. Minimum cash subscription, seven shares. Signatories include William Baker, 28, Basinghall-street, E.C., and J. G. T. Derrington, 1, Great Winchester-street, E.C.

**Scottish Australian Mining Company Limited.**—Dividend at the rate of 4 per cent. per annum out of the profits of the half-year to June 30 last, less tax.

**South Eastern Investment Company Limited.**—This private company has been registered, with a capital of £20,000 (19,900 ordinary shares of £1 each, and 2,000 deferred shares of 1s. each), to carry on the business of colliery proprietors, mineral owners, miners, and explorers, etc. First managing director, Herbert S. Simpson, 42, Castle-street, Dover, Kent.

**Twefontein Colliery Company Limited.**—Interim dividend of 15 per cent. for the first six months of the current year.

**Wilsons and Clyde Coal Company Limited.**—The directors, after allowing for depreciation, recommend a final dividend of 4s. each on the ordinary shares, leaving £31,400 to be carried forward.

### THE FREIGHT MARKET.

The outward freight market has been normally active this last week. On the north-east coast, rates have receded and stiffened again. Coasting business has been done at from 3s. 4½d. to 4s., Tyne to London, and from 3s. 7½d. to 4s. 1½d. to Hamburg, with Havre at from 4s. 9d. to 4s. 10½d. The Baltic is busied on 5s. 9d. to Cronstadt, and the Bay on 6s. to Rochefort. The Mediterranean has varied between 9s. 3d. to 9s. 9d. to Genoa. South Wales chartering has been fairly active. Rates for the Mediterranean are steady for the higher ports, but easier for the nearer trades. South America is stationary, and business for the Bay and coasting ports is quiet. At the Humber, business is dull and orders scarce. The Clyde reports business quiet, with rates fairly steady. Homewards, there is only a small enquiry for the Black Sea, Azof and Danube, and the tone is rather weak. The Mediterranean and ore trades are steady. The Baltic is substantially unaltered. America is quiet, and the River Plate is dull. Eastern markets are easy and inactive.

Tyne to Boulogne, 1,000, 5s.; 2,100, 4s. 6d.; from Dunston; Cronstadt, 2,800, 5s. 9d.; Constantinople, 6,200, 11s.; Cannes, 2,000, 10s.; Carloforte, 2,100, 10s. 9d.; 4,100, 10s. 9d.; Cadiz, 2,700, 9s.; 2,000, 9s.; Esbjerg, 1,500, 6s.; East Norway, 850, 6s. 6d.; Genoa, 3,000, 9s. 3d.; 4,400, 9s. 3d.; 6,700, 9s.; 5,300, 9s. 6d.; river loading; 3,000, 9s. 7½d.; 300, river loading; 3,550, 9s. 6d.; 2,700, 9s. 9d.; Hamburg, 2,500, 3s. 9d.; 3,700, 3s. 7½d.; 1,500, 4s. 1½d.; Havre, 2,000, 4s. 10½d.; 1,900, 4s. 9d.; from Dunston; 2,500, 4s. 10½d.; from Dunston; Königsberg, 3,200, 4s. 10½d.; London, 1,800, 3s. 4½d.; 1,200, 4s.; 1,700, 3s. 6d.; Lisbon, 2,700, 7s. 7½d.; 3,800, 7s.; 350; Leghorn, 3,000, 9s. 7½d.; river loading; Marseilles, 4,300, 8s. 9d.; Malta, 4,500, 7s., reported; Odessa, 5,500, 9s. 9d.; Piræus, 4,000, 9s. 6d.; end October; Port Said, 6,500, 9s. 6d.; end October; 6,400, 9s. 6d.; from Dunston; Rouen, 2,500, 5s.; Rochefort, 1,700, 6s.; St. Petersburg, 1,500, 6s.; Stockholm, 2,000, 5s. 1½d.; Santos, sail, 20s. 6d., 200 discharge; Savona, 3,000, 9s. 7½d.; river loading; Santa Cruz, 1,950, 9s. 6d.; St. Nazaire, 1,700, 7s. 6d.; pitch; Syra, 4,000, 9s. 6d.; end October; Teneriffe, 1,900, 9s. 6d.; Varna and Bourgas, 5,300, 11s.; 5,500, 11s. 3d.; 3,800, 11s. 3d.; Windau, 2,100, 5s. 6d., 500, early November; Zea, 4,000, 9s. 6d., end October.

Cardiff to Algiers, 3,200, 10 fr.; 4,700, 10 fr., 600; Alicante, 2,300, 9s., f.t.; Algiers, 3,400, 9½ fr.; Bourgas and/or Varna, 3,800, 11s. 1½d. one port, 6d. extra both ports; 2,800, ditto, ditto; Barcelona, 3,300, 9s. 9d.; Bordeaux, 3,300, 7½ fr.; Brest, 2,200, 4s. 9d.; Bombay, 12s.; Buenos Ayres, 19s. 6d., October, reported; Cape Verde, 2,100, 8s. 6d., December; Chantenay, 7½ fr.; Corunna, 4,600, 7s.; Civita Vecchia, 2,700, 10s. 6d., end October; Colombo, 6,800, 12s. 3d., December; Constantinople, 4,000, 11s., early November; Devonport, option Portland, 1,900, 2s. 9d., Admiralty; 2,300, ditto, ditto; 2,800, ditto, ditto; Dakar, 2,200, 8s. 3d., November; Dieppe, 2,100, 4s. 10½d.; Genoa, 5,800, 9s. 3d.; 4,800, 9s. 3d.; 7,000, 9s., end October; 4,300, 9s. 6d.; 4,200, 9s. 4½d.; 5,500, 9s., November 1-10; 3,400, 9s. 6d.; 4,700-5,000, 9s., November; Havre, 1,800, 4s. 9d.; 800, 5s. 9d.; 1,500, 4s. 10½d.; Harwich, 2,000, 3s. 7½d.; Haifa, 5,400, 11s. 3d.; Leghorn, 4,200, 9s. 6d., 500; 5,500, 9s. 6d., 500; 2,800, 9s. 3d.; La Rochelle, 2,200, 7 fr.; 3,000, 6½ fr.; Lisbon, 3,300, 7s., 400, November 1; 3,300, 7s., 400, November 15; 3,500, 6s. 9d., October 25; Malta, 5,400, 7s. 3d.; 3,300, 7s.; 2,500, 7s.; 4,000, 7s.; Monte Video, 5,000, 18s., November 10; 18s. 6d., November; 5,500, 18s.; Marseilles, 2,500, 10½ fr.; 4,000, 10½ fr.; 4,500, 11 fr.; Madeira, 4,000, 8s. 9d.; Naples, 4,200, 9s. 6d., 500; 5,500, 9s. 6d.; Nantes, 1,300, 7½ fr.; Nieudiep, 3,200, about 4s.; Oporto, 800, 8s. 6d.; Piræus, 3,000, 10s.; 5,200, 9s. 9d., October 27; 5,600, 9s. 3d., end October; Port Said, 6,100, 9s., end October; Pernambuco, 2,900, 17s. 6d., 200, November 1; Portland, 2s. 10½d., Admiralty; Palma, 1,200, 10s. 6d., October 27; Portsmouth, 2s. 10½d., Admiralty; River Plate 5,000, 19s. 6d., October, reported; 18s. 6d., November; 5,700, 19s. 6d., November 10 cancelling; lower ports, 5,300, 17s. 9d., November 10-20; 5,800, 17s. 9d., November; 5,000, 17s. 6d., November 25 cancelling; Rio de Janeiro, 5,100, 17s. 6d., end October; Rouen, 900, 6s. 3d.; St. Nazaire, 3,000, 6½ fr.; St. Malo, 1,350, 5s. 3d.; Syra, 3,000, 10s.; 5,200, 9s. 9d., October 27; 5,600, 9s. 3d., end October; St. Brieux, 680, 6s.; Savona, 7,000, 9s., end October; 4,300, 9s. 6d.; 4,200, 9s. 4½d.; 4,900, 9s. 3d.; 3,400, 9s. 6d.; 4,700-5,000, 9s., November; 5,500, 9s., early November; Santos, 5,500, 21s., November 10 cancelling; Spezzia, 4,900, 9s. 3d.; 3,400, 9s. 6d.; 4,700-5,000, 9s., November; Tunis, 3,000, 12½ fr. coal, 13½ fr. fuel, November;

Torre Annunziata, 2,700, 10s. 6d., end October; Tarragona, 3,500, 8s. 6d.; Vinaroz, 1,000, 11s. 6d.; Venice, 4,800, 10s. 6d., November 27; 4,400, 10s. 7½d.; 3,800, 10s. 7½d.; Zea, 3,000, 10s.; 5,200, 9s. 9d., October 27.

Swansea to Alicante, 1,300, 11s.; Brest, 2,200, 4s. 11d.; Reval, 2,500, 6s. 9d., end October; Palma, 1,350, 10s. 3d., reported; Messina, 2,600, 9s. 9d., 400, 10d., end October; Rouen, 2,250, 5s. 10½d.; 650, 6s. 3d.; 800, 6s. 1½d.; Barcelona, 2,200, 9s. 9d.; Boulogne, 800, 5s. 6d.; Castellon, 1,100, 11s. 9d. coal, 12s. 6d. fuel; Königsberg, 850, 7s. 6d.; Calais, 750, 5s. 4½d.; Ancona, 5,000, 11s. coal, 11s. 9d. fuel; Genoa, 2,800, 10s.; 1,800, 10s.; Savona, 2,800, 10s.; 1,800, 10s.; Spezzia, 2,800, 10s.; Leghorn, 1,800, 10s.; Valencia, 1,500, 11s.; Nice, 2,700, 10s. 7½d.; St. Malo, 1,700, 5s. 3d.; Cagliari, 2,800, 10s. 6d. coal, 11s. 3d. fuel; Colombo, 7,000, 12s. 3d., December 1-20; Bombay, 8,000, 12s., November; Aden, 5,400, 11s. 6d., end November; Bahia Blanca, 5,000, 18s. 9d.

Wear to Cronstadt, 2,800, 5s. 9d.; 1,800, 5s. 4½d.; Odense, 1,300, 5s. 9d.; Pillau, 3,000, 4s. 9d.; Königsberg, 3,200, 4s. 10½d.; St. Nazaire, 1,700, 7s. 6d., pitch; Rochefort, 1,700, 6s.; Oporto, 900, 10s.

Blyth to Genoa, 3,000, 9s. 7½d.; Savona, 3,000, 9s. 7½d.; Boulogne, 1,000, 5s.; Hamburg, 2,200, 3s. 9d.; Odessa, 5,500, 9s. 9d.; Varna or Bourgas, 3,800, 11s. 3d.; Esbjerg, 1,500, 6s.; Sundsvall, 1,800, 5s. 6d., November; 1,900, 5s. 9d.

Grangemouth to Rio de Janeiro, 18s., October-November; Aalborg, 1,500, 5s. 3d.; Bayonne, 1,800, 9 fr.

Humber to Riga, 2,000, 5s. 3d.

Liverpool to Riga, 2,200, 4s. 9d.

Hull to Gêfle, 2,750, 5s. 1½d.; Lihau, 1,400, 5s. 1½d.; Marianople, 4,500, 11s. 9d.; St. Petersburg, 1,800, 6s.; Buenos Ayres, 3,800-4,200, 17s. 9d., 250, 18s., 200, November 5-November 20; Hamburg, 2,300, 3s. 10½d.; Pernau, 1,700, 5s. 4½d.; Riga, 2,300, 5s. 3d.; Odessa, 9s. 9d.; East Norway, 600, 6s. 9d., 250, 48 hours; 530, 9s. 3d., coke; Aarhus, 1,250, 5s. 9d., 300, 72 hours, end October.

Newport to Bordeaux, 3,400, 7½ fr., 500, October; 1,700, 7½ fr.; Genoa, 4,800, 9s. 3d.; 7,200, 9s.; Gibraltar, 1,800, 6s., 900; 2,600, 6s.; 1,850, 8s. 3d.; 8s. 3d., 500, October; 1,800, 8s. 6d., end October; Marseilles, 2,500, 10½ fr., part cargo; Savona, 7,200, 9s.; Naples, 3,600, 9s., 800; Torre Annunziata, 3,600, 9s., 800; Algiers, 3,400, 9½ fr.; 5,500, 9½ fr.; 1,050, 6s.; Lisbon, 1,600, 7s. 3d.; Villa Real, 900, 10s.; Rouen, 1,050, 6s.; San Juan, 2,800, 8s. 6d.

Forth to Elsinore, 1,300, 6s.; Helsingfors, 1,500, 5s. 9d.; Rouen, 700, 6s. 6d.

Hamburg to Brunswick or Pensacola, 3,900, 10s. 6d., November; Callac, sail, 25s. 9d., coke.

Glasgow to Bayonne, 9½ fr.; Genoa, 9s. 4½d.; Savona, 9s. 4½d.; Leghorn, 9s. 4½d.; Buenos Ayres, end October.

Partington to Kustendje, 12s., early November.

Manchester to Bordeaux, 1,600, 8s. 6d., pitch.

Fife port to North Norway, 2,000, 6s.

Rotterdam to Barcelona, 3,600, 10s. 6d. fuel, 11s. 9d. coke, October; Charleston, Norfolk and Wilmington, 5,000, 11s. 6d., sulphate of ammonia in bags; St. Nazaire, 3,400, 5s. 9d., Trignac terms, October 25-27; Bordeaux, 3,800, 5s. 9d. steam coals, 6s. 6d. fuel, end October; Algiers, 10 fr. for part cargo fuel, November 1; 3,700, 10 fr., 800 tons fuel; Marseilles, 4,000, 10½ fr., 600, 10½ fr., 900, October 30; Porto Vecchio di Piombino, 4,600, 9s. 3d., October 27; 3,800, 9s., October 27; Bagnoli-Porto Ferrajo, 5,000, 6s. 6d., October 27; Malta, 4,000, 7s. 3d.

Wales to Callao, sail, 22s.; Iquique, sail, 18s. 3d.; West Coast South America and home to United Kingdom—Continent, in and out, November; Antofagasta or Mexillones, sail, 16s. 4½d., May; direct nitrate port, ex Junin, sail, 17s., March; Mexillones, sail, 19s.

London to Cape, one port, sail, lump sum, £2,400; East Norway, sail, 9s.

Thames to Bordeaux, 1,600, 8s. 6d., pitch.

Sharpness to Waterford, 2,600, 4s. 9d.

Penarth to Genoa, 4,800, 9s. 3d.

Ardrossan to Ancona, 11s. 6d., pitch.

Bary to Genoa, 4,800, 9s. 3d.; Rouen, 780, 6s. 3d.

Grimby to Barcelona, 1,250, 9s. 9d.; Aarhus, 1,250, 5s. 9d., 300, 72 hours, end October.

Port Talbot to Genoa, 4,800, 9s. 3d.; Rouen, 1,800, 5s. 9d.

Burntisland to Sundswall, 5s. 6d., 500, November.

Llanelli to Rouen, 6s. 3d.; Calais, 800, 5s. 6d.; Boulogne, 800, 5s. 6d.

Methil to Sundswall, 3,000, 5s. 6d., 500, November.

Warkworth to Cronstadt, 1,400, 7s.

Boston to Tofte, 800, 6s. 3d.

Hartlepool to Hamburg, 3,800, 3s. 7½d.

Immingham to Pernau, 1,500, 5s. 4½d.; Riga, 1,600, 5s. 7½d.; Aarhus, 1,250, 5s. 9d., 300, 72 hours, end October; Hernosand, 1,800, 5s. 6d.

Goole to Antwerp, 900, 4s. 10½d.; Bruges, 750, 4s. 6d.

Clyde to Bayonne, 2,200, 9 fr.

Bristol Channel to Genoa, 9s. 3d., October.

Weser to Norfolk or Wilmington, 6,000, 10s. 6d., November.

Seaham Harbour to Malmo, 1,600, 6s. 3d.

Homeward bound:—Kherson, Nicolaieff or Odessa, 6,000, Rotterdam 9s., Weser 9s. 3d., Hamburg 9s. 6d., 3d. less barley, October 20-31; 2,500, Cadiz or Seville, 12s. 6d., ppt.; 6,700, Rotterdam 9s., Hamburg 9s. 6d., 3d. less barley, spot; 5,800, Rotterdam, basis 9s., 3d. less barley, early November; Nicolaieff, 9,600, Weser 9s., Hamburg 9s. 3d., 3d. less barley, October 20-November 10; 3,000, Rotterdam, 7s., ore, ppt.; 8,500, Weser 9s. 1½d., Hamburg 9s. 4½d., 3d. less barley, October; Sulina, 3,300, London or Hull, 10s. 6d., option 1,200 tons oats 2s. extra, October; 4,400, Lisbon and Oporto, 12s., early November; 5,800, L.H.A.R., Leith, Liverpool, Manchester or Glasgow 9s., Hamburg 9s. 6d., option Sulina and Kustendje loading 3d. more, November; Port Pirie, 7,000, Antwerp, 30s. 6d., ore, January-February; Savannah, &c., 173 ft., Liverpool, Manchester or Bremen, 42s. 6d., November; 1,768 net, Liverpool or Bremen, 34s. 6d., option part general, November; 138 ft., Liverpool or Bremen, 35s., November-December; 2,030 net, Liverpool or Bremen, 33s. 9d., Havre 35s., November-December; La Plata, 4,000, 10 per cent., United Kingdom-Continent, 10s. o.c., no reduction direct, spot; Santa Fé, 4,500, 10 per cent., United Kingdom-Continent, 21s., less 6d., quebracho, November; 4,500, 10 per cent., 21s., less 6d., quebracho, January-February; Parazuelos, 3,800, 3,300, Rotterdam, 7s. 3d., end October; 2,000, 11s. 6d., early November; Aguilas, 1,000, Heysham, 8s. 3d., October; Baltimore, 2,570 net, Rotterdam 2s. 1½d., Hull or Tyne 2s. 3d., October-November; 3,106 net, Rotterdam, 2s., November; Savannah, 2,633 net, Liverpool or Bremen, 37s. 6d., option part general, December; 2,414 net, Liverpool, Manchester or Bremen, 36s., cotton, Decem-



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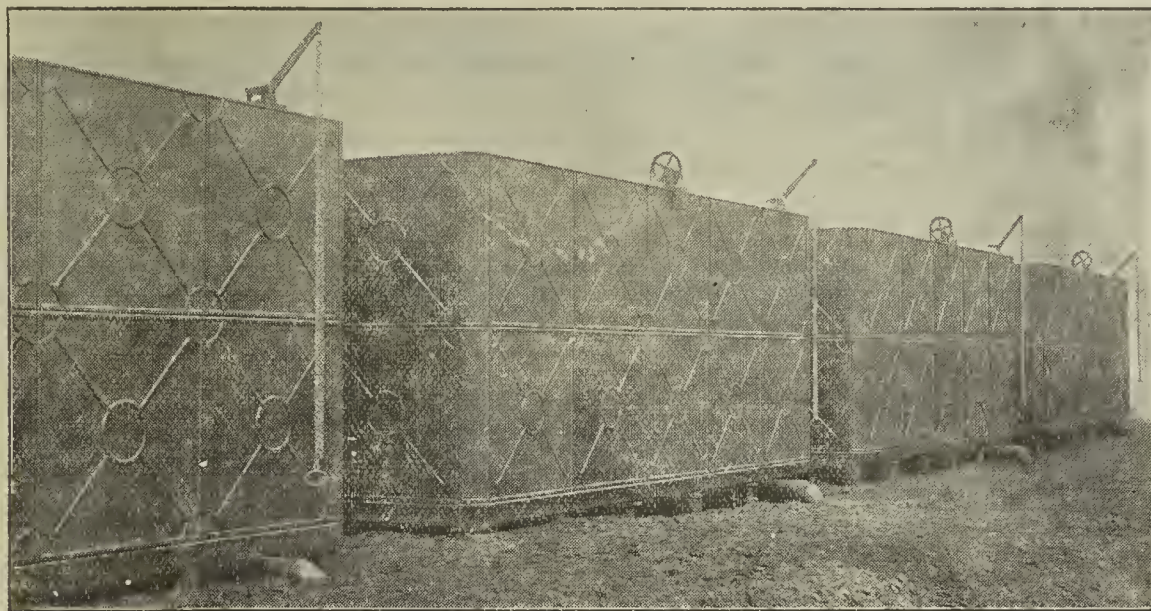
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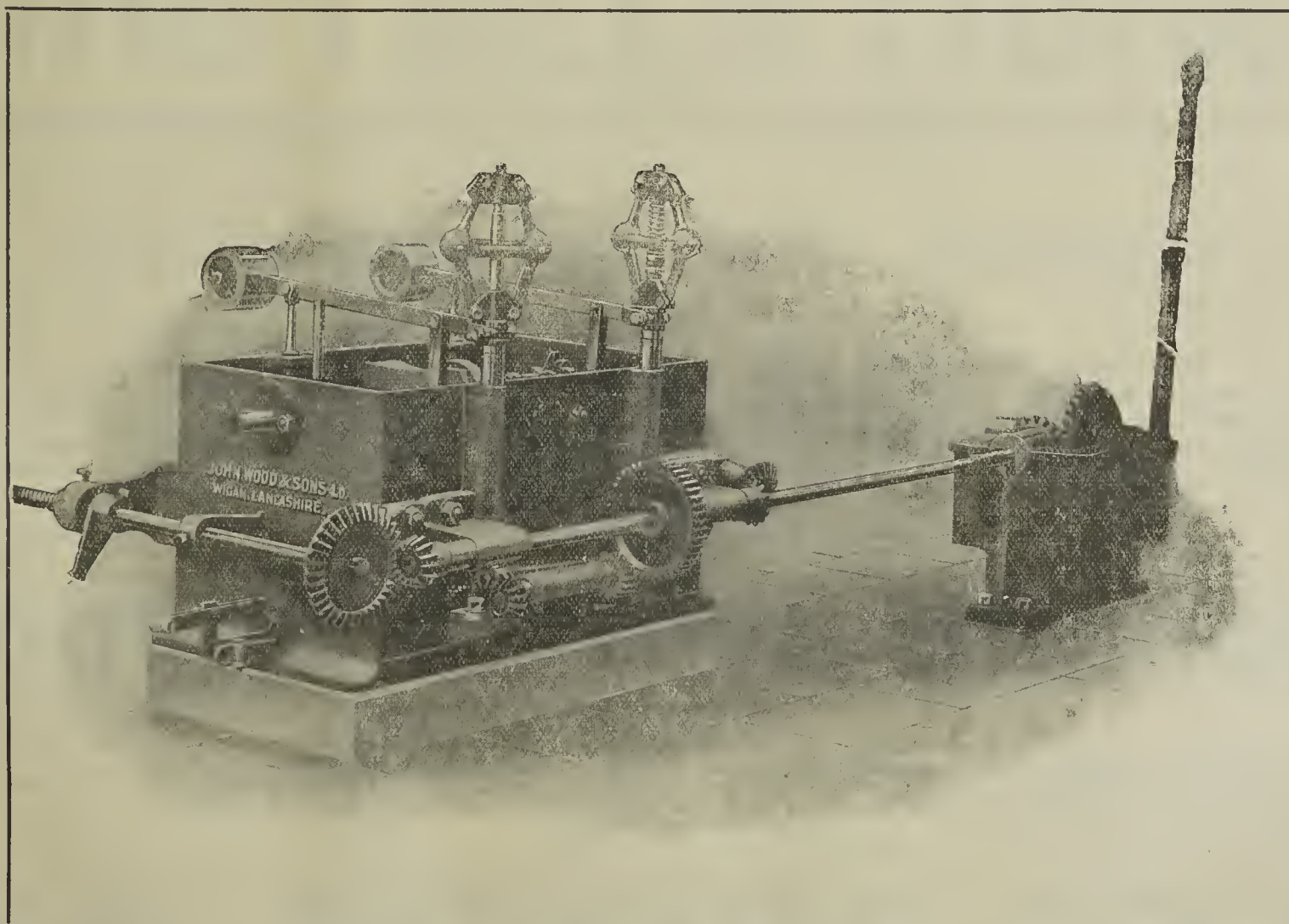
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1, cotton, with 750 tons general; 1,960 net, 1,960 net, November 10-30; 36s., cotton, December; 36s., cotton, N.S.W., sail, 24s. 6d., West Coast South America; time charter, Australian and Eastern trade, 5s., four to five months, delivery Newcastle, N.S.W., redelivery East; time charter, trans-Pacific trade, 5s., five months, delivery Newcastle, N.S.W., redelivery West Coast South America, nitrate ports, 25s., United Kingdom-Continent or United States; 25s., November; 26s. 6d., January; 25s. 9d.; Brunswick, 33s. 9d., Liverpool or Bremen; Bulgaria or Kustendje, 6,000, Antwerp or Rotterdam, 9s. one port, 9s. 1½d. two ports, 9s. 3d. three ports loading, 500 tons oats 2s. extra, 200 tons bran 4s. extra, Oct.-Nov.; Poti, 5,500, Antwerp, 11s. 9d., Oct.-Nov.; Batoum, 6,000, Rotterdam, 11s. 3d., ppt.; 21,000 qrs., Avonmouth or Rotterdam, 2s. 1½d., Oct.-Nov.; Azof, 6,000, Bergen-Christiana Range, 12s. one port, 3d. less barley, early November; 4,200, 12s. one port, 12s. 3d. two ports, 12s. 6d. three ports, November 1-15; Kurrachee, 5,000, 10 per cent., Malmo, 17s., November 1-20; 5,000, 10 per cent., United Kingdom-Continent, o.c., 16s. 6d. one port, 17s. two ports, January; Christmas Island, 5,600-6,000, Hamburg, 27s. 6d., February; Saigon, 4,500, Marseilles, Havre, Dunkirk and Bordeaux, 26s. 6d. one port, 27s. 3d. two ports, 9d. extra maize, November; Wilmington, 1,110 net, 141 ft., Liverpool or Bremen, 35s., Havre 37s. 6d., Barcelona 40s., November; 2,614 net, Liverpool or Bremen 30s., Havre 32s. 6d., November; San Lorenzo, 3,500, 10 per cent., United Kingdom-Continent, 16s. 6d. o.c., less 6d., January-February; Baltimore, 21,000 qrs., 10 per cent., Avonmouth or Rotterdam 2s. 1½d., Plymouth and Cardiff, Barry or Newport (two ports) 2s. 3d., Southampton and Plymouth 2s. 3½d., November; Cuba, 5,200, Northern States, 9s. 3d., ore, November; Villaricos, 5,600, Rotterdam, 8s., f.t., end October; Narvik, 2,903 net, Northern States, 7s., November; nitrate ports, sail, 25s., United Kingdom-Continent, less 9d., March; Eupatoria, 3,900 max., South Spain, 14½ fr. one port, 50 c. extra two ports, ppt.; Gulf timber port, 700 stds., 10 per cent., North Spain, 120s. one port, 122s. 6d. two ports, 135s. three ports, January-February; Villa Constitucion, 5,800, 10 per cent., United Kingdom-Continent, 13s. o.c., less 6d., early November; time charter, Eastern trade, 1,450, £650, 12 months; time charter, Brazil and River Plate trade, 4s. 2d., one round trip, delivery Dunkirk or Boulogne, re-delivery United Kingdom-Continent; Novorossisk, 5,000, Rotterdam, basis 9s., 3d. less barley, early November; Marmagosa, 5,500-6,500, Antwerp, 15s., ore, November-December; West Australia, 4,600 loads, Madras and Calcutta, 27s., December; Delagosa Bay, 2,385 net, Kurrachee, 7s., November; Calcutta, 2,472 net, Madras, Rs. 3.12, December; Madras coast, basis 27s. 6d., kernels, with options, December-January; La Falaise, 3,400, Barrow, 8s. 6d., November 12-15; Bilbao, 4,100, Rotterdam, 4s. 9d., ppt.; 2,500, Middlesbrough, 5s. 3d., spot; South Australia, sail, 25s., Cape; Columbia River, sail, 51s., Napier; time charter, European trade, 2,300, £555, nine months; time charter, Spanish fruit trade, 1,700, £475, five months.

### CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

#### Abstracts of Contracts Open.

**BARROW-IN-FURNESS, OCTOBER 27.**—Coal, for the Corporation. Forms from the Director of Education, Town Hall.

**CARDIGAN, OCTOBER 31.**—Best Staffordshire screened coal (cobble size), for the Cardigan District Education Committee. Tenders to Mr. Ivor Evans, district clerk, District Education Office, Cardigan.

**CHATHAM, OCTOBER 28.**—About 290 tons household coal, for the Guardians. Forms from Mr. A. Reynolds Norman, clerk to the Guardians, 22, High-street, Chatham.

**DUBLIN, OCTOBER 29.**—Coal for outdoor relief, by the bag, for the South Dublin Guardians. The coal to be best Wigan, and each bag to contain 10 stone. Tenders to Mr. John P. Condon, clerk of the Union, 1, James's-street, Dublin.

**HARWICH, OCTOBER 27.**—Bestwood bright coals, for the Education Committee. Tenders to Mr. G. D. Hugh-Jones, secretary, Harwich.

**MORLEY, OCTOBER 27.**—House coal, for the corporation. Forms from Mr. F. Thackray, town clerk.

**NEATH, OCTOBER 28.**—Between 2,000 to 2,500 tons of through-and-through or small steam coal for the Electricity Generating Station at Court Sart, for the Rural District Council. Forms from Mr. G. H. Thompson, electrical engineer and manager, 12, Green-street, Neath.

The date given is the latest upon which tenders can be received.

### CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

**ALTOFTS (NEAR WAKEFIELD), OCTOBER 27.**—Sludge Filters.—Construction of sludge filters at their sewage works, for the Altofts Urban District Council. Specifications obtained from Mr. J. C. Coates, surveyor, Council Office, Altofts.

**ASHCHURCH, NOVEMBER 18.**—Water Main.—For laying of a water main for a distance of about 4½ miles in the parish of Ashchurch, and other works in connection therewith, for the Tewkesbury Rural District Council. Specification obtained, on payment of £1 ls. (returnable), from Mr. H. A. Badham, clerk to the Council, Tewkesbury.

**BALLYCLARE, NOVEMBER 1.**—Pump.—Rotary pump to replace the existing ordinary pump on the Green-road, Le-Ballyclare, for the Urban District Council. Specification at the Town Clerk's office.

**BEDFORD, NOVEMBER 12.**—Plant.—The Corporation invite tenders for the following machinery: 1,000 kw. mixed-pressure turbo-alternator with exciter and condensing plant; one water-tube boiler with mechanical stoker and coal-handling plant. Specifications may be obtained from Mr. R. W. L. Phillips, borough electrical engineer, Electricity Works, Cauldwell-road, Bedford, on payment of £1.

**BRZESZEZE (AUSTRIA), OCTOBER 31.**—Pit-sinking Plant.—For the supply of a complete mechanical shaft-sinking plant, capable of sinking to a depth of 3,280 ft., for the Brzeszeze Coal Mining Authorities, Brzeszeze.

**DUNDEE, OCTOBER 27.**—Tar Distillation Plant.—Erection of a tar distillation plant, &c., for the Corporation. Forms obtainable from Mr. Alex. Y. L. engineer's office, gasworks, Dundee.

**CHRISTIANIA (NORWAY), DECEMBER 1.**—Coal Discharging Machinery.—Tenders are invited by the Norwegian Main Railway for the supply of two coal-discharging machines, each capable of discharging at least 50 tons per hour.\*

**IPSWICH, NOVEMBER 10.**—Pipes.—For supply of about 3,750 6 in. or 7 in. and 550 9 in. by 12 ft. cast iron pipes, for the Waterworks Committee. Copies of the specification from Mr. C. W. S. Oldham, engineer, Waterworks Offices, Ipswich, on receipt of £1 ls. (returnable).

**IVYBRIDGE (DEVON), NOVEMBER 7.**—Reservoir, &c.—Construction of a reservoir on Harford Moor, and the providing and laying of about 2 miles of cast iron pipes, for the Ivybridge Urban District Council. Specifications at the office of the engineer, Mr. H. Francis, M.I.C.E., 12, Lockyer-street, Plymouth.

**JOHANNESBURG, OCTOBER 28.**—Boiler Tubes.—Tenders are invited by the South African Railways Administration for the supply and delivery of iron and steel boiler tubes. Copies of the specification and form of tender can be obtained from the office of the High Commissioner in London for the Union of South Africa, 32, Victoria-street, S.W.\*

**KETTERING, OCTOBER 27.**—Cast Iron Pipes, &c.—Cast iron pipes and specials, for the Urban District Council. Forms obtainable from Mr. T. R. Smith, Market-place, Kettering.

**LONDON, OCTOBER 29.**—Turbines, &c.—Steam turbines and condensers, &c., and turbo-alternators, for the directors of the East Indian Railway Company, as per specification to be seen at the company's offices. Tenders to Mr. C. W. Young, secretary, Nicholas-lane, London, E.C.

**LONDON, NOVEMBER 3.**—Corrugated Sheets.—Galvanised corrugated sheets to the Egyptian War Department. All particulars obtainable from Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.

**LONDON, NOVEMBER 10.**—Plant.—Erection of six 3,950-k.v.a. vertical generators, three-phase, 5,000 volts; five 875-k.v.a. horizontal generators, three-phase, 5,000 volts; power-house switchboard; three complete sub-stations; 40,000-volt transmission line, for the Egyptian Government (Ministry of Public Works). Form of tender, &c., can be obtained from Messrs. Harper Bros. and Co., consulting engineers, 13, St. Helen's-place, London, E.C., on payment of £1 (returnable).

**LONDON, NOVEMBER 11.**—Pumping Engine, &c.—Erection, at the Abbey Mills pumping station, West Ham, London, E., of one steam-driven hydraulic pumping engine, capable of supplying 5 cubic feet of water per minute at a pressure of 800 lb. per square inch; one hydraulic accumulator 10 in. diameter by 8 ft. stroke; a 7 ft. 3 in. by 5 ft. by 4 ft. steel tank and certain pipes, valves, and fittings. Specification on application to Mr. G. W. Humphreys, County Hall, Spring-gardens, S.W., upon payment of £2 (returnable).

**LLANDUDNO, NOVEMBER 8.**—Retorts, &c.—For the supply of retorts, fireclay goods, &c., for the Urban District Council. Full particulars can be obtained upon application to the gas manager.

**LLANELLY, NOVEMBER 12.**—Pipe-laying, &c.—For carting, laying, jointing, and fixing about 22½ miles of cast iron and steel pipes, 16 in. and 14 in. in diameter, about 20 miles of 10 in., 9 in., and 8 in., and about 30 miles of 5 in. and 4 in. cast iron pipes, and the special castings and valves in connection therewith. Specifications may be obtained at the offices of Messrs. H. Rofe and Son, civil engineers, 8, Victoria-street, S.W., upon payment of £5 5s. (returnable).

**MELBOURNE (AUSTRALIA), NOVEMBER 3.**—Galvanised Iron Pipes.—Tenders will be received at the office of the Deputy Postmaster-General, Melbourne, for the supply and delivery of 900 galvanised iron pipes.\*

**OUCHTERARD (IRELAND), NOVEMBER 30.**—Wells.—For the sinking of 23 new wells, and deepening, enclosing and improving 21 existing wells, for the District Council. Tenders to Mr. P. A. Joyce, clerk to the Council, board room, Oughterard, Galway.

**RATHMINES (DUBLIN), NOVEMBER 4.**—Engine, &c.—Erection of one 400-kw. generating set, consisting of a high-speed steam engine direct-coupled to two continuous-current dynamos in tandem, for the Urban District Council. Specification may be obtained from the township electrical engineer on payment of £1 ls. (returnable).

**RESOLVEN, NEAR NEATH.**—Headings.—For driving two hard headings from No. 1 Rhondda seam to No. 2 Rhondda seam, each about 200 yards long, at Glyn Merthyr Colliery, Resolven, near Neath. Particulars obtainable from Mr. Evan Lewis, mining engineer, Atlantic-buildings, Swansea.

**RHYL, NOVEMBER 19.**—Diesel Engine Set.—For the Rhyll Urban District Council, one 160-kw. Diesel engine set. Specification from electrical engineer, Mr. E. H. Wright, Electricity Works, Rhyll, on payment of a deposit of £1 ls. (returnable).

**SHEFFIELD, NOVEMBER 4.**—Purifier Boxes.—Supply and erection of eight purifier boxes, each 40 ft. by 37 ft. by 6 ft. deep, with luteless steel covers, for the directors of the Sheffield United Gaslight Company. Specifications and drawings can be obtained upon application to the engineer, Mr. J. W. Morrison, M.Inst.C.E., Commercial-street, Sheffield.

**SOFIA (BULGARIA), NOVEMBER 17.**—Electric Power Plant.—Tenders are invited for the supply and erection of the machinery required for a central electric generating station at the "Pernik" State coalmine. The estimated value of the contract is 200,000 fr. (£8,000), and includes three water-tube boilers, two double-expansion horizontal engines of 250-horse power each, two three-phase dynamos, switchboards, transformers, &c., and a centrifugal pump of 500 litres per minute capacity driven by electric motor.\*

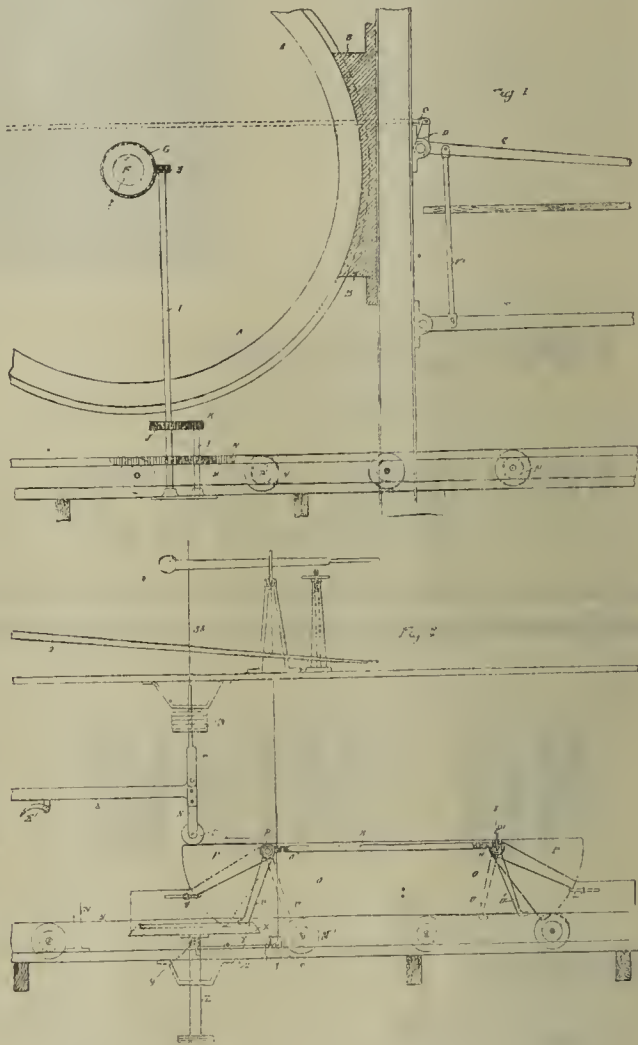
**WARRINGTON, OCTOBER 28.**—Turbo-alternator, &c.—One 2,000 kw. turbo-alternator condensing plant, pumps, piping and fittings; and one water-tube boiler, mechanical stokers, superheaters, &c., for the Electricity Committee of the Corporation. Specifications obtained on payment of 1 guinea (returnable) from Mr. F. V. L. Mathias, borough electrical and tramways engineer, Howley, Warrington.

**WESTHOUGHTON, NOVEMBER 1.**—Steel Tank.—For a steel tank of the capacity of 220,000 gallons, for the Urban District Council. Specifications obtained on application to Mr. Geo. Hayes, surveyor to the council, Town Hall, West-houghton, on payment of 10s. 6d. (returnable).

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

### ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

1655 (1913). *Improved Device for Preventing Accidents in Coal and other Mines due to Overwinding.*—W. Wilson, of Bathville Cottage, Armadale, West Lothian, Scotland.—A gear or worm wheel is fixed on the drum shaft of winding engine, which said worm wheel gives motion to a rack attached to or formed in one with a block or carrier. A weighted roller having levers and connecting rods communicating with brake and throttle valve bears upon the travelling block or carrier. The said block travels simultaneously with the winding drum in the ascent and descent of the cage. When the cage has to be drawn up, the engineman starts the engine, which causes the drum to revolve and puts the device into operation; and when the engine is started, the pinion or worm wheel, which works in a rack, would move the rack forward at a speed proportionate to the winding engine, so that when it reaches a predetermined point some distance from the surface, unless the engineman centred his reversing lever to put a pin in a shoe or block, the carrier still travelling would cause the weight to run gradually down the inclined plane and, putting on the brake, so bring the engine gradually to rest. The arrangement is such that the engineman could not put his engine into operation again without raising the weight and setting the sectors again in position as hereinafter described. This only applies in the case of an overwind. Fig. 1 is a side elevation of winding drum, brake block, rack and gearing; fig. 2 is a side elevation of the mechanism for preventing overwinding. The position of the block or carrier O indicates that the cage or one of the cages is at the top of the shaft and is about to descend, the direction of the arrow shows the direction of the travel of the block or carrier O. Should the operator, however, have inadvertently started the engine in the wrong direction, the



block or carrier O would proceed in the direction opposite to that indicated by the arrow, the weighted roller S would have dropped over the end of the sector P, and before any harm or accident could have occurred, the automatic brake lever would have put on the brake and brought the engine to a stop. When the cage has descended within a certain distance from the bottom of the shaft and the carrier O has moved longitudinally into the position wherein the weighted roller S is at the point indicated by Z, the lever U<sup>1</sup> has reached a point where the slide X will engage said lever U<sup>1</sup> and raise the sectors, if the pin or bolt Y has been put in the slide by the operation of the engineman centring his lever. Unless the engineman has centred his lever to put in the pin or bolt Y, the weighted roller will run down the inclined plane formed by the depressed sector P<sup>1</sup> shown in fast lines at the right-hand side of fig. 1, thereby putting on the brake and bringing the engine to rest. The sectors P<sup>1</sup> are locked as already referred to. The slide X is locked by a horizontal sliding bolt Y acted upon by a spring 10. The operation of unlocking is brought about by the movement of a bell-crank lever Y<sup>1</sup> connected to the reversing lever, as shown in fig. 2. The elbow joint Y<sup>2</sup> of the bolt Y is to adapt itself to the radial movement of the bell-crank arm Y<sup>1</sup>. A helical spring 9 presses against the underside of the slide X to raise it to the required position. The stopping of the engine by cutting off the steam is effected by the employment of a projecting curved piece S<sup>2</sup> mounted upon the said block or carrier O, which, in its movement, comes against the lever S<sup>1</sup> and cuts off the steam at the throttle valve by means of a rod. When it is required to lift the weighted roller S to the position shown, the cam E<sup>1</sup>, mounted upon the lever E<sup>2</sup>, is employed, which bears upon the under surface of the automatic brake lever E. (Five claims.)

8530 (1913). *Improvements in Explosives for Use in Coal-mining and the like.* G. Crew and British Westfalite Limited, explosive manufacturers, all of the Powder Factory, Denaby, near Rotherham, Yorkshire.—Relates to explosives such as are used in coalmining and the like operations, and consists in an improved mixture of the ingredients contained in such an explosive, the result being a produce which is less liable to flame when being used than others at present in use. The explosive, which has passed the latest Government Home Office test for permitted explosives, contains the following ingredients in the pro-



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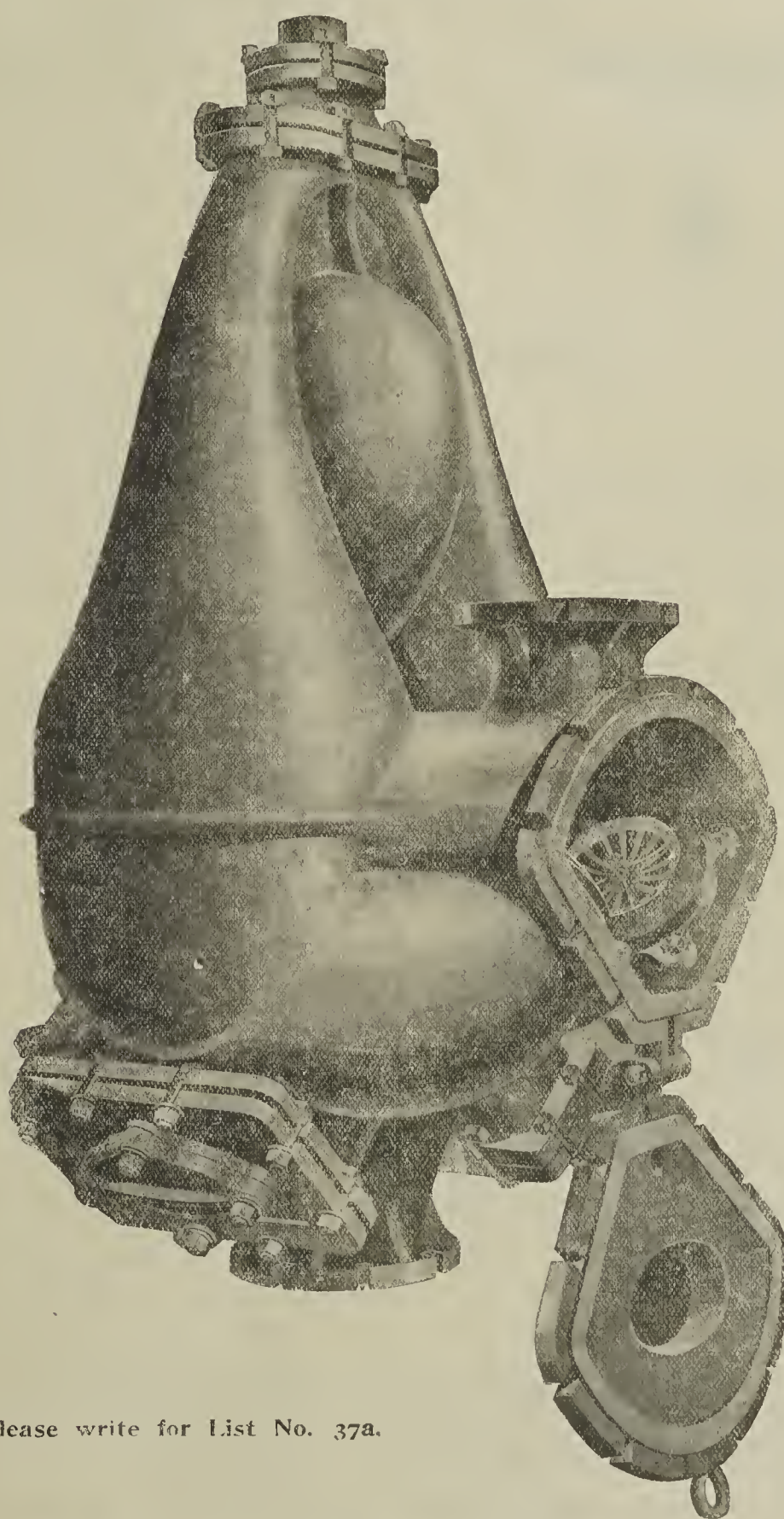
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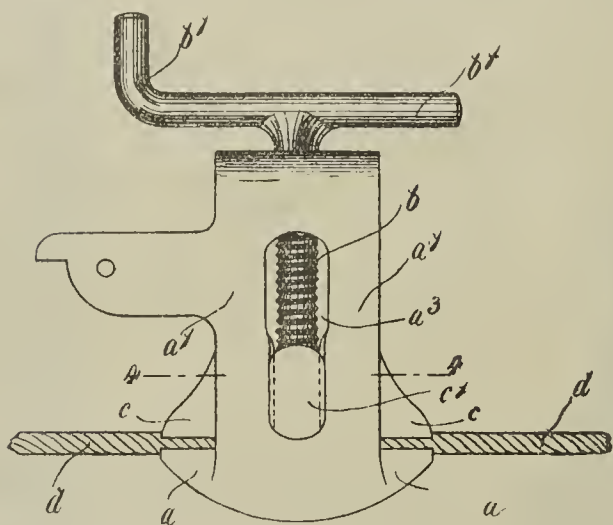
Telegrams—"Pulsometer, Reading."

Telephone—583 Reading.



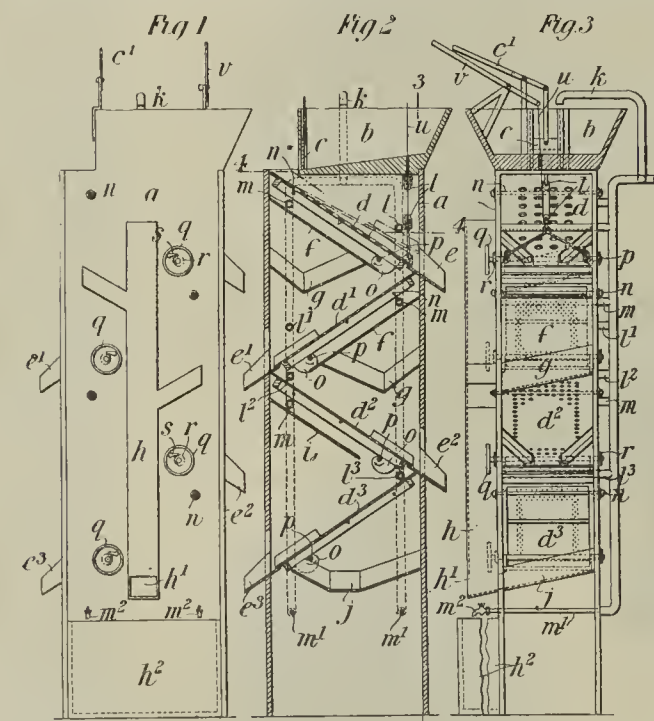
type in which a member geared to move in accordance with the wind, such as a disc or a slide having a succession of teeth or positive engaging elements, is arranged in relation to a governor-controlled member or members in such a manner that the member or members are operated to control the main power member in the event of overwinding and/or overspeeding. According to the present invention the provision for adjustment is rendered more complete, and is therefore of greater utility. A radial or lateral adjustment of the teeth or members is now provided, either alone or in combination with the circumferential or longitudinal adjustment. The radial adjustment may be provided in connection with a plate bearing a series or succession of the teeth, and the adjustment is advantageously of such a character that either or both ends of said plate can be displaced or adjusted individually in relation to the centre of the disc, by which adjustment the degree of increase of the succeeding heights of the teeth may be diminished or increased. Further, if desirable, provision may be made for the individual adjustment of each of a series or succession of teeth. The invention is applicable to the slide type of safety apparatus as well as the disc type. The accompanying drawing illustrates an application of the present invention to the safety gear. (Three claims.)

27582 (1912). *Improvements in Haulage Clips*. H. Weetman, of 131, Bentley-lane, Walsall, Staffordshire.—Relates to haulage clips more especially designed for colliery use and adapted to engage the rope frictionally of the type comprising a body carrying a fixed jaw and a head, a movable jaw slidable relative to the body and the fixed jaw, and a controlling screw carried by the said clip head and engaging the movable jaw which is operated thereby, the movable jaw being provided with a projection and the



clip body with a slot, the projection extending through the slot and operating therein. According to the invention, the movable jaw is provided with a projection and the clip body with a slot both of dovetail or parallel section, said slot having an enlargement to facilitate the assemblance of the parts. The accompanying drawing shows a rear elevation of a haulage clip according to the invention. (Two claims.)

28675 (1912). *An Improved Apparatus for Screening and Washing Gold, Sand, Coal and other Minerals*. R. W. Pleasance, of 62, Coleridge-avenue, Manor Park, Essex.—Relates to that class of apparatus described in the specification of former letters patent No. 6181 of 1907, and wherein



a series of superposed inclined screens is arranged in such a manner that the material which falls through the perforations of one screen will drop on to the screen below it and so on, the movement of the material on or through the screens being effected by water directed against the screens

at the upper part thereof. According to this invention, provision is made for adjusting the angles of the screens to suit the varying conditions of the material under treatment and of the water supply, so that if, for instance, a large quantity of water is available, the angle of inclination may be less than is required if less water is available. Fig. 1 is a side view of the apparatus; fig. 2 is a sectional side view; and fig. 3 is a section on the line 3-3, fig. 2. (Four claims.)

### NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

#### Applications for Patents.

23038. Rolls and screws for rolling mills. O. Lewis.  
23049. Generating the products of combustion. F. M. Fletcher.  
23050. Valve-controlling devices. W. Davy.  
23052. Machines and appliances for cutting or forming screw threads. G. H. Alexander.  
23054. Hoppers for gas producers, blast furnaces and the like. Babcock and Wilcox Limited. (Babcock and Wilcox Company, United States.)  
23061. Picks, pickaxes, miners' picks and all similar tools. E. J. R. Gardiner.  
23070. Air compressors. J. E. Foxlee.  
23097. Ball and pebble mills and the like. H. W. J. Cheffins.  
23109. Masks, helmets, or the like for use with respiratory apparatus. Drägerwerke Heinr. and Bernh. Dräger.  
23159. Means of increasing the efficiency of the heating surfaces and also the circulation of the water in marine return tube boilers. C. H. West.  
23174. Tunnel driers and kilns for drying products of clay and the like material. A. R. Stevenson.  
23193. Apparatus for lifting the doors of coke retorts, connected with the coke-drawing machine. Hartung, Kuhn and Co. Maschinenfabrik Akt.-Ges.  
23217. Apparatus for the mechanical boshing of iron or steel bars or the like. F. W. Gilbertson and C. F. Gilbertson.  
23228. Crushing-jaw for disintegrating machines. K. Birchler.  
23229. Rope grips or jockeys for mechanical haulages and the like. G. T. Cannon.  
23274. Utilisation of the waste heat of caked coke. C. Semmler.  
23345. Respiratory apparatus. Drägerwerk Heinr. and Bernh. Dräger.  
23347. Process for the production of pure ethane from ethylene and hydrogen by the aid of catalytic agents. Elektrochemische Werke G.m.b.H.  
23348. Switchgear in which all parts under tension are immersed in oil or embedded in a fusible insulating mass. Allgemeine Elektrizitäts-Ges.  
23350. Method of and means for mixing the constituents of a combustible gaseous mixture. A. C. Ionides, jun.  
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20947. Steam superheaters. Bruce.  
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### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named **post free**.

- Consular Reports, 1912: Portuguese Possessions in East Africa, 5d.; Morocco, District of Casablanca, 5d.; Italy, Milan, 4½d.; Gold Coast, 4½d.  
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Local Acts: Port Talbot Railways and Docks, 6½d.; Kent Electric Power, 9½d.

EXPLOSION AT AUCKLAND PARK COLLIERY, DURHAM, Report, 1s. 4d.

- Labour Gazette, October, 2d.  
Taxes and Imports Return, 4d.  
Boiler Explosion Reports: (No. 2241), at Messrs. Vickers Limited, Sheffield, 2½d.; (No. 2235), at Allanton Foundry, Morningside, 8d.

### PUBLICATIONS RECEIVED.

- CRANES AND HOISTS. By Hermann Wilda. London: Scott, Greenwood and Son. Price 3s. 6d.  
MONTHLY STATEMENTS OF COALMINE FATALITIES IN THE UNITED STATES, May and June, 1913 (United States Bureau of Mines). By A. H. Fay. Washington: Government Publishing Office.  
"Bulletin of the Imperial Institute" (Vol. 11, No. 3), July-September 1913, London, John Murray, price 2s. 6d.; "The Prevention of Waste of Oil and Gas from Flowing Wells in California" (Technical Paper 42, United States Bureau of Mines), by Ralph Arnold and V. R. Garfias; "Trade of the Union of South Africa, Southern and Northern Rhodesia and British South Africa for the Month of August," price 3s. 6d.; "Mines Department, Union of South Africa: Statistics for the Month of August."

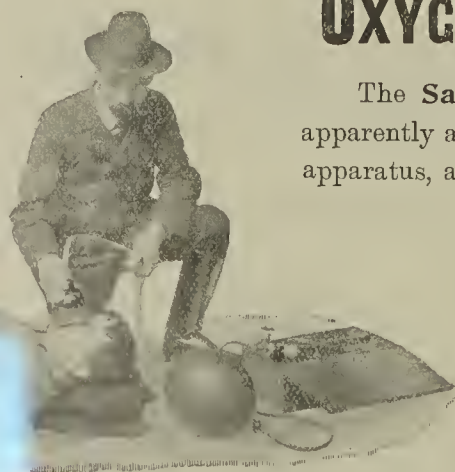
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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

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No. 2757.

## FRENCH COALDUST EXPERIMENTS AT COMMENTRY.\*

By J. TAFFANEL.  
The Commentry Gallery.

This is situated in a drift, 1,115 m. long, constructed as a haulage road for working a seam above the abandoned main seam. This road, the plan of which is shown in fig. 1, passes almost entirely through rock and hard ground, and is open at both ends, the point marked A being at the head of a descending incline 325 m. long, whilst at the further end, O, the road opens into the side of a cut. At B and C it connects with a number of galleries in the old workings and served by the St. Paul shaft, whilst at I, J and K there is a blind branch, 180 m. long, rising for the first 20 m. I to J, but afterwards level. The end K is blocked by a barrier 30 m. through, shutting off workings which were still in operation at the time of conversion. The branch E to F has been closed by a barrier shutting off a goaf, and the branch G to H by another barrier shutting off old workings which gave off carbon dioxide. In addition, several other barriers have been constructed at various points for the purpose of isolating the gallery.

In the incline the sectional area of the gallery is about 5 to 6 square metres, with local enlargements up to 8.70 square metres. Further on the area is fairly constant between 4 and 5 square metres, except in the last 100 metres nearest the mouth O, where it is barely 3.50 square metres. Throughout the gallery is timbered

In several particulars the Commentry gallery differs from that at Liévin, especially in that it is three to four times as long, and has about double the sectional area; in addition to which come its clayey or rocky nature, the lining of the walls with pit timbers, the presence of several branches and of empty spaces in the old workings, and finally in its sinuous course, there being three successive right-angle bends at L, M and N.

In preparing for the experiments, a coal containing 30 per cent. of volatile matter, and furnishing highly-inflammable dust, was crushed and graded so as to obtain a dust leaving behind 60 to 70 per cent. on a No. 200 sieve, and containing grains up to 1 to 2 millimetres in diameter, this powder being mixed with varying proportions of boiler-flue ash. Near the initial point of the explosion, however, a more inflammable dust, leaving only 5 per cent. behind on a No. 200 sieve, was employed in all cases, no admixture of incombustible dust being given. The mixtures to be tested were carefully prepared, and then strewn evenly over the floor so as to obtain a uniform weight of dust per unit of sectional area of the gallery. No firedamp being available, the initial ignitions were produced by firing an explosive in presence of highly inflammable coaldust: a heavy steel block, provided with a hole 60 cm. (2 ft.) deep and 40 mm. (1½ in.) in diameter, being used as a mortar. The new forms of measuring instruments adopted have already been referred to in the *Colliery Guardian* (July 18, 1913, p. 119).

releases the sides of the trough. This takes place, no matter whether the vertical member of the T is displaced by pressure coming from one or other direction in the gallery, the leverage and surface of the shutter being calculated so that the latter will swing as soon as the velocity of the air exceeds that of the normal ventilating current. To ensure the continuity of the water curtain for a certain period of time, the troughs are divided into three longitudinal compartments by means of two partitions extending nearly, but not quite, down to the bottom, so that the contents of the two outer compartments are discharged as soon as the sides of the trough are released; whilst the water from the central compartment issues more slowly and continues to form the curtain for a controllable period of time, depending on the capacity of the compartment and the dimensions of the effluent orifices. It having been found that, under certain conditions, the current of air produced by a violent explosion may be strong enough to delay the descent of the nearest side of the troughs, by counter-acting the outward pressure of the water, a fixed screen of sheet-iron has been mounted in front of the movable side in question. For use in mines it is also advisable to provide a metal grating in front of the movable shutter, in order to prevent accidental (or malicious) displacement of the latter out of due course. The troughs should be covered where fragments of roof are likely to fall into them; and this precaution also reduces losses by evaporation. The troughs or reser-

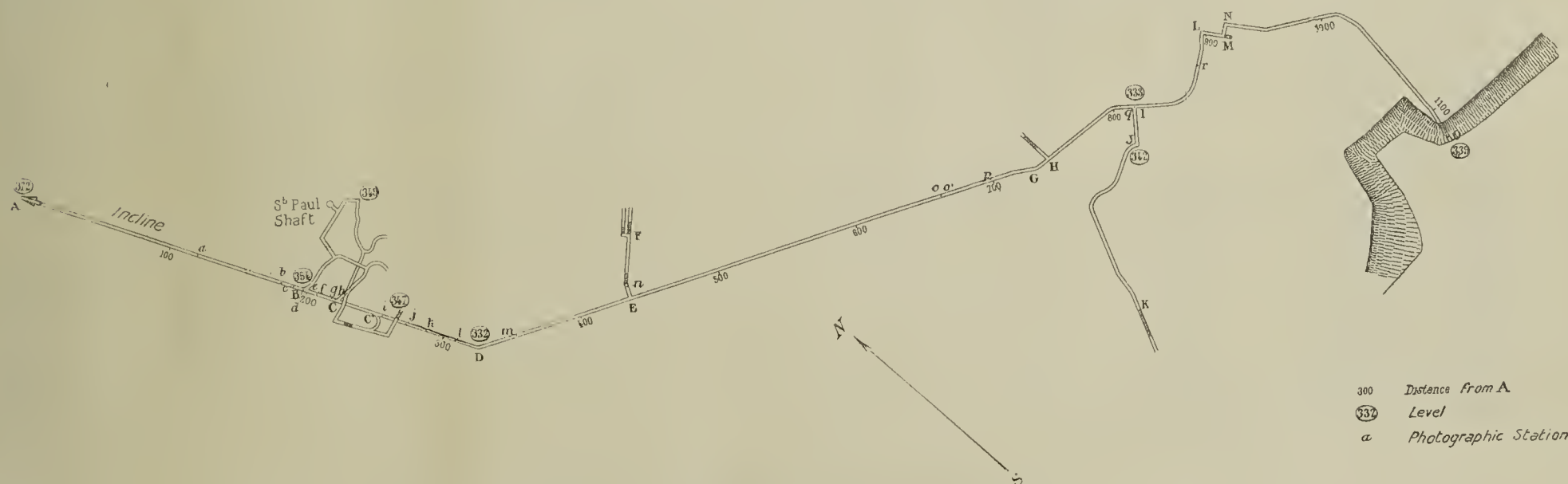


FIG. 1.—PLAN OF THE COMMENTRY GALLERY.

with oak timbers, 15 to 20 centimetres (6 to 8 inches) in diameter, and set at 60 cm. (2 ft.) intervals, except where the rock is very sound (between the points 500 and 700 on fig. 1), where the distance is double that specified, and in the incline, where it is reduced to 40 cm. (16 in.). The floor is generally good, but not so smooth as the cemented gallery at Liévin, and after being swept a deposit of incombustible dust soon forms again. The section 250 to 300 in the incline has been floored with goaf packing, owing to the difficulty of preventing the formation of dust from the wearing away of the natural floor.

Normally, the gallery is not damp, but being only 40 m. below the surface, and the roof being cracked as a result of mining operations, water finds its way in at a number of points after rain, though not seriously, at an old borehole, where, however, the incoming water is drained off into a sump a few yards away. A rail track runs all along the gallery, but the rails have been taken out of the branches, and the floor there is consequently uneven and crumbling, a circumstance which, in combination with the dampness of most of them, prevents their conversion into coaldust galleries. There is no fan, and the natural circulation of air through the tunnel, from the intake O to the outlets A and the St. Paul shaft, is about 2 to 4 cubic metres per minute in the winter.

\* Report published by the Comité Central des Houillères de France.

### A New Arrêt Barrage.

With the idea of forming a water curtain which would continue in operation long enough to stop even a delayed flame, an improved form of *arrêt barrage* (fig. 2) has been devised, the numerous small water tanks of the earlier form being replaced by a smaller number, of increased capacity. These are rectangular, with flat bottom and straight sides, and are suspended from the cross-timbers by chains—an arrangement enabling a larger volume of water to be concentrated in a shorter section of the gallery, and facilitating the mounting and dismounting of the tanks. The automatic discharge of the water, even under the slightest shock produced by a coaldust explosion, is effected in the following manner: The sides of the tanks are hinged to the bottom, so that they will turn through an angle of 180 degs. when released, whilst normally they fit tightly against the ends by means of rubber liners. The sides are held in the closed position by means of a rod provided with two downward projections which bear against the sides, and when the rod is lifted so that one or other of these projections is shifted out of contact with the tank side, the other side is also released by the pressure of the water displacing the rod longitudinally. Now, the two ends of the rod rest on swing shutters, of T section, hung crosswise of the gallery. Any sudden pressure of the air against the vertical member of the T causes the shutter to swing on its horizontal axis and tilts the crossbar, which thereupon lifts the end of the rod and

voirs forming the *arrêt barrage* are two in number, measuring 2.30 metres (about 7½ ft.) long, 1.20 metres (4 ft.) wide and 25 cm. (10 in.) deep, and each is charged with 650 litres (143 gallons) of water, equivalent to 260 litres (57 gallons) per square metre (10 square feet) of sectional area of the gallery, or nearly three times the quantity of water found sufficient in the fourth series of experiments at Liévin. The whole arrangement, however, occupies less space than the older form of barrage with small tanks.

The apparatus is designed so as to be set in operation by an air-current flowing with a velocity of about 10 m. (11 yards) per second. The water in the reservoir holds the sides against the stops on the rod with a pressure of about 16 kilogs. (32½ lb.); and since the coefficient of friction with the stops is found to be 0.3, the force needed to lift the rod is 4.8 kilogs. (10½ lb.). If the vertical member of the T shutter has a superficial area of 3,000 square centimetres (3¼ square feet), it will exert sufficient power to tilt one end of the rod when the velocity of the air-current exceeds 10 m. (11 yards) per second. The central compartment of the reservoir is 1.5 m. (5 ft.) long and holds about 420 litres (92½ gallons) of water. The two outer compartments will be discharged in a couple of seconds; and the effluent orifices of the central compartment, which are 8 cm. (3¼ in.) high, allow this latter to be emptied in about 5 seconds. To provide for the contingency of a delayed flame, the effluent orifice of the central compartment in



and reservoir is only 1.5 cm. (slightly over  $\frac{1}{2}$  in.) that the discharge of the water takes about

#### SUMMARY AND CONCLUSIONS.

Whilst the Commentry gallery does not present the complexity of a mine that is in active work, it approximates more closely to practical conditions than that at Liévin, and is adapted for progressive investigation by stages from the known to the unknown, without introducing too many variables at one time. On the other hand, the new experimental conditions resulting from the greater length, sectional area and sinuosity of the gallery are less adapted to scientific investigation than the Liévin gallery, and means have therefore had to be adopted for measuring, recording and analysing the development of the explosions, and comparing the results with those obtained at Liévin.

The dust problem may be considered from various aspects, corresponding to different phases of the explosion, and therefore separate investigations had to be made in connection with the initial ignition, the tendency of the dust to propagate that ignition, and, finally, the laws of the development and arrestation of propagation.

#### Initial Ignition.

Previous experience has shown that the conditions for a coaldust explosion are more favourable when the initial ignition takes place near the closed end of a long, straight gallery, and that, conversely, where there is an opportunity for the air to expand in both directions the explosion can be more easily checked by a stonedust

composition of the dust restricts the propagation to one direction only, whilst in other directions there are spaces which act as safety valves in respect of expansion.

*Relative Propagating Capacity of Coaldust.*—When an initial explosion of firedamp or coaldust takes place, the surrounding air is forced back with violence, the disturbance being propagated at the rate of about 350 m. (380 yds.) per second, and stirring up, almost instantaneously, all the dust lying in the galleries, etc., within the above radius. Whether the flame will be propagated in the resulting mixture or not depends chiefly on the composition of the mixture and the degree of agitation of same, the latter factor being influenced in turn by the form and regularity of the gallery and by the velocity with which the combustible mixture is pushed forward by the combustion. The danger limit, in so far as the composition of the mixture is concerned, depends on the gallery factor and on the air velocity. The experiments made to compare the relative influence of the gallery factor at Liévin and Commentry respectively show that the direct application to the Commentry gallery of the conclusions furnished by the tests in the Liévin gallery would lead to a slight error, which, however, is in the direction of safety. With a given dust and a given force of initial explosion about 10 per cent. less of incombustible dust was required at Commentry to obtain the same propagating capacity, though in reality the difference was smaller, owing to the presence of natural stonedust in the latter gallery. It is there-

means for lowering the velocity of the gusts of air. Now, windings or sudden bends in a gallery present the best obstacle to violent gusts of air, and are therefore the most suitable positions—wherever possible—for the location of zones of arrestation, so that the effects of the two moderating actions may be cumulative. The efficacy of such a combination has been demonstrated in the Commentry gallery. The explosion was allowed to develop for a distance of about 250 m., under which conditions the tests at Liévin have shown that a safety zone 200 m. in length would not be sufficient to arrest the explosion in a straight gallery, even though the proportion of ash constituents in the dust were increased to 70 or 75 per cent. Near the 250-m. point in the Commentry gallery the course of the gallery becomes sinuous, terminating at 450 m. in three successive right-angle bends. This zone was left in the same favourable condition for propagation as the first 250 m.; but this, notwithstanding the violence of the explosion, was found to diminish progressively, the flame being extinguished on reaching the first bend.

The practical effect of this observation is that all the ways connecting different districts in a dusty mine should preferably be tortuous in places, with sudden bends. This measure would not seriously affect ventilation, though it would cause difficulties in haulage roads, and is therefore not capable of general application. In many roads, however, it would be quite feasible to divert the gallery for a distance of about 10 yards, so as to make four right-angle bends and arrange a stone-

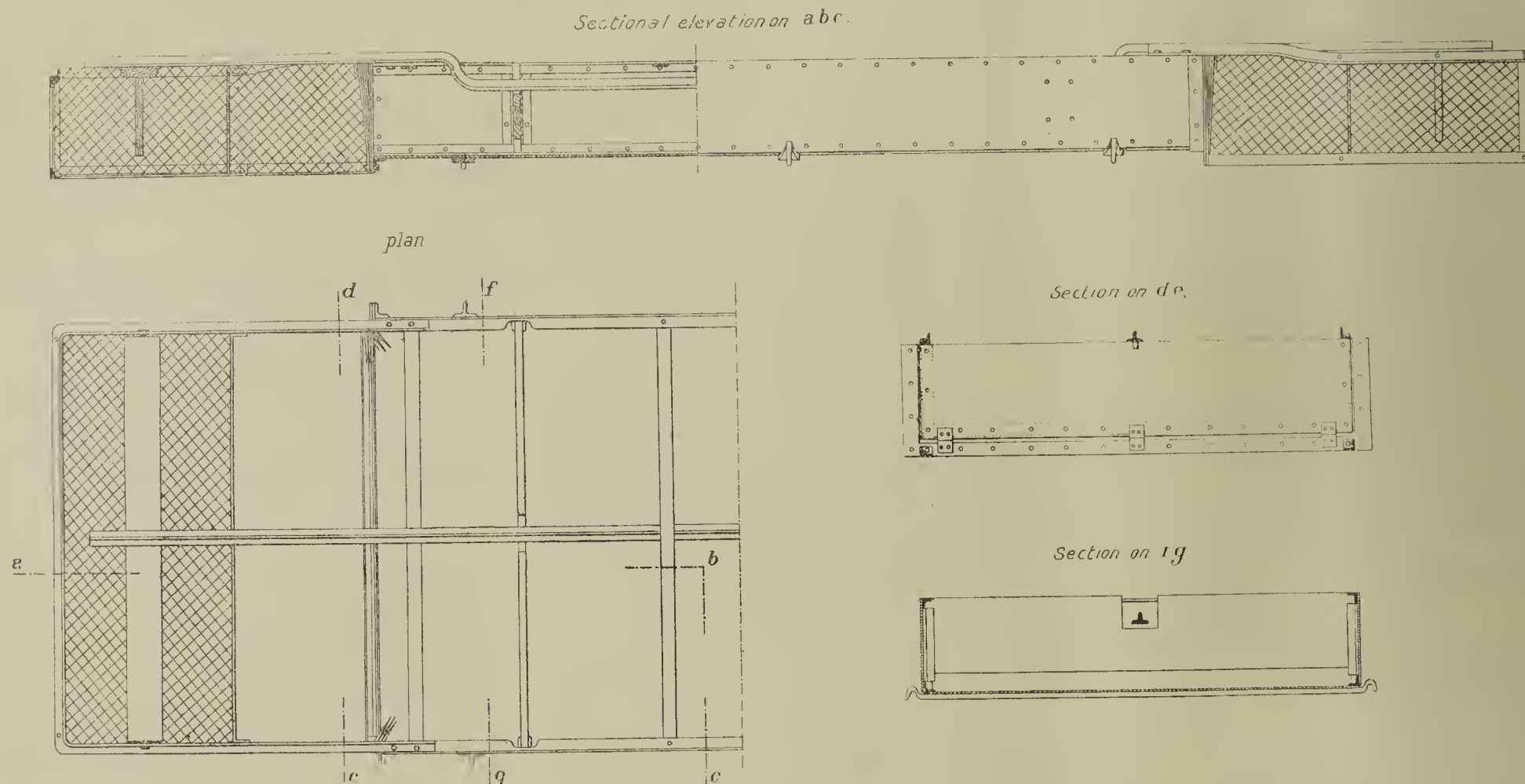


FIG. 2.—WATER EXTINGUISHER USED AT COMMENTRY.

zone. Moreover, in certain still unpublished experiments at Liévin it has been found that, when the ignition is produced by the aid of a mortar, under conditions enabling this expansion in both directions to occur, the dissymmetry in the effect of the shot, coupled with the rearward expansion, lessens the velocity of the air waves by one-half, but that when two mortars are set back to back and fired simultaneously, the conditions for a dust explosion are just as favourable as when the initial ignition takes place near the closed end of the gallery. The first series of tests at Commentry confirm the influence of the position of the initial ignition. The charge was fired in a blind end, 6 metres long, at right angles to the gallery, so that the expansion in the latter was entirely lateral and split up into two directions, in place of being concentrated in one. Consequently, the charge of explosive and the amount of dust had to be increased in order to obtain propagation, the dust having, moreover, to be strewn on the walls of the gallery as well as on the floor. The practical conclusion is that, with a given volume of firedamp and quality of coaldust, the chance of an ignition or explosion of firedamp becoming propagated varies according to the position of the initial ignition. The danger is greatest when this position is near a closed end, especially when the gallery is straight for some distance; and less if the ignition occurs in the open gallery, so that expansion can take place in both directions, the conditions being especially when a difference in the

fore justifiable to assume that, so far as the percentage of ash constituents is concerned, the limits obtained in the lined artificial gallery at Liévin and in the timbered natural gallery at Commentry are almost identical.

#### Development and Arrest of Explosions.

In presence of dust capable of propagating an initial explosion, it is necessary, in order to arrest propagation, either to adopt means for modifying the composition of the dust cloud, or else to act on the cause of agitation—that is to say, to reduce the violence of the gusts of air. In the former case, the object is achieved by watering or by adding the necessary proportion of incombustible dust, the extent to which either of these means must be applied, increasing with the violence of the agitation, since this latter augments the velocity of combustion. In other words, for a zone of arrestation to be effective, the neutralisation will have to be increased in proportion as the explosion has been allowed to become more violent and the gusts of air to have attained an increased velocity. Moreover the arrestation is not immediate, and besides, the preliminary gusts of air having stirred up the dust over considerable distances, tend to overleap the neutralised and other zones, so that, unless the zone of arrestation be very long, no part of the dust cloud therein is left without unfavourable change in its degree of safety. Under these conditions it will evidently be useless to attempt to arrest an explosion that has become violent, by means of a simple neutralised zone of inconsiderable length. It is, therefore, advisable to adopt

dust zone about 100 yards in length, about this centre, which precaution would certainly prevent the propagation of explosions. The *arret barrage* already described is also a valuable means for arresting an explosion.

To sum up, the Commentry experiments have confirmed the applicability to practical mining conditions of the conclusions drawn from the Liévin experiments with regard to the classification of dust deposits and the efficacy of *arrets-barrages*, besides demonstrating the possibility of isolating the districts in a mine by means of bends in the roads and airways.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—W. L. Morgan and E. T. Forester, carrying on business as coal merchants and haulage contractors, at York-street, Swansea, under the style or firm of W. Laugharne, Morgan and Co.; J. Henderson and T. Adamson, carrying on business as cycle, motor and electrical engineers, at Meadow-lane, Leeds, under the style or firm of the Adelphi Cycle, Motor, Electrical and General Engineering Company; J. W. Heighton and J. F. Heighton, carrying on business as ironmongers, plumbers and sanitary engineers, at Manor-road, Hastings, under the style of J. W. Heighton and Son; H. Anderton and H. Beatson, carrying on business as electrical and gas lighting engineers, at Surry-street and Waingate, both in Sheffield, under the style of Anderton and Beatson; A. Dickinson and A. H. Cox, carrying on business as coal merchants, at Stroud, under the style of Dickinson and Cox.



EXPERIMENTS ON THE OXIDATION OF COAL.\*

By M. P. MAHLER.

In the year 1892 the author published a paper on the alteration of coal upon exposure to the air—a subject which, as early as 1855, had engaged the attention of Regnault, and later, in 1879, had been exhaustively treated by M. H. Fayol in a notable paper published in the *Bulletin de la Société Minérale de Saint-Etienne*.

The samples used by the author in 1892 had been carefully preserved at the Ecole des Mines, and thus afforded an opportunity for the repetition of the tests then carried out in order to ascertain what changes they had undergone during the 20 years that had elapsed since these tests were made. The tests included determinations of calorific power, proximate analysis of the coals and estimation of hygroscopic moisture. The following table shows the losses or gains under these headings, respectively:—

CHANGES IN COAL AFTER 20 YEARS STORAGE.

Sample of coal.	Calorific power (calories).	Carbon.*	Hydrogen.*	Oxygen* and nitrogen.	Volatile† matter.	Moisture.	Ash.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Commentry.....	-226	-3'314	-1'694	+1'008	-0'76	-0'82	+2'35
Blanzv.....	-150	-3'251	-0'323	+3'578	+4'20	-0'21	+2'44
Saint-Etienne.....	-88	-0'361	-0'326	+0'687	+3'76	-0'21	+0'10
Lens.....	—	-2'312	-0'02	+2'332	+4'30	+0'10	+0'57
Roche-la-Molière.....	-9	-2'706	+0'478	+2'223	+3'30	+0'22	+1'34
Anthracite (Pennsylvania) ...	-26	-1'183	+0'169	+2'014	+3'00	+0'49	+0'08

\* Calculated after subtracting ash and moisture.

† Calculated on pure coal.

From the above we see that there was a loss of calorific power and an increase in oxygen consistently in all the samples, and in general there was a loss in hydrogen, with an increase in volatile matter and in ash. The amount of change varies with different kinds of coal, being greatest in those which are rich in volatile matter. It should be stated that none of the samples had much ash, and the results are, therefore, free from certain errors attributable to a high ash content.

Ulmic acid was not found in appreciable quantity in any of the samples, showing that this substance represents a still higher phase of the oxidation processes.

*Effect of Pressure and Humidity.*—A sample of dried Commentry coal was pulverised and submitted to the action of oxygen, under a pressure of 20 atmospheres for two months, the gas in one case being dry and in the other case saturated with moisture. The experiments were carried out in 1910, and repeated in 1912.

The results are given below:—

	Before treatment.	After exposure to dry oxygen at 20 atmos.		After exposure to saturated oxygen at 20 atmos.	
		1910.	1912.	1910.	1912.
Calorific power, pure coal in calories ...	8,420	8,410	8,270	8,380	8,170
Volatile matter of pure coal.....per c.	37'5	36	38	36	38
Carbon.....per c.	84'47	—	81'61	—	78'20
Hydrogen.....per c.	5'50	—	4'82	—	4'50
Oxygen and nitrogen.....per c.	10'03	—	13'57	—	17'00
Ash.....per c.	2'45	2'52	3'38	2'84	4'34
Moisture.....per c.	2'59	0'80	3'59	4'75	3'37

Thus in general the action of oxygen under pressure appears to have but little influence on the Commentry coal. But the interval of two years seems to have resulted in considerable change in the samples, since the author found in 1912, after the treatment with moist oxygen under pressure, a considerable quantity of ulmic acid, which, however, was appreciably present after treatment with the dry gas. A similar appearance of ulmic acid, after the same treatment, was noticed in the case of coal samples from Anzin and Courrières.

It seems, therefore, to be established that moisture plays an important part in the formation of ulmic acid during oxidation of coal, and the author suggests that this change may follow from the fixation of water by one of the oxidisable constituents of the coal. This would explain why the Blanzv coaldust, examined by the author in 1892 and found to contain ulmic acid, was not deficient in hydrogen.

This fixation of water is important in regard to the facility with which coal is dehydrated under the action of heat, or deprived of hydrogen by the action of oxygen.

*Determination of Hygroscopic Moisture in Coal.*—There is a real uncertainty in the determination of moisture in coal, arising from oxidation on the one hand, and loss of hydrogen on the other. The author conducted comparative experiments by estimating the loss of weight *in vacuo* and comparing this with the actual weight of water obtained in a specially contrived apparatus by expelling the moisture by heat. In the case of fresh samples of coal, these two methods, carefully carried out, were found concordant within experi-

\* From the *Annales des Mines*.

mental limits of error. But in the case of outcrop coals and oxidised samples, desiccation *in vacuo* gave distinctly low results. Oxidised coals often have more moisture than the same coal in the unaltered state, and the author thinks that this excess of moisture is present in the fixed condition, in the form of hydrates, easily decomposed by heat.

*Experiments on the Action of Air at Low Temperatures.*

—The author next discusses the composition of gases evolved from coal at temperatures below the boiling point of water, with reference to carbon dioxide, carbon monoxide, and water vapour due to the oxidation of hydrogen in the coal. He describes in detail the apparatus used in this research. Precautions were taken to purify thoroughly the air which passed over the coal sample, and was then led over soda lime to absorb carbon-dioxide, and after complete washing by sulphuric acid, potash, and baryta, the carbon monoxide

was estimated by iodic anhydride by means of the reaction:—



The actual experiments lasted about 30 hours each, but a month was occupied in each case in verifying and arranging the apparatus.

The author, while not claiming the absolute value of the figures obtained in these experiments, is of opinion that the results are within certain limits comparable. He finds that dry air at ordinary temperatures acts upon dry coal with the formation of water, carbon monoxide, and carbon dioxide, in quantities increasing with the temperature, and more pronounced in the case of highly bituminous coals. He does not attempt to explain the chemistry of the process whereby these changes are brought about in our present ignorance of the constitution of coal, but he does not think it can be due to the decomposition by heat of any specific substance, such, for example, as oxalic acid, as this kind of decomposition would demand higher temperatures than those at which these experiments were made. He is inclined to attribute it to a kind of very slow combustion, involving the oxidation of cellulose, chlorophyll, &c. He noted, moreover, a distinct increase in the velocity of the reaction at a temperature near 125 degs. cent., when the gases came off too fast for complete absorption in the apparatus. At this critical temperature, also, odours of carbides and acetic acid were noticeable. The coals tested included dried samples from Decazeville, Courrières, and Anzin.

*Presence of Carbon Monoxide in Mine Air.*—The above experiments show that carbon monoxide should be a normal constituent of mine air. This gas has indeed been recognised in certain cases but has been usually attributed to explosives. The author tested samples of raw coal in the above mentioned apparatus and found that the action of the air produced less carbon monoxide than in the case of dried coal. Thus Courrières coal, with 1 per cent. moisture, after 30 hours exposure at 35 degs. Cent. only yielded 1.13 cubic centimetres of carbon monoxide; and other coals, with more moisture, failed to give any appreciable volume of the gas. But in all cases when the air was passed through a Winkler tube containing a dilute solution of rabbits' blood the spectroscope showed the presence of the characteristic bands of oxycarbohemoglobine resisting the action of reducing agents such as ammonium sulphide.

In 1910 the author and M. S. Denet made some observations in the mines at Liévin, Lens and Drocourt, using the iodic anhydride apparatus of M. Goutal. Minute precautions are necessary to avoid the possibility of mine air gaining access to the anhydride before being freed from any traces of dust and non-saturated hydrocarbons. This was done by filtering through glass wool and washing by bromine and sulphuric acid. The iodine liberated by carbon monoxide is absorbed by chloroform, the depth of coloration of which affords an index of the extent of the reaction. The results in Table A were obtained.

The mean value gave 0.002 per cent. of carbon monoxide in the mine air investigated, the maximum being 0.004 in a working-place and the minimum 0.000

TABLE A.

Pit.	Volatile matter in the coal. Per cent.	Carbon monoxide. Per cent.	Methane. Per cent.
Liévin.....	26	0.0016	0.02
.....	34	0.0006	0.25
.....	34	0.0000	0.80
Lens.....	26	0.0023	0.03
.....	26	0.0040	0.00
.....	26	0.0025	0.06
Drocourt.....	26	0.0020	0.00
.....	26	0.0023	0.00

in a roadway. It is to be noted, also, that the maximum value was found where the methane content was a minimum and *vice versa*. The small quantities of carbon monoxide thus found may be regarded as harmless.

*Experiments on the Oxidation of Coal between 100 degs. Cent. and 300 degs. Cent.*—When coal is heated above 125 degs. in air, liquid matter sometimes appears, with acetic odours. The author has examined the nature of such liquid matter evolved from Courrières coal at 200 degs. Cent. This possessed an acidity of 40 per 1,000. A sample of liquid from the coal of the Marek seam of Anzin Colliery was transparent and limpid, with a coaly smell, acid and apparently carrying traces of formic acid. Acetic acid was recognised in this liquid by the ordinary method, but the volume was not sufficient for an examination for the presence of the higher homologues. Acetone was proved by the formation of iodoform as well as by the remarkable reaction, due to Mr. Denigès, with mercuric sulphate. Methyl alcohol was also shown to be present by means of M. Denigès' method. (*Comptes Rendus*, t. cl., 1910, p. 832.)

In liquids produced at temperatures above 250 degs. Cent. acetic acid was found, but no trace of alcohol or acetone; and the same result was obtained with the less bituminous coals examined in this way. Amongst other observations made by the author, importance attaches to the increase in humidity in some of the samples when kept for some time in the laboratory. Thus a sample of anthracite from La Mure increased from 3.50 to 4.50 per cent., and the same coal oxidised at 250 degs. increased from 1.42 to 5.20 per cent. in humidity; while another sample oxidised at 300 degs. Cent. passed, after keeping for some time, from 0.90 to 7.25 per cent. of water.

LAW INTELLIGENCE.

SUPREME COURT OF JUDICATURE.

COURT OF APPEAL—October 24.

Claim to Minerals.

Before the MASTER OF THE ROLLS, Lord Justice SWINFEN EADY, and Lord Justice PHILLIMORE.

*Mitchell v. Mosley.*—This was an appeal from a decision of Mr. Justice Eve. The plaintiff in the case claimed a declaration that she was entitled as tenant for life to the mines and minerals under certain lands in Manchester. By two indentures of 1791 the predecessor in title of the defendant assured to the predecessor in title of the plaintiff certain land in Cleydon, Manchester, of about 10½ acres. In neither deed were the minerals excepted, and in each of them a yearly rent was reserved to the vendor of one-fifth part of the value of all the ironstone which should be raised out of the land. At the date of the deeds the coal and cannel were leased for 200 years from 1740, but there was no mention of such lease in the deeds except in the vendor's covenant against encumbrances. In 1828 part of the land was conveyed back to the defendant's predecessor in title, and in exchange two other pieces of land containing about 13,700 square yards were granted to the plaintiff's predecessor, but again no exception was made of the minerals, though the grant was made subject to the lease. The defendant, Sir Oswald Mosley, denied that the reversion of the premises devised by the lease of 1740 was vested in the plaintiff. He alleged that the rents could not be apportioned, and that the plaintiff's claim was barred by the Statute of Limitations. Mr. Justice Eve made the declaration asked for by the plaintiff.

The defendant appealed.

The court, without calling on counsel for the plaintiff, dismissed the appeal.

The Master of the Rolls, in his judgment, said the two deeds were clearly conveyances of the land, and the land included everything down to the centre of the earth. As a matter of construction, therefore, these deeds were not conveyances merely of the surface, but of the whole substratum down to the centre of the earth. Then it was said that the parties never contemplated an apportionment, but apportionment was a matter of law, which on the severance of a reversion conferred rights between the co-owners. Then it was said that section 9 of the Real Property Limitation Act, 1883, was an answer to the plaintiff's claim. The exact point was decided by Mr. Justice North in *Laybourn v. Gridley* (61 L.J., Ch., 352), and in his (the Master of the Rolls's) opinion that decision was perfectly right and in no way inconsistent with the decision of Lord Romilly in *Williams v. Pott* (L.R., 12 Eq., 149). The plaintiff never been any wrongful possession within section 9, and the







technical worth and to acquire commercial experience. Assuming then that both prove to be well balanced men of the world, who will have the first offer of promotion? Surely the one who, in his own special line, has shown himself to be most efficient, and such efficiency can never be obtained if the average English student, after securing the usual foundation in general science, be compelled to spread himself equally over three quite distinct branches of technology, diluted also with a dash of coalmining. Members of one class would be able straightway to step into first-class posts; the others must begin as subordinates and may never get a chance of showing their value.

Now you see why I think it unfair to handicap a raw student with this composite course and to tempt him with a hall-mark that appears to be such a plausible advertisement of his work.

THOMAS H. HOLLAND.

Alderley Edge, October 29, 1913.

SIR,—In reference to your issue of October 17 with Sir Thomas Holland's address to the Manchester Geological and Mining Society, it is impossible not to feel disappointed that men of Sir Thomas's and Prof. Calman's standing in the educational world should find it necessary to air their grievances against each other publicly. As a nation interested in oil well mining we are undoubtedly behind other nations in regard to educational facilities, and although it may not be that the practical men in the profession approve altogether of the B.Sc. diploma, we do recognise that the appendix conveys the fact that the owner thereof has at least had some considerable brain-training.

The *pros* and *cons* of university training as against that of daily practice coupled with night-school instruction are matters of great moment, but are so infinitely connected with personal circumstances that their respective values cannot be reasonably judged except on concrete data respecting each individual case; at the same time, there is little doubt that the night school or technical class is an opportunity for the masses, and that the university training can only be the privilege of a very few.

Birmingham University has taken the responsibility of a special section in which it is intended to give a more or less comprehensive tuition in matters connected with oilmining. If the University can provide such facilities and further make itself a centre of research in matters connected with the oilmining industry, the authorities responsible will be deserving not only of the greatest credit for their efforts, but will undoubtedly benefit the interests of the nation as a whole. The proposal should have the warmest support of all those who have the interest of our mining industries at heart, and although the initial education may not for the time being be all that our practical engineers would desire, it is a step in the right direction and one that may reasonably be supported.

Sir Thomas's scathing remarks anent the drilling machinery indicate a lack of understanding in regard to the practical side of oil well engineering; as a matter of fact, the student, especially any student who has had some engineering training in shops, should be able to learn a very great deal about practical drilling and the manipulation of drilling machinery, providing the authorities at the University employ suitably trained demonstrators in this branch of the work.

As a nation we lack a sufficiency of practical men in the oilmining profession as well as scientifically trained men in all branches.

The young man passing through a course at the University and then doing a post-graduate course of two or three years in the field will be more valuable than the man who has to spend 20 years of his life learning the practical side of oilfields work, continually hampered by a lack of brain-training in mathematics, physics, &c. On the other hand, the young man who has already served his apprenticeship to the practical work in the field, and can then afford to graduate at a university, is likely to prove a very much more valuable asset to the nation than the one who has gone through the theory first.

If these leaders in the educational world would only pull together, many of the anomalies and failures of our educational system would disappear.

JOHN WELLS.

Cross Keys House, 56, Moorgate-street,  
London, E.C., October 27, 1913.

The Clifton and Kersley Coal Company Limited are carrying out improvements on the surface and below at their Outwood Collieries, Radcliffe, near Manchester (formerly owned and worked by Messrs. Thomas Fletcher and Sons), with a view to increasing output. They are also rapidly opening out the Worsley Four-foot Mine at their Wet Earth Colliery, Clifton.

CONTINENTAL MINING NOTES

Belgium.

An accident has occurred at the Boeringen No. 2 sinking in the Campine, one of the freezing tubes having given way at a depth of 260 m., with the result that the shaft has been flooded. The damage, it is expected, will soon be repaired. The No. 1 shaft has now reached a depth of 430 m. At Waterschei a depth of 425 m. has been reached without accident.

Exports and imports during the first nine months of the present year were as follow:—

	Imports.		Exports.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	5,954,292	6,689,148	3,741,741	3,713,154
Coke .....	691,920	851,911	738,539	813,315
Briquettes ..	329,681	355,394	482,579	470,363

From Germany there were imported 3,900,141 tons of coal, 757,987 tons of coke, and 348,161 tons of briquettes, as against 3,432,093 tons of coal, 621,798 tons of coke, and 309,482 tons of briquettes last year. Imports of British coal rose from 1,232,985 tons to 1,742,443 tons, but those from France fell from 929,315 tons to 650,149 tons. *Boulets-ovsides* have fallen 3 fr. in price, and secondary coke 1 fr. Prices generally are lower, and several coke ovens have been extinguished.

France.

The price of metallurgical coke for the last quarter of the year has been fixed at 26 fr., a reduction of 1.825 fr. as compared with the previous three months.

An international conference of miners met in Paris on Thursday, under the presidency of Mr. Robert Smillie, to settle the differences between the two French federations, the National Federation of Underground Workers and the Federation of the Nord and the Pas-de-Calais.

Exports and imports of coal during the first eight months of the present year were as follow:—

	Imports.		Exports.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	10,102,900	12,327,500	1,333,035	892,581
Coke .....	1,780,300	2,142,800	120,352	149,127
Briquettes ..	734,400	722,700	142,787	132,930

During the month of August coal imports were 1,550,040 tons, as against 1,389,700 tons in August 1912; of this total 899,500 tons came from Great Britain (780,800 tons); 311,800 tons from Belgium (293,800 tons); and 317,100 tons from Germany (291,600 tons). In the eight months deliveries of British coal have risen from 5,547,000 tons to 7,523,400 tons, those of Belgian coal from 2,223,700 tons to 2,374,200 tons, and those of German coal from 2,166,200 tons to 2,230,500 tons. In addition 1,488,400 tons of German coke have crossed the frontier, as against 1,780,000 tons last year.

Germany.

At a meeting held last week the Coal Syndicate decided to lower the "participation" figures during November from 95 to 87.5 per cent. for coal, the figures for briquettes and coke to continue at 85 and 65 per cent. respectively.

*Coal Syndicate Report for September.*—Total coal raised, 8,561,102 tons (7,958,448 tons in September 1912), or 329,273 tons (318,338 tons) per working day. Calculated distribution, 6,886,554 tons (6,543,808 tons), being 264,867 tons (261,752 tons) per working day, or 96.40 per cent. (99.68 per cent.) of the participation. Total coal distribution by Syndicated pits: 8,516,113 tons (8,081,601 tons), or 327,543 tons (323,264 tons), per working day. Deliveries, including local sales, miners' house coal, and supplies to pits' own ironworks: Coal, 5,537,507 tons (5,106,646 tons), or 212,981 tons (204,266 tons), per working day; coke, 1,706,990 tons (1,722,772 tons), or 56,900 tons (57,426 tons), per working day; briquettes, 386,358 tons (367,376 tons), or 14,860 tons (14,695 tons), per working day.

*Fuel Traffic in Ruhr Harbours in September.*—The total consignments of coal, coke and briquettes by rail were as follow:—To Ruhrort 1,214,955 tons, to Duisburg 406,503 tons, to Hochfeld 22,218 tons, or 1,643,676 tons in all. Shipments outward to Coblenz and places higher up river 796,936 tons, to places below Coblenz 28,216 tons, to Holland 647,156 tons, to Belgium 329,542 tons, to France 29,747 tons, to other markets 38,735 tons. Total shipments from Ruhrort 1,208,153 tons, Duisburg 367,157 tons, Hochfeld 20,038 tons, Rheinpreussen 91,182 tons, Schwelgern 93,446 tons, Walsum 90,357 tons—aggregate, 1,870,333 tons.

*Ruhr Coal Market.*—Business continues to decline, for though the volume of railway traffic is considerable, it is about 2,000 wagon loads per diem below the maximum. This is mainly due to the falling demand for industrial fuel, especially by the iron industry, which finds expression in the decreased distribution of coking coals. Part of the surplus, however, is finding an outlet abroad, especially in France and Holland, though it is true that the prices obtained are not very remunerative. Conditions are less favourable in Belgium, where, apart from the more depressed state of the iron industry, English competition is increasing. In South Germany greater activity is manifested, both wholesalers and retailers being in the market, for their winter supplies. On the other hand the shipments to that district have fallen off, owing to the low state of the river, and therefore all arriving cargoes can be

sent away by rail without being put into stock. On the whole, while the coal market situation may be considered passable, the coke market is in a pitiable state, the output largely exceeding the demand except in the case of broken coke for domestic heating purposes.

*Coal Market in South Germany.*—Conditions are slowly changing for the worse. In various branches of industry the demand for coal is declining, and delivery specifications are being reduced, in contrast to the position a short time back. Consequently stocks of industrial coal are increasing, especially in fines and small nuts. The continued mild weather has also adversely affected the demand for house coal, especially in large nuts and broken coke (except No. III.), whilst anthracite nuts still go off satisfactorily. There are, however, no great stocks of large nuts, the supply being still moderate. Lignite briquettes for domestic use are selling more freely, and gas coke is in steady request.

*Coal Market in Upper Silesia.*—The favourable situation in this market still continues, the demand being strong enough to take over the whole output, and even more, so that deliveries are getting greatly in arrear. The output, moreover, cannot be increased, although the labour question is less acute for the time being. It is therefore impossible for the pits to lay up any stocks, desirable though such a course may be. Up to the present there has been no appreciable shortage of railway wagons, the authorities having profited by the experience of previous years. Exports to Russian Poland and Austria are very large, but not extensive enough to satisfy buyers in those countries. In spite of the less favourable condition of the iron industry, the demand for industrial coals does not seem to have been much affected, whilst that for house coal is naturally on the up grade, so that customers' requirements are difficult to satisfy. Gas coals show an improving tendency, and coking coals are nearly as active as before. There has been no unfavourable change in the coke market of late, although the output of pig iron has declined, and deliveries are still in arrear, smaller grades being also in improved request.

*Exports and Imports.*—Exports and imports of fuel in August were as follow:—

	Imports (August).		Exports (August).	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	993,597	85,413	2,721,635	3,073,666
Lignite .....	558,897	570,130	5,997	3,636
Coke .....	63,543	56,371	535,167	530,210
Coal briquettes ..	4,118	3,992	179,747	187,756
Lignite do. ....	8,124	8,840	64,366	57,798

Imports during the eight months ended with August were as follow:—Coal, 6,964,395 tons (+569,682 tons); lignite, 4,717,163 tons (−61,888 tons); coke, 409,956 tons (+20,611 tons); coal briquettes, 17,990 tons (−14,034 tons); lignite briquettes, 77,256 tons (−1,352 tons); and exports: coal, 22,473,309 tons (+1,918,654 tons); lignite, 40,415 tons (+5,308 tons); coke, 4,502,886 tons (+806,829 tons); coal briquettes, 1,583,167 tons (+165,216 tons); lignite, 554,573 tons (+195,577 tons). The imports of British coal in August fell from 875,130 tons to 771,974 tons, but the total for the eight months, 6,078,352 tons, is higher by 615,428 tons. Exports of coal in August increased to Holland, Austria-Hungary, European Russia, Belgium, Switzerland, Sweden and Spain.

Russia.

The importations of foreign coal which have now begun to arrive have created quite a *furor* in the Donetz coalfield. An event that has caused still greater surprise is the order by the Transcaucasian Railway, situated close to the B. toum region, of 2 million poods of American petroleum residue, of which it is proposed to take 15 million poods in all. During the first eight months of the present year 235,240,000 poods of British coal, valued at 26,142,000 roubles, were imported into Russia, as compared with 155,980,000 poods, valued at 15,466,000 roubles, in the corresponding period of 1912. In the same period 64,700,000 poods of German coal and coke have been imported, as compared with 53,360,000 poods. Prices in all the chief centres continue to rise.

At an enquiry instituted by the Local Government Board with a view to the adoption of a town-planning scheme for the districts of Dykehead and Shotts, it came out in evidence that there was a bright prospect of development of the coalfields locally in the immediate future. The Baton Colliery Company, it was stated, controlled four pits, and they had sufficient coal to last for 100 years at an output of 1,500 tons per day. They could employ from 200 to 300 additional men, but were unable to do so owing to the scarcity of houses. Shotts Iron Company were, on the other hand, sinking a new pit, and would probably require 200 men when it was in use. Then the Kepplehill Coal Company proposed opening two new pits at Blackhall, while a coal pit at Dykehead, called Brownrigg, was about to be opened by the Brownrigg Coal Company. In connection with several new pits which were being sunk by the Culnness Iron Company, branch railways were being laid down, and it was anticipated that the first would be opened in about a year, and would employ 500 men. Further, the Summerlee Company were opening a new pit at West Benhar, which would employ 500 men in the next few years.



## THE COAL AND IRON TRADES.

THURSDAY, OCTOBER 30.

Scotland.—Western District.  
COAL.

The position of the coal trade in the west of Scotland continues satisfactory, notwithstanding an easier tendency in some departments, owing to a scarcity of tonnage, and the general demand is well maintained. The best qualities of ell are booked up to the end of the month, although some second-hand lots can be purchased at prices a little below colliery rates. An active business is being done in the better qualities of splint coal, and collieries are provided with orders for this class well into November, but the ordinary qualities are much more plentiful. A heavy demand is still being experienced for navigations and best steams, and shippers are finding great difficulty in arranging for adequate supplies of the former. Among smalls, treble nuts are holding their position well, but doubles and singles are plentiful and somewhat easier. At Glasgow the shipments were 85,503 tons, Bowling 312, Greenock 611, Ardrossan 2,272, Troon 7,366, Irvine 959, and Ayr 12,088—total 109,111 tons, compared with 103,365 in the previous week, and 101,204 tons in the corresponding week of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/	13/
Splint .....	13/ to 15/6	13/ to 15/
Treble nuts .....	13/ to 13/9	13/9
Double do. ....	12/3 to 12/6	12/3 to 12/6
Single do. ....	11/	11/ to 11/6

## IRON.

There has been no improvement in the Glasgow pig iron warrant market during the week. The total turnover did not exceed 10,000 tons and, with little fluctuation, the closing price shows a drop on the week of 3½d. per ton, Cleveland iron being quoted 51s. 6d. per ton cash, 51s. 8d. one month, and 52s. 2d. three months. There are 83 furnaces in blast in Scotland, compared with 84 in the preceding week and 88 in the corresponding week of last year. The imports of pig iron into Grangemouth from Middlesbrough and district amounted to 8,050 tons. Stocks in Middlesbrough stores have decreased in the course of the week to the extent of 2,895 tons. The prices of Scotch makers' iron are practically unchanged. Monkland is quoted f.a.s. at Glasgow, No. 1, 67s., No. 3, 65s. 6d.; Govan, No. 1, 65s., No. 3, 63s. 6d.; Carnbroe, No. 1, 71s., No. 3, 67s.; Clyde, No. 1, 72s. 6d., No. 3, 67s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 73s., Nos. 3, 68s.; Glengarnock, at Ardrossan, No. 1, 73s., No. 3, 68s.; Eglinton, at Ardrossan or Troon, No. 1, 67s. 6d., No. 3, 66s. 6d.; Dalmellington, at Ayr, No. 1, 69s., No. 3, 67s.; Shotts at Leith, No. 1, 73s., No. 3, 68s.; Carron at Grangemouth, No. 1, 73s. 6d., No. 3, 68s. 6d. per ton. Scotch hematite is quoted 67s. per ton for delivery at west of Scotland steelworks. Business in the manufactured branches of the trade is still of a most unsatisfactory nature. The malleable iron trade continues in a depressed condition, despite the recent cut in prices, and prospects of an improvement are not bright in face of the keen foreign competition. Makers have been enabled to book a few more orders than would have been possible before the last reduction in prices, but these are on home account, and there is an entire absence of fresh business for export. Foreign hoops, strips and bars are still being imported for local consumption, and are offered at prices considerably below home rates. The Scottish malleable iron makers held a meeting in Glasgow this week to consider a further revision of their minimum prices, when it was decided to adhere to the present level of prices, which are based on £7 2s. 6d. per ton for Crown bars for Glasgow delivery. The present prices of Scotch iron bars are considerably below the English quotations for similar material. The price quoted in Lancashire is £7 15s., and in the north-east of England £7 10s. per ton, both less 2½ per cent. for delivery in the respective districts.

Scotland.—Eastern District.  
COAL.

The position of the coal trade in the Lothians district is very strong, all classes of coal being in active demand, with secondary steams and treble nuts in particularly good request. Shipments from the different ports are well up to the average. The clearances were at Grangemouth 47,220 tons, Granton 12,792, Leith 47,425, Bo'ness 14,166—total 113,925 tons, compared with 102,772 in the preceding week, and 116,050 tons in the corresponding week of last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/6 to 14/	13/ to 14/
Secondary qualities .....	12/ to 12/6	11/9 to 12/3
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/3 to 12/6	12/6 to 12/9
Single do. ....	11/ to 11/6	11/ to 11/3

ty in the Fife coal trade, and all s are very busy, and with the greatly relieved, are moving off

freely. Some East of Fife collieries are being heavily pressed for deliveries of round coal.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/9	17/
Unscreened do. ....	14/9 to 15/	15/
First-class steam coal .....	13/9 to 14/	13/9 to 14/3
Third-class do. ....	11/3 to 11/6	11/3 to 12/
Treble nuts .....	13/6 to 14/	13/9 to 14/3
Double do. ....	12/ to 12/6	12/3 to 12/9
Single do. ....	10/9 to 11/6	11/ to 11/3

The aggregate shipments from Scottish ports during the week amounted to 347,273 tons, compared with 330,072 in the preceding week, and 330,888 tons in the corresponding week of last year.

## Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

## COAL.

During last week 149,114 tons of coal and 2,468 tons of coke were despatched from Tyne Dock, an increase of 14,153 tons of coal and 1,786 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 53,422 tons of coal and 3,704 tons of coke, a decrease of 14,785 tons of coal and an increase of 3,121 tons of coke. The Blyth shipments aggregated 88,634 tons of coal and coke, a decrease of 224 tons. The forward market has been unusually quiet during the week. The Moscow-Windau Railways are enquiring for 60,000 tons of best or second-class Northumbrian steam coals for shipment over next season, and tenders have now been forwarded. The Swedish State Railways invite offers of 100,000 tons of Northumberland or Durham steam coals for January-March delivery. Russian merchants are again endeavouring to cover, in British markets, their commitments in respect of the Russian State Railways' contracts for coal for delivery at Baltic ports. It is stated that there is a strong movement in Russia to induce the Government to remove the tax on imported coal for industrial purposes as well as for railways. It is believed that, should this movement be successful, there would be a keen enquiry for large supplies of coal from the districts in which a fuel famine still prevails. Steam coal sales during the past week include the following:—6,000 tons D.C.B. smalls for delivery over next year at 7s. 3d. per ton f.o.b.; 15,000 tons similar for like delivery at 7s.; a quantity of Tyne prime smalls for November shipment at 8s. 11½d., sold by second-hand holders; from 25,000 to 30,000 tons of Hastings-Hartley coal for shipment to Alexandria next month, price not stated; and 15,000 tons of Broomhill smalls for 1914 shipment at 8s. 6d. It is reported also that a quantity of "any" Northumberland smalls has been sold by second-hand holders over next year at 6s. per ton f.o.b., including Tyne dues. The price, however, is incredibly low. Indeed, some consternation is expressed at the D.C.B. smalls changing owners at so low a price as 7s. f.o.b.—a bad augury for next year's prices. Prompt business is conspicuous by its absence. Supplies are much more plentiful, although loading turns are still awkward and prices are falling. F.o.b. quotations for prompt shipment are as follows, compared with those of a week ago:—Best steams (Blyths), are 3d. cheaper; Tynes, similarly fallen; seconds (Blyths), 3d. lower; Tynes, ditto; unscreened, 3d. to 6d. reduced; smalls (Blyths), 3d. cheaper; specials, 3d. to 6d. down; smithies, weaker; gas bests, 3d. down; seconds, 6d. decreased; specials, 3d. to 6d. fallen; unscreened bunkers (Durhams), 3d. down; Northumbrians, 6d. reduced; coking coal, easier; coke, foundry, 1s. to 1s. 6d. advanced; blastfurnace, 1s. increased, and gas coke, 3d. cheaper. Other descriptions of fuel are unaltered. It will be noted that foundry and blastfurnace cokes alone show any accession of strength.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	14/6 to 14/9	14/9 to 15/
Do. Tynes (Bowers, &c.) .....	15/	15/ to 15/3
Secondary, Blyths .....	12/6 to 12/9	12/6 to 13/
Do. Tynes (Hastings or West Hartleys) .....	12/6 to 13/	12/9 to 13/3
Unscreened .....	11/9 to 12/6	12/ to 13/
Small, Blyths .....	7/9	7/9 to 8/
Do. Tynes .....	6/6 to 6/9	6/6 to 6/9
Do. specials .....	8/6 to 9/	9/ to 9/3
Other sorts:—		
Smithies .....	13/6 to 14/	14/
Best gas coals (New Pelton or Holmside) ...	15/	15/3
Secondary gas coals (Pelaw Main or similar) .....	13/6	13/6 to 14/
Special gas coals .....	15/ to 15/3	15/6
Unscreened bunkers, Durhams .....	12/6 to 13/6	12/9 to 13/9
Do. do. Northumbrians .....	12/ to 12/6	12/ to 13/
Coking coals .....	13/ to 13/6	13/3 to 13/6
Do. smalls .....	13/	13/
House coals .....	15/6	15/6
Coke, foundry .....	20/ to 22/6	19/ to 21/
Do. blast-furnace .....	17/6 to 18/6	17/6
Do. gas .....	16/6 to 17/9	17/ to 18/

Sunderland.

## COAL.

The exports from Sunderland during the past week amounted to 94,430 tons of coal and 1,880 tons of coke, as compared with 107,865 tons of coal and 1,805 tons of coke for the corresponding period of 1912, being a decrease of 13,435 tons of coal and an increase of 75 tons of coke. The coal market presents no special feature. Steams for prompt loading are full; there is a moderate enquiry for November, but offerings appear to be ample, and buyers generally are in a waiting mood. Gas coals are heavily stemmed at round about previous values. Household coals are quiet. Coking sorts are easier. Bunkers are experiencing a quiet sale, and are the turn cheaper. Coke is steady, and in some instances at a slight advance in price for both foundry and gas descriptions. Tenders for the Windau Railways are

being sent in; 15,000 tons of steam coal is required. The Trondhjem Gasworks are reported to have contracted for 8,000 tons of best Durham gas for delivery over next year at 17s. 10½d. c.i.f. Current quotations are about as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/9
Secondary do. ....	13/6	14/
House coals:—		
Best house coals .....	15/9	17/6
Ordinary do. ....	15/3	16/6
Other sorts:—		
Lambton screened .....	15/9	15/9
South Hetton do. ....	15/6	15/6
Lambton unscreened .....	13/6	13/9
South Hetton do. ....	13/6	13/6
Do. treble nuts .....	16/3	16/6
Coking coals unscreened ..	13/3	13/
D. smalls .....	12/9	12/9
Smithies .....	15/9	15/6
Peas and nuts .....	16/6	18/
Best bunkers .....	14/	14/
Ordinary bunkers ..	13/6	13/9
Coke:—		
Foundry coke .....	20/	20/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	18/6	18/6
Gas coke .....	17/	17/6

The outward freight market has been fairly active, but with more tonnage offering the tone ruled easy for all directions. Recent fixtures include:—Coasting: London 3s. 3d., Hamburg 3s. 9d., Havre 4s. 9d., Bay: St. Nazaire 5s. 9d., Bordeaux 6s. Baltic: Königsberg 4s. 9d., Pillau 5s., Stockholm 5s. 3d. Mediterranean: Genoa 9s., Algiers 7s. 9d., Marseilles 9s. 3d., Piræus 9s. 3d., Nice 9s., Civita Vecchia 10s. 3d., Constantinople 11s. 6d., Alexandria 9s. 3d., Port Said 9s., Odessa 9s. 9d., Las Palmas 8s. 9d.

Middlesbrough-on-Teess.

## COAL.

The fuel market keeps steady and firm. Producers of best qualities of coal have no anxiety as to the current position. There is a continued good and growing demand for good gas coal, and trade in this section seems assured over the year. Best Durham gas coal is 15s. 3d. to 15s. 6d.; seconds, 13s. 9d. to 14s. 3d.; and special sorts up to 16s. The fairly heavy demand for bunker coal is met by a very ample supply, and ordinary Durham bunkers range from 12s. 9d. to 13s. f.o.b., whilst superior kinds are 14s. to 14s. 3d., and specials 15s. to 15s. 3d. Household coal is rather quiet at 15s. 6d. to 15s. 9d. Coking coal is in good request. Unscreened kinds are 13s. 3d., and smalls 13s. Supply of coke for local use is inadequate, with the result that high rates are realised for blastfurnace kinds. Nothing below 18s. 6d. is named for medium furnace quality delivered at Teesside works, and parcels have sold readily at that figure whilst for superior sorts up to as much as 20s. is asked. Foundry coke for shipment is in the neighbourhood of 21s. f.o.b., and gashouse coke is 17s. 9d. to 18s.

## IRON.

Business in pig iron is still on the quiet side, but there is rather more doing in Cleveland kinds. There are renewed persistent rumours of sales of Cleveland pig to the United States, and it is said that a steamer has been fixed at 7s. 6d. to take a 4,000 tons cargo of Cleveland pig to America, but reliable confirmation of such reports is not forthcoming. There have been enquiries in this market on American account, due doubtless to the removal of the tax on iron imported to the States. No. 3 g.m.b. Cleveland pig is on sale at 52s. 6d. f.o.b., and some business has been done at that price, though there are buyers who are not prepared to pay more than 52s. 3d. No. 1 is 55s., No. 4 foundry 52s., No. 4 forge 51s. 9d., and mottled and white iron each 51s. 6d. All the foregoing quotations are for early delivery. East coast hematite pig is selling only very moderately, the concessions that producers are prepared to make failing to tempt forward customers. Nos. 1, 2, and 3 are offered by both makers and merchants at 64s. 3d. for either early or forward delivery, and it is understood that buying is possible at 64s. Foreign ore sellers still quote on the basis of 19s. ex-ship Tees for rubio of 50 per cent. quality, and some business has been done in best rubio at that figure, though consumers consider such terms about a shilling too high. Freights Bilbao-Middlesbrough stand at 4s. 10½d. The manufactured iron and steel industries are quiet, but a lot of work is being turned out. There are a few orders in the market for railway material, and hopes are entertained that part of contracts to be given out shortly for Norway and for Siam will come to this district. Messrs. Bolckow, Vaughan and Company have divided with the Australian Lithgow Works an order for 27,000 tons of rails for the Victorian Government. Quotations for iron and steel plates and angles, and for steel bars have again been reduced. Prices of these descriptions now stand:—Iron ship plates, £6 15s.; iron ship angles, £7 10s.; steel ship plates, £6 15s.; steel ship angles, £6 7s. 6d.; steel boiler plates, £7 15s.; and steel bars, £6 15s.—all less the usual discount.

## South-West Lancashire.

## COAL.

The quietness that has been prevalent more or less all the month in the household demand still continues, and the trade is waiting for more suitable weather. Forges are not taking full supplies of round coal, and at many places short time and single turn are being worked. With regard to shipping, there is little change to report. Bunkering fuel is in no great demand, requirements under contract being, for various reasons, under the average, and there is comparatively little to compensate for this in the way of outside business. Supplies are more than adequate, and under the circumstances the market is naturally somewhat flat, though quotations nominally are about the same as last reported—viz., 13s. to 13s. 3d. f.o.b. for ordinary screened Lancashire steam coals, and up to 14s. f.o.b. for the best descriptions. Best coals are as much as ever in demand for the coastwise and cross-Channel household trade, but other shipments are at the moment on the quiet side. There is little that is fresh to say with regard to slack. The demand



increases slowly, and is likely to do so as the weather gets colder and the days shorten, and in the meantime the little excess that there is here and there is being put upon the floor.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/	17/
Do. (f.o.b. Garston, net) .....	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/ to 14/	13/ to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

### South Lancashire and Cheshire.

#### COAL.

There was a good attendance on the Manchester Coal Exchange on Tuesday, but there was no evidence of any improvement in the house coal trade. The demand for furnace coal is somewhat easier, but prices are unchanged. There is a fairly good demand for shipping coal, with steady prices. The enquiry for slack is good, with plentiful supplies offering. Prices generally are as at foot.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 14/	13/3 to 14/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

#### IRON.

The attendance on 'Change at Manchester on Tuesday last was fairly good, but there is nothing fresh to report as regards trade in this district. Pig iron remains unchanged. Forges are moderately employed with crown bars at £7 15s., second quality 10s. less, hoops £8 7s. 6d. Steelworks are asking £7 to £7 5s. less 2½ per cent. for bars, according to specification, and £5 5s. net for billets, and are fairly busy. Wagon works are fairly busy, also textile machinists. Foundries could do with more orders.

### Yorkshire and Derbyshire.

#### Leeds.

#### COAL.

The Yorkshire Coal Exchange was exceptionally well attended on Tuesday, and business in most departments was satisfactory. The bulk of the enquiries circulating concerned screened steam coal for export to Russia, and one or two substantial orders are said to have been placed. Although the attendance of local merchants was fairly good, business in house coal was on the quiet side. The pits have managed to work about full time this week, and there have been numerous complaints as to the scarcity of empty wagons. After the ordinary business of the market, a formal meeting of the members of the Exchange was held, at which it was decided to incorporate the Yorkshire Coal Exchange as a limited liability concern.

**House Coal.**—The demand from London has been quiet all this week, the warmer weather having checked the consumption. Reports of the retail trade are disappointing. In spite of this, however, prices are firmly held, and the very best qualities continue scarce. Good shipments are being made for the coastwise depots, and secondary qualities for this business are firmer on the week. Freight show very little variation on the week, small steamers averaging 3s. 9d. per ton from Hull to London, and about 4s. 3d. Goole to London. Small sailing boats under 200 tons are on offer at about 5s. per ton from Goole to London. In the West Riding markets the retail trade is quiet. There are no alterations in official pit prices. Current quotation:—Haigh Moor selected, 18s. 6d. to 19s. 6d.; Wallsend and London best, 17s. 6d. to 18s. 6d.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other qualities 14s. to 15s. 6d.

	Current prices.	Last week's prices.
House coal:—		
Prices at pit (London):		
Haigh Moor selected ..	15/ to 16/	15/ to 16/
Wallsend & London best ..	14/ to 14/6	14/ to 14/6
Silkstone best .....	14/ to 14/6	14/ to 14/6
Do. house .....	12/6 to 13/6	12/6 to 13/6
House nuts .....	11/6 to 12/9	11/ to 12/9
Prices f.o.b. Hull:		
Haigh Moor best .....	17/6 to 18/6	17/6 to 18/6
Silkstone best .....	16/6 to 17/6	16/6 to 17/6
Do. house .....	15/ to 16/	15/ to 16/
Other qualities .....	14/6 to 15/	14/6 to 15/
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/9	12/ to 12/9
Gas nuts .....	11/3 to 12/3	11/ to 12/
Unscreened gas coal ..	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	10/6 to 11/6	10/9 to 11/6
Large double-screened engine nuts .....	9/9 to 10/6	9/9 to 10/6
Small nuts .....	9/3 to 9/9	9/3 to 9/9
Rough unscreened engine coal .....	9/9 to 10/3	9/9 to 10/3
Best rough slacks .....	7/9 to 8/3	7/9 to 8/6
Small do. ....	6/ to 7/	6/ to 7/
Coking smalls .....	6/6 to 7/	6/6 to 7/
Coke:—		
Price at ovens:		
Furnace coke .....	12/	12/

**Gas Coal.**—Contract requirements are so heavy at the present time that there is scarcely any free coal on the market. Where spot lots are available prices are a shade higher than recent contract rates. Stocks of gas coal at the collieries are practically nil, and reserves in the hands of consumers are none too large in view of the winter months. There are still considerable enquiries circulating for prompt supplies of screened and unscreened coal for export.

**Manufacturing Fuel.**—Slacks are again lower in price, and many of the collieries have a fair number of loaded wagons on hand. The demand from Lancashire is a shade better, but only moderate supplies are being taken in the Bradford and Huddersfield districts.

**Washed Furnace Coke.**—There is very little alteration in this market. The output is much below the average, and ordinary samples of washed furnace coke realise about 12s. per ton at the ovens. One or two contracts are reported for delivery to the end of the year at about this figure, and up to 12s. 6d. for special brands.

#### Hull.

#### COAL.

With the Baltic season in its last stages, and with a plenitude of coal on offer prices for the Best South Yorkshire hards have receded considerably in value, and have been bought freely at 15s. 3d. for prompt f.o.b. shipment at Hull, thus recording a fall of fully sixpence on the week. Derbyshire and Nottingham steams, however, maintain their value, and at 15s. to 15s. 3d. at Grimsby or Immingham nearly approximate to best South Yorkshires at Hull. Secondary sorts are slightly lower in sympathy, but other kinds are practically unchanged, although the demand is of only moderate dimensions. The shipping season is only now beginning to show signs of its approaching close. Shipments to Cronstadt have about finished, but a good deal of coal is being sent to the lower Baltic ports. This and shipments to the Mediterranean and South America help to keep the appliances pretty busy. Loading conditions are good, but tonnage is scarce, and this is reflected in the slight rally there has been in the freight market. Rates are about the same as a week ago, though very few steamers have been booked. The open Baltic ports are quoted at 5s. to 5s. 4½d., while in the Mediterranean direction rates are on the basis of 9s. Alexandria, at which figure a 4,800 ton steamer has been chartered. Black Sea rates are nominally at 9s. 9d. Odessa, but no business is reported. The following are the approximate prices for prompt shipment f.o.b. Hull, etc.

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	15/3	15/9
Washed double-screened nuts .....	13/6 to 13/9	13/9
Unwashed double-screened nuts .....	12/9 to 13/	12/9 to 13/
Washed single-screened nuts .....	13/ to 13/3	13/ to 13/3
Unwashed single-screened nuts .....	12/6	12/6
Washed smalls .....	10/3 to 10/9	10/6 to 10/9
Unwashed smalls .....	9/3 to 9/6	9/3 to 9/6
West Yorkshire:—		
Hartleys .....	14/3	14/3
Rough slack .....	9/ to 9/3	9/ to 9/6
Pea slack .....	8/3 to 8/6	8/3 to 8/6
Best Silkstone screened gas coal .....	14/3	14/3
Best Silkstone unscreened gas coal .....	12/ to 12/3	12/ to 12/3
Derbyshire:—		
Best steam hards (Hull) ..	15/6	15/6
Do. (Grimsby) ..	15/ to 15/3	15/ to 15/3
Derbyshire nuts (doubles) ..	13/	13/
Derbyshire nuts (doubles) (Grimsby) ..	12/9	12/9
Derbyshire large nuts ..	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby) ..	14/	14/
Nottinghamshire hards ..	15/6	15/6
Do. do. (Grimsby) ..	15/ to 15/3	15/ to 15/3

#### Barnsley.

#### COAL.

A quieter tone prevails in the trade this week, chiefly on foreign account. The rush for supplies on account of the Baltic ports is not so apparent, and though the requirements of buyers have not been fully satisfied, there is a feeling that the lull is only a means to bring down values. The production of the district is no doubt very extensive, and the slacker state of affairs will be quickly felt when the market is submitted to the test. The holding off on next year's contract accounts is creating a little apprehension, though there are enquiries circulating in regard to the railway companies' supplies during the coming year. However, nothing of a definite character has yet been done, though it is understood the question of price has received the consideration of the colliery owners. For the present, large steams are a little easier, though the best sorts are most largely taken for local purposes. Prices are about 3d. per ton less on the week, and secondary sorts are on offer at a large reduction. There is also a little weakness in regard in nuts, which have hitherto remained fairly firm. The demand, however, is hardly what it was, though stocks at the collieries are not very considerable. The enquiry for all kinds of small steam fuel is again on the quieter side, and slacks particularly are causing trouble to sellers. The demand for the cotton and West Riding districts is hardly so robust, whilst the consumption for coke-making is materially reduced. Best slacks are being given the preference with prices falling, and with the pits keeping at full work, the stocks on hand are becoming considerable. The enquiry for gas coal is hardly so strong, though the output is almost entirely taken on contract account, but spot lots are most freely met with, and prices are a little weaker. The house coal branch of the trade continues to be hardly so brisk, and the orders are being supplied with more promptness at the pits. Though there are stocks, these are not considerable, and values are fairly well maintained, though secondary sorts are rather more competitive. The position in regard to coke continues to be about the same. The reduced output meets the require-

ments of the markets, and most enquiry is received from the Middlesbrough district. Prices are, however, still weak, and forward business is of little account.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone .....	16/	16/
Best Barnsley softs .....	15/3 to 15/6	15/3 to 15/6
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	13/ to 13/3	13/ to 13/3
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/6	12/6 to 12/9
Secondary do. ....	11/6	11/6 to 11/9
Best washed nuts .....	11/6	11/6 to 11/9
Secondary do. ....	10/6	10/3 to 10/9
Best slack .....	7/6 to 7/9	7/9 to 8/
Rough do. ....	6/6	6/6 to 7/
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/ to 12/	11/ to 12/
Gas nuts .....	12/ to 12/3	12/ to 12/6
Furnace coke .....	12/	12/ to 12/6

#### Chesterfield.

#### COAL.

Dulness pervades the house coal market at present, for which the mild weather is accountable. Stocks, however, are at a low point and only a return of cold weather is now needed to bring about a sharp revival in this branch of the trade. Pits continue to work full time and the prospects for the winter are good. There is no falling-off in the demand for fuel for manufacturing purposes, and the deliveries of cobbles and nuts for the large steelworks of Sheffield and district are still on a large scale. Slack for boiler-firing—apart from the best brands—is in quieter demand and prices are slightly weaker. The long drawn-out strike of the Sheffield moulders is responsible to some extent for the lessened demand for this fuel. Spot lots of secondary qualities of slack are freely offered and buyers are able to pick up cheap lots at the moment. It is expected that the position will materially improve between now and Christmas. The demand for steam coal for locomotive use is good and the condition of the market in respect of this class of coal is strong. The export market is in a satisfactory position, which, in a measure, is due to the enormous demand for steam coal for the Russian railways. Shipments on account of these purchases are proceeding vigorously and they will continue on a large scale to the end of the year—probably longer. Prices for the best brands of Derbyshire Top Hards are firm at 15s. 3d. per ton delivered alongside steamer at Grimsby. Supplies are not, however, by any means plentiful, the bulk of the total output of the district being already disposed of on contract account. There is a better demand for nuts for export, and the price is fully 3d. more than it was a week or two ago. Cobbles continue to be wanted for near Continental ports and a good tonnage is going forward. Washed fuel is in steady demand and prices remain firm. There is not much, if any, change in the coke market, which, however, cannot be said to be any weaker than it was at the beginning of the month. Indeed, in some quarters it is noticeable that coke is not quite so readily obtained as it has been now for some little time. No real improvement can be looked for until pig iron is in greater demand than it is at present. Coking fuel is more plentiful and prices are weak.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	9/	9/

#### IRON.

Depression still characterises all branches of the iron trade. Buyers show no inclination to enter into engagements for forward delivery, and they still prefer to buy only sufficient to meet their immediate requirements. Engineers and wagon builders are fairly well employed.

### Nottingham.

#### COAL.

The tone of the coal trade in Nottinghamshire has manifested an improvement during the past week, a brief spell of colder weather having undoubtedly tended to improve business. This has been perhaps more noticeable in the house coal branch, those householders who purchase for immediate requirements having had to increase their orders. Consequently sales at the local landsale depots have made a better showing, whilst merchants are having more enquiries. Most of the collieries are working full time, and with stocks being on a moderate scale, values are in the main keeping firm, though slight reductions are in a few cases being made for certain qualities which are in slow request. Coming to the steam coal section, the demand for exports is not quite as active, but the general position is fairly satisfactory. Fuel for manufacturing purposes is going out of hand moderately well, and the railway companies are drawing freely on contract account. With regard to the slack market, there is no particular activity. Best qualities are in fair request, but secondary sorts are moving slowly. A satisfactory tone pervades the gas fuel branch, but coke is having a rather quiet sale.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	14/ to 14/6	14/ to 14/6
Good house coals .....	13/ to 14/	13/ to 14/
Secondary do. ....	11/6 to 12/	11/6 to 12/6
Best hard coals .....	11/9 to 12/3	11/9 to 12/3
Secondary do. ....	10/8 to 11/6	10/8 to 11/6
Slacks (best hards) .....	8/3 to 8/9	8/3 to 8/9
Do. (seconds) .....	7/ to 7/6	7/ to 7/6
Do. (soft) .....	7/3 to 8/	7/3 to 8/



**Leicestershire.**  
**COAL.**

The state of business in the past week has shown but little variation. If anything, there has been less business done on the whole. Owing to the continuance of mild, open weather, merchants are relying on stocks, as consumers are doing the same thing. In household coals there is a very quiet business, the best qualities are in very small request, the principal business in these is in the middle qualities. Small household coals are in fair enquiry. The demand for steam coals and cobbles is very well upheld, and there is a fair enquiry for nut slacks. The quieter demand has generally curtailed the output somewhat, and, on the whole, there is more stock on hand than there has been lately. Local merchants are experiencing a very quiet time, and what they are doing is mainly in steam coal. Quotations are generally firm, but there is, here and there, a little easiness, but in the main, there is not any notable alteration. Colder weather would be welcomed and at once give much activity.

**South Staffordshire, North Worcestershire and Warwickshire.****Hednesford.****COAL.**

The condition of the coal trade throughout the Cannock Chase district is on the whole satisfactory, and now that the local "wakes" are over it is hoped that the men will settle down to regular work again. Orders for most qualities of coal are fairly plentiful, and there is not very much coal in stock at the collieries. Prices are about the same as when last reported. The house coal trade considering the mildness of the weather is fairly satisfactory, and there is a good demand for coal for manufacturing purposes. The supply of fine slack has unfortunately overtaken the demand, and there is some difficulty in disposing of it.

**Birmingham.****COAL.**

Business is still on the quiet side, but the collieries are, with few exceptions, making full time. There is a free supply of smalls and slacks. Prices are unaltered as follow:—

**Prices at pit.**

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/6
Do. seconds deep .....	16/	16/
Do. best shallow .....	14/9	14/9
Do. seconds do. ....	14/	14/
Best hard .....	15/	15/
Forge coal.....	11/	11/
Slack .....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked .....		
cobs .....	14/	14/
Best hard spires .....	15/	15/
Forge (steam) .....	11/	11/
D.S. nuts (steam) .....	10/	10/
Small (do.) .....	8/3	8/3

**IRON.**

The market remains lifeless in practically all branches. While current business amounts to a fair aggregate, it is insufficient to employ productive capacity, and in these circumstances there is very keen competition for orders, very low prices being accepted where there is special pressure to sell. Apart from the fall in steel just announced, there is no quotable change in values, though there is a good deal of shading by producers. Pig iron smelters are prevented from making any further all-round concessions by the high cost of production. Orders are only for immediate requirements, and there is consequently considerable irregularity of rates, more especially in regard to the commoner grades of forge iron. South Staffordshire makers do business down to 50s. for low-grade material. Northamptonshire prices range from about this level up to 53s. Derbyshire is quoted 53s. to 54s. The higher-grade irons keep a relatively favourable position in the market; South Staffordshire all-mine has settled on the basis of 85s. to 90s. for forge qualities, and 92s. 6d. for foundry, the latter being in good request. Cold blast remains at 125s. Makers of marked bars and good quality merchant bars are fairly well off for business, though orders are only being given out now on the hand-to-mouth principle. Marked bars are £9, and merchant bars about £7 5s. delivered Birmingham. Some houses stand out for £7 7s. 6d., and on the other hand business can be done as low as £7 2s. 6d. delivered by boat. Common fencing and hurdle bars have been sold to a large tonnage at £6 15s. North Staffordshire crown bars have dropped 5s., following the reduction in Lancashire. The situation in regard to sheets remains unchanged. Black sheets are weak at £8 per ton for hard qualities of 24-gauge for galvanising. Merchant sorts, which have to be annealed, sell at £8 2s. 6d. to £8 5s. for singles delivered in the district. There is hardly any perceptible slackening in the demand for galvanised sheets, and it is only the enormous output which keeps the quotations down to £10 15s. to £11 f.o.b. Liverpool. Despite the fact that very little new business has been moving in steel for some time past, makers in the district have something like four months' work in hand, and would have been content to leave prices alone. The exigencies of the Scottish trade made this impossible, however, and quotations have now been brought into line by a 10s. reduction on plates, angles, and tees, and 5s. on large sizes of rounds and squares. There are no indications that business will be materially stimulated by this latest move.

**Forest of Dean.****Lydney.****COAL.**

The state of business in the past week has shown but little variation. If anything, there has been less business done on the whole. Owing to the continuance of mild, open weather, merchants are relying on stocks, as consumers are doing the same thing. In household coals there is a very quiet business, the best qualities are in very small request, the principal business in these is in the middle qualities. Small household coals are in fair enquiry. The demand for steam coals and cobbles is very well upheld, and there is a fair enquiry for nut slacks. The quieter demand has generally curtailed the output somewhat, and, on the whole, there is more stock on hand than there has been lately. Local merchants are experiencing a very quiet time, and what they are doing is mainly in steam coal. Quotations are generally firm, but there is, here and there, a little easiness, but in the main, there is not any notable alteration. Colder weather would be welcomed and at once give much activity.

our last issue and many of the pits are idle a couple of days in the week. Stocks are more than they should be for the season of the year. Slacks are difficult to place and the price will probably be reduced next week.

**Prices at pithead.**

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	17/6
Forest .....	16/6	16/6
Rubble .....	16/9	16/9
Nuts .....	15/	15/
Rough slack .....	7/6	7/6
Steam coal:—		
Large .....	12/ to 13/	12/ to 13/
Small .....	8/ to 9/	8/ to 9/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

**THE WELSH COAL AND IRON TRADES.**

THURSDAY, OCTOBER 30.

**North Wales.****Wrexham.****COAL.**

During the past week trade has visibly increased in this district. The majority of the collieries have been able to work full time, and the output has been sent away at fairly good prices. The orders for house coal, steam coal, and gas fuel have been fairly numerous, and prices have been maintained. There has been no appreciable change in the figures ruling in the open market, and no large new contracts have been fixed up.

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal .....	15/ to 16/	15/ to 16/
Secondary do. ....	14/ to 15/	14/ to 15/
Steam coal .....	12/6 to 13/	12/6 to 13/
Gas coal .....	13/ to 13/9	13/ to 13/9
Bunkers.....	12/ to 12/6	12/ to 12/6
Nuts .....	11/ to 11/9	11/ to 11/9
Slack .....	6/ to 7/3	6/ to 7/3
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 18/4	17/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

**Monmouthshire, South Wales, &c.****Newport.****COAL.**

Shipments of coal for some days now have been heavier than usual, aided by a better supply of tonnage, while the remainder of the week will probably see the increased rate of exports maintained. There is not a great enquiry for November shipment, but the French State Railways are asking for Newport coal for delivery over next year from January, which tenders will be made known about December 1. There are also large enquiries from South America, where both the Cordoba Central Railways and the Buenos Ayres Great Southern Railways will be requiring supplies of semi-bituminous locomotive coals. Colliery salesmen just now are quoting firmly rates recently presented, but, despite the foregoing enquiries, the general disposition of the market leaves much to be desired from a colliery point of view. There has been no marked change in market records, the most noticeable alteration being a slight advance in the value of pitwood, for which 21s. 6d. ex ship is being asked for good French fir. The outward freight market rules slack just now, plenty of tonnage on offer, but stems difficult to arrange. Rates generally are easier. Latest approximate ruling quotations are as follow:—

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	16/9 to 17/3	16/9 to 17/3
Western-valleys, ordinary	15/6 to 16/	15/6 to 15/9
Best Eastern-valleys .....	15/3 to 15/6	15/3 to 15/6
Secondary do. ....	15/ to 15/3	15/ to 15/3
Best small coals .....	8/ to 8/3	8/ to 8/3
Secondary do. ....	7/3 to 7/9	7/3 to 7/6
Inferior do. ....	6/9 to 7/	6/9 to 7/
Screenings .....	8/3	8/3
Through coals .....	11/6 to 11/9	11/6 to 11/9
Best washed nuts .....	13/ to 13/3	13/ to 13/3
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/ to 20/	19/ to 20/
Furnace coke .....	19/ to 20/	19/ to 20/
Foundry coke .....	23/ to 25/	23/ to 25/

**IRON.**

There is no improvement to report in the local conditions of the iron and steel trades since last week. The tone generally continues weak and only a small hand-to-mouth business is passing. Values generally are inclined to sag and any orders coming along cause keen competition to secure them. Arrivals of tinplate bars from abroad are again exceedingly heavy and quotations for these continue unchanged, with a very poor enquiry for the home article. Comparatively, the rail department continues satisfactory, makers are fairly well booked, and specifications are coming along in a satisfactory manner. The pig iron market is somewhat depressed, a very limited enquiry existing. Furnaces report an average output and quotations remain nominally unaltered. The tin-plate trade is lamentably weak and a few orders that have been secured this week are at prices a good deal below the official figures. Very little hope is entertained of any early improvement here. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tin-plate bars: Bessemer steel, £4 15s., Siemens steel, £4 16s. 3d. to £4 17s. 6d. Tin-plates: Bessemer primes, 20 × 14 × 112, 13s., Siemens primes, 20 × 14 × 112, 13s. to 13s. 1½d. Finished black plate, £9 10s. to £9 15s. Pig iron: Welsh hematite, 70s. to 71s., delivered locally. Iron ore: Best rubio, 18s. 6d. to 19s., c.i.f. Newport.

**Cardiff.****COAL.**

The general complaint of colliery people just now is the reduction of output, which in a large number of cases is at least 10 per cent. less than during the corresponding months of previous years. There are many reasons to account for this, not the least being the numerous stoppages which have taken place on the question of non-unionism. Of course so long as the output is barely sufficient to meet the requirements of shippers, as has lately been the case, no easiness of prices can be expected. Another factor which has had a hardening effect on the market is the unusual demand on the part of the British Admiralty, who have not only taken almost every ton of coal it has been possible for the collieries to supply, but have been engaging steamers freely to load for Malta and Gibraltar, so that altogether it is probable they will relieve the market of some 40,000 or 50,000 tons of the better class of coals. Judging from the heavy charterings that have lately taken place, the pressure is likely to continue for some time to come. Last week no less than 464,000 tons were taken up, which is a record with the exception of the first week in the year. Owing to this increased demand for coal coming on the top of a reduced output, prices, especially of best Admiralty coals, are decidedly firmer. As much as 20s. 3d. is asked and obtained for best qualities, and even at this figure the quantity available for disposal is very limited. Superior second Admiralties are 19s. 3d. to 19s. 6d., and ordinary qualities 17s. 9d. to 18s. Within the next week or two it is probable that the Admiralty will be in the market for their next year's requirements, which, taking last year as a guide, will amount to a very large quantity. Sellers' ideas of prices for 1914 are in no particular modified, but they are practically what they were a couple of months ago. In fact, so far as best Admiralties are concerned, they are, if anything, firmer, and there is no question that considerably enhanced prices, as compared with this year's contracts, will have to be paid. As pointed out on many previous occasions, the market for best Welsh steam coals is a peculiar preserve, and the British and other Governments, as well as a number of steamship companies, who require best coals for their war vessels and crack liners, seem to be prepared to pay the price. Some buyers are still holding off, especially those who come under the term "middlemen." Some large railway contracts have been placed during the last few days. Amongst the orders fixed up are those of the Central Argentine Railways for 420,000 tons for delivery over next year. Of this quantity the Standard or Ynyshir take 140,000 tons, Lewis, Merthyr Consolidated 120,000 tons, Insole's Cymmer 100,000 tons, and the Albion 60,000 tons. The prices at which the contract has been placed, are to a certain extent, a matter of conjecture, but our correspondent has reason for stating that the collieries are perfectly satisfied with them. Exchange rumours put the figures at from 17s. 3d. to 17s. 9d. f.o.b. net. It is reported that the Buenos Ayres and Great Southern Railways contract for 340,000 tons of Monmouthshire large steam coals has been secured by one of the Black Vein collieries at about 16s. f.o.b. net. The small coal market continues in a very lethargic state, but owing to the diminished output rather higher prices are obtainable. Best bunkerings are 10s. 6d. to 10s. 9d., cargo qualities 7s. 3d. to 7s. 6d. per ton. The French State Railways contract has been given out. Originally this enquiry was for 380,000 tons for delivery over next year, but as far as can be ascertained, only 320,500 tons have been purchased. The price at which the bulk of the business has been done is from 18 to 18½ francs delivered at North French and Bay Ports. After allowing for freight, French import tax, &c., this is equivalent to about 8s. 3d. to 8s. 6d. per ton f.o.b. The allotments reported are:—Messrs. Tabb and Burletson (Newcastle) represented at Cardiff by Messrs. John Powell and Co., 90,000 tons; Messrs. Pyman, Watson and Co., 70,000 tons; Messrs. Moxey, Savon and Co., 50,000 tons; Messrs. C. L. Clay and Co., 50,000 tons; Messrs. Morgan, Wakley and Co., 30,000 tons; Messrs. Watts, Watts and Co., 18,000 tons; and Mr. Charles le Borgne, 12,500 tons. The Midi Railway Company have arranged with Messrs. J. E. Thomas Limited, and Messrs. Franklin Thomas and Co., for the supply of about 60,000 tons of inferior cargo smalls for delivery over next year at from 16/85 to 16/90 francs delivered at Bordeaux. Tenders have also been sent in for 80,000 tons of small coal for the Belgian State Railways for delivery over next year. In consequence of the increase in tonnage supplies and the scarcity of Admiralty coals, there is a slight improvement in the prices of Monmouthshire coals. Black Veins are 16s. 9d. to 17s. 3d., Western Valleys 15s. 9d. to 16s., and best Eastern Valleys 15s. 6d. f.o.b. Cardiff. According to the Custom House returns, the exports of coal from the Bristol Channel to foreign countries for the nine months ended September, amounted to 22,349,338 tons being an increase of 4,117,734 tons as compared with the corresponding period of last year. The following table shows the total exports to the principal foreign countries as well as the increase or decrease as compared with the nine months of last year:—

	Total	Nine months.	Increase.	Decrease.
	1913.			
	Tons.	Tons.	Tons.	
Russia .....	487,531	110,791	...	—
Sweden .....	175,570	12,443	...	—
Norway .....	76,052	—	...	11,728
Denmark .....	29,439	1,878	...	—
Germany .....	236,108	56,862	...	—
Netherlands .....	92,871	—	...	10,773
Java .....	20,411	—	...	7,820
Dutch possessions in				
Indian Seas.....	12,448	2,538	...	—
Belgium .....	369,464	154,735	...	—
France .....	5,485,142	1,454,560	...	—
Algeria .....	567,198	200,623	...	—
French Somaliland...	43,696	24,934	...	—
Madagascar.....	10,651	—	...	4,700
Portugal .....	613,083	165,404	...	—
Azores .....	12,392	—	...	7,785
Madeira .....	101,373	7,238	...	—
Spain .....	975,545	233,504	...	—
Canary Islands .....	535,456	48,955	...	—
Italy .....	4,063,604	458,512	...	—
Italian East Africa	5,301	—	...	20,811
Austria-Hungary ...	247,725	135,094	...	—
Greece .....	263,711	65,397	...	—
Bulgaria .....	—	—	...	16,251



	Total Nine months Tons.	Increase. Tons.	Decrease. Tons.
Romania .....	120,321	—	11,534
Turkey (European) .....	72,328	—	16,416
" (Asiatic) .....	76,456	—	29,189
Egypt .....	1,439,880	182,875	—
Tripoli .....	3,010	—	9,141
Tunis .....	126,452	33,395	—
China (exclusive of Hong Kong) .....	25,579	12,617	—
Japan .....	314	—	15,207
Cuba .....	9,167	2,850	—
Mexico .....	19,068	93	—
Peru .....	8,697	—	11,317
Chile .....	356,339	—	45,974
Brazil .....	1,246,978	293,343	—
Uruguay .....	484,721	—	41,123
Argentine Republic .....	2,355,206	452,215	—
Channel Islands .....	45,341	—	10,328
Gibraltar .....	164,600	—	9,100
Malta .....	412,344	207,257	—
Cape of Good Hope .....	31,045	17,378	—
Mauritius .....	27,078	9,597	—
Aden .....	127,678	—	21,603
British India .....	81,666	26,933	—
Straits Settlements .....	18,011	5,233	—
Ceylon .....	168,005	—	14,552
Wei-hai-Wei .....	6,909	819	—
Hong Kong .....	39,239	16,026	—
Newfoundland .....	14,548	2,834	—
Bahamas .....	5,130	1,084	—
British West Indies .....	6,660	—	366
Falkland Islands .....	11,140	9,248	—
West Africa: French .....	127,553	52,585	—
" Portuguese .....	177,591	—	40,365
" British .....	79,296	20,927	—

There is no material change in Rhondda bituminous coals, No. 3 large being still 17s., and No. 2 ditto 12s. 9d. to 13s. House coals are the same as last reported—namely, 17s. 6d. to 20s. 6d. Shipments of patent fuel for the week were very heavy, amounting to 37,968 tons. Of this quantity, the Crown Company shipped 12,070 tons, and other local makers 9,558 tons, Swansea 9,990 tons, and Newport 6,350 tons. Best brands for prompt shipment are still quoted at 22s. 6d.; for delivery over next year, 19s. With the diminishing trade in metals, there is very little demand for coke, and special foundry does not command more than 28s. Furnace coke is 20s. to 21s. Pitwood is rather better, being 21s. 6d. per ton.

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	20/ to 20/3	19/9 to 20/3
Superior seconds .....	19/3 to 19/6	19/ to 19/3
Ordinary do. ....	17/9 to 18/	17/6 to 17/9
Best bunker smalls .....	10/6 to 10/9	10/6
Best ordinaries .....	10/ to 10/3	10/
Cargo qualities .....	7/3 to 7/6	7/ to 7/6
Inferior smalls .....	6/6 to 7/	6/ to 6/6
Best dry coals .....	18/3 to 18/9	18/3 to 18/6
Ordinary dries .....	15/9 to 16/3	15/6 to 16/
Best washed nuts .....	16/	16/
Seconds .....	15/	15/
Best washed peas .....	14/ to 14/6	14/
Seconds .....	13/ to 13/3	13/
Dock screenings .....	11/9 to 12/	11/9
Monmouthshire—		
Black Veins .....	16/9 to 17/3	16/9 to 17/
Western valleys .....	15/9 to 16/3	16/3 to 16/6
Eastern valleys .....	15/6	15/9 to 16/
Inferior do. ....	14/9	15/ to 15/3
Bituminous coals:—		
Best house coals (at pit) .....	20/6	20/6
Second qualities (at pit) .....	17/6 to 18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/	17/
Through-and-through .....	14/6 to 15/	15/
Small .....	12/ to 12/6	12/ to 12/6
No. 2 Rhondda—		
Large .....	12/9 to 13/	13/
Through-and-through .....	10/9 to 11/	10/6 to 11/
Small .....	8/ to 8/6	8/
Best patent fuel .....	22/6	22/6 to 23/
Seconds .....	20/ to 21/6	20/ to 21/6
Special foundry coke .....	28/	28/ to 30/
Ordinary do. ....	23/ to 26/	23/ to 26/
Furnace coke .....	20/ to 21/	20/ to 21/
Pitwood (ex-ship) .....	21/6	21/3

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

#### IRON.

Affairs in the tinplate trade are as bad as they can possibly be. Shipments and receipts well balance each other, so that there has been no addition to stocks, but orders are very difficult to obtain. Bessemer standard coals have fallen to 12s. 10d. per box, and though oil sizes are still quoted at 13s. 6d. and 19s. buyers do not seem disposed to do business except at a reduction of 1d. to 3d. How long the mills can keep going at present prices remains to be seen. There is again talk of a general stoppage with the view of regulating the market, and to force up prices from their present unremunerative level. There continues to be a steady importation of foreign steel bars. Welsh bars are fairly firm at £4 15s. to £4 16s. 3d. for Bessemer and Siemens qualities respectively. The galvanised sheet trade shows no improvement. There is a little better enquiry from India, but the amount of business put through is but small. Prices are stationary, 24 gauge corrugateds still being quoted at £10 15s., though one or two of the Welsh works have accepted rather less than this figure. Welsh pig iron is 68s. 6d. f.o.t. Scrap metals are easier, new steel crop ends being 60s. to 61s., heavy wrought 48s., light 32s. 6d., heavy steel 55s., and cast 52s. 6d.

#### Swansea.

#### COAL

The trade of the port still maintains the activity it has experienced for some months past; both the coal and patent fuel trades, last week, were very brisk, the shipments

amounting to 113,628 tons. There was a capital attendance on 'Change this morning, and there was no material alteration in the general condition of the anthracite coal market; the undertone remained steady. Swansea Valley large moved off satisfactorily, and last prices were fully upheld. Red Vein large was also a very strong market. Of the machine-made varieties, German nuts, and also peas, were in excellent request; French nuts were barely holding their own. Both rubbly culm and duff were weak. In the steam coal market there was very little demand, and all descriptions were freely offered for immediate delivery at lower figures.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/6 to 20/6	19/6 to 20/6
Big Vein large (less 2½ per cent.) .....	17/6 to 18/6	17/6 to 18/6
Red Vein large do. ....	14/6 to 16/	14/6 to 16/
Machine-made cobbles (net) .....	21/6 to 23/	21/6 to 23/
Paris nuts (net) .....	23/6 to 25/6	23/6 to 25/6
French do. do. ....	23/6 to 25/6	23/6 to 25/6
German do. do. ....	23/6 to 25/6	23/6 to 25/6
Beans (net) .....	16/6 to 18/6	16/6 to 18/6
Machine-made large peas (net) .....	12/6 to 13/6	12/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	5/9 to 6/3	5/9 to 6/3
Duff (net) .....	4/ to 5/3	4/ to 5/3
Steam coals:—		
Best large (less 2½ p.c.) .....	19/ to 20/	19/ to 20/
Seconds do. ....	14/ to 15/	14/ to 15/
Bunkers do. ....	10/6 to 11/6	10/6 to 12/
Small do. ....	7/ to 7/6	7/9 to 8/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) .....	10/ to 11/	10/6 to 11/6
Patent fuel do. ....	18/ to 19/	18/ to 19/

#### IRON.

During last week the aggregate production of pig iron was heavy, and the steel trade was in full swing, the yield of ingots being on a par with that of the preceding week, and considerably above that of the corresponding weeks of either August or September. The tinplate trade in this district has improved, with the exception of one works. Work at the Mannesmann tube works was brisk, and splendid outputs were registered. The engineering and fitting shops were working overtime, getting new plant for the tinplate works in readiness. The shipments of tinplates were 108,971 boxes, receipts from works 108,989 boxes, and stocks in the dock warehouses and vans 291,576 boxes.

#### Llanelli.

The boisterous weather of the past few days is having its effect on the local market, and delayed tonnage is causing an accumulation of stocks. This has resulted in a temporary lull, but as soon as boats come along the position will again be firmer. The only market which is giving trouble now is the steam and bituminous, and the position could not very well be worse. These coals are experiencing the worst slump that has been the case for the past couple of years, and prices have been reduced lower than it was expected they would come to again. Some of the best steam smalls are being offered at 7s. 6d. to 7s. 9d., and collieries are willing to contract for a period at 8s. The future prospects are not at all hopeful for any of these kinds. Anthracite is going very well for most qualities, and it is expected there will be an excellent demand for most kinds over the next six months. Large is difficult to get, and collieries are fully sold. All the machine-made kinds are going very well with the exception of beans, whilst culm is also very easy.

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	21/ to 22/6	22/ to 23/
Secondary do. ....	19/ to 20/	19/ to 21/
Big Vein large .....	18/ to 19/	18/ to 19/
Red Vein do. ....	14/ to 15/	14/6 to 15/6
Machine-made cobbles .....	19/6 to 20/6	20/ to 21/
German nuts .....	23/ to 24/6	23/ to 25/
French do. ....	23/ to 25/	23/ to 25/
Paris do. ....	23/ to 25/	23/ to 25/
Machine-made beans .....	18/ to 20/	18/ to 20/
Do peas .....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	5/6 to 6/	5/3 to 5/6
Duff .....	4/3 to 6/	4/6 to 5/6
Other sorts:—		
Large steam coal .....	16/ to 17/	16/ to 17/
Through-and-through .....	11/ to 11/3	11/ to 11/6
Small .....	9/ to 9/6	9/ to 10/
Bituminous small coal .....	11/ to 11/6	11/ to 12/

A joint meeting of the Scottish branches of the National Association of Colliery Managers and the Association of Mining Electrical Engineers was held in the Royal Technical College, Glasgow, on Saturday, when a paper previously read by Mr. W. H. Telfer, of the Wilsons and Clyde Company, was discussed at considerable length. Mr. Frank Anslow, in the course of a written communication said that while being primarily interested in electrical matters he had more than once expressed the opinion that compressed air should be regarded rather as the ally of electrical power than its enemy. There were many positions in which the use of compressed air was at least preferable to electricity, and to press the adoption of electrical power in such circumstances was only to eventually prejudice its further use. The author in his paper had referred to measurements as being partially responsible for the increased economies effected in electrical schemes, but it was of interest to note that considerable steps were being made in the measurement of steam and air. Messrs. A. Anderson (Wishaw); W. A. Ker (Glasgow); A. B. Muirhead (Glasgow); Wilson (Giffnock); Smillie (New Cumnock) and C. C. Reid (Cowdenbeath) also joined in the discussion.

#### THE IRISH COAL TRADE.

THURSDAY, OCTOBER 30.

#### Dublin.

There is very little change in the position with regard to the labour disputes, and the coal trade continues to suffer both locally and at some of the seaside districts, where the Dublin merchants have large branches of their business, to which the strikes have extended. Traffic on the quays is still in a dislocated condition, although during the past week a number of men have been taken on for the purpose of discharging the coal boats which have been laid up at the quays. The daily deliveries effected for the Coal Merchants' Association only average about 50 tons, this being 5 tons for each of the merchants, and the motor lorries are loaded at the docks. Under existing circumstances business is much restricted, and many orders are held back until some settlement of the disputes is arrived at. Prices are about as follow:—Best Orrell, 28s. per ton; best Arley coal, 27s.; best Wigan coal, 26s.; best kitchen coal 26s.; best slack, 22s. per ton; steam coals, from 22s. to 23s. per ton; coke, 23s. per ton delivered in the city. At the Arigna collieries (county Leitrim), the prices of coals at the pit mouth are from 15s. 10d. to 18s. 4d. per ton; culm or slack, from 9s. 2d. to 10s. per ton. During the past week the coaling vessels arriving in this port amounted to 28, as compared with 34 the week previously, chiefly from Workington, Garston, Newport, Troon, Preston, Partington, Campbelltown, Liverpool, Ayr, and Newcastle-on-Tyne. The total quantity of coal discharged upon the quays was 12,000 tons.

#### Belfast.

Business generally is fairly good, although the household trade is rather quiet for the time of year, and with the exception of a few instances in which slight advances have been made, prices remain unchanged. Quotations in the city are:—Giant's Hall Arley coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current rates for steam coals ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton. There is a plentiful supply of all qualities, cargoes arriving during the week being chiefly from Partington, Maryport, Ayr, Garston, Sharpness, Troon, Cardiff, Ellesmere Port, Girvan, Irvine, Ardrossan, Glasgow, Preston, and Swansea. From October 5 to 18 the total number of colliers entering the harbour was 120.

#### THE TIN-PLATE TRADE

#### Liverpool.

A fair amount of business has been placed during the week for early delivery, in most cases at exceedingly low figures. There is little or no forward buying, however, 14 x 20 cokes were done as low as 12s. 9d. for prompt, and 25s. 6d. for 28 x 20's, but works will not make plates at these figures, quotations for shipment over next two or three months ranging as follow:—Coke tins: I C 14 x 20 (112 sh. 108 lb.), 13s. per box; I C 28 x 20 (112 sh. 216 lb.), 26s. to 26s. 3d. per box; I C 28 x 20 (56 sh. 108 lb.), 13s. 4d. to 13s. 6d. per box; I C 14 x 18½ (124 sh. 110 lb.), 13s. 6d. per box; I C 14 x 19½ (120 sh. 110 lb.), 13s. 6d. per box; I C 20 x 10 (225 sh. 156 lb.), 19s. per box; I C squares and odd sizes, 13s. 3d. to 13s. 4d. basis for approved specifications. Charcoal tins are in quiet demand and prices run 15s. 6d. basis and upwards according to tinning. Coke wasters are in moderate request. Quotations:—C W 14 x 20, 12s. 3d. per box; C W 28 x 20, 25s. to 25s. 3d. per box; C W 14 x 18½, 11s. 1d. per box; C W 20 x 10, 15s. 6d. per box—all f.o.b. Wales, less 4 per cent.

#### THE BY-PRODUCTS TRADE.

Tar Products.—The market is decidedly quiet, and in many cases prices are easier. Benzols constitute the firmest section of the market—a somewhat novel position for this product, which was at one time selling for as many pence as it formerly commanded shillings. Pitch is quiet, and naphthas are much about the same, but carbolic, both crude and crystals, are very weak. Closing values are:—

Benzols, 90's .....	1/2
Do. 50's .....	1/0½
Do. 90's North .....	1/1
Do. 50's North .....	1/1½
Toluol .....	1/11
Carbolic acid, crude (60 per cent.) .....	1/0½ to 1/1
Do. crystals (40 per cent.) .....	3/3 to 3/5
Solvent naphtha (as in quality and package) .....	9/4
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3/1½
Pitch (f.o.b. east coast) .....	43/6 to 44/
Do. (f.a.s. west coast) .....	42/6 to 43/6
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

Sulphate of Ammonia.—Though quiet, the market seems steadier. Forward business is at a standstill, but though quotations vary considerably, according to locality and source, as a whole they seem to have come to a standstill, the apparent weakening being more pronounced on paper than in the actual market. Nearest closing prompt prices are:—

London (ordinary makes) .....	£12/7/6
Beckton (certain terms) .....	—
Liverpool .....	£13/2/6 to £13/3/9
Hull .....	£13/1/3
Middlesbrough .....	£13 to £13/2/6
Scotch ports .....	£13/10
Nitrate of soda (ordinary) per cwt. ...	10/7½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

The Scottish branch of the National Association of Colliery Managers have arranged to hold their annual dinner in Messrs. Ferguson and Forrester's, Edinburgh, on Saturday, November 22.



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(A Classified List appears on page 916.)

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For the United Kingdom ...	£1 1 0
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WITH A PREFACE BY

Professor J. S. HALDANE, F.R.S., M.D.,

AND A LEGAL APPENDIX BY

DOUGLAS KNOCKER, M.B., Barrister-at-Law.

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**For Sale, one pair of Haulage Engines,**  
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\*.\* For other Miscellaneous Advertisements see Last White Page.

## The Colliery Guardian.

LONDON, FRIDAY, OCTOBER 31, 1913.

A deputation from the Miners' Federation of Great Britain waited upon the Home Secretary, on Monday, to ask him to appoint a Special Commission Court to enquire into the disaster at Senghenydd. Mr. McKenna said he would consult the law officers and give his decision in the course of a few days.

After being suspended for a week, exploration of Senghenydd pit, where 329 miners' bodies still lie, was resumed on Thursday. Owing to falls of roof and dense masses of gas, the exploring parties had to retreat, and it is thought that many weeks will elapse before all the bodies can be reached.

A St. Petersburg telegram states that, in view of the deficiency of coal, the Russian railway companies have applied for the free import of 15,100,000 poods (243,550 tons) of coal, and the Minister of Communications has recognised the request as a legitimate one.

The Court of Appeal has reserved judgment in an appeal from the decision of Lord Justice Swinfen Eady in the trade union case *Oram v. Hutt*. Two officials of the union sued one of its members for slander uttered at a meeting of the union in a speech which contained criticisms of the official conduct of the business of the union. The solicitor's costs of the two officials had been paid out of the union funds. It was held in the Court below that the payment was invalid in that it offended against the law of maintenance and that it was also *ultra vires*.

In the King's Bench Division, on Monday, Mr. Justice Scrutton held that the owner of land leased to a coalmining company had been rightly assessed to mineral rights duty under the Finance (1909-10) Act, 1910, in respect to two sums payable under the lease for the carrying of coal belonging to other owners over the land. The referee before whom the point was originally raised held that by the Act a duty was to be levied on all mineral wayleaves, whether the minerals belonged to the grantor of the lease or not, and his lordship has upheld this decision.

Four more of the nine miners injured in the explosion which occurred on the 18th at the Glynea Colliery, Llanelly, have died during the past week, thus bringing the death roll up to eight.

The International Conference of Miners met in Paris on Wednesday to settle differences between the two French Federations, the National Federation of Underground Workers and the Federation of the Nord and Pas-de-Calais.

A special conference of the Miners' Federation of Great Britain will be held in London on



December 11, to consider the question of surface-men's wages.

At a meeting of the miners' section of the Coal Conciliation Board for the Federated districts in England and North Wales, it was decided that efforts should be made to secure a new wage basis 50 per cent. higher than the present 1888 standard, or equal to the present minimum level.

The award of Lord Mersey as chairman of the Northumberland District Minimum Wage Board regarding the revision of minimum wage schedules and regulations for the county, has now been issued.

Lord Balfour of Burleigh has now given his award as arbiter in connection with the claim of Scottish coalowners for a reduction in wages. The award reduces the wages by 6½ per cent. on the basis price, which represents a difference of 3d. per day.

A preliminary meeting of the newly appointed Royal Commission on Railways was held on Monday, when it was decided to hold the meetings of the Commission at Winchester House, commencing on November 14 at 10.30 a.m. The sittings of the Commission will be open to the public, and written evidence will be accepted.

Lord Haldane performed the opening ceremony on Saturday of the new technical buildings attached to the Applied Science Department at the University of Sheffield.

A central rescue station for the collieries throughout North Wales was opened at Wrexham on Saturday. The station has been erected by the Coal Owners' Association.

At a joint meeting of the four companies concerned with the Kent coalfield, on Thursday, the amalgamation of the four companies to form a new company was approved.

**Collieries and Income Tax.** THE Income-tax Committee appointed by the Association of Chambers of Commerce, has just submitted a memorandum to the chairman of the Board of

Inland Revenue with a request that he will receive the committee at an early date to hear representations on the following subjects:—(a) Allowance for depreciation on buildings and other structures; (b) allowance for depreciation on wasting assets, shaft sinking, and developments, furniture, fixtures and fittings; (c) allowance for expenses of removal and re-arrangement of plant and machinery; (d) extra allowance for depreciation of machinery run both day and night; and (e) that a definite effort should be made by the Revenue authorities to regularise the rates of depreciation allowed in different trades. The matter is one of special interest to collieries. It has often been pointed out that whereas deductions are admissible for the diminished value by wear and tear of machinery or plant, a provision that has been liberally interpreted, there is another class of wasting assets which involve a reduction of capital for which no allowance is made, although income tax is charged on the whole income. These include buildings, fixtures, leases, annuities and mines.

To put the matter very briefly, the dividends paid by colliery concerns, according to the general practice, may be said to represent in part a return of capital, and in part interest on capital; the income-tax authorities tax both. As a rule it would be impracticable to set aside from revenue amounts that would in the end equal the total disbursements from capital in respect of properties and plant; accordingly these amounts are gradually returned to the shareholder,

leaving him to make his own distinction between income and capital. It is beside the point that the shareholder does not always make this distinction and, generally speaking, is unaware that a sound financial system requires him to do it. The company itself cannot hallmark the respective moieties, as to do so would be to reduce its capital, in which case numerous legal formalities must be observed. Some valuable suggestions on the treatment of this class of property are contained in a book by Mr. P. D. LEAKE,\* but it is sufficient here to observe that the Treasury continues to reap this misbegotten harvest, although Mr. LLOYD GEORGE and his predecessors have repeatedly recognised the injustice. The CHANCELLOR quite recently admitted it, his sole excuse for its continuance being that he could not afford to lose the revenue. The injustice becomes obvious when we consider that the company with a capital of £500,000 has probably spent the greater part of this sum in irreclaimable assets before a single ton of coal is raised.

It may be observed, parenthetically, that under the new income-tax arrangements in the United States a reasonable deduction is allowed for the exhaustion, wear and tear of a property arising out of its use or employment in the business—not exceeding, in the case of mines, 5 per cent. of the gross value at the mine of the output for the year for which the computation is made.

There is another respect in which the taxation of collieries differs from that of other industrial undertakings. Although, strictly, a three years' period of assessment may be taken, it is the general custom to work on a five years' average. One effect of this is that income tax is paid on profits and gains years after those profits and gains are earned and, possibly, spent. If we take the record of assessments given in the last return of the Inland Revenue Commissioners and contrast with it the average pithead prices of coal, the point will be made evident:

		Gross assessments. (Collieries.)			Average price of coal at pithead. (England.)
		£			s. d.
1900-01	...	12,030,910	1900	...	10 6
1901-02	...	17,641,593	1901	...	9 1
1902-03	...	20,258,907	1902	...	8 1
1903-04	...	21,194,470	1903	...	7 7
1904-05	...	21,235,729	1904	...	7 1
1905-06	...	19,999,972	1905	...	6 9
1906-07	...	16,371,678	1906	...	7 0
1907-08	...	16,400,000	1907	...	8 5
1908-09	...	16,614,322	1908	...	8 9
1909-10	...	18,460,036	1909	...	7 9
1910-11	...	19,342,747	1910	...	7 10
1911-12	...	19,680,637	1911	...	7 9

If these figures are plotted, it will be seen that one curve is practically the converse of the other. It cannot be wondered that, considered as an index of prosperity in the coal trade, the income-tax returns are altogether misleading.

Returning to the subject of deductions, some of the legal decisions reported during 1912 illustrate the difficulty of arriving at any precise rule. In *Bonner v. Bassett Mines Limited*, it was decided that the sinking of a staple shaft to reach an unworked body of ore should not be regarded as capital but as working expenditure; in the *Scottish Shire Line Limited v. Lethem*, it was found that a newly-formed company is entitled to the benefit of deductions allowable to their predecessors; in *Darngavil Coal Company Limited v. Francis*, which referred to a hire-purchase agreement, it was decided that deduction was allowable in respect of payments for the use of wagons, but not in respect of consideration paid for the option to purchase; in *Lochgelly Iron and Coal Company Limited v. Crawford*, that no deduc-

\* *Depreciation and Wasting Assets.* P. D. Leake. London: Henry Good and Son.

tion could be made in respect of a levy for the carrying out of coaldust experiments, although a deduction in respect of the general levy for the purposes of the local Coalowners' Association was permissible as being an ordinary expense. The authorities, we presume, regard experiments of this nature as a frivolous amusement.

The Associated Chambers of Commerce can reckon upon the support of the coalmining industry if they succeed in removing some of these anomalies, which are a serious obstacle to development on sound business lines.

### The Oxidation of Coal.

SOME important work carried out both in this country and abroad, and published within the last few months, has thrown additional light upon the phenomena accompanying the oxidation of coal. These researches, although perhaps somewhat academic at the present stage of our knowledge, or rather want of knowledge, of the chemistry of coal, may at any time assume a practical importance second to none of the many problems with which the colliery manager has to contend. It is important, therefore, that we should keep our readers informed of the progress of research in this direction, and the paper by M. P. MAHLER, of which an abstract appears in this issue, forms an interesting addition to the valuable work recently published by Mr. WINMILL on "The Absorption of Oxygen by Coal," and by Mr. LAMPLOUGH and Miss HILL on "The Slow Combustion of Coaldust and its Thermal Value."

M. MAHLER modestly claims only to have confirmed and rendered more definite the classic results of M. FAYOL published in 1879. He has, however, done more than that, and although his conclusions are as yet somewhat incomplete, his experiments indicate some promising lines of research which will doubtless be followed up, if not to immediate finality, at least to a further stage of development. It has been too often the habit of those who have followed the question of the oxidation of coal to regard the process as a simple form of slow combustion, with the production of volatile products consisting in the main of carbon dioxide and water. It is clear, however, that the action is in reality far more complex, and varies, probably within somewhat wide limits, with the nature of the coal, the temperature at which the oxidation takes place, and other factors, of which the presence of moisture is not unimportant. It is here that we think M. MAHLER attacks the problem from rather a different standpoint as compared with the researches of Mr. WINMILL on the one hand, and those of Mr. LAMPLOUGH and Miss HILL on the other. In some cases there is an apparent want of harmony in the several conclusions of these workers, and notably so in regard to the formation of carbon monoxide by the action of air on coal at low temperatures. Such discrepancies, however, if they can justly be so called, must be expected to arise when experiments are made under such varied conditions.

There is one point we should much like to see cleared up in connection with this problem, and that is the part played by pyrites in spontaneous combustion of coal and gob fires. Judging by recent discussions upon these and other papers, opinions are still much divided on this question, and yet it should not be difficult to prove whether pyrites in the form of marcasite plays a primary or a secondary part in the process, or whether in some cases, as is believed to have been shown in certain cases of spontaneous combustion of coal cargoes on ships



is clear evidence that pyrites has played no part at all. It would appear to the lay mind that the connection of pyrites with any particular cases of spontaneous combustion, such as occur with marked frequency in certain British seams, would be shown by the simple determination of sulphates in the goaves where such tendencies are displayed. Would it not form a suitable research, in connection with the praiseworthy scheme now being carried out in the Doncaster area, at the instance of the colliery owners of that new and important district, to push this investigation to a definite conclusion, so that we might at least know to what extent, if any, marcasite is the responsible agent? It is surely not creditable to the scientific reputation of our country that a Government Committee should be actually investigating the problem of gob fires, and yet we have up to the present time no definite data upon which a decisive answer can be given to so apparently simple a question as the relative degree of responsibility to be attached to the coal substance and marcasite respectively. In this connection the paper by Mr. J. LOMAX, read at the Manchester meeting of the Institution of Mining Engineers, is suggestive.

The phenomena accompanying the oxidation of coal have, of course, many other practical bearings besides the question of gob fires. They are related to the comparative inflammability of coaldusts, the deterioration of coal on weathering, the coking properties of coal, and also to that still debatable point the chemical constitution of the coal substance. All additions to our knowledge of this process, therefore, may be rightly regarded as aids to the proper treatment of coal both in its extraction and subsequent use.

#### The State of Trade.

REPORTS from the different coal-fields this week indicate a marked falling-away in the demand, and although, as usual, the "bears" at home and abroad are blamed, signs are not lacking that the long term of prosperity which opened in the closing month of 1911 is drawing to a close. This is especially notable on the Continent. In France and Belgium prices have undergone a sensible reduction; the Rhenish-Westphalian Coal Syndicate have just reduced their "participation," and both production and deliveries by rail and water have declined, except where the depression in the local markets has encouraged export. On the top of this we hear of some alarming "cuts" on next year's bunker contracts, the winter rise in house coal is still delayed indefinitely, and miners' wages in Scotland have this week been reduced. It may, of course, be but a passing lull, but the condition of the iron trade does not carry great hopes of a revival, and optimism generally is at a discount. The chief hope lies in the possibility that the cheapened cost of materials may bring into the market shipowners, railway companies, and others, who have been compelled to delay orders owing to the impossibility of getting work done promptly and cheaply, during the early months of the year.

#### Trade Summary.

The London coal trade during the week has been largely affected by the warm weather, and the demand for house coal has fallen considerably. Steam coals continue in fair demand, and a slight improvement is noticeable in bakers' nuts and kitchen qualities. Small nuts and slacks are moving very slowly. Prices remain unaltered, but buying has been of small dimensions. The improvement in the tone of the market at the end of last week has not been maintained.

Import and forward business at Newcastle is dull, supplies are more plentiful. Prices are falling.

The Durham coal trade shows no appreciable change. Coke is rather more steady.

Lancashire house coal continues quiet, and there is no great animation in any branch of the trade.

Business in West Yorkshire house coal is dull. Some good enquiries for export are circulating.

In South Yorkshire a quieter tone prevails on foreign account. The demand for slacks is dull, and house coal is under a cloud.

Derbyshire house coal is easy, but stocks are still low. The demand for manufacturing purposes continues heavy.

The market at Cardiff has hardened, supplies being on the short side. Monmouthshire coals have increased slightly in price.

Business in Scotland is fairly well maintained, although shortage of tonnage has had a weakening influence in some directions.

**Home Office Prosecution at Barnsley: The Dimensions of Haulage Roads.**—A prosecution instituted by the Home Office for a breach of the provisions of the Coal Mines Act, 1911, was heard at the Barnsley West Riding Court last week. The New Monckton Colliery Company Limited, Chas. Chetwynd Ellison (agent of the company), and Arthur C. F. Assinder (certificated manager, of the Monckton Main Colliery) were charged with a breach of section 43, subsection 3, of the Act at a pass-bye known as No. 8 in No. 1 plane of No. 1 pit, where sets of trains consisting of three or more tubs were uncoupled; there was not provided a clear space of 2 ft. between the tubs standing on the rails and the side of the road nearest to the rails, and that there was not a clear space of not less than 3 ft. between corves standing on the rails, and that there was no regulation substituting other provisions for securing safety on July 2 last.—Mr. T. H. Mottram, H.M. chief inspector of mines, conducted the prosecution, and Mr. Coddington, Sheffield, defended.—Mr. Coddington raised a preliminary objection. The provision of the section of the Coal Mines Act under which the proceedings were taken came into force on January 1 last, and the pass-bye was then in the same state as on the date of the alleged offence. Nothing had been done to the pass-bye, which was an old one, prior to July 1, and the information was not laid until October. He submitted that it being more than six months since the matter arose, the Court had no jurisdiction.—Mr. Mottram said the offence was discovered in July.—The Clerk, after the Bench had consulted, said the point raised would be overruled, and in answer to Mr. Coddington agreed to state a case.—Mr. Mottram said there were two sets of rails in the pass-bye in question, and said the object of the provision was to provide ample safety for the man engaged in dealing with the tubs, and it was well known the section was drafted in order to prevent accident. There were exemptions from the provisions with regard to a pass-bye next to the face, as in this case; but no proposal had been made, so that there were no special regulations in existence. On July 2 Mr. Flint, an inspector, visited the colliery to investigate a fatal accident that had occurred at the place. He found the space provided was not adequate to give protection to workmen. He pointed out the colliery company had had about 18 months in which to comply with the Act. Mr. Mottram added he believed arrangements had been made whereby one road was kept empty whilst the coupling was done, but that could not be termed a regulation under the Act.—Mr. Arthur L. Flint, junior inspector of mines, gave evidence. He said he made measurements and could not get more than 6 in. space between corves on both roads, whereas there should have been 3 ft. space. At the side the maximum space between the tubs and side of the road was 8 in. instead of 2 ft. This was at the spot where a man had been crushed on the previous day. Witness admitted regulations of a common-sense character might exist, but they had not been approved by the Secretary of State. The fact that an accident occurred showed the regulation was insufficient. He considered the pass-bye could have reasonably been widened in about two months.—Mr. Mellor, H.M. inspector of mines, who also gave evidence, said he did not know whether or not Mr. Robinson, a previous inspector in the district, had expressed satisfaction with the arrangement referred to. Replying further to Mr. Mottram, witness said he knew that tubs had frequently run back and caused accidents. He agreed there were other persons to consider besides those actually engaged in the work of coupling or uncoupling.—Mr. Coddington, for the defence, agreed that possibly a technical offence had been made out, but the blame was very very small. The work necessary to comply with the new Mines Act was of an extensive character, and it could only be done very slowly and with difficulty if the mine was to be kept at work. The work had been done continuously up to the present, and the progress was only at the rate of 1 ft. per day. They had the advantage of the third provision to give security, whilst the work of coupling or uncoupling of corves was being done, and they carried that out. The only thing was that it was not a rule which had received the approval of the Secretary of State. The widening of the road had now been completed. He suggested the Bench might consider the option they had under section 112 subsection 3 of the Act to dismiss the case on the ground that it had not been practicable to get the work done.—Mr. Mottram, replying, said the regulations were issued in draft form, and there had been ample time to get the work done.—After consultation, the chairman (Mr. H. A. Allport) said they considered there had been a technical offence. The colliery company would be fined 20s. and costs and the other defendants 10s. each and costs.

#### LABOUR AND WAGES.

##### North of England.

The Northumberland Coalowners' Association have appointed a committee to formulate an alternative scheme to that put forward on behalf of the workmen for a modification of the three shift system. In the meantime employers and workmen at Bebside have mutually agreed upon a change in the working system which is considered a big improvement on that in vogue at other centres, as it enables all men and lads to finish at five instead of seven o'clock at nights as hitherto.

At a meeting of the executive committee of the Durham Miners' Association, held at Durham on the 28th inst., Ald. W. House presiding, the recent award of Sir Robert Romer was fully discussed. The following resolution was carried:—"That we express our keen disappointment and strong disapproval of Sir Robert Romer's award, especially for not having due regard to the existing daily rate of wages, and for not reducing the 100 per cent. of time, and that we ask the President of the Board of Trade for an early interview on the subject, the result of such interview to be reported at a council meeting."

Representatives of the Northumberland Miners' Association met the coalowners at the Coal Trade Offices, Newcastle, on Saturday, to consider several questions of importance to miners in the county. A committee appointed by the miners' council attended to lay before the owners the county requests approved at the last half-yearly meeting of the council, and confirmed by a proxy vote of the lodges. The principal requests of the men were as follow:—(1) A better supply of fire coal; (2) the county percentage to be added to all minimum wages; (3) the colliery owners to supply all tools, explosives, &c., free of cost to the workmen; (4) chargemen to receive the same rates of wages as deputies. There was also an application for an advance of wages for surfacemen. After a long sitting, at which the several requests and the wages application were fully discussed, the owners intimated that they would communicate their decisions in due course to the secretary (Mr. Straker) of the Miners' Association.

Lord Mersey's award regarding the revision of rates and rules for the county of Northumberland under the Coal Mines (Minimum Wage) Act has been received by the Northumberland Coalowners' Association and the secretary of the Northumberland Mining Association, as follows:—

#### COAL MINES (MINIMUM WAGE) ACT, 1912.

##### AWARD.

##### NORTHUMBERLAND DISTRICT.

"Whereas by an award dated the 10th May, 1912, minimum rates of wages and district rules within the meaning of the Coal Mines (Minimum Wage) Act, 1912, were duly settled by me for the district of Northumberland; and

"Whereas one year has elapsed since the said rates and rules were so settled; and

"Whereas applications under and within section 3 of the said Act have been made to the Joint District Board to vary the said rates and rules; and

"Whereas the said Board has failed to deal with the said application within three weeks after the expiration of the notices of such applications:—

"Now I, John Charles, Baron Mersey, having first heard the parties, do hereby, as and being chairman of the said Board, deal with the said applications as follows:—

"As to the minimum rates of wages: These rates shall stand and remain as settled by my award of the 10th May, 1912, but with and subject to the following alterations:—

"Boy datallers shall be divided into seven subdivisions, namely:—

- (a) those from 14 to 15 years of age;
- (b) those from 15 to 16 years of age;
- (c) those from 16 to 17 years of age;
- (d) those from 17 to 18 years of age;
- (e) those from 18 to 19 years of age;
- (f) those from 19 to 20 years of age;
- (g) those from 20 to 21 years of age;

"Those in sub-division (a) shall be entitled to a minimum wage of two shillings per day; those in sub-division (b) shall be entitled to a minimum wage of two shillings and fourpence per day; those in sub-division (c) shall be entitled to a minimum wage of two shillings and eightpence per day; those in sub-division (d) shall be entitled to a minimum wage of three shillings per day; those in sub-division (e) shall be entitled to a minimum wage of three shillings and fourpence per day; those in sub-division (f) shall be entitled to a minimum wage of three shillings and eightpence per day; and those in sub-division (g) shall be entitled to a minimum wage of four shillings per day.

"Boy piece-workers (putters) shall be divided into three sub-divisions—namely (a) those under 19 years of age; (b) those from 19 to 20 years of age; (c) those from 20 to 21 years of age.

"Those in subdivision (a) shall be entitled to a minimum wage of four shillings per day; those in subdivision (b) shall be entitled to a minimum wage of four shillings and threepence per day; and those in subdivision (c) shall be entitled to a minimum wage of four shillings and sixpence per day.

"As to the district rules, I award and determine that the said rules shall stand and remain as settled by my award of 10th May, 1912, but with and subject to the following amendments or variations:—

"Rule 1 shall be varied by striking out the words 'and the word day means a colliery working day,' and inserting instead thereof the words 'and the word day means a day on which it is customary for the workmen of any particular class to work.'



"Rule 2 shall be varied by substituting the figure 60 for the figure 57, and 65 for 63.

"Rule 13 shall be amended by adding thereto at the end thereof the words, 'In the event of either party failing to act in accordance with clauses (a), (b), (c), or (d), or any of them, within fourteen days after notice in writing is given by the other party, then the party raising the question shall be entitled to select an Umpire from the Panel, who shall forthwith proceed to investigate the case and give his decision.'

"This award shall operate as from the 18th October, 1913. (Signed) MERSEY.

"Dated October 18, 1913."

The effect of the award, briefly, is that the pay of boys is slightly increased, and the age limit for pieceworkers is raised from 57 to 60 years and that of datallers from 63 to 65 years. The minimum rates for adult pieceworkers and datallers are unchanged. The most important alteration made by Lord Mersey is in respect of Rule 1 of the District Rules. In defining the meaning of a "day" the old rule said "the word day means a colliery working day." The new rule reads "the word day means a day on which it is customary for the workmen of any particular class to work." This means that a man to be entitled to the minimum wage must work the hours of his class and not merely according to the practice of the colliery as a whole.

A meeting of the men's side of the Joint District Board was held on the 24th inst., at Burt Hall, Newcastle, the headquarters of the Northumberland Miners' Association, to consider the award. Mr. Joseph English, the president of the association, was in the chair. A resolution was passed expressing strong dissatisfaction at the award.

This week a meeting was held between the Cleveland ironstone mineowners and the representatives of the Cleveland miners respecting the wages to be paid at the Cleveland ironstone mines and Weardale quarries for the ensuing three months. Sir Hugh Bell, Bart., presided over the proceedings, and eight representatives of the men were present. A settlement was arrived at under which wages are reduced by 7½ per cent.

The quarterly meeting of the Cumberland Miners' Association was held at Workington on Wednesday. The total membership is now over 9,000. It was agreed that the miners' annual holiday should begin on the first Monday in August. A discussion took place on section 61 of the Mines Act and the Explosives Orders, and the meeting was unanimously of opinion that the workmen ought not to be in any way responsible for carrying explosives into mines or bringing them out. It was agreed to request that all workmen employed at the collieries, below and above ground, should be allowed to cease work at 12 o'clock noon on Saturdays. It was further resolved to demand that all explosives and lamps be supplied to workmen free of charge. These last three matters and the holiday week question will come before a meeting of the Conciliation Board to-day (Friday).

At the Wearmouth Colliery, Sunderland, the following notice has been posted by the management at the pit-head:—

"This warns the non-unionists that if they insist on remaining outside the union they are not entitled to the addition of the usual current percentage on the basis wage, and if this is put into effect it will mean to the non-unionists a loss in wages of no less than 12s. in the £.

This follows a threat to strike on the part of the members of the Durham Miners' Association employed by the company in the event of about 40 non-unionists refusing to become members of the union.

#### Federated Area.

A meeting of the miners' section of the Coal Conciliation Board for the federated mining districts in England and North Wales was held at the Westminster Palace Hotel, London, on the 28th inst., to consider the proposals for the setting up of a new wage standard. Mr. Stephen Walsh, M.P., Lancashire, presided. The present agreement with the coalowners terminates in March 1915, when negotiations will take place for a new agreement. The meeting was primarily arranged for the purpose of preparing the men's case for proposals to set up a new standard wage in place of the present 1888 standard, by which wages are regulated in the area of the English Conciliation Board. It was decided to ask the coalowners to agree to a new wage standard 50 per cent. higher than the existing standard, by merging into the standard the present minimum wage of 50 per cent., which was part of the present agreement. This proposal will be submitted to the coalowners for their consideration at an early date. The ordinary quarterly meeting of the Conciliation Board was fixed for Thursday, but this meeting has, by mutual arrangement, been postponed. Thus, the coalowners will have better opportunity of considering the proposal before it is submitted to the Conciliation Board.

The decision of the men's section of the Coal Conciliation Board for the federated mining districts in England and North Wales to ask for a new wage basis, advanced by 50 per cent. on the present wage basis of 1888, brings the proposal within the range of practical mining proposals which will have to be considered. It is understood, though the main proposal has been adopted by the men's section of the Conciliation Board, that there are certain details to be filled in at a subsequent meeting, and the probabilities are that a general conference of the districts embraced within the area of the Board will be held to give the *imprimatur* of their approval to the scheme before it is presented to the full Conciliation Board for consideration. This means that the proposal is unlikely to be submitted until the beginning of next year. As the present agreement continues until the end of March 1915, there will be ample time for the consideration of the men's pro-

posals before the termination of the present agreement. As is well known, the proposal for a new wage basis, increased by 50 per cent., is part of a national policy unanimously approved by the recent annual conference of the Miners' Federation at Scarborough. This means that proposals on similar lines will be presented to the Conciliation Boards in Scotland and South Wales. Though the proposal does not immediately and directly increase wages, it does upset the whole basis on which wages have been calculated in the Federation area ever since the Rosebery agreement in 1894. All future alterations in wages would be on an entirely different basis. At present the changes in wages, whether by way of increase or reduction, are made on the basis wages, and not on the wage which is being paid. Thus a 5 per cent. advance is calculated on the standard. If the proposed new standard was set up the advances would be made on that standard, and a 5 per cent. advance would be equal to about 7 per cent. on the present standard. This is the factor in the situation which will require the most careful consideration in the discussions that are to take place. The men's representatives have at the back of their minds the obtaining of a higher wage by largely increasing the amount represented by a 5 per cent. advance. The present standard, together with the 50 per cent. minimum, would be merged in the new standard and then the wage alterations would be made on that higher standard. This aspect of the proposal will undoubtedly be put before the men's representatives when they submit it to the full Conciliation Board.

A strike of 1,000 colliers and 200 surface workers at the Prince of Wales Colliery, Pontefract, has been settled. The dispute was about the new rules governing the relation of the banksmen and the checkweighmen with regard to the miners and the proportions of dirt sent to the surface in the tubs of coal. The checkweighmen had refused, as required, to act as arbitrators, and the men declined to submit to the powers of summary dismissal sought to be vested in the banksmen. As the result of a long conference on Saturday, the old conditions of working have been restored. The surfacemen's grievance has also been remedied. Hitherto they have regarded it as a grievance that, whereas the colliers were allowed to have a ton of coal monthly at the nominal charge of 2s. 6d. per ton, they were expected to pay 6s. 8d. Under the new working arrangement the coal is to be supplied to all classes of workers at a uniform rate of 2s. 6d.

#### Scotland.

The officials of the Scottish Coal Trade Conciliation Board on Wednesday received the award of Lord Balfour of Burleigh, who last week arbitrated upon the Scottish miners' wages. He has reduced wages by 6½ per cent. on the basis price. This alters the daily rate from 7s. 6d. to 7s. 3d.

A meeting of miners' representatives of Mid and East Lothian was held at Dalkeith at Saturday. Reports were submitted as to the proportion of surface workers in each of the colliery districts in view of the demand for an increase of wages for all surfacemen of 15 per cent. It was intimated that the Scottish colliery owners had declined to deal with this matter collectively, and it was agreed that each federation district should approach the employers through the county unions, and to make a direct appeal where no association exists.

#### Iron, Steel, and Engineering Trades.

There will be no need for the blastfurnacemen of Cumberland and North Lancashire to carry out their conditional threat to come out on strike at the end of the month, the employers having acceded to their demand for overtime pay for week-end work. A conference of the representatives of employers and employed was held at the Grand Hotel, Whitehaven, on Tuesday, Mr. Marley, of the Whitehaven Hematite Iron and Steel Company, presiding. After an hour's amicable discussion, it was agreed that the furnacemen be paid at the rate of time and a-quarter from six o'clock on Sunday morning until six o'clock on Monday morning. This settlement does not in any way interfere with any other agreement.

#### Miners' Federation of Great Britain.

A deputation from the Miners' Federation of Great Britain met Mr. R. McKenna at the Home Office this week to ask that a special court of enquiry under the Mines Regulation Act should be held in connection with the Senghenydd disaster. Mr. Robert Smillie and Mr. W. Brace, M.P., submitted to the Home Secretary the reasons why the executive of the Miners' Federation considered that a special court of enquiry should be held and not an ordinary enquiry by a Home Office representative under the Mines Act. It was pointed out that the new Mines Act provides that the Home Secretary may appoint a person to hold a special enquiry, and may also appoint a person or persons with legal or special knowledge to sit with him as assessors, these persons to form the court. It was urged that, from the magnitude of the disaster, it was important that persons with a special and trained knowledge of the mining industry should be appointed to sit as assessors and form the court.

Mr. McKenna expressed his sympathy with their views on the matter, promised to consult the law officers of the Crown and give them a reply within a day or two.

An official circular relating to the failure of Messrs. James Watson and Co., of Glasgow and Middlesbrough, states that if the creditors agree to accept a trust deed and discharge the partners within a reasonable time one of the relative partners will withdraw his claim for £50,000 and hand over an additional £10,000. To this the creditors have agreed. Payment of a first dividend of 3s. 4d. in the £ has been recommended by the committee of creditors.

## INDIAN AND COLONIAL NOTES.

### India.

*Indian Mining Association.*—Owing to a disagreement all the companies managed by Messrs. Andrew Yule and Co. have resigned membership of the association. The companies are the Bengal Coal Company Limited, the Bengal Giridih Coal Company Limited, the Bengal Bhatder Coal Company Limited, the Katras Jharia Coal Company Limited and the Bengal-Nagpur Coal Company Limited. The Bengal Coal Company requested the association to obtain from the East India Railway a special supply of wagons to enable them to comply with a contract with the South Indian Railway, but the committee of the association declined to do this on the ground that it would prejudice the interests of other members.

The managers of the Raneegeunge Coal Association, as a result of the disastrous floods in the Jharia coalfield, have requested the committee to urge upon the Government the necessity of protecting the collieries situated to the dip in the coalfields. During the floods the Kustore Colliery was flooded up to the mouth of the inclines.

It is expected that the Mines Board of Health will be established at an early date. Conditions in some of the bazaars in the Jharia coalfield have been very bad of late.

It appears that the Railway Board resent some of the statements made at the deputation that waited upon the Secretary of State for India in May last; the allegation that colliery stocks were at that time still heavy is disputed, and as for the statement that the Board was purchasing foreign coal, it is urged that it should not have been made with verification. The committee of the association have adhered to their statements, and allege that the reports were used to keep down the price of Indian coal. The committee express the opinion that "had adequate traffic facilities existed during the past season, an additional sale of Indian coal to the extent of at least 1,000,000 tons could readily have been effected. We have ample proof that the coal was raised, but could not be despatched, and we have ample proof that very large business has had to be refused by all members of the association, which business would have absorbed the entire increased output."

*Appointments.*—The following appointments have just been communicated to us:—G. T. Heal, manager of the mines department of the Tata Iron and Steel Works; Eland Curnow, B.Sc. (Manchester), as assistant mining engineer; and Dr. R. Briercliffe, medical officer in the collieries of the same company; R. W. Palmer, M.Sc. (Manchester), assistant superintendent Geological Survey of India; L. D. Ford, B.Sc., and H. S. Allen, assistant managers on the East Indian Railway Collieries; and J. J. Turnbull, junior inspector of mines in India. The last named is a son of J. J. Turnbull, for some time general manager of the East Indian Coal Company, and his appointment will give great satisfaction in India.

## MINING AND OTHER NOTES.

Askern, near Doncaster, where the new colliery has recently been sunk, was last week the scene of a serious fire, which did damage to the extent of £3,000. It occurred at the premises of the Hardy Patent Brick and Tile Company, whose works, on the road leading from Askern to Norton, and erected about 18 months ago, were practically demolished. The company employ about 40 hands and turn out 150,000 bricks per week. The engine room and boiler house were saved, but the machine room, drying sheds, and other apartments were burnt out.

Another new colliery is rapidly approaching the working stage at Benton Square, where the Backworth Coal Company have a considerable area of excellent coal to draw upon.

At West Cramlington, work with the sinking of a new shaft for the Cramlington Coal Company is also being pushed forward and a new pit is under way at Ellington for the Ashington Coal Company.

The Seaton Burn Coal Company are also conducting boring operations a little to the south of Lord Ridley's park at Blagdon, and have already had good promise of success.

The Hulton Colliery Company who own and work extensive collieries in the Hulton and Chequerbent districts near Bolton, are making arrangements for sinking new pits in the Rainhill and Huyton localities, which are nearer Liverpool. Some of the mines at Chequerbent will not last any great length of time, and this new development is to be in readiness for the exhausting of these mines. It is understood there are several valuable seams to be tapped in the Rainhill and Huyton neighbourhoods, the working of which will occupy many decades.

Boring operations, it is stated, are at present being carried on in the neighbourhood of Shilbottle Wood House, about 3½ miles from Alnwick. These have been instituted by the Shilbottle Coal Company, with a view to prove the seams, and the future opening out of a large coalfield.

The annual meeting of the governors of the Royal Technical College, Glasgow, was held last week. The annual report showed that the numbers of students enrolled during the past year were:—Day classes 610, evening classes 4,459, making a total of 5,069. Of the 4,459 evening class students 4,298 were in the college and 161 at country



Reference was made to the completion of the requirements for the affiliation of the college to the University, and it was stated that the college courses were fully recognised fully covered the classes required for graduation in engineering, and students might therefore proceed to the degree of B.Sc. in engineering by attendance at the university or at the college, or at both. In moving the adoption of the report, the chairman, referring to the affiliation of the college with the university, said that these two institutions were now working hand in hand for the promotion of applied science in Glasgow.

The first meeting of the session of the West of Scotland branch of the Association of Mining Electrical Engineers was held recently in the Royal Technical College, Glasgow. Mr. Matthew Brown, general manager of the Banknock Coal Company, was in the chair and there was a large attendance of members. In the course of his presidential address, the chairman alluded to the fact that the branch was now the leading one, numerically, in the association, while it was to be congratulated on the fact that it had given the association its present president, namely, Mr. Alex. Anderson. That the branch had done good work in Scotland was, he thought, evidenced by the reference to it in the most recently published report of Mr. Wm. Walker, H.M. inspector of mines, in which he had observed that the association had to some extent been instrumental in securing for the mines a better class of colliery electricians in the majority of the mines throughout the country.

Mr. James McCann, electrician, Carron Collieries, has been presented with a prize of 4 guineas for a practical paper on coal-cutters read last session before the West of Scotland branch of the Association of Mining Electrical Engineers. The competition was open to ordinary working electricians at collieries.

The Greenhill Coal Company's field, which has been on the market for a short time, has been taken over by the United Collieries Limited and the Auchenlea Coal Company. The portion of the field taken over by the latter company is that which lies most convenient to them.

For some time past the General Committee of the Yorkshire Coal Exchange, which has its headquarters in Leeds, has had under consideration the question of making the Exchange an incorporation. A special advisory committee has decided in favour of the proposal, and a special general meeting of the members of the Exchange was held on Tuesday at Leeds to consider the matter. The committee's recommendation was unanimously adopted.

On Tuesday Messrs. R. and T. Hindmarsh and Heppell, auctioneers, offered for sale by public auction, at Newcastle, the whole of the coal royalty and reversion to the coal lying under the Willington Estate, Northumberland, and containing an area of 414.5 acres. The seams of coal underlying the estate are believed to be the Bensham seam, the Low Main seam, the Metal coal, the Yard coal, the Five-quarter seam, and the Beaumont seam, of which the last four are unworked. The property is let on lease to the Wallsend and Hebburn Coal Company, for a term of 42 years from January 1, 1892. The royalty was sold to the highest bidder, Mr. Wm. Gibson, for £5,700.

It is stated the Fife Coal Company are about to introduce hydraulic stowage at their Valleyfield Colliery. The object is to facilitate the output of coal from the steeper workings.

A central rescue station for the collieries throughout North Wales was opened at Wrexham on Saturday, fully equipped with the latest fire-extinguishing and life-saving apparatus for coalmines. A motor car with all necessary apparatus will be kept permanently in readiness to rush to the scene of a colliery accident. The station has been erected by the North Wales Coalowners' Association.

A Fuel, Light and Power Exhibition has been opened at Sheffield, the object of which is to demonstrate the best ways of avoiding the pollution of the air by clouds of smoke.

The Archbishop of York, addressing a meeting in Sheffield on Thursday, 23rd inst., said that the new colliery district which was being developed around Doncaster gave a splendid chance of making a great new city something like what a city in Christian England ought to be. Very soon, he supposed there might be 100,000 or 120,000 people living there, and the churchpeople of the Sheffield district were responsible for the social conditions under which these people would be living. He urged that the old kind of colliery slum—those ugly, dirty, squalid villages which had been scratched up upon our coalheaps—shall not be repeated.

An important test case under the Minimum Wages (Coal Mines) Act came before Judge Macpherson at Chesterfield County Court on Monday, but after legal arguments, occupying several hours, the hearing was adjourned pending consideration of the question of jurisdiction by his Honour. Henry Hooley, Birchwood-lane, Somercotes, and the Derbyshire Miners' Association, were the claimants, and the Butterley Colliery Company were the respondents. Hooley is a stallman under the Butterley Company, and the men under him having claimed the minimum wage, the question was raised who were their employers—Hooley or the company.

At the Morley Borough Police Court on Monday, John ... summoned for wilfully endangering ... Colliery, Morley, by winding a cage ... men ... to a defective winding rope,

knowing the rope to be defective; also for neglecting to report the defect in the rope. The defendant pleaded guilty to both charges. On behalf of Messrs. Critchley, the owners of the colliery, it was stated that on September 29 a man named Arthur Hallas found that the rope connected with Jubb's engine rope was lying loose on the drum. In drawing the rope tight on the drum Jubb caused a "kink," or twist, in the rope, and Hallas drew his attention to it and told him it was a serious matter. Jubb continued working the rope till October 1, when it was examined by the inspector at the colliery, who found the "kink." About 200 men had been lowered down and drawn out of the pit between the dates mentioned. Defendant was fined 10s. and costs on each charge.

Mr. Wm. Heslop of Hunwick has been appointed to the position of under-manager at Prestwick Colliery, near Ponteland.

### THE LONDON COAL TRADE.

THURSDAY, OCTOBER 30.

The London coal trade for the past week has been very depressing. The warm weather has had the effect of stopping all house coal demand and the orders have fallen to very low dimensions. The last few days of the preceding week showed unmistakable signs of an improvement in the demand for all qualities of coal and the tone of the market was distinctly optimistic; in fact, in more than one case, the special offers which had been made during the week were withdrawn and higher prices substituted, but with the return to the unusually mild weather on Monday and the subsequent days of the current week, a complete change has been effected in the tone of the market. The depots report very few orders from the public, so the delivery trade has fallen to almost summerlike proportions. The impetus given to the London trade during the preceding week shows how keenly alive the London market is to the variations of the weather, for it was felt on all sides that the prices must shortly advance if the weather had continued cold, and many of the merchants bought freely at that time, only to find they have a heavy stock of loaded wagons on hand during the current warm weather. The shipping trade, especially for hards, continues strong, and gas coals are also increasing in tonnage. Some huge contracts have already been concluded and tenders are open for a large number of enquiries during the present week. The Yorkshire prices still remain high and very little of it finds its way into the Metropolis, except under contract. The available supplies, however, especially of best coal, are readily absorbed and the coastwise trade is reported good. Coke has been abnormally low, and both foundry and gas coke are sadly neglected. Some of the railway contracts terminate at the end of the year and it is reported that more than one have renewed for the 12 months for South Yorkshire best hards at 12s. 6d. pit. In the South Wales district, supplies are said to be in excess of the demand. Best Admiralties are quoted at 20s. 3d. f.o.b. and seconds at 19s. Some of the large contracts, including those of the French railway companies, are said to be deferred, as the Administration do not care to pledge themselves to the high prices quoted. The subscription list for the Senghenydd Disaster Fund, both in the Inland Colliery Owners' subscription room and the Coal Merchants' Society, is steadily increasing. The number of vessels reported as arriving in the Thames for Monday's market was 26 and for Wednesday nine, but all sold. Prices are quoted as before—viz., 21s. 6d. for best Wallsend and 20s. 6d. for seconds.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/	13/
Do. nuts .....	12/	12/
Birley cube Silkstone .....	12/6	12/6
Do. branch coal .....	16/	16/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	13/6	13/6
West Riding Silkstone .....	13/	13/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	12/	12/
New Charlton Wallsend .....	15/	15/
Wharfedale Silkstone branch .....	16/	16/
Do. Flockton Main .....	15/6	15/6
Do. Athersley house coal .....	12/	12/
Newton Chambers best Silkstone .....	17/	17/
Do. Grange best Silkstone .....	15/6	15/6
Do. Hesley Silkstone .....	14/	14/
Do. Rockingham selected .....	14/	14/
Do. Rockingham Silkstone .....	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best .....	12/6	12/6
Do. large nuts .....	12/3	12/3
Do. small nuts .....	10/	10/
Do. kitchen coal .....	10/6	10/6
West Hallam Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/3	12/3
Do. London brights .....	11/	11/
Do. bright nuts .....	11/	11/
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Shipley do. brights .....	13/	13/
Do. do. nuts .....	12/6	12/6
Mapperley brights .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Cossall Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Trowell Moor brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Grassmoor Main coal .....	13/	13/
Do. Tupton .....	11/6	11/6
Do. do. nuts .....	11/6	11/6

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal .....	13/	13/
Do. do. cubes .....	13/	13/
Do. special Derbys .....	12/	12/
Do. house coal .....	11/6	11/6
Pilsley best blackshale .....	13/	13/
Do. deep house coal .....	11/6	11/6
Do. hard screened cobbles .....	11/	11/
Hardwick best Silkstone .....	13/	13/
Do. Cavendish brights .....	12/6	12/6
Do. cubes .....	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/6	12/6
Do. small hards .....	12/6	12/6
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	13/
Do. cobbles .....	13/	13/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/6	14/6
Bestwood hard steam coal .....	13/	13/
Do. bright cobbles .....	11/9	11/9
Hucknall Torkard main hards .....	12/9	12/9
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. .....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. bakers' nuts .....	11/3	11/3
Do. loco Two Yard hards .....	14/6	14/6
Do. Ryder nuts .....	11/9	11/9
Do. do. cobbles .....	13/	13/
Nuneaton steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Haunchwood steam .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Wyken steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Exhall Ell coalspires .....	14/3	14/3
Do. brights .....	12/6	12/6
Do. large steam coal .....	12/	12/
Do. best screened cobbles .....	12/3	12/3
Do. large nuts .....	12/3	12/3
<b>Leicestershire.</b>		
Snibston steam .....	10/	10/
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	18/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	9/9	9/9
Do. large nuts .....	9/6	9/6
Do. bakers' nuts .....	9/	9/
Do. Main nuts .....	9/6	9/6
Do. hards .....	9/3	9/3
Granville New Pit cobbles .....	11/	11/
Do. Old Pit cobbles .....	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/	13/
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	14/	14/
Do. cobbles .....	13/	13/
Apedale best .....	13/	13/
Do. seconds .....	12/9	12/9
Podmore Hall best .....	13/	13/
Do. seconds .....	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London		
Do. brights .....	11/	11/
Do. shallow one way .....	11/	11/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	10/9	10/9
Coppice deep coal .....	14/6	14/6
Do. cobbles .....	14/	14/
Do. one way .....	12/	12/
Do. shallow coal .....	13/6	13/6
Cannock Chase deep main .....	16/	16/
Do. Deep kitchen cobbles .....	11/6	11/6
Do. best shallow main .....	13/	13/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/9	11/9

### From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, October 24.—The slight change in the weather has had no effect in the seaborne house coal market to-day, and no sales were reported. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 23.

Monday, October 27.—The seaborne house coal market was again quiet to-day; no Durham cargoes offering. Yorkshires were in better demand in small quantities, ex-craft. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 26.

Wednesday, October 29.—The seaborne house coal market was again quiet to-day, with no cargoes on offer, either in the Durham or Yorkshire class. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 9.



MODERN BY-PRODUCT COKING.

The Koppers Process: British and Foreign Bricks.

A paper on the above subject, by Mr. G. S. COOPER, was discussed before the Junior Institution of Engineers on Monday, October 20, Mr. S. BYLANDER in the chair.

Mr. COOPER, at the outset, said by-product coking now forms a very important branch of the mining industry of this country, and the development of coke oven engineering is due entirely to the application of scientific method to an otherwise wasteful and uneconomic—though profitable—commercial process. The coking industry is very closely associated with the iron and steel trade, but it is very often lost sight of in this connection, and its immensity is not fully appreciated by many of those who profess to be well acquainted with all the details of the iron trade. The by-product coke oven has been developed along scientific lines, and the advances which have been made are largely due to the investigation and experiment which has been made in Germany; consequently, the by-product coke oven industry is largely controlled throughout the world by firms of German origin. Originally much of the erection work in this and other countries was directed from Germany, but within recent years the leading German firms of coke oven erectors have established themselves in England, and the development of the industry here has been very rapid indeed.

Some idea of the importance of the coking industry can be gathered from very interesting information which is contained in the annual report issued by the Chief Inspector of Mines (Section on Mines and

scale by the late Mr. C. Lowthian Bell did much to remove this prejudice, but even to-day in some parts there are people connected with the iron industry who will on no account use anything except beehive coke for their foundries. No scientific reason can be put forward in favour of beehive coke, and from an economical point of view it does not compare favourably with by-product coke, being always a few shillings higher in price than the latter. In Germany there is practically no beehive coke to-day, and as almost every class of ironwork is manufactured in Germany which is also made in this country, it is difficult to see what real objection English makers have to by-product coke. In the United States of America an enormous amount of beehive coke is manufactured, but considerable attention is now being paid to the by-product process, the United States Steel Corporation having erected over 2,000 by-product ovens at their various works.

With the majority of beehive ovens coke is the only product, whilst with the by-product ovens are obtained coke, tar, sulphate of ammonia and benzol, together with a large quantity of illuminating gas, which can be used in gas engines or for other purposes. Taking the case of a typical South Yorkshire coking coal, this, carbonised in beehive ovens, would yield about 60 per cent. of coke. In by-product ovens the yield of coke would be at least 70 per cent., whilst the by-products obtained would be, approximately, 5 per cent. of tar, 1.5 per cent. of sulphate of ammonia, 1.0 per cent. of benzol and 5,500 cubic feet of surplus gas per ton of coal (*i.e.*, assuming that regenerative ovens were used). On an average coking plant the battery consists of 50 ovens, carbonising, say, 100,000 tons of coal per

away by means of a flue to a range of steam boiler, where the heat is abstracted from the gases, the latter then passing to the chimney. In the regenerative type of oven, the air for combustion is pre-heated to a high degree in regenerator chambers of the Siemens type, and consisting of chequer brickwork. The construction and working of a modern regenerative oven is described later. With both types of ovens equal results are obtained as far as the quantity and quality of the products are concerned. It is generally stated that where the surplus energy of the plant is required in the form of steam, waste heat ovens should be built, but that where gas engines are employed regenerative ovens should be erected. This, however, does not necessarily give the best method, for the following reasons. Where waste heat ovens are employed, the surplus heat from the ovens must be utilised at once, before the gases have time to cool. The boilers where the heat is abstracted must be in very close proximity to the ovens, else much heat is lost in transit, owing to radiation and other causes.

It is not always convenient to have the boilers so near to the ovens, particularly on collieries where the ovens are some distance from the pit head. With regenerative ovens, on the other hand, the surplus energy is produced in a form of a combustible gas. This gas can be conveyed any distance, and can be stored for any length of time without deteriorating at all. If used under boilers it will raise quite as much, if not more, steam than would the waste heat from an equivalent battery of waste-heat ovens. In order to develop the maximum amount of power, however, combustion in gas engines is by far the most efficient method.

The following is a comparative statement of the power obtainable from batteries of (a) 50 waste heat ovens, and (b) 50 regenerative ovens respectively. Such a battery would carbonise, approximately, 300 tons of coal per day:—

Waste Heat Ovens.

About 320 tons of steam raised per day.  
Usual type of colliery steam engine consumes about 22 lb. per b.h.p. hour.

Power obtainable  $\frac{320 \times 2,240}{22 \times 24} = 1,360$  b.h.p. per day.

Regenerative Ovens.

Each ton of coal yields, approximately, 11,000 cubic feet of gas; 5,500 cubic feet surplus gas per ton.  
Large gas engines utilise about 21 cubic feet per b.h.p. hour.

Power obtainable  $\frac{300 \times 5,500}{21 \times 24} = 3,275$  b.h.p. per day.

The recent introduction of the Bonecourt boiler, working on the principle of surface combustion, will undoubtedly have some effect in time on the method of dealing with surplus gas. These boilers are eminently suitable for plants where a large volume of gas is available at a low cost, such as is the case on coke-oven plants with regenerative ovens. Two of these boilers are at work in connection with regenerative ovens at the Skinningrove Iron Company's works, and are said to be highly successful.

Many of the large iron and steel works in this country now have their own collieries and coke ovens. In Germany this association of the two industries is very close indeed, and naturally efforts have been made to render the association as profitable as possible by utilising all the products to the best advantage. In iron and steel works many improvements have been introduced in recent years, especially in regard to the methods adopted for heating purposes. Gas-fired furnaces equipped with regenerators have been largely used, and have met with much success. Coke-oven gas is especially valuable as a fuel in steel furnaces for ingot heating, brass melting, drying vessels, steel ladles, &c., and for open-hearth furnaces. This outlet for the surplus energy of a coke-oven plant is a very valuable one, but it can only be made use of where regenerative ovens are employed.

Unfortunately, from the point of view of many colliery owners, all coal cannot be converted into coke. Many varieties of coal do not possess that "caking" property by virtue of which the particles of coal adhere together on carbonisation and form a dense and homogeneous mass of coke. Exactly what constitutes the "caking" property of the coal is not known. Some kinds of coal are absolutely devoid of any tendency to bind together, and when carbonised leave the oven in the same state of division as when they entered. Generally speaking, a coal which contains a high percentage of oxygen possesses little caking power, though there are several well-marked exceptions. Probably the best coking coal in the country is that mined in Durham, whilst excellent coke is also obtained from Yorkshire and South Wales coals. Different coals behave in different ways when carbonised under the same conditions, and consequently the method of treating the coal has to be adapted to the particular class of coal to be dealt with. The average Durham coal is charged into the ovens in a normal state—that is to say, containing about 2.5 per cent. of moisture, and crushed to the degree of fineness, *viz.*, about  $\frac{3}{4}$  in.—0 in. The coal is not compressed in any way, and a good hard, dense coke is produced. The coke is of about the same volume as that occupied by the original coal, and no difficulty is experienced in pushing the coke from the ovens. In South Wales the coal is charged in the same way, but has a tendency to swell on being carbonised. Unless care is taken, therefore, the oven walls might be damaged, and difficulty also experienced in pushing the coke from the ovens. In Cumberland still another variation is met with. There the coals contain about 30 per cent. of volatile matter, against about 25 per cent. in Durham and 15 to 20 per cent. in South Wales. If the coal is charged in the oven as in Durham, the coke produced is soft and friable and will not stand much handling. In order to

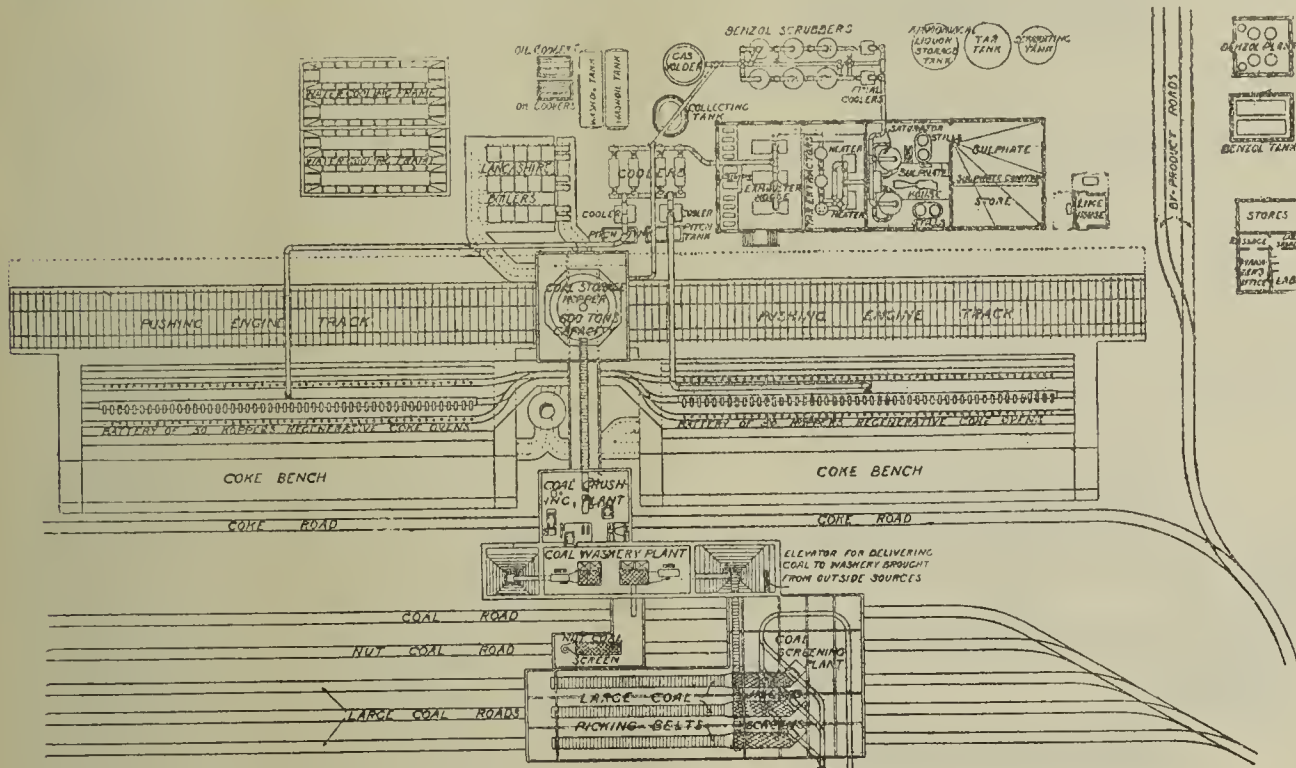


FIG. 1.—GENERAL ARRANGEMENT OF A COMPLETE MODERN COKING PLANT.

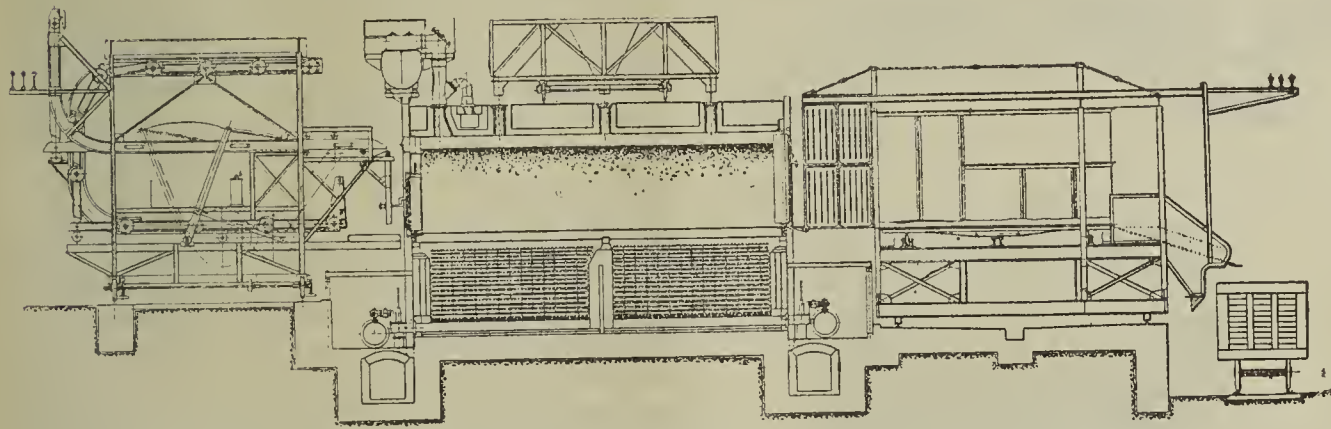


FIG. 2.—SECTION THROUGH OVEN, SHOWING PUSHING AND LEVELLING MACHINE, COAL-CHARGING MACHINE, AND COKE-QUENCHING MACHINE, AS ADOPTED AT BIRMINGHAM.

Quarries). The following particulars are extracted from the report for 1911:—The weight of coke manufactured (other than at gas works) was 11,474,174 tons, representing an approximate coal consumption of 20,000,000 tons. Of this quantity of coke the county of Durham produced 5,058,907 tons, and Yorkshire 3,627,264 tons. The other counties in order of output were as follow:—Glamorgan, Monmouth, Lancaster, Stirling, Derbyshire, Staffordshire, Cumberland, Lanark, Gloucester, Dumbarton; but not one of these produced more than 750,000 tons. Of the total quantity of coke manufactured in that year approximately half was made in beehive ovens without recovery of by-products. Since 1911, however, by-product ovens have been gradually replacing the old type, and at the present time all the coke oven builders are extremely busy erecting new plants.

The manufacture of coke for metallurgical purposes commenced about the beginning of the seventeenth century, but it was not until the introduction of the hot blast in furnace work that coke was utilised to any extent. It was then realised that coke was a much better fuel than charcoal, and it was more widely adopted, and consequently the coke-making industry developed very rapidly indeed.

Much opposition was manifested at first against the coke made in by-product ovens, and for a long time many ironmasters declared that it could not be used for furnace work. The experiments made on a practical

annum. On the above basis the yields from such coal would be as follow:—

	In beehive ovens.	In by-product ovens.
Coke .....	60,000 tons ...	70,000 tons
Tar .....	Nil ...	5,000 tons
Sulphate of ammonia .....	Nil ...	1,500 tons
Benzol .....	Nil ...	1,000 tons
Surplus gas .....	Nil ...	550 million cub. ft.

With the increasing use of tar for road-making purposes, of sulphate of ammonia as a fertiliser, and of benzol for motor spirit, it is evident that the country is losing an enormous sum every year by neglecting to recover all these valuable constituents of coal. The amount of power which could be developed by the utilisation of the surplus gas in internal combustion engines is almost inconceivable.

Practically all the modern by-product recovery ovens are direct developments of the old Coppée retort oven, or of the Simon-Carves oven. There are two systems of heating the ovens in general use—*viz.*, (1) by means of vertical flues, and (2) by means of horizontal flues. The former is more popular, although the latter has met with success both in this country and in America.

There are two distinct modifications of coke ovens in general use—*viz.*, the waste-heat oven and the regenerative oven. In the waste-heat oven the heating gas is supplied with cold air for combustion, and the hot waste gases resulting from the combustion are led



to produce a harder and denser coke, the coal is compressed into the form of a cake containing about 10 per cent. of added moisture, and so charged into the oven. The coke obtained by treating the coal in such manner is quite suitable for furnace work.

The major portion of the coal used in this country for coking purposes is subjected to a washing operation before being carbonised, so as to materially reduce the ash content of the coke by separating the shale, and also to eliminate some of the sulphur compounds which occur in the coal, such as pyrites. Sulphur is an undesirable constituent in metallurgical coke, especially in that used for foundry purposes. Coal in certain districts contains an appreciable amount of salt, and this should be removed as far as possible, as the salt eventually produces a corrosive effect on the brickwork inside the oven, causing it to crumble, and thereby necessitating frequent repairs. After washing, the coal is crushed so that it ranges in size from about  $\frac{3}{4}$  in. down to 0 in., and it is then deposited in a storage bunker, where the excess of water is allowed to drain off. Two methods of charging the crushed coal into the ovens are employed—viz., (1) from above, the coal passing through holes in the roof of the oven; and (2) through a door, the coal being fed into the oven in the form of a compressed cake. In the former case the charge is levelled in the oven by means of a beam which travels backwards and forwards through the oven. The method of charging adopted depends upon the nature of the coal. Generally speaking, a coal containing above 25 per cent. of volatile matter has to be compressed, whilst coal with less than 25 per cent. is charged in the normal state. These methods are adopted with all types of ovens, as the principles of coking involved are the same in all cases.

The main points of difference between the several systems of ovens may be summarised as follows:—(1) The arrangement of the heating flues; (2) the facilities for inspecting all the working parts of the ovens; (3) the method of regulating and controlling the heating of the ovens; (4) the preheating of the air required for combustion. The essential features of a good coke oven may be generally stated thus: The heating of the ovens must be easy to regulate and control; the temperature should remain the same throughout the whole length of the oven wall, in order to produce a homogeneous coke; ample means for controlling both gas and air supplies should be provided; all working parts of the oven should be easily accessible for inspection and regulation, and without discomfort to the workmen; the amount of gas required for heating the ovens should be reduced to the minimum, and the largest possible amount of surplus energy should be produced without decreasing the output of by-products. The ovens should be of substantial construction, but simple in design, and great care should be bestowed upon the foundations, as any subsidence would mean serious damage to the ovens. It is particularly necessary to take note of the nature of the foundations, and to take any precautions against the possible effects of the heat of the ovens.

The author next gives a detailed description of one of the best known and most successful types of coke ovens and by-product recovery processes—viz., that devised by Heinrich Koppers, of Essen Ruhr, Germany. This oven was only designed about 10 years ago, but it has met with great success from the first, upwards of 11,000 being now in operation and under construction in all parts of the world.

The new construction enables about 16 per cent. of the hot gases to be saved at the expense of the gases passing into the chimney. The air being raised to the same temperature as in the older construction, no more combustible gas is required for heating the ovens, and consequently the same amount of surplus gas is available. As already stated, the quantity of surplus gas from the Koppers regenerator oven amounts to from 45 to 55 per cent. of the total quantity evolved from the coal. The gas being in a combustible form, can be conducted almost any distance, and can be utilised for any purpose for which ordinary town illuminating gas can be used. There is, therefore, no necessity for erecting a special range of boilers in close proximity to the ovens, as is necessary with waste-heat ovens.

Two principal methods are adopted in coke-oven plants for charging the ovens, according to the class of coal to be dealt with. In some cases the coal is charged into the ovens through openings on the top of the chamber, the coal being fed in from a travelling charging machine having three hoppers. In other cases the coal is charged into the oven through one of the doors, the coal being in the form of a compressed cake. Generally speaking, where the coal contains less than 25 per cent. of volatile matter the former method is adopted, and above 25 per cent. the latter method. In both cases, after carbonisation, the resulting coke is discharged from the oven by means of a ram operated electrically or by steam on to a coke bench—horizontal or inclined, according to local circumstances—where it is immediately quenched by powerful jets of water. Many interesting mechanical appliances are in use on coke works for the purpose of coal and coke handling, but these hardly come within the scope of the present paper. Many devices also have been brought out to perform the operation of quenching, screening and loading the coke, but up to the present time it cannot be said that any one of these is entirely satisfactory.

The period of carbonisation varies according to the class of coal being carbonised, but it is usually about 25 to 35 hours, a longer time being required when the coal is charged into the ovens containing 10 or 12 per cent. of added moisture than when it is charged in the natural state containing only about 4 or 5 per cent.

The by-products usually recovered on coke oven plants are tar, ammonia, and in most cases benzol. In 1903, the method of recovery adopted was still in use on gasworks. The gas from the ovens was cooled down to atmospheric temperature, thereby removing the tar, and also the

moisture contained in the gas. This moisture brought with it a portion of the ammonia salts. In order to remove the whole of the ammonia the gas was then passed through a series of apparatus known as scrubbers, where it met streams of water which absorbed the ammonia. The solution so obtained, together with the liquor obtained by cooling, was then distilled with lime, and the ammonia gas again liberated, and this time absorbed by sulphuric acid, thus forming sulphate of ammonia. Obviously this process is a roundabout one, as the ammonia is first dissolved in water and then expelled from it. Attempts were therefore made to pass the gas directly into sulphuric acid, and thus obviate the necessity of washing out the ammonia. A German, Herr Franz Brunck, of Dortmund, was the first to experiment with this process on coke works, but his plant was not a success owing to difficulties in extracting the tar without cooling the gas, and also in working the saturator for the production of solid sulphate. Finally, Brunck abandoned his system, but the idea was taken up by Koppers, and, after much experimental work, he succeeded in developing his process. The Koppers process immediately met with

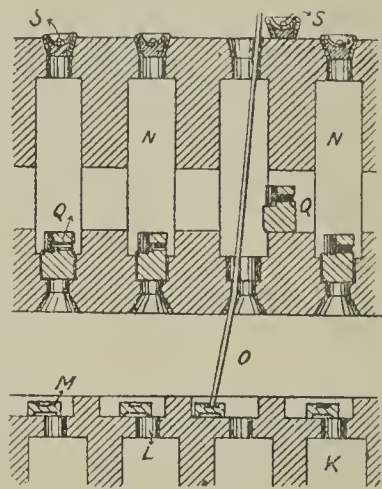


FIG. 3.—LONGITUDINAL SECTION THROUGH HEATING FLUES OF KOPPERS OVENS.

FIGS. 4 AND 5.—LONGITUDINAL SECTION THROUGH HEATING FLUES AND OVEN CHAMBER RESPECTIVELY (KOPPERS REGENERATOR OVEN).

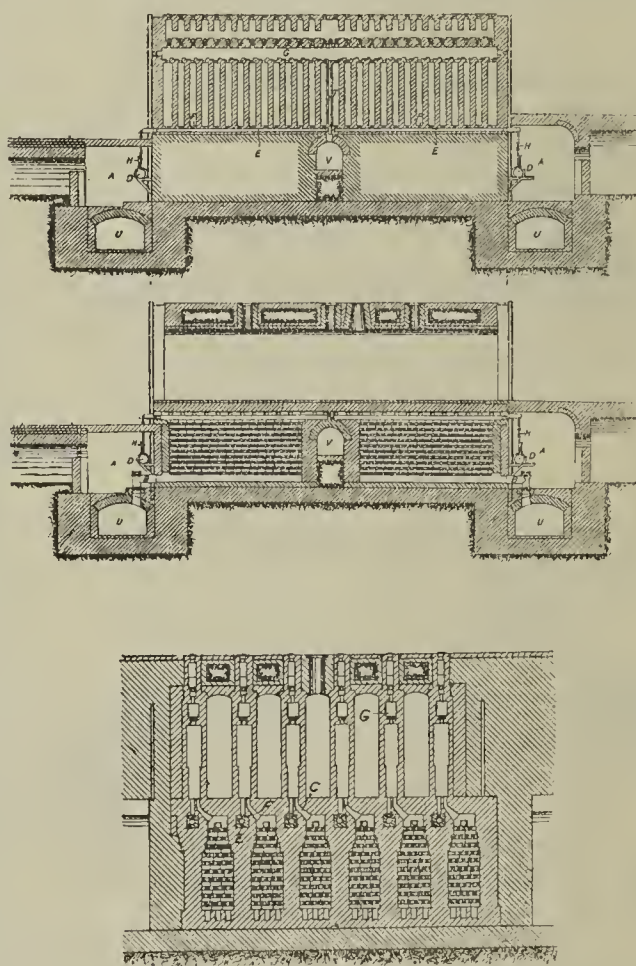


FIG. 6.—CROSS-SECTION THROUGH OVENS.

great success, and since its introduction in 1905 over 80 plants have been erected, dealing with the gases from over 9,000 ovens, or upwards of 20 million tons of coal per annum.

Soon after the introduction of Koppers' process, and when it was seen that it was successful, other processes were developed on somewhat similar lines. These have met with more or less success, but none of them has been adopted to the same extent as the Koppers process. Reference, however, is made to the latest type of ammonia recovery systems of Burkheiser and Feld. Crude coal gas as it leaves the ovens contains sulphur in the form of sulphuretted hydrogen. Now sulphur is the basis of sulphuric acid, and the ideal process is therefore one which will utilise the sulphur in the gas to combine with the ammonia, instead of having to first convert it into acid and then neutralise it by the ammonia to form sulphate of ammonia. It is this shortening of the process which is the object of both the Feld and Burkheiser systems. At present these systems are both somewhat too complicated for general adoption, but the author is convinced that ultimately such a process will come. In passing, it might be mentioned that no large gasworks in England has yet departed from the old system of washing the ammonia out of the gas. In Buda-Pesth, however, the new system has

been adopted at the new gasworks which are being erected by Koppers, and the installation will undoubtedly be watched with much interest by members of the gas-engineering profession.

The recovery of benzol has received much attention of late, owing to the fact that much refined benzol is now being used in place of petrol as fuel for motor engines. The majority of coke oven plants now have benzol recovery plants, but very few indeed produce refined spirit—what is known as "crude" or "65 per cent." benzol being generally made.

On all by-product coke oven plants in this country the benzol can be extracted from the gas without affecting the amount of energy obtained from it when used for boiler-firing purposes, or for combustion in gas engines, by more than about 5 to 10 per cent. The quantity of benzol obtainable differs of course according to the nature of the coal. In South Yorkshire, Derbyshire, the Midlands and Cumberland the yield is about  $2\frac{1}{2}$  to 3 gallons of crude spirit per ton of coal; in Durham it is about 2 to  $2\frac{1}{2}$  gallons, whilst in South Wales it is only about 1 to  $1\frac{1}{2}$  gallons. Consequently very few of the coking plants in South Wales recover benzol, as it would not pay except with a large installation.

The recovery of benzol from coke oven gas is now universally effected by means of absorption in creosote oil—a product obtained in the distillation of coal tar—and the difference between the various systems on the market lies principally in the internal arrangement of the apparatus employed, and the temperature and steam pressure at which the various parts are worked. In some cases rotary washers are substituted for the tower scrubbers.

Mr. Cooper, in addition, mentioned that he had found that the specified standards for fireproof bricks were very seldom attained by British manufacturers. He instanced a case in which some bricks had been specified to contain 80 per cent. silica, but out of 46 different samples which he had tested one had 82 per cent. silica, while the others all had considerably less.

#### Discussion.

Mr. W. A. TOOKEY said he thought it a fact that coke-oven gas was not ideal for engine work. On the Continent, however, it was largely used, but in nearly every case the users were also manufacturers of ovens. Both ovens and machines were very successful, but this, he thought, tended to show that some special care was needed in their running. With regard to the greater flexibility of the regenerative oven, he thought that the ability for over- or underwork had some disadvantages in altering the calorific value of the gas obtained, though it was not always the alteration in calorific value which interfered with the running of the engine, rather the composition of the gas. In the regenerative oven, where one part was cool and the other part hot, he thought that the composition was likely to vary. Everyone knew, he said, that uneven running was liable to produce pre-ignition, and this gave steam and electrical engineers the opportunity to say nasty things about the plant. Ovens made for a good quality coke might or might not be suitable for getting the maximum yield of ammonia and tar from the coal. It was advisable to use coal with a high percentage of nitrogen, and therefore it should be more profitable to use this. It did not seem right that British manufacturers should not know how to make retorts.

Mr. G. H. ROBINS asked the author what was the effect of different quality coals on the firebrick? Also what was the author's opinion of the reason for the coke splitting down the centre? Was it a steam outlet, or was it simply due to the fact that it was heated from the two sides simultaneously? He also asked was water ever added to help the coking process?

Mr. S. HUTCHINS remarked that he came for instruction in coke-oven gas, but he was himself interested in producer gas, and in special cases tar and sulphate of ammonia were recovered. He had in mind a case of a big installation which his firm was about to put down in Africa. The coal there contained 2.2 per cent. of nitrogen, and they could not sell the gas, and therefore a large amount of money would go to waste. The capacity of the plant was between 17,000 and 20,000 horse-power, and they hoped to recover about 140 lb. of sulphate per ton of coal. The coal was lower in price than in this country, but there was no market for the coke. Therefore, there could be no comparison between the two systems. There was no doubt that in some cases coke-oven plant was far better than recovery plant when treated purely as a simple commercial proposition. He had been associated with the Birmingham contract, in which they had to arrange for the supply of producer plant to provide gas of a certain calorific value to heat the furnaces. The plant had been very successful, and this success had resulted in larger orders for both Koppers and the Power Gas Corporation. He thought all the material for this plant had been made in England. There were many German names among English engineers to-day who stood out as first class Englishmen.

Mr. W. D. WOOD said he was particularly interested



with the dangers of fire. He had spoken to chemists, and they had to agree that it was desirable that some precaution to prevent the spreading of fire in case it broke out should be effected, but they one and all simply said that the makers "did not do it." He would like the author to explain why this was so. It appeared to him that if the benzol tank ever got alight all the other parts of the plant would go. He asked why Humphrey gauzes or something similar were not adopted as bafflers in the pipes. He had often noticed that in the still-house the steam pipes were run inside, so that in case of fire in the building the steam could be injected into it. So far, the makers had apparently ignored this question. He would like to ask whether any binding material for the coal was ever used; also what pressure was used for compressing the coal for the coking ovens; and he would like to know what was the width of the flues. He understood that the oven itself was about 20 in. wide.

Mr. T. J. TAPLIN said that he could not understand why such enormous temperatures were needed to drive off the gas as had been given by the author. The temperature was about 1,500 degs. Cent. outside the oven, and no doubt inside the oven it was much lower. Owing to the complicated construction of the ovens, he should imagine that the cost of maintenance was very high. As the difference in temperature between the two ends of the regenerative oven was very considerable, he could not understand why such elaborate precautions were taken for keeping the temperature uniform by building separate chambers. It appeared to him that as a certain proportion of the gas had to be led off by a central flue, this was an indication that too much gas was being burned.

Mr. HAMILTON SHAW said with regard to the question of English bricks, he was very sorry to say that he could entirely endorse every word Mr. Cooper had said. He had on occasion asked several firms to supply samples of coke oven bricks. In most cases the results were deplorable, and in other cases very bad, which meant that the elaborate means of testing at their disposal were utterly useless. They had tested the bricks, and had found that up to half the oven temperature they had more or less uniformly expanded; but beyond this temperature they had contracted an amount about equal to the original expansion; but not content with this, they had contracted still more, so that after continued use they had contracted still more.

Mr. COOPER, in reply, said that as Mr. Tookey had pointed out, there was some variation in the pressure of gas available from the regenerative oven; but it was not much, and in a battery of 50 or more ovens the sum total of the variation was not great. He did not know how this was met in practice, but he did not think it was serious. There was no special treatment of coal in this country depending on the nitrogen contained. The object was to obtain a good coke and as large a yield of sulphate and tar as was compatible with this. With regard to the question of refractory material, he would point out that in the Birmingham contract there had been much discussion in the papers as to the use of entirely inefficient material; but his firm had pointed out that they would not take any responsibility if they had to use English bricks. As a consequence, they had been allowed to put German bricks in for the hottest parts. To rely on the chemical composition of firebricks was very misleading. The English manufacturers were often able to obtain this, but physically the bricks were very defective. With regard to the effect of different classes of coal on the firebrick, it had been found that the presence of common salt in the coal was very troublesome, and in Yorkshire the coal contained a high percentage of salt. It had a marked effect after a short time on the brickwork, which was seen to crumble away. The quality of salt in the different classes was a very local effect. He knew of two examples where the ovens were only about twenty miles apart. In one case no replacement of the brickwork was required even after four years, while it was necessary to rebuild the brickwork in the other battery of ovens within a year. With regard to the splitting of the coal in the centre, there were two or three theories as to why this happened. One was that the coal was gradually carbonised towards the centre, and the gas from the coal was driven in and forced up, so splitting the charge. A second one was that it was the natural effect of the heat being applied from the two sides, as a very thin layer of uncarbonised coal was formed in the centre. In Durham the coal was crushed and charged direct. In Yorkshire it had to be compressed, and this coal contained 8 to 10 per cent. of moisture when going from the washery. No other binding material was used here nor in any other instance. It had been suggested that if the coal contained tar it ought to act as a good binding material,

but he would like to say that in Yorkshire the coal contained 5 per cent. or more of tar and in South Wales only 2 per cent., but the former would not make good coke, while the latter was very good. In South Staffordshire the coal contained 5 to 6 per cent. of tar and this would not coke at all. If tar was added to some coals they would coke, but it was necessary that the added tar should not have been obtained from that class of coal.

With regard to starting up a furnace, the main point to be looked to was slowness. The slower it was done the better. It was usual to take between three and five weeks to heat the ovens ready to make coke. Generally this was done by means of small fires in each oven to dry them. These fires were gradually increased; and when once sufficient heat was produced to carbonise a small charge, the action went on more rapidly. With regard to the temperature of the gas, which had been mentioned, it was not quite so high as 1,500 degs. Cent., but sometimes reached 1,300 degs. Cent. It would not be possible to attain a temperature of 1,500, as the bricks would be squeezed too much under the weight of the superstructure. Only a few parts of an oven were at this high temperature, and the maintenance cost was not excessive. An oven might reasonably be expected to last 20 years. He would like to reaffirm what he had said previously—that the principal object of these ovens was to obtain coke, and the by-products were subsidiary results.

### APPROVED SAFETY LAMPS FOR MINES.\*

(Continued from page 854.)

Messrs. Richard Johnson, Clapham and Morris's No. 3 and No. 6 Lamps.

The No. 3 and No. 6 Lamps are modifications of the No. 1 and No. 4 Lamps respectively, and are identical with them in all but the following respects:—

(1.) *The Crown, Bonnet, Middle Ring and Oil Vessel* may be of aluminium.

(2.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

The lamps must have been made at the works of Messrs. Richard Johnson, Clapham and Morris Limited, at Newton Heath, Manchester.

*The Laidler Lamp, No. 2A.*

This lamp is a modification of the Laidler Lamp No. 2, and is identical with it in all but the following respects:—

(1.) *The Bonnet, Middle Ring, Bottom Ring, and Oil Vessel* may be of aluminium.

*The Gauzes* may be of copper in the case of lamps used for surveying purposes.

The lamp must have been made at the works of Messrs. James Laidler and Sons, at New Elvet, Durham.

*The "J.M.S." No. 2 Lamp.*

This lamp is a modification of the "J.M.S." No. 1 Lamp, and is similar to it in all but the following respects:—

(1.) *The Bonnet, Middle Ring, Bottom Ring, and Oil Vessel* may be of aluminium.

(2.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

The lamp must have been made at the works of Messrs. John Mills and Sons, at Walkergate, Newcastle-on-Tyne.

*The "J.M.S." No. 3 Lamp.*

This lamp, the general design of which is shown in fig. 31, is a modification of the "J.M.S." No. 1 Lamp, and is similar to it in all but the following respects:—

(1.) *The Bonnet and Crown* are of aluminium in one piece and riveted to a bonnet ring. Outlet holes are

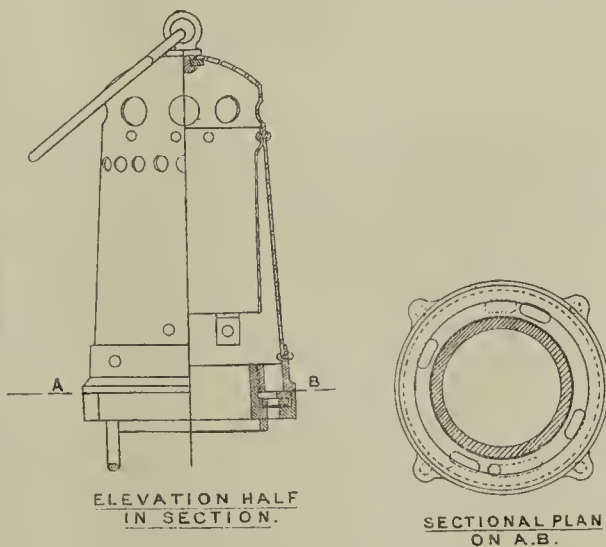


FIG. 31.—J.M.S. No. 3 LAMP.

(John Mills and Sons.)

provided round the top of the bonnet, the bottoms of the holes being not less than  $\frac{1}{2}$  in. above the top of the outer gauze. The bonnet is furnished with inlet holes

\* From the Order dated August 26, 1913. [No. 886.]

of total area not greater than 2 square inches and protected by a baffle ring, as shown in fig. 31.

(2.) *A Bonnet Ring* of aluminium, furnished with vertical air inlet holes, is screwed to a pillar ring.

(3.) *The Pillar Ring* is of aluminium, furnished with vertical air inlet holes of total area not greater than 0.6 square inch. It is provided with a shut-off ring.

(4.) *The Oil Vessel* may be of aluminium.

(5.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

*"Bifold Burner Marsaut Lamp for Officials."*

*Marsaut "A 1" Lamp for Officials.*

*"B 2" Lamp for Officials.*

These lamps are modifications of the "Bifold Burner Marsaut," the Marsaut "A," and the Marsaut "B" lamps respectively, and are identical with them in all but the following respects:—

(1.) *The Crown, Bonnet, Middle Ring, Bottom Ring and Oil Vessel* may be of aluminium.

(2.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

The lamps must have been made at the works of J. H. Naylor, Esq., at Wigan.

*Marsaut "B" Lamp.*

This lamp, the general design of the upper portion of which is shown in fig. 32, is a modification of the "Bifold Burner Marsaut" Lamp, and is identical with it in all but the following respects:—

*The Bonnet or Crown* may be of brass, iron or aluminium, of the type shown in fig. 32, with two rows of inlet holes of total area not greater than 1.1 square inches, protected, as shown in fig. 32, by a baffle plate.

The bonnet is removable and is screwed to the middle ring.

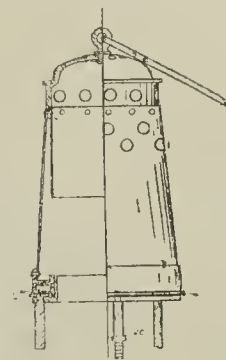


FIG. 32.—MARSAUT "E" LAMP.  
(J. H. Naylor.)

(2.) *The Middle and Bottom Rings and Oil Vessel* may be of aluminium, the middle ring being provided with vertical air-inlet holes of total area not greater than 0.5 square inch, and fitted with a shut-off ring held in position by an additional sliding pillar.

(3.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

The lamp must also be made at the works of J. H. Naylor, Esq., at Wigan.

*Patterson and Co.'s Safety Lamps, Types A 2, A 4 and B 2.*

These lamps are modifications of Messrs. Patterson and Co.'s lamps, types A. 1, A. 3 and B. 1 respectively, and are similar to them in all but the following respects:—

(1.) *The Bonnet, Bonnet Ring, Pillar Ring, Lock Ring and Oil Vessel* may be of aluminium.

(2.) *The Pillars* may be of brass.

(3.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

*Patterson and Co.'s Safety Lamp, Type D. 1.*

This lamp is a modification of Messrs. Patterson and Co.'s Lamp, Type A. 1, and is similar to it in all but the following respects:—

(1.) *The Crown Bonnet, Bonnet Ring and Pillar Ring, Lock Ring and Oil Vessel* may be of aluminium.

(2.) *The Pillars* may be of brass.

(3.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

(4.) The inlet holes in the bonnet ring are of total area not exceeding 0.5 square inch.

(5.) Additional inlet holes are provided in the bonnet of total area not exceeding 1.1 square inches, the gauzes being protected from a direct current by means of a baffle plate.

*The "Prestwich Patent Protector A" Lamp.*

The "Prestwich Patent Protector A" Lamp is a modification of the "Prestwich Patent Protector" Lamp, and is identical with it in all but the following respects:—

(1.) *The Bonnet, Pillar Ring, and Bottom Ring* may be of aluminium.

(2.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.

The lamp must have been made at the works of the Protector Lamp and Lighting Company Limited, at Eccles, near Manchester.

*Messrs. W. E. Teale and Co.'s Standard Bonnetted Marsaut Lamp No. 4A.*

This lamp is a modification of Messrs. W. E. Teale and Co.'s Standard Bonnetted Marsaut Lamp, No. 4, and is identical with it in all but the following respects:—

(1.) *The Bonnet* may be of aluminium or brass.

(2.) *The Middle Ring, Bottom Ring and Oil Vessel* may be of aluminium.

(3.) *The Gauzes* may be of copper in the case of lamps used for surveying purposes.



### The Cambrian Lamp No. 1A.

The Cambrian Lamp No. 1A, the general design of per portion of which is shown in fig. 33, is a modification of the Cambrian Lamp No. 1, and is identical with it in all but the following respects:—

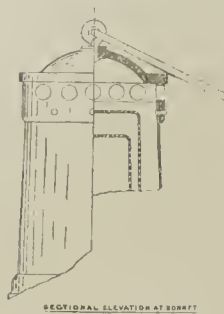


FIG. 33.—CAMBRIAN OFFICIAL'S LAMP (NO. 1A).  
(Thomas and Williams Limited.)

- (2.) The Bonnet, Crown, Middle Ring, Bottom Ring, and Oil Vessel may be of aluminium or copper.
- (3.) The Gauzes may be of copper in the case of lamps used for surveying purposes.

The lamp must have been made at the works of Messrs. Thomas and Williams Limited, at Aberdare.

### The Cambrian Improved Fireman's Lamp No. 21.

The Cambrian Improved Fireman's Lamp No. 21, the general design of which is shown in fig. 34, is a double gauze, flame, oil lamp, with air feed through holes in the lower portion of the bonnet and through slots protected by double gauzes situated below the glass.

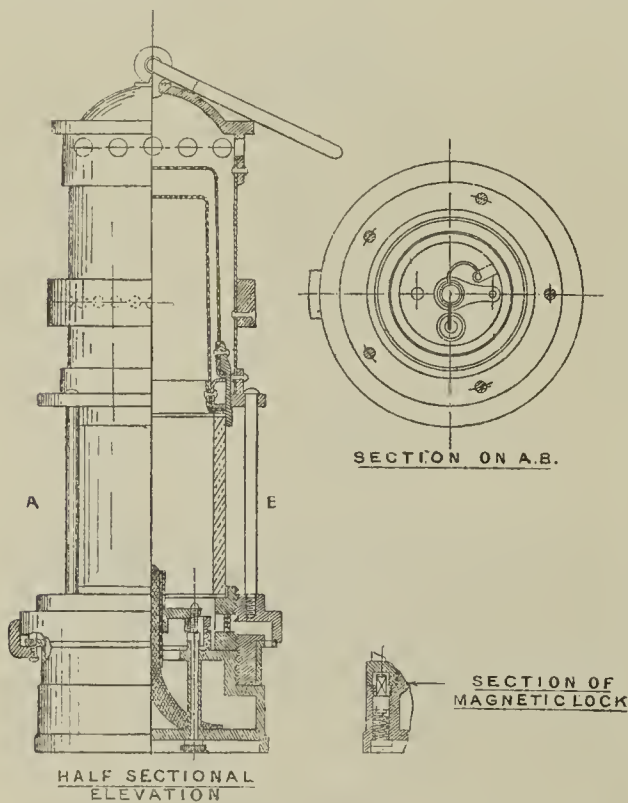


FIG. 34.—CAMBRIAN IMPROVED FIREMAN'S LAMP (NO. 21).  
(Thomas and Williams Limited.)

It consists of the following essential parts:—

- (1.) Bonnet or Shield of aluminium or brass, with a separate securely riveted crown of the type shown in fig. 34, with outlet holes round the top so arranged that the bottom of the outlet holes is not less than  $\frac{1}{8}$  in. above the top of the outer gauze. Furnished also with inlet holes round the lower portion of the bonnet, protected by an external deflector as shown in fig. 34, and of a total area not exceeding 0.6 square inch.

- (2.) Middle Ring of aluminium, riveted to shield.

Pillars, of brass, or steel, five, so arranged that a straight line touching the exterior part of consecutive pillars does not touch the glass.

Bottom or Body Ring of aluminium, with vertical inlet holes as shown fig. 34, fitted with a shutter.

Furnished also with teeth to engage the bolt of the magnetic lock.

- (3.) Gauzes of not less than 28 S.W.G. best charcoal annealed iron wire, 784 meshes to the square inch, with secure and flame-tight double bend seams stiffened with a steel liner, so riveted to brass or copper rings with additional inner flanges as to make strong and flame-tight joints.

The arrangement of the gauzes in the lamp is that shown in fig. 34, and is such that the gauze rings form the seating necessary to hold the glass firmly in position when the retaining ring is screwed home, thus preventing the possibility of the lamp being put together without gauzes.

	Internal dimensions.	Outer gauze.	Inner gauze.
Height from shoulder of base ring of inner flange	$3\frac{1}{2}$ in. $\pm \frac{1}{4}$ in.	$3\frac{1}{2}$ in. $\pm \frac{1}{4}$ in.	$3\frac{1}{2}$ in. $\pm \frac{1}{4}$ in.
Diameter at top	$1\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.	$1\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.	$1\frac{1}{2}$ in. $\pm \frac{1}{8}$ in.
Diameter at bottom	$1\frac{1}{8}$ in. $\pm \frac{1}{8}$ in.	$1\frac{1}{8}$ in. $\pm \frac{1}{8}$ in.	$1\frac{1}{8}$ in. $\pm \frac{1}{8}$ in.

- (4.) Glass, of an approved type, furnished with top and bottom asbestos washers to ensure flame-tight joints with the gauzes and retaining ring.

External diameter	57 mm. $\left\{ \begin{array}{l} + 0 \text{ mm.} \\ - 1 \text{ mm.} \end{array} \right.$
Internal diameter	57 mm. $\pm \frac{1}{4}$ mm.
Weight	57-67 or E.T.W 1.

The Air Admission Ring of brass, readed at the bottom ring and furnished with

air inlet slots covered by securely fastened double copper gauzes of the same mesh and gauge of wire as in the gauzes described above; the total area of the slots being not greater than 0.5 square inch.

- (6.) Oil Vessel of aluminium, of capacity sufficient to provide the required light for the required time, as specified in paragraph 9 below; fitted with a flat  $\frac{7}{16}$  in. or a round  $\frac{1}{4}$  in. burner; provided or not with a screw wick adjuster and with or without an electric igniter of either of the types shown in the drawing of the Cambrian Lamp, No. 1 (fig. 24).

- (7.) Locking Device.—One or other of the following:—

- (i.) A magnetic lock, of the type shown in fig. 34.
- (ii.) A lead-rivet lock with a hinge or lug securely attached to a pillar or to the lock ring, and a second lug securely soldered to the oil vessel.

- (8.) Reflector. The lamp may be fitted with a reflector.

### III.—Electric Safety Lamps Approved for General Use

#### The "Ceag" Miners' Safety Lamp.

The specification of the "Ceag" Miners' Safety Lamp was published in the Order dated May 3, 1913, and appeared in the *Colliery Guardian*, May 30, 1913.

The lamp must have been made at the Concordia Works of the "Ceag" Electric Safety Lamp Company, in Dortmund, Germany.

#### The Gray-Sussmann Electric Safety Lamps Nos. 3 and 4.

The specifications of the Gray-Sussmann Electric Safety Lamps Nos. 3 and 4 were published in the Order dated April 18, 1913, and appeared in the *Colliery Guardian*, May 16, 1913.

The lamps must have been made at the works of Mr. W. E. Gray at 19, Archer-street, Camden Town, London.

#### The "Oldham" Miner's Electric Safety Lamp.

The specification of the "Oldham" Miner's Electric Safety Lamp was published in the Order dated March 13, 1913, and appeared in the *Colliery Guardian*, May 23, 1913.

The lamp must have been made at the works of Messrs. Oldham & Son, at Denton, near Manchester.

#### The Wolf Alkaline Lamp.

#### The Wolf Lead Lamp.

In the Wolf Electric Lamps, the general design of which is shown in fig. 35, the current is supplied by an alkaline or lead cell, as the case may be. Each possesses the following essential features:—

- (1.) A case of pressed steel with vertical ribs, fitted with a securely rivetted brass, steel or iron upper ring, which is fitted with a screw thread or with slots for a bayonet joint, for the attachment of the cover.

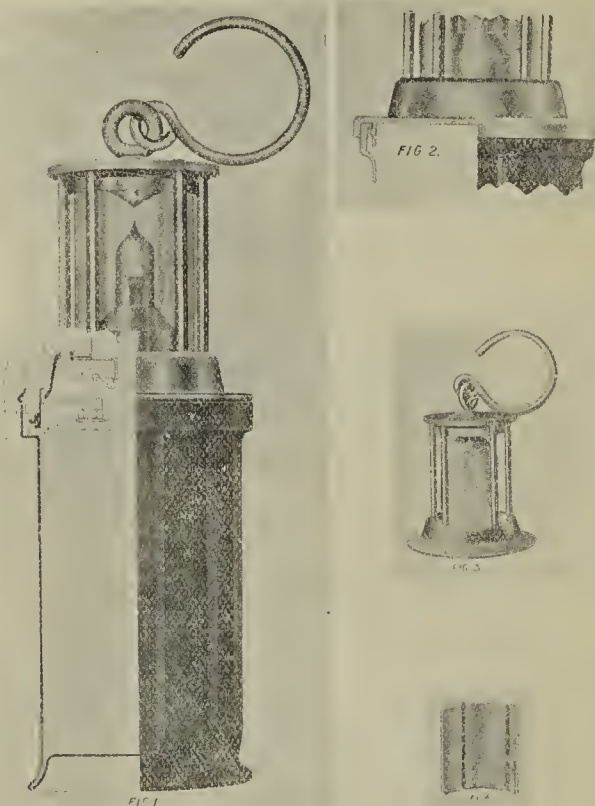


FIG. 35.—WOLF ELECTRIC LAMPS.  
(Wolf Safety Lamp Company.)

- (2.) A cover of brass, steel or iron, fitted with a screw thread or with feathers, and in the latter case with an outer vertical flange, each cover forming a secure and flame-tight connection with the case. The cover is fitted with an internal plate of vulcanised fibre or other suitable insulating material carrying the bulb, outer glass and contacts. The outer glass may be cylindrical or dome shaped; it is furnished with a washer or washers of asbestos or other suitable material to ensure flame-tight joints with the cover and crown. The outer glass is protected by an iron or steel crown supported by iron or steel pillars mounted on the cover.

- (3.) An electrical accumulator, so constructed as to prevent escape of the liquid, whatever the position of the lamp, whilst allowing the escape of gas generated by chemical action; fitted with sliding spring terminals.

- (4.) A magnetic lock, mounted on the cover, as shown in fig. 35, with a bolt engaging a slot in the upper ring of the case, so constructed that the bolt can be withdrawn only by a powerful electromagnet.

The lamp must be capable of maintaining a light of not less than 1-candle power all round in a horizontal plane throughout a period of not less than nine hours, and also of giving a light of not less than 1.5-candle power over an arc of 45 degs. in a horizontal plane.

The lamp must have been made at the works of the Wolf Safety Lamp Company at Zwickau, Saxony, or at Bank-street, Sheffield.

### IV.—Electric Safety Lamps Approved for Use by Officials or for Special Purposes only.

#### The Float Patent Electric Lamp.

The Float Patent Electric Lamp, the general design of which is shown in fig. 36, is of the bull's-eye type. The current is supplied by a primary 2-cell battery, and the circuit is completed by inverting the lamp, which brings the electrolyte in contact with the poles. The lamp possesses the following essential features:—

- (1.) An aluminium case with a cover making a flame-tight connection with the case, and secured thereto by a lead-rivet lock of the type shown in fig. 36. The cover carries flat spring contacts which make connections with the poles of the cells.

- (2.) A 2-cell primary battery, so constructed as to prevent escape of the liquid whatever the position of the lamp.

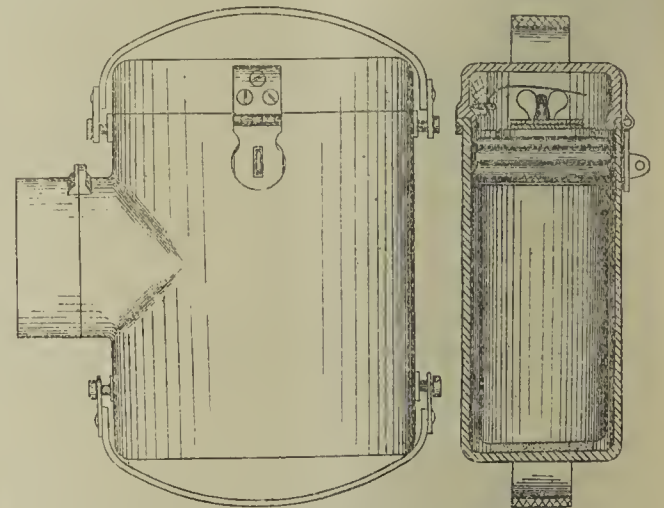


FIG. 36.—FLOAT PATENT ELECTRIC LAMP.

- (3.) A bulb, having a flame-tight screw attachment to the case, and a reflector contained in an enclosure on the front of the lamp, which is closed by a screwed ring carrying the protecting glass. The screwed ring is locked to the case by a lead-rivet lock.

The lamp must be capable of maintaining a light of not less than 1.5 candle-power throughout a period of not less than 9 hours.

The lamp must have been made at the works of the Float Electric Company Limited, at Adam-street, London, S.E.

#### The Oldham "Emergency" Electric Lamp.

The specification of the Oldham "Emergency" Electric Lamp was published in the Order dated January 14, 1913, and appeared in the *Colliery Guardian*, March 14, 1913.

The lamp must have been made at the works of Messrs. Oldham and Son, at Denton, near Manchester.

#### The "Oldham" Shaft and Roadway Lamps.

#### Types "A," "B" and "C."

The "Oldham" Shaft and Roadway Lamps, Types "A," "B" and "C," the general design of which is shown in fig. 37, all possess the following essential features:—

- (1.) A cast aluminium case with a hinged cover, secured with a lead-rivet lock, as shown in fig. 37.

- (2.) One or more electrical accumulators, so constructed as to prevent escape of the liquid, whatever the position of the lamp, whilst allowing the escape of gas generated by chemical action.

- (3.) Flame-tight screwed plugs of vulcanite or other suitable material, enclosing the contacts made between the insulated leads and the terminals of the cells, the insulated leads entering the cover through flame-tight bushes of vulcanite or other suitable material.

- (4.) A hollow metal base plate, secured to the cover and making a flame-tight joint therewith, carrying the bulb and a cylindrical protecting glass, pillars and crown, or, in the case of Type "C," a domed protecting

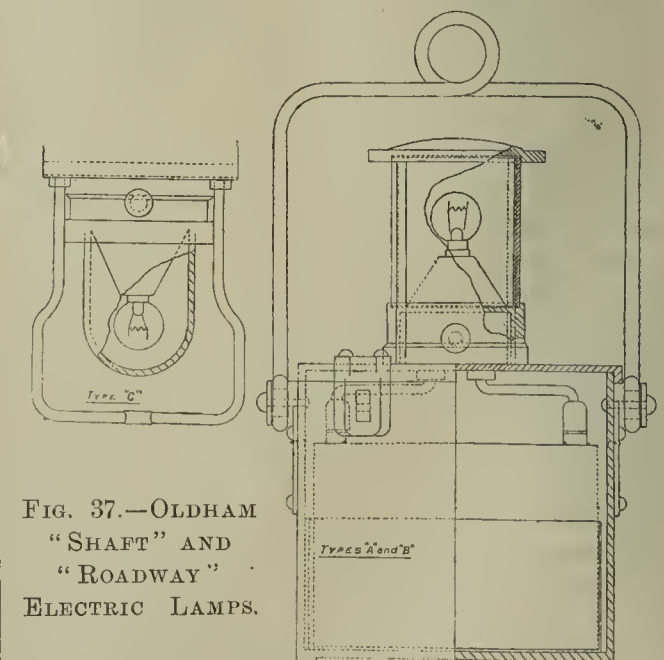


FIG. 37.—OLDHAM  
"SHAFT" AND  
"ROADWAY"  
ELECTRIC LAMPS.

glass; the protecting glass forming flame-tight joints with the crown and base plate by means of washers of indiarubber or other suitable material.

- (5.) A flame-tight screw switch in the base plate.

The total weight of the lamp must not exceed:—  
In the case of Type "A" ..... 34 lb.  
In the case of Types "B" and "C" ..... 28 lb.

and each lamp must be capable of maintaining a light of approximately 8-candle power for a period of not less than nine hours.

The lamps must have been made at the works of Messrs. Oldham and Son, at Denton, Manchester.

(To be concluded).



## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Grave Risk of Explorers at Senghenydd—Extreme Value of Rescue Brigade Action—Installation of Military Field Telephone—Visit of French Mining Experts—Miners' Federation seek Special Commission of Enquiry—Colliery Workmen's Demands upon Home Secretary—Effect of the Explosion upon Labour and Output—Result of the Saturday Stoppage of Coal Trimmers at Docks—Complaint against Umpires—Important Resolution on Colliery Assessments—Serious Questions Raised and Thousands of Men Idle.**

The record of Senghenydd is one mainly of fire-fighting—very difficult work, and proportionally dangerous. Exploration and attempted rescue ceased last week, all hope of recovering any survivors being abandoned, and it is now estimated that the death-roll totals 429. Some of the bodies have had to be buried unidentified. A sum of nearly £70,000 has been secured by the different funds, and additional local subscriptions from those who are in or connected with the coal trade include:—

Mr. D. Davies, M.P. (Ocean), Mr. J. C. Hanbury, and Trustees of the Micklefield Explosion Fund .....	each	£500
Great Western Colliery Company .....		300 guineas
Wilson, Sons and Co. and Lloyd's Bank each .....		250 guineas
Insoles Limited.....		£250
Tirpentwys Black Vein Company; Furness, Withy and Co.; Lord and Lady Aberconway; W. and C. T. Jones; Gloucester Wagon Company; J. and C. Harrison; W. H. Mathias; C. T. Bowring and Co. each .....		100 guineas
Earl of Plymouth, Lord Llangattock, Sir A. Mond, Lady Mond, North Wales Miners' Association.....	each	£100
Frachtcontor Gesellschaft (Cardiff); Deutsche Kohlen Depot of Hamburg of Frachtcontor Gesellschaft; and Forster Brown and Rees.....	each	50 guineas
Great granddaughters of a mineowner (Sir G. Elliot) .....		30 guineas
Bwlfa and Merthyr Dare Collieries Limited .....		100 guineas
M. Jacques Taffanel.....		£100

The grave risks run by the exploring parties have been made manifest once more by the narrow escapes of 19 persons on Wednesday week, and by the fact that five more were badly "gassed" on Friday. Because of those risks, exploration has been almost at a standstill for several days, while the fires were being got under control, the falls surmounted and provision made for ensuring safety during subsequent operations. Mr. J. P. Gibbon (North's) was in charge of the earlier party which encountered such serious peril, and with him were Mr. Tudor Davies (Abercynon), Mr. D. R. Thomas, Mr. E. Edwards (Ocean), Mr. C. Roberts, Mr. M. John (Ynysybwl), Mr. C. Roberts, Mr. H. Jenkins (Abertridwr), Mr. W. Thomas, and Mr. G. Barker and Mr. O. Harris (Miners' Federation). Three of the assistant inspectors of mines followed close behind—Messrs. P. T. Jenkins, H. Morgan and W. Davies.

A sudden urgent call brought the rescue brigade to the pit within 15 minutes, and but for their promptitude the consequences might have been fatal, all but one of the 19 being badly "gassed." The Aberaman and Crumlin brigades, under Messrs. Morris and Wimborne, were those in attendance at the time; and when the men arrived they found the explorers quite overcome. Their arrival is said to have been "in the nick of time," for some were lying helpless.

The work of exploration is surrounded with such difficulties that one of the miners' leaders, who has been below many times, expresses an opinion that it will be months before all the bodies are brought out. Five of the rescued men have since died.

Telephone communication was established during Thursday between the workings and the office on the surface; the first time, it is said, that a military field telephone has been installed under such conditions.

Two experts from France visited Senghenydd, and M. J. Taffanel, from the experimental station at Liévin, and his assistant, M. Parent, have descended the pit and made investigation. M. Taffanel has at Liévin been conducting a series of experiments similar to those at Altofts, his researches being directed especially to the action of coal dust. Dr. Atkinson, H.M. inspector, accompanied the French visitors underground, with them being Prof. Galloway, Mr. Hannah (Ferndale), Mr. T. Griffiths (Cymmer), and Mr. Shaw.

A deputation from the executive of the Miners' Federation of Great Britain has waited upon the Home Secretary, in London, asking that a special Government enquiry into Senghenydd explosion should be made. Mr. Smillie (president) and Mr. Brace, M.P., submitted the request, their desire being that not only should there be a public enquiry but also that a special court should be set up with a commissioner and assessors.—Mr. McKenna expressed his sympathy with the idea of a searching investigation, and promised that within a few days, after he had consulted the law officers as to statutory provisions, he would give a reply.

Meetings of colliers are being held all over the coal-field in order to arrange for making levies on behalf of the dependants. There seems to be a prevalent idea that the Compensation Act meets their need; but this is very far from being the case, and one estimate of the sum required to provide anything approximating to requirements puts the figure at not less than £250,000.

It has, however, again to be stated that no trustworthy investigation as to numbers and necessity has been made, yet there can be no question of the huge mass of suffering and the urgency of the appeal.

At Pontypool, the Home Secretary received a deputation of colliery workmen, who sought his consideration of several matters affecting their industry. The operation of the Eight Hours Act, the holding of enquiries into the conduct of firemen, the need for a lamp more effective both as an illuminant and a gas detector, the desire that examiners and firemen should be State employees, the demand that every five years the hearing and eyesight of examiners should be tested—these were some of the subjects dealt with.

One suggestion has gained heed—namely, that rough plans of the mine should be more readily available for the use of rescue parties. This is the first occasion in South Wales for a conclusive test to be afforded upon any large scale of the work of rescue parties; and it is pointed out that as so many of the men drawn from other collieries do not know the workings to be explored, if there were at hand some rough plans of the district, these could be handed to the rescue parties, and would be of material assistance to them at a time when the utmost expedition in the work of rescue is of vital consequence. If each body of rescuers engaged upon exploration had its own plan, this would be of assistance by relieving them of sole dependence upon the personal direction of someone connected with the mine.

From the miners' side comes a proposal that a dozen or more inspectors, paid by the Federation, should be appointed. The Western District delegates' meeting passed a resolution to this effect on Saturday, and Aberdare men have also agreed to a resolution of similar purport.

Of the same nature is a declaration of opinion in the Avon Valley meeting on Saturday—namely, that colliery firemen should be directly employed by the State, "so that they could devote the whole of their time to looking after the proper ventilation of the mine and the safety of the miners."

The explosion has had a distinctly adverse effect upon output—directly by reason of the actual stoppage, and indirectly because of the fears excited among the thousands of men who are idle at Llanhilleth and Risca, and by the complete abandonment of their occupation in the case of others. The docks and other centres of industry are approached by numbers of ex-miners, who now seek employment above ground. For a long time past shortage of labour has characterised certain colliery districts, and it is inevitable that so shocking an accident as that at Senghenydd will for a time prevent the drift of workmen from other parts of the kingdom to South Wales, notwithstanding the high wages, which hitherto have been such a powerful attraction.

Other questions which have arisen are such as will entail action for some time to come—as, for instance, the demand upon the Miners' Federation that relief should be granted the men—about a thousand—who have been thrown into idleness by the explosion. A conference on this matter, representative of the whole coalfield, takes place to-day, called by the Federation. There is also the suggestion that relief funds should be pooled, in order that surplus moneys may be utilised for relief in single and other smaller accidents. As to the latter proposal, it is to be noted that grants in aid of the Senghenydd dependants have been made by the trustees of three or four other funds. An important question of principle is, however, being raised—namely, whether contributions are not specific, and therefore restricted in their allocation; that is, whether contributions to the Senghenydd fund must not be used solely for the benefit of the dependants there.

Colliery examiners took occasion of the presence of the Home Secretary in his constituency (North Monmouth) to send a deputation setting forth their views and special interests in regard to mining; and Mr. McKenna, observing that they had put their case very lucidly, promised to give careful consideration to what had been said. The deputation included examiners from a wide area of the coalfield.

Considerable interest attaches, of course, to the effect of the action of the coaltrimmers and tipplers in stopping at one o'clock on Saturday, and many enquiries have been current as to the result this has had upon the total of shipments. Whilst it is too soon yet to gauge the actual effect, there can be no doubt that the result has been to limit the shipments considerably, and this notwithstanding the fact that the gangs are now evidently speeding up their work during Friday and on Saturday morning. This is to their own interest; for it is obvious that if a gang of trimmers left a vessel at one o'clock on Saturday with only a very small quantity to complete the cargo, they would themselves suffer on Monday morning by the time lost between completion of that cargo and the putting of another steamer under the tips. Their own earnings are very much greater if they can commence on Monday morning with an empty vessel, and go straight forward at full speed. Doubtless it is this consideration which has brought about that speeding up on Friday and Saturday which is undoubtedly manifest.

This greater expedition in working prevents the loss being so great as was originally anticipated; but enquiry in the chief docks leads to the conclusion that the reduction varies anywhere from 3 to 5 per cent. of

the total of shipments; and it is not too much to say that the difference upon a whole year will probably work out at about a-quarter of a-million of tons. Several vessels have been stopped, failing to get away, although their cargoes neared completion, and it is the coasting class which in particular have suffered.

Complaint is prevalent concerning delay in the work of umpires appointed under the Minimum Wage Act; and it is essential that no occasion for such complaint should be allowed to continue.

An important resolution affecting the assessment of collieries was passed at the meeting of Merthyr Guardians on Saturday. Mr. Prowle referred to the profits now made by colliery companies in comparison with the profits and the difficulties of the time when the present rating of coal was made, and he moved a resolution—"that this Board is of opinion that mining properties in the union are not paying their fair share of the burden upon local rates, and calls upon the Assessment Committee to take such steps as they consider best to make a more equitable agreement with the coalowners." He declared that the collieries were rated upon the basis of a valuation in 1875, and the clerk stated that "the legal basis laid down by the Denaby Main judgment is the gross receipts, less the costs of production, or on a profit and loss account." The resolution was carried, as was also another favouring a general re-valuation of the union.

Another seam of coal has been struck at the Nantgarw sinkings of Mr. T. Taylor. It is at 735 yards depth, about 5 ft. thick, and believed to be a continuation of the Black Vein. Two other seams have previously been reached, and one of these is being developed.

Between 700 and 800 men have been idle at the new Bedwas collieries, on strike against non-unionists, but the men returned to work on Monday. Ten times that number—as many as 7,500 it is estimated—stopped on Monday, at the Ferndale, Tylorstown, and Bodingall collieries, for the same reason. Not more than 50 men out of this large number were in arrears with contributions. The Ferndale pits were entirely free, and only four defaulters were reported from Tylorstown. Yet 7,500 ceased work! They resumed, however, on Monday evening.

The miners at Llanhilleth to the number of 1,500 have also been on stop, but these are not idle on account of the non-unionist question. Their trouble is as to the safety of the pit. Representatives of the men made a special examination, and they reported conditions which the men considered a justification for ceasing work. The existence of such conditions is, however, denied by the officials. The trouble developed, the men requiring the withdrawal of certain officials whom they criticise; but this the employers would not concede, and, therefore, a deadlock took place. A Government inspector has visited the mine and the Home Office has been made aware of the circumstances.

North Risca men to the number of 2,000 declined to work on Saturday, there having been reports of gas in certain districts on Friday. Nineteen representatives were appointed on Monday to descend with the firemen and make a report, and they went down with Mr. Ivor Llewellyn (general manager) and Messrs. A. and S. Williams, occupying several hours in a thorough investigation. Their report, however, did not lead to resumption of work.

On Saturday, at Kenfig Hill, Mr. E. Morgan (late manager) and Mr. D. M. Powell (late accountant), of Ton Philip Colliery, were each presented with a gold watch and an illuminated address by the officials and workmen.

## THE FREIGHT MARKET.

The outward freight market has been fairly active during the past week, although the volume of business done falls short of that for the week previous. On the north-east coast there is an ample supply of tonnage, and, with little pressure for boats from merchants, rates are easing very considerably. Coasting business is being done at from 3s. 3d. to 3s. 4½d. from Tyne to London, with Hamburg at from 3s. 7½d. to 3s. 9d., and Havre at about 4s. 9d. The Baltic is based on 5s. 3d. to Stockholm, and 6s. to St. Petersburg. The Bay is worth 5s. 7½d. to Bordeaux, and about 5s. 9d. to St. Nazaire. The Mediterranean has been very active, especially for Genoa, to which port vessels have been chartered at from 8s. 10½d. to 9s. 9d. At the time of writing, the rate ranges from about 8s. 10½d. to 9s. 3d. At South Wales chartering has been fairly brisk; but here, again, tonnage offers in excessively large quantity, and rates in most directions, therefore, are dropping. At the Clyde business is quiet, with rates somewhat easier. The Hummer market is conditioned similarly. Homewards, the volume of transactions constitutes a fair average. New York advices report chartering as dull, and tonnage as ample to cover all requirements. There is a very limited enquiry, and the market is against the owners. At the Black Sea the tone is exceedingly weak, orders are very scarce, and rates are inclined to fall. The Azof and Danube are constituted similarly. The Eastern market is slow and easy; the Mediterranean and ore trades are steady. The Baltic is firm, and the River Plate is inactive.

Tyne to Algiers, 2,500, 7s. 9d., 600; 5,000, 7s. 7½d.; Alexandria, 5,000, 9s. 9d.; 4,200, 9s. 9d., 400; 5,400, 9s., 700, 3d.; Ancona, 4,600, 11s. coal, 14s. coke; Bordeaux, 2,500, 5s. 7½d.; Civita Vecchia, 5,000, 10s. 3d.; Castellamare, 3,100, 12s. 3d.; Genoa, 5,500, 9s. 9d., river loading; 3,300, 9s. 6d.; 4,900, 4s. 4½d., November; 4,700, 9s. 4½d., early November; 4,000, 9s. 6d.; 5,700, 9s. 6d.; 6,000, 9s.; 2,400, 9s. 9d.; 4,700, 9s.; 3,600, 8s. 10½d.; 2,400, 9s.; 3,300, 9s. 3d.; Hamburg, 2,500, 4s. 1½d., from Dunston; 2,500, 3s. 10½d.; 3,100, 3s. 9d.; 1,800, 3s. 9d.; 3,000, 3s. 10½d., from Dunston; 2,200,



3d.; Havre, 2,000, 4s. 9d., from Dunston; 1,450, 4s. 9d.;  
 Angfors, 4,200, 5s. 7½d.; Hango, 1,200, 5s. 7½d.; 3,000,  
 5d.; Lisbon, 3,300, 7s.; Las Palmas, 2,500, 8s. 9d.;  
 1,000, 8s. 9d.; Leghorn, 2,700, 9s. 9d.; London, 1,700, 3s. 3d.;  
 1,000, 3s. 4½d.; Marseilles, 2,400, 9s. 3d.; Naples, 4,000,  
 3d.; 700; Nantes, 1,800, 6s.; Odessa, 5,500, 9s. 9d.,  
 December; Piræus, 6,300, 9s. 6d.; 3,600, 9s. 9d.; 5,000,  
 9s. 3d.; Port Said, 9s. 6d.; 6,400, 9s.; 5,400, 9s. 3d.; Pillan,  
 2,000, 5s.; Savona, 3,300, 9s. 3d.; 4,700, 9s.; 500, 8s. 9d.,  
 750; 4,000, 9s. 6d.; St. Nazaire, 1,800, 5s. 9d.; 2,000, 5s. 6d.,  
 Trignac charter; Stockholm, 1,400, 5s. 3d., 400; St. Peters-  
 burg, 1,600, 6s.; Syra, 5,000, 9s. 3d.; Tarragona, 1,800, 11s.;  
 1,600, 10s. 6d.; Teneriffe, 4,500, 8s. 9d.; Trapani, 3,000,  
 10s. 6d.; Volo, 3,000, 12s.; Zea, 5,000, 9s. 3d.

Cardiff to Alexandria, 5,000, 9s. 6d., November 1; 4,500,  
 9s. 6d., November 8; 2,500, 10s., Admiralty; 4,800, 10s.,  
 5,200, 9s. 3d., November 5; Algiers, 3,200, 9½d. fr.; 3,600,  
 9½d. fr., November 3; 4,200, 9½d. fr., November 3; Aden,  
 5,000, 11s. 6d., mid-November; Agamone, 950, 10s.; Bahia  
 Blanca, 5,000, 18s. 9d., early November; 5,200, 17s. 10½d.,  
 mid-November; sail, 16s. 6d.; Bordeaux, 3,200, 7 fr.;  
 Bougie, 2,000, 11½ fr.; Barcelona, 4,200, 9s. 4½d.; Berehaven,  
 2,000, 3s. 3d., Admiralty; Cape Verdes, 2,300, 8s. 9d., Novem-  
 ber 15; 5,800, 9s.; 9s., November 1; Corunna, 850, 8s.;  
 1,700, 7s. 3d.; 1,000, 7s. 6d.; Constantinople, 4,400, 11s.;  
 Civita Vecchia, 4,200, 10s., 500; 4,000, 10s. 6d., 400, early  
 November; Campana, 5,000, 19s. 6d.; Cape Verdes, 5,800, 9s.,  
 November 1; Colombo, 5,500, 12s., November-December;  
 2,300, 10½ fr.; 11s. 6d., Admiralty; Devonport, 2,800, 2s. 9d.,  
 Admiralty; Genoa, 5,300, 9s., November 1; 5,300, 9s.,  
 November 5; 5,800, 8s. 9d., November 5; 5,000, 8s. 9d.,  
 2,500, 8s. 9d., November 12; 5,000, 8s. 6d., reported;  
 Gibraltar, 2,700, 5s., 1,200, Admiralty, November 5; 3,200,  
 ditto, ditto; 3,600, ditto, ditto; 2,600, ditto, ditto; Havre,  
 1,900, 4s. 9d.; Honfleur, 1,500, 5s. 9d.; 1,500, 5s. 6d.;  
 Halifax (N.S.), 2,100, 10s., November 3, Admiralty; Hong  
 Kong, 5,000, 17s. 9d., mid-November, Admiralty; Islands,  
 8s. 9d.; 3,200, 8s. 6d.; Jersey, 550, 6s.; Las Palmas, 4,200,  
 8s. 9d.; 5,000, 8s., November 10; Lisbon, 2,400, 6s. 9d.,  
 500, November 1; 1,800-1,800, 18 voyages, 6s. 9d., 300,  
 January-June; 2,400, 7s., 350; 2,700, 6s. 10½d., 500, Novem-  
 ber 3; La Rochelle, 1,700, 7 fr.; Leghorn, 2,500, 8s. 10½d.;  
 La Pallice, 1,250, 7½ fr.; Malta, 3,000, 7s., Admiralty; 3,600,  
 7s., Admiralty; 7,400, 7s. 3d., November 5; 5,700, 7s. 6d.,  
 November 3; 7½ fr.; 4,000, 7s. 6d.; Marseilles, 3,000, 10½ fr.,  
 voyages over 1914; 2,600, 10½ fr., November 4; 2,300, 10½ fr.;  
 5,200, 10½ fr., November 3; Madeira, 5,000, 8s.; Naples,  
 4,200, 9s., 800; 500, 8s. 10½d.; Nantes, 2,100, 7-37½ fr.;  
 Port Said, 5,700, 9s.; 6,000, 9s., early November; 6,300, 9s.,  
 November 5; 4,000, 9s. 3d.; 4,500, 9s., 5,000, 9s., Novem-  
 ber 5; 5,500, 9s., November 7; Palma, 1,200, 10s. 6d.;  
 Piræus, 5,300, 9s. 6d.; 4,000, 9s. 6d.; Puerto Militar, 6,000-  
 6,500, 19s. 3d., 250; Rio de Janeiro, 6,000, 17s. 6d., Novem-  
 ber; 17s. 6d. coal, 18s. 3d. fuel; River Plate, 17s. 3d.,  
 cancelling November 25; 4,000, 17s., November; 5,200,  
 17s., end November; 5,000, 17s., November 20; 5,000,  
 16s. 9d., December 10; 5,000, 17s. 9d., November 10, lay  
 days; 5,000, 19s. 3d.; 19s.; 7,500, 17s. 9d., November 3,  
 with options; 4,500, 16s. 6d., November 5; 6,000, 16s.,  
 November 15-28; Rosario, 5,200, 18s., early November;  
 Reval, 2,100, 5s.; Romero Quay (Malaga), 2,700, 8s.; St.  
 Malo, 1,400, 5s. 3d.; Suez, 5,500, 12s. 6d., November 1-15;  
 Salerno, 2,300, 10s. 6d.; Savona, 5,800, 8s. 9d., November 5;  
 5,000, 8s. 9d.; St. Servan, 1,900, 5s.; Syra, 4,000, 9s. 6d.;  
 Syracuse, 2,700, 10s. 6d., 350, November 5; Torre Annun-  
 ziata, 4,000, 10s. 6d., 400, early November; 4,700, 10s.;  
 Teneriffe, 5,000, 8s., November 10; Venice, 4,800, 10s. 7½d.;  
 4,600, 10s. 6d.; 3,000, 11s. 4½d.; Villa, Constitucion, 5,000,  
 19s. 6d.; Zea, 4,000, 9s. 6d.

Newport to Genoa, 5,300, 9s.; Bahia Blanca, 7,800,  
 18s. 9d.; San Juan, 8s. 6d.; Almeria, 3,200, 8s. 6d.;  
 Gibraltar, 1,300, 8s. 6d.; 2,600, 5s. 9d., f.d., November 1;  
 Torre Annunziata, 3,500, 10s. 6d., early November; 4,000,  
 ditto, ditto; Civita Vecchia, 3,500, 10s. 6d., early November;  
 4,000, ditto, ditto; Milazzo, 2,500, 10s. 6d., November 1-15;  
 Bilbao, 1,800, 7s. 3d., fuel; Alexandria, 5,000, 10s.; 5,600,  
 9s., 700, November 11; Salerno, 2,300, 10s. 6d., 500,  
 November 3; Coroubion, 1,800, 7s. 6d.; Marseilles, 5,000,  
 10½ fr., November 5; Oran, 1,600, 10 fr., November 3.

Port Talbot to Liverpool, 480, 4s., fuel; Alexandria,  
 4,400, 9s. 6d., 700; Chantenay, 2,200, 7½ fr.; Rouen, 2,000,  
 5s. 6d.

Swansea to Barcelona, 2,500, 9s. 9d.; 2,600, 9s. 6d.,  
 November 5; Agnias, 1,000, 11s.; Havre, 1,800, 5s. 3d.;  
 1,000, 5s. 6d.; Rouen, 1,400, 6s. 4½d.; 1,700, 6s. 3d.; 850,  
 6s. 3d.; Genoa, 3,800, 9s. 3d.; 9s. 6d.; Savona, 9s. 6d.;  
 3,800, 9s. 3d.; Leghorn, 1,800, 10s.; 2,800, 9s. 7½d.; Alexan-  
 dria, 3,200, 9s. 9d.; Honfleur, 1,050, 5s. 9d.; Oran, 2,000,  
 11 fr. coal, 12 fr. fuel; La Rochelle, 1,700, 7½ fr.; 2,400,  
 7½ fr.; Stettin, 3,700, 5s. 6d., 1,000; Tronville, 6s.; Spezzia,  
 9s. 6d.; Sables, 900, 7½ fr.; Dieppe, 1,250, 5s. 4½d.; Syra,  
 4,000, 9s. 6d.; Piræus, 4,000, 9s. 6d.; Zea, 4,000, 9s. 6d.;  
 Alicante, 1,200, 10s. 3d.; Torre Annunziata, 4,000, 10s. 6d.,  
 400, early November; Brest, 1,300, 5s.; Civita Vecchia,  
 4,000, 10s. 6d., 400, early November; Charente, 1,900,  
 7-62½ fr.; 2,200, 7½ fr.; Palamas, 1,100-1,200, part cargo,  
 12s.; Nantes, 1,400, 7-87½ fr.; 2,100, 7-37½ fr.

Glasgow to Monte Video, about 18s. 7½d., end November;  
 Alexandria, 9s.; Barcelona, 9s. 6d.

Hamburg to West Coast South America copper port, sail,  
 22s. 6d.; Valparaiso, sail, 22s. 3d.

Methil to Trieste, 10s.

Wales to direct nitrate port, sail, 16s. 3d., March-April;  
 West Coast of South America and home to United  
 Kingdom-Continent, sail, 52s. 3d., guano; sail, 41s., in and  
 out.

Hull to Reval, 1,400, 5s. 4½d.; St. Petersburg, 3,000,  
 5s. 7½d.; Cronstadt, 3,500, 5s. 6d.; Odessa, 5,500, 9s. 9d.;  
 Rouen, 1,400, 5s.; Bordeaux, 2,900, 6s.; Alexandria,  
 5,000, 9s.

West Point to Calcutta, 12s., ppt.

Grangemouth to Aarhus, 1,450, 5s. 4½d.

Goole to Cowes, 400, 5s., f.d.

Forth to Nakskov, 1,200, 6s.; Randers, 1,700, 5s. 4½d.;  
 Aarhus, 2,000, 5s. 7½d.; Konigsberg, 1,500, 5s. 9d.

Blyth to Sundsvall, 2,000, 5s. 9d.; Constantinople, 4,800,  
 11s. 6d.; 4,000, 11s. 6d.; Havre, 1,300, 4s. 9d.; Alexandria,  
 5,400, 9s., 700; 4,300, 9s. 3d.; North Norway, 1,400, 6s. 9d.;  
 Helmsdahl, 2,100, 6s.

Hartlepool to Genoa, 3,000, 9s. 6d.; Leghorn, 3,800, 9s. 9d.,  
 Genoa terms.

Patania, 10s.

nos Ayres, sail, 19s. 9d.

berg, 2,800, 4s. 9d.; Hamburg, 3,500,  
 2,200, 9d.; Nice, 3,000, 9s.

Burntisland to Nice, 1,700, 11s. 3d.

King's Lynn to Libau, 1,500, 5s. 7½d.

Fife port to Wallvik, 1,500, 5s. 9d.; St. Brieux, 850, 7s. 6d.

Newport River to Tarragona, 2,000, 10s.; Corunna, 2,400,  
 8s.; Bilbao, 1,350, 7s. 3d.

Seaham Harbour to Hamburg, 3,100, 3s. 9d.

Rotterdam to Bordeaux, 3,500, 5s. 6d.; 3,600, 5s. 9d.

steam coals, 6s. 6d. fuel; Bilbao, 3,400, 5s. 3d.; St. Nazaire,  
 3,300, 5s. 6d., Trignac terms, November 8-10; 3,430, 5s. 6d.,

Trignac terms; Calamata and Nauplia, 3,800, 12s.,  
 November 10-15; Barcelona, 4,800, 9s.; Bagnoli-Porto

Ferrajo, 5,000, 8s. 3d.; Leghorn, 5,000, 9s.; Malta, 4,600, 7s.

Homeward charters:—Azof, 20,000 qrs., 10 per cent.; 400,  
 10s. 6d. n.c. or any, 11s. Hamburg, November 4-15;

20,000 qrs., 10 per cent., 400, 10s. n.c. or any, 10s. 6d.

Hamburg, November; 4,800 max., Marseilles, 12 fr., ppt.;  
 Nicolaieff, 4,800, Middlesbrough, 8s. 9d., ore, early

November; 6,000-6,700, Rotterdam, 7s. 3d., ore, November;  
 South Russia, 20,000 qrs., 10 per cent., 400, 10s. 6d.

n.c. or any, 11s. Hamburg, November 20-December 5;  
 Sulina, 4,200, L.H.A.R., 8s. 6d., with 3d. less barley, 1,000

tons oats 2s. extra, November 1-15; 6,600, Antwerp or  
 Rotterdam, 9s., 3d. less barley, 2,000 tons oats 2s. extra,

November 15-30; 7,000 max., Antwerp, 8s. 9d., 3d. less  
 barley, November 20-December 10; 6,000, Rotterdam 8s.,

Antwerp 8s. 3d., November-December; 5,000, Denmark,  
 basis 11s., November; Skadowsk and Theodosia, 5,700,

Antwerp or Rotterdam, 9s. 3d., with 3d. less barley, ppt;  
 South Australia, 5,800 max., United Kingdom-Continent,

31s. 3d., December-January; Massowah, 6,000, Calcutta,  
 Rs. 6, November; Philadelphia, 32,000 qrs., 10 per cent.,

Rotterdam, 2s., November 1-15; Baltimore, 3,000-4,000, La  
 Plata, 17s. 6d., ppt.; 22,000 qrs., 10 per cent., Bordeaux,

2s. 9d., January; 2s. 2½d. Rotterdam, 2s. 9d. Havre, Decem-  
 ber; 22,000 qrs., 10 per cent., Santos, 4s. 3d., November;

Tampa and Savannah, 1,988 net, Havre and Dunkirk, 45s.,  
 November; Gulf, 2,705 net, Liverpool or Bremen 40s.,

Havre 42s. 6d., cotton, November-December; 2,471 net,  
 United Kingdom-Continent, two ports to one port, 13s., net

form, January; 1,400 stds., 10 per cent., South Africa,  
 three ports, 131s. 3d., December; Rio de Janeiro, 2,198 net,

Philadelphia or Baltimore, 11s. 6d., ore, ppt.; Torrevieja,  
 5,800-600, Calcutta, 10s. 6d., salt, December; Algiers, 6,000,

Rotterdam, 4s. 9d., ppt.; Barreiro, 1,500, Goole, 8s. 9d., ppt.;  
 Bilbao, 4,300, Rotterdam, 4s. 9d. ppt.; 3,500, Dunkirk, 5s. 6d.,

spot; Norfolk, 30s., Liverpool, Manchester or Bremen,  
 cotton, November; Port Said, 6,000, Singapore, 10s., salt,

November-December; Huelva, 4,500, Chrome Dock, 10s.,  
 f.d., November; nitrate ports, 7,500, United Kingdom-

Continent or United States, 25s. 3d., December; 6,400-6,800,  
 25s., December; 6,800, 25s. 6d., December; 25s. 9d., with

options, December; South Australia, sail, 28s. 9d., United  
 Kingdom-Continent, option South Africa 24s., charterers

paying extra insurance; Newcastle, N.S.W., sail, 24s. 6d.,  
 West Coast South America, 25s., Callao; Newcastle,

N.S.W., 15s., Java; Madras Coast, 28s. 9d. one port,  
 30s. both ports, Trieste and/or Marseilles, December-

January; time charter, Mediterranean and Black Sea trade,  
 4s. 7½d., one round trip, delivery Wales, re-delivery United

Kingdom-Continent; Burmah, 25s., United Kingdom-Conti-  
 nent, o.c.; San Lorenzo, 16s. 3d., United Kingdom-Conti-

continent, option Bahia Blanca same rate; 5,300, 10 per cent.,  
 United Kingdom-Continent, 12s. 7½d. o.c., less 6d. Novem-

ber; 4,500, 10 per cent., 16s. o.c., less 6d., January-February;  
 Alexandria, 3,000, 10 per cent., Southampton or Bristol

Channel, 9s., December; Garrucha, 2,300, Stockton, 7s. 6d.,  
 mid-November; St. Nazaire, 2,900, Emden, 4s., ppt.; Vladi-

vostock, 2,686 net, United Kingdom-Continent, about 30s.,  
 December-January; Christmas Island, 2,206 net, Fremantle,

12s., December; Poti, 4,500, Boulogne, 13s., early November;  
 5,300, Antwerp, 11s. 9d., early November; 5,800, Rotterdam,

11s. 3d., Antwerp 1s. 6d., Westoll's terms, early November;  
 Calcutta, 9,488 net, Bombay or Kurrachee, Rs. 5.8, Novem-

ber; Kherson, Nicolaieff or Odessa, 5,000, London or  
 Rotterdam 8s. 6d., Hamburg 9s., 3d. less barley, ppt.; 6,600,

London or Rotterdam 8s. 3d., Weser 8s. 6d., Hamburg  
 8s. 9d., 3d. less barley, ppt.; Bulgaria, 2,900 max., Antwerp,

9s. one port, 9s. 1½d. two points loading, spot; Carthage,  
 4,000, Maryport, 7s., ppt.; Wilmington, 1,946 net, 152 ft.,

Liverpool or Bremen, 33s. 9d., November; Savannah, &c.,  
 2,482 net, Bremen or Rotterdam, 35s., November 5-25;

Buenos Ayres, 5,500, 10 per cent. United Kingdom-Conti-  
 nent, 10s. 3d. o.c., no reduction, ppt.; Port Pirie, 30s. 6d.

Antwerp, option 32s. Stettin, December 1-20; Burmah,  
 6,700, United Kingdom-Continent, 24s. 3d., February;

Danube, 2,400, 10s. n.c. or any, 10s. 6d. Hamburg; Aden,  
 6,300, Calcutta, Rs. 5.8, option Chittagong, Rs. 6, salt; Poti,

4,800, St. Nazaire, 13s., ppt.; Porman, 3,400, Tyne Dock,  
 6s. 9d., ppt.; Malaga, 3,800, Rotterdam, 5s. 6d., early

November; La Falaie, 3,100, Barrow, 8s. 6d., ppt.; Bahia  
 Blanca, 5,000, United Kingdom-Continent, 16s. o.c., less 6d.,

January-February.

A special meeting of the general committee of the

Cumberland Mine and Quarries Centre of the St. John

Ambulance Association was held at the Grand Hotel,

Whitehaven last week. The election of officers resulted as

follows:—President of the centre, the Earl of Lonsdale;

chairman of the committee, Mr. J. R. R. Wilson; deputy

chairmen, Messrs. W. Leck and G. Cook, H.M. inspectors

of mines; secretary, Mr. Thos. W. Atkinson; treasurer,

Mr. A. C. Scoular; auditors, Messrs. W. McGowan and

S. S. Wilson. On the proposition of Mr. W. J. Dalzell

Burnyeat, seconded by Mr. Andrew Sharp, the following

resolution was cordially adopted: "That this meeting

hereby expresses its sincere and hearty appreciation of

Mr. Atkinson's valuable work as chairman of the committee

during the last 10 years, and that this expression of opinion

be recorded in the minutes of the association." The

secretary's report for the session contained the following:—

During the session 1912-13, 18 classes were held, 689

persons received a complete course of ambulance instruction

and 486 presented themselves for examination, resulting in

263 first aid certificates, 97 vouchers, 47 medallions and 56

labels being issued. The competition for the challenge

shield again formed an interesting feature in connection

with the Association's work, 20 teams entering for the

same. The shield was won by a team representing Moss

Bay Mines, Lowca Colliery team being placed second.

## COAL, IRON AND ENGINEERING COMPANIES.

**British Engineering Company of Siberia Limited.**—This private company has been registered, with a capital of £103,000 (10,000 6 per cent. cumulative preference shares of £10 each and 70,000 ordinary shares of 1s. each), to carry on the business of ironfounders, mechanical engineers, &c. Signatories: E. George Mawby and William A. Ward, both of 7, Queen-street, Cheapside, E.C.

**Cradley Heath Colliery Company Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of colliery proprietors, miners and dealers in all kinds of metals and minerals. Signatories: D. Westwood, Chester-road, Cradley Heath; James B. Higgs, Sydney-road, Cradley Heath; and William Jones, High-street, Cradley Heath.

**Dominion Steel Corporation Limited.**—Dividend No. 7, at the rate of 1½ per cent., on the preference has been declared.

**Horden Collieries Limited.**—The directors announce a final dividend of 8 per cent. on the share capital called up before October 1, 1912, making 12 per cent. for the year.

**Jones (John) and Co. (Neal and Hughes) Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire the business now carried on by Henry James Neal and Charles Henry Hughes at Liverpool, under the style of John Jones and Co., and to carry on the business of tin-plate and sheet iron workers, ironfounders, mechanical engineers, manufacturers of agricultural implements and other machinery. First directors; Henry James Neal, 86, St. Paul's-road, Seacombe, Cheshire, and Charles Henry Hughes, 69, Green-lane, Liscard, Cheshire.

**Lancashire Wagon Company Limited.**—The directors' report for the half-year ended September 30, 1913, states that the revenue account shows a profit of £23,390 18s. 8d., to which must be added the balance brought forward from last year, £1,484 16s. 1d., making a total of £24,875 14s. 9d., which the directors recommend should be appropriated as follows:—In payment of dividends for the half-year at the rate of 5 per cent. per annum, less income tax, on the preference shares, and at the rate of 10 per cent. per annum, free of income tax, on the ordinary shares, £1,557 12s. 8d.; to be added to the reserve fund, £2,000; leaving to be carried forward to next account the sum of £1,318 2s. 1d.

**Mohachang Exploration Company Limited.**—This private company has been registered, with a capital of £30,000 in £1 shares, to acquire any mining claims, mines and metalliferous lands, and to carry on the business of manufacturers of and dealers in coal, minerals, ores and other similar substances. Signatories: Lewis Edward Lawton, W. Frederick Witt and Alfred Wh



# THE COLLIERY GUARDIAN

## MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below :—

Am. City = American City.  
Am. Gas Light JI. = American Gas Light Journal.  
Am. School of Corr. = American School of Correspondence.  
Ann Min. Belg. = Annales des Mines de Belgique.  
Berg- Hüttenmänn. Rdsch. = Berg- und Hüttenmännische Rundschau.  
Bl. Diam. = Black Diamond.  
Bull. Soc. Amicale Douai = Bulletin de la Société Amicale Douai.  
Bull. Soc. Min. St. Etienne = Bulletin de la Société de l'Industrie Minière de Saint Etienne.  
Canad. Min. JI. = Canadian Mining Journal.  
Coal and Coke Op. = Coal and Coke Operator.  
Coal Tr. Bull. = Coal Trade Bulletin.  
Colliery Eng. = Colliery Engineer.  
Colliery Guard. = Colliery Guardian.  
Colorado Sch. Mines Mag. = Colorado School of Mines Magazine.  
Compr. Air Mag. = Compressed Air Magazine.  
D. Bergwerks Ztg. = Deutsche Bergwerks Zeitung.  
Dingler's Polytechn. JI. = Dingler's Polytechnisches Journal.  
El. Kraftbetr. = Elektrische Kraftbetriebe und Bahnen.

El. Maschbau = Electrotechnik- und Maschinenbau.  
Engin. Min. JI. = Engineering and Mining Journal.  
Fördertech. = Fördertechnik.  
Indian Eng. = Indian Engineer.  
Int. Marine Engin. = International Marine Engineering.  
Jl. S. Afr. Inst. Engin. = Journal of the South African Institute of Engineers.  
Jl. Gas Light. = Journal of Gas Lighting.  
Jl. Soc. Chem. Ind. (Lond) = Journal of the Society of Chemical Industry (London).  
Kohle Erz = Kohle und Erz.  
Midland Inst. Min. Engin. = Midland Institute of Mining Engineers.  
Min. Engin. (Lond.) = Mining Engineering (London).  
Min. Eng. World = Mining Engineering World.  
Min. Inst. Scotld. = Mining Institute of Scotland.  
Min. Science = Mining Science.  
Min. Scient. Press = Mining and Scientific Press.  
N. Eng. Gas Managers' Assoc. = North of England Gas Managers' Association.  
Petr. World = Petroleum World.  
Railw. Gaz. = Railway Gazette.  
Rev. Ind. = Revue Industrielle.  
Rev. Minera = Revista Minera, Metallurgica de Ingenieria.

Rev. Noire = Revue Noire.  
S. Afric. Min. JI. = South African Mining Journal.  
Sci. Art. Min. = Science and Art of Mining.  
S. Wales Inst. Engin. = South Wales Institute of Engineers.  
Trans. Inst. Min. Engin. = Transactions of the Institution of Mining Engineers.  
U.S. Bur. of Mines = United States Bureau of Mines.  
Verh. Ver. Beförd. Gew. Abh. = Verhandlungen des Vereins zur Beförderung des Gewerbefleißes, Abhandlungen und Sitzungsberichte.  
Z. Berg- Hütten Salinenwes. = Zeitschrift für das Berg- Hütten- und Salinenwesen im Preussischen Staate.  
Z. Dampfkessel-Betr. = Zeitschrift für Dampfkessel- und Maschinenbetrieb.  
Z. Oberschles. Berg- Hütten- Ver. = Zeitschrift des Oberschlesischen Berg- und Hüttenmännischen Vereins.  
Z. Schiesswes. = Zeitschrift für das Gesamte Schiess- und Sprengstoffwesen.  
Z. Ver. D. Ing. = Zeitschrift des Vereins Deutscher Ingenieure.

\*\* We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

### I.—General.

Costs Efficiency in Mining. W. J. Crocker. "Min. Eng. World," vol. 39, 7, p. 299-300. 1s. 3d.  
Strikes and Lock-outs in Germany in 1912. (Streiks und Aussperrungen im Deutschen Reich im Jahre 1912.) "Glückauf," vol. 49, 23, p. 905-6. 2s. 6d.  
The Export of Pit Coal from the Rhenish Westphalian Coal District. (Die Ausfuhr von Steinkohle aus dem niederrheinisch-westfälischen Steinkohlenbezirk.) E. Jüngst. "Glückauf," vol. 49, 24, p. 941-6.  
Coal and the Coal Industry in France. (Le Charbon et son Industrie en France.) M. de Peyerimhoff. "Bull. Soc. Amicale Douai," 1913, p. 507.  
The Rhenish Lignite Industry in 1912. (Die rheinische Braunkohlenindustrie im Jahre 1912.) "D. Bergwerks Ztg.," 1913, p. 1, 29, 7. 2s. 6d.  
The Economic Significance of the Mining Industry on the Cultural and Industrial Development of a Country, with Special Reference to the German Empire. (Die wirtschaftliche Bedeutung der Montanindustrie fuer die kulturelle und industrielle Entwicklung eines Landes unter besonderer Berücksichtigung des Deutschen Reiches.) K. Flegel. "Berg Hüttenmänn. Rdsch.," 1913, p. 327; ill. 2s. 6d.  
The Influence of the Ems-Weser Canal on the Coal Market. (Der Einfluss des Ems-Weser-Kanals auf den Kohlenmarkt.) Muehlefeld and Spackeler. "Glückauf," vol. 49, 29, p. 1143-56. 2s. 6d.  
Sickness Insurance in Germany During 1911. (Die Krankenversicherung im Deutschen Reich in Jahre 1911.) "Glückauf," vol. 49, 32, p. 1265-9. 2s. 6d.  
The Wages of Coalminers in 1912. "Colliery Guard.," vol. 106, 2756, p. 838. 6d.  
Industrial Agreements in the Coal Trade: Scotland. "Colliery Guard.," vol. 106, 2752, p. 640; Evidence of Miners' Leaders, "Colliery Guard.," 2756, p. 851. (Digest of evidence before Industrial Council.) 1s.  
The Geographical Value of Coal. H. N. Dickson. "Colliery Guard.," vol. 106, 2753, p. 685. (Address British Association.) 6d.  
Workmen's Compensation in 1912. "Colliery Guard.," vol. 106, 2753, p. 694. 6d.

### II.—Education.

Free-hand Sketching in the Mining and Engineering Field. A. Lakes. "Min. Science," 1913, p. 92; ill. 2s.  
Presidential Address, Manchester Geological and Mining Society. Sir T. Holland. "Colliery Guard.," vol. 106, 2755, p. 787. 6d.

### III.—Geology.

The Coal and Lignite Reserves of Germany. (Die Stein- und Braunkohlenvorräte des Deutschen Reiches.) H. E. Boeker. "Glückauf," vol. 49, 27, p. 1045-58; 28, p. 1087-1101; ill. 5s.  
The Coal Reserves of France. (Les Reserves Houillères de la France.) R. Pitaval. "L'Echo des Mines," 1913, p. 850 and p. 866.  
The Coal Reserves of France. (Die Kohlenvorräte Frankreichs.) "D. Bergwerks Ztg.," 1913, p. 1. 2s. 6d.  
The Coalfields of India. "Indian Eng.," vol. 54, 8, p. 102-3. 2s.  
Coal Resources of the World. W. McInnes and Others. "Canad. Min. JI.," vol. 34, 16, p. 520-2. (Digest of reports from 64 countries.) 1s. 6d.  
The Origin and Deposition of Coal. W. B. Richards. "Min. Engin., Lond.," 1913, p. 126; ill. 9d.

Tertiary Coalfields of the Rio Grande, Texas. B. L. Miller. "Coal Age," vol. 4, 8, p. 260-3; 6 ill., 2 maps. 1s. 3d.  
The Coal Deposits at Nanaimo, Vancouver Island, B.C. C. H. Clapp. "Canad. Min. JI.," vol. 34, 18, p. 586-7. 1s. 6d.  
The Coal Deposits of Belgium. (Les Gisements Houillères de la Belgique.) A. Rebier. "Ann. des Min. Belg.," vol. 18, 3, p. 755; ill.  
Bituminous Coal in Pennsylvania. A. W. Calloway. "Coal and Coke Op.," 1913, p. 254. 2s. 3d.  
Oil and Gas Wells through Workable Coal Beds; papers and discussions. G. S. Rice and Others. "U.S. Bur. of Mines," Wesley; ill. Svo, 101 pp. 2s. 6d.  
The Coal Resources of the World: An enquiry made upon the initiative of the executive committee of the Twelfth International Geological Congress, Canada, 1913, with the assistance of geological surveys and mining geologists of different countries. "Geological Survey," Canada, 3 vols. 4to and atlas. £5 15s.  
Note on Some Deep Boreholes by the Chatillon-Commentry Company, between Douai and Arras, France. (Notes sur Quelques Sondages Profonds Exécutees Entre Douai et Arras par Compagnie de Chatillon-Commentry.) Ch. Barrois. "Bull. Soc. Amicale Douai," 1913, p. 545.  
Ten Deep Borings in East Kent. Malcolm Burr. "Colliery Guard.," vol. 106, 2754, p. 731; 1 fig. (and plate of sections). 6d.

### IV.—Mine Surveying.

Mechanics of Mining. M. E. Strohman. "Colliery Eng.," vol. 34, 2, p. 114-6; 4 fig. (An explanation of the principles underlying calculations relating to engines, pumps, and other machinery.) 2s. 6d.

### V.—Mining Technology.

Mining Machinery. Handbook for Miners, vol. 4: Hauling. (Die Bergwerksmaschinen. Eine Sammlung von Handbuechern fuer Betriebsbeamte.) Bansen and others. Berlin, 1913: Springer, 333 p.; 402 ill. 18s.

### VI.—Working of Minerals.

Mines and Mining in the English Lake District. J. Postlethwaite. Third edition; ill., Svo. Dulau. 5s.  
Machine Mining in the South Wales Steam Coals. G. D. Budge and W. E. Jayne. "Colliery Guard.," vol. 106, 2752, p. 628; 4 fig. (Abst. paper read before S. Wales Inst. Engin.) 6d.

### VII.—Boring, Shaft Sinking, and Tunnelling.

Hammer Drills in Shaft-sinking in Soft Shale. "Coal Age," vol. 4, 7, p. 231-3; 3 fig. 1s. 3d.  
Concrete Shaft Station, Wolverine Mine. C. T. Rice. "Engin. Min. JI.," vol. 96, 9, p. 397-9; 3 fig. 1s. 6d.  
Drilling in the Roof. (Der gegenwaertige Stand der Hochbohrtechnik.) O. Döbbelstein. "Glückauf," vol. 49, 32, p. 1252-61. 2s. 6d.

### VIII.—Explosives, Blasting.

Switch for Utilising High-tension Mains for Shot-firing in Mines. (Schiessschalter zur Benutzung von Starkstromleitungen als Stromquelle bei der elektrischen Zuendung von Sprengschuessen im Bergbau.) P. Humann. "Glückauf," vol. 49, 33, p. 1306; ill. 2s. 6d.

The Use of the Ballistic Pendulum for the Determination of the Strength of Explosives. (Der Gebrauch des ballistischen Pendels zur Bestimmung der Staerke von Explosivstoffen.) A. M. Comey and H. B. Fletcher. "Z. Schiess-Wes.," 1913, p. 265; ill. 2s. 6d.

### IX.—Timbering, Packing, &c.

Heidkamp Sectional Wooden Pit Prop. (Mehrbeiliger hoelzerner, nach dem Verfahren von Heidkamp hergestellter Grubenstempel.) "Glückauf," vol. 49, 34, p. 1344-5; ill. 2s. 6d.

### X.—Surface Arrangements

Tipples of the Allegheny River Mining Company. (Each tippel has two dumps but requires only three men; the cars are pulled by power and run by gravity.) "Coal Age," vol. 4, 8, p. 265-6; 2 ill. 1s. 3d.  
Astley Green Colliery. "Colliery Guard.," vol. 106, 2753, p. 684; 1 ill. (group). 6d.

### XI.—Winding and Haulage.

Mechanical Tub-changers for Mine Cages. (Maschinelle Beschreibungsvorrichtung fuer Foerderkoerbe.) Wintermeyer. "Glückauf," vol. 49, 33, p. 1287-91; 13 ill. 2s. 6d.

Underground Haulage in Coalmines. (Unterirdische Steinkohlenfoerderung beim Steinkohlenbergbau.) J. Rechtenwald. "Fördertech.," vol. 6, 8, p. 183-5. 2s. 6d.

Electrically-driven Main Shaft Hauling Engine with Steam Turbine Driving and Starting Dynamo. Elektrisch betriebene Hauptschachtfoermaschinen mit Dampfturbinenantrieb der Anlassdynamo.) E. Blau. "El. Maschbau," vol. 31, 36, p. 764-9; ill. 2s. 6d.

Internal Combustion Mine Locomotives. J. Tyssowski. "Engin. Min. JI.," vol. 96, 8, p. 347-50; 5 ill. (Some features of construction of principle American-made gasoline locomotives for mine haulage, consumption 0.1 gallon per horse-power-hour.) 1s. 6d.

Locomotives with Multiple Cylinder Benzine Motors. (Les Locomotives avec Moteurs à Benzine à Cylindres multiples. E. P. Leroux. "Rev. Noire," 1913, p. 260; ill.; and p. 304; ill. 4s.

Description of Two Safety Stops for Inclined Planes and Self-acting Inclined Planes. (Beschreibungen von zwei Bremsschacht- und Bremsbergverschlüssen.) "Bergbau," 1913, p. 433; ill. 2s.

Winding Frames with Special Consideration of the Ferro-concrete Frame at the Campbausen Pit, near Saarbruecken. (Fördertürme, besonders der Eisenbetonbau auf Grube Campbausen bei Saarbruecken.) Russwurm. "Dingler's Polytechn. JI.," 1913, p. 273-5, ill.; p. 405-6, ill. 5s.

The Selection of a safety Regulator for Steam Hauling Engines. (Ein Ratgeber für die Wahl einer Sicherheitsvorrichtung für Dampffördermaschinen, Fahrtregler Schoenfeld.) Berlin-Halensee, 1913. 2s.

Prevention of Haulage-way Accidents. L. M. Jones. "Coal and Coke Op.," 1913, p. 383. 2s. 3d.

Contribution on the Determination of the Safety of Wire Ropes. (Beitrag zur Beurteilung der Sicherheit von Drahtseilen.) G. Benoit. "Glückauf," 1913, p. 1328. 2s. 6d.

The Development of the Electrically-driven Hauling Engine. (Die Entwicklung der elektrisch betriebenen Foermaschine.) Wintermeyer. "Verh. Ver. Beförd. Gew. Abh.," 1913, p. 289-300; ill.



Proceedings and Investigations of the Prussian Transportation Commission, Parts I and 2, 1913. (Die Verhandlungen und Untersuchungen der Preussischen Seilfahrt-Kommission. "Z. Berg. Hütten- und Salinenwes." special number, part 1, 258 pp., part 2, 372 pp.; ill. 5s.

On the Question of Economy in the Use of Electrical Winding Engines in Large Shafts. (Sobre la Question de la Economía en el uso de las Maquinas Electricas de Extraccion en los Grandes Pozos.) W. Philippi. "Rev. Minera," 1913, p. 357, ill.; p. 371, ill.; and p. 388, ill.

The Braking of High-speed Winding Engines. G. K. Chambers. "Jl. S. Afr. Inst. Engin.," vol. 12, 2, p. 33-7. 5s.

Compressed-air Locomotives in Tunnel Construction. E. C. Amos. "Railway Gaz.," vol. 19, 12, p. 298-300; 3 ill. 1s.

Graphic Determination of Diagrams for Hauling Engines Driven by Series Motors. (Zeichnerische Diagrammmittlung für Foerdermaschinen mit Antrieb durch Reihenschlussmotoren.) G. Treffer and F. Nettel. "Z. Ver. D. Ing.," vol. 57, 24, p. 935-42, ill.; 25, p. 977-80, ill. (Hauling engines with driving pulley, cylindrical and conical drums.) 5s.

Results of Shaft Hauling Rope Statistics in the Bonn District for 1911. (Ergebnisse der Schachtfoerderseilstatistik der Erzbergbaues im Oberbergamtsbezirk Bonn fuer das Jahr 1911.) F. Buerklein. "Glückauf," vol. 49, 30, p. 1179-85; ill. 2s. 6d.

Skip-Haulage in German Mines. (Die Gefäss-Schachtförderung (Skipförderung) und der deutsche Bergbau.) Herbst. "Glückauf," vol. 49, 31, p. 1209-15; 32, p. 1245-52. 5s.

Winding Engine Trials. (Untersuchungen von Bergwerksmaschinen.) "Glückauf," vol. 49, p. 34, p. 1331-5; ill. (Report by the Dortmund Boiler Inspection Association.) 2s. 6d.

Electric Main Hauling Engine at Shaft II. of the Rheinpreussen, Homberg-Ilgen Plant. (Elektrische Hauptschachtfördermaschine auf Schacht II der Zeche Rheinpreussen, Homberg a.Rh.) Philippi. "El. Kraftbetriebe," 1913, p. 421-9; ill. 2s. 6d.

Electrical Winding Gear at South Kenmuir Colliery. W. M. Dunn. "Colliery Guard.," vol. 106, 2755, p. 785; 3 fig. (Abst. paper read before Min. Inst. Scotld.) 6d.

Rufford Colliery Accident, W. Walker. "Colliery Guard.," vol. 106, 2755, p. 783; 5 fig. (Home Office Report.) 6d.

## XII.—Signalling.

An Electric Mine Signal System. E. A. Colburb, jun. "Min. Scient. Press," vol. 107, 9, p. 340; 1 fig. 1s. 4d.

Installation of Signals in Mine Shafts for Controlling Cages in Motion. (Installation dans les Puits de Mines de Signaux Pouvant être Manœuvrés des Cages en Mouvement.) J. Kersten. "Ann. Min. Belg.," vol. 18, 3, p. 697; ill.

The Wireless Telephone in Mines. (La Telefonía sin Alambres en las Minas.) "Madrid Científico," 1913, p. 345.

Automatic Telephone System for Mines. "Min. Eng. World," 1913, p. 285. 1s. 3d.

Approved Safety Lamps for Mines. Bifold Burner Marsaut, Marsaut A, B, C and D, Patterson's, Prestwich Patent Protector, and 176 Oil Lamps. "Colliery Guard.," vol. 106, 2752, p. 643, 4 fig.; Rothwell's A, B, C and E Lamps, 2754, p. 737 3 fig.; Teale's Protector Nos. 1, 2 and 3, Bonneted Marsaut No. 4, and Deflector Marsaut No. 5 lamps; 106, 2755, p. 802, 3 fig.; Cambrian No. 1, Deflector No. 15, Hailwood Nos. 01a, 06, and 71, Cremer No. 11a, Davis-Beacatorh No. 11, Davis-Boss No. 3, Davis-Alumthorn No. 6, Davis-Diabl No. 7, Davis-Bossgy No. 3 C lamps, 106, 2756, 6 fig. 2s.

## XIII.—Lighting.

On the Gauzes of Safety Lamps. (Sur les Tamis des Lampes de Sûreté.) "Bull. Soc. Amicale Douai," 1913, p. 308.

## XIV.—Ventilation.

Mine Ventilation. "Colliery Eng.," vol. 34, 2, p. 112-4; 5 fig. (Mine doors—the purpose for which they are used, methods and construction.) 2s. 6d.

Ventilation of Mines and Removal of Gas. J. J. Rutledge. "Coal and Coke Op.," 1913, p. 339; ill. 2s. 3d.

Studies on Mine Ventilation. (Etude sur l'Aerage des Mines.) Bouvat-Martin. "Bull. Inst. Min. St. Etienne," 1913, p. 49-89; ill. (Natural ventilation. Influence of the composition of air, humidity, pressure, &c.)

## XV.—Mine Gases, Testing.

Ignition of Mine Gases by the Filaments of Incandescent Lamps. H. H. Clark and L. C. Ilsley. "U.S. Bur. of Mines," ill. 1s. 6d.

On the Analysis of Combustible Gases by Explosion. (Sobre el Analisis de los Gases Combustible por Explosion.) E. Hauser. "Rev. Minera," 1913, p. 267.

Various Types of Mine Gas Indicators. (Die verschiedenen Bauarten von Wetteranzeigern.) Forstmann. "Glückauf," vol. 49, 26, p. 1008-18; 27, p. 1058-63; ill. 5s.

## XVI.—Coaldust.

The Effect of Incombustible Dnsts on the Explosion of Gases. H. B. Dixon and C. Campbell. "Jl. Soc. Chem. Ind., Lond.," 1913, p. 684. 4s.

First Series of Coaldust Explosion Tests in the Experimental Mine. G. S. Rice, L. M. Jones, and W. L. Ezy. "U.S. Bur. Min. Bull.," 56.

Influencing Factor in Coaldust Explosions. R. C. "Coal and Coke Op.," 1913, p. 345. 2s. 3d.

Coaldust and its Preventive. E. L. "Colliery Guard.," vol. 106, 2754, p. 749. 6d.

## XVII.—Explosions.

Explosion at Auckland Park Colliery. R. A. S. Redmayne and A. D. Nicholson. "Colliery Guard.," vol. 106, 2756, p. 833; 3 fig. (Home Office Report.) 6d.

## XVIII.—Mine Fires.

Accident during Mine Fires in the Moeller Pits, Gladbeck. (Unfall in Brandwettern auf den Moellerschächten der Königlichen Berginspektion zu Gladbeck am 21 November 1912.) Richstaetter. "Z. Berg.-Hütten Salinwes.," 1913, 2, p. 297-303; 1 tab. 2s. 6d.

The Absorption of Oxygen by Coal. Part I. T. F. Winnill. "Colliery Guard.," vol. 106, 2752, p. 625; 3 fig. (Abst. paper read before Inst. Min. Engin.) 6d.

Further Researches in the Microscopical Examination of Coal, especially in relation to Spontaneous Combustion. J. Lomax. "Colliery Guard.," vol. 106, 2752, p. 630. (Abst. paper read before Inst. Min. Engin.) 6d.

A Method of Measuring Goaf Temperatures. T. F. Winnill. "Colliery Guard.," vol. 106, 2752, p. 631; 1 fig. (Abst. paper read before Inst. Min. Engin.) 6d.

The Cadder Pit Disaster. "Colliery Guard.," vol. 106, 2752, p. 631; 2753, p. 696. (Report of Home Office Enquiry.) 1s.

## XIX.—Rescue and Ambulance

National Mine Rescue and First Aid Conference, Pittsburg, Pa., September 23-26, 1912. H. M. Wilson. Washington D. C.: Bull. 62 "U.S. Bur. of Mines," 74 pp.

Modification of the Tissot Respiratory Apparatus. (Modification des Appareils Respiratoires Tissot.) "L'Echo des Mines," 1913, p. 871.

Testing Device for Oxygen Apparatus. (Prüfungsvorrichtungen fuer Sauerstoff.) Forstmann. "Glückauf," vol. 49, 31, p. 1216-18. 2s. 6d.

Liquid Air and Rescue Work. "Colliery Guard.," vol. 106, 2756, p. 852. 6d.

## XX.—Drainage, Pumping, &c.

The Turbo-Pump Works of C. H. Jaeger and Co. (Der Turbinenpumpenbau von C. H. Jaeger and Co.) H. Mitter. "Z. Ver. D. Ing.," vol. 57, 26, p. 1005-14, ill.; 27, p. 1052-61, ill.

## XXI.—Preparation.

Coal Separating Machines. (Amerikanische Setzmaschinen.) R. Neumann and R. Blumenfeld. "Z. Ver. D. Ing.," vol. 57, 23, p. 896-901; ill. (Description of American machines for coal preparation; discussion of details in which they differ from German types.) 2s. 6d.

## XXII.—Briquettes.

Notes on Briquetting Methods. C. L. Edholm. "Coal Age," vol. 4, 9, p. 304-5; 7 fig. 1s. 3d.

Briquetting Pitch from Coke Oven Tar: Cava Process. "Iron Age," vol. 92, 11, p. 589-90. 2s.

Briquetting of Fine Materials. W. Heym. (Zusammenpressen feinen Materials.) "Kali Erz Kohle," 1913, p. 807. 2s. 6d.

The Manufacture of Coal Briquettes with the Addition of Naphthaline. (Fabrication des Briquettes de Charbon avec Addition de Naphtaline.) "Rev. Ind.," 1913, p. 15.

The Poncet Rotary Drying Furnace Installed at the Briquetting Plant of the Escarpelle Mining Company, France. (Four Secheur rotatif Poncet installé à l'Usine à briquettes de la Compagnie des Mines de l'Escarpelle, à Douai.) A. Say. "Rev. Noire," 1913, p. 480; ill. 2s. 6d.

## XXIII.—Coke Ovens.

English v. Continental Coke Oven Bricks. A. Hutchinson. "Gas World," vol. 59, 1521, p. 313. 10d.

By-Product Coking Practice and the Utilisation of Gas and Tar. "Gas World," vol. 59, 1521, p. 313-4. 10d.

Ammonium Sulphate from Coke Oven Gases. "Iron Age," vol. 92, 8, p. 403. (European processes which dispense with the use of sulphuric acid.) 2s.

Supply of Coke Oven Gas to German Municipalities. "Engineer," vol. 116, 3012, p. 303. 1s.

The Examination of Coal in Coking with the Recovery of By-products. (Die Untersuchung der Steinkohle in der Praxis des Kokereibetriebes mit Gewinnung der Nebenprodukte.) A. Rzehulka. "Z. Oberschles. Berg.-Huettenmänn.-Ver.," 1913, p. 243; ill. 2s. 6d.

By-product Recuperative Coke Ovens. (Beiprodukte Rekuperativ-Koksoefen.) "Bergbau," 1913, p. 417; ill. 2s.

Still's Method for the Direct Production of Tar and Ammonia from Coke Oven Gases. (Das Verfahren von Still zur direkten Gewinnung des Teers und Ammoniaks aus Koksofengasen.) F. Korten. "Glückauf," vol. 49, 28, p. 1102-5. 2s. 6d.

## XXIV.—Fuels, Testing, &c.

Classification of Coals. J. M. Gordon. "Canad. Min. Jl.," vol. 34, 16, p. 524-7; 4 fig. 1s. 6d.

The Slow Combustion of Coaldust and Its Thermal Value. F. E. E. Lamplough and A. M. Hill. "Trans. Inst. Min. Engin.," vol. 45, 5, p. 629-57; 7 fig. 8s.

New Methods in the Utilisation of Coal. A. E. von Groeling. "Petr. World," 1913, p. 380; ill. 2s.

Calorific Power of Coals. "Am. Gas Light Jl.," vol. 49, 11, p. 163-4. (Report to Am. Soc. Test. Mat.) 1s. 6d.

The Spontaneous Combustion and Storage of Coal. (La Combustion dite Spontanée des Charbons et leur Emmagasinage.) "Métallurgie," 1913, p. 400. 5s.

The Proper Utilisation of Coal and Fuels Derived Therefrom. "Jl. Gas Light.," vol. 123, 2628, p. 838-46. 1s.

Method and Means of Smoke Abatement. R. C. Benner. "Am. City," vol. 9, 3, p. 230-2. (European and American.) 2s.

Gas Problems. E. F. Hooper. "Colliery Guard.," vol. 106, 2755, p. 793. (Add. N. of Eng. Gas Managers' Assoc.) 6d.

## XXV.—Steam Engines and Bolders.

Economy in the Generation of Steam. (Die Oekonomie bei der Erzeugung des Dampfes.) O. Albert. "Kohle Erz," 1913, p. 795. 2s. 6d.

Uniformity of State Laws for Boiler Construction and Inspection Advocated. Col. E. D. Meier. "Iron Age," vol. 92, 11, p. 591-2. 2s.

Report of the Dortmund District Colliery Boiler Inspection Association, 1912. (Bericht des Dampfkessel-Ueberwachungsvereins der Zechen im Oberbergamtsbezirk Dortmund ueber das Geschäftsjahr 1912/13.) "Glückauf," vol. 49, 31, p. 1218-21. 2s. 6d.

The Utilisation of Low-grade Fuels for Steam Boiler Working. (Die Verwertung minderwertiger und gasarmer Brennstoffe für Dampfkesselbetriebe.) Nerger. "Z. Dampfkessel. Betr.," 1913, p. 387-9. 2s. 6d.

## XXVI.—Compressed Air.

The Underground Blacksmith Shop. W. Blackburn. "Compr. Air Mag.," 1913, p. 6911; ill. 1s.

A Modern Compressor Plant. T. H. Kneeland. "Coal Age," vol. 4, 10, p. 345-6; 1 ill. (A representative type of underground installation.) 1s. 3d.

Rules for the Testing of Fans and Compressors. (Regeln fuer Leistungsversuche an Ventilatoren und Kompressoren.) R. Schöttler. Issued by the Union of German Engineers and the Association of German Manufacturers. "Fördertechn.," vol. 6, 7, p. 159-63; ill.; 8, p. 177-80; ill. 5s.

Care and Lubrications of Air Compressors. "Colliery Eng.," vol. 34, 2, p. 104. 2s. 6d.

Compressed Air. L. J. Wightman. 168 p.; 110 ill. (Am. School of Corr.) C. Lockwood, London. 6s.

## XXVII.—Electricity.

Insulated and Bare Copper and Aluminium Cables for the Transmission of Electrical Energy, with Special Reference to Mining Work. B. Welbourn. "Trans. Inst. Min. Eng.," vol. 45, 5, p. 658-708; 25 fig. 8s.

Electricity in Mines. H. S. Webb. "Colliery Eng.," vol. 34, 2, p. 116-8; 4 fig. (Methods of grouping cells, relation between electro-motive force, resistance and current.) 2s. 6d.

Electrical Apparatus. H. D. Jackson. "Coal Age," vol. 4, 9, p. 310-2. (Suggestion on the selection and placing of indicating instruments, also on the construction and installation of electrical machines and switchboards.) 1s. 3d.

The Leonard Control and its Applications. (Die Leonard-Schaltung und ihre Anwendungen.) E. Blau. "Kohle Erz," 1913, p. 818. 2s. 6d.

## XXVIII.—Surface Transport.

The New Clinchfield Dock at Charleston, S.C. "Bl. Diam.," 1913, p. 26; ill. 1s. 6d.

New Coal-handling Plant of the Lehigh Valley R.R. at Sputh Amboy, N.J. "Bl. Diam.," 1913, p. 23; ill. 1s. 6d.

A Modern Distribution and Coal-storing Plant. A. Gradenwitz. "Coal Age," vol. 4, 11, p. 378-80; 9 fig. (An electric system to accumulate coal coming from a separate plant and intended for local consumption, the line has 27 curves, and is entirely automatic.) 1s. 3d.

Transfer of Coal to and from Ships. "Int. Marine Engin.," vol. 18, 9, p. 390-2; 4 fig.

Hopper Bottom Box Wagon for Grain and Coal Traffic, Canadian Pacific Railway. "Railw. Gaz.," vol. 19, 12, p. 301; 3 ill. 1s.

Loading Plant at the Brassert Mine, Marl i.W. (Verladeanlage der Gewerkschaft Brassert, Marl i.W.) Von Schleinitz. "Eisenbau," 1913, p. 283-6; ill. 2s. 6d.

Improved Coal-shipping Facilities on the Tyne. "Colliery Guard.," vol. 106, 2754, p. 734; 2 fig. 6d.

A Coal-handling Plant at Crewe. "Colliery Guard.," vol. 106, 2756, p. 836; 2 fig. 6d.

## XXIX.—Sanitation, Diseases, &c.

Sanitation in Mines and in Mine Towns. W. H. Moulton. "Engin. Min. Jl.," vol. 96, 9, p. 391-2. 1s. 6d.

Miners' Phthisis and Speeding Up on the Rand. "S. Afric. Min. Jl.," vol. 22, 1143, p. 671. 2s.

Mine Sanitation. J. H. White. "Coal Tr. Bull.," 1913, p. 47.

Health as a Factor in an Engineer's Efficiency. H. J. Wolf. "Colorado Sch. Min. Mag.," 1913, p. 155; ill. 2s.

Baths for Miners. "Colliery Guard.," vol. 106, 2752, p. 627. (New orders.) 6d.

Miners' Nystagmus. J. Court. "Colliery Guard.," vol. 106, 2753, p. 701. (Abst. paper read before Midland Inst. Min. Engin.) 6d.

## XXX.—Mining Laws, Royalties.

Coal Mines Act. "Sci. Art. Min.," vol. 24, 2; p. Supp. 1-11.

Mining Legislation in France. (La Législation Minière en France.) "Bull. Soc. Amicale Douai," 1913, p. 542.

The Taxation of Mines. "Colliery Guard.," vol. 106, 2755, p. 800. (Income Tax and Mineral Rights Duty, 1912-13), 6d.

**Grimsby Coal Exports.**—According to the official returns for the week ended Thursday, October 23, the export of coal from Grimsby totalled 22,302 tons foreign and 1,358 coastwise, compared with 32,370 and 885 tons respectively for the corresponding week last year. Shipments:—Foreign: To Antwerp, 795 tons; Assens, 916; Christiania, 760; Dieppe, 639; Esbjerg, 233; Gefle, 2,028; Gothenburg, 2,880; Hamburg, 903; Kristiansand, 1,182; Landskrona, 1,511; Libau, 2,377; Malmo, 1,991; Randers, 549; Ronne, 724; Ronneby, 2,210; Rotterdam, 260; Trondhjem, 1,501; and Vezle, 843. Coastwise: To Hayle, 760 tons; London, 98 and Lowestoft, 500.



## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

BARNES, NOVEMBER 11.—The Barnes Council are prepared to receive tenders for the supply of coal suitable for chain grate stokers for use at their electricity works, High-street, Mortlake, for six and twelve months respectively, commencing from November 1, 1913. Forms of tender, with particulars, may be obtained at my offices as under. Tenders must be sent so as to be received by me before 12 noon on Tuesday, November 11 next, marked "Tender for Coal, Electricity Works." The council reserve to themselves the right to decline all or any, or any portion of the tenders received. By order, Wm. Thos. Goodale, clerk to the Council, the Council House, High-street, Mortlake, S.W.

## Abstracts of Contracts Open.

ALDERSHOT, NOVEMBER 4.—About 800 tons of coal (more or less) for use at the electricity works, for the Urban District Council. Form from Mr. F. Garside, Electricity Works, Laburnham-road, Aldershot.

ALEXANDRIA (EGYPT), DECEMBER 1.—Tenders are invited for the supply of 4,000 tons of Cardiff coal and 40 tons of Newcastle coal, 180 tons of petroleum, and 7 tons of benzine, required by the Egyptian Coast Guard Administration during the year 1914. Forms from the Director of Stores, Coast Guard Administration, Alexandria.

BECKENHAM, NOVEMBER 10.—Midland small coal, for the Beckenham Urban District Council. Forms from the Resident Engineer, Electricity Offices, 45, High-street, Beckenham.

BURY, NOVEMBER 3.—Coal and coke for the Bury and District Joint Hospital Board. Forms from Mr. Fred Wild, clerk to joint board, Cross-street, Bury.

CRONDALL (HANTS.), NOVEMBER 11.—About 70 tons of good household coal, for the Crookham and Ewshot Fuel Fund Trustees. Applications to be sent to Mr. Jesse Hoar, clerk to the trustees, The Deans, Crondall, Hants.

DOWNPATRICK (DOWN), NOVEMBER 5.—Best household coal, say about 40 tons, and of steam coal, for use in heating apparatus, for the Down County Council. Tenders to be sent to the Courthouse, Downpatrick.

DUNCHURCH, NOVEMBER 5.—About 80 tons of best coal or cobbles, free from slack (Moira and Donisthorpe), for the Trustees of the Thurlaston Poor Plot Charity. Tenders to Mr. W. D. Barnwell, Dunchurch.

LONDON, NOVEMBER 18.—About 4,000 tons of South Wales coal, to be delivered at Gibraltar during 1914, for H.M. Government. Forms from the Crown Agents for the Colonies, Whitehall-gardens, S.W., on payment of the sum of £1 (returnable).

WAKEFIELD, NOVEMBER 8.—Coal slack and smudge required at the electricity works of the Corporation at Calder Vale, for the Corporation. Forms from the City Electrical Engineer, Old Town Hall, Wakefield.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &amp;c.

ALLAHABAD (INDIA).—*Generating Plant.*—An electric generating plant consisting of oil engines, continuous-current dynamos, and storage batteries, for the Allahabad Club Limited. Tenders must be forwarded early to the Honorary Secretary, Allahabad Club Limited, Allahabad, India.

ARDEE (IRELAND), NOVEMBER 4.—*Well Sinking.*—For sinking and lining a well for the No. 1 Rural District Council. Specification can be seen at the clerk's office.

ASHCHURCH, NOVEMBER 18.—*Water Main.*—For laying of a water main for a distance of about 4½ miles in the parish of Ashchurch, and other works in connection therewith, for the Tewkesbury Rural District Council. Specification obtained, on payment of £1 1s. (returnable), from Mr. H. A. Badham, clerk to the Council, Tewkesbury.

BEDFORD, NOVEMBER 12.—*Plant.*—The Corporation invite tenders for the following machinery: 1,000 kw. mixed-pressure turbo-alternator with exciter and condensing plant; one water-tube boiler with mechanical stoker and coal-handling plant. Specifications may be obtained from Mr. R. W. L. Phillips, borough electrical engineer, Electricity Works, Cauldwell-road, Bedford, on payment of £1.

BRADFORD, NOVEMBER 15.—*Installation.*—For the electrical installation required at the technical college, for the Education Committee. Specifications, &c., on application to the City Architect, Town Hall, Bradford.

BRISTOL, NOVEMBER 10.—*Boiler.*—New steel boiler to fit an existing locomotive, for the Docks Committee. Specification can be obtained from Mr. W. W. Squire, engineer, engineer's office, Cumberland-road, Bristol.

CANBERRA (AUSTRALIA), NOVEMBER 24.—*Pumping Plant.*—Tenders are invited by the Commonwealth Department of Home Affairs for the supply of waterworks pumping plant for Canberra, the new Federal capital in New South Wales. The contract is divided into two sections, viz.:—(1) Pumps, motors and switchboards; (2) transformers and transformer switchgear. Forms, &c., from the works director for New South Wales, Custom House, Sydney.\*

DRAMMEN (NORWAY), NOVEMBER 10.—*Bar Iron &c.*—Tenders are invited by the Norwegian State Railway authorities for the supply of bar iron, plates, angle iron and grating iron required for the Drammen district. Sealed tenders, marked "Anbud paa leverance av stangjern, plater, vinkeljern og ristjern til Statsbanerne, Drammen distrikt," to "Distriktschefens kontor, Statsbanerne," Drammen. No special form of tender required.\*

EDINBURGH, NOVEMBER 5.—*Cast Iron Pipes.*—Quantity of cast iron pipes, from 2 in. to 12 in. in diameter, weighing about 360 tons, for the Edinburgh and District Water Trust. Specification obtained at the office of the engineers, Messrs. J. and A. Leslie and Reid, 12, St. Giles-street, Edinburgh.

ERITH, NOVEMBER 5.—*Air-compressor, &c.*—Erection of an electrically-driven air-compressor, including a three-

phase motor, switchgear, cable connections, and the necessary pipe work, at the sewage disposal works, for the Urban District Council. Specifications and forms obtained at the office of the surveyor to the Council, Baxley-road, Erith, on payment of the sum of £1 1s. (returnable).

FENTON (STAFFS.).—*Shaft Deepening.*—For deepening a shaft below the 10 ft. coal for 150 yards complete. Further particulars obtainable from the Fenton Collieries Limited.

HASTINGS, NOVEMBER 4.—*Cast Iron Pipes.*—About 2,500 yards of 16 in. cast iron socket pipes, for the Corporation. Specifications from the borough engineer, Mr. P. H. Palmer, M.I.C.E., Town Hall, Hastings.

IPSWICH, NOVEMBER 10.—*Pipes.*—For supply of about 3,750 6 in. or 7 in. and 550 9 in. by 12 in. cast iron pipes, for the Waterworks Committee. Copies of the specification from Mr. C. W. S. Oldham, engineer, Waterworks Offices, Ipswich, on receipt of £1 1s. (returnable).

IVYBRIDGE (DEVON), NOVEMBER 7.—*Reservoir, &c.*—Construction of a reservoir on Harford Moor, and the providing and laying of about 2 miles of cast iron pipes, for the Ivybridge Urban District Council. Specifications at the office of the engineer, Mr. H. Francis, M.I.C.E., 12, Lockyer-street, Plymouth.

LIMERICK, NOVEMBER 12.—*Engine Repair.*—For repairs and renewals to the engines at Rhebogue Waterworks, for the Corporation. Particulars at the Waterworks Office, Town Hall.

LIMERICK, NOVEMBER 12.—*Smoke Box, &c.*—New smoke box and set of tubes on boiler at Rhebogue Waterworks, for the Corporation. Particulars at the Waterworks Office, Town Hall.

LONDON, NOVEMBER 3.—*Corrugated Sheets.*—Galvanised corrugated sheets to the Egyptian War Department. All particulars obtainable from Sir A. L. Webb, K.C.M.G., Queen Anne's-chambers, Broadway, Westminster, S.W.

LONDON, NOVEMBER 10.—*Plant.*—Erection of six 3,950-k.v.a. vertical generators, three-phase, 5,000 volts; five 875-k.v.a. horizontal generators, three-phase, 5,000 volts; power-house switchboard; three complete sub-stations; 40,000-volt transmission line, for the Egyptian Government (Ministry of Public Works). Form of tender, &c., can be obtained from Messrs. Harper Bros. and Co., consulting engineers, 13, St. Helen's-place, London, E.C., on payment of £1 (returnable).

LONDON, NOVEMBER 11.—*Pumping Engine, &c.*—Erection, at the Abbey Mills pumping station, West Ham, London, E., of one steam-driven hydraulic pumping engine, capable of supplying 5 cubic feet of water per minute at a pressure of 800 lb. per square inch; one hydraulic accumulator 10 in. diameter by 8 ft. stroke; a 7 ft. 3 in. by 5 ft. by 4 ft. steel tank and certain pipes, valves, and fittings. Specification on application to Mr. G. W. Humphreys, County Hall, Spring-gardens, S.W., upon payment of £2 (returnable).

LLANDUDNO, NOVEMBER 8.—*Retorts, &c.*—For the supply of retorts, fireclay goods, &c., for the Urban District Council. Full particulars can be obtained upon application to the gas manager.

LLANELLY, NOVEMBER 12.—*Pipe-laying, &c.*—For carting, laying, jointing, and fixing about 22½ miles of cast iron and steel pipes, 16 in. and 14 in. in diameter, about 20 miles of 10 in., 9 in., and 8 in., and about 30 miles of 5 in. and 4 in. cast iron pipes, and the special castings and valves in connection therewith. Specifications may be obtained at the offices of Messrs. H. Kofe and Son, civil engineers, 8, Victoria-street, S.W., upon payment of £5 5s. (returnable).

MELBOURNE (AUSTRALIA) NOVEMBER 3.—*Galvanised Iron Pipes.*—Tenders will be received at the office of the Deputy Postmaster-General, Melbourne, for the supply and delivery of 900 galvanised iron pipes.\*

MELBOURNE (AUSTRALIA) DECEMBER 3.—*Steel Blooms.*—Tenders are invited by the Victoria Railway Commissioners for 25 steel blooms for piston rods for engines.\*

OGHTERARD (IRELAND), NOVEMBER 30.—*Wells.*—For the sinking of 23 new wells, and deepening, enclosing and improving 21 existing wells, for the District Council. Tenders to Mr. P. A. Joyce, clerk to the Council, board room, Oughterard, Galway.

RATHMINES (DUBLIN), NOVEMBER 4.—*Engine, &c.*—Erection of one 400-kw. generating set, consisting of a high-speed steam engine direct-coupled to two continuous-current dynamos in tandem, for the Urban District Council. Specification may be obtained from the township electrical engineer on payment of £1 1s. (returnable).

RHYL, NOVEMBER 19.—*Diesel Engine Set.*—For the Rhyll Urban District Council, one 160-kw. Diesel engine set. Specification from electrical engineer, Mr. E. H. Wright, Electricity Works, Rhyll, on payment of a deposit of £1 1s. (returnable).

SHEFFIELD, NOVEMBER 4.—*Purifier Boxes.*—Supply and erection of eight purifier boxes, each 40 ft. by 37 ft. by 6 ft. deep, with luteless steel covers, for the directors of the Sheffield United Gaslight Company. Specifications and drawings can be obtained upon application to the engineer, Mr. J. W. Morrison, M.Inst.C.E., Commercial-street, Sheffield.

SOFIA (BULGARIA), NOVEMBER 17.—*Electric Power Plant.*—Tenders are invited for the supply and erection of the machinery required for a central electric generating station at the "Pernik" State coalmine. The estimated value of the contract is 200,000 fr. (£8,000), and includes three water-tube boilers, two double-expansion horizontal engines of 250-horse power each, two three-phase dynamos, switchboards, transformers, &c., and a centrifugal pump of 500 litres per minute capacity driven by electric motor.\*

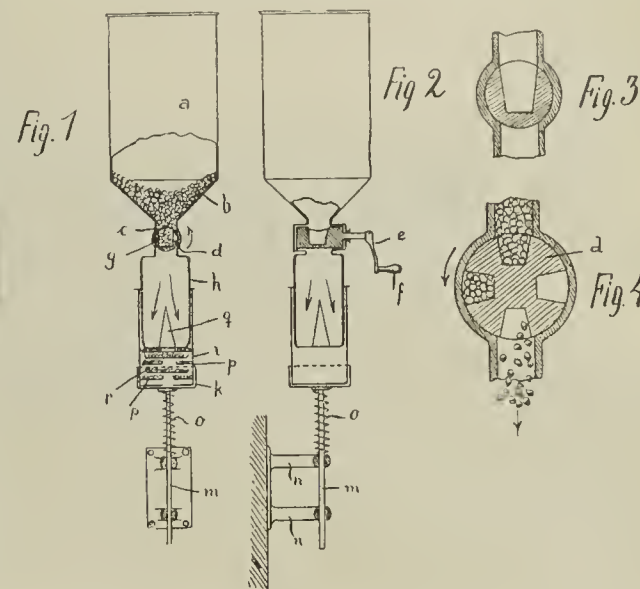
VALENCIA (SPAIN), NOVEMBER 18.—*Crane.*—Tenders invited for supply of an electric crane for discharging coal at Valencia Harbour.\*

WESTHOUGHTON, NOVEMBER 1.—*Steel Tank.*—For a steel tank of the capacity of 220,000 gallons, for the Urban District Council. Specifications obtained on application to Mr. Geo. Hayes, surveyor to the council, Town Hall, Westhoughton, on payment of 10s. 6d. (returnable).

WONTHAGGI (VICTORIA, AUSTRALIA), NOVEMBER 12.—*Haulage Engine.*—Tenders are invited by the Victorian Railways Commissioners for the supply and delivery of a haulage engine (mechanical portion only), and a 200-horse power electric motor and equipment, for the State coalmine.\*

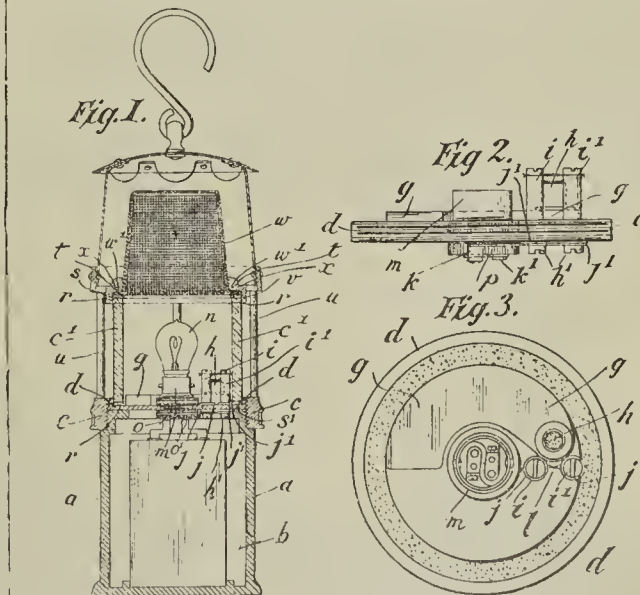
## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

3557 (1913). *Improvements in Apparatus for Charging Containers of Respiratory Apparatus.* W. J. Mellersh-Jackson, of the firm of Haseltine, Lake and Co., chartered patent agents, of 7 and 8, Southampton-buildings, London, Middlesex. (Communication from the firm of Drägerwerke, Heine and Bernh. Dräger, of 53, Moislinger, Allee, Lubeck, Germany.)—Relates to apparatus for filling cartridges of respiratory apparatus. These cartridges consist of containers or cans made of sheet iron in which a series of trays are so arranged that the air may pass over them in a zig-zag line. These trays carry caustic soda or potash in granulated form and which is adapted to absorb the carbonic acid contained in the exhaled air passing through the cartridge. The manner of filling the cartridge, as known heretofore, has the drawback that the chemicals come into contact with the open air for a considerable time whereby the absorbing power of the chemical is impaired. By means of the new



apparatus the filling of a cartridge can be carried out very quickly, each tray being charged with a predetermined amount of chemicals by the mechanism of the apparatus itself, the attendant having no occasion to touch the chemicals with his fingers. The invention consists in apparatus comprising a closed reservoir, a movable chamber below the reservoir adapted to communicate with the reservoir in one position and to communicate with an open cartridge in another position, in combination with a guiding funnel in shape corresponding to the inside of the cartridge, and with means for lowering a cartridge in a line below the guiding funnel. Fig. 1 is a vertical section of a complete apparatus; and fig. 2 is a similar view drawn at right angles to fig. 1; fig. 3 is a sectional view of a detail for measuring a predetermined amount of chemicals; and fig. 4 is a sectional view of a modification of the mechanism shown in fig. 3. (Four claims.)

4707 (1913). *Improvements relating to Miners' Lamps.* T. Heaton, 72, Cambridge-street, Wigan, Lancashire.—Has particular reference to certain improvements in lamps described and claimed in the Specification of a former Patent No. 239 of 1912. The present improvements consist mainly of a gas detector comprising in combination a resistance wire or bridge of platinum or nickel chrome or the like, and a suitable receptacle or vessel for obtaining an inflammable oil or spirit or the like which is attached to the top plate carrying the bridge of platinum, nickel chrome, or other suitable wire, and provided with a wick or other suitable burner in proximity to the resistance wire or platinum bridge, the heating of which will cause the oil or spirit contained in the receptacle or vessel to become volatilised and ignited in the presence of firedamp. To assist in the volatilisation of the inflammable oil or spirit, the burner of the said receptacle may be made of porcelain or other non-conducting material, and the resistance wire of platinum



or the like spirally wound round the burner, the heat generated in the said spiral coils causing ignition to take place more rapidly. The gas detector contact strips beneath the top plate, which are designed to be brought into or removed from contact with the accumulator terminals, are insulated from contact with the back of the plate or with the lamp socket by washers and strips of insulating material such as rubber, mica, vulcanised fibre, or other insulator. A detail improvement is also introduced into the construction of the lamp top, which is now fitted internally with double wire gauze cones one overlying the other. Fig. 1 is a sectional elevation of the improved miners' safety lamp fitted with said additional improvements; fig. 2 is a side elevation on an enlarged scale of the said top plate, showing the combination of the resistance wire or bridge and said receptacle or vessel for containing oil or spirit fitted with a burner; fig. 3 is a plan view thereof. (Three claims.)

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

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21237 (1912). *Improved Chain or Chain Coupling*. D. H. Hutchison-street, Granville, New South Wales; and F. Bowden, of Blaxcell-street, Granville. The improved chain or coupling consists of the chain with ordinary links of a straight bar link interposed between each or any pair of ordinary links, the said bar link having an eye at each end which engages the ordinary link, and each eye is characterised by having that portion of it which contacts with the ordinary link when

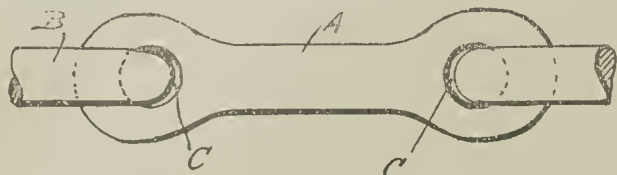


Fig. 1.

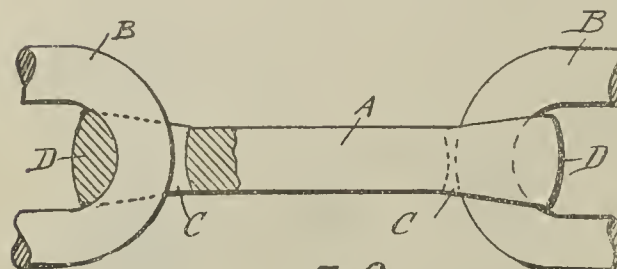


Fig. 2.

the chain is taut convex to the same radius as the concave end of the latter; and furthermore, the ends of the bar link are sufficiently thick in a direction axially to the eye thereof to prevent lateral closure of the ordinary links, to offer greater wearing and bearing surfaces, to increase the strength of the ends of the bar link, and to diminish bending stress in the ordinary link. Fig. 1 is a view of a portion of a chain or coupling showing the straight bar link and portions of the ends of two ordinary links connected thereby, while fig. 2 is a similar view partly in section, but on a plane at right angles to fig. 1. (Three claims.)

21237 (1912). *Improvements in Eye-guards for Pit Ponies*. J. Millar, of 105, Main-street, Cambuslang, Glasgow. Relates to an improved metallic eye-guard for pit ponies, of the kind comprising a base piece of ring-like formation and a plurality of substantially bow-shaped radiating arms formed integral with said base piece, said guard being adapted to be detachably secured to a protective cap capable

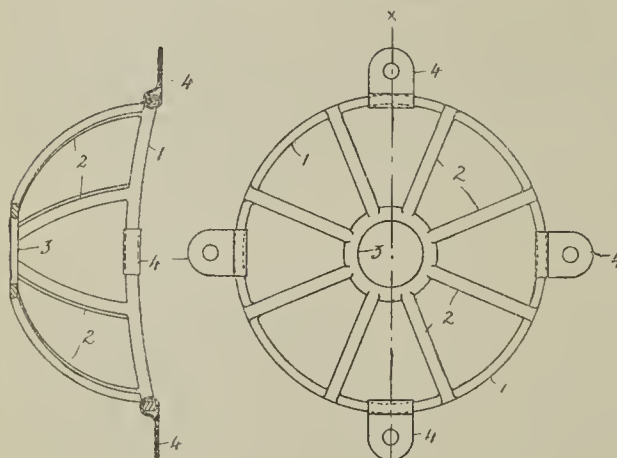


Fig. 1.

of being fitted on the head of the pony. The invention consists in an improved construction of eye-guard of the kind referred to, wherein the ribs or arms radiate from a common open central ring. The improved eye-guard is illustrated in the accompanying drawing, of which fig. 1 is a front elevation and fig. 2 a section on the line X-X fig. 1. The guard is attached, preferably by means of clips 4, to a cap such as described, for instance, in the Specification of Letters Patent No. 27320 of 1911. (One guide.)

22738 (1912). *Improvements in Safety Electric Lamps, more especially intended for Use in Mines*. W. H. Hanson, of 47, Hyde-vale, Greenwich, Kent; H. L. Langston, of 84A, West Ferry-road, Millwall, London; and the Electrical Power Storage Company Limited, of 4, Great Winchester-street,

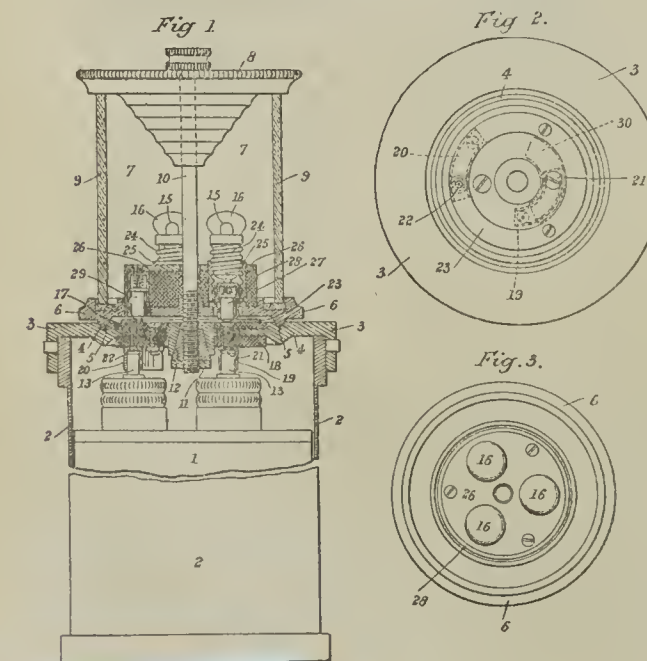


Fig. 1.

the said lamp in which they are applicable, the said lamp being provided with a transparent case containing the filaments and connec-

tions constituting the lamps proper is rotatable upon the cover of a casing containing the battery from which the lighting current is obtained, and in which the electric circuit between the terminals of the battery and the filaments of the lamp is made and broken in an airtight chamber, so that danger caused through sparking at the terminals is prevented. According to the invention, the electric circuit or electric circuits between the terminals of the battery and the filaments of one or more lamps is, or are, made and broken in an airtight chamber or space which is formed between two plates, one of which is the base plate of the lamp chamber and the other the cover of the battery casing upon which the lamp chamber rotates. One of the aforesaid plates is provided with a V or otherwise suitably shaped circular projection which fits into a correspondingly shaped circular groove in the other plate, which will permit of rotary movement of one plate with respect to the other, and whereby a more efficient airtight joint is made. The lamp chamber is rotatably secured to the covering of the battery casing by a central screw bolt. Fig. 1 shows a lamp in elevation with parts in section, and figs. 2 and 3 show in plan the cover of the battery casing and the base plate of the lamp casing respectively and their associated parts. (Four claims.)

22958 (1912). *Improvements in and Relating to the Manufacture of Artificial Fuel*. J. T. Armstrong, of 11, Southampton-row, London, W.C., and J. Mordan, of Walters Ash, Hughenden, Buckingham. According to the invention a liquid hydrocarbon, such as petroleum, tar oil or the like is emulsified with an emulsifying or binding material or materials and a suitable quantity of sewage or like sludge is incorporated therewith either before or after the emulsion has been formed. According to one mode, a suitable binding or emulsifying material, preferably a binder of a nitrogenous nature, such as bone glue or other substance of like nature, is mixed with water and is introduced in a hot condition into a steam jacketed mixer; and after the stirrers of the latter have been set in motion, petroleum, which may be heated or not, is then introduced at a regular speed into the agitated binder until an emulsion is formed, whereupon the sludge either in its wet or dry state is added thereto and the mixing is continued until the sludge has been thoroughly incorporated with the emulsion and the latter has attained the desired thickness. A small proportion of sulphate of iron, preferably about 1 per cent., is added to the mixture either before or after the introduction of the sludge for the purpose of hardening the final product—either by acting directly on the binder, more especially when such binder is of a nitrogenous nature, such as bone glue, or by acting on the surface of the mixture on exposure to air, thereby forming a hard crust owing to the oxidation of the iron sulphate. It will, however, be obvious that any other means may be used for hardening the final product. According to another mode, more especially in connection with sludge, used in its wet state, the sludge is added to the agitated binder before the petroleum is introduced therein, the latter being slowly poured into the mixer and the mixing continued until an emulsion of the desired consistency is obtained. The sulphate of iron is added to the mixture either before or after the addition of petroleum. The following two examples of proportions have given good results:—

	I.	II.
Petroleum.....	24.45	22.80
Glue or other binder .....	2.55	2.40
Water .....	5.09	5.70
Sulphate of iron .....	76	70
Sewage sludge.....	67.15	45.60
Coal .....	—	22.80

(Four claims.)

26231 (1912). *Improvements in and Relating to Eyeguards or Protectors for Pit Ponies*. E. J. Griffiths, of 16, Station-street, Walsall, Staffordshire. Consists essentially in making eyeguards or protectors for ponies working underground, whereby the eyes are protected from coming in contact with obstructions, and at the same time enabling the pony to see freely in all directions; the protector is made of a single length of strong wire. Furthermore, the

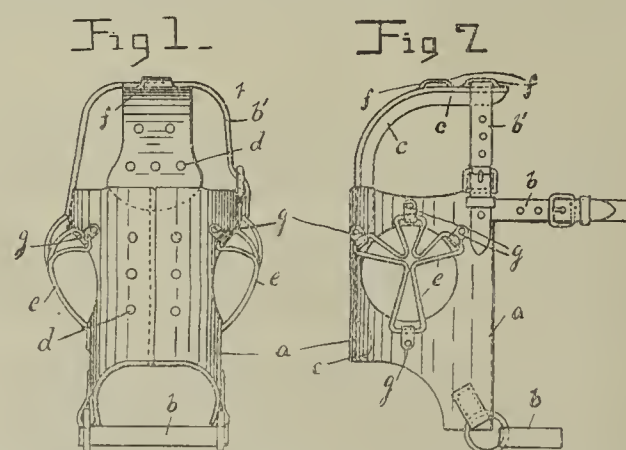


Fig. 1.

headpiece or cap is perforated so as to afford perfect ventilation, and is padded. Fig. 1 shows a front elevation and fig. 2 a side elevation. Guards may be made from a single length of strong iron or steel wire bent or fashioned in any geometrical design as circumstance may require to enable the greatest strength being at the apex and the greatest sight area at the bottom. (Four claims.)

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, October 21, 1913, is as follows:—Amsterdam, 833 tons; Antwerp, 770; Bremen, 1,352; Bilbao, 1,442; Buenos Ayres, 2,474; Corunna, 1,298; Cronstadt, 4,941; Christiania, 2,218; Copenhagen, 1,036; Drontheim, 103; Frederica, 891; Gothenburg, 321; Ghent, 907; Genoa, 542; Guernsey, 706; Hallsta, 1,005; Husum, 518; Helsingfors, 991; Harlingen, 1,075; Hamburg, 10,139; Libau, 1,680; Langesund, 1,249; Marianople, 2,667; Malmo, 1,222; Monte Video, 2,577; Nakslov, 359; Nykjoberg, 1,870; Novorossisk, 7,816; Oran, 378; Oxelosund, 1,058; Oporto, 1,091; Pernau, 1,754; Riga, 27,520; Reval, 2,822; Rouen, 5,241; Rotterdam, 4,680; Stockholm, 2,144; Stettin, 4,934; St. Petersburg, 21,176; St. Malo, 620; total, 126,420 tons; corresponding period October 1912, total, 76,979 tons.

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

23703. Construction of gear-wheel rotor. Hon. Sir C. A. Parsons, A. Q. Carnegie and S. S. Cook.  
 23707. Furnace firebars. J. Rickard and D. J. Davis.  
 23719. Process of casting ingots of metals and alloys, and apparatus therefor. P. H. G. Durville.  
 23731. Axleboxes for railway wagons and the like. G. B. Bowles.  
 23804. Travelling roller trains for rolling mills. Poldihütte Tregelgusztahlfabrik.  
 23805. Pulverising apparatus. A. Granger.  
 23807. Engine valve gear. M. E. Teague.  
 23833. Drilling machines. C. L. Becker (firm of).  
 23853. Air compressors. L. Ricard.  
 23861. Clutches for winding engines. R. C. Gardner. (W. F. Smeeth, India.)  
 23866. Ball bearings for rotatable supporting plates or turntables. A. Riedinger.  
 23878. Governor for winding engines and apparatus in connection therewith for the prevention of overwinding. R. J. Worth.  
 23881. Grabs. Heenan and Froude Limited and W. B. Sanderson.  
 23884. Guide rollers and bearings therefor for use in connection with cable haulage. J. Wilkinson and J. Richardson.  
 23889. Sheath for protecting pick or mandril points. D. J. Lewis and J. Evans.  
 23908. Haulage clip. T. Chesterton.  
 23923. Hollow brickworks. H. Frettlöh.  
 23928. Process of treating ores. J. A. McLarty.  
 23948. Rotary pumps and motors. W. J. Vincent and Rotoplunge Pump Company Limited.  
 23992. Double-acting compound air pump. W. Turner.  
 24011. Railway wagon brake. W. Pantall.  
 24024. Means and apparatus for transmitting heat by conductors. H. Trenerry, A. Kingman, and H. E. Wright.  
 24073. Control device for rotary feed pumps. G. and J. Weir Limited and J. Petermüller.  
 24112. Conveyors and elevators. S. W. Porter and Spencer and Co. Limited.  
 24129. Apparatus for conveying excavated or other material. D. Whitaker.  
 24137. Method of and apparatus for blasting or exploding by liquid air, oxygen or other suitable liquefied gas or medium of low temperature. O. Simonis.  
 24141. Process for obtaining from furnace slag a material similar to ordinary pottery or the like. M. Chiapponi.  
 24167. Steam turbines. K. Baumann.  
 24168. Steelyard weighing apparatus. W. and T. Avery Limited and R. R. Gibbs.  
 24171. Device or apparatus for the prevention of overwinding in collieries and the like. C. M. Haslam.  
 24192. Apparatus relating to the withdrawal of air and water from steam condensers. D. B. Morison.  
 24194. Ore separators. A. M. Plumb.  
 24209. Steam superheaters for marine and like tubular boilers. J. G. Robinson.  
 24233. Centrifugal blowers and other centrifugal machines of a similar nature. T. H. C. Homersham.  
 24234. Continuous gas retorts, producers and the like. W. von Oswald.  
 24237. Method of and means for removing deleterious substances from tar, tar oils, or pitch. H. C. Ross.  
 24239. Furnace linings. W. S. Rawson.  
 24245. Expanded metal. J. G. Lorrain. (Corrugated Bar Co., United States.)

### Complete Specifications Accepted.

To be published on November 13, 1913.

1912.

16903. Shotfiring by powder fuses and the like. Price and Pryse.  
 23489. Construction and manufacture of wrought-metal wheels. Challiner.  
 23725. Process of manufacture of bricks and other refractory products having spinel as a binding material. Mankau.  
 23838. Steam superheaters for locomotive, marine, and other boilers. Allen.  
 23853. Gas producers. Bousfield. (Stuart and Stuart.)  
 24334. Conveying belt. Scholtz and Balashol Belting Company.  
 26585. Aerial ropeway systems. Praetorius.  
 26943. Furnace for burning refuse from wood-working and/or coal, coke, and the like. Stockton.  
 27752. Steam-throttle valve. Martin and Waller.  
 28232. Machine for the automatic manufacture of wheels with helical or compound helical teeth. Boulton. (Maschinenfabrik Lorenz.)  
 29313. Ball or pulverising mills employed in the grinding of potters' and other materials. Johnson, and William Boulton Limited.  
 29326. Continuous furnaces for the heating of billets, blooms, and the like. Hutter.

1913.

114. Securing hammer heads or like tools or implements affixed to or on wooden shafts. Burrell.  
 500. Gas-producers. Tait.  
 657. Pumps for water and other liquids. Rhodes and Harris.  
 1102. Elastic fluid turbines. Warwick Machinery Company (1908). (Curtis.)  
 2373. Centrifugal pumps or compressors. Hayes.  
 2733. Apparatus for automatically lubricating the axle bearings of corves and the like. Hailwood.  
 4312. Safety scotch or lock for the wheels of mining corves and similar vehicles. Harrison and Farrell.  
 6179. Process and apparatus for impregnating wood. Dautreppe.  
 7317. Apparatus for automatically regulating the flow of gases in conduits. Apparate-Vertriebs Ges.  
 7601. Apparatus for distilling fuel. Koppers.  
 9963. Working of combined reciprocating engines and turbines for ship's propulsion. Swan, Hunter and Wigham Richardson Limited, and Wurl.

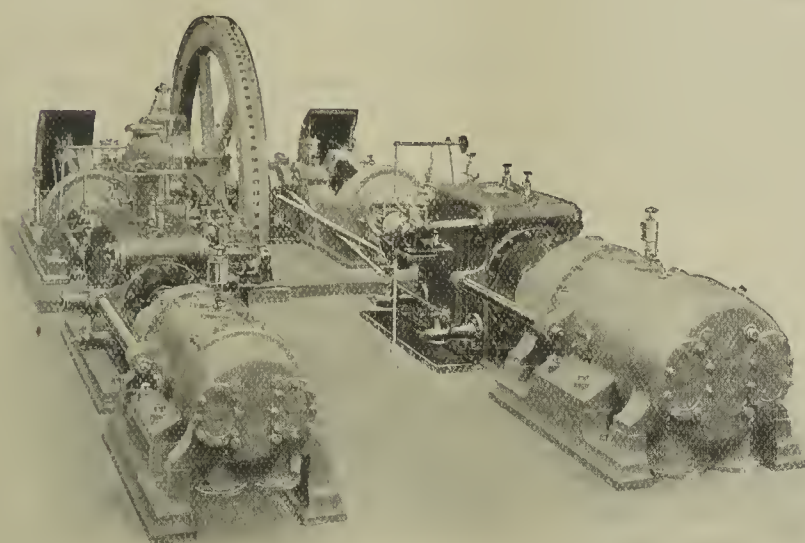
(Continued on page 914.)



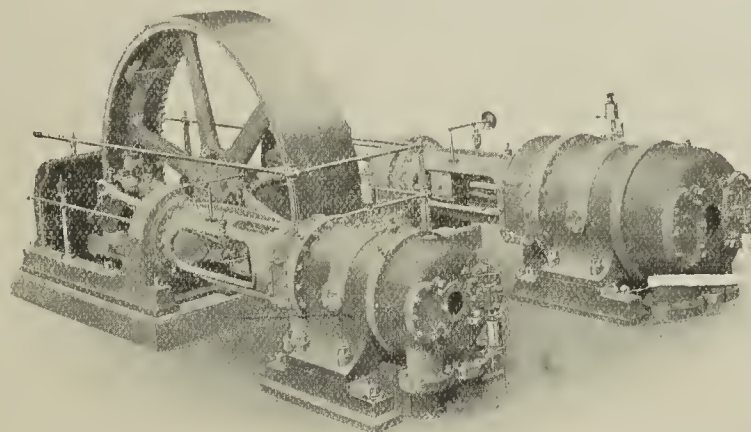
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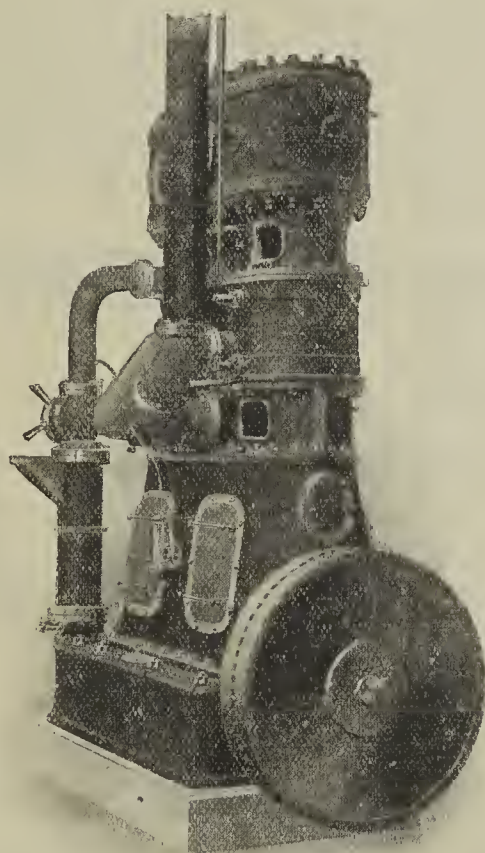
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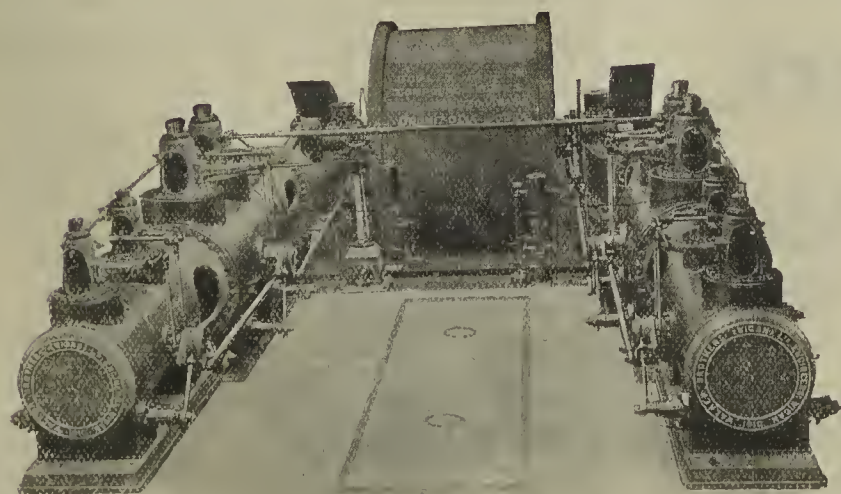
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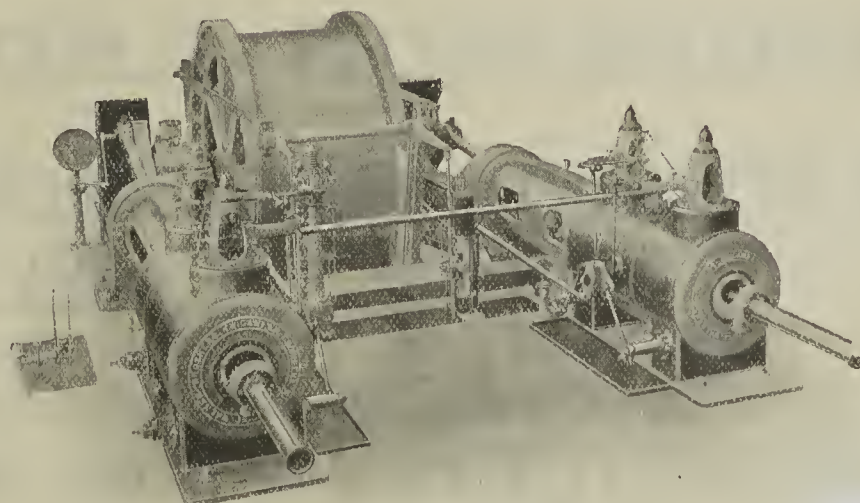
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10674. Means for securing together angularly arranged wires, ropes, rods or the like at their place of juncture. Bullivant and Selby.
- Regenerative open-hearth furnaces. Rogerson.
- Automatic cut-off valves. Karamees.
1369. Safety apparatus for mining cages. Richardson and Staveley.
12453. Machines for boring, punching or stamping holes in rolled metal. Kolassa.
13071. Centrifugal machines. Richardson.
14979. Steam turbines. Evans. (Vereinigte Dampf-turbinen Ges.)
15021. Truck frames for bridge girders of overhead cranes and the like. Golby. (Brown Hoisting Machinery Company.)
15101. Foundry moulding boxes. Rudman, Lancey and Craven.

**Complete Specifications open to Public Inspection before Acceptance.**  
1913.

13413. Manufacture of articles having parts of iron which are permanently or temporarily subjected to high temperatures. Pasel.
13414. Manufacture of metallic articles which require great power of resistance to corrosion. Pasel.
22514. Method and devices for measuring the heating value of fuels. Junkers.
23468. Method of and means for mechanically extracting minerals. Wissemann.

**Provision of Rescue Brigades.**—Mr. J. H. Whitehouse, M.P. for Mid-Lanark, addressing the electors of Larkhall last week, made special reference to the colliery disaster in Wales, which he said reminded them forcibly of the perils by which this great industry of mining is followed, and of the debt we owe to the men engaged in this dangerous occupation. He wondered if these accidents were unavoidable. The Bill of 1911 gave power to form rescue brigades. The report in connection with the Cadder pit accident had not yet been published, but there had been evidently no attempt made to provide the rescue apparatus recommended by the Home Office. He took the gravest view of this omission, and was already dealing with the subject. They were not free from the probability of a fire in any mine, and in this matter he could not divest himself of the responsibility of seeing that the mineowners carried out the provisions of the Act. Replying to questions, Mr. Whitehouse said he would be in a position within a day or two to state what steps the Home Office would take to enforce the regulations regarding rescue brigades and apparatus at collieries.

**GOVERNMENT PUBLICATIONS.**

Any of the following publications may be obtained on application to this office at the price named **post free**.

Local Government Board Report: Dr. Morgan Rees' Report on Housing and Other Sanitary Circumstances in the St. Dogmell's Rural District (No. 82), 3½d.

Consular Reports, 1912: Denmark, 5d.; Germany, Düsseldorf, 5½d.; Russia, St. Petersburg, 7½d.

Birmingham Corporation Light Railway Order, 1913, 1½d.

Conveyancing Bill, 1s. 2½d.

**Royal Commission on Metalliferous Mines and Quarries.**—Meetings of the Royal Commission on Metalliferous Mines and Quarries were held on Wednesday, Thursday and Friday, October 22, 23 and 24, at Winchester House, 21, St. James's-square, S.W. Sir Henry Cunynghame, K.C.B., presided, and the other Commissioners present were Dr. J. S. Haldane, F.R.S., Mr. R. A. S. Redmayne, C.B. (H.M. Chief Inspector of Mines), Mr. J. S. Ainsworth, M.P., Mr. R. M. Greaves, Mr. R. Arthur Thomas, Mr. R. T. Jones, Mr. W. Lewney and Mr. U. Lovett. The Commission had their Report under consideration.

**New Science Department at Sheffield University.**—On Saturday last, Lord Haldane opened the new technical buildings attached to the Applied Science Department of Sheffield University. This department has already been of incalculable service to the heavy steel trades of the city, and it is hoped that in the new building the non-ferrous laboratories, electro-metallurgical laboratory, mining section and applied chemistry department will prove of equal utility to the mining industry of the city and district. The buildings and equipment have cost about £45,000. Lord Haldane, in declaring the buildings open, said what would be done in the department would be to go still further than had been done in the past in bringing science to bear on the problems of industry. Pure science could not be separated from applied science. They were one subject. In old days pure science was thought to be something that no one was very much interested in from the point of view of practical application. It lived in old universities, and did not come in contact with the public as it does to-day. Now the greatest commercial discoveries depend upon new ideas, new conceptions being developed by men of brain and capacity that could not be bought. If British industry was to hold its own in the future its responsible men must see to it that pure science had opportunity to develop itself and come into contact with the daily practice. It was in the atmosphere of the university as a whole that they got that high standard of scientific culture which alone produced the big men who can solve these problems.

**PUBLICATIONS RECEIVED.**

SECTIONS OF THE SYDNEY COALFIELDS, CAPE BRETON, NOVA SCOTIA (Department of Mines, Canada). By Joseph G. S. Hudson. Ottawa: Government Printing Bureau.

ANNUAL REPORT ON THE MINERAL PRODUCTION OF CANADA, 1911 (Department of Mines, Canada). By John McLeish. Washington: Government Printing Office.

"Annual Report of the Chief Inspector of Explosives of the Union of South Africa for the Year Ending December 31, 1912," price 1s.; "Fifth Census of Canada" (Bull. No. 16), "Mineral Production, 1910"; Report of the Department of Mines, Western Australia, for 1912"; "Zeitschrift für das Berg- Hutten- u. Salinen Wesen" (Band 61), 1 Statistische Lieferung und 3 Heft; "University of Illinois Bulletin" (No. 68), "The Strength of G Beams in Flexure," by Herbert F. Moore, price 30 cents; "Department of U.S. Interior of Mines" (Bull. 61), "Abstract of Current Decisions on Mines and Mining, October 1912 to March 1913," by J. W. Thompson; "Monthly Mining Report of the Chamber of Mines of Victoria," July 1913 (Vol. 9, Part 12), price 1s.

**Coal Supply and the Power Problem.**—Members of the Yorkshire branch of the Association of Mining Electrical Engineers met at Sheffield, on Saturday. In his presidential address, Mr. H. C. Jenkins, looking into the future when the shortage of this country's coal supplies would become more acute, said it was not beyond the bounds of possibility that each colliery would be a gigantic electric supply station, generating electricity from gas engines or probably gas turbines. In one town in Germany already gasworks were done away with, and gas was obtained from the local by-product ovens for consumption in the town, and he believed the town made considerably more money from the sale of the gas bought in bulk from the colliery companies than when it had its own gasworks. The same thing might apply, as he had suggested, to electricity, and if the price of coal or of fuels rose to such an extent, this might mean the only practical solution of the modern industrial power problem. Electricity was made the scapegoat wherever possible for colliery accidents, and it was the duty of the mining electricians to disprove this charge and to prove that electric plants, when properly installed, were as safe as any other means of power transmission. Mr. John Bentham gave a comprehensive paper on "Testing Transformers for Colliery Work." He described the portable testing plant which is in use at the New Sharncliffe Collieries. It is for testing electrical motors and fittings by means of high pressure before they are installed at the colliery, and also when they are brought up for repairs. Mr. Bentham said the chief advantage of the system was that it tended to safety. The cost of the plant was about £235, and in a year he had saved his colliery about £150 directly.

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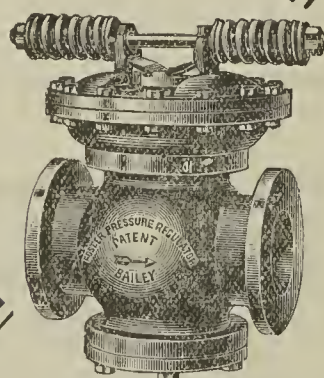
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Nothing Sacrificed for Cheapness.

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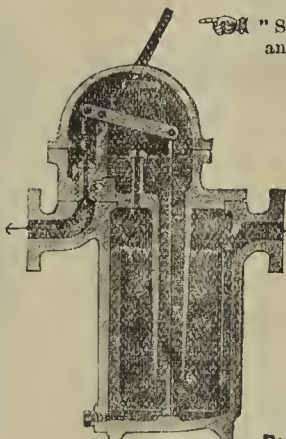
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## A NOVEL FIREDAMP INDICATOR.

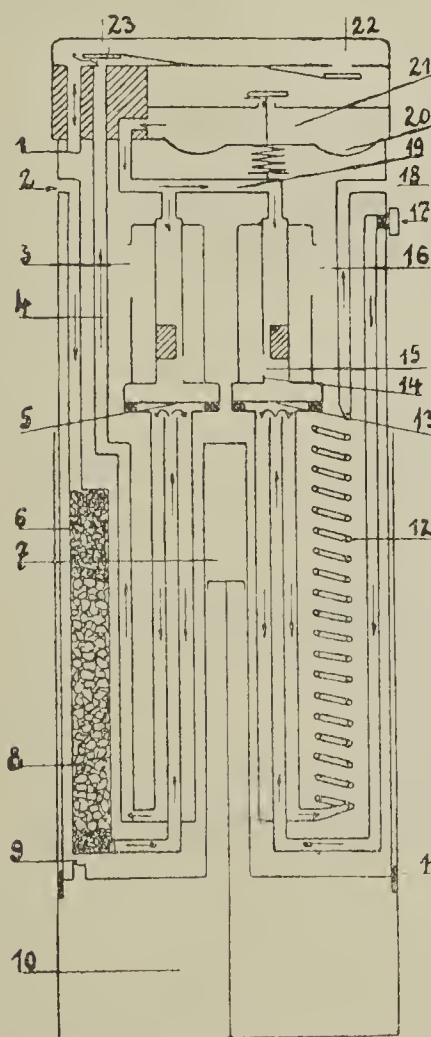
Within the last few days attention has been drawn by the daily Press to the interest manifested by the German Emperor in a firedamp indicator invented by Prof. Dr. F. Haber, and described by him in a paper read before the Kaiser-Wilhelm-Institut on 28th ult.; and, in view of these circumstances and of the value of an efficient apparatus of this kind, we give below a translation of Prof. Haber's paper, as reported in the *Chemiker Zeitung*.

Methane, whose liberation from coal can neither be prevented nor controlled by man, is harmless so long as the proportion in which it is contained in pit air remains small. If, however, that proportion rises above the explosive limit of 5½ per cent., the life of the miner depends on the explosive mixture finding no opportunity of igniting. It is, therefore, necessary to provide the miners working in fiery pits with an appliance which will reveal, in due time, the increasing percentage of methane in the pit air; and at the same time every means capable of igniting firedamp must be excluded from the working places.

Up to the present it has not been found practicable to do this effectually, the only reliable firedamp indicator available being the flame of the safety lamp. When the wick is turned down low this flame becomes surrounded by a "flame cap," which can be detected by the experienced eye when the proportion of methane exceeds 1 per cent., and increases considerably in size and visibility as the explosive limit is approached. The flame, however, is very dangerous as a means of igniting firedamp; and formerly it was impossible to eradicate this fundamental disability, the lamp being used as a portable illuminant. The State, though recognising its responsibility for endangering the industrial worker, could do no more than prohibit the use of naked lights and make safety lamps—in which the flame is separated from the outer atmosphere by a wire gauze cylinder, or preferably two such cylinders—compulsory. The invention of the wire gauze cylinder by the chemist Davy is one of the most ingenious and valuable ideas in applied science. Theoretically, it renders the lamp perfectly safe against firedamp, since, while the inflammable gases entering through the meshes of the gauze burn inside the latter, the flame cannot strike back into the surrounding atmosphere. The introduction of the safety lamp into mining work has undoubtedly prevented innumerable accidents. In practice, however, the safety it ensures against firedamp is by no means unconditional, since, according to recent official statistics in Prussia, more than half the pit explosions occurring nowadays are attributable to safety lamps. For this reason the authorities have lately gone further and prescribed the use of portable electric lamps in specially fiery pits, the safety lamp being only allowed to be used as a firedamp detector. Representatives of the mining industry incline to the hope that the lamp, if used only for this latter purpose and not for lighting, can be made perfectly safe; but in the end the flame which has been found not indispensable for lighting will not maintain its position in fiery mines, and will have to make way for firedamp indicators which operate in a manner precluding all possibility of accidental ignition.

The problem of devising a new firedamp indicator has for many years past led to an astonishing number of proposed solutions, none of which, however, has been permanently adopted into mining practice, efficiency being lacking in some cases and suitability for use under practical conditions in others. The requirements of the mine are of a peculiar nature; the dim light renders many observations difficult, and only the very simplest appliances are suited to the hands of the miner. Experts are unanimous in agreeing that stationary apparatus are unsuitable for the purpose in view, and measuring instruments are no good to the miner. Considered as a matter of principle, the indicator must be based either on chemical changes sustained by methane itself, or else on physical properties of the atmosphere in which the methane is present. Viewing the problem from the chemical side, we find the dis-

turbing factor that methane does not begin to react readily until red-heat is attained. High temperature must, however, be avoided on principle, if all risk of accidental ignition of the firedamp is to be prevented; whilst at low temperatures methane reacts in an extremely sluggish manner, and its chemical modification, when compulsorily effected, does not furnish any phenomena capable of affording indications that would be useful in the mine. Special difficulty is placed in the way of a chemical indicator by the requirement that it must furnish an estimate of the proportion of firedamp between the important limits of 1 per cent. and 5 per cent., without the assistance of any measuring devices or operations. Dr. Leiser, of the Kaiser-Wilhelm-Institut, and the author have made all kinds of experiments of a chemical nature,



FIREDAMP WHISTLE: DIAGRAMMATIC VERTICAL SECTION.

- |   |  |
|---|--|
| 1. To pump chamber.   | 12. Expansion spiral (connecting stopped end of air whistle with discharge orifice). |
| 2. Intake to gas whistle.   | 13. Mica membrane of air whistle.  |
| 3. Soundhole of gas whistle.  | 14. Lip of air whistle.  |
| 4. Connection between stopped end of gas whistle and suction valve. | 15. Mouth of air whistle.  |
| 5. Mica membrane of gas whistle.                                    | 16. Soundhole of air whistle.  |
| 6. Dust filter.   | 17. Intake of air whistle.   |
| 7. Vacuum.  | 18. Discharge orifice of air whistle.  |
| 8. Soda-lime.   | 19. Air intake for blowing the whistles.   |
| 9. To pressure regulator.   | 20. Membrane of pressure regulator.  |
| 10. Pump chamber.   | 21. Pressure regulator.  |
| 11. Packing between pump shell and whistle casing.                  | 22. Pressure valve.  |
|   | 23. Suction valve.   |

Several parts have been omitted for the sake of clearness: connections between the pipe ends to pump and pressure regulator; syntonisers at soundholes; reverser enabling air for blowing the whistles to be drawn directly into the pump instead of through the gas whistle.

without, however, succeeding in overcoming this difficulty. They then resorted to the appliances used in physical chemistry, with the application of which to pit gases the author had previously acquired some experience, having induced the firm of Zeiss (Jena) to transform the Rayleigh interferometer into a device for measuring pit gases. Thanks to the expert interest of Bergassessor Beyling, chief of the Westphalian experimental gallery at Derne, this device has gained a permanent position as a stationary instrument in experimental gallery work; and a new portable model, in the shape of a flat corselet, seems capable of doing useful service underground in the hands of a mine manager or his chief subordinates, because it enables the methane content, in tenths of 1 per cent., to be seen

at a glance, and the ventilation of the mine to be supervised and controlled in accordance with this information. Nevertheless, it is not a firedamp indicator to be used by the miner at the coal face.

The interferometer is based on the fact that the optical density of the atmosphere changes when methane becomes mixed with the air. Other devices can be constructed which enable the contemporaneous changes taking place in other physical constants of the atmosphere; but, as a general thing, the results come under the same category, the apparatus being a measuring instrument and not an indicator, at least so long as the eye is used as the organ of observation. The reason for this is that, except by means of sparks, flame, or incandescent wires, one cannot produce phenomena which will reveal to the eye, by direct appeal to the visual sense, the presence of certain percentages of methane. Such a phenomenon, however, is essential in a firedamp indicator. It should impress itself on the memory and lead the miner to form an approximate estimation of the methane content within the important range of 1 to 5 per cent., without his having to fall back on the reading of a scale.

These considerations induced Dr. Leiser and the author to try and devise a firedamp indicator which would appeal not to the eye but the ear, trained to sensitiveness by the silence of the mine. The miner's habit of communicating with distant comrades by rapping, demonstrated the feasibility of such a method. The idea of detecting variations in the chemical condition of gases by means of the ear is old; and in lectures on physics, students are shown the different tones produced by forcing air and coal gas, respectively, through one and the same pipe or whistle. The phenomenon appeals more particularly to the senses when two syntonised wind instruments are used at the same time, air being blown through the one and a different gas through the other. Like other physico-chemical methods, the employment of this phenomenon in mining was advocated a long long while back (Forbes 1880, Hardy 1893); but the small amount of importance attached to these proposals by the mining industry is evident from a criticism of firedamp indicators, recently published in *Glückauf*,\* in which it is stated that the known acoustic devices are entirely unsuited for practical application, and that placing them in the hands of the ordinary miner is unimaginable. Dr. Leiser and the author concluded from that expression of opinion that a principle, correct in itself, had been wrongly applied, and they endeavoured to embody it in a form that should be capable of vitality. So long as the device would entail carrying about a large supply of pure air for blowing the standard whistle for comparison, the result did not seem capable of achievement; and, finally, the use of a new form of whistle was decided upon as the best way of removing this obstacle, and led to the construction of the "Firedamp Whistle" illustrated in the drawing—an indicator of handy form and easily attended to.

This apparatus—as seen from the outside—forms a closed brass cylinder 10 in. long and 2¼ in. in diameter. Internally the main feature consists of two whistles syntonised (when equally filled with gas) and operated by one and the same flow of gas. The peculiarity of the whistles is that the gas (the composition of which determines the pitch of the note) in the whistle tube, is shut off from contact with the operating gas by means of a very thin disc of mica, and therefore remains unchanged inside the whistle, except when separate supply and exhaust devices are brought into action. The one whistle is charged with pure air before the apparatus is sent down the pit; and this air cannot mix with the pit air, since it only communicates therewith through a very long, narrow tube (expansion spiral). The tube of the other whistle is filled with pit air which is freed from dust, moisture and carbon dioxide by means of a detachable purifier tube arranged at the intake. To work the indicator the shell, which plays the part of a pump, is pulled downward, thus drawing

\* See *Colliery Guardian*, July 25, 1913.



through the purifier and gas whistle into the chamber. On the pump plunger being released the gas is drawn back by a vacuum plunger in the middle of the apparatus, and forces the indrawn gas through the pressure regulator to the whistle nozzles. If the gas whistle contains 1 per cent. of methane, two pulsations on the average will be audible in the note every second. As the methane content increases the pulsations become more rapid, until, when it approaches the explosive limit, the note becomes a characteristic trill. The ear very readily appreciates the differences, which are clearly audible for more than 100 yards in straight galleries in the pit.

It is not altogether an easy matter to weigh the relative advantages and drawbacks of the whistle and lamp as firedamp detectors. The lamp has the advantage that the occurrence of large volumes of irrespirable gas in the air will extinguish the flame, and thus give an automatic danger signal before the risk of asphyxiation actually occurs. In favour of the whistle are its unconditional safety in firedamp and in the insistent character of its signals, even through considerable distances. Whether the device is strong enough to withstand the working conditions in the mine for any length of time will require to be ascertained by practical tests. No doubt it is capable of being improved in many respects, as at present it is only in its first completed phase, whereas several generations have laboured to improve the lamp. The whistle was the subject of demonstration to mining experts at the Kaiser-Wilhelm Institut, the Derne experimental gallery and the Gneisenau Colliery, Dortmund, and its efficiency and practicability produced a favourable impression in all cases.

THE MINING ASSOCIATION OF GREAT BRITAIN.

A meeting of the Parliamentary Committee of this association was held at the Whitehall Rooms on Wednesday forenoon. The president of the association, Mr. ARTHUR F. PEASE, occupied the chair, and there were present representatives from the mining districts of England, Scotland and Wales.

Prior to the business on the agenda being entered upon, a resolution of sympathy with the sufferers by the Senghenydd explosion was passed in the following terms:—

“That this meeting of the Parliamentary Committee of the Mining Association of Great Britain, assembled at the Whitehall Rooms, London, this 5th November, 1913, desires to convey to the colliery company and to the relatives of the unfortunate men who lost their lives in the deplorable disaster at Senghenydd, and with all who are sufferers by it, its earnest and very deep sympathy with them in the loss and great sorrow they have suffered as the result of the explosion.”

**Claim for Royalties.**—In the Official Referee's Court, on the 23rd ult., before Mr. Virey, Captain P. Hunloke, Chesterfield, sued Mr. William Spooner, Chesterfield, for damages for an alleged breach of contract with regard to the working of the Boythorpe-lane Colliery, Chesterfield, the property of the plaintiff. It was explained by plaintiff's counsel that the enquiry had been directed to that court by Mr. Justice Joyce, who had tried the matters of dispute between the parties in connection with the colliery. Capt. Hunloke was claiming for an alleged breach of a covenant to work a seam of coal known as the “Piper seam,” contained in a lease dated March 27, 1894. There were no reservations; the lease was for a term of 21 years, and expired in 12 months' time. The lessee, under the covenant, had to pay royalties to the plaintiff during the continuance of the lease, at the rate of £25 per superficial acre, irrespective of the thickness of the seam. The important point in the covenant was that the mine should be carried on in a workmanlike manner, to the satisfaction of the lessor or his mineral agent, and according to the best methods in the county of Derby. Like the generality of these leases, the covenant obliged the lessee to go on working the mine, whether for a profit or not. The defendant ceased to work the colliery, and when the matter came before Mr. Justice Joyce, his lordship held that the defendant had no right to discontinue working the coal, and rejected the defendant's contention that he was prevented from doing so at a profit by reason of the fact that the coal was waterlogged. He further ordered an enquiry to be taken before an official referee as to the damages plaintiff might have suffered by reason of the defendant's breach of the covenant. That was the question his Honour had to determine. Plaintiff was claiming for £175 18s. 8d. Defendant said he had done his best to work the mine, and that through circumstances over which he had no control the referee said the case was a clear one, and was in favour of the plaintiff for the amount

STRIKES AND LOCK-OUTS IN THE MINING AND QUARRYING INDUSTRIES IN 1912.

Mr. F. H. McLeod, of the Department of Labour Statistics, Board of Trade, in the Twenty-fifth Report on Strikes and Lock-outs and on Conciliation and Arbitration Boards in the United Kingdom in 1912, observes that the outstanding feature of the year was the national dispute in the coalmining industry, in which about 1,000,000 workpeople were involved, or more than twice as many as the total for all other disputes. The stoppage of the work in and about coal-mines for an aggregate of over 30 million working days represented approximately 11 per cent. of a year's working time in the coalmining industry; but owing to increased activity both before and after the dispute and the great demand for coal in a year of expanding trade, the total output in 1912 was only about 4 per cent. less than in 1911. The interruption in the regular output of coal, and the consequent rise in the price of the supply available, had considerable influence on employment in other industries, especially those in which

workpeople involved in disputes; all other causes of disputes accounted for only 4 per cent. Owing to the coalminers securing district minimum rates of wages the proportion of workpeople who obtained their principal demands was exceptionally high, amounting to no less than 75 per cent. of the total directly involved in all the disputes of the year. The disputes in which the workpeople were wholly or partially unsuccessful accounted for only 14 and 11 per cent. respectively. While the great majority of disputes were settled by negotiation between the parties or their representatives, arbitration or mediation was increasingly resorted to during 1912, and the number of disputes settled by these agencies was the highest recorded. Voluntary boards of conciliation and standing joint committees continued to increase, and by their efforts a large number of disputes were settled without recourse to a stoppage of work.

For the eight completed months of the present year a larger number of disputes have occurred than during the corresponding period of 1912, or during the whole of any of the last ten years. In the 960 disputes so far

TABLE A.—CAUSES AND RESULTS OF DISPUTES IN 1912—MINING AND QUARRYING INDUSTRIES.

Principal cause or object.	Number of disputes.	Number of workpeople directly involved in disputes beginning in 1912, the results of which were—				Total directly involved.	Total indirectly involved.	Total aggregate duration* in working days.
		In favour of work-people.	In favour of em-ployers.	Compro-mised or partially successful.	Indefinite or un-settled.			
<b>Wages:—</b>								
For increase .....	27	1,413	2,379	1,812	—	5,604	4,794	59,619
Against decrease .....	13	195	614	1,690	105	2,604	620	22,807
As to system of payment of wages.....	1	50	—	—	—	50	—	50
Readjustment of rates of payment on account of difficulties or ease in working, quality of materials, &c.	21	5,938	1,610	4,611	—	12,159	3,273	1,469
For the establishment of the principle of a minimum wage.	1	850,000	—	—	—	850,000	150,000	69,300
Other .....	31	4,454	9,175	3,756	—	17,385	12,688	101,415
Total .....	94	862,050	13,778	11,869	105	887,802	171,375	31,171,112
<b>Hours of labour:—</b>								
For decrease .....	3	—	—	538	—	538	2,468	7,886
Against increase.....	1	—	—	222	—	222	461	683
As to arrangement of hours.....	3	594	350	—	—	944	291	3,505
Other .....	1	—	670	—	—	670	—	2,010
Total .....	8	594	1,020	760	—	2,374	3,220	14,084
<b>Employment of particular classes or persons:—</b>								
For reinstatement of discharged workpeople	16	1,107	844	1,686	—	3,637	4,637	16,796
Against employment of certain officials.....	2	—	900	193	—	1,093	—	1,393
Other .....	5	4,415	8	190	—	4,613	892	55,915
Total .....	23	5,522	1,752	2,069	—	9,343	5,529	74,104
<b>Working arrangements, rules, and discipline (other than above):—</b>								
For change in existing arrangements .....	5	10	136	1,470	—	1,616	977	7,893
Against change in existing arrangements...	3	1,920	60	—	—	1,980	80	2,100
Other .....	5	105	175	421	—	701	1,790	5,250
Total .....	13	2,035	371	1,891	—	4,297	2,847	8,358
Trade unionism .....	14	13,291	320	3,380	—	16,991	266	18,351
Miscellaneous .....	3	—	155	1,366	—	1,521	1,171	5,250
Total .....	155	883,492	17,396	21,335	105	922,328	184,408	143,993
								2,860
								38,400
								31,460,044
								133,801

\* The roman figures show the aggregate duration in 1912 of disputes which began in that year; those in italics show the aggregate duration in 1912 of disputes which began before that year but were still in progress in 1912. The aggregate duration is computed on the basis of the total number involved, directly and indirectly.

large quantities of coal are used (e.g., pig iron, iron and steel, tin-plate, brick, glass, pottery), and the percentage of trade union members unemployed rose sharply from 2·8 in February to 11·3 in March. On the resumption of work by the miners in April, however, employment quickly recovered, and by the end of May had returned to its former high level.

Although the second half was comparatively free from industrial disturbance, the total number of workpeople involved (1,464,000) and the aggregate duration in working days (40,915,000) of all disputes in 1912 were much higher than in 1893, a year which, owing to a great coalmining dispute affecting the Federated districts of England, has hitherto held the record in both these respects. Altogether in 1911 and in 1912 the aggregate duration of labour disputes exceeded the total time lost in this way during the previous 12 years.

The majority of the disputes arose on demands for higher wages, and the proportion of workpeople involved in all wages disputes (86 per cent.) showed a large increase, due in a great measure to the inclusion of the coalminers' strike to enforce the principle of a minimum wage. Questions of trade union principle were responsible for the next highest percentage (10 per cent.) of

reported nearly half-a-million workpeople have been involved, and the total aggregate duration has been over 7,000,000 working days.

In the coalmining industry sectional disputes were fewer in 1912 than in the three previous years, although more numerous than in any of the other years in the 10-year period.

As regards duration, in the coalmining industry the average loss of time was about 30 days per head of those employed. The estimated aggregate duration of the general coal strike was 30,800,000 working days, and the total aggregate duration of all disputes in the coal-mining industry in progress during the year was 31,561,043 working days. Prior to 1912 the years with the highest aggregate durations in the coalmining industry were 1893 and 1898, when 21,137,000 and 11,650,000 working days respectively were lost by prolonged disputes in the federated districts and in South Wales.

Table A shows the causes and results of disputes in 1912 in the mining and quarrying industries. Disputes involving less than 10 workpeople and those which lasted less than one day have been omitted, except when the aggregate duration exceeded 100 working days.



Taking coalmining only, we have the following :—

DISPUTES BEGINNING IN 1912.		
Method of settlement.	No. of disputes.	No. of workpeople directly involved.
By direct arrangement or negotiation between the parties or their representatives.....	118	61,449
By arbitration .....	1	130
By conciliation or mediation.....	2	3,105
By legislation .....	1	850,000
By return to work on employers' terms without negotiation.....	23	6,651
By replacement of workpeople.....	1	60
By closing of works.....	—	—
Otherwise (including indefinite and unsettled).....	1	105
	147	921,500

The following shows the number of workpeople involved and the aggregate duration, in working days, of disputes in the coalmining industry, classified according to district :—

District.	No. of workpeople directly and indirectly involved in disputes beginning in 1912.	Aggregate duration in working days.	
		Disputes beginning in 1912.	Disputes in progress at beginning of 1912.
Northern counties ...	25,396	145,780	—
Yorkshire.....	11,838	105,512	22,700
Lancs. and Cheshire	4,193	21,954	—
N. and W. Midland counties .....	21,597	65,530	—
S. and W. counties...	1,118	8,360	—
Wales & Monmouth	38,169	206,155	100,534
East Scotland.....	1,560	5,739	—
West Scotland .....	1,878	71,072	7,707
Ireland.....	—	—	—
Two or more districts* .....	1,000,000	30,800,000	—
Total.....	1,105,749	31,430,102	130,941

The next table shows the number of disputes in the mining and quarrying industries, together with the numbers of workpeople involved, and the aggregate duration in working days in each of the past ten years :—

Year.	No. of disputes beginning in each year.	Total directly involved.	Total indirectly involved.	Total aggregate duration in working days.	
				Disputes beginning in year.	Disputes in progress at beginning of year.
1903 ...	125	49,995	13,583	692,178	705,720
1904 ...	113	26,131	20,156	533,703	123,582
1905 ...	106	34,069	10,722	1,167,340	88,174
1906 ...	96	64,056	19,777	629,764	292,338
1907 ...	112	35,629	16,938	466,526	102,535
1908 ...	145	60,474	26,548	1,271,979	79,450
1909 ...	207	149,576	123,178	2,056,170	173,317
1910 ...	224	205,283	91,290	5,263,139	261,021
1911 ...	179	68,207	72,601	1,419,162	2,682,114
1912 ...	155	922,328	184,408	31,460,044	133,801

Conciliation and Arbitration

The number of disputes settled by conciliation or arbitration in 1912 was the highest for any of the years in the period under review; although the number was only slightly in excess of that in 1911, it was more than double the average number of disputes so settled during the period 1903-1910. The number of workpeople involved in these disputes in 1912 was larger than in any of the eight years preceding 1911, but was less than in 1911 when 19 disputes in the transport trades, directly involving over 300,000 workpeople, were settled by the mediation of third parties; in these trades during 1912 the number of disputes so settled was about the same as in 1911, but the number of workpeople directly involved therein was only 24,724.

As in 1911, the number of disputes settled in 1912 by conciliation far exceeded those settled by arbitration; about three-quarters of all disputes brought to a termination by the intervention of third parties were settled by conciliatory efforts as distinct from arbitration.

The number of cases involving a stoppage of work settled by conciliation under the Conciliation Act, 1896, showed a considerable decline as compared with 1911, but the number of cases settled by arbitration under the Act was, with the exception of 1909, the highest in the period under review.

Thirteen disputes were settled in 1912 through the agency of voluntary permanent conciliation boards and standing joint committees dealing with particular trades, but none were of great magnitude.

The number of such permanent boards and committees known to have taken action in 1912 was 164, and the number of cases considered by them was 3,083, as compared with 4,543 considered by 126 boards and committees in 1911. Of the cases considered 1,905 were settled by the boards and committees, and 233 by umpires, independent chairmen, or arbitrators appointed

by them. Of the total number of disputes thus settled by the instrumentality of the boards only 16 involved a stoppage of work, of which two occurred in the coalmining industry. In 739 cases the questions under consideration were withdrawn, ruled out of order, or settled independently, in 28 cases they were referred to higher boards, and the remaining 178 cases were still under consideration at the end of the year.

The number of cases considered by boards in 1912, though much less than in 1911, was considerably greater than the average of cases in the period 1903-1911.

The agencies for voluntary conciliation and arbitration in the coalmining industry may be divided into three classes, viz. :—(1) Boards which deal only with the general level of wages over a large area; (2) boards which not only settle changes in the general wages rates, but also deal with other questions of a general or local character; and (3) joint committees which deal only with disputes not involving a general rise or fall in wages. The first class now consists of two important boards, viz., one for the Federated districts of England and Wales, and one for Scotland. In June 1912 the miners' representatives on the board for the Federated districts made an application for an advance in wages of 5 per cent. A meeting held on July 17 to consider the matter was adjourned to August 1, and further adjourned to August 20, when the Right Hon. Lord Coleridge (the new chairman appointed in 1912 to succeed the late Right Hon. Lord James of Hereford) attended. A difference existed between the parties, the coalowners claiming that they had not yet recouped themselves, in accordance with the resolution of September 3, 1909, for the disadvantage they had incurred by the payment of the rate of wages prevailing at that date during the period that the selling price was less than 7s. 10-21d., and that therefore the advance could not be applied for. At the suggestion of his lordship, conferences took place between the parties on September 17, October 10 and October 21, when an agreement was arrived at providing for the continuation of the conciliation board until March 31, 1915, and an advance in wages of 5 per cent. affecting in all about 390,000 workpeople. On December 9 the men's representatives made an application for a further advance of 5 per cent. Meetings of the board were held on December 18 and January 6, 1913, and on the latter date it was agreed that the advance should be given. Two changes in the district rate of wages were effected by the Board of Conciliation in Scotland. At a meeting of the board held in June, Lord Hunter, the independent chairman, awarded an advance of 12½ per cent., making wages 62½ per cent. above the standard of 1888, and later in the year a further advance of 6¼ per cent. was granted by agreement between the parties. Of the boards comprising the second class, six considered cases in 1912, viz., those for Durham, Cumberland Coal, Cumberland Coke, Radstock, Monmouth and South Wales, and Scotland (enginemmen only) respectively. In the case of the board for the Durham coal trade, four meetings were held in 1912 to consider the question of changes in the district rate of wages. In addition, eight other cases were considered by the board, one of which was settled by the board, two were settled by awards of the umpire, the Right Hon. Sir David Harrel, K.C.B., two were referred back to the respective associations, and three were settled independently. The Board for Monmouthshire and South Wales effected two advances in the general wages rate in 1912. Of the other cases considered by this board, 12 were referred to representatives of the board for settlement, 12 were withdrawn or settled independently, and two were under consideration at the end of the year. Of the 26 cases considered by the four other boards in the second class, 21 were settled by the boards, and one by arbitration. In the case of the Cumberland and Radstock coal boards, changes in the district rates of wages were effected.

The most important of the joint committees included in the third class are those covering the counties of Northumberland and Durham. The Northumberland Committee, which in 1911 held nine meetings and considered 86 cases, in 1912 held one meeting only in January and did not resume its sittings until January 1913. In the Durham coalfield five joint committees exist, covering respectively the miners, cokemen, deputy overmen, enginemmen and mechanics. The Miners' Committee, as usual, dealt with a very large number of cases during the year, although the number was not so large as in previous years.

Under the terms of the Coal Mines (Minimum Wage) Act, 1912, joint district boards were established in 22 districts for the purpose of carrying out the provisions of the Act, but as these are not voluntary boards, no particulars of their proceedings are given in this report.

The following table summarises the work of voluntary permanent conciliation and arbitration boards and

standing joint committees in the coalmining industry during 1912 :—

Boards and committees.	Cases settled in 1912		Other cases considered in 1912.		Total number of cases dealt with in 1912.
	Conciliation.	Arbitration	Withdrawn, ruled out of order, or settled independently of Board.	Still under consideration at end of 1912.	
Federated Districts Board	1	—	—	—	2
Northumberland miners' committee .....	5	—	4	3	12
Durham coal board .....	5	2	5	—	12
Durham miners' committee .....	147	130	351	—	628
Durham cokemen's committee .....	29	10	22	—	61
Durham mechanics' committee .....	6	1	10	—	17
Durham enginemmen's committee .....	12	1	5	—	18
Durham deputy overmen's committee.....	1	—	—	—	1
Cumberland coal.....	3	—	1	—	4
Cumberland coke .....	9	1	—	—	10
Radstock .....	4	—	—	—	4
Monmouthshire and South Wales coal .....	1	14	12	2	29
Scotland coal board .....	1	1	—	—	2
Scottish engine-keepers' committee .....	5	—	1	2	8
Total.....	229	160	411	8	808

THE KENT COALFIELD.

As briefly reported in the last issue of the *Colliery Guardian*, at a meeting held in London on the 30th ult., of the shareholders in the Kent Coal Concessions Limited and subsidiary companies, provisional approval was given to a proposal to form a new company to take over certain of the assets. At that meeting the chairman, Mr. J. Dewrance, stated that the nucleus of the new board had been formed, the following gentlemen having provisionally agreed to form the board of the new company, with power to add to their number :—Sir Henry McCallum, Sir Arthur Yorke, C.B., Mr. C. E. Allan (of Messrs. Workman, Clark and Co.), Prof. Galloway, Lieut.-Col. R. Standen, Dr. Malcolm Burr, Mr. G. N. Scarfe, and Mr. Agelasto (of the firm of Rodocanachi). When the new board was settled, with an honest intention to bring the finances and the arrangements of the different companies into the most satisfactory condition, they would be able to get the enormous sum of money which would be required to thoroughly develop the great Kent coalfield. At present, the capital necessary to bring about the prosperity of the coalfield was wanting.

Mr. Arthur Burr afterwards gave some particulars of the present status of the undertakings. At Tilmanstone on the previous day, he said, the output was 307 tons. They would not increase their output beyond 750 tons a day until the new winding engines and the new headgear, which were all ready, had been erected at No. 2 pit. Then all the coal from the present seam would be transferred to that shaft, and No. 3 pit would be sunk down to the deeper seams as rapidly as possible. In six or seven weeks they would reach the deeper seam at Snowdown, and then would be able to put men at work in both seams. By next year Guilford ought to come on the scene as a coal-producing colliery. The same thing would obtain in regard to Wingham and Woodnesborough.

According to the *Joint Stock Companies' Journal*, No. 3 shaft at Snowdown is approaching closely to the point at which the Fredville boring was stopped on account of the narrowing of the diameter of the bore. Fredville came to a stand at 1,825 ft. No. 3 shaft is at 1,750 ft., where a stop was made for bricking; and it is interesting to note that a seam of good coal, 7 in. in thickness, was passed through, of which the boring gave no indication. Sinking is now being resumed.

Our contemporary is devoting a considerable amount of space to the subject of Kent coal, and gives some particulars of the proposed directorate of the new company. Col. Sir Henry E. McCallum, R.E., G.C.M.G., has acted as Governor of Newfoundland, Natal and Ceylon. Lieut.-Col. Sir H. Arthur Yorke, R.E. (retired), is one of the most distinguished railway experts in the country. In 1891 he became inspector of railways for the Board of Trade, and was promoted Chief Inspecting Officer of Railways in 1900. Mr. C. E. Allan is a colliery proprietor and a member of the Belfast engineering firm of Workman, Clark and Co. The career of Prof. William Galloway, F.G.S., is too well known to readers of the *Colliery Guardian* to need repetition here.

The negotiations between the Trafford Park Estates Company, Manchester, and the British Mannesmann Tube Company, have been broken off, owing to the practical requirements of the Manchester Canal Company. It is being speculated as to what site the tube company select for erection of new works, and offers are stated to have been received from several large shipping ports.



## MIDLAND INSTITUTE OF ENGINEERS.

## Rescue Work and Nystagmus.

An interesting account of the saving of life by means of portable breathing apparatus and a further discussion on miners' nystagmus were the features of a general meeting of the Midland Institute of Mining, Civil and Mechanical Engineers, held at Sheffield on November 4. The PRESIDENT (Mr. W. Hargreaves) occupied the chair, and there was a large attendance.

The following new members were elected:—Associate members: Mr. Frederick Parker Rhodes, Finningley Park, near Bawtry, proposed by Mr. G. Blake Walker, seconded by Mr. P. C. Greaves; Mr. William Harrison Barwell, 10, Carter Knowle-road, Sheffield, proposed by Mr. Thomas Stubbs, seconded by Mr. Thomas Gill. Student members: Mr. John McKenzie Menzies, Yew Tree Farm, Bentley, near Doncaster, proposed by Mr. Robert Clive, seconded by Mr. W. D. Lloyd; Mr. Stanley Burnett Kay, Acton Hall Colliery, Featherstone, proposed by Mr. Roslyn Holiday, seconded by Mr. David T. Protheroe; Mr. David John Rowlands, care of David Bowen, Esq., 68, Prudential-buildings, Leeds, proposed by Mr. David Bowen, seconded by Mr. F. W. Hardwick; Mr. Kerris Ap Thomas, care of David Bowen, Esq., 68, Prudential-buildings, Leeds, proposed by Mr. David Bowen, seconded by Mr. F. W. Hardwick; Mr. Roger Vernon Harvey, Cromwell, Newark, Notts, proposed by Mr. E. B. Whalley, seconded by Mr. E. W. Thirkell.

On the motion of the PRESIDENT, the following resolution was carried, all standing;—"The members of the Midland Institute of Mining, Civil and Mechanical Engineers, assembled in general meeting, having heard with deep sorrow of the terrible disaster and loss of life at the National Colliery, Senghenydd, South Wales, desire to express their sincere sympathy with the families and relatives of the deceased miners and with the owners and staff of the Universal Colliery, and to express their admiration of the devoted men who are taking part in the endeavour to recover the mine."

Mr. W. D. LLOYD then read a paper on "An Account of the Use of Rescue Apparatus at Lodge Mill Colliery, Huddersfield," which is given elsewhere in this issue.

The PRESIDENT, in opening the discussion on the paper, said their thanks were due to Mr. Lloyd for having put on record the experiences of the Altofts Brigade under circumstances which called the practicability of their apparatus to the test. The colliery was situated in the far eastern portion of West Yorkshire, and in summertime was fairly inaccessible, but in winter was a most difficult place to get to; and in addition to that the telephone was not connected with the National system, and the colliery was 20 miles away from the only help which could be of use to them in the circumstances. Another difficulty was the long, low haulage road. In spite of all these things the team were able, for the first time, to rescue human life by means of a portable breathing apparatus. The conclusion at which Mr. Lloyd arrived—that if efficient rescue apparatus and trained men to use it had been available at the colliery or in the immediate neighbourhood, the lives of all three men would certainly have been saved—was one of very considerable moment to them. It was highly satisfactory to find that Dr. Haldane had clothed his note on the case in such simple language. It seemed to him that that message came at an opportune time. They were having a great deal of discussion nowadays on the question of the chemical purity of the air in their mines. He remembered reading last year that Dr. Leonard Hill attributed all the big mine explosions to the fact that too much attention was paid to the chemical purity of the air. The Coal Mines Regulation Act insisted on the air in all working places containing not less than 19 per cent. of oxygen, and not more than  $1\frac{1}{4}$  per cent. of carbon dioxide. It was now quite on the *tapis* that that composition might be perhaps the most dangerous possible, and they had scientists arguing to-day that if they were to reduce the liability to explosion in mines, they must reduce the amount of oxygen in the air-currents by the introduction of an inert gas. Whether that was practicable or not, he would not attempt to say at that moment, but there was undoubtedly a good deal to be said for it. He thought it impressed upon all connected with mines the necessity of sampling their air—taking samples in any working places which they might suspect, or perhaps regular samples in whole districts—and by that means putting themselves in possession of what was really going on in their mines.

Mr. W. H. CHAMBERS, referring to the circumstances detailed by Mr. Lloyd, suggested that if men could exist and keep alive for 11 hours in the atmosphere described,

they would have got out by people making a dash for the rescue apparatus at all.

Mr. LLOYD said he gathered from the paper

that some of the men at the colliery made attempts at rescue, but were overcome. He noticed that the men were pushed in some 1,500 yards, to the end of the haulage road, from which point they had to creep 300 yards further. He asked whether they were wearing their mouthpieces in travelling that 1,500 yards, or whether it was only when they got within 80 yards of where the men were lying that the apparatus was actually used as an apparatus. He thought it was very fitting that the Altofts team, which he believed was one of the first teams to exist in that district for the purpose of doing rescue work, should have the privilege of being able to rescue the first life that was rescued in that part of the country.

Mr. THOMAS BEACH asked for information with regard to the veins of the men's legs. Mr. Lloyd said "they were very much clotted, particularly in the case of English, so that the veins stood up in knots." Was that due to the poisoning that they had undergone, or was English subject to varicose veins before he encountered this gas?

Prof. J. S. MACDONALD said the information as to the ages and conditions of the men, and the positions in which they were found, was exactly what was wanted for really understanding such a matter from the medical point of view. The view which Dr. Haldane had taken as to the cause of death seemed, from the statements in Mr. Lloyd's report, absolutely the only one to which one could be led. Part of the difficulties of living in an atmosphere where there was a small amount of oxygen were due to, or corresponded with, the age and the weight of a person. The man who died in this case was the oldest man, and the heaviest. The age mattered, because gradually through life the heart underwent a certain amount of deterioration. The weight mattered, because with every movement of the limbs greater mechanical work was done, and the consumption of fuel in the body and the intake of oxygen was necessarily more. So that one might quite fairly have assessed the inverse chances of these men's recovery by multiplying their ages by their weights, which would give the following:—Sykes, 700; English, 380; Chatterton, 380; Schofield, 283. He thought that really did represent Schofield's chances of recovering from the trouble—that he was a young man, and not a very heavy man. As to the knots in the limbs, that he took to be a symptom of the heart failure which followed during the hours of insufficient breathing.

Prof. L. T. O'SHEA said Dr. Haldane had referred to one point which was of extreme importance in cases of going to the rescue of men who had been overcome, and that was the question of deficiency of oxygen in the atmosphere. Dr. Haldane had pointed out in his work how very suddenly men were overcome by deficiency of oxygen—that a man might go on breathing, for a comparatively long time, air which even contained only 7 per cent. of oxygen, without feeling any distress at all, and then suddenly he would be overcome, would lose the use of his limbs, fall down, and become unconscious. A point like that ought to be emphasised very strongly. When they attempted to make rescue of their unfortunate brothers in a mine under those conditions, the greatest care should be taken in entering an atmosphere, on account of the suddenness with which men were overcome.

Mr. SMITHSON asked what treatment was applied to the men after they were got into the fresh air. Was oxygen used, or artificial respiration?

Mr. RUSSELL asked whether a spare apparatus was taken in to the point where the men were, or whether any attempt was made to use a spare apparatus in the place where the air was bad?

The PRESIDENT said it had been suggested that perhaps Mr. Mottram might tell them what brought about this particular condition of the atmosphere in the pit. It would be interesting to know how this came about, and how suddenly.

Mr. MOTTRAM said he was not sure that he was at liberty to give them the particulars. He thought it was a well-known fact that the workings were disused, and that the men went in to get some old rails.

Mr. LLOYD, replying to the discussion, repeated that he believed that, before the rescue party arrived, the officials and men on the spot did their utmost to get at the three men, but had not been able to get them out. He did not think anyone else was actually overcome. In reply to another question, there was no necessity for the men to use their apparatus in the fresher air, and they carried their headpieces. In reply to Mr. Beach, he thought it quite probable that somebody would suggest that English was suffering from varicose veins; but he (Mr. Lloyd) did not think he was. He might have had them slightly. At first they thought he was suffering from cramp. The veins of his legs were knotted up in a very peculiar way—in fact, the

men nearly rubbed some of his skin off in their efforts to keep him warm. But he believed it was a fact that the whole of the blood in the men's bodies would be in a clotted condition; it certainly gave that appearance. He merely put the information on record to see whether it would be of any help to those who were dealing with the physiological part of the question. Mr. Smithson asked as to the treatment adopted. When the men were got out they were actually breathing, but very slightly. They were breathing through the nose, and their teeth were tightly clenched. One of the greatest difficulties was to get their mouths open; in fact, for a long time they absolutely could not get them open at all. By prising things between their teeth and other means they got the teeth slightly open, but that was the most they could do. The Pulmotor was used, though not at first, for just at first they simply let the men breathe the oxygen from the breathing apparatus, and of course wrapped them up as soon as they could and kept them warm. It might seem a curious use to which to put lamps, but the safety lamps were so hot that the idea suggested itself to him of putting them between the men's legs and feet, as the nearest approach to warm bricks that they could get. They did not find it necessary really to use the ordinary methods of artificial respiration to any extent, though they did use them for a certain amount of time. It was not even absolutely necessary to use the Pulmotor, which was intended for use when breathing was absolutely stopped. It was used simply to let the men breathe oxygen in preference to the air, because the breathing was already restored. As to Mr. Russell's question as to the spare apparatus, Mr. Lloyd said they did use it, though they did not actually put it on. They simply disconnected the oxygen pipe and let the oxygen play direct into the men's mouths. It was only such a short distance from where the rest of the rescue party could breathe into fresh air, that undoubtedly the best thing was to get them straight out; in fact, it only took about 10 minutes to get each of the men out. The best thing was to get them out and treat them in the fresh air. They did not try to do anything where the men were lying. As far as he heard, the district had been abandoned—why it was abandoned he could not say—but it had been abandoned for a couple of months, and the gases had been gradually accumulating during that time. These men were getting the rails out as a last step before the district was finally abandoned.

On the motion of the PRESIDENT, seconded by Mr. BEACH, a vote of thanks was accorded to Mr. Lloyd, and the further discussion on the paper was adjourned.

## Miners' Nystagmus

The meeting then resumed the discussion on the paper on "Miners' Nystagmus and its Effect on Vision," which was read by Dr. J. Court at the previous meeting at Doncaster.

Mr. J. E. CHAMBERS related a little experience that he had. A man was reported to be suffering from nystagmus and claiming compensation. In a short time they asked for the test to be repeated, and it was found that the man was able to work. They asked if he was still suffering from nystagmus, and whether there was any possibility of it recurring. The doctor again said that the man was able to work. He (Mr. Chambers) determined to know what was the matter with him, and it turned out that he had been suffering from biliousness, and they had been paying him compensation. He advised anyone who got a report from a doctor that a man was suffering from nystagmus to send the man to a doctor some distance from himself and get a report from him.

Mr. SMITHSON added his testimony of appreciation of Dr. Court's paper. It was very interesting to him, seeing that he had probably as many cases of nystagmus as anyone present. At present he had 31, and that was not the largest number he had had. He entirely agreed with Dr. Court's idea as to the cause of nystagmus. He had spent about four years in trying to find out what the cause was. In 1910, he had 11 cases; at the same time in 1911, he had 29. He had his lamps tested as against other lamps, and found that there was nothing seriously wrong there. He went to the places in the mine where the men had been working, and he could not find anything different from other places. He did not agree with the theory that nystagmus was caused by man-holing and that sort of thing. It might possibly accentuate it, but he did not think it was the cause, inasmuch as the collieries which he had to look after were good for men to work at. There were four seams, all about 4 ft. 6 in. thick, and there was very little holing done. There was a good deal of coal cutting, which was very easy work; and yet he had all these cases of nystagmus. After going carefully into the question, he had come to the conclusion that it was light, and



light alone, which caused nystagmus. He had certainly got as good an oil lamp as there was on the market, in his opinion, for giving light; and yet he had all these cases. He also thought there was something in what Dr. Court said, that the men had a good deal to do with it. The number of cases at their collieries jumped up so much from 1910 to 1911 that it was like a fever. He really thought that men talked to others until they knew they had got it, and he also believed that some of them wanted a holiday, and took it in that way.

Mr. WHALLEY, touching on the question of light, said it was a strange thing that in Scotland, where they used so many naked lights, which gave considerably higher candle power than lamps, and which was a perfectly diffused light, not focussed or reflected, they had still a very large number of cases of nystagmus. There must be something else besides the question of light. He did not personally know of any electric lamps which gave as much as 2-candle power, but they had hundreds of men in Scotland working with naked lights of considerably more than that power.

The PRESIDENT said his recollection of Dr. Court's paper was that his experience was quite in contradiction to that of Mr. Whalley. Dr. Court said he never knew

bottom of the trouble, but, if men were going to get nystagmus on the surface, it certainly seemed that there must be some inherent physical defect in the man himself, apart from the question of light.

Prof. MACDONALD said he supposed it was quite clear that nystagmus was only a symptom, and that it was a symptom of quite a number of different kinds of trouble, and that a man on the surface of the colliery might be involved in nystagmus which arose out of quite different conditions and had no relationship whatever to the kind of nystagmus which was picked up inside the pit.

Mr. BLAKE WALKER said that what Prof. Macdonald had said seemed to open up a very interesting vista, and he hoped the professor would extend his remarks after reading the paper.

## MAP OF COLLIERIES IN THE NORTH MIDLANDS.

The North-Eastern Railway Company have just issued a useful map, of which that on this page is a reproduction on a smaller scale, of the collieries in Yorkshire, Notts and Derbyshire, and their railway

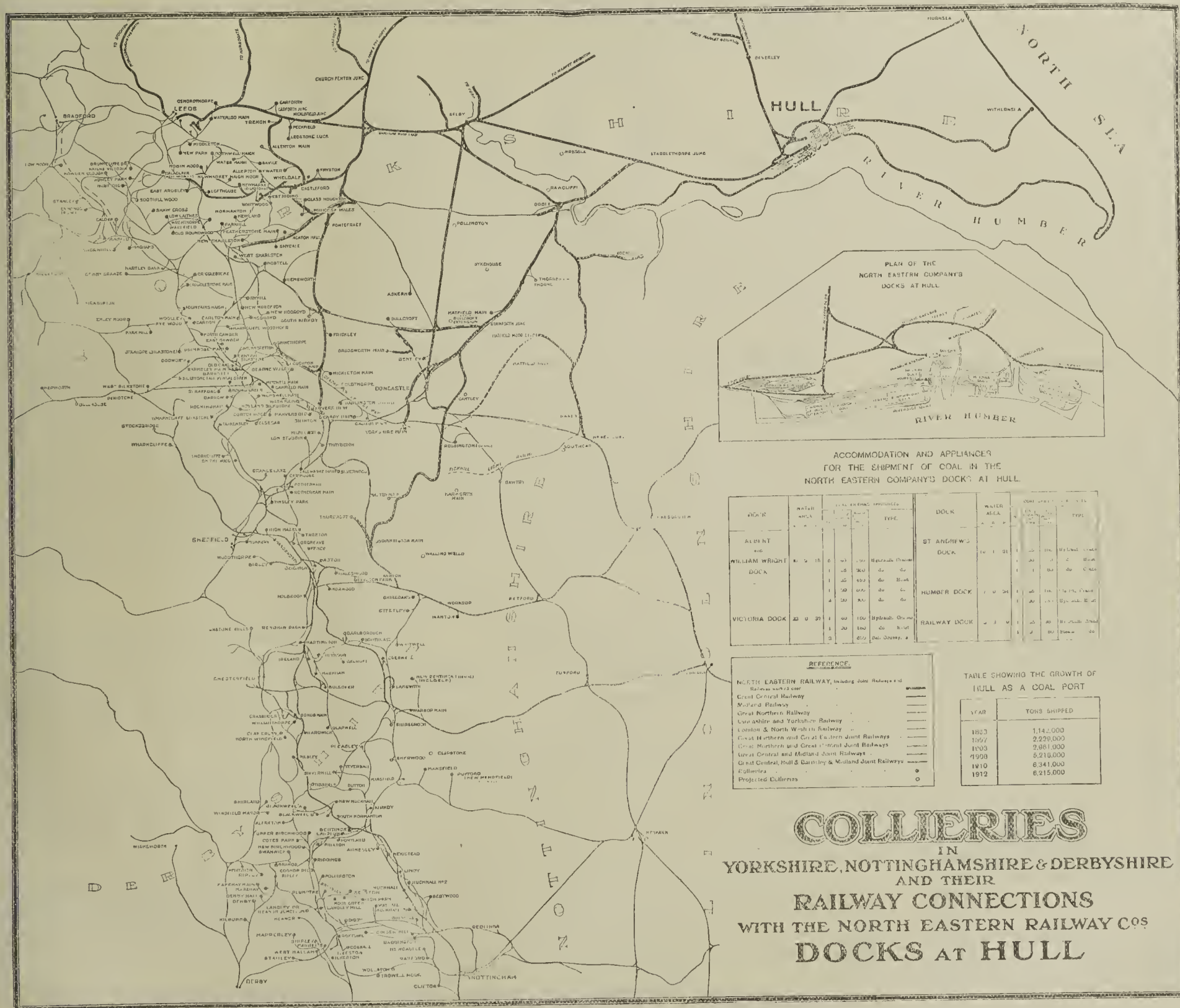
**LANCASHIRE AND CHESHIRE COALOWNERS' ASSOCIATION.**

## Annual Meeting.

The seventieth annual meeting of this association was held at the Queen's Hotel, Manchester, on Tuesday afternoon, Mr. HARRY SPEAKMAN, president, in the chair, there being a full attendance of members.

Mr. W. H. HEWLETT said he had been asked to propose a president for the ensuing year, but before doing so he would like to say how grateful they were to Mr. Speakman for having undertaken the office of president for two years.

It was the turn of the Manchester district to nominate a president, and he was going to ask the meeting to carry unanimously and with acclamation the name of a gentleman who was well known to all the members, one whose father occupied the position over 20 years ago, with very great success. They now looked forward to the sons taking their father's place. The gentleman he was about to name had taken successfully his late father's place as manager of one of the largest colliery concerns in the Manchester district. He had great pleasure in proposing, "That Vincent Bramall, Esq., be and is hereby elected president of the association for the ensuing year." If Mr. Bramall would undertake the duties they would all feel indebted to him. His duties



a case where naked lights had been used. He thought Mr. Wilkinson also made a similar remark.

Mr. J. R. WILKINSON said the president was quite correct, that in mines worked by candles, that had come under his observation, he had not been able to turn up one recorded case of nystagmus, while at the same time they had been frequent, as Mr. Smithson said, in safety lamp pits.

Mr. W. D. LLOYD said he noticed in the papers a short time ago a case, which, he thought, was in Scotland, where a man was claiming compensation for nystagmus who was employed on the top, and had never worked below ground. It would be interesting if they could get some information on that point. As far as he remembered, Dr. Court could not give a definite answer as to what proportion of surface workers suffered from nystagmus. He (the speaker) had been, and was at present, of opinion that the light question was at the

connections with the North-Eastern Railway Company's Docks at Hull. The original map, measuring 32 in. by 40 in., is mounted on rollers, and should prove useful to the numerous traders, shippers and others who do business with this enterprising company.

The annual gathering of the Leicestershire branch of the Midland Mining Officials' Association was held at Coalville recently. Mr. Arthur Smith said legislation was continually making the duties of mining officials more onerous, and it enhanced the value of membership of an association of that kind. Referring to the disaster in South Wales, he said he considered it a scandalous thing that should anything happen to the gallant fellows who volunteered for rescue work, their dependants would have to depend on charity. He hoped that state of things would soon be altered. It was announced that the members of the association now numbered 166, 33 having joined during the year.

would be rendered comparatively light by the assistance and guidance of their secretary, Sir T. Ratcliffe-Ellis.

The CHAIRMAN said he seconded the resolution with very great pleasure. He remembered the late Mr. Henry Bramall and the admirable way in which he presided over their deliberations, and the great service he rendered to the association. In Mr. Vincent Bramall they had a gentleman who was moving in his father's footsteps. As Mr. Hewlett had said, he had succeeded as general manager to Messrs. Andrew Knowles and Sons Limited, and had proved himself a capable member of the association.—The resolution was carried unanimously, and Mr. Bramall, in taking the chair, thanked the mover and seconder and the members for the high honour they had conferred upon him in electing him as their president. He felt great diffidence in taking the position, but he would do his best, and with the help of Sir T. Ratcliffe-Ellis, which he knew was always available, he hoped he might be able to discharge his duties to the satisfaction of the members. (Hear.)



HART DAVIS moved "That the best thanks of the association be and are hereby given to Harry Speakman, for his valuable services as president of the association during the past year." He did not think that any gentleman amongst the long list of past presidents had filled the chair more satisfactorily than their late president had done for two years. They had passed through an extremely strenuous time, but Mr. Speakman had carried out his duties to their entire satisfaction, and the fact that he had been elected for a second year was a very high compliment. He did not think any president had shown more industry or greater zeal, and it gave him the greatest pleasure to move the resolution.

The resolution was seconded by Mr. CHARLES PILKINGTON, and, on being put to the meeting, was carried with acclamation.

Mr. SPEAKMAN, in reply, said he was at a loss to say what he thought of the all too kind remarks which had been made in reference to himself. When he agreed to accept office two years previously he did so with great diffidence, knowing there were difficult times in front. He was not sorry now, however, that he had undertaken the duty. He had been strengthened by the power behind the throne, namely, the help he had received from their Law Clerk. They were especially grateful to him for all he did for the association, and as long as they had him the post of president would not be a difficult one. He thanked them all. (Hear.)

The call for the ensuing year having been fixed, the cordial thanks of the association were given to Sir William Scott Barrett for his valuable services as honorary auditor, coupled with the request that he would favour the association by continuing to act in the capacity named.

In thanking the members, Sir WILLIAM was good enough to assent to the request.

The Parliamentary, Railway, and Finance committees having been appointed, on the motion of Mr. SPEAKMAN, seconded by Mr. W. H. HEWLETT, a cordial vote of thanks was accorded to Sir Thos. R. Ratcliffe-Ellis and to Mr. Arthur Ratcliffe-Ellis, for their services as secretary and assistant secretary during the past twelve months. Sir THOS. R. RATCLIFFE-ELLIS responded. The ordinary business was then proceeded with.

## CONTINENTAL MINING NOTES.

### Belgium.

In consequence of a 10 per cent. reduction in the wages of the miners in the Borinage, the chief coal region in Belgium, 2,000 men of the Produits mines, in the Flénu district, have come out on strike.

Some information is to hand with regard to the tenders for the State Railways contract. The total requirements are 350,000 tons of bituminous coal, and of this total 200,000 will be purchased abroad. Amongst the tenderers are Messrs. Morgan, Wakley and Co., G. van Emmerik, Pyman, Watson and Co, Tabb and Buletson, H. C. Vivian and Co., Evans and Reid, C. L. Clay and Co., and the Rhenish-Westphalian Syndicate. It may be noted that the tenders made by the latter are some 4 fr. higher than those made by British merchants. They offered only two lots at 20 fr., whereas the average of the whole is 15½ fr.

### France.

For the present the attempt made by the International Miners' Committee to heal the differences between the two sections into which the French miners' organisation is split has failed.

### Germany.

**Hamburg Coal Trade.**—Mr. H. W. Heidmann, of Hamburg, says the import of coal has been in October:—

From	1913. Tons.	1912. Tons.
Northumberland and Durham...	221,911	249,834
Yorkshire, Derbyshire, &c. ....	77,870	65,639
Scotland .....	130,778	134,078
Wales .....	12,563	6,613
Coke .....	300	75
Total.....	443,422	456,239

**Ruhr Coal Market.**—The distribution continues to grow smaller, for, though the figures are larger, the percentage of the participation is smaller than last year. For the present month, too, the restriction on the output of coal has been increased by 7½ per cent., whereas there was no restriction between October 1912 and July last, and since that time it has only been 5 per cent.—a sufficient indication of the change in the situation. The unsatisfactory state of the iron industry is the chief cause of the poor trade in industrial coals; and there seems but little prospect of any early improvement. Some compensation is afforded by the export trade, since France, Holland and Belgium are all taking large quantities, though at poor prices. In South Germany there has latterly been a more active demand, more particularly for house coal, and the comparatively small amount of coal being taken up at once. In the Ruhr, the demand for blastfurnace coke is again increasing, and the amount of business is the time of year.

**Coal Market in Upper Silesia.**—The volume of business continues to increase, the unfavourable condition of the local iron industry having no effect on the coal market. The pits are finding it increasingly difficult to satisfy the requirements of consumers adequately, and in many cases a large number of orders have to be left unfulfilled. The traffic returns for the first half of October show an increase of over 10,000 wagon loads over the same period of last year, and the daily average amounted to over 12,000 wagons. The export trade is equally active, and neither Austrian nor Russian buyers are receiving as many coals as they would like to get. The coke market is also in a very satisfactory condition, there being no difficulty in disposing of the output of most grades, and the cokeries are complaining of delays in the receipt of coking coal.

**Production of Coal and Coke.**—The following shows the output of fuel during September and the nine months ended therewith:—

	September.		January-September.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	14,906,654	16,355,617	131,319,788	143,674,282
Lignite .....	6,832,013	7,473,246	59,712,638	64,132,226
Coke .....	2,499,492	2,677,559	21,187,617	24,965,556
Coal briquettes .....	476,083	495,521	3,946,938	4,406,338
Lignite do. ....	1,607,810	1,909,156	13,971,271	15,993,722

**Exports and Imports of Fuel.**—The following shows the exports and imports of fuel during September and the nine months ended therewith:—

	Imports (Sept.).		Exports (Sept.).	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	1,077,152	990,183	2,860,615	3,155,739
Lignite .....	618,132	611,804	4,681	4,458
Coke .....	50,138	21,035	483,059	488,534
Coal briquettes .....	3,869	1,622	167,042	159,729
Lignite do. ....	11,357	10,055	56,735	61,498

Imports during the nine months ended with September were as follow:—Coal, 7,954,578 tons (+482,713 tons); lignite, 5,328,967 tons (−68,216 tons); coke, 430,991 tons (−8,492 tons); coal briquettes, 19,612 tons (−17,181 tons); lignite briquettes, 87,311 tons (−2,654 tons). Exports were: Coal, 25,629,048 tons (+2,213,778 tons); lignite, 44,873 (+5,085 tons); coke, 4,991,420 tons (+812,304 tons); coal briquettes, 1,742,896 tons (+157,903 tons); lignite briquettes, 616,071 tons (+200,340 tons). The imports of British coal in September fell from 957,076 tons to 875,529 tons, but the total for the nine months, 6,953,881 tons, is higher by 533,881 tons. Exports of coal in August increased to Austria-Hungary, Russia and Belgium, but less coal was sent to France. In the nine months, exports to the principal foreign countries were as follow:—Belgium, 726,059 tons (+206,186 tons); France, 1,915,565 tons (+283,251 tons); Italy, 134,891 tons (+9,103 tons); Netherlands, 218,835 tons (+16,011 tons); Austria-Hungary, 804,360 (+106,719 tons); Russia, 399,509 tons (+77,872 tons); Sweden, 133,832 tons (+4,885 tons); Switzerland, 278,760 tons (+47,879 tons).

## LAW INTELLIGENCE.

### JUDICIAL COMMITTEE OF THE PRIVY COUNCIL.

November 3.

Before Lord SHAW, Sir JOHN EDGE, and Mr. AMER ALI.

#### The Rent of an Indian Mining Settlement.

**Raja Durga Prasad Singh v. Rajendra Bagchi and others.**—This was an appeal from a decree of the High Court of Calcutta of August 26, 1909, varying a decision of the Subordinate Judge of Manbhum in the Bengal Presidency.

Sir John Edge, in delivering their lordships' judgment, said that the suit was brought by the appellant Raja to recover Rs. 23,868, being arrears of rent, cesses and interest in respect of a mining settlement in India. His predecessor made a permanent and heritable settlement of "the rights of cutting, raising and selling the coal underneath a plot of land contained within certain boundaries at a fixed rent of Rs. 2,800." The respondents alleged that although the coal underneath 400 bighas of land had been demised to them, they had not been put in possession of the whole area and were therefore entitled to an abatement of the rent. They also alleged that the coal demised was of inferior quality and could not be sold as steam coal, and that under part of the land no coal at all was found. The High Court, varying a decision of the subordinate judge, found that as the defendants were only in possession of 275 bighas and not 400 they were entitled to a proportionate abatement of the fixed rent. Sir John Edge said in their lordships' opinion the respondent had failed to prove any facts which would entitle them to any abatement of the rent fixed by the lease. They would thereby humbly advise his Majesty that the appeal should be allowed, and the order of the High Court should be varied by decreeing the appellant's claim for Rs. 23,868, less Rs. 3,083 due to the respondents in a previous suit, with interest on the balance at the rate of Rs. 6 per cent. per annum from the date of the suit to the realisation. The respondents must pay the costs in the courts below and on this appeal.

## SUPREME COURT OF JUDICATURE.

### COURT OF APPEAL.—November 5.

Before Lord PARKER, Lord SUMNER, and Mr. Justice WARRINGTON.

#### Action Against Trade Union Officials.

**Oram v. Hutt.**—This was an appeal from a decision of Mr. Justice Swinfen Eady. The action was brought by a member of the Warwickshire Miners' Association against the executive committee and trustees thereof for a declaration that two payments of £511 19s. 4d. and £437 7s. 8d. made out of the funds of the association to Mr. Pownall, a solicitor, of Nuneaton, in July 1908, by the direction of the defendants, in settlement of amounts due to him for costs in two actions of slander brought by Messrs. Johnson and Davis, two of the then officials of the association, against one McNicholas, were made *ultra vires*. Repayment was claimed also. Mr. Justice Swinfen Eady held that it was not open to the officers of the association to take proceedings for slander at the expense of the association, and that the payments were invalid principally upon the ground that they offended against the law of maintenance, and also that they were *ultra vires*, as they were not specially sanctioned by the rules of the association. The defendants appealed.

Their lordships dismissed the appeal.

Lord Parker, in the course of his judgment, said he could not doubt that an agreement which if entered into by an individual would be void as an agreement to commit an illegal act would, if entered into by a corporation, be similarly void. A person who maintained the action of another could only justify by proving the existence of a common interest or bringing himself within certain recognised exceptions of the common law rule. It was decided in the case in question that a libel action was a personal action which in point of law concerned only the parties to it and the matters legally at issue were merely whether the plaintiff had been libelled, and if so to what damages he was entitled. The mere circumstance that in the libel action there must or might arise questions of fact in the determination of which a third party had an interest would not constitute a common interest sufficient to justify maintenance by such third party. His lordship did not see how this case could be distinguished from the case of *Alabaster v. Harness*, nor did he think that the association could be brought within any of the recognised exceptions. But even if the objection based on maintenance were out of the way in the present case, his lordship was of opinion that the payments could not be justified. Such payments were certainly not justified by express words of the rules of the association. It might possibly be that when a trade union had under its rules power to apply its funds in the attainment of specified objects, certain ancillary powers reasonably necessary for the attainment of those objects could be implied, but it would be stretching this principle too far to hold that a trade union was justified in defraying the costs of legal proceedings by its members whenever an indirect benefit might be expected to result from or had resulted from the proceedings.

Lord Sumner said the association and Mr. Johnson had no common interest in the latter's action. They suffered under similar wrongs caused by identical charges made against them severally on the same occasions. They possessed identical causes of action; they had a common aim—namely, the confutation of McNicholas and his reduction to silence. But a common cause was not a common interest. The association had no right to fight Mr. Johnson's battles.

Mr. Justice Warrington gave judgment to the same effect.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinion expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### "B.Sc. PETROLEUM MINING," BIRMINGHAM.

SIR,—Mr. John Wells enters the ring as a peacemaker, and, by way of soothing ruffled feelings, he discovers in your report of my presidential address to the Manchester Geological and Mining Society that I show "a lack of understanding in regard to the practical side of oil-well engineering." So far as my remarks go, he might have noticed just as surely my inefficiency at auction bridge; for in the comparative degree both conclusions would be true. Indeed, my ignorance of the progress of oil-well engineering is such that I cannot recall any phase of the technology which has been improved by Mr. Wells' own study on the subject. This, like his experience of university life, is modestly concealed by his letter. However, to spare Mr. Wells an expensive glazier's bill, I will temporarily dump the stones which he so clumsily aims at my personal shortcomings; for even in these, as on other points, we evidently agree.



Mr. Wells thinks that the university student who passes through a post-graduate course in the field should be better than the uneducated practical man. I agree; but the Birmingham hall-mark of "B.Sc. Petroleum Mining" is not withheld till the completion of such practical training.

Mr. Wells thinks that it would be better still if the young man obtained his practical training before going to the University; so do I. But the University regulations do not make this an essential part of matriculation.

No one objects to the universities teaching all they know about the habits of petroleum, and everyone must commend even the feeblest attempts they may make at research work in all branches of the industry. I have not decried these things. What I object to is the issue of a title which will certainly be mistaken abroad for a sign of technical proficiency; the "B.Sc. Petroleum Mining" is given after only a three years course at the University—a course made up of little better than tit-bits of various sciences, with artificial imitations of an equal number of distinct technical processes. Such a course neither gives the "brain-training" that Mr. Wells admires, nor can it result in the technical efficiency which the degree indicates. The average young student who enters for this degree will be in danger of developing the usual failings of those half-breeds who inherit only what is evil in both parents.

The objection to this new title applies likewise to some other forms of "B.Sc. Tech.," wherein Manchester also has sinned; for in most of them the University laboratory is unable to duplicate the conditions of actual practice. In the case of medicine, however, the University, because of its association with hospitals, can provide facilities for real practice; and it is significant that, through the power of the British Medical Council, the bachelor's degree in this form of applied science is granted only after five years' training. Other technical men in practice should, like the Medical Council, object to the manufacture of false marks of efficiency; for the sake of the young men themselves, in the interests of investors in oilfields which they cannot visit, and for the good name of our English universities, this system of electro-plating ought to be mended or ended.

Mr. Wells thinks we ought not to dispute in public. He will find the history of the case in my address: I gave my views to the India Office Committee, and afterwards Prof. Cadman had an opportunity of "emphatically" disagreeing with my opinion. There the matter was left by me. But Prof. Cadman thought it well to recall my views again for unqualified condemnation before his own institute, and I am not in the habit of accepting *ex cathedra* judgments—not even those of my juniors.

Poor Birmingham is not fairly treated by her well-meaning friends. Mr. Wells thinks the University deserves the greatest credit for its efforts in instituting this degree, and forthwith proceeds to detail as essential conditions that the University does not prescribe. Last week, through the indiscretion of Mr. Cochrane in retailing an imaginary story about Manchester, your readers were unwittingly given a hint as to the real incentive to this new degree; for if Manchester had contemplated such a move it would have been wiser and more consistent with the real interests of education to have asked its intentions and advice.

Manchester University, THOMAS H. HOLLAND.  
November 4, 1913.

#### APPROVED SAFETY LAMPS.

SIR,—While it was absolutely necessary for steps to be taken whereby stronger and higher heat-resisting glasses should be introduced for the purpose of increasing the margin of security, also by duplicating the gauze, the writer is certainly of opinion that it was much more necessary to duplicate the glass, because there are over 1,000 glasses broken daily to one damaged gauze. Such results are obviously appalling.

WILLIAM BEST.

Providence House, New Park-street,  
Morley, Yorks, November 3, 1913.

A case of considerable interest was decided in Airdrie Sheriff Court last week, when James McLaughlin, winding engine-keeper, Cambuslang, sued the Glasgow Coal Company Limited, Uddingston, for two weeks' wages in lieu of notice of dismissal from their employment. Defenders admitted that under the contract they were bound to give this notice, but they pled that the dismissal was justified, by reason of the pursuer's negligence and carelessness in allowing the water in the boiler of his engine, to become almost exhausted on the date of dismissal, and the miners to go down the pit to the great danger of themselves and the boiler. Sheriff Lee decided in favour of the defenders, holding that the dismissal was, under the circumstances, not only a duty but a necessity.

#### MINING AND OTHER NOTES.

On Saturday last Mr. Adam Hargreaves, of Cleckheaton, who has completed sixty years' service with the Low Moor Company Limited, celebrated the occasion, and also his seventieth birthday, by entertaining a number of his co-officials to dinner at the Armitage Arms, Clifton, when a valuable timepiece and umbrella were presented to him by Mr. Charles Ingham, as a gift from the officials of the colliery department of the company.

A trade correspondent understands that Messrs. Pearson and Knowles Coal and Iron Company Limited have under consideration the gradual removal of the Dallam and Bewsey forges from Warrington to a site in the immediate vicinity of the Partington Steel and Iron Company's huge new works at Irlam.

The Cannel mine at the Ellesmere Colliery, Walkden, Manchester, belonging to the Earl of Ellesmere, has been closed, owing to unremunerative working. The men who were employed in this mine have been found employment in other pits belonging to his lordship.

The new Prospect colliery, which is about to be sunk by the Seaton Delaval Coal Company, is to win the coal south of the area lying south of the Hartley South Whin Dyke, and it is proposed to sink to the Yard seam, or possibly to the Low Main. The former is expected to be found at 54 fathoms from the surface, and the Low Main about 29 fathoms deeper. It is proposed to work the High Main, Main Coal and Yard seams. A railway to connect the proposed colliery to the private railway at Seaton Delaval Colliery is to be commenced practically at once. About 55 houses are at present in course of erection for the use of sinkers, and these will afterwards be occupied by miners at the colliery.

Ex-Provost Keith, Hamilton, reports that the Town Council of Hamilton, have now almost completed a bargain with the feuars for the working of the unwrought coal beneath the burgh. The only difficulty, and it was not an insuperable one, was as to what sum should be paid that would fairly reserve the rights of the ratepayers, and at the same time enable them to go on with what they believed would be a profitable undertaking for the community. If the bargain was completed as they anticipated, it would keep the community about them for the next fifty or sixty years.

Mr. D. M. Arbuckle, who is a native of Wishaw, Lanarkshire, has been appointed to the management of Messrs. Baldwin's Aberbaiden and Pentre Collieries, and also of the pits owned by the Ton Phillip Rhondda Colliery Company. These represent the largest gas and house coal collieries in South Wales. On leaving Controyhen Colliery to fill his new appointment, Mr. Arbuckle was presented by the men and officials with a purse of gold, a clock and ornaments and a diamond brooch and gold chain for Mrs. Arbuckle.

At a special meeting of the Mining Institute of Scotland held in Glasgow on Tuesday evening of last week, Mr. James Hamilton, president, in the chair, it was agreed to support the proposed application by the Institution of Mining Engineers, for a Royal Charter.

The Hammersmith Borough Council are making arrangements for providing storage accommodation for at least 6,000 tons of coal. To defray the cost of the coal storage and transportation scheme, an application is to be made to the London County Council for sanction to the borrowing and the advance of the sum of £15,500.

Boring operations have, it is stated, been commenced in Longniddry district, on the farm occupied by Mr. Binnie, with a view to ascertaining the nature of the coal there and its depth.

There was a large company in the Heriot-Watt College, Edinburgh, on Friday last, on the occasion of the formal opening of the new chemical laboratories. Lord Provost Inches occupied the chair. Sir William Turner, K.C.B., LL.D., Principal of Edinburgh University, in formally declaring the new laboratories open, stated that the Governors had asked the University to take into consideration the establishment of a School of Mining, and he presumed that was to be crowned by a degree. This question would be most carefully considered.

In the lecture hall of the North of England Institute of Mining and Mechanical Engineers, Newcastle, on Saturday, an interesting presentation was made to Mr. J. B. Atkinson, on the occasion of his retirement from the office of inspector of mines. There was a large gathering of coalowners and others interested in the coal trade. Sir Lindsay Wood, Bart, presided, and made the presentation, which took the form of a writing bureau, a fitted suit case, a fishing rod and reel and a cheque.

It is stated that the Staveley Coal and Iron Company have just completed in Rutlandshire negotiations for the purchase of a plot of land at Pilton for ironstone workings. It is estimated that the workings will yield about 1,000,000 tons of ironstone.

Mr. J. A. Pease, M.P., President of the Board of Education, speaking at the City and London Guilds' Institute, at the Mansion House last week, said that the Board had appointed a committee to report on the best way to carry out the report of the Royal Commission on University Education in London, which recommended complete reorganisation. The Government believed that the result would be a real university, worthy of London.

A very pleasant function took place on Wednesday, the 29th ult., at the Liverpool office of Pearson and Knowles, Moss Hall and Wigan Junction Collieries, in the presence of friends, officials, and staffs. The occasion was a presentation of a gold watch and chain, six handsome solid silver candlesticks, and a self-recording barometer, to Mr. Richard Brancker, late managing director, who retired on June 30 last, after 20 years' service.

The foundation stones of ten cottages to be erected in Benton-road, South Gosforth, by the Northumberland Aged Mineworkers' Homes Association, were laid on Saturday afternoon, in the presence of a large gathering. The ceremony was performed by Mr. Joseph English and Mr. J. A. C. Brumwell.

Dr. William S. Bruce, Antarctic and Arctic explorer, gave a lecture at the Bristol Museum recently, on Spitzbergen. He stated that the country possessed an unlimited supply of coal, practically equal to the best Welsh coal.

The annual dinner and smoking concert of the Sheffield and District Branch of the Coal Trade Benevolent Association was held at Sheffield, on Friday. The chairman mentioned that the funds for the last year had been increased from £184 to £350. Eight cases were now in receipt of regular allowances.

Mr. William Thom, of Dutton Manor, Longridge, Lancashire, head of the ironfoundry firm of Messrs. Yates and Thom Limited, Blackburn, who died on August 13, left £128,089.

The preliminary programme of the 84th annual meeting of the British Association, which will be held in Australia in August 1914, has been issued. The president for the meeting will be Prof. William Bateson. The main party will leave London by direct steamer on July 3, and will arrive at Fremantle on August 4.

With regard to the question of toll charges on the Panama Canal, a Bill is to be brought forward by Mr. Adamson in the American Congress, the effect of which will be to give complete equality to all vessels using the new means of communication between the Atlantic and Pacific oceans. The Bill, which is described as a temporary measure, is expected, however, to lead to permanent results. The American Ambassador, speaking in London on Tuesday, stated that British ships would be present when the opening of the canal took place.

The Brodsworth Colliery employees have decided to secede from the West Riding Permanent Relief Society, and to take their liabilities with them. The president of the branch stated they were unable to carry it on under the existing conditions; Brodsworth was all right, but the main society was a sinking ship. If they seceded, and took over their own liabilities, they would still be able to meet them, and save something like £700 per annum. So the employees, to the number of over 2,200, decided to secede.

It is rumoured that colliery shafts are about to be sunk on the Whiston side of Huyton in Lancashire. A lease has been obtained of an extensive plot of land on the Willis estate. The rental of the mineral rights is stated to be £2,000 a year, the lease being granted to the Hulton Colliery Company, who propose to open new mines in the vicinity of the Wigan and Whiston, Halsnead Park, and several other disused pits. These pits were abandoned some years ago through the overpowering rushes of water. By sinking new shafts, a wall of coal will be maintained to keep the water from entering the new workings, save in such quantities as can be regulated by pumping.

At Blyth, on the 21st ult. C. Kellar, assistant stoneman, was charged with keeping in the Mill Pit, Blyth, on the 12th inst., an explosive otherwise than in a secured case, such explosive not being about to be used. Similar charges were preferred against Harold Jacques and William Rasmussen. Evidence was given by various officials of the Cowpen Coal Company, who found the cartridges in the pockets of the defendants. There had been a great excess of powder taken away from the pits recently. Defendants were fined 5s. and 5s. costs.

The No. 3 furnace at the Solway Ironworks, Maryport, owned by the Workington Iron and Steel Company, was damped down on Saturday afternoon, owing to the shortage of Durham coke.

A well-attended meeting of the Cumberland Colliery Officials' Association has been held at Whitehaven. Mr. Thomas Sanderson (Flimby), presided, with Mr. W. McTrusty in the vice-chair. Two lectures have been arranged for in December by a mining lecturer from Warwickshire County Council on the subject of "Coal dust Explosions and Rescue Work." The committee, in their report, stated that they have had a protracted correspondence with Mr. T. P. Martin, of the Coalowners' Association over the question of recognition, and they hoped in the near future that all difficulties would be cleared away by a friendly discussion with the owners and that the recognition asked for would not be delayed much longer. The committee were in communication with the General Federation of Colliery Firemen, Examiners and Deputies' Association of Great Britain, and hoped shortly to become affiliated with the same.

The officials and employees at Murdostoun Colliery, Lanarkshire, have presented Mr. Walter Nisbet, manager there, with a purse of sovereigns and a roll top desk on the occasion of his leaving for a more lucrative appointment.



## THE COAL AND IRON TRADES.

THURSDAY, NOVEMBER 6.

## Scotland.—Western District.

## COAL.

The position of the coal trade in the west of Scotland has undergone a change during the week, and conditions are not now so favourable. Though the collieries producing the better qualities of ell and splint have a large number of orders on hand, the market generally is not so firm as recently, and there is a decided lack of tonnage. The best brands of ell coal are now fairly plentiful at about 13s. per ton, with secondary qualities 3d. to 6d. less. Navigation and steam coal continue active at firm prices, while splint is in good request, chiefly for shipment to the River Plate. Among smalls the tone is easier. Trebles are being well taken up, but doubles and singles, which are very plentiful, are decidedly weak. At Glasgow 73,192 tons were shipped, Bowling 253, Greenock 3,782, Ardrossan 3,621, Troon 4,437, Irvine 701 and Ayr 17,888—total 103,874 tons compared with 109,111 in the preceding week and 103,180 in the corresponding week of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/	13/
Splint.....	13/ to 15/6	13/ to 15/6
Treble nuts .....	13/3 to 13/6	13/ to 13/9
Double do. ....	12/ to 12/3	12/3 to 12/6
Single do. ....	11/	11/

## IRON.

Business on the Glasgow pig iron warrant market has been of a restricted character. The turnover during the week did not exceed 10,000 tons. Prices were a little better at the beginning of the week, some buying taking place owing to the reduction in the German bank rate, but latterly, with continued weakness reported from abroad, a reaction set in, and the closing price was 3d. lower than in the previous week. Cleveland iron closed at 51s. 2d. cash buyers, which is the lowest quotation for 18 months. Cumberland hematite was on offer at 64s. one month and 64s. 6d. three months, without any business being done. Consumers continue to buy only to cover immediate requirements. There are now 80 furnaces in blast, compared with 83 in the preceding week and 88 in the corresponding period of last year. The imports of pig iron into Grangemouth from Middlesbrough and district amounted to 10,156 tons. The prices of Scotch makers' iron have again been reduced 6d. per ton. Monkland is quoted f.a.s. at Glasgow, No. 1, 66s. 6d., No. 3, 65s.; Govan, No. 1, 64s. 6d., No. 3, 63s.; Carnbroe, No. 1, 70s. 6d., No. 3, 66s. 6d.; Clyde, No. 1, 72s., No. 3, 67s.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 72s. 6d., Nos. 3, 67s. 6d.; Glengarnock, at Ardrossan, No. 1, 72s. 6d., No. 3, 67s. 6d.; Eglinton, at Ardrossan or Troon, No. 1, 67s., No. 3, 66s.; Dalmellington, at Ayr, No. 1, 68s. 6d., No. 3, 66s. 6d.; Shotts at Leith, No. 1, 72s. 6d., No. 3, 67s. 6d.; Carron at Grangemouth, No. 1, 73s., No. 3, 68s. per ton. Scotch hematite is quoted 66s. 6d. per ton for west of Scotland delivery. Notwithstanding the further reductions in prices, the manufacturing branches of the trade show little improvement. Though the prices now quoted enable makers to secure a few more orders on home account, the export trade is stagnant, as foreign prices for similar material are yet considerably below local quotations. The malleable iron trade is suffering most keenly, and four of the works remain closed, while the others are working short time. Other branches of the trade are only managing with the greatest difficulty to keep works even moderately well employed.

## Scotland.—Eastern District.

## COAL.

The coal trade in the Lothians continues comparatively good. There is a fair all round demand, with ordinary steam coals among large, and treble nuts among smalls in special request. Doubles and singles are also moving off well. The clearances were at Grangemouth 41,823 tons, Granton 11,384, Leith 41,507 and Bo'ness 12,152—total 106,866 tons compared with 113,925 in the preceding week and 107,172 tons in the corresponding week of last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/6 to 13/9	13/6 to 14/
Secondary qualities .....	12/ to 12/6	12/ to 12/6
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/3 to 12/9	12/3 to 12/6
Single do. ....	11/ to 11/6	11/ to 11/6

The position of the industry in the Fifeshire district is still regarded as satisfactory. While the pressure on the collieries to overtake the concluding shipments for Cronstadt is now over, a large amount of tonnage is being dealt with at both ports. Although there is little fresh business in the market, collieries are kept steadily employed working against contract. There is no outstanding change in the trade, with the exception that the demand for smalls is easier according to. At Burntisland 10,000 tons were shipped, Methil 60,185, Charleston 125, Alford 1,603, Dysart 1,603 and Wemyss 1,351—total 73,747 tons compared with 74,237 in the previous week and 74,237 in the corresponding week of last year.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	16/9	16/9
Unscreened do. ....	14/9	14/9 to 15/
First-class steam coal.....	13/6 to 14/	13/9 to 14/
Third-class do. ....	11/ to 11/6	11/3 to 11/6
Treble nuts .....	13/3 to 13/9	13/6 to 14/
Double do. ....	12/ to 12/6	12/ to 12/6
Single do. ....	11/	10/9 to 11/6

The aggregate shipments from Scottish ports during the week amounted to 326,148 tons compared with 347,273 in the preceding week and 315,815 tons in the corresponding week of last year.

## Northumberland, Durham and Cleveland.

## Newcastle-upon-Tyne.

## COAL.

During last week 150,099 tons of coal and 2,264 tons of coke were despatched from Tyne Dock, an increase of 17,365 tons of coal and 716 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 49,263 tons of coal and 3,848 tons of coke, a decrease of 17,945 tons of coal and an increase of 1,876 tons of coke. The Blyth shipments amounted to 92,466 tons of coal and coke, a decrease of 3,645 tons. The Turin Gasworks, which recently received tenders of 20,000 tons of Durham gas coal for delivery over the ensuing year, are stated to have decided to limit their present purchases to one cargo of 5,000 tons of seconds and to postpone allotment of the balance of the order on account of the highness of tendered prices. Twelve thousand tons of best Blyth steams have been sold by second-hand holders for delivery over next year at 12s. 9d. per ton f.o.b. The Moscow-Windau Railways are stated to have placed their order for 60,000 tons of steams in the hands of Russian merchants. Best North-country coal is to be supplied over next season. The price has not transpired. Six thousand tons of good ordinary unscreened Durham bunkers have been sold for delivery over next year at 11s. f.o.b. Advices from Genoa state that 30,000 tons of Durham gas coal, half Holmside and half Boldon, have been sold for shipment at the rate of 10,000 tons per month over December, January and February at 23s. 9d. per ton c.i.f. that port, and that parcels of Tyne Main gas coal on passage have been sold at 21s. 6d., 21s. 7½d. and 21s. 9d. per ton. Genoa sellers are asking 25s. per ton c.i.f. for New Pelton-Holmside coal without finding purchasers. For November sellers quote 24s. 9d., and for December 24s. 6d., whilst buyers offer 24s. 6d. and 24s. respectively. There are numerous sellers at 21s. over next year. For November and December, sellers quote 22s. 9d. for Hebburn coal, and buyers counter-offer 22s. 3d. for November and 22s. for December. There are sellers at 20s. over next year. The chief feature in the local coal market is the great lengthening of loading turns. Best Blyth steams are difficult to obtain before November 26 from the collieries. Turns for Tyne bests are well filled, and those for gas bests are very long. Bunker coal turns are filled for about a week ahead. Violently windy weather in the forepart of this week has caused some delay of expected tonnage, but, speaking generally, the supply of vessels is fully equal to all requirements. Forward business is of very limited dimensions, and it is averred that coaling station contracts are being carefully withheld in the hope of lower prices ruling before the end of the year. F.o.b. quotations for prompt shipment are a shade firmer, where altered at all, this week, the only exception to this dictum being in the case of Tyne best steams, steam smalls, and blastfurnace coke, which are weaker. The following changes are noted on the week's prices:—Best steams (Blyths), are 3d. advanced; Tynes, easier; Blyths, smalls, weaker; specials, 3d. reduced; gas bests, 3d. increased; specials, 3d. higher; coking coal, 6d. improved; smalls, 3d. more; and blastfurnace coke, 6d. cheaper.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	14/9 to 15/	14/6 to 14/9
Do. Tynes (Bowers, &c.) .....	14/6 to 15/	15/
Secondary, Blyths .....	12/6 to 12/9	12/6 to 12/9
Do. Tynes (Hastings or West Hartleys) .....	12/6 to 13/	12/6 to 13/
Unscreened .....	11/9 to 12/6	11/9 to 12/6
Small, Blyths ..	7/6 to 7/9	7/9
Do. Tynes .....	6/6 to 6/9	6/6 to 6/9
Do. specials .....	8/6 to 8/9	8/6 to 9/
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	15/ to 15/3	15/
Secondary gas coals (Pelaw Main or similar)	13/6	13/6
Special gas coals .....	15/ to 15/6	15/ to 15/3
Unscreened bunkers, Durhams	12/6 to 13/6	12/6 to 13/6
Do. do. Northumbrians	12/ to 12/6	12/ to 12/6
Coking coals.....	13/6 to 14/	13/ to 13/6
Do. smalls .....	13/ to 13/3	13/
House coals .....	15/6	15/6
Coke, foundry .....	20/ to 22/6	20/ to 22/6
Do. blast-furnace .....	17/6 to 18/	17/6 to 18/6
Do. gas .....	16/6 to 17/9	16/6 to 17/9

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 96,565 tons of coal and 1,205 tons of coke, as compared with 108,970 tons of coal and 1,215 tons of coke for the corresponding period of 1912, being a decrease of 12,405 tons of coal and 10 tons of coke. The position of nearly all classes of coal is strong for the first half of the month, with an improved enquiry, and the forward enquiry tends to expand, with sellers indicating higher prices. Durham gas qualities are firm, and coking unscreensd is steadier; bunkers are still freely offered but prices are a shade better; the household coal market is quiet; coke is on the scarce side with prices firm. The Swedish State Railways are inviting

offers of 100,000 tons of best steams for shipment January to March. A contract has been placed for 6,000 tons of good Durham bunkers, shipment over next year, at 11s. f.o.b. It is reported that the contract for supplying the Windau-Moscow Railways with their next year's requirements has been secured by Russian merchants, the price has not transpired. Current quotations are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/6
Secondary do. ....	14/	13/6
House coals:—		
Best house coals .....	17/	15/9
Ordinary do. ....	16/	15/3
Other sorts:—		
Lambton screened .....	15/6	15/9
South Hetton do. ....	15/3	15/6
Lambton unscreened .....	13/9	13/6
South Hetton do. ....	13/6	13/6
Do. treble nuts	16/3	16/3
Coking coals unscreened...	13/	13/3
Do. smalls .....	12/9	12/9
Smithies .....	15/6	15/9
Peas and nuts .....	16/	16/6
Best bunkers .....	14/	14/
Ordinary bunkers ..	13/6	13/6
Coke:—		
Foundry coke .....	20/	20/
Blast-furnace coke (divrd. Teesside furnaces) .....	18/9	18/6
Gas coke .....	17/	17/

Mediterranean freights are much easier: Genoa 8s. 3d., Venice 10s. 3d., Marseilles 8s., Algiers 7s., Malta 7s., Palermo 9s. 3d., Port Said 8s. 4½d., Alexandria 9s. 3d., Odessa 9s. 6d., Las Palmas 8s. 6d. The Bay is weak at 5s. 3d., Bordeaux and Rochefort 5s. 6d., Boucan 5s. 3d., Lisbon 6s. 6d. Baltic is slow with few freights offering, recent fixtures include: Riga 5s. 9d., Ahus 5s. 6d., Malmö 5s. 9d., and Aarhus 5s. Coastwise is represented by London 8s. 2d., Havre 4s. 6d., Rotterdam 8s. 6d., and Antwerp 4s. 3d.

## Middlesbrough-on-Tees.

## COAL.

The fuel trade is steady with a good deal of business passing. Deliveries of gas coal are on a large scale, and demand is reported good. Best Durham gas coal is 15s. 3d. to 15s. 6d., and second class is in the neighbourhood of 14s., whilst up to 16s. has to be paid for special kinds. Supply of bunker coal is fairly good, and some inferior kinds are being offered at rather cheap rates, but as a rule ordinary Durhams are quoted 12s. 7½d. to 13s., f.o.b., superiors 13s. 6d. to 13s. 9d. and specials 14s. 6d. to 15s. Household coal is firm and in improving demand at 15s. 6d. to 15s. 9d. Coking coal continues to be well taken up at prices ranging from 13s. to 14s. Coke is in good request, and with supply inadequate, high prices are realised, especially for furnace kinds for local consumption. Nothing below 18s. 6d. is named for average blastfurnace kinds delivered at Teesside works, and up to 20s. is asked for superior sorts. Good foundry coke is put at 21s., f.o.b., and gashouse coke is 17s. 9d. to 18s.

## IRON.

October shipments of iron and steel from the Tees were quite up to expectations. The quantity of pig iron shipped totalled 125,190 tons, as compared with 117,914 tons for the previous month and 129,856 tons for October last year. Of last month's clearances, 113,281 tons went from Middlesbrough and 11,909 tons from Skinningrove, the whole of the latter going to Scotland. Of the Middlesbrough loadings, 78,690 tons went abroad and 34,591 tons coastwise. As usual, Scotland was the largest customer, taking 18,555 tons, whilst Sweden received 13,194 tons, France 10,972 tons, Germany 9,569 tons, Japan 9,371 tons, Canada 7,375 tons, Wales 7,215 tons, Belgium 6,339 tons, Italy 5,315 tons, and the United States 4,085 tons. Of the 14,235 tons of manufactured iron despatched last month, 6,107 tons went to foreign ports and 8,128 tons to coastwise customers; and of the 42,025 tons of steel cleared, 31,494 tons went abroad and 4,531 tons coastwise. Once more India was the largest importer of both manufactured iron and steel, receiving 4,021 tons of the former and 11,227 tons of the latter. Other principal importers of steel were—the Argentine 7,300 tons, New South Wales 6,067 tons, and West Australia 3,445 tons. The pig iron market is weak and inactive, and, in fact, values of Cleveland kinds are lower than they have been for the past 20 months. Reports from America and from the Continent are discouraging, and assist to depress the market here. Pig iron makers declare that present quotations are unprofitable. This week No. 3 g.m.b. Cleveland pig has changed hands at 51s. f.o.b., and probably the ruling quality could still be bought at that figure, though some sellers endeavour to fix the price at 51s. 3d. No. 1 is 54s. 9d., No. 4 foundry 50s. 9d., No. 4 forge 50s. 6d., and mottled and white iron each 50s. 3d. All the foregoing quotations are for early delivery. A forward contract for No. 3 has been made at 50s. 6d. East coast hematite pig is flat. Both makers and merchants offer mixed numbers freely at 63s. 6d. for either early or forward delivery, and purchases could probably be made at below that figure. Sellers of foreign ore still base market rates on 19s. ex-ship Tees for best rubio. The manufactured iron and steel trades are steadier. Fairly good enquiries for some descriptions are reported, and the recently reduced quotations have brought forth a few orders for shipbuilding material.

## South-West Lancashire.

## COAL.

There is still a lack of animation in the inland household trade, the deliveries being rather below the average for November. Forges are taking less than maximum supplies of screened coal as many of them are working less than full time. Shipping shows little or no change since last week. Contract bunkering requirements are somewhat below normal, and open sale business continues on the quiet side. There is no shortage of supplies, and quotations for screened Lancashire steam coals remain at about 13s. to 13s. 3d., f.o.b., for ordinary qualities, and up to 14s., f.o.b., for the best grades. The coastwise and cross channel trade



for household coal is very satisfactory, and in regard to the very best grades, there is difficulty in getting promptly all that is required. In slacks, although the consumption is steadily on the increase, a change of weather is required to bring forward a really full consumption, and at present there is being perhaps a little more raised than is being used.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/	17/
Do. (f.o.b. Garston, net) .....	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/ to 14/	13/ to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

South Lancashire and Cheshire.

COAL.

The attendance on the Manchester Coal Exchange on Tuesday was not quite up to the average. House coal is still dull; perhaps a trifle brighter than last week. Prices are unaltered. Furnace coal is fairly brisk, and shipping coal is in good demand, prices being steady. The demand for slack is moderate, and generally prices are steady, but lower prices are accepted for spot lots, and this has a somewhat disturbing influence on the market.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 14/	13/3 to 14/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

IRON.

The markets here are lifeless. There is no enquiry of any weight coming out, and small orders are taken at lower prices every week. Good No. 3 pig iron can now be bought at 58s. Beyond one or two foundries which are busy on textile work, others are slack. Forges remain about as they were in spite of the recent reduction in their finished commodities. With forge pig iron in the neighbourhood of 54s. 6d. and scrap iron 57s. 6d., they should be able to show a profit if they were working better time. The Association price for bars continues at £7 15s., with second quality £7 5s. These prices are good compared with the price at which steel is ruling—one hears of quotations as low as £6 15s. In the meantime local steelworks are asking £7 to £7 5s., and 5 guineas for billets. The competition from abroad in the latter at very much lower prices is very serious; the same remark applies to steel girders, both Germans and Belgians are competing keenly for any work in this country. Engineers could do with more work. Wagon builders still keep their price up, but could do with more work coming forward.

Yorkshire and Derbyshire:

Leeds.

COAL.

The continuance of fine open weather has led to a marked falling off in the demand for house coal, particularly in the local markets. In spite of this, however, the pits in West Yorkshire have worked fully five days, and stocks, apart from manufacturing sorts, are negligible. There are again serious complaints about scarcity of empty wagons, and at some of the pits ground stocking has had to be resorted to. Colliery engineers complain strongly of reduced outputs owing to absentees amongst the miners.

**House Coal.**—Very few orders for any description of house coal have come to hand from London this week. Merchants have sent a fair supply of their own wagons, but supplies in colliery and railway wagons have been at a discount. The very best qualities are scarce, but the medium sorts are abundant. The retail trade in London is very poor and likely to continue so until there is a change in the weather. The coastwise trade also shows some weakness, and several cargoes of Silkstone house coal have been sold this week at from 6d. to 1s. per ton below the figures quoted a month ago. Freight rates are about the same. In the West Riding markets there is very little doing, apart from the cheapest qualities, which are in fair request from merchants who do the bagging trade. Current quotations:—Haigh Moor selected, 18s. 6d. to 19s. 6d.; Wallsend and London best, 17s. 6d. to 18s. 6d.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other qualities 14s. to 15s. 6d.

**Gas Coal.**—One or two late contracts are reported to have been concluded this week at prices quite equal to those in operation in July. Forward business is quiet, but where figures are quoted which show up to 1s. per ton reduction on present prices buyers are prepared to book the business. Stocks of gas coal are light, and in gas nuts deliveries ex contracts are considerably in arrear.

**Manufacturing Fuel.**—There is no improvement in the position with regard to slacks and small fuels generally. Many of the collieries carry fair stocks of these qualities, and prices are still further in buyers' favour. Washed fuel is being taken in increasing quantities, and small nuts for mechanical stokers and electricity works are also in pretty good demand.

**Washed Furnace Coke.**—Although the ovens are not turning out more than 75 per cent. of the possible output, supplies are ample and prices are no better. Average samples of washed, patent oven coke realise 12s. per ton at the ovens. There is a feeling, however, that bottom has been reached, and that prices may improve in sympathy with the firmer tone in the Middlesbrough district.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected .....	15/ to 16/	15/ to 16/
Wallsend & London best .....	14/ to 14/6	14/ to 14/6
Silkstone best .....	14/ to 14/6	14/ to 14/6
Do. house .....	12/6 to 13/	12/6 to 13/6
House nuts .....	11/6 to 12/6	11/ to 12/9
Prices f.o.b. Hull:		
Haigh Moor best .....	17/6 to 18/6	17/6 to 18/6
Silkstone best .....	16/6 to 17/6	16/6 to 17/6
Do. house .....	14/6 to 15/6	15/ to 16/
Other qualities .....	14/6 to 15/	14/6 to 15/
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/9
Gas nuts .....	11/ to 12/	11/3 to 12/
Unscreened gas coal .....	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	10/6 to 11/6	10/6 to 11/6
Large double-screened engine nuts .....	9/9 to 10/6	9/9 to 10/6
Small nuts .....	9/3 to 9/9	9/3 to 9/9
Rough unscreened engine coal .....	9/9 to 10/3	9/9 to 10/3
Best rough slacks .....	7/6 to 8/	7/9 to 8/3
Small do. ....	6/ to 7/	6/ to 7/
Coking smalls .....	6/6 to 7/	6/6 to 7/
Coke:—		
Price at ovens:		
Furnace coke .....	12/	12/

Barnsley.

COAL.

Although the demand for steam coal on foreign account is again somewhat quieter, the volume of trade continues to be extensive. There is evidence that the enquiry on behalf of the Baltic ports has been practically satisfied, but a brisk business continues to be done with some of the Continental ports, and also on account of the Black Sea ports. In spite of this activity the output exceeds the demand, and prices are lower than a fortnight ago. There is more difficulty with respect to secondary descriptions of large steam coal, and although the prices in the home market seem to be fairly well maintained, if the collieries are kept at full work there is every probability that the position will go in favour of buyers. There has little been done yet in regard to forward business, and the position is of a very interesting character. Buyers are not disposed to pay the prices demanded, which are in excess of present quotations. But coalowners are adopting a strong attitude, with the knowledge that a large tonnage has yet to be arranged for shipment by way of the Black Sea ports. An indication of the strength of the market is afforded by the fact that an early move has been made to arrange for the supplies to the companies connected with steam trawlers at Grimsby. In recent years it has generally been a keen struggle with the coalowners before these extensive contracts have been completed, but already a very large portion of the total required has been arranged for on the basis of 12s. 6d. per ton for the best Barnsley hards. This price is an advance of 1s. per ton on the price paid a year ago, and is equal to the amount which several railway companies have already paid to renew contracts which have recently fallen out. It is not known whether negotiations are pending for the completion of the total quantity required, and there appears to be some doubt as to whether the collieries producing secondary class of coal will be strong enough to enforce 1s. per ton advance. It does not appear likely they will succeed without a very strong effort, but the fact that the advance named has been paid for the better quality, of course, is much in favour of their chances. In regard to other branches of the trade there has been little change during the week, but the position with regard to small coal has not improved. The demand for double and single nuts continues to be strong, if not as vigorous as it was a few months ago, and it is reported that several collieries have been invited to arrange contracts for supplies for this class of coal for next year. Slacks, both best and secondary, have been offered at considerably reduced prices, and the outlook suggests that this class of fuel will continue to be more difficult to deal with if the pits continue at full work, owing to the reduced demand. The enquiry for gas coal is again weaker, and contract prices are hardly being obtained for surplus lots. In respect to the house coal trade, business is again not so active, no doubt owing to the mild weather, and collieries working full time are adding stocks. The higher-priced coal is beginning to suffer, and the public appear to be taking a larger quantity of secondary sorts. Prices, however, are maintained, but not without some little difficulty. The demand for coke continues to be of a sluggish description, although there is some enquiry from the north-eastern district. Makers, however, appear unable to obtain better prices.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	15/6 to 16/	16/
Best Barnsley softs .....	15/ to 15/3	15/3 to 15/6
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	13/ to 13/6	13/ to 13/3
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/ to 12/3	12/6
Secondary do. ....	11/ to 11/3	11/6
Best washed nuts .....	11/3 to 11/6	11/6
Secondary do. ....	10/3 to 10/6	10/6
Best slack .....	7/6 to 7/9	7/6 to 7/9
Rough do. ....	6/6	6/6
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/ to 12/	11/ to 12/
Gas nuts .....	12/ to 12/3	12/ to 12/3
Furnace coke .....	12/	12/

Hull.

COAL.

The Humber coal market has been rather quieter this week. The demand for the Baltic has, of course, eased off considerably, though shipments chiefly under contract are still on a fairly high level. Best South Yorkshire steam

hards are plentiful, and with agents competing against each other the best sorts are again lower on the week, and can be readily bought at 25s. for prompt shipment. Derbyshire and Nottingham best steams are about unchanged, these coals being in good request for Swedish ports. Secondary sorts and smalls do not show much change in value, though it must be admitted that the tendency is still towards weakness. Forward business is still largely in a state of suspense, though it is stated that the Grimsby trawling companies have bought a quantity of best Yorkshire steam hards at 12s. 6d. for delivery over next year, the price being 1s. in advance of current contracts. Collieries maintain a firm attitude generally, but buyers are holding aloof and prefer to wait a little to see the market better shape itself. At the docks shipments have been again heavy owing in some measure to the new business for South Russia, to which large quantities are being sent both from Hull and Immingham. The freight market is very quiet. Little Baltic business is being done, and rates quoted for the lower ports are at 5s. to 5s. 4½d. In the Mediterranean direction Alexandria has been done at 9s., but tonnage can be had now on a lower level. There is a good demand for large steamers for Black Sea ports, rates paid being 9s. 3d. and 9s. 6d. Odessa and 9s. 7½d. Theodosia. The following are the approximate prices for prompt shipment f.o.b. Hull, &c.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	15/	15/3
Washed double-screened nuts .....	13/3 to 13/6	13/6 to 13/9
Unwashed double-screened nuts .....	12/6 to 12/9	12/9 to 13/
Washed single-screened nuts .....	12/9 to 13/	13/ to 13/3
Unwashed single-screened nuts .....	12/3 to 12/6	12/6
Washed smalls .....	10/ to 10/3	10/6 to 10/9
Unwashed smalls .....	8/9 to 9/	9/3 to 9/6
West Yorkshire:—		
Hartleys .....	14/ to 14/3	14/3
Rough slack .....	9/ to 9/3	9/ to 9/3
Pea slack .....	8/3 to 8/6	8/3 to 8/6
Best Silkstone screened gas coal .....	14/3 to 14/6	14/3
Best Silkstone unscreened gas coal .....	13/ to 13/3	12/ to 12/3
Derbyshire:—		
Best steam hards (Hull) .....	15/6	15/6
Do. (Grimsby) .....	15/ to 15/3	15/ to 15/3
Derbyshire nuts (doubles) .....	13/	13/
Derbyshire nuts (doubles) (Grimsby) .....	12/9	12/9
Derbyshire large nuts ...	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	15/6	15/6
Do. do. (Grimsby) .....	15/ to 15/3	15/ to 15/3

Chesterfield.

COAL.

The condition of the coal trade of the district is practically unchanged on the week. The demand for house coal is quiet, and until the weather becomes colder no improvement is looked for. Prices, however, are firmly maintained in accordance with the list issued on October 1. Stocks are on a low level all round. The demand for fuel for manufacturing purposes is satisfactory, and deliveries are practically equal to the average monthly tonnage of the year. The requirements of coal for the heavy trades of Sheffield and district are well maintained, and cobbles and nuts for gas-producers are in active request. There is a considerable falling off in the demand for slack for boiler firing, and stocks are accumulating. This has the natural effect of depressing values, and some collieries are compelled to reduce their prices in order to obtain some relief. The weakness in small fuel is brought about by the large number of coke ovens that have been closed down owing to the lessened demand for coke, and the consequent release of large supplies of coking slack, which are now competing with hard slacks. Gas coal is in brisk request, and the demand for steam coal for locomotive use is well maintained. Business in steam coal for export is fairly active. The closing of the upper Baltic ports has, however, a slightly weakening effect on the demand, but, on the other hand, the Russian requirements for the southern ports are the means of giving to the market a steadier tone than is usual at this time of the year. Prices for current delivery are firm at 15s. 3d. per ton delivered free alongside steamer at Grimsby. No contracts have been concluded for next year, but negotiations will, no doubt, be entered into shortly. There is a good demand for cobbles and nuts for shipment, and washed fuel finds a ready sale. The condition of the coke market is unchanged. Owing to the restricted output, the supply is not so plentiful as it has been recently. Prices are stationary.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	8/6	9/

IRON.

The depressed condition of the iron trade continues, and there are no prospects of an improvement during the remainder of the year. Pig iron is bought only for current consumption, and orders for finished are difficult to secure.

Nottingham.

COAL.

Although the colder weather has had a stimulating effect on the coal trade in Nottinghamshire, still, on the whole, the amount of business which is being done is hardly up to expectations. With regard to the domestic fuel market, merchants are not disposed to take large quantities, and householders continue to purchase steadily. The result is that at some collieries stocks are inclined to increase, but



no material extent, so that owners are well prepared to deal with extra orders should there suddenly come a change of weather. In the present state of this branch, prices are being in most cases well maintained. The aspect of the steam coal section is hardly as favourable as a week ago, prices in some instances showing a falling tendency. At the same time, a fair amount of fuel is being sent to the east coast ports for shipment, but new orders are coming slowly to hand in consequence of the approaching end of the Baltic season. The home demand for steams is considered satisfactory. There is an active sale of gas fuel, the prices of which are firm. Slacks of various kinds are selling somewhat irregularly, and while the values of bests do not show much fluctuation, common sorts are obtainable at cheap rates.

#### Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	14/ to 14/6	14/ to 14/6
Good house coals.....	13/ to 14/	13/ to 14/
Secondary do. ....	11/ to 12/	11/6 to 12/
Best hard coals .....	11/6 to 12/	11/9 to 12/3
Secondary do. ....	10/6 to 11/6	10/6 to 11/6
Slacks (best hards).....	8/3 to 8/6	8/3 to 8/9
Do. (seconds) .....	7/ to 7/6	7/ to 7/6
Do. (soft).....	7/3 to 7/9	7/3 to 8/

#### Leicestershire.

##### COAL.

In the past week business has on the whole shown little alteration. It has been rather a quiet time except for steam coals which have been fairly good in demand. But household coals generally have been in little request. This has been mainly from merchants holding stocks and consumers small wants. But there are indications in the last day or two that greater activity will shortly rule, and some collieries are already busier. During last week the output has been much curtailed, but an improvement in this respect is likely in the coming week. On the whole stocks are not unduly heavy, so that any access of business will at once stimulate the output. The prospects of trade are generally regarded as being good. Local merchants are somewhat busier. Quotations continue firm on the whole, and there is little variation from those lately ruling.

#### South Staffordshire, North Worcestershire and Warwickshire.

##### Hednesford.

##### COAL.

The coal trade of the Cannock Chase district is on the whole in a fairly satisfactory condition, but the demand is not quite so pressing as was expected, this no doubt being due to the mildness of the weather and the somewhat quiet state of the iron market. The collieries are running fairly regularly, in most cases practically full time being worked. There has been little change since last report in the demand for house coal, and for manufacturing sorts the enquiry is a bit uncertain. There is a plentiful supply of slack. There is no improvement to report in business at the landsale depots.

##### Birmingham.

##### COAL.

The position with regard to coal is slightly better. The cool weather has stimulated the household trade, and there is also a better demand for smalls and slacks generally. The collieries are well occupied. There is no change to record in prices, which are:—

#### Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/6
Do. seconds deep .....	16/	16/
Do. best shallow .....	14/9	14/9
Do. seconds do. ....	14/	14/
Best hard .....	15/	15/
Forge coal.....	11/	11/
Slack .....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked .....		
cobs .....	14/	14/
Best hard spires .....	15/	15/
Forge (steam) .....	11/	11/
D.S. nuts (steam) .....	10/	10/
Small (do.) .....	8/3	8/3

##### IRON.

The market was dull and dejected. Though values generally remain unaltered, there is a good deal of cutting and sellers are gradually losing ground. Little hope is now entertained of any improvement this year. Notwithstanding the curtailment of the output of pig iron, values are weakening. South Staffordshire forge qualities fetch about 51s. to 52s., part-mine 52s. 6d. to 53s. 6d., best all-mine 85s. to 90s., with 92s. 6d. for foundry iron, and cold-blast 125s. The Northamptonshire market is irregular, smelters quoting 50s. to 52s. Derbyshire realises 53s. to 54s. Makers of marked bars are still comparatively well off, having a fair amount of business on their books, mostly taken at the revised basis of £9. The position as regards middle-class bars is less satisfactory, manufacturers being mainly dependent on small orders which reach them from week to week. The trade in low-grade bars is largely controlled by imports from Belgium, which can be obtained in the Black Country at something like £1 below the local price. Shipments of galvanised sheets are maintained on a considerable scale, but there is less new business coming forward, and price-cutting is rife. Thus £10 15s. is now a good price for 24-gauge sheets f.o.b. Liverpool, and business is even done as low as £10 10s. The price of the home trade is, however, maintained at £11 minimum, and at the leading houses quote £11 5s. The Staffordshire trade is quiet, and values show a drooping tendency. Gas prices remain nominally unchanged, but there are indications to consider special terms in the case of

big lines. The further reduction in steel sections has done nothing to stimulate business. Confidence seems to be thoroughly undermined, and although employment is steady for the time being, makers are greatly concerned as to the prospects for next year. The new business now being placed relates only to small emergency lots.

#### Forest of Dean.

##### Lydney.

##### COAL.

The position as far as the house coal trade is concerned shows very little change; if anything, the demand has declined still further, and all the collieries agree as to the dullness prevailing. The pits are averaging about four days' work and stocks are heavier than was the case in August and September. Slacks have been a drug in the market for some time and the price is reduced 1s. this week. The steam coal trade has not improved since last writing. The enquiry for all qualities is only a moderate one and prices are somewhat irregular.

#### Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	17/6
Forest .....	16/6	16/6
Rubble .....	16/9	16/9
Nuts .....	15/	15/
Rough slack .....	6/6	7/6
Steam coal:—		
Large .....	12/ to 13/	12/ to 13/
Small .....	8/ to 9/	8/ to 9/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

#### Devon, Cornwall, and South Coast.

##### Plymouth.

##### COAL.

Messrs. W. Wade and Son report that mild weather conditions have caused a dullness in the retail coal trade which has naturally reacted on the wholesale demand. Prices and freights are quoted lower, and an almost summer-like apathy is apparent on all sides. The usual number of contract shipments are being imported, but stocks are by no means heavy, so that a sudden fall of temperature would find many of the smaller firms, and some of the larger ones, quite unprepared to cope with the sudden rush of business that would offer.

#### THE IRISH COAL TRADE.

THURSDAY, NOVEMBER 6.

##### Dublin.

There has been considerable activity at this port during the past week owing to the importation of free labour, and the work of discharging the coal cargoes is being proceeded with as far as possible, although several vessels are still held up for want of sufficient hands to unload them. The trade is very active, and the use of the motor lorries has become a recognised feature of the coal traffic, as deliveries can be effected with more expedition and in larger quantities than by means of the carts. The merchants have an immense number of orders awaiting execution, and in cases where immediate delivery is required consumers have, in some instances, to convey the coal from the yards in their own carts. There is no change in any of the prices, which are about as follow:—Best Orrell, 28s. per ton; best Arley coal, 27s.; best Wigan, 26s.; best kitchen, 26s.; best slack, 22s. per ton; steam coals, from 22s. to 23s. per ton; coke, 23s. per ton delivered in the city. There is a good demand for briquettes, and wood blocks have come more generally into use as domestic fuel during the past year or two. Best coals at the Arigna mines (county Leitrim) are from 15s. 10d. to 18s. 4d. per ton; culm or slack, from 9s. 2d. to 10s. per ton at the pit mouth. The coaling vessels arriving in the port amounted to 41, as compared with 28 the week previously, chiefly from Garston, Troon, Preston, Newport, Campbelltown, Glasgow, Whitehaven, Ayr, and West Bank. The total quantity of coal discharged upon the quays was 19,170 tons.

##### Belfast.

There is an absence of the activity which usually sets in for household requirements at this season, and during the past week or two orders show a decided falling off, both locally and in the country districts. Quotations for all qualities remain unchanged, prices of house coals being the same as those ruling during the summer months. The supply is very plentiful, and merchants are adding largely to their stocks. Freights are normal. City prices stand as follow:—Best Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current rates for steam coals ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton. Cargoes arriving during the week were chiefly from West Bank, Glasgow, Garston, Partington, Ayr, Ellesmere Port, Ardrossan, Troon, Newport, Neath Abbey, Preston, Maryport, Sharpness, Workington, Manchester, Whitehaven and Lydney.

Dr. S. O. Bingham, the medical officer of the Alfreton Urban District Council, in his annual report, just issued, says: "The health of the miners does not compare unfavourably with that of any other industrial class, and I attribute no serious disease to their work—with one exception, nystagmus. It is difficult not to believe that this disease is increasing in frequency; at any rate, the number of cases under treatment is doing so. The conditions of work have improved steadily, the hours are shorter, and the light no worse. The conclusion to be drawn is, that if the disease is real, it is due to some alteration, bodily or mentally, of the type of man working in the coalmines. It is possible that one contributory factor is a gradual psychological change in the industrial classes, by which they are becoming more sensitive, bodily and mentally, to adverse conditions."

#### THE WELSH COAL AND IRON TRADES.

THURSDAY, NOVEMBER 6.

#### North Wales.

##### Wrexham.

##### COAL.

There is more unrest in the labour circles of this locality—this time with the railway men. There is also trouble in the building trade, as a number of bricklayers in the Wrexham district are on strike at the time of writing. Orders for coal for household purposes are now fairly plentiful, both for rail-borne and the landsale depot trade. Prices are on the rising scale, both for wholesale and retail business, and everything now points to a good run from now to Christmas. In regard to gas coal, many of the gas companies are asking for extra supplies, and, as far as is possible, the collieries are coping with this extra trade. The amount of large gas coal available is fairly considerable, but for small gas coal and nuts, the demand is greater than the supply in some cases. Consequently there are few nuts for offer on the open market, and these are fetching good prices. With reference to steam coal, the railway companies are taking their usual quota against contracts, and manufacturers of the district continue to keep busy, and there is a good demand for steam coal against industrial contracts; in the general market, sellers have been able to obtain almost any reasonable price, owing chiefly to the improvement in the demand for coal for shipment, which for the past few weeks has been rather dull. Buyers have been coming along with offers for large lots for prompt delivery at good figures, and prices all around are much firmer than they were last week or the week before. Slack is better sold also, and in addition to the improved demand, there is an improvement in the all round prices asked for this commodity. The tonnage of gas coke disposed of has increased, but so far the gas companies have not advanced their prices. The current quotations in the open market are as follow:—

	Current prices.	Last week's prices.
Prices at pit f.o.b.:		
Best house coal .....	15/6 to 16/6	15/ to 16/
Secondary do. ....	14/6 to 15/6	14/ to 15/
Steam coal .....	12/9 to 14/	12/6 to 13/
Gas coal .....	13/ to 13/9	13/ to 13/9
Bunkers.....	12/6 to 12/9	12/ to 12/6
Nuts .....	11/3 to 12/3	11/ to 11/9
Slack .....	6/ to 8/6	6/ to 7/3
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 18/9	17/6 to 18/4
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

#### Monmouthshire, South Wales, &c.

##### Newport.

##### COAL.

Since last week, the tone of the steam coal market has been slowly but steadily gaining strength, and to-day's position shows colliery salesmen much more hopeful of their prospects. Not that a great amount of business has been done, but supplies are not so crowded, and present enquiries regarding next year's requirements are more numerous and sincere than they were. It must be said, however, that buyers are by no means eager to close, and, in many cases, expressing firm opinions against the prices now being asked, and a belief that easier rates are bound to come soon. The steady decline of rates in the outward freight market also affects the attitude of collieries, the purchase of coal for shipment to foreign depots, business which is naturally expected about this time, being deferred until a better estimate of the probable course of freights can be made. For all grades of small and large the market has advanced fully 3d. a ton on the week, house coals remaining steady and unaltered. Patent fuel and coke likewise show no change, the latter having if anything, a weaker tendency. Pitwood, with a good demand, rules rather better at 21s. 6d. to 21s. 9d. for best French fir ex-ship. The freight market shows continued weakness, with rates slightly easier in every direction.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	17/ to 17/3	16/9 to 17/3
Western-valleys, ordinary	15/9 to 16/	15/6 to 16/
Best Eastern-valleys .....	15/6 to 15/9	15/3 to 15/6
Secondary do. ....	15/3 to 15/6	15/ to 15/3
Best small coals .....	8/3 to 8/6	8/ to 8/3
Secondary do. ....	7/9 to 8/	7/3 to 7/9
Inferior do. ....	7/ to 7/6	6/9 to 7/
Screenings .....	8/3 to 8/6	8/3
Through coals .....	11/9 to 12/	11/6 to 11/9
Best washed nuts .....	13/ to 13/6	13/ to 13/3
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/ to 20/	19/ to 20/
Furnace coke .....	19/ to 20/	19/ to 20/
Foundry coke .....	23/ to 25/	23/ to 25/

##### IRON.

Local conditions of the iron and steel trades remain very much the same as a week ago. Only a small amount of new business is passing, and that of an obligatory nature. Specifications on account of current contracts are satisfactory, but there is little or no forward enquiry at the moment. Output at bar mills is scarcely up to the average, with fresh business only of a very meagre description. Exceptional keenness is now being shown by Continental makers for any enquiry of importance that is likely to come along. Rail mills continue busy, but mostly on current orders, fresh enquiry and business being considerably easier than of late. At blastfurnaces work is slackier, while the future is looked at almost with apprehension. In the tin-plate market a little more business than usual has been placed, leading to hopes of recovery, so eagerly looked for, but scarcely to be relied upon because of present slight indications. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tin-plate bars: Bessemer steel, £4 15s., Siemens steel, £4 16s. 3d. to £4 17s. 6d. Tin-



plates: Bessemer primes, 20 x 14 x 112, 13s., Siemens primes, 20 x 14 x 112, 13s. to 13s. 1½d. Finished black plate, £9 10s. to £9 15s. Pig iron: Welsh hematite, 70s. to 71s., delivered locally.

**Cardiff.****COAL.**

The chief feature of the market during the past few days has been the quantity of tonnage taken up by the Admiralty for the Mediterranean, where in the near future there will be congregated a large number of British war vessels. For what reason they are being assembled it is difficult to foresee, but perhaps the present position of affairs in the Near East may have something to do with the demonstration. In spite of the large engagements by the Admiralty, tonnage has continued plentiful, with the result that rates are still on the down grade, and from present appearances they are likely to be easy for some considerable time to come. There is no doubt that the very large number of merchant steamers which have been launched from the shipbuilding yards during the year is at last beginning to tell, and, with the supply of tonnage overtaking the demand, owners' ideas of rates have been considerably modified. The fall in rates of freight during the past month has been very marked to practically all parts of the world, but in particular for home cargoes. To the River Plate there has been a fall of 4s. 3d., and to Italian ports, such as Genoa and Venice, of at least 1s. per ton. It would appear as if the golden days of shipowners had, for the present, come to an end, although it is admitted that freights are still on a remunerative basis, though immensely less than during the last 18 months or two years. So far as best Admiralty steam coals are concerned, the position is much the same as last week. Supply continues to be inadequate to the demand, with the result that prices are firmer than ever. For prompt shipment, especially for small parcels, as high as 20s. 6d. has been paid, and some of the leading Admiralty collieries are refusing to entertain any further business for this month at less than this figure. Even collieries whose stems are not quite so crowded are firmly quoting 20s. 3d. per ton. At present there does not appear to be much enquiry for December, but there can be no question that orders are being held back by buyers in the hope that prices may be somewhat less than month than during this. Collieries, however, are showing no sign of reducing their quotations. Superior second Admiralties are 19s. 6d., and ordinary seconds 13s. 3d. The high prices now prevailing, will, it is believed, have a considerable effect upon next year's contracts. From present appearances, there is good ground for the belief that something round about 20s. or even more will have to be paid for January, and possibly for even later months, but, notwithstanding the firmness of the market, buyers seem to be reluctant to come forward until they know the result of the Admiralty contracts, which, in all probability, will be made before the end of the present month. Whether this belief is wise on their part, only the future will disclose. Last year, through putting off their arrangements for a few weeks, some had to pay at least 1s. a ton more than they could have bought at a couple of months previously. It is known that some middlemen have sold forward best steam coals to Genoa at from 25s. 3d. to 25s. 6d. c.i.f. Taking the average freight over the year at 8s., and allowing for incidental charges, this would only leave 17s. 3d. for the coal f.o.b. Probably they think that the freight may fall 1s. 6d. or more per ton, as it has done in past years. If it does, they may probably cover themselves, but at present the business seems very risky. It is understood that a steamer was fixed at the end of last week for Genoa over the year at 7s. 10½d. per ton. Outputs still continue very low for the time of the year. In the majority of cases it is at least 10 per cent. under the normal for the corresponding months of previous years. It is estimated that the loss to the market by the Senghenydd explosion must be from 1,300 to 1,400 tons per day. The 2,000 men employed at the Llanhilleth Colliery are still on strike, owing to an alleged accumulation of gas in the workings, but in the case of Risca the men returned to work on Monday, after a week's stoppage. Over 1,000 men employed at the United National Colliery, Wattstown, were idle on Monday in consequence of a complaint that there was not sufficient headroom in some parts of the mine, but as a Government inspector had been appointed to go through the workings, it was not thought that the stoppage here would be of long duration. The non-unionist question is still a source of trouble. Chartering for the week amounted to over 467,000 tons, or 3,000 tons more than in the preceding six days, so that there is every probability that the collieries will be very fully employed for some time to come, provided of course, that a series of gales does not interfere with the arrival of tonnage. The outlook generally is considered very favourable so far as sellers are concerned. There are some very large railway contracts in the market. The Chilean Government are enquiring for tenders for two large cargoes of steam coals, one to be supplied in the middle of this month, and the other at the end of December or the beginning of January. It is expected that in this case some of the best Admiralty coals will be contracted for. The French State Railways, in addition to the contracts they placed a few days ago for 320,500 tons of small coal, are now asking for tenders for 185,000 tons of ordinary Cardiff or Monmouthshire large coals for delivery over next year. The tenders have to be in by the 11th inst., but will hold good till December 1. It is reported that the Buenos Ayres Western Railways have purchased large quantities of Monmouthshire Western Valley coals at about 16s. 3d. net f.o.b. for delivery over next year, but details are lacking. A fair quantity of Eastern Valley coals has been sold over 1914 at 15s. 6d. net f.o.b. Invitations have been sent out for about 200,000 tons of Monmouthshire coals for the Cordoba Central Railways. The small coal market is somewhat stronger, bunkerings being 10s. 9d. to 10s. 10½d., and cargo qualities 7s. 9d. to 8s. In Monmouthshire coals there is a firmer tone, and some sellers are demanding advances. Black Veins are 16s. 9d. to 17s., western-valleys 16s. to 16s. 3d., and best eastern-valleys 15s. 6d. f.o.b. Cardiff. There is no change in bituminous coals, No. 3 Rhondda still being quoted at 16s. 6d. to 17s., and No. 2 ditto at 13s. 6d. The quantity of coal shipped coastwise during the month of September was 340,058 tons, being an increase of 10,777 tons as compared with the corresponding month of last year. From Cardiff alone there were shipped 173,433 tons, of which Southampton took 48,040 tons, London 38,920 tons, Liverpool 36,388 tons, and Bristol 16,190 tons. From Newport the shipments amounted to 73,432 tons, the

heaviest consignments being to Dublin, which took 15,520 tons. From Swansea there were shipped 32,659 tons, of which London took 15,830 tons, whilst from Port Talbot and Briton Ferry the shipments totalled 18,626 tons. The Cardiff *Journal of Commerce* gives the following as the average declared price per ton of coal exported from the chief Welsh ports during September:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam .....	17	6	16	2	16	7	15	8
Through-and-through	13	5	14	7	11	0	11	2
Small .....	9	4	10	6	7	11	9	6
Large anthracite .....	22	0	29	1	16	5	17	6
Household .....	16	11	—	—	13	11	—	—

Prices in September of last year were:—

	Cardiff.		Newport.		Port Talbot.		Swansea.	
	s.	d.	s.	d.	s.	d.	s.	d.
Large steam .....	16	1	14	9	15	4	14	9
Through-and-through	12	10	11	8	10	9	10	3
Small .....	9	1	10	2	7	6	8	6
Large anthracite .....	25	9	—	—	14	10	17	7
Household .....	16	10	—	—	15	6	—	—

Shipments of patent fuel for the week amounted to over 25,000 tons, of which the Crown Company despatched 9,752 tons and other local makers 200 tons, Swansea 13,915 tons, and Newport 1,350 tons. Best brands are still 22s. 6d., seconds 19s. 6d. to 21s. 6d. There is an enquiry from the South French Railways for 16,000 tons of Cardiff or Swansea fuel for delivery over next year at Nice. Contracts have been made over 1914 at 17s. 9d. to 18s. 9d. per ton. In coke there is no change. Pitwood is 22s. 3d., or 9d. per ton more than last week.

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
<b>Steam coals:—</b>		
Best Admiralty steam coals .....	20/3 to 20/6	20/ to 20/3
Superior seconds .....	19/6	19/3 to 19/6
Ordinary do. ....	18/3	17/9 to 18/
Best bunker smalls .....	10/9 to 10/10½	10/6 to 10/9
Best ordinaries .....	10/ to 10/6	10/ to 10/3
Cargo qualities .....	7/9 to 8/	7/3 to 7/6
Inferior smalls .....	7/ to 7/3	6/6 to 7/
Best dry coals .....	18/9 to 19/	18/3 to 18/9
Ordinary dries .....	16/ to 16/6	15/9 to 16/3
Best washed nuts .....	16/	16/
Seconds .....	15/	15/
Best washed peas .....	14/	14/ to 14/6
Seconds .....	13/	13/ to 13/3
Dock screenings .....	11/9 to 12/	11/9 to 12/
<b>Monmouthshire—</b>		
Black Veins .....	16/9 to 17/	16/9 to 17/3
Western-valleys .....	16/ to 16/3	15/9 to 16/3
Eastern-valleys .....	15/6	15/6
Inferior do. ....	15/	14/9
<b>Bituminous coals:—</b>		
Best house coals (at pit) .....	20/6	20/6
Second qualities (at pit) .....	17/6 to 18/	17/6 to 18/
<b>No. 3 Rhondda—</b>		
Bituminous large .....	16/6 to 17/	17/
Through-and-through .....	14/6 to 15/	14/6 to 15/
Small .....	11/6 to 12/6	12/ to 12/6
<b>No. 2 Rhondda—</b>		
Large .....	13/6	12/9 to 13/
Through-and-through .....	11/	10/9 to 11/
Small .....	8/3 to 8/6	8/ to 8/6
Best patent fuel .....	22/6	22/6
Seconds .....	19/6 to 21/6	20/ to 21/6
Special foundry coke .....	28/	28/
Ordinary do. ....	23/ to 26/	23/ to 26/
Furnace coke .....	20/ to 21/	20/ to 21/
Pitwood (ex-ship) .....	22/3	21/6

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

**IRON.**

The most interesting event in the iron and steel trade this week is the confirmation of the report that the Mannesmann Tube Company have acquired the option of 100 acres of land on the banks of the Usk at Newport, whereon to erect large works for their special manufactures. The news came as a surprise, as it was understood that they had already decided to go to Old Trafford, Manchester, but it seems a hitch has occurred with the authorities there, and negotiations have been broken off. They are now sinking trial shafts both at Newport and at Port Talbot, but all other things being equal, there is very little doubt but that Newport will be selected. Of course, a good deal will depend on the stability of the foundations, and on the facilities which the local authorities are prepared to afford the company. If the conditions laid down by them are not considered reasonable, the managing directors will go elsewhere. It is understood they have already acquired options both at Avonmouth and Glasgow. The trial shafts which are being sunk on Col. Lockwoods' property are almost within a stone's throw of the works of Messrs. John Lysaght and Sons, who since they have been at Newport, have more than doubled the number of their mills, and are now turning out a million sheets per week. It is said that the new works which the Mannesmann Company propose erecting will eventually find employment for some 4,000 men. In the tin-plate trade there is nothing cheering to report. Shipments for the week only amounted to 80,000 boxes as against 119,000 boxes received from works, so that stocks have been increased by 39,000 boxes, and now stand at 330,787 boxes. There is but little enquiry for forward delivery. Works are quoting 13s. basis for 14 x 20 cokes, but business has been done at 1½d. below this figure. A fair number of orders have been taken for oil sizes at 13s. 4½d. and 18s. 10½d. In consequence of a strike of wheelers and annealers at the Cwmfelin tin-plate works for an advance of wages, the works have been rendered idle. If the strike continues it may eventually bring about a stoppage of some 27 mills, as 28 days' notice to terminate contracts have already been put up at the Worcester and Forest Works, Morriston. There is no alteration in steel bars, Siemens being still quoted at £4 16s. 3d. and Bessemer at 1s. 3d. less. The galvanised sheet trade is very dull, and prices are weaker, 24-gauge corrugateds being

£10 12s. 6d. to £10 15s. Some of the smaller works, in order to keep going, have accepted as low as £10 10s. There have been considerable exports of railway material to the colonies. It is announced that Messrs. J. S. Tregoning and Sons of Llanelly have acquired the entire interest of the St. Davids Tin-plate Company in the Bynea Steel Company. Welsh pig iron has fallen to 67s. 6d., f.o.t.

**Swansea.****COAL.**

The returns of the trade of the port last week were again most satisfactory; both the coal and patent fuel trades were active, the shipments amounting to 110,962 tons. A very good attendance assembled on 'Change this morning, and there was no material alteration to report in the general conditions prevailing on the anthracite coal market. Swansea Valley large continued to move off satisfactorily, and Red Vein large was very strong. There was an excellent demand for machine-made nuts and cobbles. Beans, however, were quiet. Both rubbly culm and duff were without alteration, and parcels were freely offered for immediate delivery at slightly reduced prices. In the steam coal market there were practically no enquiries.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
<b>Anthracite:—</b>		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/6 to 21/6	19/6 to 20/6
Big Vein large (less 2½ per cent.) .....	17/6 to 18/6	17/6 to 18/6
Red Vein large do. ....	14/6 to 16/	14/6 to 16/
Machine-made cobbles (net) .....	21/6 to 24/6	21/6 to 23/
Paris nuts (net) .....	23/6 to 26/	23/6 to 25/6
French do. do. ....	23/6 to 26/	23/6 to 25/6
German do. do. ....	23/6 to 26/	23/6 to 25/6
Beans (net) .....	17/ to 18/9	16/6 to 18/6
Machine-made large peas (net) .....	13/ to 13/9	12/6 to 13/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	5/ to 5/6	5/9 to 6/3
Duff (net) .....	4/3 to 4/9	4/ to 5/3
<b>Steam coals:—</b>		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	14/3 to 15/	14/ to 15/
Bunkers do. ....	10/6 to 11/6	10/6 to 11/6
Small do. ....	7/ to 7/6	7/ to 7/6
<b>Bituminous coals:—</b>		
<b>No. 3 Rhondda—</b>		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) .....	10/ to 11/	10/ to 11/
Patent fuel do. ....	17/6 to 18/	18/ to 19/

**IRON.**

Last week the tin-plate trade was a little brisker than a month ago, but several mills were idle at the various works. The production lately has been in excess of the demand, so that proprietors have had to adopt means of restricting the make. The steelworkers had little to complain of, and an average production of pig iron was registered at the blast furnaces. A period of uninterrupted briskness was again observed at the Mannesmann Tube Works, and the engineering and fitting shops had a moderate week. The shipments of tin-plates were 80,068 boxes, receipts from works 119,279 boxes, and stocks in the dock warehouses and vans 330,787 boxes.

**Llanelly.****COAL.**

The position for most coals in this market is fairly satisfactory, although there has been a slight easing off during the past few days, due most probably to the gales delaying tonnage. There is no reason to expect other than that the market will be firm throughout the winter, as it is known that colliery order books are well stemmed. Tonnage is not so plentiful as it should be, and a lot of difficulty is at times experienced to get suitable freights. The collieries raising manufacturing coals are not at all satisfied with the position, and have to cut prices very low to keep going. No one expected that this market would fall to the extent it has, or that prices would come down to what they are now being quoted. Unfortunately there is little prospect of an improvement within the next few months. It is expected that anthracite kinds will have a ready sale over the winter months, especially if we have a cold winter.

Prices f.o.b.

	Current prices.	Last week's prices.
<b>Anthracite:—</b>		
Best malting large .....	21/ to 22/6	21/ to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	18/ to 19/	18/ to 19/
Red Vein do. ....	14/ to 15/	14/ to 15/
Machine-made cobbles ...	19/6 to 20/6	19/6 to 20/6
German nuts .....	23/ to 25/	23/ to 24/6
French do. ....	23/ to 25/	23/ to 25/
Paris do. ....	24/ to 25/	23/ to 25/
Machine-made beans .....	17/6 to 19/6	18/ to 20/
Do peas .....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	5/6 to 6/	5/6 to 6/
Duff .....	4/3 to 6/6	4/3 to 6/
<b>Other sorts:—</b>		
Large steam coal .....	16/ to 17/	16/ to 17/
Through-and-through ...	11/ to 11/6	11/ to 11/3
Small .....	9/ to 10/	9/ to 9/6
Bituminous small coal ...	10/6 to 11/	11/ to 11/6

Considerable developments are at present being made in the Northumbrian coalfield. A new pit, to be known as the Prospect Pit, is rapidly approaching a state of preparedness for coal drawing. This pit is an extension of the Seaton Delaval Coal Company's ventures, and will open up an excellent royalty on the estate of Lord Hastings. An extensive plant is to be installed on the surface, including high grade winding machinery, with screening and washing of the most modern type.



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(A Classified List appears on page 968.)

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\*\* For other Miscellaneous Advertisements see Last White Page.



# The Colliery Guardian.

LONDON, FRIDAY, NOVEMBER 7, 1913.

At the seventieth annual meeting of the Lancashire and Cheshire Coal Association, held in Manchester on Tuesday last, Mr. Vincent Bramall was unanimously elected president for the ensuing year.

The half-yearly meeting of the council of the Northumberland Miners' Association will commence on Saturday, 15th inst.

The dispute in the North Staffordshire coal-field, involving 30,000 men, has now been settled, and notices to cease work withdrawn. The owners have offered to use their influence to induce non-unionists to join the union, and this offer has been accepted by the four unions concerned.

An application for an advance of 18½ per cent. has been made by the Scottish miners whose wages have only recently been reduced by an award of Lord Balfour of Burleigh. The present wage (as recently altered) is 7s. 3d. per day, and the application represents about 9d. per day.

Sir Robert Romer, the independent chairman of the Cleveland Joint District Minimum Wage Board has fixed December 2 for the hearing of claims by both owners and men for modifications of his award of May 1912.

A meeting of the Lancashire and Cheshire Coalowners' Association was held on Tuesday to consider the application for an advance in the wages of surfacemen. It was announced that the meeting had been unable to do anything in the matter.

In consequence of a 10 per cent. reduction in the wages of miners in the Borinage, the chief coal region in Belgium, 20,000 men of the Produits mines, in the Fleny district, have, it is reported, gone out on strike.

A meeting of the Midland Institute of Mining, Civil and Mechanical Engineers was held at Sheffield on Tuesday. Mr. W. D. Lloyd read an interesting paper on the use of rescue apparatus at Lodge Mill Colliery, Huddersfield. A discussion took place on Dr. J. Court's paper, "Miners' Nystagmus and its Effect on Vision."

A committee of shareholders of the Duffryn Rhondda Colliery Company Limited was appointed on Tuesday to meet the directors with the view to formulating a scheme for the provision of further capital.

The Appeal Court on Wednesday dismissed the appeal of Mr. William Johnson, M.P., general secretary of the Warwickshire Miners' Association, against a judgment of Mr. (now Lord) Justice Swinfen Eady holding him personally liable for costs incurred by him as plaintiff in a slander action.

During her visit to Lambton Castle, Durham, at the end of this month, the Queen will visit the homes for aged miners in different parts of the county.

The report of the Board of Trade on strikes and lock-outs, and on conciliation and arbitration boards, has been issued. The national dispute in the coalmining industry was the outstanding feature of the year, and accounted for nearly 70 per cent. of the total number of workpeople involved in strikes. The total number of disputes commencing in 1912 was 857, as compared with 903 in 1911, the workpeople affected by these strikes being 1,233,016 directly and 230,265 indirectly, as against 831,104 and 130,876 respectively in the previous year.

A meeting of the Manchester Geological and Mining Society will be held at Manchester, on

Tuesday next, when two papers will be read by Dr. John Harger on "Firedamp in Mines and the Prevention of Explosions" and "The Detection of Gob Fires."

On Wednesday the explorers in the Senghenydd Pit reached, for the first time, the working-places of the miners at the face of the coal. So far, only 144 bodies have been recovered from the mine. The united relief funds now total about £80,000.

## The Employer and the Non-Unionist.

IF the trade union leader is accustomed to trace every thought and action of the employer back to the common stock of "profits," there is an obvious retort that nearly every trade union demand is intimately associated with "wages." At the present time there are roughly three main questions to the forefront of the miners' programme—omitting nationalisation as being remote and academic rather than urgent and practical. These are the non-unionist question, the basis wage question, and the surface workers' agitation. All have during the last few weeks reached an interesting stage in their development.

To take the non-unionist question only on this occasion, the concerted movement instigated by the Miners' Federation of Great Britain has so far led to some local stoppages of work, but there has been no strike at all approaching the dimensions threatened, mainly because the organised workmen have succeeded, in the majority of instances, in making the weight of numbers felt, even to the extent of subverting strong individual convictions. It is in North Staffordshire that the difficulties have seemed greatest, and here also matters appear to be well on the way to a settlement. The action taken by the North Staffordshire coalowners to secure this settlement, however, raises some very serious questions. Indeed, we attach so much importance to the resolution passed by them that we give it here in full:—

The North Staffordshire colliery owners recognise that, in the interests of employers and employees alike, all the workmen shall be members of a trade union. They made a *bona fide* effort to induce all their workmen to join one or other recognised trade union, and will from time to time, on evidence being brought before them that certain workmen are not members of a union, continue those efforts. The owners will accept as such evidence names supplied by the recognised union representative, who shall also be enabled to obtain information as to the names of freshly-engaged workmen. The coalowners will give the unions all reasonable facilities for securing and maintaining the membership of the unions by allowing the distribution of leaflets and circulars, taking of showcards, the collection of contributions, and posting of necessary notices after submission to the manager. In the event of men being found in arrears or out of the union, lists of such names to be submitted to the employers, and they agree to meet the federated unions, firstly before the end of the year, and afterwards quarterly, if necessary, to consider such lists and deal with them.

There is, perhaps, nothing quite so mortifying to the employer as to have his pits laid idle, because of an internal disagreement amongst his workmen, in a matter which virtually does not concern him. This makes it all the more important, to our mind, that he should not lend his weight to either side. Trade union recognition, in the ordinary sense, is an entirely different matter, and, sharing as we do with the most enlightened employers a full appreciation of the value of the trade union, we agree that the attitude adopted by the South Wales coalowners in refusing to accept the leaders of the South Wales Miners' Federation, in that capacity, as representatives of the workmen on the Concilia-

tion Board, is to strive for a principle that no longer is of any great value; but we also hold most strongly with the representatives of the coalowners who gave evidence before the Industrial Council that it is no function of the employer to coerce his own or other people's workmen or other employers, except so far as concerns his own working arrangements. The refusal of the Northumberland and Durham owners to lend their aid even to enable the union to impose fines and penalties in pursuance of a mutual system of financial guarantees accentuates this attitude of strict impartiality. The colours in which the non-unionist is sometimes drawn as that of a man of lofty individual aims, are not universally true; much more frequently when a workman falls outside his union it is because he has got into arrears with his subscriptions, through having spent his money in the public-house or on other mundane amusements; we can appreciate the intolerance of the trade unionist, who has done something to better the conditions of his fellows, for the man who reaps where he has not sown. But undoubtedly there are men who dissociate themselves from the unions on loftier grounds; and it is regrettable that employers should use their weight to crush independent ideals of this nature out of existence, especially in these days when the welfare of the worker is at times submerged in the councils of the unions beneath considerations of a purely political character.

The way the North Staffordshire coalowners have taken is an easy and a comfortable way, and is a sign of the times, attesting not only to the growing importance, but also to the increasing power of the unions. Last week we recorded the fact that a notice had been posted by the management at the pithead of a Durham colliery warning the non-unionists that, if they insisted upon remaining outside the union, they would not be entitled to the addition of the usual current percentage of the basis wage. We fear that the consequences of such compacts may be grave. They place a dangerous weapon in the hands of the agitator, and make it difficult for employers to convince the public that their pleas for the liberty of the subject are genuine.

## Canals and Coal Transport.

THE question of the resuscitation of British canals has recently assumed a position of increased prominence, mainly owing to the activities of the Waterways Association and the enthusiastic support recently given by the Birmingham City Council to a practical project for the attainment of this purpose. It will be remembered that the Royal Commission on Inland Waterways, appointed in 1906, reported in 1909 in favour of the appointment of a Central Waterways Board for the purpose of acquiring and maintaining the four routes known as "The Cross," whereby the ports on the four estuaries—Thames, Severn, Mersey and Humber—would be placed in effective canal communication with the Midlands. The cost of the whole scheme adopted by a majority of the Royal Commission would be something over £17,000,000, and, as a business proposition, it is not at all clear that such an expenditure would be wise. The Waterways Association, however, makes certain suggestions which certainly do promise to bring the reorganisation of British canals nearer to the sphere of practical politics. In the first place, it is evident that nothing can be done under the present system of multiple control. It is, therefore, advocated that unification of control should first be secured by the establishment of the Central Board. Such a step would not cost a



amount, although some expenditure would be incurred in the purchase of private land and concessions. When M. DE FREYCINET in 1879, as Minister of Public Works for France, secured the passage of a Law for the nationalisation of French waterways, similar difficulties were involved, and we understand that even up to the present day financial considerations have hindered the full completion of State purchase in that country. Thus we regard even the first item of the programme of the Waterways Association as one which is not free from difficulty, although the problem is greatly simplified by the fact that only the four arms of the so-called "Cross" would come within the scheme now proposed.

The next step would be the gradual improvement of the waterways forming the "Cross" up to the desired standard of capacity, and here it may be noted that the smaller scheme of adaptation to 100-ton barges is more likely to find favour than the larger 300-ton standard.

From the colliery owners' point of view there is much to be said both for and against canal transport upon such a basis. The question was discussed at considerable length at the recent meeting of the British Association in Birmingham. Mr. G. R. JEBB called attention to the fact that in London alone, out of a total quantity of about 16 million tons of coal which arrive annually in the Metropolis, only about 20,000 tons come by canal. There are in London and the suburbs some 160 railway coal depots, with many miles of sidings, and it is difficult to see how it would be possible to find the necessary space for canal wharfage if any very great increase took place in the transport of coal by this medium. Already sea-borne coal is often at some disadvantage in London on account of heavy cartage costs. Similar arguments would apply in greater or less degree to every one of the towns along the proposed canal routes. Another point to be considered is the question of delay in canal basins, and the blockage which might ensue while 100-ton barges were awaiting a full load at the several collieries. We are assuming, of course, that the canals have been uniformly brought up to the 100-ton basis. It has been suggested that a plan more advantageous, so far as giving the Birmingham district access to the sea, would be to proceed *via* Gloucester to the Severn, along which route there is already a canal for 300-ton boats as far as Worcester—more than halfway.

There are, in fact, so many possibilities and conditions to be discussed in connection with these several views that it is impossible to consider the question adequately in a single short article. Upon some of the main arguments we have commented on previous occasions.\* The main contention in favour of a forward policy is the reduced freights which might thus be expected to be secured. At present the freight-charge for water-borne coal between the Leicestershire coalfields and London is 0·55d. per ton-mile, which is almost as much as by rail: but under improved conditions it is believed that the charge by canal would be reduced to 0·27d. per ton-mile. It is obvious that the truth of this contention rests largely upon hypothetical factors. We are quite in the dark as to what exactly is meant by improved conditions. Presumably they include not only the 100-ton capacity in the place of the existing 25-ton boats, but also more modern haulage systems, such as have been found so efficient in the case of Continental waterways. And what is perhaps still more important is the possibility that canal

traffic in this country would only be made to pay by means of State subsidies and a consequent increase of burden to the taxpayer. At present, about 45 per cent. of the total tonnage carried by English canals consists of coal, and it is obviously upon the transport of this mineral that the future of canals must chiefly depend.

WE are glad to see that the **The Proposed Nationalisation of Miners' Relief.** proposals made in our issue of October 24, in regard to the nationalisation of miners' relief funds, have met with a warm approval.

Those proposals, apart from the main suggestion, were (1) that any such fund should be made to cover the necessities of small as well as large accidents; (2) that the services of the Public Trustee should be enlisted in the investment and financial administration of the amalgamated funds; and (3) that a suitable method of utilising the funds would be in the erection of orphanages and cottages for the dependants of workmen killed by accident.

Dealing with these points in order, the accident at the Glynea Colliery has had the useful purpose of giving weight to our first contention, and we now learn that the victims of the Glynea accident are to be relieved from a fund in common with the Senghenydd dependants; thence it is arguable that, had that explosion occurred some months before or after the Senghenydd explosion, instead of under the shadow of that overwhelming disaster, the necessities would have been just as great and just as urgent.

As regards the second point, we are able to say that there is no prospect of any difficulties in the way of utilising the offices of the Public Trustee, and that means will undoubtedly be found to override the preliminary objection that, according to its constitution, this authority is debarred from dealing with funds subscribed for a "religious or charitable" object. There will, further, be no difficulty in securing, in the administration of the funds, that the representatives of the employers and workmen who have gained so valuable an experience in the management of the numerous existing special and general relief funds, shall have as large a place as in the past. Indeed, the process of formulating a scheme is easy by comparison with the "Titanic" scheme, because the machinery already exists; in some respects it is, of course, more complicated by reason of the fact that in the "Titanic" scheme it was possible at the outset to estimate approximately, as in the case of a special colliery relief fund, the scale of benefits on a proper actuarial basis, whereas we cannot know how many wives and children may lose their breadwinners in the years to come. In this case, however, the law of averages is sufficiently accurate for practical purposes, and all the experience of the Central Association for Dealing with Distress is at our disposal.

We are particularly interested to see that the suggestion that a portion of the funds at least should be employed in the erection of orphanages has received whole-hearted support. The *Western Mail*, in a telling article, strongly advocates this proposal, and suggests that power should be given, whenever appeals are made for great colliery disasters, to pass over a portion of the funds to such an object, that the ultimate balances should be devoted to the same purpose, and that, co-existent with these two sources of income, direct appeal for support should be made on national lines.

It is possible that when the unused balances of the existing special relief funds are aggregated some disappointment may be expressed as

to the smallness of the amount. Many of the funds have been wound up and the surpluses disposed of; in other cases the balances form but a small proportion of the funds subscribed. Thus the *Western Mail* has published particulars showing the present position of ten large funds raised in South Wales, from which it appears that about £45,000 remains. Probably the total sum of money available in this way would not exceed £100,000; but there are other sources, and £100,000 is a useful nest-egg in any case. Some fears have been expressed that the formation of a national fund might affect public subscriptions, due partly to the feeling that sufficient funds would be already in existence to provide for all the necessities of any case that might arise, and partly because the territorial sentiment would be lacking. Any danger in this respect would be overbalanced, we think, by the prospects that such a fund would have of benefiting from testamentary bequests, a source of income at present absent.

In leaving this subject, we may say that the Hulton trustees have already interviewed the HOME SECRETARY, with highly satisfactory results, and, although an Act of Parliament may be necessary to confer the necessary powers and erect the necessary machinery, we feel sure that this excellent movement will not, like some other excellent movements, die stillborn.

#### Trade Summary.

The London coal trade for the past week has again been very slow. The mild weather has largely influenced the home coal market, and whilst the delivery trade has been so small, the merchants find the utmost difficulty in dealing with the daily contract supplies. Factors are buying very little, and only from hand to mouth. Steam coals are fairly brisk, but smalls are lower than at any point during the year. The wharves and depots in London are full of stock. Colliery prices remain stationary, but in many cases rebates are given for immediate orders.

Loading turns on the Tyne have lengthened considerably, but good business is still limited. Prompt quotations are slightly better.

Prospects in the Durham coal trade are rather better.

The Lancashire house coal trade still hangs fire. Other classes are somewhat easy. Slacks are more heavily consumed, but the demand is still below the maximum.

West Yorkshire house coal is dull, and manufacturing coals are also below par.

The export demand for South Yorkshire hard coals is quieter, and prices are lower, owing to the large output. Slacks are also easier. House coal is dull.

The call for Derbyshire house coal is quiet, but the demand for manufacturing sorts is satisfactory.

At Cardiff the prices of best coals continue very firm. The small coal market is somewhat stronger. Monmouthshire coals are firmer. Bituminous coals are unchanged.

#### THE HEATING VALUE OF FUELS.

On Monday, October 19, Mr. J. W. Cobb, B.Sc., F.I.C., Livesey professor of coal-gas and fuel industries in the University of Leeds, and some time chief chemist at the Farnley Ironworks, delivered at the Armstrong College, Newcastle, the first of a series of five fortnightly lectures on "The Utilisation of Fuel." The series has been arranged under the auspices of the Newcastle section of the Society of Chemical Industry in conjunction with the department of chemistry at Armstrong College. Mr. Ernest F. Hooper, president of the North of England Gas Managers' Association, presided over a very large audience.

Prof. Cobb said it was difficult to know quite what was the best method in which to treat such a subject in five lectures; but it seemed to him that the correct thing to do was to review his own works career, and to remember, so far as he could, what sort of principles had really proved of service, and what sort of principles would prove of service to others.

When a fuel was burnt in the industries, they were concerned primarily with three things—first, the total amount of heat generated by the combustion of the fuel; secondly, equally important for many purposes, the intensity of the heat which was generated and the temperature; and, thirdly, which was a more complicated question, the extent to which the heat was used before it escaped—a quality which might be expressed in a number of ways, in various percentages which were known as the efficiency. It was necessary to understand



the conditions controlling these things, and, for satisfactory work, it was very advisable to measure it.

For convenience, he would take the second consideration—that of the temperature—first. He warned his hearers that there were several thermal units in use, but there were only two which were in common use at all—*i.e.*, the heating power of a fuel was defined by the number of calories which were generated in the combustion of one gramme of fuel or the number of “large calories” which were generated by the combustion of a kilogramme of fuel. The “large calorie” was, of course, equivalent to 1,000 small calories, so that the calorific value was the same whether expressed in small or large values.

That calorific value, which it was so essential to know at the outset in considering the use of any fuel, could only be determined in a laboratory, because its determination consisted essentially in burning the fuel completely to ash, and lowering the ash of all the products of combustion nearly to air temperature—hence the necessity for the calorimeter. Prof. Cobb proceeded to describe, in much detail, various types of calorimeters, including, especially, Mahler's bomb calorimeter and Parr's calorimeter.

Prof. Cobb next discussed various methods of estimating the heating value of fuel, concluding his lecture with a description of the instruments employed in the recording of high temperatures.

The second lecture was delivered on Monday last. Prof. Cobb remarked that at the previous lecture they were considering what were the best methods in practice of determining temperatures that were well above redness, and he was really pointing out that, really, the practical instrument to use was the thermocouple. There were limits, however, above which the thermocouple became quite useless. As a matter of fact, for temperatures that were above 1,400 degs., thermocouples became so liable to failure that they were practically impossible to use. In many industrial processes such temperatures were in common use. Therefore an entirely new principle was used, the principle of the variation of radiant heat given off from a heated surface as the temperature became greater. The amount of heat given off from a black body was proportional to the fourth power of the absolute temperature. This was known as Stefan's law. It followed that as the temperature got higher, such a method of estimation got more and more accurate. Prof. Cobb then described an instrument whereby this principle was applied—the Fery radiation pyrometer telescope. The law, he said, only held good for what was called a “black body.” Sometimes it became advisable to take a number of temperatures in inaccessible places, and for that purpose it was sometimes found expedient to avail oneself of what were known as segar cones of silicate, which at certain heats bent over. These cones were made up and tested by the makers for given temperatures and were numbered, and when they were in use the furnace or kiln was said to be heated, say, to cone 9.

It was quite evident that, for the proper understanding of the combustion of fuel, they should begin with the study of what happened when carbon burned under certain conditions.

It was often stated that the combustion of carbon to carbon monoxide was conditioned by a limited air supply and to carbon dioxide by a free air supply. That was true, but it was not the whole truth. As soon as carbon began to take in air or oxygen at all it formed a certain amount of carbon monoxide and carbon dioxide together. From recent work there seemed quite good reason to suppose that the first reaction, beginning about 400 degs. Cent., was the formation of a chemical complex of the general formula CXOY and that CO<sub>2</sub> and CO together resulted from the combustion of the complex. As the temperature of combustion rose the CO<sub>2</sub> fell. The percentage of CO present at 800 degs. Cent. would be 86.4; at 900, 96.5; at 1,000, 99.4; and at 1,100, 99.8.

There were disadvantages in gas producer work and in boiler work in a pure air blast. These were that the temperatures obtained were excessive, so that the wear and tear on the producer, for instance, were excessive, and the thermal efficiency was lower, and unless the producer was built quite close up to the furnace, a very large proportion of the 29,000 calories would, obviously, be lost. Prof. Cobb went on to speak of the combustion of carbon with air-steam blast.

The syllabus for the rest of Prof. Cobb's course is as follows:—

November 17.—The making and distributing of gaseous fuels. Choice of coal. Gas-producer construction and working. Mond gas. Distribution.

December 1.—Radiation, conduction, and convection, and their significance for furnace construction and use. Steam raising by coal, waste-heat, and gas.

December 15.—Principles of the construction and use of regenerative and recuperative furnaces. Surface combustion. Uses of high-grade gas at normal and high pressures. Electrical heating.

## LABOUR AND WAGES.

### North of England.

The Cumberland Coal Trade Conciliation Board met at Workington on Friday, Mr. W. Graham, the president, in the chair. The question of the appointment of a neutral chairman was discussed, and the meeting failing to agree upon anyone, the joint secretaries were directed to submit certain names to the county court judge (Judge Gawan Taylor), that he might make a selection according to rule.

A dispute with reference to the interpretation of a clause of the Explosives Order having arisen at Clifton Colliery, it was resolved that the joint secretaries should get the Home Secretary's opinion on the point. The employers applied for a 2½ per cent. reduction in underground wages under the suspended agreement of April 13, 1908, and the matter having been exhaustively discussed, its further consideration was postponed. The workmen asked that explosives and lamps should be supplied free of charge, and that work should cease below and above ground at 12 noon on Saturday, but the masters could not agree to any of these demands. The week's holiday was also discussed, and the owners expressed themselves favourable to it, conditionally on the men giving up various day holidays during the year. With a view to this being arranged, the question was postponed till the next meeting of the Board.

About 400 back shift hewers and lads employed at New Hartley Colliery left work on Tuesday morning without giving the usual 14 days' notice, owing to a dispute about fire coal.

The North Seaton miners have arranged to take a strike ballot in connection with the non-union agitation.

Both the mineowners and the miners of Cleveland are claiming modifications in the minimum wage award of Sir Robert Romer, who has intimated his willingness to meet the Board at Middlesbrough on December 2. The miners have asked that the minimum for machine men, shot-firers, and chargers shall be raised from 5s. 11d. to 7s. per day, that the wage of miners shall be advanced from 5s. 4d. to 6s., and that other sections of pieceworkers shall receive 5s. instead of 4s. 7d. In the section for datal workers 6s. 6d. is asked for face deputies, compared with 5s. 11d. now paid; 5s. 9d. is to be claimed for back-by deputies and deputies' assistants, instead of 5s. 1d.; and an effort is to be made to secure an advance from 5s. 1d. to 5s. 4d. for shifters. An increase of 1s. 2d. a day is sought for hauling enginemen, an advance of 1s. 1d. for pumping enginemen, and 5s. is claimed for all other adults. Increases for youths are to be claimed, and the workmen will ask that the minimum shall be paid when 80 per cent. of the time has been worked, instead of 100 per cent., and that no workman shall be deemed aged unless it can be satisfactorily proved that from physical inability he is unable to perform a fair day's work. The owners, on the other hand, are seeking substantial reductions, and have intimated that they will suggest that miners should only receive 4s. 9d., machine men and chargers 5s. 9d., on-setters 4s. 4d., and other pieceworkers 3s. 9d.; 5s. 10d. for face deputies, and 3s. 10d. each for deputies' assistants, shiftmen and others, and a starting wage of 1s. 4d. instead of 2s. for boys.

Mr. W. Straker, in his monthly circular to the Northumberland miners, offers vigorous criticism on Lord Mersey's recent award on the revision of rules and rates of pay under the Minimum Wage Act in Northumberland. He declares the award to be unsatisfactory and disappointing—so much so, that it has destroyed any faith they had in laying their case before him. It was expected that he would have acted as an independent chairman, but, instead of that, it was quite evident, from the sameness in the Durham award and his, that there had been a close collaboration between Sir Robert Romer and himself, not only on this occasion, but last year also.

The question of Sir Robert Romer's recent award to the Durham miners under the Minimum Wage Act is also dealt with by Mr. John Wilson, M.P., in his circular. He stated that there was very general, if not universal, disappointment at the nature and scope of the award. However great the disappointment might be at the lodges, it was no less in the minds of the executive committee, who had to show reasons for and advance arguments in favour of the changes sought. The whole debate would be before them shortly, and he urged them to accept the decision with all its defects, and by all lawful means use it for the greatest good possible.

The half-yearly council meeting of the Northumberland Miners' Association will commence at Burt Hall on the 15th inst. There are 29 resolutions from the lodges on the agenda. The Ashington Lodge will ask that the management committee meet the coalowners in order to ask them what they are prepared to give in lieu of the present colliery house system, and that, failing to secure conditions from the coalowners, to seek an increased rent allowance for all workmen who are willing to give up their claim for a colliery house. From Newbiggin comes the proposal that the coalowners be asked for an allowance of 3s. per week for house rent for men living in rented houses, a ballot vote of members as to whether or not they are in favour of striking to enforce the claim to be taken in case of refusal. Other proposals include the following:—“That we request the colliery owners to agree for all pits to be loosed not later than one o'clock on ‘baff’ Saturdays.—North Elswick.” “That we take a ballot vote

of our members with a view to giving 11 days notice to cease working on ‘baff’ Saturdays.—Hartford.” “That we request the colliery owners to grant all workmen a week's holiday each year.—Cramlington Ann.” “That we ask to have the joint committee re-established on the basis that no reductions of wages shall take place except it be proved that the coalowners are unable to work their mine at a profit at the existing tonnage rates.—Newbiggin, Preston, Netherton Hall and North Elswick.” “That in the event of the Coalowners' Association refusing to pay a compensation claim within three months, our compensation secretary place the matter before the executive committee with a view to issuing proceedings against the owners to recover compensation in such cases.—Hartley.” “That we request the Miners' Federation Committee to at once approach the Government and request that in future 20 mines inspectors be drawn from the ranks of miners.—Wylam.” “That we endeavour to secure legislation to prevent the Board of Trade interfering in trade disputes when questions of wages are involved, unless such Board has power to inspect the employers' books.—Walker.” “That we initiate a national movement to secure the abolition of all ‘piece’ work in the coalmines of Great Britain.—Blucher.” “That we request the executive of the Miners' Federation of Great Britain to convene a conference of representatives of miners', railway workers', transport workers', and other associations for the purpose of considering an agreement under which, in case of the members of one association being on strike or locked out, the members of other associations may down tools to assist those locked out or on strike.—Ellington.”

### The Federated Area.

A meeting of the Lancashire and Cheshire Coalowners' Association was held in Manchester on Tuesday for consideration, among other matters, of the application by the Miners' Federation of the area for an advance in wages of surface workers at all the collieries. The question was discussed at a joint meeting of representatives of the two bodies on October 14, when the owners accepted the principle of a uniform list, but asked for an adjournment in order that the whole of their association might be consulted upon the rates submitted on behalf of the men. After deliberations extending over two hours and a-half, it was announced at Tuesday's meeting that nothing had been done. The position will be considered at a special conference of the National Miners' Federation on December 11.

At a conference of the owners and men in the North Staffordshire coalfield on Friday last, an agreement was arrived at on the non-union question. Over 30,000 men had handed in their notices, which have now been withdrawn. The following is the corrected text of the terms offered by the North Staffordshire colliery owners, and accepted by the four unions:—“The North Staffordshire colliery owners recognise that in the interests of employers and employees alike, all the workmen shall be members of a trade union. They made a *bonâ fide* effort to induce all their workmen to join one or other recognised trade union, and will from time to time, on evidence being brought before them that certain workmen are not members of a union, continue those efforts. The owners will accept as such evidence names supplied by the recognised union representative, who shall also be enabled to obtain information as to the names of freshly engaged workmen. The coalowners will give the unions all reasonable facilities for securing and maintaining the membership of the unions by allowing the distribution of leaflets and circulars, taking of show cards, the collection of contributions, and posting of necessary notices after submission to the manager. In the event of men being found in arrears or out of the union, lists of such names to be submitted to the employers, and they agree to meet the Federated unions, firstly, before the end of the year; and afterwards quarterly, if necessary, to consider such lists and deal with them.”

### Scotland.

The Scottish Miners' Federation have forwarded a demand to Mr. Baird, Glasgow, secretary of the Masters' Federation, for an increase of 18½ per cent. on the 1888 basis. This represents 9d. per day, and is similar in amount to the coalmasters' demand for a reduction put forward seven weeks ago, and which was only referred to Lord Balfour recently, with the result that wages fell by 6½ per cent.

A meeting of the Scottish Miners' Federation was held in Glasgow on Friday last. Mr. John Robertson, vice-president, was in the chair. A resolution was adopted in favour of contesting the Parliamentary vacancy in South Lanarkshire in the Labour interest, and that Mr. Tom Gibb be nominated as the Labour candidate. A report on the wages question was submitted and adopted. Mr. Robertson, in moving a resolution of condolence with those families bereaved through the Welsh mine disaster, said that such disasters should spur them on to get legislation that as far as humanly practicable would make them impossible. He was convinced that such an industry as mining ought not to be carried on by private enterprise, but, even for the safety of the miner alone, the sooner the mines became the property of the nation the better. If the Mines Act were being carried out, these dangerous conditions would not exist, or, if they did exist, the miners would be withdrawn from the mine.

With a view to eliciting information with regard to the condition and sufficiency of the housing of the working classes in the Cleland and Omoa districts of Lanarkshire, a local enquiry has been held by the Middle Ward District Committee. As the outcome of the enquiry it is evident that there is a difference of opinion as to the life of the coalfield in the district. Some of the earlier opinion put it as high as 50 years, but later witnesses were inclined to qualify this to 25 years for the working of the present coalseams, the working of the lower seams they said being problematical.



## INDIAN AND COLONIAL NOTES.

## India.

Learn that Dr. Biercliffe finds he will be unable to accept the appointment of medical officer at the collieries of the Tata Iron and Steel Company announced last week. A fresh candidate will be selected to fill the post.

## Australia.

The New South Wales Minister of Mines last March instructed Mr. W. Humble, the senior inspector of collieries for that State, to make enquiries and investigations in Great Britain and on the Continent respecting methods in use for rescuing miners from the results of accident and for restoring those who are suffering from poisonous inhalations. Mr. Humble's report, dated September 11, is now to hand. In making his recommendations with respect to stations for New South Wales, Mr. Humble writes: "In the matter of equipment, I am satisfied that the safest plan for us to adopt is to decide for one kind of apparatus only. Practising with more than one type leads to danger, and my opinion is supported by three of the station instructors . . . The liquid air apparatus is good, but costly. The machinery necessary for a reasonable supply costs £1,000, and the daily loss by unavoidable evaporation is from 5 to 10 per cent. . . . The total cost of a liquid air plant is £3,500. . . . I recommend that the plan of the Porth station in South Wales be adopted for our station in South Maitland, with of course, freedom to vary in matters which the advice of our architect may show to be advisable. . . . I am further of opinion that the apparatus should be either "liquid air" or "Meco." The Porth station was built and equipped with "Meco" for £6,500, and the estimated upkeep for the two years after erection is £2,000 per annum; afterwards about £1,200 per annum. If liquid air apparatus is provided instead of Meco the plant for the production and storage of air will cost £3,500, and there is, in addition, the great loss by evaporation, so that I am constrained to recommend that we adopt the Porth station, with its Meco apparatus and equipment."

## Canada.

A Victoria, B.C., cablegram states that scores of union miners are returning to work at the Vancouver Island collieries, and the end of the ten months' strike is in sight. It is believed that the United Mineworkers of America will declare the strike ended owing to the heavy drain on the organisation's finances, and its inability to win recognition from the employers.

The output of the Glace Bay mines of the Dominion Coal Company to the end of September was 3,527,707 tons, against 3,321,362 tons to the same date in 1912. The output for October will approximate 435,000 tons, or 10,000 tons greater than the previous record of 425,000 tons in July last. The production for 1913 will probably reach 4,750,000 tons, or 220,000 tons more than the total outputs for 1912. No. 17 Colliery, formerly the Victoria Mine, has been unwatered, but will not produce coal until 1914.

## New Zealand.

A grave industrial crisis has arisen in New Zealand. The State miners have struck, and a serious position is arising owing to the shortage of coal and food supplies. The struggle has resolved itself into a trial of strength against the Federation of Labour, an organisation which has not registered itself under the Arbitration Act.

## THE BY-PRODUCTS TRADE.

**Tar Products.**—Things are distinctly quiet, pitch even has a tendency towards lower prices. Carbolics are weak but unchanged as regards values, crystals, perhaps, being the weaker section of this market. Creosote and naphthas steady. Benzols keep firm and in request. Nearest values are:—

Benzols, 90's .....	1/2
Do. 50's .....	1/0½
Do. 90's North .....	1/1
Do. 50's North .....	11½
Toluol .....	11
Carbolic acid, crude (60 per cent.) .....	1/0½ to 1/1
Do. crystals (40 per cent.) .....	3½ to 3½
Solvent naphtha (as in quality and package) ..	9½
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3½
Pitch (f.o.b. east coast) .....	42/ to 42/6
Do. (f.a.s. west coast) .....	41/6 to 42/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acid, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—Business is very quiet, and prices are variable—not only in the matter of face values, but also as regards interpretation. In the forward position there is next to nothing doing. In fact, the market has assumed an aspect which resembles the cat-and-mouse methods that used to prevail some few years back. Such a state of attitude is no good to either producer or merchant. Closing prompt prices are:—

London (ordinary makes) .....	£12/5/
Beckton (certain terms) .....	—
Liverpool .....	£13/1/3
Hull .....	13
Middlesbrough .....	£12/18/9 to £13
Scotch ports .....	£13/2/6 to £13/5
Do. (ordinary) per cwt. ....	10/7½

f ....., f.o.b. in bags, less 2½ per cent. discount for excess.]

## THE LONDON COAL TRADE.

THURSDAY, NOVEMBER 6.

The London coal trade for the past week has been exceedingly slow. Prices (already reduced), have been with difficulty maintained, but no official reductions have been announced. The seaborne quotations have now been at one figure throughout the whole year, viz., 21s. 6d. for best Wallsend, and 20s. 6d. for seconds. The arrivals in the river of the loaded vessels have all been contract coals, or coal bought beforehand, so that no actual test of the market values has been forthcoming, and during the whole year the official quotations have been largely approximate and nominal. All the depots and principal coal sidings are now full of loaded wagons, and the delivery trade has fallen considerably. The returns, however, from the various collieries show that the output has been lower than usual, and so far the stocks have not caused any inconvenience. Manufacturing qualities have kept up a steady demand, but all household qualities have suffered considerably on account of the warm weather. The retail trade for house coal has also felt very keenly the opposition of gas fires, and the recent competition of a section of the London merchants in advertising a continuance of the lowest summer prices. The margin of profit for the ordinary merchant is exceedingly small when the higher prices in the wholesale market are taken into account. Collieries point out that the legislation of the present day prevents any lower quotation from being given, and this is also helped by the continued shipping demand, but as the London house coal trade is dependent upon the weather it is a very difficult problem to raise the public prices in a falling market. Some of the London coal merchants are strongly advocating an Exhibition in the near future, of the material advantages of an open grate fire as a reply to the utterances, &c. from the recent Gas Exhibition. Coking coals and the recognised qualities of gas coals are finding a better enquiry, but all kinds of coke are moving very slowly. D. S. nuts and peas are still plentiful, and are selling at lower prices. Smalls are quoted from 1s. to 1s. 6d. less than last winter. Bakers' nuts and kitchen qualities are very irregular, but steam coals are fairly brisk. The wholesale market for all qualities of household fuel during the past week has been very dull, and the prolonged mild winter keeps the actual consumption unusually small. With a lessened outlet and sluggish trade for the daily supplies coming forward under contract, the wharves and depots are becoming congested and merchants find it an increasing difficulty to deal with their full contract deliveries. Factors are not prepared to buy whilst the demand is so feeble and the fear of siding rent and demurrage charges prevents any speculative buying. Colliery prices are holding well together, and assisted somewhat by the irregular working of the miners, very few are selling below the contract rates. The shortage of empties also is helping to maintain colliery prices. The attendance on market lately has not been up to the usual average, and it has been noticeable how few buyers have been present as compared with sellers. In the seaborne market, 39 vessels are returned as arriving in the Thames for Monday's market, and only five for Wednesday; no cargoes on offer. The difficulties of the Port of London Authority in connection with the labour problem seems likely now to be equitably arranged. The committee are arranging for 3,000 men to be put upon the permanent labour staff at a minimum wage of 28s., rising 1s. each year to 30s., terminable with seven days' notice on either side. Sir Guy Granet (general manager of the Midland Railway Company) was unanimously elected chairman of the Railway Managers' Conference for the ensuing year. In the Welsh coal market prices are reported very steady, and in some cases a slight advance has been maintained. An increasing number of contracts are open for this week, and tenders are required for some very large tonnages.

## Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/	13/
Do. nuts .....	12/	12/
Birley cube Silkstone .....	12/6	12/6
Do. branch coal .....	16/	16/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	13/6	13/6
West Riding Silkstone .....	13/	13/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	12/	12/
New Sharlston Wallsend .....	15/	15/
Wharfedale Silkstone branch .....	16/	16/
Do. Flockton Main .....	15/6	15/6
Do. Athersley house coal .....	12/	12/
Newton Chambers best Silkstone .....	17/	17/
Do. Grange best Silkstone .....	15/6	15/6
Do. Hesley Silkstone .....	14/	14/
Do. Rockingham selected .....	14/	14/
Do. Rockingham Silkstone .....	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best .....	12/6	12/6
Do. large nuts .....	12/3	12/3
Do. small nuts .....	10/	10/
Do. kitchen coal .....	10/6	10/6
West Hallam Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/3	12/3
Do. London brights .....	11/	11/
Do. bright nuts .....	11/	11/
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Shipley do. brights .....	13/	13/
Do. do. nuts .....	12/6	12/6
Mapperley brights .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Cossall Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Trowell Moor brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Grassmoor Main coal .....	13/	13/
Do. Tupton .....	11/6	11/6
Do. do. nuts .....	11/6	11/6

## Derbyshire—(cont).

Clay Cross Main coal .....	13/	13/
Do. do. cubes .....	13/	13/
Do. special Derbys .....	12/	12/
Do. house coal .....	11/6	11/6
Pilsley best blackshale .....	13/	13/
Do. deep house coal .....	11/6	11/6
Do. hard screened cobbles .....	11/	11/
Hardwick best Silkstone .....	13/	13/
Do. Cavendish brights .....	12/6	12/6
Do. cubes .....	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/6	12/6
Do. small hards .....	12/6	12/6
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	13/
Do. cobbles .....	13/	13/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/6	14/6
Bestwood hard steam coal .....	13/	13/
Do. bright cobbles .....	11/9	11/9
Hucknall Torkard main hards .....	12/9	12/9
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. ..	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. bakers' nuts .....	11/3	11/3
Do. loco Two Yard hards .....	14/6	14/6
Do. Ryder nuts .....	11/9	11/9
Do. do. cobbles .....	13/	13/
Nuneaton steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Haunchwood steam .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Wyken steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Exhall Ell coalspires .....	14/3	14/3
Do. brights .....	12/6	12/6
Do. large steam coal .....	12/	12/
Do. best screened cobbles .....	12/3	12/3
Do. large nuts .....	12/3	12/3
<b>Leicestershire.</b>		
Snibston steam .....	10/	10/
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	18/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	9/9	9/9
Do. large nuts .....	9/6	9/6
Do. bakers' nuts .....	9/	9/
Do. main nuts .....	9/6	9/6
Do. hards .....	9/3	9/3
Granville New Pit cobbles .....	11/	11/
Do. Old Pit cobbles .....	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/	13/
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	14/	14/
Do. cobbles .....	13/	13/
Apedale best .....	13/	13/
Do. seconds .....	12/9	12/9
Podmore Hall best .....	13/	13/
Do. seconds .....	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London ..		
Do. brights .....	11/	11/
Do. shallow one way .....	11/	11/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	10/9	10/9
Coppice deep coal .....	14/6	14/6
Do. cobbles .....	14/	14/
Do. one way .....	12/	12/
Do. shallow coal .....	13/6	13/6
Cannock Chase deep main .....	16/	16/
Do. Deep kitchen cobbles ..	11/6	11/6
Do. best shallow main .....	13/	13/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/9	11/9

## FROM MESSRS. DINNAM, SAWON and CO.'S REPORT.

Friday, October 31.—There was no improvement in the enquiry for Durham seaborne house coal to-day, and no cargoes on offer. Yorkshires were disposed of in small quantities, as usual—it was reported at fair prices, but no quotations. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 23.

Monday, November 3.—There was a slightly better tone in the seaborne house coal market to-day. Yorkshires were firm, but no Durham cargoes on offer. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 38.

Wednesday, November 5.—There was no alteration in the seaborne house coal market to-day, which remained quiet. Best (Durham) 21s. 6d., seconds 20s. 6d. Cargoes 5.



# INDUSTRIAL AGREEMENTS IN THE COAL TRADE.

(Continued from page 852.)

## South Wales.

On January 29, 1913, evidence was given before the Council by Mr. W. Gascoyne Dalziel and Mr. Joseph Shaw, K.C., on behalf of the Monmouthshire and South Wales Coalowners' Association. The former stated that the association was formed in 1864, when it comprised some eleven firms in the Aberdare Valley, with an annual output of 1,623,000 tons. It was reconstructed in 1870, and then included five firms in the Rhondda Valley, the total output being 2,076,000 tons. There was another reconstruction in 1873, when an amalgamation took place between the firms already associated and the ironmasters and the colliery owners in Monmouthshire and the Western or Swansea district, and the output was raised to 11,422,000 tons. There was a further reorganisation in 1880 and again in 1890. The association has now an output approximately of 42,000,000 tons per annum, and comprises 88 firms, employing about 170,000 men. Approximated, the associated owners produce four-fifths of the output of the coalfield.

Witness said collective bargaining had been recognised in principle ever since 1875. Witness handed in the agreements referring to the sliding-scale, which existed from 1875 to 1902. It was abolished at the wish of the men to enable either party to introduce factors other than the selling price of large coal in determining the general wage rate. Mr. Dalziel said that since 1903 there had been three agreements carrying out the Conciliation Board principle.

They had had the same principle for dealing with local questions since 1875. They were either settled between the management and the workmen locally, or, if they failed to agree, there was a reference to the joint board appointed under the agreement. No provision was made for the appointment of an independent chairman. Clause 5 was merely an elaboration of the system formerly in practice. Referring to the wages agreement Mr. Dalziel said the workmen's representatives had declined to join in the audits, because certain proposals which they made for including factors other than the selling price were not agreed to by the owners. The owners had continued to take the audit in the same way as formerly, and the ascertainment was placed before and accepted by the workmen's representatives and the independent chairman. He next described the equivalents and the procedure under the agreement. The agreement was made, he said, not with the union, but with the representatives of the workmen employed at the collieries, whose names were scheduled. In practice the operation of the agreement had always been followed, as regards the general wage-rate question, by all the collieries in the coalfield, whether they were associated or not.

The evidence of Mr. Joseph Shaw was then taken. He said he was convinced that the machinery in operation for dealing with the general rate of wages and disputes was the most suitable for that particular coalfield, and his association would deprecate any legislation of the nature of compulsory arbitration. If they went before a compulsory arbitrator they were debarred from conciliation in advance, and would give away their case. If an independent chairman had free liberty to decide what the wages were to be for the next period of three months, instead of merely a casting vote, either the owners or the men might put forward preposterous claims.

Witness said the standard rates varied very much throughout the district. They depended upon the physical conditions, which were perhaps more complicated than those existing in any other district of the kingdom, and it would be impossible to leave them to be fixed by an outside arbitrator. Then there was the further difficulty of enforcing a compulsory award. The decisions of the Conciliation Board on the general wage rate had been invariably accepted. They had a good many stoppages, however, from time to time, in breach of the Conciliation Board agreement with regard to difficulties outside the general rise and fall of wages. For instance, they had stoppages upon the non-unionist question and sympathetic strikes, in which the men had neglected to give notice.

Referring to the stop-days in 1901, Mr. Shaw said the effect was to upset the whole of the trade. That was a case in which the officials of the Federation called upon the men to stop in breach of the agreement. Again, the stoppage in 1912 was a distinct breach of the agreement. In the former case they were able to recover some £65,000 from the Federation, but the Trades Disputes Act had since intervened.

The total number of days lost in the period from

1900 to 1911 through stoppages without notice was 2,330. The men very often threw down their tools on very small occasion without bringing the matter before the Board as provided in Clause 5.

Witness explained that each workman made, as part of his contract, the base agreement which had been settled for him and on his behalf. When the Minimum Wage Act came into force, abrogating the agreement, they had to start the men back again on the terms of the Conciliation Board agreement as the base, with the variations caused by the Act on top of it, and subject to one day's notice instead of a month. By giving notice the men terminated their individual contracts, and the Act abrogated the whole of the base agreement.

Mr. Shaw said he thought the only way in which they could enforce their agreements properly was to get the Trades Disputes Act altered. An illegal strike instigated or put into force by the trade union should render that union liable. He put in a table showing the amounts recovered from workmen in the courts, for stopping work without notice in the period from December 1904 to November 1912. The total amount awarded by the courts was £1,950, and £3,932 was recovered by agreement; the total number of prosecutions was 79, and men were prosecuted at 102 pits. He could also show a list of cases in which the employers had been brought before the courts, where the men had nearly always failed to prove that the owners had committed a breach either of a contract or custom. Witness did not think they could ask the union to pay damages in cases where a breach was brought about by the workmen on their own initiative, and not at the instigation of the union.

As to Mr. Brace's allegations in regard to the abnormal places question, Mr. Shaw said they always took the value of the work done, and if a man was simply nalingering they would refuse to make up his wages. Otherwise, his wages would be made up; that had always been the custom, and was always acted upon at the present time, notwithstanding Judge Bryn Roberts' judgment. Alluding to another point raised by Mr. Brace to the effect that a certain colliery had been guilty of a breach of the agreement in compelling the men to send out only large and small coal, when there was provision in the price-list for the payment for "brush" or mixed coal, Mr. Shaw explained that in their agreement they paid the men upon the large clean coal gotten, and in the price for that coal they included all the small coal that was made by attrition and otherwise coming out from the face, so that the men were paid, not on the actual tonnage that was brought out, but a sum to cover the actual tonnage, arrived at by the tonnage of the large coal. In some collieries, especially on the Monmouthshire side, they had different prices—one for the large coal only, and another for the through or brush coal. The dispute was as to who was to decide when they were to be paid on the large coal and when upon the brush coal. The management maintained that it was a question of colliery management which must reside with them. The price was only put into the list so that if the management asked the men to fill through coal there was a price for doing so. In South Wales they must have large coal, because if they put all the small coal out the collieries would stop, and he recalled a case in which one of the Western collieries had a "through" price and had to stop, the men afterwards agreeing to a "large" price. The reason was that the small spoilt the quality of the coal. The cutting price of large coal was always much higher than the cutting price of brush coal.

As to Mr. Brace's contention that there should be an enquiry as to profits in fixing wages, witness said the question of profits depended largely on the management, and were made by organisation and engineering skill. If they worked on the old conditions which obtained when he first went down to South Wales, nearly every colliery would have to stop; but the men were working under much better conditions. The owners had always refused and always would refuse, so long as they could, to take the subject of profit and loss into the question of wages.

Asked whether he would approve, in the event of a deadlock, the calling in of somebody such as the Council, witness said he should agree, if it were in a consultative capacity, but he was opposed to such a body being empowered to make a pronouncement that was in any sense an arbitration or award. Such an award could never be enforced. Nor was he in favour of compelling outsiders to accept the decisions of the board. The men were quite capable of getting the same wages out of the non-associated owner.

Witness said the gentlemen who were called upon to settle local grievances were required to report within three months. That might seem a long time, but there was an enormous number of details to be argued and fought out before a price list could be drawn up. In

the meantime the men were put on day wages. Numbers of points cropped up also in cases that arose on other circumstances. Many never came to a settlement. At every meeting of the Conciliation Board they had a big agenda with many questions raised by the men and owners respectively, usually accusing each other of breaches of agreements and various things. Very often the disputes that were not settled were not followed by strikes, and nothing more was heard of them. The main objection to arbitration in such cases was that if an independent chairman said a man was to accept less than he was asking for, the man would give a month's notice and go elsewhere, but the colliery had to stop where it was. There were other objections nearly as strong.

Witness said he strongly objected to South Wales being linked up with the Midlands in one wages agreement; they had enough trouble with the rest of England during the minimum wage trouble. He added that he was perfectly convinced that if they brought an outsider—that is, a man from the North of England or from the Midlands—to manage a South Wales colliery, he would ruin it in less than no time. It took about two years to understand how to manage a South Wales colliery.

Returning to the stop-day question, Mr. Shaw said there was a curious tendency among the people in South Wales to reduce output. They often found that, if a man was doing too much, pressure was brought to bear on him. The stop-days did nothing to steady trade, because they depended on shipping, and ships would not run into Cardiff unless they had some assurance that they were going to have an output. That was the reason they were so strong on having long-term agreements. As a matter of fact, prices fell steadily from February 1901 until October 1902. Both this stoppage and the one in 1912 were directly due to the men's leaders; he was positive that on the last occasion the men did not want to come out. When a ballot was taken in South Wales, if the men did not come out from the lodge with the "No" half of their ticket pinned on their coat or cap, they were peacefully picketed. The ballot was not worth a snap of the fingers. At one of the Ferndale collieries more men voted than were employed at the colliery.

Mr. Shaw said the reason the wages agreement was drawn up between the owners and the workmen was that, at the request of Mr. Abraham, they attempted to introduce the Miners' Federation into the agreement, but desired to make the other men a third party to it, on the ground that the Federation did not represent all the workmen. Mr. Abraham said he preferred the old system. As a matter of fact, all the workmen's representatives were leaders of the Federation. He (witness) felt that where they entered into an agreement with a trade union they were using pressure to force all the men in. He would never be a party to taking the chestnuts out of the fire for the union, although he was in favour of trade unionism.

In conclusion, Mr. Shaw recalled the crisis of the Cambrian strike. On that occasion, he said, Mr. Abraham and Mr. Davis came to an agreement which the men refused to accept. The Federation paid strike pay, because the men had given due notice, for 12 months.

## THE TIN-PLATE TRADE

### Liverpool.

There has been a good deal of enquiry the last few days, and a fair amount of buying resulted. Prices paid, however, were in most cases exceedingly low. Makers are not willing sellers ahead, unless at an advance on to-day's rates, which they are compelled to take in order to keep their mills working. Those works who are backed up for a month or two will not sell at figures which have recently been accepted by others less fortunately situated. Following are about the figures generally quoted for coke tinplates, shipment over the next three months:—I C 14 × 20 (112 sh. 108 lb.), 12s. 10½d. per box; I C 28 × 20 (112 sh. 216 lb.), 26s. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 3d. to 13s. 4½d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 4½d. to 13s. 6d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 4½d. to 13s. 6d. per box; I C 20 × 10 (225 sh. 156 lb.), 19s. per box; I C squares and odd sizes, 13s. 3d. to 13s. 4½d. basis for approved specifications. Charcoal tins are in quiet demand, and are quoted 15s. 3d. basis and upwards according to tinning. Coke wasters are in moderate request. Quotations:—C W 14 × 20, 12s. 1½d. to 12s. 3d. per box; C W 14 × 18½, 10s. 10½d. to 11s. per box; C W 28 × 20, 24s. 10½d. to 25s. per box; C W 20 × 10, 14s. 10½d. to 15s. per box—all f.o.b. Wales, less 4 per cent.

It is stated that, at a depth of 551 yards, coal has been reached at the new Rufford Colliery, near Mansfield. The seam struck, the "Top Hard," is 6 ft. 10 in. thick, including a small portion of soft coal, which will be worked with the rest. The seam is a foot thicker than that at the Mansfield colliery belonging to the same firm, the Bolsover Colliery Company. Sinking operations have occupied 17 months, but the preliminary operations were started two and a-half years ago. The area of coal to be worked is 6,000 acres, and is leased from Lord Savile.



MINERS' RELIEF FUNDS.

The Proposed National Fund.

Sir Lees Knowles, Bart., has forwarded to us a copy of the following letter which he has addressed to the Lord Mayor of London :—

November 4th, 1913.

To the Rt. Hon. Sir David Burnett, Kt.,  
Lord Mayor of London,  
The Mansion House, London, E.C.

MY DEAR SIR,—

RE A PERMANENT FUND FOR THE RELIEF OF MINERS.

I write to thank you for your letter of October 21st, in which you are so good as to inform me that you will try to get some information as to the present condition of things, and especially as to the balance unappropriated of present funds.

In this connection, I forward you a copy of a letter which I have received from Mr. T. Lomax, secretary of the Manchester and Salford Clifton Hall Colliery Explosion Fund, with the annual report for this year. Further, I am in communication with Mr. David Shaw, secretary of the Lancashire and Cheshire Miners' Permanent Relief Society; and when I hear from him, I hope that I may be able to send you some further information. At the moment, I have before me the rules of his society, and the report of the annual general meeting for 1913.

The *Colliery Guardian* for October 24th, on pages 840 and 847, refers to the subject of our correspondence, and the editor of that paper would be, no doubt, of use to you in your enquiries. The proprietors of the paper are the Colliery Guardian Company Limited, 30, Furnival-street, Holborn, E.C.

Many papers have referred approvingly to a national fund, and one suggestion, which appeared in the *Manchester Guardian* for October 30th, is specially worthy of notice namely, the association of the public trustees with local trustees.

If I can be of further use, I shall be very pleased, my Lord Mayor, to place my services at your disposal.

I remain,

Yours faithfully,

LEES KNOWLES, Bart.

THE DISTRICT PROVIDENT AND CHARITY ORGANISATION SOCIETY OF MANCHESTER AND SALFORD.

(Established 1833.)

T. Lomax, agent and secretary.

Head Office: 133, Deansgate, Manchester,  
October 31st, 1913.

DEAR SIR,—Mr. B. Ormerod asks me to send you some particulars of the Clifton Hall Colliery Explosion Fund, of which I am secretary. The "explosion," as you may remember, occurred on June 18th, 1885, whereby 178 men lost their lives. Of these, 70 left widows and families of children under 13 years of age numbering 205, 17 left widows with no children, and three left five orphan children under 13 years, and 69 persons were dependent on one or other of those who had been killed, making a total of 366 to be provided for, and 44 to be temporarily assisted suffering from the effects of afterdamp, &c. The amount subscribed was £27,273, which up to the present time has been regularly distributed at Pendlebury every four weeks. As will be seen from the enclosed statement for the year ending June 30th, 1913, there are 23 persons—viz., 19 widows and four dependants—still receiving assistance. The sum of £2,000 represents the whole of the resources at the disposal of the committee, and at the present rate of expenditure will become exhausted, say, in five years. The present scale is as follows :—

4 widows receive .....	5s. weekly,
15 " " .....	6s. "
2 dependants receive ...	5s. "
1 " " ...	8s. "
1 " " ...	10s. "

and you will see there is a possibility of reductions next year.

Mr. Ormerod says you will kindly consider any suggestion I may make with regard to the founding of a "central fund." Your excellent letter and also that of Mr. Ralph Fletcher says all that can be said, and I am in entire agreement. To me it is a scandal that there are several balances of previous funds (colliery accidents) which cannot be used, although every legitimate and reasonable claim has been provided for; on the other hand, with some funds there has been such lavish and unnecessary expenditure as to sap the independence of people. By all means let there be generous provision, but "charity running to riot" is shocking. I am concerned for the families of the poor fellows—one or two—who lose their lives here and there, of which little is heard. A central fund would I hope make provision for such cases. If a fund were established, carefully managed in a businesslike way, no hoarding of money, on the other hand no extravagance, it would create confidence, and many, when arranging their worldly affairs, would, I believe, remember it. Apologising for taking up so much of your time,

I am, Dear Sir,

Yours faithfully,

T. LOMAX.

Sir Lees Knowles, Bart.,  
Pendlebury.

He quotes of a national relief fund for use in connection with mining disasters and of amendment

of the Truck Act were discussed at the one hundred and twenty-second quarterly meeting of the Midland District Miners' Fatal Accident Relief Society at Derby last week. Mr. R. E. Martin, who presided, remarked that while the opinion was strongly held that the large balances remaining from relief funds raised on various occasions in the past should not be allowed to lie idle, there were two difficulties in the way of forming a national fund. The existing friendly societies could not, without altering their constitution, contribute to such a fund, and the trustees were unwilling to permit the surpluses under their control to be devoted to the relief of sufferers from accidents outside their own districts. Personally, he considered the most prudent course would be to use the surpluses in helping any society such as theirs when an unusual strain was placed upon their resources by the occurrence of such a calamity as that which recently overtook the men engaged at the Senghenydd Colliery. Although the Midland Society was in a sound financial position, a disaster of that nature would strike a very heavy blow at its funds. The general feeling among the members was that surplus funds, instead of being locked up, should be rendered available, under proper supervision, for dealing with cases of distress throughout the country. No resolution was proposed, the matter being left over for further consideration at the next meeting. Referring to the proposed amendment of the Truck Act, the chairman pointed out that the Bill backed by Lord Hy. Bentinck and other M.P.'s would, if passed, prohibit all deductions from wages for whatever purpose. That was a matter that was vital to the existence of the Midland and similar societies, the members' contributions to which were in the main taken from their earnings on pay-day. Irrespective of politics, he could not imagine any M.P. who had any knowledge of actual conditions supporting legislation interfering in that way with the system under which those societies worked. If it came to the men themselves handing over their contributions every time they received their wages the societies would have to whistle for their money. If they did not make their voices heard early the House of Commons would pass some stupid provision that would hamper the beneficent work they were doing. It was decided to join with the National Association of Miners' Permanent Relief Societies in sending a deputation to Lord Henry Bentinck and to the Home Secretary for the purpose of urging that a clause should be inserted in any amending Bill making it legal for contributions to relief societies to be deducted from wages. The report on the society's operations during the past quarter showed that the number of members stood at 43,229, an increase of 217 when compared with the total a year ago. Fifteen members had died, and 11 widows and 14 children had thereby become entitled to benefit. The income amounted to £3,744, including £2,255 in contributions, and the expenditure to £1,689, including £1,497 in annuities. The balance carried to the credit of the benefit fund was thus £2,055, as compared with £2,167 for the corresponding quarter of last year. A sum of £3,021 was invested during the quarter. The number of widows now in receipt of benefit was 288, and of children 358—increases of 18 and 20 respectively.

**The Industrial Uses of Coal Gas.**—At a congress of manufacturers, at the National Gas Exhibition, Shepherd's Bush, on Wednesday, 29th ult., a paper on "The Industrial Uses of Coal Gas" was read by Prof. W. A. Bone. The lecturer said it had long been realised by scientific technologists that the direct use of raw coal as an industrial fuel was a dirty, unhealthy and wasteful practice which ought to be abolished; but it had taken years of education to convince manufacturers and the public generally of the great and varied economies which resulted from the substitution of gaseous fuel for coal. The principal gaseous fuels available for industrial purposes in Great Britain were—(1) The surplus gases from blastfurnaces and coke ovens; (2) producer gas, generated under various conditions with or without ammonia recovery; (3) water gas; and (4) ordinary "coal gas." In the iron and steel industry the total fuel consumption was equivalent to about 30,000,000 tons of coal per annum. Of this amount, probably about half was carbonised to make the coke for the blastfurnaces, and inasmuch as by-product coke ovens were now rapidly superseding the old beehive ovens, there was the possibility, with regenerative ovens, of generating within the smelting area about 70,000,000,000 cubic feet of surplus "coal" gas of an average net calorific value of 500 B.Th.U. per cubic foot. But, in addition to this rich gas, there was generated in the blastfurnace about 168,000 cubic feet of gas of calorific value about 100 B.Th.U. per cubic foot for every ton of iron produced. Altogether the surplus gas for the whole industry amounted to about 800,000 million cubic feet per annum, and, combined with the surplus coke-oven gas, it would be more than sufficient to provide the whole of the heat and power required in the manufacture of all the steel produced in Great Britain. In considering the place of coal gas in the industrial field, it should be recognised, he said, that its chief usefulness would be more in the direction of supplying the manifold wants of innumerable but, relatively speaking, small consumers than in meeting the requirements of the fewer large establishments whom it would probably always pay to generate their own gaseous fuel. In conclusion, Prof. Bone said the experience of the past 20 years in connection with the development of gaseous fuel of all kinds enabled one to predict with considerable confidence the approaching time when gas of one sort or another will have practically ousted raw coal in most industrial operations.

INFLUENCE OF MOISTURE CONTENT ON THE INFLAMMABILITY OF COALDUST.\*

A number of experiments on the behaviour of coal-dust of varying moisture content toward shots of black powder and kieselguhr dynamite have been conducted at the Upper Silesian Testing gallery, Beuthen, with a non-caking open-burning coal from different parts of the Fanny seam. The samples averaged about 40 per cent. of volatile constituents, 58 to 60 per cent. of coke and 3.70 to 6.86 per cent. of ash, the moisture content ranging from 2.76 to 7.76 per cent., except in three samples, taken from wet-drilled shot holes, when the figures rose to 10.05 to 13.92 per cent.

In the first series of tests the coaldust was strewn in the small testing gallery, without any preparation, and stirred up in the air by means of a propeller. The results are set forth in the following table :—

Moisture.	Size of grains.	Ignition effected by	
		Powder.	Dynamite.
Per cent.	Mm.	Grammes.	Grammes.
4.66	0-3	40	35
4.95	0-4	25	20
5.00	0-3	45	30
5.04	0-2	35	25
5.09	0-3	35	35
5.39	0-4	20	30
5.88	0-3	35	30
6.02	0.5-3	50	90
6.22	0.5-3	70	over 100
6.54	0.5-3	25	15
7.76	0-10	40	50
10.05	0-3	65	50
11.36	0.5-3	60	85
13.92	0-2	55	55

In the next series a sample containing 4.05 per cent. of moisture was ground in a ball mill and passed through a sieve with 900 meshes per square centimetre, after which it was damped with water to give successively increasing proportions of moisture, and tested in the same manner as the first series with the following results :—

Moisture.	Ignition effected by	
	Powder.	Dynamite.
Per cent.	Grammes.	Grammes.
4	20	25
6	20	30
8	25	30
10	30	30
12	30	35
15	30	40
20	30	45
24	40	65
30	45	over 100
35	60	—

Finally, a sample, with 3.67 per cent. of moisture, was prepared as in the second series and tested, under the same conditions, in the large gallery, the results being given below :—

Moisture.	Ignition effected by	
	Powder.	Dynamite.
Per cent.	Grammes.	Grammes.
0	275	150
4	375	175
6	300	150*
8	350	225
10	375	275
15	425	375
20	425	475
25	575	No ignition with maximum charge (600 grammes) of dynamite.
30	675	
35	725	

\* Apparently erroneous.

The foregoing results indicate the influence of moisture on raising the limits of ignition, fineness of division of the dust having the opposite effect. The sectional area of the gallery in which the dust is contained at the time of firing the shot has also a considerable influence on the inflammability, the limit being much lower in the smaller gallery (sectional area 0.213 square metre) than in the larger one (3.68 square metres). Another point is that, whilst in the smaller gallery the charge required to ignite the dust is smaller in the case of black powder than in that of dynamite (except that with 10 per cent. of moisture the amounts were equal), in the larger gallery the dynamite has the greater effect for moisture percentages up to 15 per cent., the results, however, being reversed on that limit of moisture being exceeded. It appears, therefore, that coaldust, when sufficiently fine, is more likely to be ignited by shots of black powder than with dynamite. In both galleries the violence of ignition increased with the proportion of moisture in the dust, the flame being particularly large from the samples containing 10 to 15 per cent. of moisture, though beyond the higher limit the violence decreased again. The conditions were intentionally made more severe than would occur in practice, since unstemmed shots would never be fired in presence of coaldust in rapid agitation, and the limits are much higher when the dust is stagnant. The sectional area of mine workings is also usually much greater than that of the testing galleries.

\* Bergassessor Woltersdorf. Glückauf.



# APPROVED SAFETY LAMPS FOR MINES.\*

(Continued from page 906.)

## Part V.—Approved Safety Lamp Glasses

The following is a summary of that part of the Order relating to approved safety lamp glasses. The glasses are required to bear the approved trade mark. Generally speaking, the permissible variations in thickness is 1 mm., whilst the ends of the glasses are not to be out of parallel to an extent of more than  $\frac{1}{4}$  mm. The dimensions are to be indicated by numerals on each glass.

BRAND :—



External diameter—  
55 $\frac{1}{2}$ -56 $\frac{1}{2}$  mm.  
Height—  
66 $\frac{1}{2}$ -67 $\frac{1}{2}$  mm.  
Thickness—4.6 mm.

Makers :—Messrs. Ackroyd and Best Limited, of Morley, near Leeds.

BRAND :—



External diameter 55-56 mm.  
Height ..... 50-91 mm.  
Thickness..... 4-6 mm.


Makers :—Messrs. Anglin and Co., 17, Lime-street, London, E.C.

BRAND :—



External diameter 56-57 mm.  
Height..... 66 $\frac{1}{2}$ -67 $\frac{1}{2}$  mm.  
Thickness ..... 4-6 mm.

BRAND :—




External diameter ... 58-69 mm.  
Height ..... 50-70 mm.  
Thickness..... 4 $\frac{1}{2}$ -6 $\frac{1}{2}$  mm.

Makers :—Messrs. Butterworth Brothers Limited, Newton Heath, Manchester.

\* Glasses manufactured before the date of this Order, which bear either of the following brands, but otherwise conform with the specification, are also approved.

BRAND :—



External diameter ... 56-66 mm.  
Height ..... 55-70 mm.  
Thickness... 4-6 mm.

Makers :—Messrs. A. Hurst and Co., 59, Farringdon-road, London, E.C.

BRAND :—




External diam. 56-66 mm.  
Height ..... 55-70 mm.  
Thickness ..... 4-6 mm.

Makers :—Messrs. Koenig and Hammer, 11, Fore-street Avenue, London, E.C.

\* Glasses manufactured before the date of this Order, which bear the brand but otherwise conform with the specification, are also approved.


† Glasses manufactured before the date of this Order, which bear the brand but otherwise conform with the specification, are also approved.

BRAND :—



External diam. 55-62 mm.  
Height ..... 55-70 mm.  
Thickness ..... 4-6 mm.

BRAND :—



External diameter..... 55-62 mm.  
Height..... 55-70 mm.  
Thickness..... 4-6 mm.

Makers :—Messrs. Patterson and Co., Trafalgar-street, Newcastle-on-Tyne.

## BRAND :— PROTECTOR.

### Outer protecting glasses :—

External diameter ..... 57 $\frac{1}{2}$ -58 $\frac{1}{2}$  mm.  
Height ..... 59 $\frac{1}{2}$ -60 $\frac{1}{2}$  mm.  
Thickness ..... 4-6 mm.

### Inner glasses :—

External diameter ..... 45 $\frac{1}{2}$ -46 $\frac{1}{2}$  mm.  
Height ..... 59 $\frac{1}{2}$ -60 $\frac{1}{2}$  mm.  
Thickness ..... 1-3 mm.

Makers :—The Protector Lamp and Lighting Com-pany Limited, Eccles, Manchester.

BRAND :—





External diameter ..... 55-65 mm.  
Height ..... 55-68 mm.  
Thickness ..... 4-6 mm.

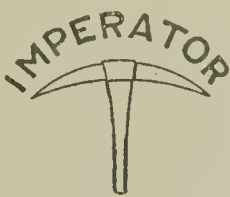
### When used with outside glasses :—

External diameter ..... 49-50 mm.  
Height ..... 60 $\frac{1}{2}$ -62 $\frac{1}{2}$  mm.  
Thickness ..... 2-4 mm.

Makers :—Messrs. Schott and Gen., at Jena, Germany.

\* From the Order dated August 26, 1913. [No. 886.]

BRAND :—



External diameter—  
56-60 mm.  
Height ... 56-63 mm.  
Thickness 4-6 mm.

Makers :—Messrs. W. E. Teale and Co. Limited.

## SAFETY ELECTRIC SWITCHES FOR MINES.\*

By H. H. CLARK.

The Bureau of Mines has recently completed a preliminary study of electric switches designed to prevent the ignition of gas by the spark that is drawn when such a switch is operated under load. The purpose of this investigation was to study the various means and methods used to confine the flashes that occur when such switches are operated. The following brief review of the test results is published in advance of a more detailed description, which will appear in another report.

The switches tested were divided into two general types according to the construction of the switch and the principle of the safety features. Switches protected by explosion-proof devices were termed type X switches and switches protected by submerging the contacts in oil were termed type O switches. One automatic and four non-automatic type O switches and one automatic and one non-automatic type X switch were tested. Four of the type O switches were rated 100 ampères and one was rated 50 ampères. The automatic type X switch was rated 40 ampères and the non-automatic type X switch 100 ampères.

### Explosion-proof Switches.

All tests of type X switches were made with direct current from a 200 kw. 225 volt generator. The switch casings were filled and surrounded with the most explosive mixture of natural gas† and air, after which the mixture within the switch casing was ignited by opening the switch under load, and the effect of the ignition upon the gas surrounding the switch casing was noted. The non-automatic switch was opened by hand. The automatic switch was connected directly across the terminals of the testing generator and in series with a resistance of 1 ohm.

The protective devices of the non-automatic switch failed to prevent the passage of flames from the interior to the exterior of the switch casing. This failure was due principally to insufficient area of relief openings and improper spacing of material used. The maximum pressure developed within the switch casing was 20.6 lb. per square inch. The protection of the automatic type X switch was adequate as far as preventing the passage of flame was concerned ; but the safety devices were not sufficiently protected from mechanical injury. The relief areas were large compared to the free enclosed space, and the maximum pressure developed was only 6 lb. per square inch.

### Oil-type Switches.

All tests of type O switches were made with direct-current from a 200 kw. 225-volt generator. Each switch was surrounded by the most explosive mixture of natural gas† and air and was operated under load 8 to 12 times a minute until the surrounding gas was ignited or until the switch had been operated at least 28,000 times. During this test the oil was not changed. The non-automatic switches were opened by mechanical means. The automatic switch was connected directly across the terminals of the testing generator and in series with a resistance of 0.37 of an ohm.

The first oil switch tested was a non-automatic switch rated 50 ampères at 250 volts. This switch was operated mechanically 75,000 times at 100 ampères and 225 volts without causing an ignition of the gas surrounding the switch. The oil contained no free carbon at the beginning of the tests, but about 4.5 per cent. at the end. During the evaporation test the weight of the oil in this switch decreased 2.2 per cent.

The second oil switch tested was a non-automatic switch rated 100 ampères at 6,600 volts. This switch was operated 75,000 times at 100 ampères and 225 volts without causing an ignition of the gas surrounding the switch. The proportion of free carbon in the oil increased from nothing to about 2.9 per cent. During the evaporation test the weight of the oil in this switch decreased 4.0 per cent.

The third oil switch tested was an automatic switch rated 100 ampères at 600 volts. This switch was adjusted to release at 160 ampères, and was operated as described above. The gas surrounding the switch became ignited at operation 2,775. In the meantime the working of the switch had ejected a large amount of oil from the oil tank and the consequent lowering of the oil level had exposed the switch contacts so that the arc was formed at the surface of the oil. The proportion of free carbon in the oil increased from nothing to about 3.9 per cent. During the evaporation test the weight of the oil in this switch decreased 3.9 per cent.

The fourth oil switch tested was a non-automatic switch rated 100 ampères at 250 volts. This switch was operated 75,000 times at 100 ampères and 225 volts. The last 5,000 operations were made while the switch casing was opened and surrounded by the most explosive mixture of the natural gas and air. The gas was not ignited in any test. The engineers who made these tests consider that if no ignition occurred during the

\* From Technical Paper 44, U.S. Bureau of Mines.

† Natural gas from the Pittsburg city mains was used in these tests ; it contains about 83.1 per cent. methane, 16.0 per cent. ethane, 0.9 per cent. nitrogen, and a trace of carbon dioxide. The most explosive mixture of this natural gas and air contains 8.6 per cent. gas.

last 5,000 tests none would have occurred had gas been present during the 70,000 previous tests, and hence the test was equivalent to 75,000 operations in an explosive mixture of gas. The quantity of free carbon in the oil increased from nothing at the beginning of the test to 4.35 per cent. at the end.

The fifth oil switch tested was a non-automatic switch rated at 100 ampères at 250 volts. This switch was operated 28,980 times at 100 ampères and 225 volts. In none of the tests did the oil level fall low enough to expose the switch contacts, although as many as 10,000 operations were made with one set of contacts. This number of tests represents about three years' service on a basis of 10 operations per day, and it is reasonable to assume that, before the lapse of so long a time, the oil in the switch casing will be replenished. The last 6,221 operations were made while the switch casing was open and surrounded by the most explosive mixture of the natural gas and air. In no test was the gas ignited. This number of tests, for the reasons previously given, is considered as equivalent to 28,980 tests in an explosive mixture. During the tests the free carbon in the oil increased from nothing to 1.06 per cent. No evaporation test was made with this switch because the casing was airtight.

### Results.

The oil switch tests seem to indicate that the oil switches will not ignite explosive mixtures of gas under the conditions described as long as the switch contacts are covered with oil to a depth of 0.25 in. or more. This is best shown by the tests of the automatic oil switch in which the maximum instantaneous current was not far from 1,000 ampères. The tests also show that the oil is not lost rapidly by evaporation nor by many operations of the switches under rated current load and at a voltage as high as the probable underground voltage in places where explosive gas is likely to be present. The tests show that the switch contacts deteriorated more rapidly than the oil. Even in the case of the automatic switch that finally ignited gas, several sets of contacts were burnt off before the oil level was so lowered that the gas was ignited. It therefore seems reasonable to believe that oil switches will not ignite inflammable gas if they are designed with attention to the service that they are to perform and are inspected at reasonably frequent intervals.

The tests demonstrate the possibility of constructing an explosion-proof type of switch that will not ignite gas.

The Bureau of Mines proposes to make tests to establish a list of electric switches permissible for use in mines where inflammable gas may be present. The conditions under which these tests will be made and the regulations governing the submission of switches for test will be published in a forthcoming bulletin.

## THE USE OF RESCUE APPARATUS AT LODGE MILL COLLIERY, HUDDERSFIELD.\*

By W. D. LLOYD.

The writer has been asked to furnish an account of the rescue effected by the Altofts Rescue Brigade on January 28, 1913, at Lodge Mill Colliery, in order that the facts may be placed on record in the *Transactions* of the institution, this being the first instance in this country where life has actually been saved by the use of portable breathing appliances. The fact that men were brought back to life after lying partly asphyxiated for many hours has also excited considerable interest both in this country and abroad.

Lodge Mill Colliery is situated at Lepton, about four miles from Huddersfield, and is owned by Mr. Benjamin Elliott, about 140 men and boys being employed below ground. On the night of January 27, 1913, James English, a deputy, and three men, named Alfred Sykes, Thomas Chatterton, and Albert Schofield, were removing rails in a disused part of the workings about a mile from the shaft. At about 3.30 a.m., English and Sykes went further inbye to fetch rails, and while doing so were overcome by gas. As their mates did not return, as expected, at about 4 a.m., Chatterton and Schofield went in search of them ; but when they had almost reached the place where the others were lying, Schofield was also overcome, whilst Chatterton was barely able to save himself. No alarm was raised until the day-shift went in to their work. Mr. C. H. Hinchcliffe, the manager, arrived on the scene about 7.30 a.m., and, accompanied by two deputies and a collier, endeavoured to reach the men. The lamps of the party were extinguished by gas about 100 yards from the place, and although the men crawled some 40 or 50 yards further without light, the air was so foul with gas that they were obliged to retreat. They then made an attempt to reach the men from the intake side, and although they got near enough to hear them groaning, they were unable to get them out. It was therefore decided to send for help from the Altofts rescue station, which had been placed at the service of the West Yorkshire coalowners by Dr. W. E. Garforth, pending the completion of the new West Yorkshire central rescue station now being built at Wakefield. In the meantime, further unsuccessful attempts at rescue were made. Mr. G. Elliott, the son of the proprietor, got near enough to touch one of the men, but was so much affected by the gas that he was unable to move him.

There was no direct connection from the colliery to the national telephone service, and the call for assistance was not received at Altofts until 9.55 a.m. In less than half-an-hour six trained men of the rescue brigade had been summoned, and were ready to leave with their apparatus ; but, unfortunately, although arrangements had been made for the use of a 30-horse power motor char-a-banc in case of a call being received for the rescue brigade ; and although the car was standing in the

\* A paper read before the Midland Institute of Mining, Civil and Mechanical Engineers, November 4, 1913.



rage, it was not in a fit state to turn out promptly. The writer and three men of the brigade left Altofts at 11 a.m. in a taxi-cab, which had a motor of only 9-horse power. Altofts is distant more than 18 miles from Lepton over hilly country, and owing to the low power of the car, the state of the roads, and through taking a wrong turning (which led the party a considerable distance out of the way), they did not arrive at Lodge Mill Colliery till 1.5 p.m., when they learnt that the men were still alive. In less than 10 minutes the three men (Samuel Berry, William Burr and William Webster) were equipped with the Weg apparatus, and the party descended the shaft. The seam worked is a thin one; the roads on the average are not more than 3 ft. high, and rise gradually towards the face. The men wearing the apparatus had therefore to lie flat on small trams, and in this way were pushed some 1,500 yards to the end of the haulage road, and from which point they had to creep about 300 yards further, and reached Mr. Hinchcliffe and Mr. Elliott at a point some 80 yards from where the men were lying, soon after two o'clock. Beyond this point it was impossible to take safety lamps, as their light became extinguished. Berry and Burr, wearing the apparatus and carrying electric lamps, were sent forward. They found Schofield lying close to the face in a road little more than 2 ft. high, and in less than 10 minutes had placed him on a tram and returned with him to a point where the members of the rescue party could place him on a stretcher and convey him into fresher air. Berry and Burr went back with a tram to the face, and at about 2.30 returned with English. Both men were in a very critical state, but were still breathing, and recovered slightly under artificial respiration and oxygen from the breathing apparatus.

In the meantime the remainder of the rescue brigade, whose motor-car had broken down some 3 miles from the colliery, arrived on the scene with a pulmotor, which was at once brought into use. Mr. C. L. Robinson, senior inspector for the Yorkshire mines inspection district, arrived at the same time. A telephone message was sent to Dr. Tate, of Lepton (who had been waiting at the pit since morning in case his services should be required), asking him, if possible, to come in-by, which he promptly did.

After rescuing English, Berry and Burr returned to the face and found the body of Sykes, who had evidently been dead several hours, and brought it out into the fresh air. English and Schofield came round very slowly, and it was 5.30 p.m. before they were got out of the pit, still in a semi-conscious condition. After further treatment in the kitchen of a neighbouring farmhouse, they were despatched in a horse ambulance to Huddersfield Infirmary. Schofield recovered completely in a few days, but English died in the infirmary three days later.

Although the writer does not feel qualified to discuss the physiological aspects of the case, he adds the following details, in the hope that further information regarding asphyxiation may be placed before the members of the institute. No information can be given as to the exact composition of the atmosphere which the men were breathing during the 10 or 11 hours that they lay unconscious, but it was presumably air mixed with a high proportion of marsh gas and having a correspondingly low oxygen content—possibly about half the natural amount—which would mean the presence of 50 per cent. of marsh gas. There certainly could not have been more than 11 or 12 per cent. of oxygen present—probably less—and there may have been some blackdamp, with a corresponding decrease in the amount of marsh gas. Sykes was 52 years of age, of heavy build, weighed 14 or 15 stone, and was presumably healthy. English was 38 years of age, of medium build, weighed about 10 stone, and had had a very bad cold for about a week before the accident. Schofield is 24 years of age, weighs 12 stone, and is a well-built young man, in every sense strong and healthy. Chatterton is 40 years of age, of light build, weighs about 9½ stone, and is a healthy but not a strong man. Sykes was found at the coal face to the left of the gate in a kneeling position, with his head and mouth resting on the back of his hands. There is no reason to suppose that the air was any worse where he lay; on the contrary, it would be better rather than worse, as he was on the intake side of the gate. His mouth was full of black blood. English was found on the opposite side of the gate, about 12 ft. from Sykes, in a kneeling position, with his head between his knees and his hands across his forehead. Schofield was lying in the gate some 15 or 20 yards from the coal face; he was face downwards, with his arms stretched forward, his head being towards the coal face. Chatterton must have crawled over or past Schofield in an attempt to get out, as he was leading when Schofield lost consciousness.

When rescued, English and Schofield were both cold and stiff; their teeth were tightly clenched, but they were breathing slightly and somewhat stertorously through the nose. Their faces were pale, but not noticeably discoloured. The blood in the veins of the legs was very much clotted, particularly in the case of English, so that the veins stood up in knots.

Why Sykes succumbed more easily than the others, the writer is unable to say, unless it was due to his greater age and heavier build, and possibly he had a weaker heart. The verdict of the coroner's jury in his case was "Suffocation by poisoning by misadventure." In the case of English a post-mortem examination was made, as some internal injury was suspected; but, after hearing the evidence of the house surgeon, the jury returned a verdict of "Death from dilation of the heart due to the combined effects of the pleuritic condition of the lungs and the breathing of the gas-laden air." Schofield was semi-conscious and recovered naturally an hour after he was rescued, but a collection of his treatment in the mine or

afterwards on the surface. He remembers something of the journey to the infirmary in the ambulance, but did not completely come round until 9 p.m., nearly seven hours after he was removed to fresh air.

There has been a tendency in some quarters to begrudge the title of "rescue apparatus" to the various types of portable breathing appliances, but certainly in this case the apparatus used has justified its right to be so called. Had efficient rescue apparatus and men trained to use it been available at the colliery, or in the immediate neighbourhood, the lives of all three men would almost certainly have been saved. At the same time, it is essential to realise that useful work cannot be safely done by men wearing such apparatus, unless the men are thoroughly trained in the use of it and the apparatus itself is kept in perfect order. Further, neither the men nor the apparatus must be expected or asked to achieve impossibilities; any work undertaken must be well within the compass both of the men and of the apparatus; and it should always be borne in mind that the life of each man wearing the apparatus in an irrespirable or poisonous atmosphere depends on the perfect working of his apparatus, and that even the best apparatus is a more or less delicate machine working under very trying conditions.

#### Note by Dr. J. S. Haldane, F.R.S.

All the facts recorded by Mr. Lloyd indicate that the men were overcome by insufficiency in the oxygen percentage of the air, due to the presence of a large percentage of firedamp (CH<sub>4</sub>), probably mixed with a little blackdamp. There was no reason to suspect the presence of carbon monoxide, as there was no gob fire or heating. Had the symptoms been due to carbon monoxide, it is hardly conceivable that Chatterton and Schofield, or Mr. Hinchcliffe and those with him, or Mr. Elliott, could have escaped. Carbon-monoxide poisoning would also have been detected from the appearance of the body of Sykes; but the blood seen oozing from his mouth was black, and not red, as it would have been if death had been due to carbon monoxide.

It is probable that sufficient firedamp was present to reduce the oxygen to 7 or 8 per cent. This would correspond to 60 or 70 per cent. of firedamp. Air of this composition is extremely dangerous, as a man can live in it for only a few minutes before he is overcome, and thus stopped from going further. To understand this, it must be borne in mind that the physiological effect depends upon the composition of the air in the alveoli or air-cells of the lungs, in which the oxygen percentage is always considerably lower than in the inspired air, since the blood is always taking oxygen from the alveolar air. Now carbon dioxide (CO<sub>2</sub>), and not want of oxygen, is the normal stimulus to the breathing, but want of oxygen will help, so long as a certain amount of carbon dioxide is still present in the alveolar air. When air containing only 7 or 8 per cent. of oxygen is breathed, the breathing is, in most persons, markedly increased at first, and this increased breathing tends to keep up the oxygen percentage in the alveolar air. It also, however, rapidly washes out carbon dioxide from the blood, and thus reduces the store of that gas in the body, so that in a few minutes there is not enough left to keep up the stimulus to increased breathing. As a consequence, the breathing diminishes, and the oxygen percentage in the alveolar air falls so low that consciousness is lost, and death may ultimately result. It is this process which makes very high balloon ascents so extremely dangerous; and to go gradually into air containing an increasing percentage of firedamp or nitrogen is equally dangerous. Firedamp is not poisonous in itself: the writer has breathed with impunity a mixture of 80 per cent. of pit gas with 20 per cent. of pure oxygen, and kept animals in this mixture for considerable periods.

The fact that English did not recover was due to exactly the same cause which often prevents men from recovering after severe carbon-monoxide poisoning. The tissues have been severely damaged by the prolonged exposure to dearth of oxygen, so that although the oxygen supply is completely restored, recovery is doubtful. In the case of English, the post-mortem examination revealed the fact that the heart was dilated. Probably the heart muscles and other tissues were in a condition of fatty degeneration caused by the want of oxygen. The writer has seen other similar cases of dilatation simulating severe heart disease, and only slowly recovering, after prolonged exposure to carbon-monoxide poisoning. So far as he is aware, however, this is the only recorded case of death, after partial recovery, from exposure to an atmosphere which was simply deficient in oxygen, apart from the presence of carbon monoxide.

In conclusion, the writer wishes to express his admiration for the great bravery displayed in the attempts to rescue English and Sykes, and his congratulations on the success with which the Weg apparatus was employed in exceptionally different circumstances.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, October 28, 1913, is as follows:—Antwerp, 689 tons; Alderney, 127; Amsterdam, 1,417; Abo, 2,091; Aalesund, 495; Alexandria, 3,940; Bremen, 1,420; Copenhagen, 2,003; Christiania, 1,003; Christianssand, 426; Cronstadt, 3,330; Constantinople, 245; Drammen, 635; Danzig, 307; Drontheim, 401; Ghent, 1,024; Gothenburg, 1,027; Guernsey, 463; Gefle, 6,167; Harlingen, 1,225; Hamburg, 5,873; Kalmar, 1,094; Langesund, 150; Lysekil, 486; Odessa, 10,903; Oxelosund, 946; Reval, 7,239; Rouen, 2,648; Riga, 15,305; Rotterdam, 4,344; Stockholm, 1,195; St. Petersburg, 2,754; Stettin, 968; Ystad, 1,648; total, 83,988 tons; corresponding period October 1912, total, 85,125 tons.

#### PORTABLE ELECTRIC MINE LAMPS.\*

By H. H. CLARK.

The Bureau of Mines is interested in this subject because the engineers of the Bureau believe that the safety of mining operations would be increased in a large measure because of the lessened danger of gas explosions and mine fires, by the abandonment of open lights underground and the universal adoption of properly-designed portable electric lamps except for testing for gas.

The author's experiments indicate that the glowing filament is the only source of danger in a portable electric-lamp equipment. The only other possible source of danger would be the sparks to be obtained by breaking the circuit of such an equipment.

#### Gas Ignition by Sparks.

The results of recent tests made by the bureau show that such sparks are not capable of igniting mine gas. These tests were made in the most explosive mixture of Pittsburg natural gas and air under the conditions stated below. Rotating contacts were made to pass under a metal contact brush, thereby opening and closing, at a speed of 1 cm. a second, a non-inductive direct-current circuit. In one set of tests the rotating contacts were made of carbon and the brush of soft iron. In another set of tests the rotating contacts were made of brass and the brush was made of copper. In all tests with the carbon-iron contacts the brush was caused to press very lightly upon the rotating contacts. Tests were also made with speed of the rotating contact reduced to 1 cm. in five seconds.

With the carbon-iron contacts a circuit carrying 12 ampères at 15 volts was made and broken 5,000 times without causing the gas to ignite. No gas ignition was obtained from 5,000 tests made under similar conditions with the circuit carrying 18 ampères at 10 volts. As the tests progressed, the carbon contacts became roughened by use, and arcing began as soon as the carbon touched the brush, and continued during the 1.27 seconds required for the carbon to pass the brush. These tests were made not only in motionless gaseous mixtures, but also in a stream of the mixture blown by a small fan directly upon the contacts. The velocity of the jet of gas varied from a gentle breath to a current sufficiently violent to blow to one side the arcs and sparks given off by the contacts.

With the brass-copper contacts a circuit carrying 25 ampères at 15 volts was made and broken 5,000 times without causing an ignition of the gas. No gas ignition was obtained from 2,700 tests made under similar conditions when the circuit was carrying 30 ampères at 10 volts. The sparks obtained by use of the brass-copper contacts were noticeably smaller than those obtained with the carbon-iron contacts. No arcing occurred with fresh clean contacts until the contacts began to separate. After the contacts had become worn and pitted by service, sparking, and even arcing, did occur. Reducing the speed of break to 1 cm. in five seconds had the effect of producing an ignition at 15 volts and 25 ampères after 127 fruitless trials. This ignition was due as much to arcing under the brush as to the slow speed of break. The test was repeated with an increased brush tension to prevent arcing under the brush. No ignition was obtained in 270 trials. Brush tension was reduced, and after 124 fruitless trials another ignition occurred. The current was then reduced to 20 ampères and 500 trials were made without producing an ignition.

Inasmuch as the battery of a portable lamp outfit rarely, if ever, represents a potential greater than 6 volts, and inasmuch as the current taken by the lamps of such outfits does not exceed 1 ampère, the Bureau's engineers believe that these tests prove quite conclusively that such sparks as can be obtained from a portable lamp outfit will not ignite gas.

#### Short-circuiting.

Even if a battery were short-circuited (a remote possibility with a properly-constructed equipment) and then open-circuited, the spark would seldom, if ever, be large enough to cause ignition of gas. The following tests were made to prove this:—Eight batteries were mounted in the testing gallery and surrounded by the most explosive mixture of gas and air. The terminals of these batteries were connected directly across the contacts used in all previous tests, and the movable contact was rotated at a speed of 1 cm. per second. The table following states the open-circuit voltage of each battery and the current that flowed when the battery was short-circuited through an ammeter.

TABLE 1.—OPEN-CIRCUIT VOLTAGE AND SHORT-CIRCUIT CURRENT OF BATTERIES TESTED.

Battery.	Number of cells.	Open circuit. Volts.	Short circuit. Ampères.
a	1	2.5	80
b	1	2.5	56
c	2	2.6	39
d	1	2.5	35
e	2	2.6	23
f	4	6.0	16
g	1	2.2	10
h	2	3.0	10

Not less than 20 sparks were drawn from each of these batteries under the conditions set forth above. No ignition of the gas took place in any test.

Inasmuch as the batteries probably deteriorated rapidly under such severe usage, the following test was made to demonstrate that the spark given by high currents at low voltages cannot ignite gas. A number of storage batteries were put in multiple with a generator, and the combination was connected through a non-inductive resistance to the copper-brass spark contacts used in the previous tests. The contacts were surrounded by the most

\* From Technical Paper 47, U.S. Bureau of Mines.



explosive mixture of natural gas and air, and were caused to open the circuit at the rate of 1 cm. per second. One thousand trials were made while the circuit was carrying 100 ampères at 4 volts, 1,000 trials were made while the circuit was carrying 80 ampères at 5 volts, and 1,000 trials were made while the circuit was carrying 55 ampères at 6 volts. The gas was not ignited in any test.

These tests seem to prove conclusively that mine gas cannot be ignited by sparks from portable electric-lamp equipments if the batteries used with such equipments are made so that their maximum short-circuit current cannot exceed the following values:—For batteries giving 2.5 volts or less, 100 ampères; for batteries giving more than 2.5 volts but not more than 4 volts, 85 ampères; for batteries giving more than 4 volts but not more than 5 volts, 65 ampères; for batteries giving more than 5 volts but not more than 6 volts, 45 ampères.\*

It must be considered, however, that if the breaking of the lamp circuit develops a continuous spark or arc, the likelihood of gas ignition is greatly increased. The possibility of drawing and maintaining an arc with a portable electric lamp equipment used under normal conditions is remote. The following tests were made in the laboratory to determine the values of current and voltage below which arcs sufficient to ignite gas cannot exist. The same contact device was used in this test as in the previous ones. The moving contact was brass and the stationary brush was copper. The contacts were caused to separate very slowly, so that an arc would form, if it ever could, with the voltage and contacts used. With an open-circuit potential of 10 volts, no arcs could be obtained by breaking 38 ampères. With an open-circuit potential of 15 volts, no arc lasting for more than one second could be obtained with 30 ampères.

#### Ignition by Filaments.

Still earlier tests (reported in Technical Paper 23† and Bulletin 52‡, Bureau of Mines) show that if, in the presence of gas, a lamp bulb is broken without injury to its filament, the gas may become ignited. This dangerous condition cannot arise (if the bulb is flexibly mounted, so that it cannot be broken by a jar imparted to the lamp guard) unless the outside guard of the lamp be smashed and the lamp bulb itself be broken by a blow so nicely calculated that, after crushing a conical guard of metal and heavy glass, it will shatter a small, nearly spherical glass bulb and then stop short of a delicate filament, leaving the latter intact and even untouched.

The Bureau of Mines is at present engaged in an investigation of all the patterns of portable electric mine lamps that, as far as the Bureau is aware, are manufactured in the United States.

\* These current values are purposely made less than those obtained in the tests in order to introduce a factor of safety.

† "Ignition of Gas by Miniature Electric Lamps with Tungsten Filaments," by H. H. Clark. 1913. 5 pp.

‡ Ignition of Mine Gases by the Filaments of Incandescent Lamps," by H. H. Clark and L. C. Hsley. 1893. 31 pp., 6 plates.

### NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Loss Occasioned by Coal Trimmers' Stoppage—The Form of c.i.f. Contracts for Italy—The German Firedamp Whistle—Senghenydd Relief Fund; Number of Dependents: Miners Make a Levy—Incorporation of Glynea Fund—Suggested National Fund to Include Single Accidents—Special Tax of a Farthing a Ton—Amalgamation of Former Funds—Miners' Executive and the Thousand Unemployed at Senghenydd—Rapid Growth of Port Talbot, and Fresh Colliery Developments—Men Demand Removal of Officials.**

At a meeting of the Cardiff Chamber of Commerce on Thursday, Mr. J. T. Duncan, president, presented a view which manifests itself especially to shipowners in the coasting trade. He referred to the continued stoppage of work at the docks on Saturday afternoons, owing to the decision of the trimmers, and said that this had turned out to be even worse than was contemplated, for they found that not only had the shipping suffered loss, but the stoppage affected also Monday and Tuesday. Tips were not cleared on the Saturday, and the getting ready of tips on Monday morning was seriously impeded. He did not know whether anything could be done, as there was no intention to apply compulsion to the men. It was a serious matter for coal and ship owners, more especially for those in the coasting trade.—Mr. J. A. Jones pointed out that it was only in the South Wales ports where an arrangement had not been come to; and Mr. F. H. Lambert referred to the satisfactory agreement which had been arrived at on the Tyne, as contrasting with the position in South Wales.

At the same meeting there was a long discussion on the new standard form of c.i.f. contracts for Italy, this having been drawn up by a sub-committee in compliance with a request from the British Chamber of Commerce in Genoa. It was agreed that the form appeared to be reasonably fair, and would be a good thing, not only for the seller, but also for the buyer. Mr. F. H. Lambert raised one or two questions—as, for example, that import taxes as well as export taxes should be borne by the purchaser; but ultimately only one clause was referred back to the committee—namely, that relating to war time.

The story of the German firedamp whistle has, of course, attracted attention, with the result that it has been discounted. Mr. Henry Davies, Director of Mining Instruction for Glamorgan, points out that the method was tried in England 30 or 40 years ago. The Forbes

Damoscope produced a musical note of a standard pitch; and according to the density of the air or gas passing through the tube, so the note varied. Then the Hardy Detector was made for the same purpose, depending on the same principle; but a slight variation in tone was difficult to detect, and then again the note produced did not entirely depend upon the quality of the gas or air.

After three weeks' strenuous work the explorers at Senghenydd have reached the coal face in one district; and a large number of bodies have been brought up. Very much work of a singularly arduous and risky nature has still to be done; but the worst is over, general testimony being borne to the bravery exhibited under the peculiarly dangerous circumstances that have prevailed.

It should be pointed out that members of the St. John Ambulance Brigade rendered some very valuable assistance at the Senghenydd disaster. Within a few hours men and nurses began to arrive, and by the evening 106 were there with a good supply of material; during the week 216 St. John men and nurses from 26 divisions in Glamorgan and Monmouthshire reported themselves at the colliery; many had to be sent home to be in readiness if wanted. The whole of these men and nurses came quite voluntarily fully equipped with stretchers, medical haversacks, bandages, blankets, oxygen reviving apparatus, one horse ambulance van, and a motor ambulance van. They did some excellent work, attending cases and assisting the exploring parties; one division alone attended 60 cases. It was very gratifying to find that such an organisation as the St. John were able to have such a body of trained men and nurses from the various collieries on the scene in such a short time.

With regard to the relief fund, the Lord Mayor of Cardiff desires to point out that a considerable sum is yet required in order to deal effectively with the claims. Although the total considerably exceeds £80,000, the very large number of beneficiaries make urgent call for still heavier contribution.

A revised estimate of the number of dependants shows that the total may not exceed 700. Mr. Evan Owen, who has been in charge of the relief work, told the central committee that he had relieved 207 widows, 436 children and 50 dependants; but he was very wishful to make it clear that these did not complete the list of those who are actually dependent. The rate of relief at present is 10s. to each widow or adult dependant, and 5s. for each child. The sub-committee which is dealing with the question of temporary relief consists of the Lord Mayor of Cardiff, Mr. T. Richards, M.P. (secretary of the Miners' Federation), and Mr. Evan Owen, who holds the position of secretary to the Miners' Permanent Relief Fund.

From the Glynea accident there have been eight deaths, and it has been decided that the dependants of the victims in that colliery explosion shall be included among the beneficiaries of the Senghenydd fund, conditional upon subscriptions to the Glynea fund being pooled with the Senghenydd total.

Mr. Clement Edwards, M.P. for East Glamorgan (in which constituency Senghenydd is situated), when speaking at Brithdir, referred to the fact that a much greater loss of life is occasioned by single accidents than by the greater catastrophes which win attention; and he advocated the appointment of a body of examiners, additional to the ordinary mining inspectors, so that there should be a number sufficiently large to make frequent visits to the different collieries. Referring to the relief funds proposal, he advocated a permanent national fund, and thought that a material contribution towards the relief funds would be obtained by a farthing per ton upon all coal raised in the country. This, he thought, would form a fund without placing any heavy burden upon the coalowners or colliery workers.

This idea of a permanent fund is being generally entertained, to be worked coincidentally with the pooling of funds already in existence.

A conference of miners' delegates was specially called to consider the question of an out-of-work fund in aid of the workmen rendered idle by the Senghenydd explosion, and it took place on Friday. The Federation committee, who are raising a fund for the relief of the widows and orphans, could not apply any part of their money to those men who are out of work. At least 1,000 Senghenydd employees have been idle since October 14, and it is certain that the idleness must necessarily be continued for several weeks to come. The East Glamorgan district of the Federation made a special appeal to the Federation executive that it would render financial assistance to those workmen, and the executive were in the difficulty of not being able to use the general fund for that purpose. By ballot, the members of the Federation have decided against making permanent provision for out-of-work benefit, and previous conferences by large majorities voted against any scheme having that object, the question having been under debate for nearly ten years, on different occasions. On Friday, it was unanimously agreed that a levy of 6d. per member should be made. An amendment that the levy should be 1s. was not approved, but it was decided that the council be empowered to make another levy if this be required.

The executive considered also the question of amalgamating the old funds in existence, which had

been raised for the dependants of colliery workmen, and a resolution was passed in favour of this action, in order that these funds might be available for the relief of dependants of workmen who are killed day by day.

Upon the general question of an unemployment fund, a resolution was passed recommending that the lodges be asked to agree to an additional 6d. per month being paid per member for that purpose.

Port Talbot, which was included until 1904 as a "creek" under the Customs port of Swansea, has for the past nine years been distinguished separately in the reports, and it has to be noted that the exports in that period have increased no less than 80 per cent., and that shipments are still rapidly growing, as the area immediately adjacent is in process of active development.

In this connection, it may be mentioned that the Whitworth Collieries, near Port Talbot, which were acquired by a German syndicate under Mr. de Frietas, of Hamburg, are likely to be proceeded with. Owing to the death of Mr. de Frietas, the work of sinking the two shafts was suspended, although one had got to a depth of 500 ft. and the other to 450 ft. They had passed a 2 ft. seam of Rhondda No. 2 coal, and the present idea is that this seam will be worked.

A strike which originally affected between 600 and 700 men of the Cynon Colliery, Avon Valley, has lasted for eight months, but a conference has now been arranged, to take place to-morrow (Saturday), and it is hoped that some arrangement may then be reached. This also would directly benefit Port Talbot.

Two thousand men of Risca Colliery who had been idle for a week, owing to allegations that gas had accumulated, resumed work on Monday, and about 1,100 men at Wattstown, who alleged insufficient headroom, &c., in the pit, and abstained from work, were reassured after examiners had been down, and returned on Tuesday.

The trouble at Llanhilleth, where between 1,500 and 2,000 men have been on strike against what they regarded as insecure conditions, has persisted; but, in the later days, centred upon their demand for removal of several officials, to whom they objected. No fewer than 15 were referred to, but the managers stood by their subordinates, whom they regard as trustworthy. Several conferences have been held. It is said that the workmen agree that the pit is now safe, but insisted upon removal of certain officials.

Upon an allegation of defective ventilation, some hundreds of men ceased work at a Blaina colliery; and here also the question is complicated by demand concerning officials, the men calling for the suspension of some of these, pending enquiry.

It has to be noted that Cardiff, which fell back during 1910 and 1911, regained its position of precedence in oversea tonnage during 1912, when the net tonnage cleared oversea at Cardiff was 9,168,115, whereas the next—namely, London—was a little under 8½ millions, whilst Liverpool was just over 7½ millions. Cardiff's position is, of course, due to the coal trade; for if values be taken into account, South Wales stands very far behind.

Among the new subscriptions to the Senghenydd fund is one of 1,000 guineas from the Powell Duffryn Company, and £100 from Messrs. Stephenson, Clarke and Co.

**Electrician's Breach of Mines Act.**—In the Hamilton Sheriff Court on Wednesday last the trial was fixed to take place of James McNeil, colliery electrician, Yenikale-place, Wishaw, for an alleged contravention of the Coal Mines Act, 1911. The complaint bore that he had at Dalzell and Broomside Colliery, between March 15 and April 16, failed to make a thorough examination of all the apparatus in said colliery (including the testing of earth conductors and metallic coverings for continuity) as often as necessary to prevent danger. An agent, who appeared for the respondent, said he had advised him to plead guilty. Proceeding the agent explained that McNeil had been an electrician for seven years, and his whole experience had been acquired in this pit. He had charge, without assistance, of the whole electrical plant, which included half-a-dozen coal-cutters, haulage engines, and several miles of cables. During the past seven years there had never been an accident through any defect in the electrical plant. The log book at the colliery had two columns for reports (1) on the apparatus and (2) as to continuity. While the book showed that the respondent had not made any reports for the period complained of, it indicated that he had frequently reported prior to these dates and immediately thereafter. The continuity tests had been introduced by the new rules, and the management had provided a new machine for the taking of these tests. The respondent, however, had not been satisfied he had taken these tests correctly, and he had not had the courage to enter them in the log book. He had now been properly instructed in the working of the new machine, and was both making the tests and reporting them.—Sheriff Shennan said the penalty could not altogether be a nominal one, as the prosecution had been brought as a warning to others. A fine of £22, with the alternative of 10 days' imprisonment, was imposed.



## COAL, IRON AND ENGINEERING COMPANIES.

**Cardiff Collieries Limited.**—Extraordinary meetings of the shareholders were held on Friday, when resolutions were confirmed empowering capital reorganisation, and resolutions were adopted providing that the 1,000 ordinary shares of £100 each be divided into 100 ordinary shares of £1 each; that the 1,000 preference shares of £100 each be divided into 100 preference shares of £1 each, of which the first 95,300 shall be credited as being fully paid up; that the capital of the company be increased to £300,000 by the creation of 100,000 new ordinary shares of £1 each, ranking in all respects with the existing £100,000 ordinary share capital; that the sum of £97,650, being the undivided profits standing to the credit of the company's depreciation account, be distributed as a bonus among the ordinary and preference shareholders in proportion to the number of shares held by them, by the allotment of 97,650 new ordinary shares credited as fully paid up.

**Coventry Electric Cable Company Limited.**—This private company has been registered, with a capital of £100 in £1 shares, to carry on the business indicated by the title. Signatories: Ernest Frank Pevison, 17, Hertford-street, Coventry, and George Edward Bailey, 43, Kensington-road, Coventry.

**Dereham Ironworks Limited.**—This company has been registered, with a capital of £6,000 in £1 shares, to acquire the businesses now carried on at Cowper-road and Wellington-road, East Dereham, Norfolk, under the styles of John Roots and Co. and T. L. Barker, respectively, and to carry on the business of ironfounders, &c. First directors: R. M. Tallent, L. F. Harrison, Thomas L. Barker, and John R. Knights.

**Dixon (William) Limited.**—The directors announce an interim dividend at the rate of 5 per cent. (free of tax) for the half-year to August 31 last on the ordinary shares.

**Downham (Joseph) Limited.**—This private company has been registered, with a capital of £7,000 in £1 shares, to carry on the business of general ironmongers, iron and steel merchants, electrical engineers and cutlers, &c.; also to enter into an agreement with William D. Hall, George Hall (executors of the will of the late Robert Hall, and Henry Turner, who are included in the first directors. Registered office, Union-street, Bury, Lancs.

**Duffryn-Rhondda Colliery Company Limited.**—An influentially-attended extraordinary general meeting, held on Tuesday, was convened for the purpose of considering, and, if deemed expedient, of passing an extraordinary resolution for the voluntary winding-up of the company. The proceedings were held privately. The position of the affairs of the company was very fully discussed, and in the end a committee was appointed to confer with the directors with the view of formulating a scheme for providing further capital to continue the working of the colliery. A short conference took place between this committee and the directors after the meeting, and it was decided that a further meeting should be held in the near future to have a full discussion of the position.

**Ebbw Vale Steel, Iron and Coal Company Limited.**—The directors have declared an adjusting dividend of 2s. 6d. per share on the new preference shares, being at the rate of 6 per cent. per annum, for the half-year ended September 30, 1913, *pro rata* on the amounts called up, payable in mid-December to shareholders on the books on December 1. It is intended to pay the preference dividend half-yearly in June and December.

**Electric Lighting and Engineering Company Limited.**—This private company has been registered, with a capital of £3,000 in £1 shares, to acquire the business formerly carried on by John O. Rhodes under the style of the Electric Lighting and Engineering Company at 145, Duke-street, Liverpool, and to carry on the business of electrical engineers, &c. First directors: J. O. Rhodes, 145, Duke-street, Liverpool, and Henry Shepherd and Percy Marsh, both of 9, Cook-street, Liverpool.

**Hadji-Dimitar Coal Company Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of colliery proprietors, ironmasters, steelmakers, steel converters and ironfounders, &c. First directors: Edward Backhouse, A. E. Backhouse, Reginald Joseph Mounsey and Arthur F. Shirreff. Qualification, 500 shares. Registered office: Savings Bank-chambers, Darlington.

**Harvey and Morris Limited.**—This private company has been registered, with a capital of £200 in £10 shares, to carry on the business of iron, brass and general ironfounders, &c. First director: Herbert Charles Harvey. Qualification: 50 shares. Registered office: Union-passage, Birmingham.

**Kent Coal Concessions Limited.**—At a joint meeting of Kent Coal Concessions Limited, South-Eastern Coalfield Extension Limited, Extended Extension Limited, and Deal and Walmer Coalfield Limited, on Thursday, 30th ult., the scheme of amalgamation and the formation of a new company to acquire the mineral areas of the four companies on a leasehold basis was approved by the shareholders of each of the companies concerned. The chairman, Mr. J. Dewrance, informed the meeting that the nucleus of a new board had been formed, the following gentlemen having provisionally agreed to become directors of the new company, with power to add to their number: Sir Henry McCallum, Sir Arthur Yorke, Mr. C. E. Allen, Prof. Galloway, Lieut.-Col. R. Standen, Dr. Malcolm Burr, Mr. G. M. Scarfe, and Mr. Agonesta.

**Kirkland Steel Foundry Limited.**—This private company has been registered, with a capital of £42,000 (40,000 ordinary shares of £1 each and 40,000 deferred shares of 1s. each), to acquire the business of the National Steel Foundry Limited, and to carry on the business of ironmasters, steelmakers and converters, colliery proprietors, smelters, engineers and brass and iron foundries, also to enter into an agreement with George Genis. Registered office: 28, Victoria-street, S.W.

**Mirle Steel Company Limited.**—This private company has been registered, with a capital of £100 in £1 shares, to carry on the business of ironmasters, steelmakers, steel converters, colliery proprietors, miners, smelters, engineers and brass and iron foundries, &c. Signatories: William Henry Targett, Fulham, S.W., and Fred Wreford, 121, Victoria-street, Balham, S.W.

**Moat Hall Colliery Company Limited.**—This private company has been registered, with a capital of £4,000 in £1

shares (1,000 preference), to acquire the business formerly carried on by Edith L. Lewis under the style of the Moat Hall Colliery Company at Tipton, Staffs, and to carry on the business of colliery proprietors and miners, manufacturers of and dealers in patent fuel, &c.; also to enter into an agreement with Edith L. Lewis. First directors: Edward C. Lewis (managing director), Greenhill House, Wombourne, near Wolverhampton, and Roger Brinton, Kidderminster. Qualification, 200 ordinary shares.

**Nimmo (James) and Co. Limited.**—The net profits for the year ended September 30 were £61,476 after providing for debenture interest and appropriating £30,000 for depreciation, and £5,445 was brought forward. A dividend of 15 per cent., free of income-tax, is proposed on the ordinary shares, adding £30,000 to the reserve, and carrying forward £11,921.

**Parkgate Iron and Steel Company Limited.**—The directors have decided to pay an interim dividend of 1s. per share, free of tax, for the half-year ending September 30.

**Shotts Iron Company Limited.**—The directors have declared a dividend of 6s. per share, equal to 30 per cent., on the ordinary shares for the year to September 30.

**Torquay and South Devon Coal Company Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of coal merchants, and to enter into an agreement with the Denaby and Cadeby Main Collieries Limited. First directors: Arthur E. Harley, William George Huxtable and W. E. Reed. Qualification: 100 shares. Registered office: The Torquay and South Devon Club Buildings, Vaughan-road, Torquay, Devon.

**United National Collieries Limited.**—An extraordinary general meeting of this company was held at the London offices on Friday, 31st ult., for the purpose of confirming certain resolutions passed at a previous meeting providing for the subdivision of the existing £10 shares of the company into £1 shares, and increasing the company's capital to £800,000 by the creation of 400,000 new shares of £1 each. On the motion of the chairman, the resolutions, together with others relating to the modification of the company's articles of association, were duly confirmed and agreed to as special resolutions. Mr. Watts (chairman) then moved further resolutions, which provided:—(a) That it was desirable to capitalise the sum of £331,780 to be provided out of the sum standing to reserve account as at the end of the year 1912, and the sum since carried to that account by the directors, out of the sums carried forward at the end of 1912, and on a re-valuation of assets, and that the sum mentioned be appropriated by way of capital to the holders of the 331,780 issued shares of £1 each by issuing to each shareholder a number of unissued shares of £1 each equal to the number of issued shares held by him; and (b) that a dividend at the rate of 1 per cent. shall be paid on December 31, 1913, on the preference shares issued in accordance with the terms of the previous resolution, the dividend to be paid afterwards half-yearly. The resolutions were agreed to.

**Whitaker (Richard E.) (Burnley) Limited.**—This private company has been registered, with a capital of £400 in £1 shares, to acquire the business of coal, &c., merchants formerly carried on by R. E. Whitaker at Manchester-road Coal Siding, Burnley, Lancashire, and to carry on the business of coal merchants, &c.; also to enter into an agreement with Richard E. Whitaker. First directors: Robert Wallis and R. E. Whitaker. Registered office, 9, Nicholas-street, Burnley.

**Yates and Thom Limited.**—The eighth annual report for the year ended August 9 states that, after providing for depreciation of plant and machinery, interest on mortgage debenture stock, and £2,000 to write down investments, the net profit amounted to £9,022, making with £6,621 brought forward, a total of £15,643. The preference interest for the year absorbs £6,215. The directors propose to apply £2,500 to the reserve fund, making this £28,032, and to carry forward the balance of £6,928. Under the circumstances, the directors do not see their way to recommend a dividend on the ordinary shares.

## THE FREIGHT MARKET.

There has been a large volume of activity in the outward freight market this week. On the north-east coast loading turns are very much congested, and tonnage is in ample supply, with the result that rates are steadily falling. Coasting business is now based on 3s. 1½d. to 3s. 3d., Tyne to London, 3s. 6d. to 3s. 9d. to Hamburg, 3s. 6d. to Rotterdam, and 4s. 4½d. to 4s. 6d. to Havre. The Baltic is worth 5s. to Aarhus. The Bay has been done at 5s. 3d. to Bordeaux and 5s. 6d. to Rochefort, loading at Dunston for the latter port. The Mediterranean is quoted at from 8s. to 8s. 6d. to Genoa. At South Wales tonnage offers freely, but chartering is checked by difficulty in arranging prompt loading turns, and rates are rather easier in most directions. At the Humber business is rather brisker, with Mediterranean orders more plentiful, although there is only a poor enquiry for Baltic tonnage. Rates tend to fall. Quotations at the Clyde are weaker, with comparatively little doing. Homewards, Black Sea advices report an inactive freight market, with tonnage offering in fully adequate quantities. Azof and Danube are similarly circumstanced. The demand from the Far East is dull, and the tone is easy. The Mediterranean and ore trades are unaltered, and the Baltic has undergone no change. The American market is slow, and the Plate is nominal for all loadings.

Tyne to Alexandria, 5 400, 9s. 3d.; Ahus, 1,500, 5s. 6d.; Antwerp, 1,500, 4s. 3d.; Algiers, 4,800, 7s. 3d.; 2,300, 8s.; 3,900, 7s.; 600; Aarhus, 2,600, 5s.; Boucan, 2,800, 5s. 3d.; from Dunston; Bordeaux, 3,000, 5s. 3d.; Bagnoli, 4,000, 8s. 6d.; 4,200, 9s.; Carlotorte, 1,850, 11s. 3d.; Catania, 2,000, 9s. 9d.; 500; Carthage, 1,500, 9s. 6d.; 250; Genoa, 7,900, 8s.; 4,700, 9s. 3d.; 4,500, 9s.; 3,000, 8s. 6d.; 5,000, 8s. 9d.; from Pelaw; 5,000, 8s. 9d.; 4,800, 8s. 6d.; Gibraltar, 2,100, 8s.; 500; Havre, 2,000, 4s. 6d.; 1,450, 4s. 6d.; Hamburg, 2,200, 3s. 9d.; Las Palmas, 2,000, 8s. 6d.; November; 3,500, 8s. 9d.; 2,000, 8s. 4½d.; London, 1,600, 3s. 3d.; 1,500, 3s. 2d.; Malaga, 1,800, 8s. 6d.; Marseilles, 2,800, 8s. 6d.; 5,200, 8s. 6d.; from Dunston; Malta, 3,700, 7s.; 2,700, 7s.; Odessa, 5,500, 9s. 6d.; 5,000, 9s. 6d.; 4,000, 9s. 9d.; Porto Ferrajo, 4,000, 8s. 6d.; 4,200, 8s. 9d.; Port Said, 8s. 9d.; from Dunston; 5,200, 8s. 4½d.; Rochefort, 3,000, 5s. 6d.; from Dunston; Rotterdam, 1,600, 3s. 6d.; 700; Savona, 3,000, 8s. 6d.; 5,000, 8s. 9d.; Trapani, 2,000, 10s. 6d.; Venice, 4,500, 10s. 3d.; Zeebrugge, 1,400, 3s. 4½d.

Cardiff to Alexandria, 5,600, 8s. 6d., November 15; 4,200, 8s. 9d., November 15; 5,500, 9s., 500, November; 1,500, 9s.; 4,500, 9s., early November; 5,200, 8s. 10½d., November 10; Ancona, 3,800, 10s. 3d.; Arzew, 1,800, 10½ fr., November 10; Aden, 5,000, 11s. 3d., December; Algiers, 5,500, 8½ fr., November 10; Barcelona, 4,200, 8s. 10½d., November 12; 4,200, 9s. 4½d., November; 4,000, 9s. 3d.; 1,250, 12½, fuel; Batavia and Sourabaya, 5,000, 14s., end November; Brest, 2,000, 4s. 6d., November 10; Bayonne, 2,200, 7 fr.; Bougie, 2,000, 11 fr.; Bombay, 5,500, 12s. 6d., November 12; 5,500, 12s., net terms, November; 12s. 4½d., free brokerage, early December; Cagliari, 2,500, 9s. 9d., November 10; Civita Vecchia, 5,600, 9s. 6d., November 10; 3,200, 9s. 3d., November 10; Cherbourg, 1,200, 6s.; Chantenay, 2,200, 7 fr.; Calais, 2,400, 4s. 9d.; Caen, 1,900, 4s. 9d.; Campana and Villa Constitucion, 4,000, 16s. 6d., November; Devonport, 2,800, 2s. 7½d., Admiralty; 2,800, 2s. 6d.; Dundee, 550, 5s. 6d., Admiralty; Genoa, 5,000, 8s. 9d.; 4,700-5,000, 8s. 7½d.; 6,000, 8s. 3d., November 10; 2,000, 8s. 9d., November 10; 9,800, 7s. 9d., November; 3,000, 8s. 6d., November 10; 7,300, 7s. 9d.; 10,000, 7s. 6d.; 6,000, 8s.; Gibraltar, 1,500, 8s.; 2,600, 8s., November 10; Havre, 1,300, 4s. 10½d.; 2,200, 4s. 9d.; Huelva, 1,800, 7s. 6d.; Islands, 2,800, 8s., November 10; 3,000, 8s. 6d., November; La Pallice, 1,100, 7½ fr.; Leghorn, 6,000, 8s. 3d., November 10; 2,000, 8s. 9d., November 10; 4,000, 8s. 6d., 500, November 14; Lisbon, 3,500, 6s. 3d., November; 3,500, 6s. 3d., 400, January; 2,200, 7s. 3d., 350; 3,400, 6s. 6d., 500, November 14; La Rochelle, 2,300, 6½ fr.; Monte Video, 4,800, 16s. 6d., November 15; Mostaganem, 1,800, 10½ fr.; Madeira, 3,000, 8s., November; Malta, 7,400, 7s. 3d.; 4,200, 6s. 6d.; 3,600, 6s. 7½d., Admiralty; 4,500, 6s. 6d., Admiralty; 3,900, 7s.; Messina, 6,400, 8s. 6d., 500, 10d., November 10; Marseilles, 6,400, 9½ fr.; 4,700, 9½ fr., November 12; Nantes, 1,250, 7½ fr.; Naples, 4,000, 8s. 6d., 500, November 14; Oporto, 850, 8s. 6d., 250; Port Said, 5,200, 9s.; 2,800, 9s.; 1,500, 9s.; 5,200, 8s. 9d.; 6,400, 8s. 6d., November 12; 5,500, 8s. 6d.; Palma, 2,700, 8s. 9d., 300, f.t., November 10; 2,600, 8s. 9d., 300, 1½ pesetas, November; Pauillac, 1,300, 7 fr., 400; Passages, 1,600, 7s. 9d. coal, 8s. 6d. fuel; Rouen, 1,200, 6s.; 1,400, 5s. 9d.; 1,400, 5s. 6d.; River Plate, 14s. 9d., reported; 17s., 6,000, 15s. 3d., November 10; 5,600, 15s., early November; 16s.; 15s. 6d., November; 5,000, 15s.; 3,500, 15s., November 24; Rio de Janeiro, 5,500, 15s. 6d., November 12; 5,000, 15s., November; 6,750, 15s.; 8,000, 15s., November 15; Rosario, 4,000, 17s., November; Reval, 2,800, 4s. 9d.; Savona, 4,700-5,000, 8s. 7½d.; 6,000, 8s. 3d., November 10; 2,000, 8s. 9d., November 10; Salerno, 2,600, 9s. 3d., 400, November 12; Santos, 5,500, 15s. 6d., November 12; Singapore, 5,000, 11s. 6d., Admiralty; Spazzia, 6,000, 8s. 3d., November 10; 2,000, 8s. 9d., November 10; Sveaborg, 2,200, 4s. 9d.; Sables, 1,400, 7 fr.; St. Nazaire, 2,200, 6½ fr.; Sulina, 4,700, 11s., November 15; Torre Annunziata, 4,800, 10s.; 3,200, 9s. 3d., November 10; Taranto, 5,600, 9s. 6d., November 10; Valencia, 2,300, 7s. 9d., f.t.; Venice, 3,300, 10s. 3d.; 4,500, 9s. 6d., 500.

Newport to Marseilles, 3,500, 10 fr., November 8; 3,300, 10½ fr.; Oran, 1,600, 10 fr.; Algiers, 4,500, 9 fr.; Seville, 1,500, 8s. 6d.; 2,000, 8s. 6s., November 10; Nantes, 2,100, 7 fr.; Taranto, 5,000, 9s. 6d.; Civita Vecchia, 2,800, 9s. 3d., 5,000, 9s. 6d.; Malta, 3,700-4,000, 7s.; Huelva, 1,850, 7s. 6d., November 15; Genoa, 6,000, 8s. 3d., November 10; Savona, 6,000, 8s. 3d., November 10; Spezzia, 6,000, 10s. 3d., November 10; Torre Annunziata, 2,800, 9s. 3d.

Swansea to Stettin, 1,500, 5s. 3d.; Alicante, 1,200, 10s. 3d.; Calais, 1,050, 5s. 9d.; 1,050, 5s. 8d.; 1,400, 5s. 6d.; Torre Annunziata, 3,200, 10s., November 10; Savona, 1,500, 9s., November 10; 3,000-3,400, 9s. 3d.; 4,100, 8s. 7½d.; Naples, 2,700, 9s.; Leghorn, 1,350, 9s.; 1,500, 9s., November 10; Bordeaux, 1,800, 7½ fr.; 1,850, 7½ fr.; Licata, 1,800, 10s. 6d.; 2,100, November 10; Naples, 2,700, 9s. coal, 9s. 9d. fuel; Oran, 2,300, 10 fr., November 12; 10 fr. coal, 11 fr. fuel, November; Cherbourg, 1,000, 6s.; Caen, 700, 5s. 10½d.; 900, 5s. 3d.; St. Nazaire, 2,000, 7 fr.; Nice, 2,500, 10s. coal, 10s. 9d. fuel; Marseilles, 5,700, 9½ fr.; 2,300, 10½ fr.; Honfleur, 1,100, 5s. 9d.; Genoa, 1,500, 9s., November 10; 3,000-3,400, 9s. 3d.; 4,100, 8s. 7½d.; 4,000, 9s. coal, 9s. 3d. fuel, November; Ticino, 4,100, 8s. 7½d.; St. Malo, 1,300, 5s. 3d.; Bombay, 4,800, 12s. 7½d.; Dieppe, 1,000, 5s. 7½d.; Passages, 1,600, 7s. 9d.; Rio de Janeiro, 6,750, 15s.; Port Said, 5,500, 8s. 6d.; Alexandria, 5,400, 8s. 10½d.; Rouen, 700, 6s. 6d.; 1,500, 6s.; 1,000, 5s. 3d.; 1,700, 5s. 9d.; 2,200, 5s. 4½d.; Brest, 1,100, 5s. 4½d.; 1,250, 6s., fuel.

Blyth to Aalborg, 1,600, 5s. 6d.; Carlotorte, 2,000, 10s. 9d.; Garrucha, 1,250, 12s.; Havre, 1,500, 4s. 6d.; Odessa, 4,700, 9s. 6d.; Port Said, 2,600, 9s. 7½d.; 2,800, 9s. 3d.

Troon to Genoa, 9s.; Savona, 9s.; Leghorn, 9s.

Burroughport to Rouen, 800, 6s., November 10.

Wales to West Coast South America and home to United Kingdom-Continent, sail, 41s., in and out; Mexillones, sail, 16s. 3d., March-May.

Immingham to Odessa, 9,000, 9s. 3d.; 4,100, 9s. 7½d.; Odessa or Nicolaieff, 9s. 3d.

Wear to Nice, 9s.; Lisbon, 4,000, 6s. 6d.; Havre, 1,500, 4s. 6d.; Riga, 2,800, 5s. 9d.

Burntisland to Kotka, 1,800, 5s. 6d.

Mersey to Riga, 2,500, 4s. 10½d.

Fife port to Horsens, 1,100, 5s. 6d.; Newfairwater, 1,600, 5s. 9d.; Sundsvall, 2,400, 5s. 9d.; Riga, 2,200, 5s. 7½d.

Seaham Harbour to Malmö, 1,600, 5s. 9d.; Nakskov, 1,300, 6s.; Gothenburg, 1,600, 5s.

Hartlepool to Rochester, 1,500, 4s.; Zeebrugge, 1,450, 3s. 4½d.

Rotterdam to Chantenay, 3,200, 5s. 3d.; Bagnoli-Porto Ferrajo, 5,000, 8s. 3d.; 8s. 3d., option Piombino 8s. 9d., November 20-30; Malta, 4,600, 7s., November 8; Leghorn, 5,000, 9s. coal, 9s. 9d. fuel, 11s. 3d. coke; 700 coal 8s. 9d., 400 fuel 9s. 6d., 300 coke 10s. 9d.; Barcelona, 9s., November 15-30; Bordeaux, 3,200, 5s. 6d. coal, 6s. 3d. fuel; Havre, 1,700, 4s. 9d., November 10-12; Venice, 5,600, 10s. 6d. coal, 11s. 6d. fuel, 12s. 9d. coke; Fiume, 6,700, 9s. 9d., November 15-30; Algiers, 2,900, 9½ fr.; 3,900, 9½ fr.; Marseilles, 3,000, 10½ fr., 600, 10 fr., 900, November 10; Naples, 5,400, 8s. 3d., November 20; Port Said, 5,400, 8s. 6d., November 8.

Barry to Malta, 7s., November.

Hull to Alexandria, 4,850, 9s.; Rio de Janeiro, 16s., with options, early November; Bilbao, 1,700, 6s. 9d., four voyages; Odessa or Nicolaieff, 9s. 3d.

Neath Abbey to London, 1,000, 4s. 9d.

Goole to Antwerp, 1,000, 4s. 10½d.; Guernsey, 500, 7s., coal.

Barry to Malta, 3,700-4,000, 7s.

Humber to Swedish Sound ports, 1,500, 5s. 4½d., November, second voyage 5s. 1½d., December; Nicolaieff, 9,200, 9s. 3d.



Hamburg to Callao, sail, 25s.; Santos, sail, 25s.  
Liverpool, Antwerp and Hamburg to Vladivostok, 30s., November-December.  
Glasgow to Genoa, 9s.; Savona, 9s.; Leghorn, 9s.  
Barry Dock to Santos, 18s. 9d., early December.  
Grangemouth to Karrahksminde, 1,500, 5s. 4½d.; River Plate, 4,500-5,000, 15s. 6d., November-December.  
Forta to G. H., 1,100, 9s. 6d.; Oxelosund, 1,900, 6s.; Sarsburg, 900, 6s. 6d.  
Emden to Bordeaux, 2,800, 6s. 3d.  
Port Talbot to Nantes, 1,800, 8½ fr.; Liverpool, 1,300, 3s. 3d., f.d.  
Methil to Genoa, 3,600, 9s.; Savona, 3,600, 9s.; Leghorn, 3,600, 9s.

Homeward charters:—Horrillo Bay, 3,300, Glasgow, 6s. 4½d., November; Benisaf, 3,500, Rotterdam, 8s. 3d., f.t., ppt.; Arzaw, 2,800, Middlesbrough, 6s. 4½d., ppt.; Bilbao, 3,100, Middlesbrough, 4s. 10½d., ppt.; 3,100, 5s., two loadings, ppt.; 3,700, Cardiff, 4s. 7½d., ppt.; Nantes, 2,100, Swansea, 3s. 6d., ppt.; Bombay, 1,869 net, Dunkirk, 18s. on d.w., November; 10s., Marseilles, Amsterdam and Hamburg, three ports, light seed, 12s. seed and cotton, 2,836 net, United Kingdom-Continent, including France, 17s. 6d. one port, 18s. two ports, on d.w., November; Kurrachee, 2,115 net, Genoa or Savona, 19s. 6d., old iron, November; 2,294 net, United Kingdom-Continent, 13s. 6d. p.p., November; Kherson, Nicolaieff or Odessa, 3,400, 9s. 3d. n.c. or any, 9s. 9d., Hamburg, November 10-25; Novorossisk, 7,000, Rotterdam 8s., Antwerp, Emden or Weser 8s. 3d., Emden and Weser 8s. 4½d., Hamburg 8s. 6d., 3d. less barley, November; New York, basis 23 c., Australia, December-January; basis 21½ c. one port River Plate; Buenos Ayres or La Plata, 6,500, 10 per cent., United Kingdom-Continent, 10s. o.c., no reduction option San Lorenzo 1s. 6d. more, ppt.; San Lorenzo, 5,000, 10 per cent., United Kingdom-Continent, 15s. o.c., less 6d., January-February; 4,100, 10 per cent., 11s. 3d. o.c., no reduction direct, ppt.; 5,000, 10 per cent., 12s. o.c., less 6d., ppt.; 4,200, 10 per cent., Gulf (U.S.), 11s. 9d., November; Sydney, N.S.W., sail, 31s. 3d., United Kingdom-Continent; 30s. 10½d., South Australia, sail, 26s., South Africa; Yarmouth, N.S., sail, 11 dols., Buenos Ayres; time charter, Transatlantic trade, 5s. 6d., one trip, delivery Gulf, re-delivery United Kingdom-Continent; 5s. 3d.; 5s. 6d., late November; time charter, Transatlantic trade, 4s. 3d., one trip, delivery Newcastle, N.S.W., re-delivery West Coast South America; Danube, 5,000, Rotterdam, 9s. 3d., London, Hull or Antwerp 9s. 6d., Hamburg 9s. 9d., 3d. less barley up to half-cargo or 1,000 tons oats 2s. more, November 15-30; 4,400, French Mediterranean, 12 fr. one port, 12½ fr. two ports, option West Italy, ex Civita Vecchia and Gulf of Naples, 12½ fr. one port, 12½ fr. two ports, November 10-25; Porman, 4,509, West Hartlepool, 6s. 6d., ppt.; La Goulette, 5,000, Rotterdam, 6s., November; La Calera, 4,500, Middlesbrough or Stockton, 7s. 7½d., November; Melbourne or Geelong, 6,000, 10 per cent., United Kingdom-Continent, 32s., option Sydney, N.S.W., loading, 32s. 6d., January-February; Mauritius, 2,459 net, London, 18s. 9d., November; Melbourne or Geelong, sail, 31s. 3d., United Kingdom-Continent; time charter, Black Sea trade, 4s. 3d., one round trip, spot delivery Wales, re-delivery United Kingdom-Continent; nitrate ports, 25s., United Kingdom-Continent or United States, December; Burmah, 24s. 3d., United Kingdom-Continent, February; Sulina, Novorossisk or Theodosia, 2,000, 10 per cent., (400), 9s. 6d. n.c. or any, 10s. Hamburg, option Kherson loading 3d. more, Nov. 21-Dec. 3; Novorossisk or Theodosia, 5,000, Rotterdam, 7s. 6d. one port, 7s. 9d. both ports loading, ppt.; Kustendje or Bulgaria, 7,200, Rotterdam, 8s. one port, 8s. 1½d. two ports, 8s. 4½d. three ports loading, Antwerp 3d. more, option Sulina, b.d., completing Kustendje, 8s. Rotterdam, 8s. 3d. Antwerp, 3d. less barley up to 1,500 tons 1s. 6d. extra, November; Balchik, 4,700, Antwerp, 8s., option Balchik and Kustendje 8s. 3d., with 600 tons oats 1s. 6d. extra, November; Kherson or Nicolaieff, 3,500, 9s. 6d. n.c. or any, 10s. Hamburg, 3d. extra both loading, November; Odessa, 6,400, Weser 8s., Hamburg 8s. 3d., 3d. less barley, November 20-December 8, Carthage, 5,000, Glasgow, 5s. 10½d., ppt.; Huelva, 4,300, Northern States, 10s., f.d., November; 3,300, West Hartlepool, 7s. 9d., f.d., November-December; Santander, 1,800, Rotterdam, 5s. 6d., ppt.; 2,500, 5s. 3d., November; Port Pirie, 6,500, Antwerp, 30s., ore, February-March; 29s., United Kingdom-Continent; 31s. 3d., January 15-February 15; South Australia, 3,399 net, United Kingdom Continent, 31s. 6d., option West Australia loading, 30s., January; 2,093 net, ditto, ditto, January; 31s. 3d., United Kingdom-Continent, January 15-February 15; Melbourne, sail, 31s. 9d., United Kingdom-Continent; time charter, West African trade, about 4s. 4½d., one round trip, delivery South

Wales, re-delivery United Kingdom-Continent; Sulina, 4,900, Denmark, 10s. 9d. one port, 11s. two ports, 11s. 3d. three ports, 11s. 6d. four ports, November-December; 4,800, ditto, ditto, December; 3,500, 10 per cent., 9s. 6d. n.c. or any, 10s., Hamburg, November-December; Bulgaria, 5,800, Antwerp or Rotterdam, 8s. one port, 8s. 3d. two ports, 8s. 6d. three ports loading, 1,000 tons oats 2s. extra, November; Greece, two ports, 5,400, Middlesbrough, 6s. 6d., November; Portland, Me., 2,508 net, Avonmouth or Rotterdam, 2s., November; Baltimore, 25,000 qrs., Avonmouth or Rotterdam, 2s., November-December; Rosario, 6,000, Antwerp, 11s. 3d., November; Sydney, N.S.W., 5,700, United Kingdom-Continent, 32s., December-January; Calcutta, 2,979 net, Bombay or Kurrachee, Rs. 4/14, November; Madras coast, 2,236 net, Marseilles, 27s. 6d., end November; time charter, Brazil and River Plate trade, 4s. one round trip, delivery Dunkirk, re-delivery United Kingdom-Continent, November 20-24; Weston Point, 11s. 6d., Calcutta, salt, November; West Australia, 2,206 net, United Kingdom-Continent, 30s., option South Australia loading, 31s. 3d., January.

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

### Abstracts of Contracts Open.

ALEXANDRIA (EGYPT), DECEMBER 1.—Tenders are invited for the supply of 4,000 tons of Cardiff coal and 40 tons of Newcastle coal, 180 tons of petroleum, and 7 tons of benzine, required by the Egyptian Coast Guard Administration during the year 1914. Forms from the Director of Stores, Coast Guard Administration, Alexandria.

BARNES, NOVEMBER 11.—The Barnes Council are prepared to receive tenders for the supply of coal suitable for chain grate stokers for use at their electricity works. Forms from Mr. Wm. Thos. Goodale, clerk to the Council, the Council House, High-street, Mortlake, S.W.

BECKENHAM, NOVEMBER 10.—Midland small coal, for the Beckenham Urban District Council. Forms from the Resident Engineer, Electricity Offices, 45, High-street, Beckenham.

BEVERLEY, NOVEMBER 24.—Coal, for the Corporation. Particulars obtainable from Mr. J. Willis Mills, clerk to the Local Education Authority, 31, Laigate, Beverley.

CRONDALL (HANTS.), NOVEMBER 11.—About 70 tons of good household coal, for the Crookham and Ewshot Fuel Fund Trustees. Applications to be sent to Mr. Jesse Hoar, clerk to the trustees, The Deans, Crondall, Hants.

GRIMSBY, NOVEMBER 13.—Fine slack coal (about 11,000 tons), for the Corporation. Forms from Mr. W. A. Vignoles, M.I.E.E., borough electrical engineer, Corporation Electricity Works, Grimsby.

LONDON, NOVEMBER 11.—Oil fuel for the London Fire Brigade, for the London County Council. Particulars from the Clerk of the Council, County Hall, Spring Gardens, S.W.

LONDON, NOVEMBER 18.—About 4,000 tons of South Wales coal, to be delivered at Gibraltar during 1914, for H.M. Government. Forms from the Crown Agents for the Colonies, Whitehall-gardens, S.W., on payment of the sum of £1 (returnable).

LONG LAWFORD, NOVEMBER 28.—About 30 tons of good house coal (named), for the trustees of the United Charities of Sir Edward Boughton and others, Long Lawford, to the various cottages in the parish of Long Lawford. Tenders to Mr. Edwin Wright, clerk to the trustees.

LOWESTOFT, NOVEMBER 22.—About 90 tons of best seaborne coals, for the trustees of Kirkley Poor's Land Estate. Tenders to Mr. James Burcham, clerk to the Trustees, 8, Grosvenor-road, Lowestoft South.

RAINHILL (LANCS.), NOVEMBER 24.—Slack for the Lancashire Asylums Board. Forms from Mr. J. Gornall, clerk and steward, Rainhill.

SWANSEA, NOVEMBER 15.—Coal and patent fuel for the Harbour Trustees. Forms from the Engineer at the Harbour Office.

TULLAMORE, NOVEMBER 11.—About 100 tons of Whitehaven coal and 50 tons of rough slack, for the Guardians. Tenders to Mr. T. J. Kelly, clerk of the Union, Boardroom, Tullamore.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ASHCHURCH, NOVEMBER 18.—*Water Main*.—For laying of a water main for a distance of about 4½ miles in the parish of Ashchurch, and other works in connection therewith, for the Tewkesbury Rural District Council. Specification obtained, on payment of £1 1s. (returnable), from Mr. H. A. Badham, clerk to the Council, Tewkesbury.

BEDFORD, NOVEMBER 12.—*Plant*.—The Corporation invite tenders for the following machinery: 1,000 kw. mixed-pressure turbo-alternator with exciter and condensing plant; one water-tube boiler with mechanical stoker and coal-handling plant. Specifications may be obtained from Mr. R. W. L. Phillips, borough electrical engineer, Electricity Works, Cauldwell-road, Bedford, on payment of £1.

BRADFORD, NOVEMBER 15.—*Installation*.—For the electrical installation required at the technical college, for the Education Committee. Specifications, &c., on application to the City Architect, Town Hall, Bradford.

BRISTOL, NOVEMBER 10.—*Boiler*.—New steel boiler to fit an existing locomotive, for the Docks Committee. Specification can be obtained from Mr. W. W. Squire, engineer, engineer's office, Cumberland-road, Bristol.

CAIRO, NOVEMBER 15.—*Pipes*.—Tenders will be received at the office of the Resident Engineer, Central Gharbia Drainage Projects, 3, Shari' Soliman Pasha, Cairo, for supply of approximately 18 tons of wrought iron pipes of from 30 to 70 centimetres in diameter, and in lengths from 3 to 6.50 metres, complete with wrought iron flanges and bolts.

CANBERRA (AUSTRALIA), NOVEMBER 24.—*Pumping Plant*.—Tenders are invited by the Commonwealth Department of Home Affairs for the supply of waterworks pumping plant for Canberra, the new Federal capital in New South Wales. The contract is divided into two sections, viz.:—(1) Pumps, motors and switchboards; (2) transformers and transformer switchgear. Forms, &c., from the works director for New South Wales, Custom House, Sydney.\*

CHRISTIANIA (NORWAY), NOVEMBER 28.—*Steel Rails, &c.*—Tenders are invited by the Norwegian State Railway authorities for the supply of about 17,976 tons of steel rails and fishplates and about 2,473 tons of bedplates. Sealed tenders marked "Anbud paa Skinner m.v." will be received at "Hovedstyrets Kontor for Baneanliggende, Statsbanerne," Christiania.\*

CHRISTIANIA (NORWAY), DECEMBER 1.—*Coal Discharging Machinery*.—Tenders are invited by the Norwegian Main Railway for the supply of two coal-discharging machines, each capable of discharging at least 50 tons per hour.\*

COMBS (SUFFOLK), NOVEMBER 18.—*Well, &c.*—A bored well, pumping station, covered tanks, and water mains and other appurtenances complete, for the East Stow Rural District Council. Specification at the offices of the Engineers, Caxton House, Westminster.

EPSOM, NOVEMBER 24.—*Pipes*.—About 800 12 ft. cast iron water pipes and specials, 15 in. in diameter, for the Epsom Urban District Council, according to specification of Mr. W. V. Graham, M.I.C.E., 5, Queen Anne's-gate, Westminster.

FENTON (STAFFS.).—*Shaft Deepening*.—For deepening a shaft below the 10 ft. coal for 150 yards complete. Further particulars obtainable from the Fenton Collieries Limited.

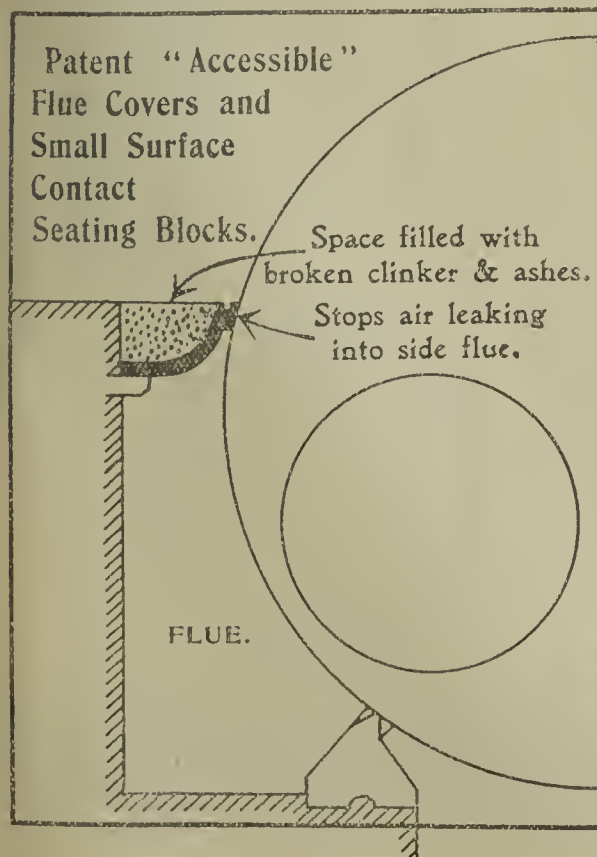
HASTINGS (NEW ZEALAND), DECEMBER 18.—*Turbo Pumps, &c.*—Tenders are invited by the Hastings Borough Council for the supply and erection of two sets of high-lift turbo pumps and electro motors, together with suction and delivery piping, &c. Specification, &c., may be obtained on payment of £2 2s. (returnable), from the Town Clerk, Hastings, New Zealand.\*

IPSWICH, NOVEMBER 10.—*Pipes*.—For supply of about 3,750 6 in. or 7 in. and 550 9 in. by 12 ft. cast iron pipes, for the Waterworks Committee. Copies of the specification from Mr. C. W. S. Oldham, engineer, Waterworks Offices, Ipswich, on receipt of £1 1s. (returnable).

LIMERICK, NOVEMBER 12.—*Engine Repair*.—For repairs and renewals to the engines at Rhebogogue Waterworks, for the Corporation. Particulars at the Waterworks Office, Town Hall.

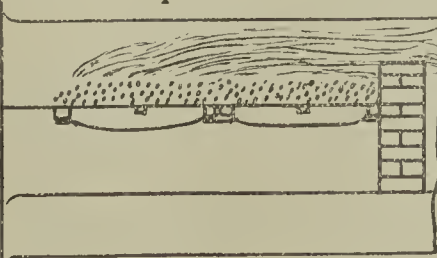
LIMERICK, NOVEMBER 12.—*Smoke Box, &c.*—New smoke box and set of tubes on boiler at Rhebogogue Waterworks,

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 7, Basinghall-street, E.C.

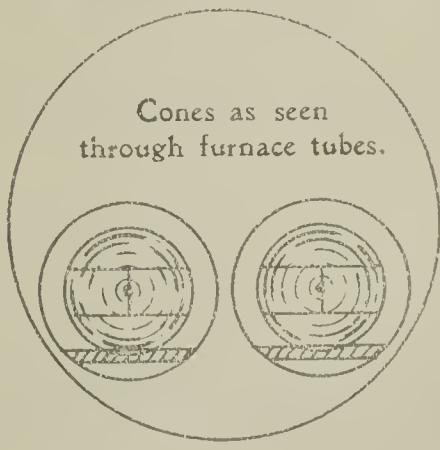
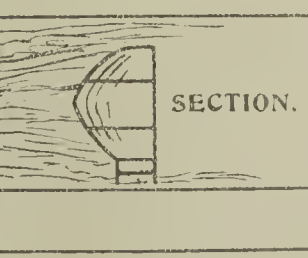


## Patent Fire Brick Cones to Divert Hot Gases against Tube Plate of Boiler.

Cones are in 4 pieces and may be fixed in one hour when cleaning flues. They may be turned half round on swivel provided.



Increases Circulation at rear end of boiler. Lowers waste gas temperature and saves fuel.



FOR PRICES AND PARTICULARS WRITE—

Messrs. JOHN KNOWLES & Co. (Wooden Box) Ltd.,

Wooden Box, nr. BURTON-on-TRENT.



The Corporation. Particulars at the Waterworks Office, Town Hall.

LONDON, NOVEMBER 10.—*Plant*.—Erection of six 3,950-k.v.a. vertical generators, three-phase, 5,000 volts; five 875-k.v.a. horizontal generators, three-phase, 5,000 volts; power-house switchboard; three complete sub-stations; 40,000-volt transmission line, for the Egyptian Government (Ministry of Public Works). Form of tender, &c., can be obtained from Messrs. Harper Bros. and Co., consulting engineers, 13, St. Helen's-place, London, E.C., on payment of £1 (returnable).

LONDON, NOVEMBER 11.—*Boiler Tubes*.—Steel boiler tubes, for the directors of the Bombay, Baroda and Central India Railway Company. Forms, with specification, can be obtained at the offices, Gloucester House, 110, Bishopsgate, London, E.C., on payment of 10s. each (returnable).

LONDON, NOVEMBER 11.—*Pumping Engine, &c.*—Erection, at the Abbey Mill pumping station, West Ham, London, E., of one steam-driven hydraulic pumping engine, capable of supplying 5 cubic feet of water per minute at a pressure of 800 lb. per square inch; one hydraulic accumulator 10 in. diameter by 8 ft. stroke; a 7 ft. 3 in. by 5 ft. 4 in. steel tank and certain pipes, valves, and fittings. Specification on application to Mr. G. W. Humphreys, County Hall, Spring-gardens, S.W., upon payment of £2 (returnable).

LLANELLY, NOVEMBER 12.—*Pipe-laying, &c.*—For carting, laying, jointing, and fixing about 22½ miles of cast iron and steel pipes, 16 in. and 14 in. in diameter, about 20 miles of 10 in., 9 in., and 8 in., and about 30 miles of 5 in. and 4 in. cast iron pipes, and the special castings and valves in connection therewith. Specifications may be obtained at the offices of Messrs. H. Rofe and Son, civil engineers, 8, Victoria-street, S.W., upon payment of £5 5s. (returnable).

MANCHESTER, NOVEMBER 15.—*Boiler*.—Lancashire boiler, 16 ft. by 6 ft. 6 in. diameter, for the Corporation. Specification can be obtained at the office of the city architect, Town Hall, upon payment of one guinea (returnable).

MELBOURNE (AUSTRALIA) DECEMBER 3.—*Steel Blooms*.—Tenders are invited by the Victoria Railway Commissioners for 25 steel blooms for piston rods for engines.\*

MERTHYR, NOVEMBER 14.—*Cast-iron Socket Pipes, &c.*—About 900 tons of 10 in. cast iron socket pipes, with specials, bends and irregulars, &c., for the Corporation; also, as an alternative, for 1,540 tons of 14 in. pipes, &c. Specification and form of tender from the waterworks engineer, Town Hall.

PRETORIA (SOUTH AFRICA), JANUARY 7.—*Pumping Plant*.—Tenders are invited by the Union Tender Board for the supply and erection of a pumping plant at Glen, Orange Free State. Specifications obtainable from the Director of Irrigation, P.O. Box 399, Pretoria, on deposit of the sum of £2 (returnable).

OUCHTERARD (IRELAND), NOVEMBER 30.—*Wells*.—For the sinking of 23 new wells, and deepening, enclosing and improving 21 existing wells, for the District Council. Tenders to Mr. P. A. Joyce, clerk to the Council, board room, Oughterard, Galway.

RHYL, NOVEMBER 19.—*Diesel Engine Set*.—For the Rhyl Urban District Council, one 160-kw. Diesel engine set. Specification from electrical engineer, Mr. E. H. Wright, Electricity Works, Rhyl, on payment of a deposit of £1 1s. (returnable).

SOFIA (BULGARIA), NOVEMBER 17.—*Electric Power Plant*.—Tenders are invited for the supply and erection of the machinery required for a central electric generating station at the "Pernik" State coalmine. The estimated value of the contract is 200,000 fr. (£8,000), and includes three water-tube boilers, two double-expansion horizontal engines of 250-horse power each, two three-phase dynamos, switchboards, transformers, &c., and a centrifugal pump of 500 litres per minute capacity driven by electric motor.\*

VALENCIA (SPAIN), NOVEMBER 18.—*Crane*.—Tenders invited for supply of an electric crane for discharging coal at Valencia Harbour.\*

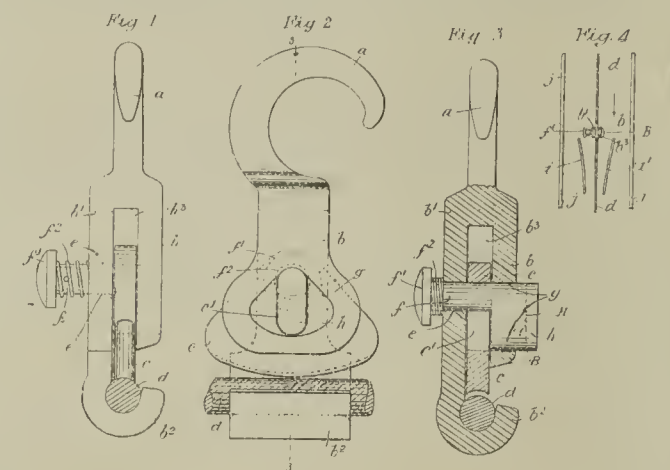
WONTHAGGI (VICTORIA, AUSTRALIA), NOVEMBER 12.—*Haulage Engine*.—Tenders are invited by the Victorian Railways Commissioners for the supply and delivery of a haulage engine (mechanical portion only) and a 200-horse power electric motor and equipment, for the State coalmine.\*

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

**Partnerships Dissolved.**—The London Gazette announces the dissolution of the following partnerships:—T. Cash, C. B. Bishop and C. R. Durban, carrying on business as coal contractors, at Corporation-street, Birmingham, under the style of Thomas Cash and Co.; W. Hurst, T. G. Schofield, G. Schofield, W. Hurst and G. Hurst, carrying on business as machinists, at Atlas Works, Bentinck-street, Ashton-under-Lyne, under the style of Schofield and Co.; W. Grimes and G. Cranmer, carrying on business as coal merchants, at St. Vincent-street, Birmingham, under the style of William Grimes; E. G. Todd and L. A. Evans, carrying on business as electrical engineers, at High-street, Sntton Coldfield, under the style of Clive and Co.; R. C. Clephan, H. S. Clephan and L. C. Nielsen, carrying on business as iron merchants, at High Bridge, Newcastle-on-Tyne, under the style of Clephan and Wiencke; J. Noble and J. H. Clemitson, carrying on business as engineers and millwrights, at Folling-on-Tyne, under the style of John Noble and Co.; T. Croft and J. Ewan, as engineers and agricultural implement manufacturers, at North-road and the New Market Entrance, both in Lancaster, and at Chapel-yard, Preston, under the style of Croft and Ewan; F. S. Ashdown and C. H. M. A. Vere, carrying on business as electricians, at The Broadway, Church End, Finchley, under the style of Francis Roade and Co.; W. H. B. Hope and C. W. Harris, carrying on business as engineers, at Chewton Mendip, under the style of C. W. Harris and Co.; J. B. S. Bunch, C. R. Bunch, carrying on business as iron and steel merchants, at Canal Wharf, Wallsall, under the style of Bunch and Co.

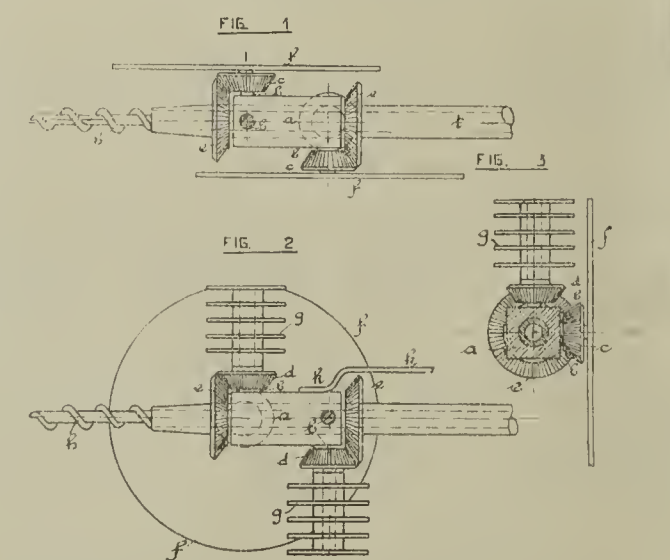
# ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

8733 (1913). *An Improved Haulage Clip for Endless Ropes*.—W. Galloway, F.G.S., of 19, Park-place, Cardiff, South Wales.—Relates to haulage clips having two parallel arms between which is pivoted a cam, one of said arms being longer than the other and formed with a curved end to partly surround the rope, and when in use the cam presses the rope against the said curved end. The object is to construct an improved clip of this type in which the cam may be readily released from the rope and which clip may be readily placed in position on the rope and be readily removed therefrom. Fig. 1 is an end elevation of the improved clip in position on a rope; fig. 2 is a side elevation of the same, and fig. 3 is a section on the line 3—3 of fig. 2 showing the cam released; fig. 4 is a plan showing diagrammatically an apparatus for automatically releasing the cam from the rope. When the head *f* of the pin *f* is pushed or knocked towards the adjacent arm *b*, as shown in fig. 3, thereby compressing the spring *f*, the key *h* is moved out of the opening *c* in the cam *c*; consequently the cam *c* is free to rise between the parallel arms *b*, *b*, the sides



of the opening *c* in the cam *c* being wide enough apart to slide over the circular pin *f*. When the cam *c* has been raised by lifting the rope *d*, or by pressing the clip downwards, the clip can be readily removed from the rope, as ample space is provided to allow the rope to pass between the lower end of the shorter arm *b* and the upper part of the curved end *b* of the other arm *b*. The pin *f* projecting laterally from the arm *b* is in a convenient position to receive a blow or push to release the cam *c*. The key *h* may be of less width as indicated by the dotted line *H* in fig. 3, and the lower part of the arm *b* may be provided with a projection *B* as indicated in dotted lines in fig. 3. It will be noticed that this projection *B* extends slightly beyond the outer face of the key *h* indicated by the dotted line *H* when the key is moved out of the cam *c*. This modification enables the head *f* of the pin to be pushed towards the arm *b* by a cam or slope *i* fixed in the path of the head *f* for automatically releasing the key from the cam. When such a fixed releasing cam *i* is employed a second fixed cam or slope *i* may be employed on the opposite side of the clip against which slides the projection *B*, and this latter prevents the second cam or slope *i* coming in contact with the key *h*, thus allowing free motion of the key *h*. In fig. 4 *j j*, indicate the rails upon which the wagons run. (Four claims.)

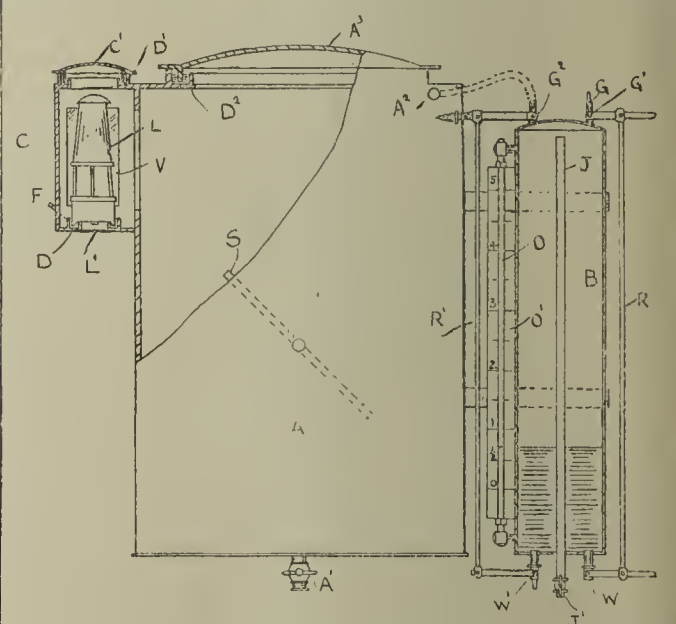
9448 (1913). *Coal-cutting Machine*. A. Scharf, of No. 2, Westerbleichstrasse, Dortmund, Germany.—Has for its purpose to arrange between the main cutting discs separate auxiliary milling cutters driven by shafts which stand perpendicular to the main shaft and designed to smoothly cut through the agglomerated coals, whereby the cutting of the coal is considerably accelerated and facilitated without any shocks or vibrations. Fig. 1 is a plan view of the improved coal-cutting machine; fig. 2 is a side elevation,



and fig. 3 is a front elevation of the same, one of the cutting discs being removed. In order to prevent the whole apparatus from turning around the shaft *t*, a handle *k* is fixed to the cast iron body *a*, by means of which the miner maintains the apparatus in the proper position. The shaft *t* is driven in the well-known manner by compressed air. The coaldust is blown out of the slot by means of air under pressure forced through the hollow driving shaft *t*. The gearing is protected by a close-fitting casing, not shown in the drawings. (One claim.)

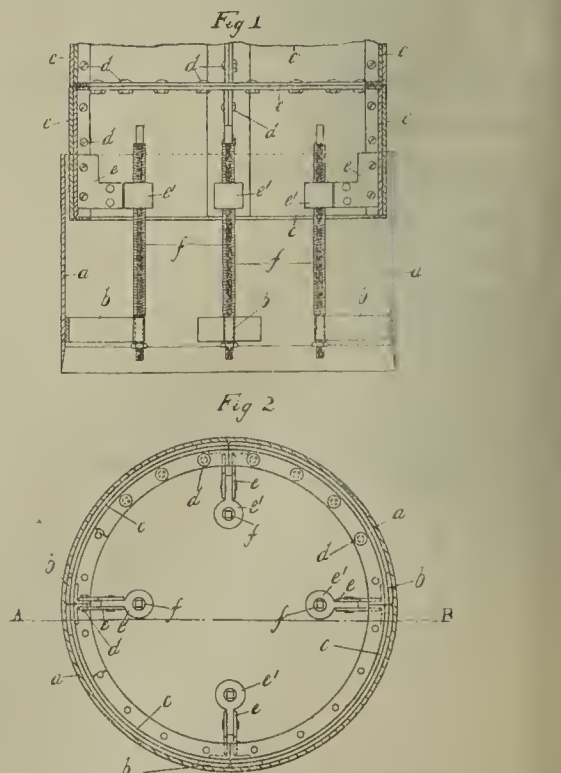
23968 (1912). *Improvements in or Relating to Testing Chambers for Miners' Safety Lamps or the Like*. E. A. Hailwood, of 7, Gladstone-terrace, Morley, near Leeds, Yorkshire.—Has reference to improvements in or relating to testing chambers, particularly the class for observing the percentage of a gas mixture by the height of a cap shown on a miners' safety lamp, and is an improvement in or a modification of the invention described in prior Specification No. 7388/10. The accompanying drawing represents a general view of the apparatus partly in section. To operate

the machine the gas tap *G* in the measuring chamber top plate is connected by means of rubber piping or the like to the source of supply, and after the water outlet tap *W* at base of such chamber has been opened, gas is allowed to displace the water with which the measuring chamber *B* is filled through tap *W* until the contents of the water-gauge show that just sufficient water is left in the chamber to form an effective water seal at the bottom of the chamber, this point being denoted by mark zero on gauge. Tap *J* at base of chamber for outlet of gas is then opened to allow any surplus gas of the measuring chamber, over and above atmospheric pressure in the mixing chamber, to escape, after which it is immediately closed; the tap *G* is then opened also water tap *W*, and water allowed to enter the bottom of the measuring chamber *B* to a desired point marked on the water-gauge or scale connected with the measuring chamber representing the quantity of gas to be passed into the mixing chamber *A* which is normally full of air, air outlet tap *A* at base of mixing chamber *A* being opened to allow the escape of surplus air from such chamber, this being then replaced by the gas through connecting tube from measuring chamber *B*, the tap *G* in this connecting tube being closed when the water in the gauge indicates the required quantity, as shown by the mark on scale to which



level the water therein has risen, the tap *W* being simultaneously closed. A tray containing caustic soda or ordinary ground lime may be placed inside and resting on the bottom of the mixing chamber *A*, the contents of such tray absorbing the carbonic acid gas which may be given off by the lamp. In a modified form the measuring chamber is preferably fixed on to the crown of the mixing chamber. In this form the whole of the apparatus would be filled with water or the like, a cock being then opened and a certain proportion of water allowed to drain out, thereby drawing in a given amount of gas; the gas cock is then closed and an additional cock to the air is opened and the balance of the water allowed to drain out, drawing in a corresponding amount of air, after which the air-valve is closed and the contents of the chamber well mixed. A valve communicating with the lamp observation chamber is then opened, and at the same time a valve communicating with the water service is opened, and water is allowed to run back into the mixing chamber, thus causing the gaseous contents of the chamber to move out into the lamp observation chamber; this latter may be provided with an outlet for the products of combustion and unconsumed gas to escape. The gas may enter the chamber either at the top, bottom or sides. In another modified form the entrances and exits to the observation chamber *C* may be made of funnel shape. (Twelve claims.)

25601 (1912). *Improvements in Sinking or Driving Shafts, Wells and the like in Soft or Running Strata and in Apparatus therefor*.—J. Crompton, 379, Ainsworth-road, Radcliffe, near Manchester, Lancashire.—Relates to improvements in and in apparatus for sinking or driving shafts, wells and the like in or through soft or running strata such as peat bog, loam, quicksand, gravel and the like. Fig. 1 is a sectional



side elevation taken through the plane of the line A—B, fig. 2, and fig. 2 is a plan of the same, partly sectional. A shield *a* is employed consisting of a cylinder of cast iron, steel or other suitable metal, and of a diameter corresponding approximately to the size of the shaft or well to be sunk or driven. On the inner side of the shield *a*, at a



convenient distance from the bottom or end, is fixed a suitable number of brackets *b*. This shield *a* is placed on the soil where the shaft or the like is to be sunk. Inside the shield *a* is fitted an inner cylinder *c*, built up of, say, four flanged segments or sections bolted or otherwise secured together as at *d*, and with good joints made by suitable packing. When the segments or sections have been secured together to form the inner cylinder *c*, to them is bolted a series of brackets *e* corresponding in number and position to the brackets *b* on the shield *a*, and the upper and lower series of brackets *e* and *b* connected together by screwed rods *f*, which pass through nuts or threaded portions *e*<sup>1</sup> formed to receive them in the upper brackets *e*. Whilst making or sinking the shaft, these screwed rods *f* are manipulated from a convenient platform, placed and supported inside the inner cylinder *c* by ratchet gearing or the like (not shown) to force the shield *a* down or forward into the soft strata, and so prevent the material penetrating the shaft from the sides. When a sufficient depth of material has been taken out of the shaft to allow other segments to be fixed in position and thereby complete another ring of the inner cylinder *c*, the top brackets *e* with the nuts or threaded portions *e*<sup>1</sup> are removed and attached to the last ring and the work proceeded with in the manner above described. In this way and by the means described the shield *a* is forced forward or downward a stage, the soft strata of the shaft are removed, a new ring of the inner cylinder *c* is formed, the shield *a* is then forced downward or forward another stage by the screwed rods *f*, and this procedure is repeated in the manner described until the shaft is completed and lined throughout its entire length by the built-up inner cylinder *c*. (Two claims.)

27264 (1912). *An Improved Apparatus for Testing Gas with Miners' Safety Lamps*. W. Baxter, of Priory-road, Bolton-upon-Deane, near Rotherham, Yorkshire.—Relates to a safety lamp gas testing apparatus of the kind in which a mixture of inflammable gas and air in known and adjustable proportion is introduced at the top of the observation chamber and flows downwardly and out at the bottom of the chamber, an ejector or its equivalent producing or assisting in the flow of the mixture through the apparatus. Fig. 1 is a front view, partly in section, of an apparatus; fig. 2 is a vertical section at right angles to fig. 1; fig. 3 is a transverse section through the observation chamber showing the floor thereof; fig. 4 is a similar section through the passages below the observation chamber, and fig. 5 is a like section through the chamber support showing the arrangement of the valves, gauges and shelves; figs. 6 and 7 are vertical and transverse sections respectively showing the construction of the gas measuring device; and figs. 8 and 9 are a section and plan respectively showing the mode of securing safety lamps within the apparatus in such a manner that they may be manipulated from without. In practice the apparatus is first standardised in the following manner:—A safety lamp is used on the reduced flame of which the aureole or cap formed by a certain percentage of the gas is known by experiment in a mixture of the gas and

yard. It is also impossible to prop up the steelyard *A* with the same object in view, due to the swing of the door *C*. The printing handle *F* is locked to prevent a record being printed when the door *C* is open, by means of the catch *F*<sup>1</sup> attached to the sliding bolt *F*<sup>2</sup>. The fingers *G* and *G*<sup>1</sup> are prevented from coming together when the steelyard is not balanced by the thickness of the said angle plate *H*, and so the printing lever *F* remains locked even when the

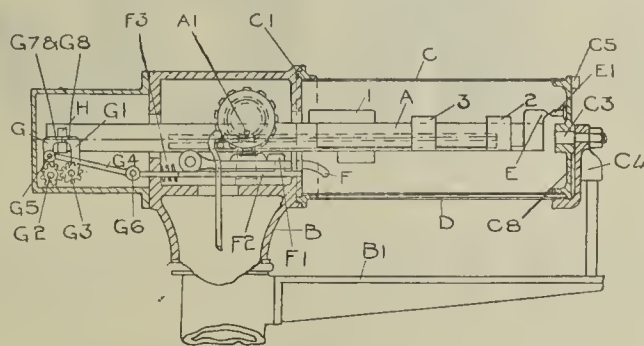


FIG 1

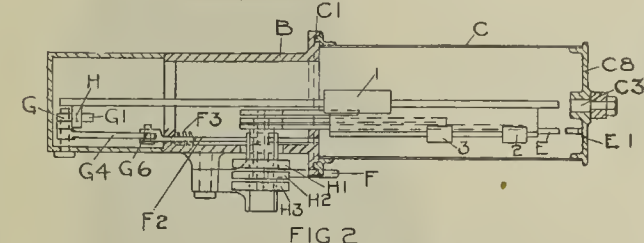
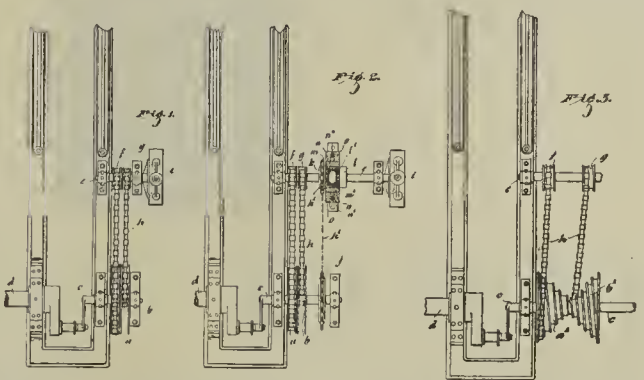


FIG 2

door *C* is closed. The steelyard is not subject to any disturbance upon its fulcrum when pinched by the fingers *G*<sup>7</sup> and *G*<sup>8</sup>. The bolt-locking mechanism is entirely concealed from the weighman, and cannot be tampered with. The printing lever *F* presses the ticket against the type to produce a record in the usual way. (Three claims.)

29243 (1912). *A New or Improved Controlling Device for Preventing Overspeeding and/or Overwinding for Use in Connection with Winding or Hauling Engines and the like*. J. Kirkby, of Bridge-street, Pilsley, Derbyshire.—Relates to a variable speed drive which is adapted to maintain the speed of the governor at such a degree as to enable the same to have an effective controlling influence over the engine to the end of the wind irrespective of the speed at which the engine is run, the speed of the governor being maintained at the normal or near cut-off so as to gradually reduce or retard the speed of the engine. The figures illustrate in plan various forms of the variable speed drive according to the invention. As the engine commences the wind in either direction, one of the drums being empty and the other full, the empty drum will commence to wind upon itself the flat flexible chain. This chain being connected to the shaft of the governor, during the acceleration period, the speed of the governor will gradually increase to the normal at about half, or any other required period of the wind. After passing this point, the winding of the chain upon itself and its consequently gradually increasing diameter will keep the governor speed at its normal, and every increment thus produced will cut off the steam, thus bringing about a gradual reduction of engine speed during the retard period till the engine is finally brought to a standstill by dead stop gear or the like. An automatic control device is advantageously employed in connection with the invention having automatically advancing controlling points or trips for effectively counteracting any tendency of the engine to race. By so proportioning the thickness of the chain or by preparing a scrolled path for it, the curve of the drums may be so designed as to give the governor entire control over the engine right up to the end of the wind, ultimately bringing it to rest by this automatic means alone without necessitating the use of a brake or dead-stop gear. The action of



the device by means of scrolled drums will be understood by reference to fig. 3 of the drawings in which two conical or substantially conical drum members *a*<sup>1</sup>, *b*<sup>1</sup> are fixed upon the driving shaft *c*, and on each drum a scrolled, spiral or like groove or pathway is formed with which the chain *h* is caused to engage and along which it travels up and down, so as to gradually increase the diameter or decrease same according to the direction of wind. These drums may, if desired, be connected together, or be formed of a single double conical member as illustrated in fig. 3. In cases where the full speed period is long—such as, for example, in the metalliferous mines, and it is desired that the governor shall be in operation during the length of the run—it is feasible and advantageous to have an extra chain wheel *j* of the gear tooth or sprocket type on the driving shaft *c* (see fig. 2), such wheel *j* to be of a suitable diameter, that when it is connected by a chain *h*<sup>1</sup> and intermediate gears and double acting reversible clutch to the governor *i*, it will drive the governor *i* at the correct controlling speed required, the governor always revolving in the same direction through the action of the double-acting reversible clutch, which action may be either automatic or performed by a subsidiary rod or member from the reversing or other lever of the winding or hoisting engine. The automatic double-acting reversible clutch device for effecting the drive of the governor in one direction only may advantageously comprise a free wheel sprocket or like member *k*, mounted upon the shaft *e* to receive chain *h*<sup>1</sup>, and to rotate the shaft *e* when turning in one direction only. The action of this arrangement is such that when the engine is running in one

direction—say the forward direction—the free wheel sprocket *k* is coupled in a direct manner to the governor drive shaft *e*, and thereby rotates same in a direct manner, the ratchet-toothed housing member *n* with differential pinions *m*, *m*<sup>1</sup> and free wheel member *l* being free to revolve in the same direction. When the engine is reversed the sprocket *k* revolves freely round the shaft *e*, and as the housing member *n* is prevented by pawls *n*<sup>1</sup> from revolving, the differential pinions *m*, *m*<sup>1</sup> effect a turning movement of the wheel member *l* in an opposite direction to that of the member *k*, which member, being locked to the shaft *e* when revolving in this direction, causes the necessary rotation of said shaft and continues to drive the governor in the same direction. (Eleven claims.)

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

- 24259. Hoisting and lowering gear. L. Tabulo.
- 24279. Couplings for railway carriages, wagons and the like. J. Darling.
- 24285. Haulage clips. A. Dootson.
- 24297. Process of treating cast iron. J. E. Johnson, jun.
- 24309. Railway coupling. A. Sprengel.
- 24318. Appliances for localising the effects of mine explosions. J. F. Balfour.
- 24329. Gas producers. B. Versen.
- 24349. Condensing plants. P. Christlein and G. Möller.
- 24355. Magnetic separators. Fried. Krupp Akt.-Ges. Grusonwerk.
- 24387. Softening and purification of water. W. E. Evans. (J. D. Riedel Akt.-Ges., Germany).
- 24397. Buffers for railway wagons and the like. D. W. Rees and W. G. Moreton.
- 24402. Signalling devices for mines applicable also for other purposes. W. C. Mercer.
- 24421. Loading and conveying machines. F. Billings.
- 24426. Process for distilling coal for obtaining gas, oil and ammonia. R. MacLaurin.
- 24473. Process for refining crude mineral oils and the like. A. Burkhardt.
- 24516. Improvements in turbine and centrifugal pumps to prevent overloading of electric or other motors, driving arrangements and the like used for driving such pumps. J. Taylor and L. W. Weil.
- 24524. Magnetic locking and unlocking of miners' safety lamps. J. H. Rothwell, J. Roberts and W. H. Roberts, trading as J. H. Rothwell and Co.
- 24532. Steam boiler settings. Babcock and Wilcox Limited. (Babcock and Wilcox Company, United States.)
- 24570. Method of preventing corrosion on ships' bottoms and other or steel iron structures. A. C. A. Holzapfel.
- 24575. Deep drilling apparatus. V. Petit.
- 24595. Impregnating wood. F. T. Brooks.
- 24615. Conveyor-actuating mechanism. R. H. Archbald and F. E. Davies.
- 24624. Brakes for railway wagons and like vehicles. S. R. Parkes and F. D. Pilkington.
- 24635. Ore classifiers. A. James.
- 24666. Distillation process. C. W. Fulton and J. Meikle.
- 24687. Brickmaking apparatus. P. Dervaux.
- 24694. Pumps, motors and the like. S. Z. de Ferranti.
- 24738. Treatment of waste sulphite lye. G. T. Onsager.
- 24751. Coal-tipping apparatus. G. Carrick.
- 24791. Appliance for supporting and liberating pit props and chocks used in coal and other mines. J. Green.
- 24792. Indicator for recording signals in mines. J. H. Eimason, W. T. Garton and T. Eddleston.
- 24800. Pumps or compressors for dust-removing and other purposes. F. H. Gilbody.
- 24822. Roller and ring mills for grinding, crushing, pulverising and the like. J. Y. Johnson. (Gebrüder Pfeiffer, Germany.)
- 24823. Manufacture of ammonia. J. Y. Johnson. (Badische Anilin und Soda Fabrik, Germany.)
- 24830. Manufacture of explosives. A. T. Cocking, and Kynoch Limited.
- 24839. Manufacture of explosive substances. C. Classen.
- 24850. Electric furnaces. I. Rennerfelt.
- 24950. Weighing machines. N. W. van Westerborg.

### Complete Specifications Accepted.

To be published on November 20, 1913.

1912.

- 17427. Treatment of peat. Rigby, and Wetcarbonising Limited.
  - 24639. Wet carbonisation of peat. Rigby, and Wetcarbonising Limited.
  - 24764. Construction of shafts for coalmines and the like. Harris.
  - 24797. Rotary compressors. Morgenschweis.
  - 28196. Safety devices for use in controlling power engines, turbines or the like. Gagg.
  - 28525. Pumps. Merryweather.
  - 28804. Collapsible gates. Kell and Dagley.
  - 29162. Respiration apparatus. Dräger.
  - 29568. Manufacture of sulphuric acid. Burkhardt.
- 1913.
- 2220. Drill. Pokorny and Wittekind Maschinenbau Akt.-Ges.
  - 2221. Drill. Pokorny and Wittekind Maschinenbau Akt.-Ges.
  - 2416. Means for emptying furnaces, boilers, and the like. Penter.
  - 2776. Hydraulic percussion drilling machines. Van Es.
  - 3658. Guards for air propellers or fans. Pintsch's Electric Manufacturing Company, and Vidal.
  - 4087. Construction of water-tube boilers. Broadbent.
  - 4331. Oiling apparatus for the axles of hutches and the like. Menzies and Wardlaw.
  - 4942. Apparatus for rendering possible a smokeless combustion of the fuel in furnaces for steam boilers and the like. Gruenwald.
  - 5810. Manufacture of briquettes. Bloxam. (Hoesch and Co. and Platsch.)
  - 5914. Dust arrester or collector for use with rock and the drilling and boring machines. Taylor.
  - 7388. Loading and unloading apparatus. Gotti.

(Continued on page 966.)

air obtained by measurement or other means. Assuming that a 4 per cent. mixture produces a cap 1 in. high on the reduced flame of the particular safety lamp to be used, and that the apparatus is fitted with six percentage taps *O*<sup>1</sup>, *O*<sup>2</sup>, *O*<sup>3</sup>, *O*<sup>4</sup>, *O*<sup>5</sup> and *O*<sup>6</sup>, in the ratio of  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{6}$  and 4 (referred to hereinafter as  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{6}$  and 4 per cent. taps respectively), then the apparatus is put into operation so that a flow of air only is promoted through the observation chamber when the air regulator cock *G*<sup>1</sup> is open. The safety lamp with reduced flame is placed inside the observation chamber, the door closed, and the 4 per cent. tap *O*<sup>6</sup> is opened. The gas mixes with the air passing through the apparatus, but in an unknown proportion, and the effect of the gas on the reduced flame of the lamp is observed through a window of the chamber. The air regulator cock is then adjusted until the proper proportion of air is admitted so that the gas in the mixture forms a cap 1 in. high on the flame of the safety lamp and it is known that the mixture contains 4 per cent. of gas. The apparatus is thus standardised. If now a 3 per cent. mixture is required, it is only necessary to close the 4 per cent. tap *O*<sup>6</sup> and open the 3 per cent. tap *O*<sup>5</sup>, and in a few seconds the proper mixture will be passing through the apparatus, and so on for any other mixture desired, which it is possible to obtain by having open any one or more of the percentage taps. (Five claims.)

28626 (1912). *Improvements in Weight-recording Devices for Weighing Machines*. S. Denison, Haaslet Foundry, Leeds.—Relates to an improvement in or modification of the invention described in the Specification No. 22484/11. The prior invention has reference to the steelyard type of weighing machine, which has all the weighing members totally enclosed, and is provided with type-printing mechanism, which is rendered inoperative except when the weighing members are in equilibrium. The object of this invention is to provide means for preventing the fraudulent printing of an incorrect weighing, while maintaining the customary form of steelyard weighing machine, manipulated by hand in the usual manner. Its novelty consists in preventing any record being printed until the steelyard is in equilibrium and also temporarily enclosed from interference. Fig. 1 is in elevation, and fig. 2 is in plan. It is impossible for the operator to fasten the two indicators together into the balanced position in order to render printing possible regardless of a true balance of the steel-



# **THE RECORD**

# **840**

**square feet in one shift with  
one "Siskol" Coal-Cutter.**

---

**INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.**



The OFFICIAL figures recently published by H.M. Home Office show that in the Manchester District, for 1910, there were 152 Coal Cutters, of eleven different types, in use, of which 81, or more than half of the total number, were "SISKOL" machines.

Is any further proof needed as to which is the best Coal Cutter?

---

INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.



7483. Manufacture and production of new derivatives of the anthracene series. Newton. (Farbenfabriken vorm. F. Bayer and Co.)
8168. Ropeways. Hansen.
9321. Steam-distributing valve for direct-acting steam pumps. Gourlay, Jackson, and Johnstone.
9243. Valve casings for pumps. Fritz and Butler.
10684. Coke ovens. Dr. C. Otto and Co.
11165. Water-tube steam boilers. Todd.
11166. Safety signalling apparatus for use in mines. Nelson.
11816. Pneumatic hammers for riveting, chipping, dressing, and the like. Ateliers Leonard Rocour (Soc. Anon.) and Eloy.
12833. Process for the utilisation of exhausted gas-purifying material. Madsen.
13518. Retort furnaces. Gohmann.
15050. Chains. Dodge.
16980. Brakes for railway and the like wagon. Morris.
19480. Centrifugal pumps. Siemens Brothers Dynamo Works Limited. (Siemens Schuckortwerke Ges.)
21668. Hoists or lifts for conveying loads of all kinds. Schlösser.

Complete Specifications open to Public Inspection before Acceptance.

1913.

16760. Self-unloading tipping-wagons. Horn.
20924. Cupolas. Tropenas and another.
21447. Dumping receptacles. Fried. Krupp Akt.-Ges.
23515. Supporting means for scrapers, fuel economisers, superheaters, or the like. Hardy and another.
23729. Turbines. Cappa.
23804. Travelling roller trains for rolling-mills. Poldihutte Tregelgusztahlfabrik.

**Panama Exposition: British Representation.**—An influential British committee is now in process of organisation with a view to asking the Government to reconsider its decision against an official participation in the Panama-Pacific Exposition at San Francisco in 1915. The organising committee, of which Mr. W. A. M. Goode is hon. secretary, with offices at Trafalgar-buildings, Trafalgar-square, London, W.C., already includes such names as Lord Aberconway, Lord Airedale, Col. Sir Charles Allen, David Davies, Esq., M.P., Marquess of Graham, Sir Robert Hadfield, F.R.S., Sir Charles S. Henry, Bart., M.P., Sir J. S. Harmood-Banner, M.P., D. M. Stevenson, Esq., Sir William Mather, and D. A. Thomas, Esq. It is felt that further consideration may well lead to a change in the attitude of the Government, and it is the object of the organising committee to place authoritatively before the Government information which has been obtained in favour of reversing or substantially modifying its policy in this matter. For this purpose the Prime Minister will shortly be asked to receive a deputation, who will lay the views of the committee before him.

### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

Consular and Trade Reports, 1912: Ashanti, 4½d.; Finances of Greece, 1912-13, 3d.; Honduras, 4½d.

Report of the Distress Committees in Scotland under the Unemployed Workmen Act, 2½d.

Pauperism Statement for September, 2d.

List of Quarries for 1912, 5s. 6d.

LIST OF MINES FOR 1912, 4s. 5d.

Census of England and Wales, 1911, Vol. 9, Birthplaces, 2s. 11d.

The Law of Real Property Bill, 1s. 8d.

Boiler Explosion Reports: No. 2248, Cast Iron Steam Heating Chest at Manchester, 2½d.; No. 2268, Cast Iron Blown-down Pipe at Lynn Saltworks, 2½d.

Royal Commission on Metalliferous Mines and Quarries, Thirty-sixth Day, January 18, 1912, 1s. 0½d.

Report on the Supply of Electricity in Germany, 2½d.

### PUBLICATIONS RECEIVED.

INDUSTRIAL UNREST AND TRADE UNION POLICY. By Charles Booth. London: Macmillan and Co. Limited. Price 2d.

THE DEBENTURE: ITS USES AND ABUSES. By Herbert W. Jordan. London: Jordan and Sons Limited.

THE "MECHANICAL WORLD" POCKET DIARY AND YEAR BOOK FOR 1914. Manchester: Emmott and Co. Price 6d.

"Journal of the Canadian Peat Society" (Vol. 2, No. 3), August, price 25 cents; "The Engineering Review" (Vol. 27, No. 4), October, price 6d.; "Annales des Mines" (Tome 4, No. 10); "Bulletin of the American Institute of Mining Engineers" (No. 82), October, price 50 cents; "Le Mois Scientifique et Industriel" (No. 170), October, price 2 fr.; "The Naturalist" (No. 682), November, price 7d.; "Cassier's Engineering Monthly" (Vol. 44, No. 5), November, price 1s.

**Grimsby Coal Exports.**—During the week ended Friday, October 31, the exports of coal from Grimsby were shown by the official returns to be:—Foreign: To Antwerp, 717 tons; Dieppe, 958; Esbjerg, 426; Faroe, 10; Gothenburg, 2,288; Graso, 1,230; Hamburg, 832; Herrang, 1,421; Kallero, 1,530; Kallundborg, 1,725; Christiansand, 570; Landsrona, 1,303; Malmo, 4,706; Nexø, 517; Porsgrund, 351; Ronne, 934; Rotterdam, 402; Sundswall, 1,705; Westervik, 660; and Ystad, 2,150. Coastwise: To London, 107 tons. Total, 24,435 tons foreign and 107 tons coastwise, compared with 28,210 and 879 tons respectively during the corresponding week last year.

### CATALOGUES AND PRICE LISTS RECEIVED.

Bulletin No. 148, issued by the Chicago Pneumatic Tool Company, deals with valveless hand drills and portable compressors driven by gasoline engines. Another list relates to a new Corliss-type steam-driven compressor, and which is capable of high-speeds for high capacities.

We have received from Sir W. H. Bailey and Co. Limited (Albion Works, Salford) a leaflet describing Clausen's patent direct-contact feed-water heater, grease-skimmer and air-exPELLER. The feed-water is heated by means of steam from the L.P. casing, or exhaust steam may be utilised; consists of a cast iron tank with two compartments, into one of which the greasy water from the hot well is led through a valve and perforated nozzle to meet the exhaust steam which imparts to it a whirling motion. The purified and heated water passes into the second compartment, where it is controlled by a float-valve. The feed pumps (Davidson patent), which draw this water through the valve, have the important feature of being unable to draw air.

A special issue of the periodical published by the Draegerwerk Lubeck has reached us dealing with the Draeger apparatus used in the international rescue service. Illustrated descriptions are given of the Draeger oxygen rescue apparatus, potash cartridge, reviving apparatus, diving rescuer for submarines, self-contained diving apparatus, aeronautical apparatus, and autogenous cutting system. The booklet is produced in the most artistic style and is embellished by numerous drawings and photographs. As regards mines, it may be noted that the firm claim that 168 lives have been saved by means of the rescue apparatus in the last five years, including 30 at the Cherry mine, Illinois, in 1909, and 50 at the North Lyell mine, Tasmania, in 1912.

Messrs. Evershed and Vignoles Limited (Acton-lane Works, Chiswick, W.) send us three of their latest catalogues. The first deals with the Murday recording ammeters and voltmeters, the chief feature of which is the form of the Murday pen. The pen secures a chart having rectangular co-ordinates, and its action is entirely independent of level, being carried on knife edges in a stirrup. Some new types figure in the list; a new 24-hour drum chart instrument is introduced, and a disc-chart instrument (Binsted's patent) is described which has the merit of producing a true polar curve. There is also a new catalogue of "megger" testing sets, with some new features of interest; these include a motor-driven "bridge megger" set for prolonged testing, and a high-range insulation testing set for values of resistances up to 5,000 megohms. The third list relates to portable indicating ammeters and voltmeters, including a combination instrument; a portion of the catalogue is devoted to dynamometer type instruments, including wattmeters, for all classes of service.

## PREVENT COLLIERY EXPLOSIONS.

Don't delay, write at once  
for full particulars of . . .

Allen's Special Plant

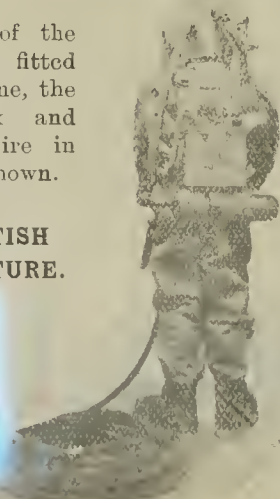
for making

# STONE DUST.

Edgar Allen & Co. Ltd.,  
IMPERIAL STEEL WORKS,  
SHEFFIELD.

Illustration of the apparatus fitted with telephone, the battery box and telephone wire in lifeline is shown.

ALL-BRITISH  
MANUFACTURE.



## SELF-CONTAINED DIVING APPARATUS

(NO AIR PUMPS OR TUBES REQUIRED).

Designed more particularly for work in Flooded Mines and other difficult situations where the use of Air Pumps and Tubes would be impracticable.

This apparatus, in its original form, was used with great success when the Severn Tunnel (Great Western Railway) was flooded in 1880.

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TABLE I.

SECTION c-d

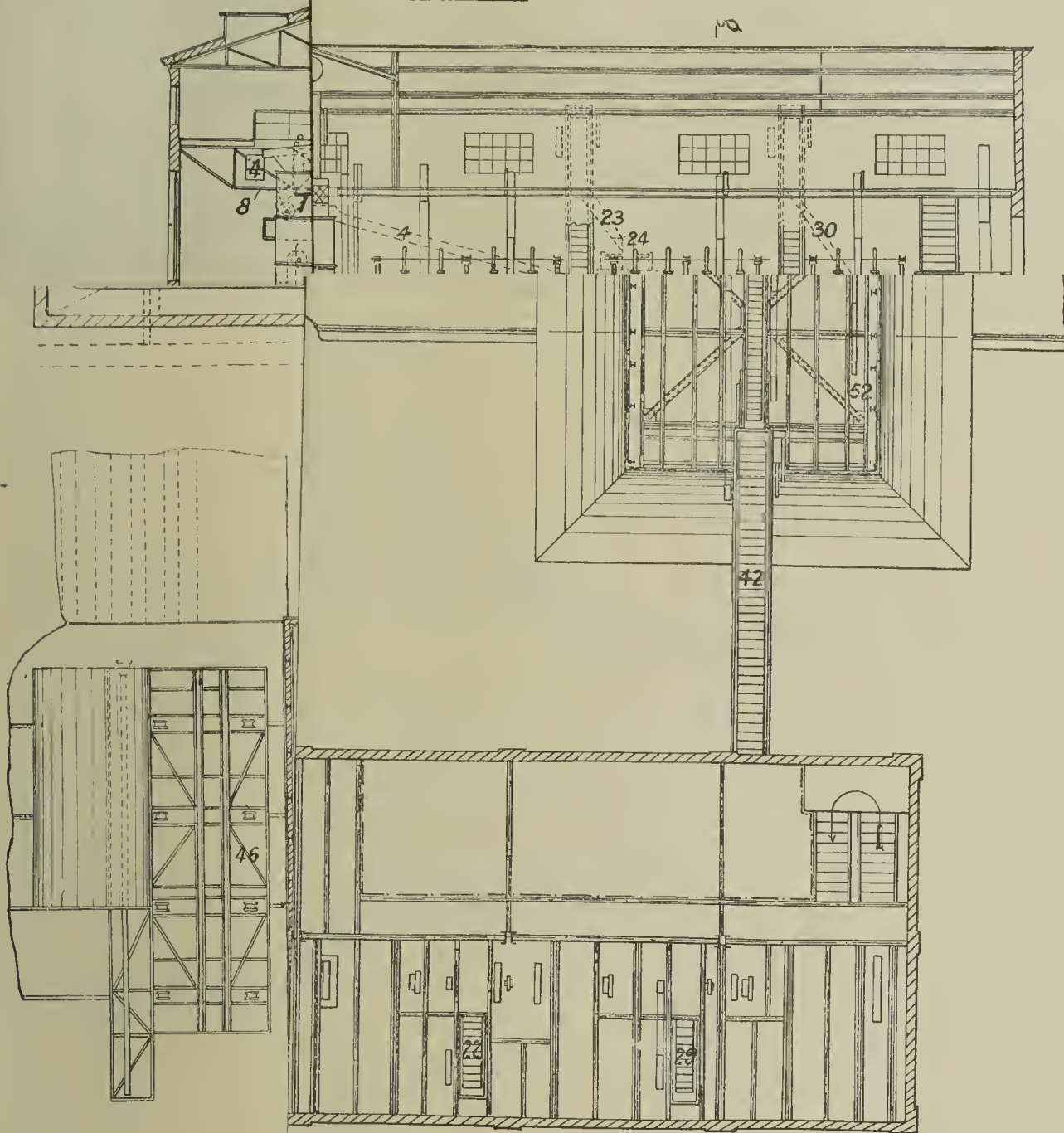
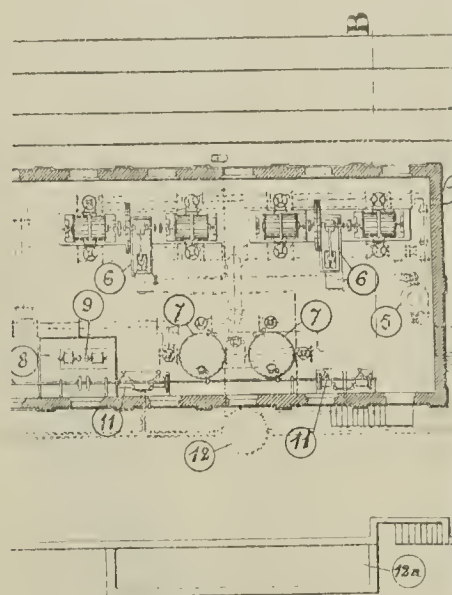
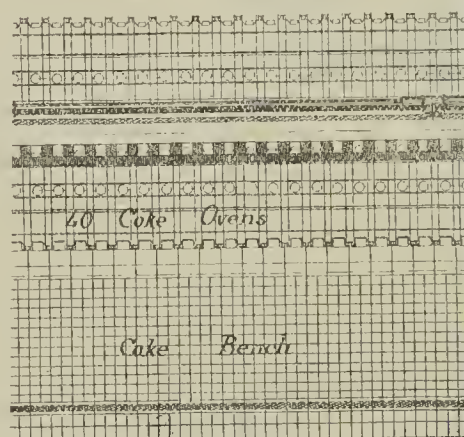


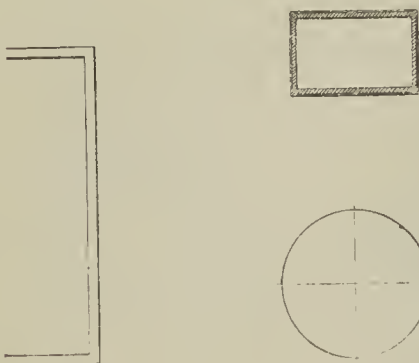
TABLE IV.



her Track



B





COAL WASHERY AT THE OLD SILKSTONE COLLIERY, NEAR BARNSELY.  
Capacity 120 Tons per Hour, with Coal Storage Hoppers 1,600 Tons Capacity.

TABLE I.

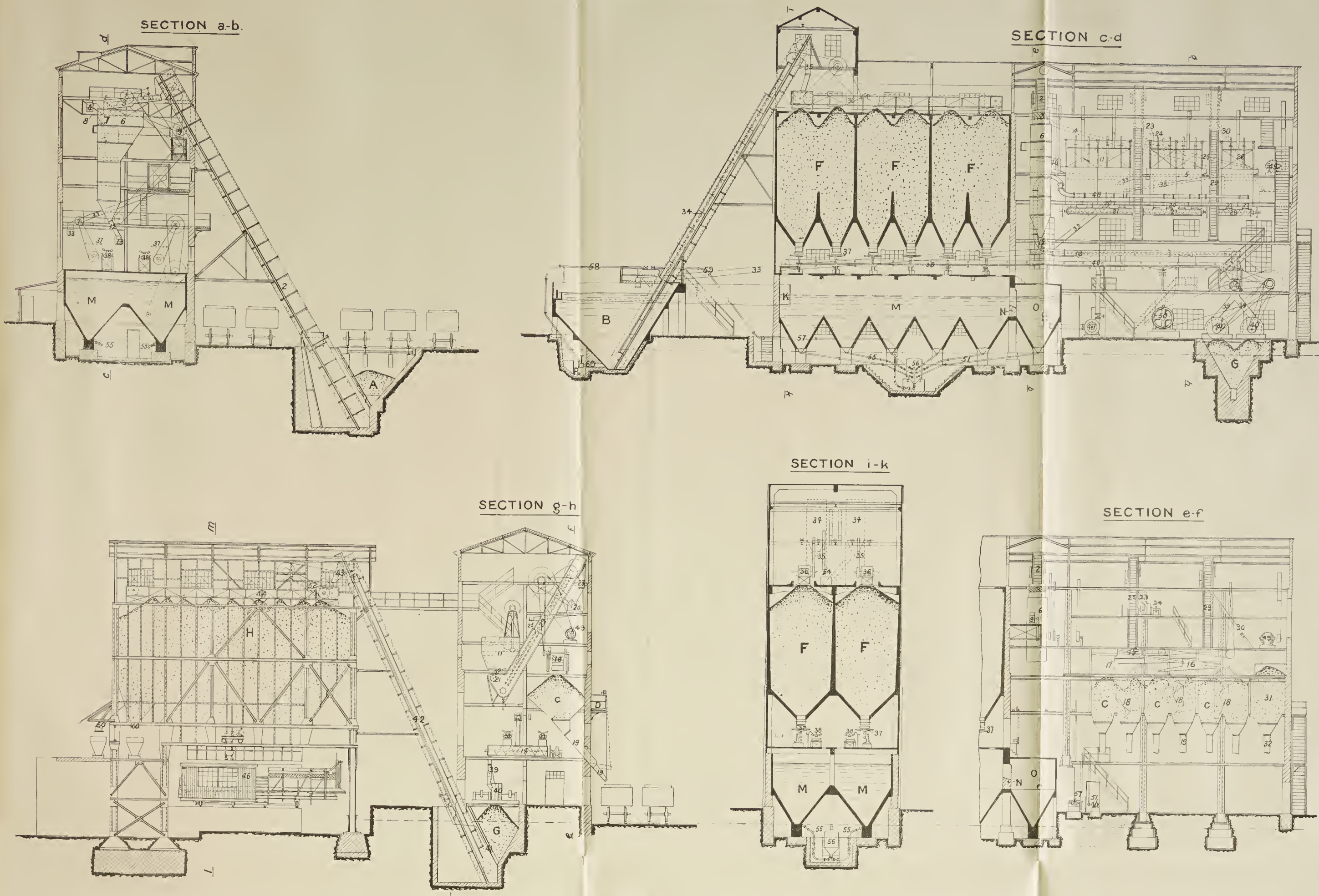
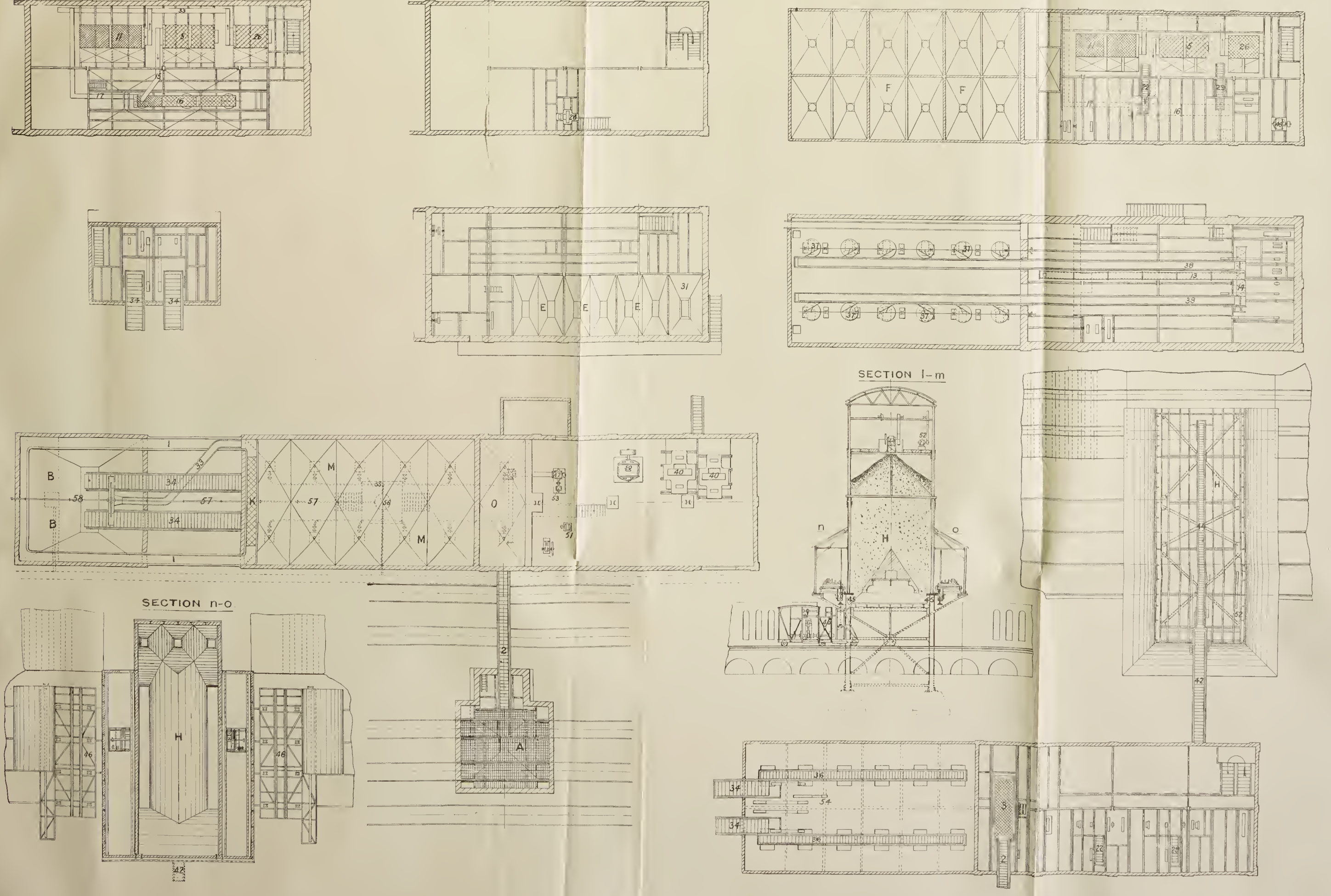


TABLE II.





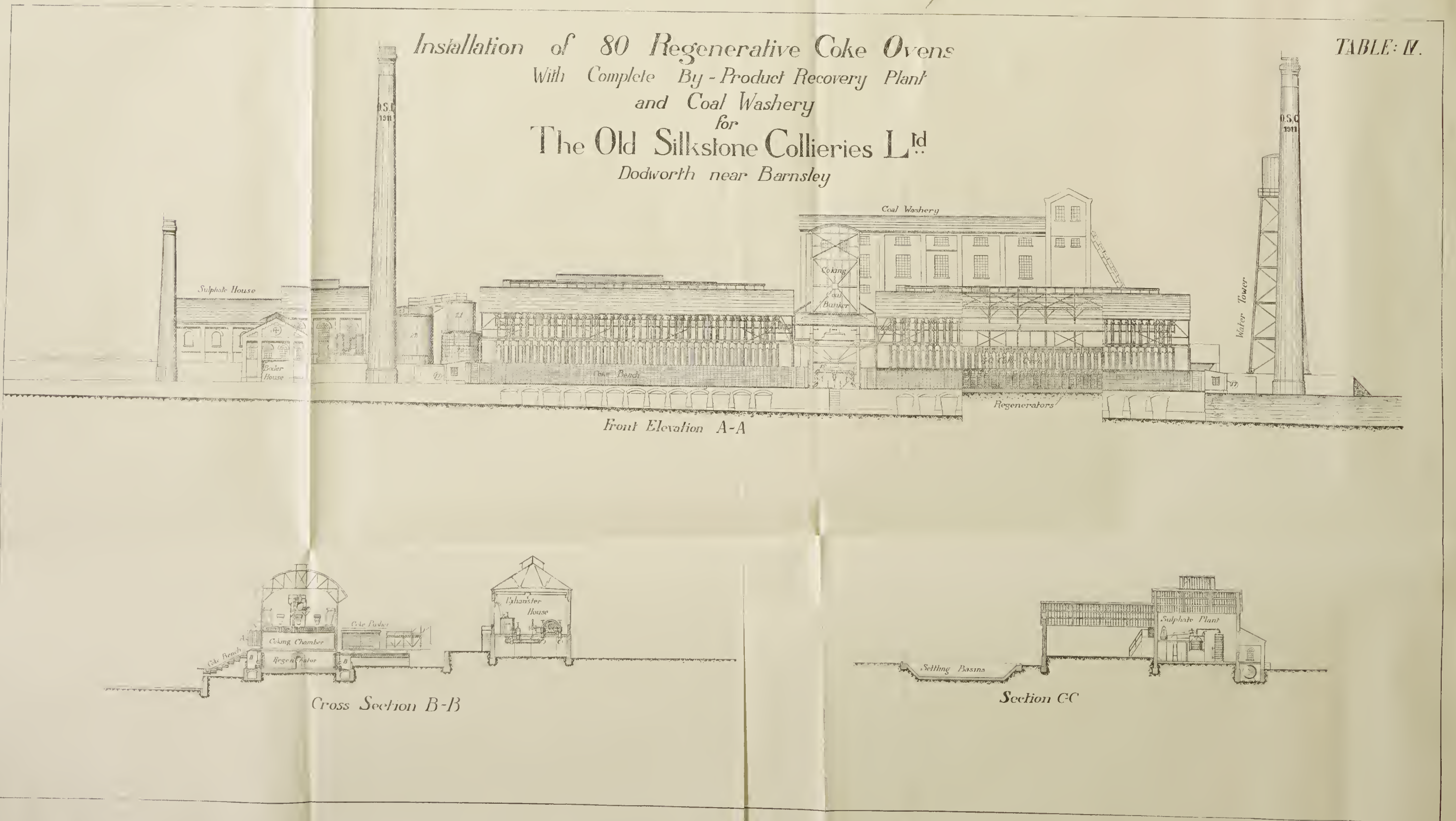
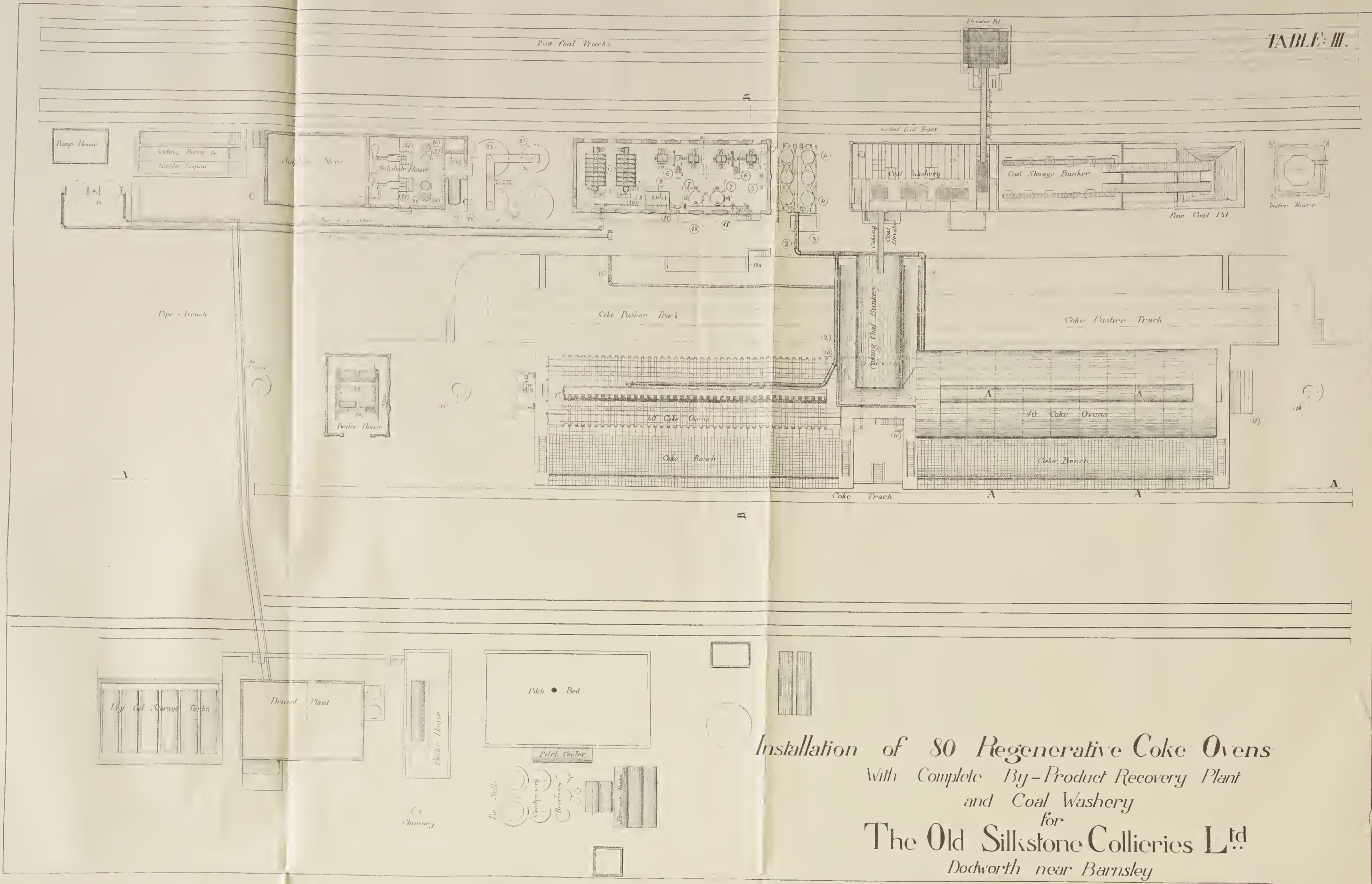
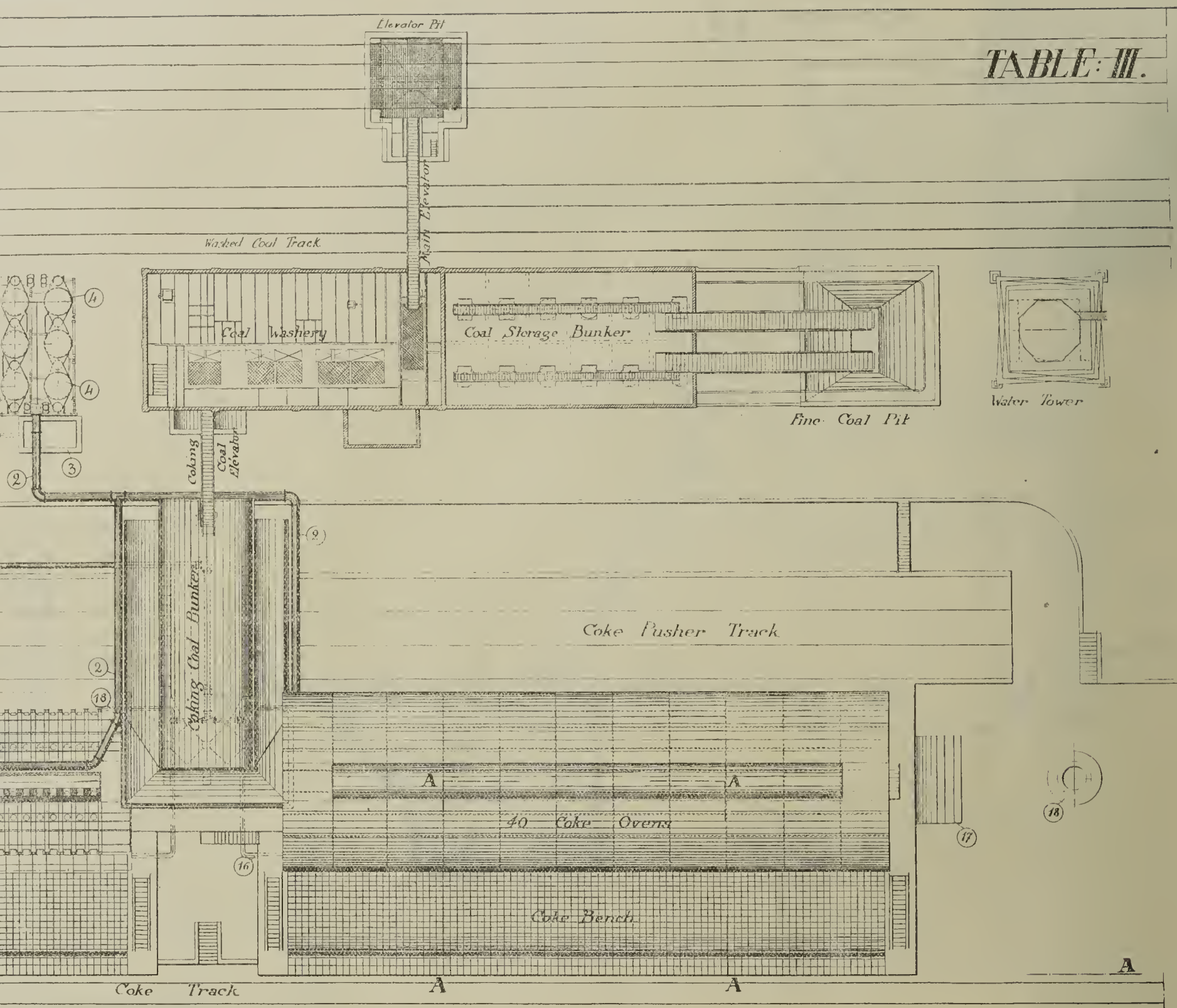




TABLE III.



Installation of 80 Regenerative Coke Ovens  
 With Complete By-Product Recovery Plant  
 and Coal Washery  
 for  
 The Old Silkstone Collieries L<sup>td</sup>  
 Dodworth near Barnsley



AND JOURNAL OF THE COAL AND IRON TRADES.

FRIDAY, NOVEMBER 14 1913.

No. 2759.

In October 1912 the Old Silkstone Collieries Limited started operating their new coal washing, coke and by-product recovery works at Barugh, near Barnsley, and the benzol recovery and tar distilling plants were put into operation in January 1913. An electric power station of 5,000 kw. capacity, erected in proximity to the works by the Yorkshire Waste Heat Company Limited, utilises the surplus gas from the coke ovens.

The lay-out of the new works was designed by Mr. L. C. Parkin, general manager of the Old Silkstone Collieries Limited, in co-operation with the Coke Ovens and By-Products Company Limited, London.

The installation is designed for carbonising 3,750 tons of coal per week, yielding about 2,750 tons of coke. An analysis made of a mixture of unwashed fine slack dried at 212 degs. Fahr., and consisting of equal parts of five different seams, has given the following results:—

	Per cent.
Ash .....	16·30
Coke by crucible test .....	67·50
Coke by carbonisation in ovens .....	74·10
Tar (say about 7·5 gallons per ton of coal) .....	3·71
Sulphate of ammonia (say about 29 lb. per ton of coal) .....	1·29
Hygrometric water .....	6·45
Sulphuretted hydrogen ( $H_2S$ ) .....	0·44
Carbonic acid ( $CO_2$ ) .....	2·07
Gas per ton of coal at 60 degs. Fahr. and 30 in. barometer .....	10,350
Weight of gas in per cent. ....	13·23

COMPOSITION OF GAS.		Per cent.
Nitrogen .....		6.6
Hydrogen .....		49.1
Methane .....		32.6
Heavy hydrocarbons.....		3.6
Carbon monoxide .....		8.1
		<hr/> 100.0

Lower calorific value of gas, per cb. ft. . . . .	549 B.T.U.
Upper " " " " " " " " " " " " " " " "	622 " "
Sulphur in the coal " " " " " " " " " " " "	1.96 per cent.

### The Coal Washery.

to the raw coal elevator pit in front of the washery. Here the trucks are automatically discharged, and afterwards gravitate on to the empty wagon road. The washery is contained in a well designed and very substantial ferro-concrete building.

The coking coal, after passing through fine grain

Provision is also made to draw the coal from hopper H by way of spouts 60, and charging the ovens from the top by means of charging tubs running on tracks extending over the whole length of each battery of ovens.

Having thus disposed of the fine coal, we return to the washer to follow the treatment of the nut coals above  $\frac{1}{2}$  in. From screen 3 the nuts are delivered into a water-shute 4 and carried on to coarse grain washer 5, where they are freed from shale and subsequently carried off by way of water-shute 15 on to a double classifying screen 16. Here the water is drained off by the top screen and led by way of shutes 17 and 33 into elevator sump B, where the coal grits produced during the washing and handling of the nuts are being recovered. The lower screen classifies the washed nuts into three sizes—viz.,  $\frac{1}{2}$  in. to  $\frac{3}{4}$  in.,  $\frac{3}{4}$  in. to  $1\frac{1}{2}$  in., and  $1\frac{1}{2}$  in. and over, and delivers them into nut coal-hoppers C by means of spiral shutes 18, in order to reduce breakage to a minimum. By means of charging shutes 19, the washed nuts are loaded at will into railway trucks ready for despatching. The shale washed out by

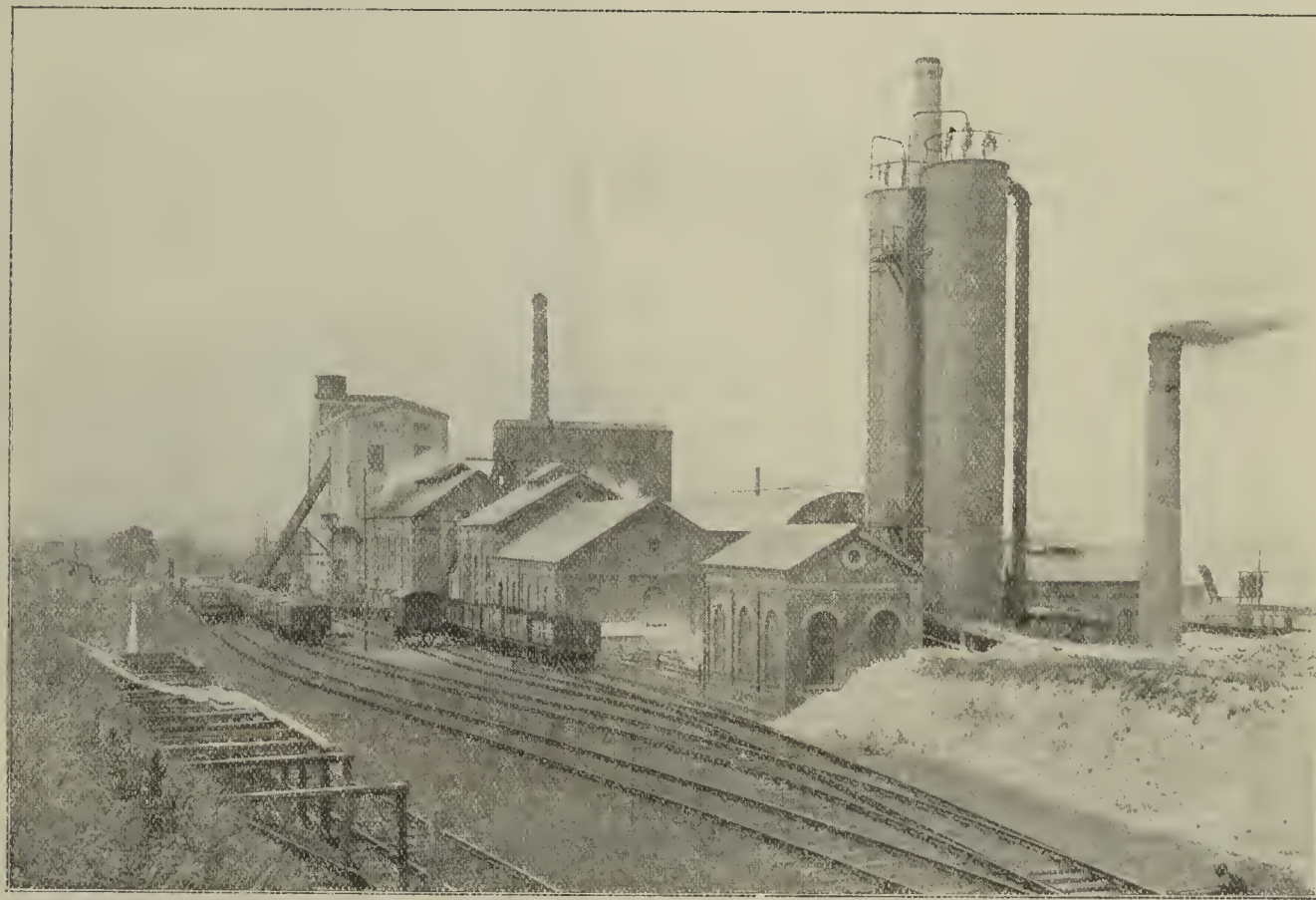


FIG. 1.—GENERAL VIEW OF PLANT FROM BARNSELY ROAD.

the two washers 5 and 11 is periodically discharged through valves 20 at the bottom of the said washers into the two screw conveyors 21, and by means of elevator 22 and shute 23 fed into crushers 24. Here the shale is broken up in order to free those particles of coal that are forming body with pieces of shale and recover the coal by re-washing the crushed product. For this purpose the latter is fed through water shute 25 on to rewasher 26, the recovered wash coal overflowing into water shute 33, and floating down to washed fine coal sump B. The shale, which is now freed of all practically recoverable coal, is periodically discharged through valves 27 at the bottom of rewasher into screw conveyor 28, fed into elevator 29, raised to the mouth of shute 30, and sent through the latter into shale hopper 31; hence it is loaded at will by way of shute 32 into trucks and taken away for dumping on a convenient site.

The water required in connection with the washing process is used over and over again. All losses due to evaporation and absorption of water by the coal, shale &c., are made good by addition of fresh water. A powerful centrifugal pump 47, directly coupled to electric motor 53 and fed from sump O, delivers the clean water through pipe main 48 to the washers.



ns, water-shutes, &c., hence it returns to elevator B after having done its work. During its contact with the coal the water has become loaded with fine coaldust, which must be removed before it can be used again. For this purpose the water is made to overflow from sump B by way of channels I and K into settling sump M, which it traverses slowly in its whole width, the clean water overflowing through opening N into sump O. During the slow progress of the water through sump M the fine coaldust has settled down in the slurry hoppers M in the form of so-called slurry. The latter is drained off through pipe mains 55 and 51 into a steel tank 56, and hence conveyed by means of compressed air through pipe line 57 into an intermediate tank discharging into the buckets of elevators 34. Should, however, the admixture of the slurry to the coking coal not be desired, provision is made to convey it through pipe main 58 into sump P, which overflows into a system of settling beds away from the washery and situated in the fields below.

The whole of the machinery of the installation is driven by six electric motors capable of developing 425-horse power, and therefore ample to drive the whole washery, requiring about 350-horse power when working at full load. The washery, which is of the Méguin type, also the coking coal bunkers and combined coal-charging and coke-pushing machines, were supplied by Messrs. Franz Méguin and Co., of Dillingen o/Saar, Germany.

#### The Coke Ovens.

The coke ovens are of the regenerator type, built under licence of the Koppers patents.

Referring to Tables III. and IV. (see Supplement), there are 80 coke ovens arranged in two batteries of 40 ovens each. Centrally between the two batteries is situated the coking coal tower with a storage capacity of some 600 tons. The coke ovens are of the vertical flue type, there being 30 vertical flues to each heating wall separating any two adjacent carbonising chambers. A gas jet and air inlet is provided at the bottom, and an opening for inspection and regulation at the top of each individual heating flue. This arrangement enables the complete control of the combustion and the uniform heating of the walls of the carbonising chambers, ensuring the manufacture of a high-class furnace coke and a maximum of surplus gas available after providing for the heating of the ovens. The regenerators are arranged parallel to the axis of the carbonising chambers. Two spacious and well-aired passages B are arranged below the bottom level of the carbonising chambers at both sides of the regenerator settings, and extending over the whole length of each of the two batteries. Here are placed the heating gas-distributing mains and cast iron air and waste heat reversing valves, which latter are situated underneath the gas main.

An electrically-driven reversing gear, placed in a small annexe, at the outer end of each of the two batteries of ovens, suitably connected with the gas-distributing and air valves, automatically reverses the flow of heating gas and combustion air every half-hour. For this purpose the vertical heating flues of each heating wall and the regenerators are divided into two halves, one half being supplied with heating gas and combustion air, whilst the other half serves to evacuate the products of combustion and *vice versa*. The air prior to being admitted at the bottom of the heating flues, has been preheated by passing through the corresponding halves of the regenerators, and brought up to an average temperature of about 1,800 degs. Fahr., whilst the products of combustion leave the other halves of the regenerators at a mean temperature below 400 degs. Fahr. to be evacuated through chimneys 18.

The coke is discharged by means of coke pushers on to the inclined benches, the quenching of the incandescent coke being effected by passing same through a coke quencher A consisting of a steel casing provided with water pipes, where it is subjected to an intense spray from numerous water jets. The quenched coke is then charged by hand into railway trucks running by gravitation along a track in front of the coke benches.

A noteworthy innovation in connection with this installation is the provision of a handsome steel roof extending over the whole length of each of the two batteries of ovens, effectively protecting the oven brickwork from rain, snow, &c., increasing the life of the ovens, reducing heat losses and incidentally offering protection to the men engaged in working at the ovens against inclement weather.

#### By-product Recovery Plant.

The by-product recovery plant is designed on lines as recognised in gasworks practice in preference to the, for the time being, more fashionable direct and semi-direct methods. The designers of the recovery plant contend that the direct method is more advantageous than the new recovery plant to, when (1) benzol recovery is

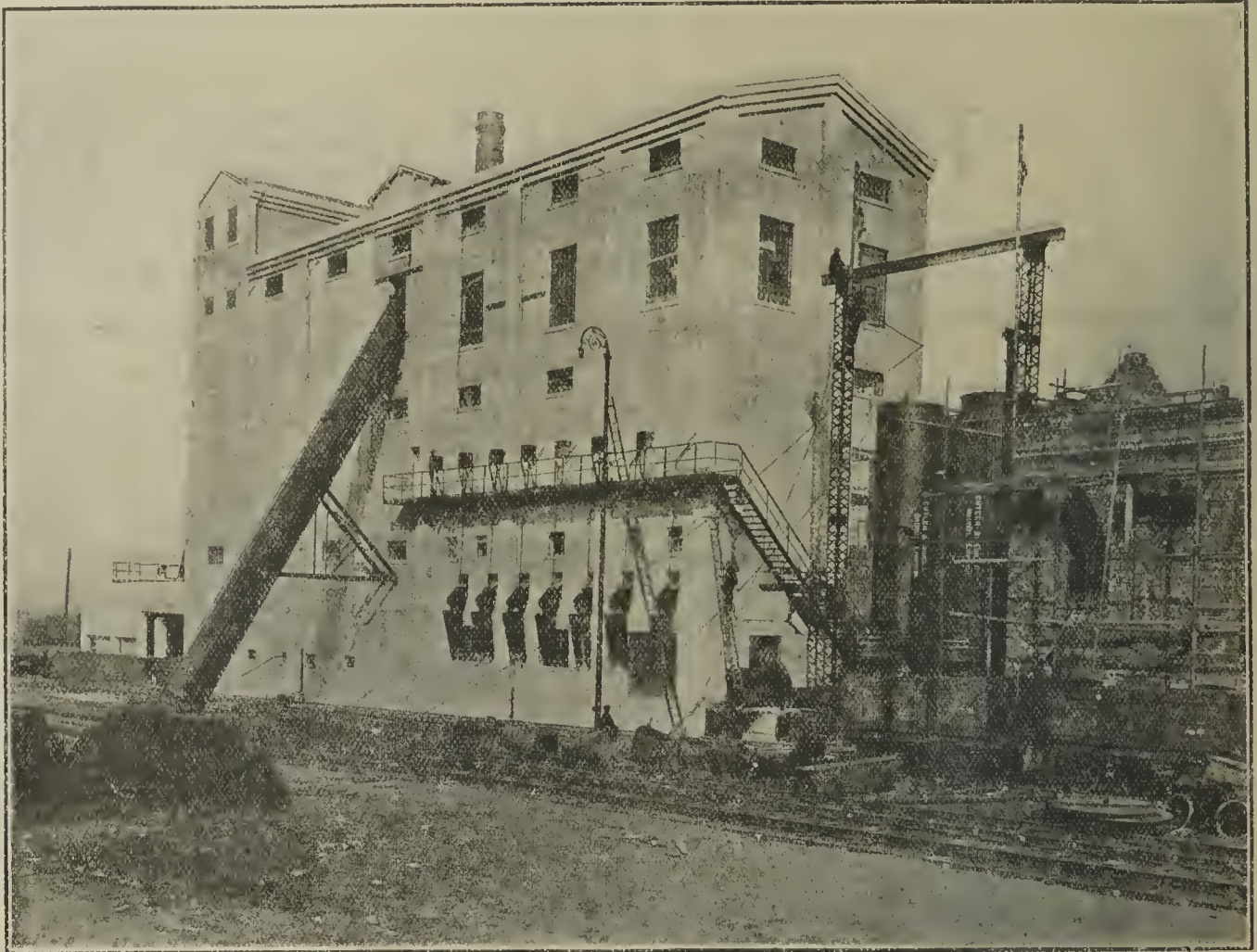


FIG. 2.—VIEW OF COAL WASHERY FROM MAIN ELEVATOR SIDE.

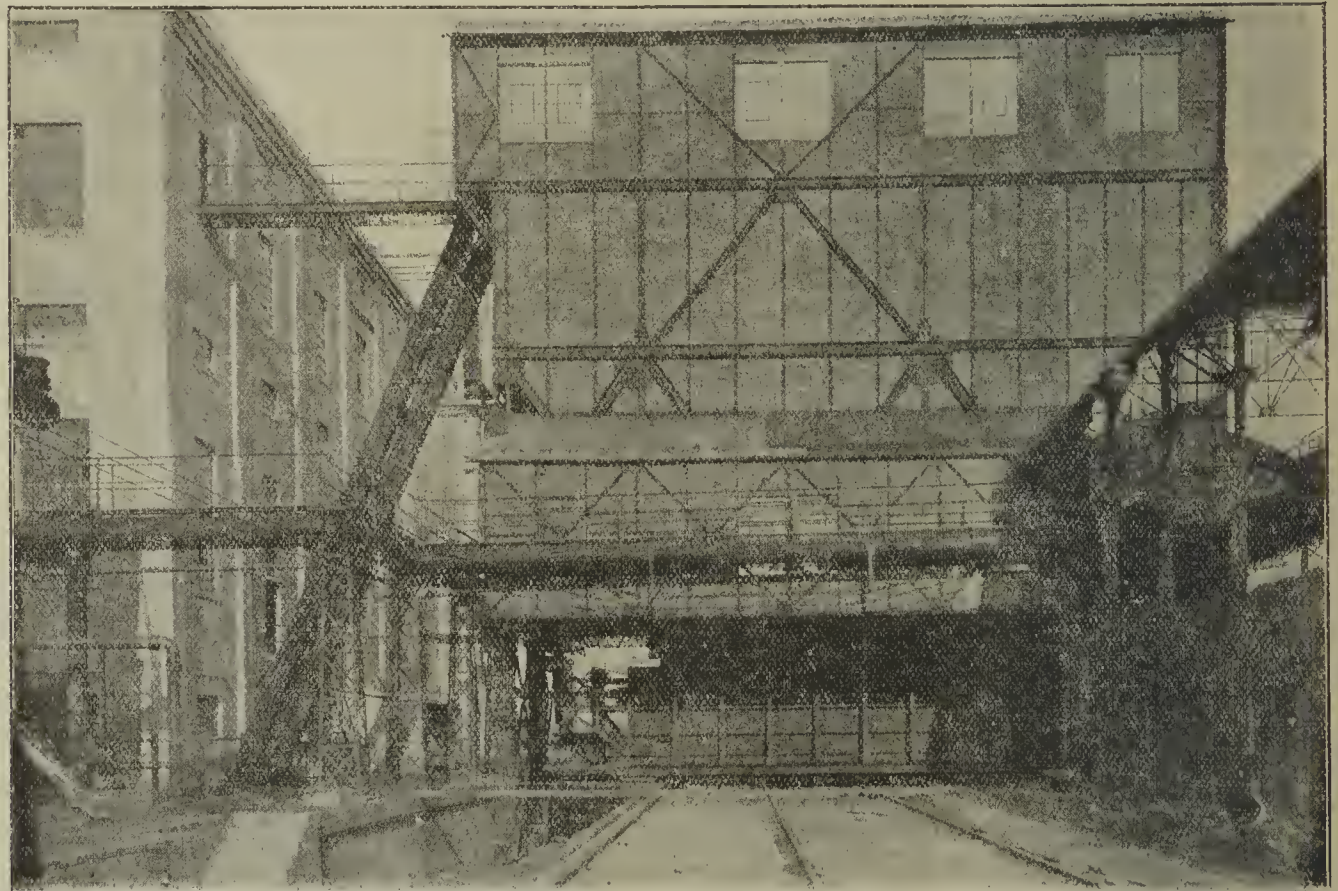


FIG. 3.—VIEW OF COKING COAL HOPPER WITH COAL COMPRESSORS STANDING BENEATH, ALSO SHOWING COKE OVENS ON RIGHT AND WASHERY ON LEFT.

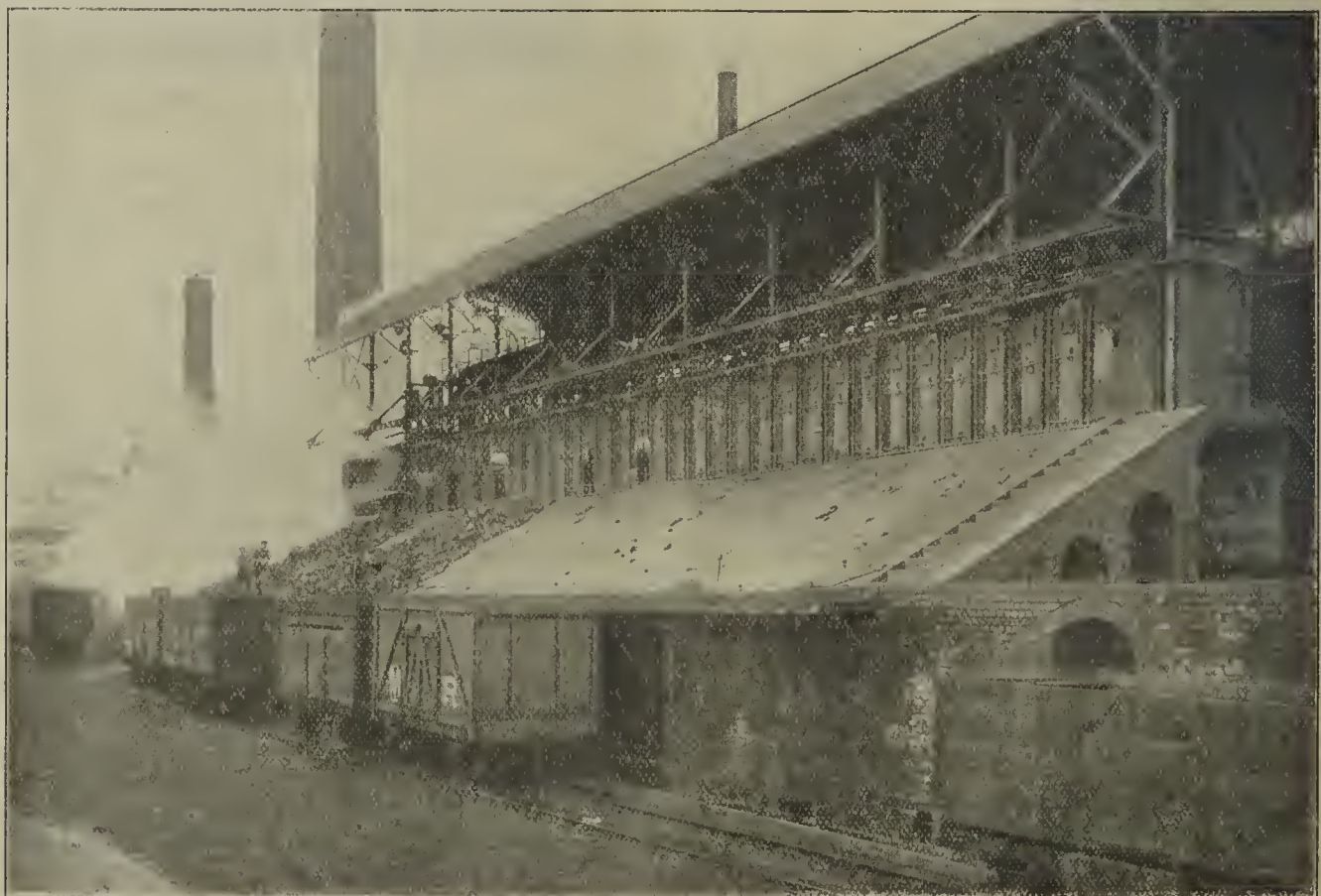


FIG. 4.—VIEW OF NO. 2 BATTERY OF OVENS SHOWING COKE DISCHARGE SIDE.





FIG. 5.—INTERIOR OF EXHAUSTER HOUSE.

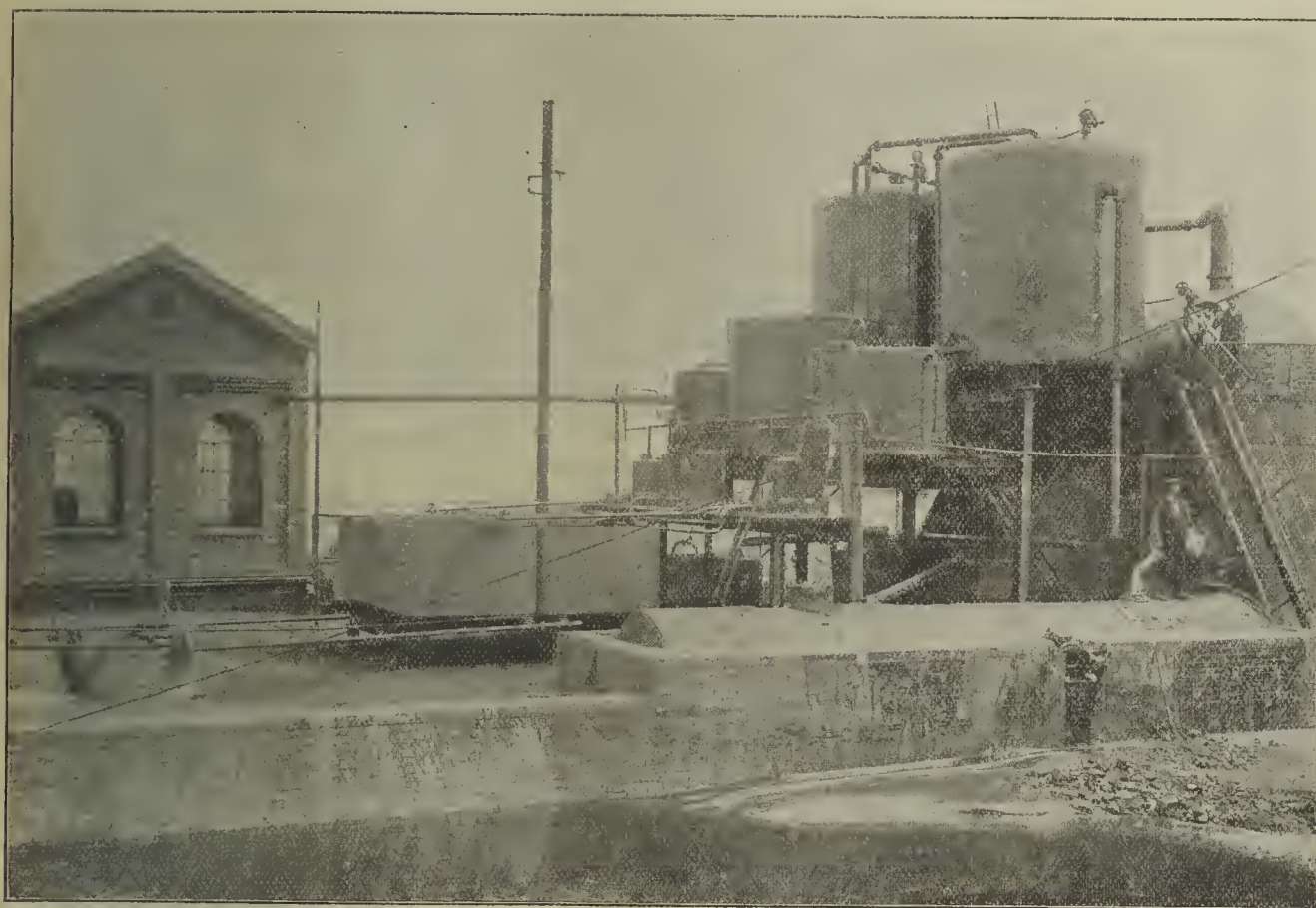


FIG. 6.—GENERAL VIEW OF TAR PLANT.

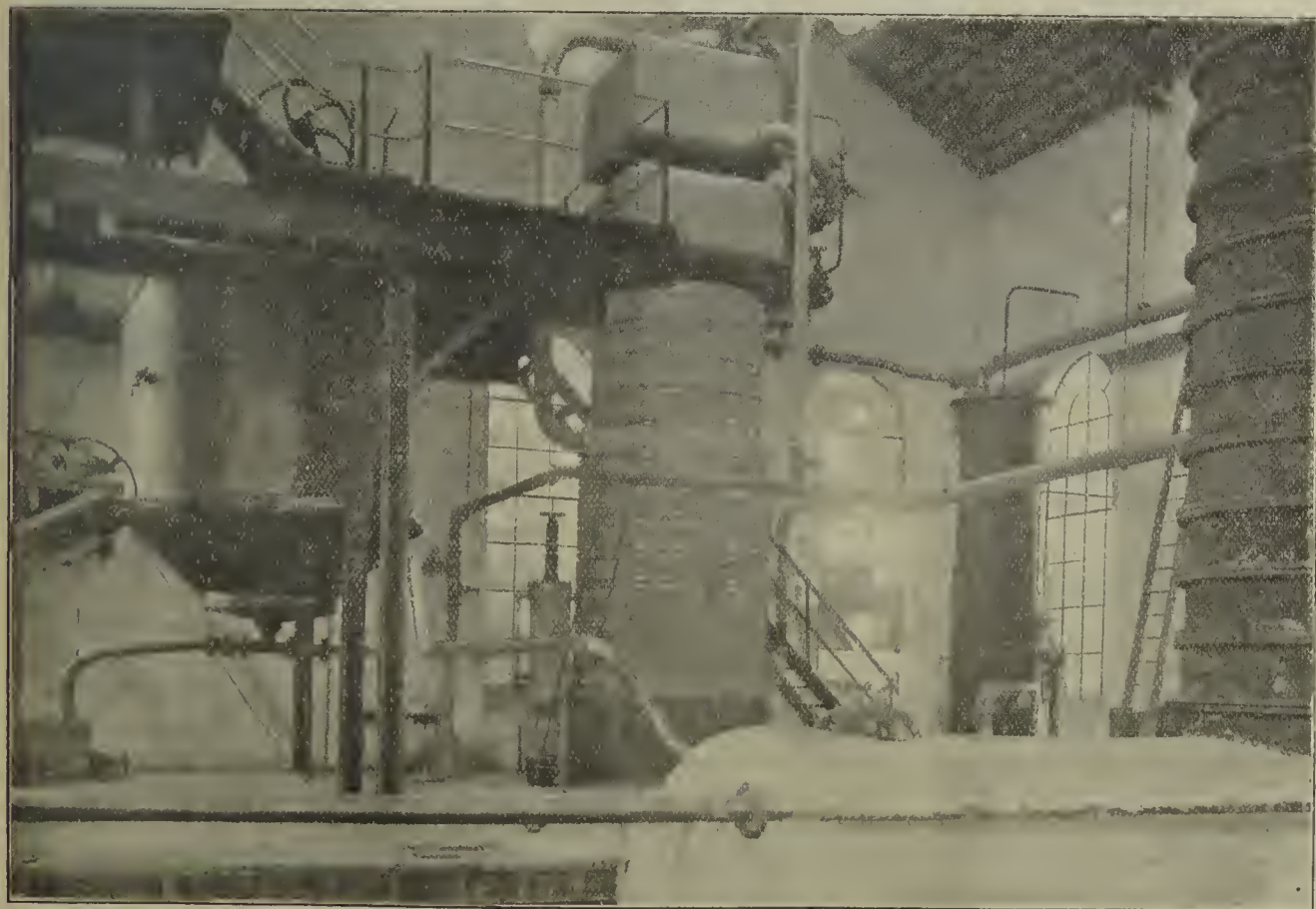


FIG. 7.—INTERIOR OF BENZOL PLANT SHOWING BENZOL WASHER, CRUDE OIL AND RECTIFYING STILL.

carried on requiring a gas temperature below 75 degs. Fahr., (2) no difficulty is found in disposing of the waste liquor, (3) steam is raised by means of a fuel otherwise considered as waste, (4) a maximum yield of sulphate of ammonia by recovering both free and fixed ammonia is the prime object, (5) a white coloured salt of sulphate of ammonia free from all tarry substance is desired, (6) a salt free from that highly detrimental and objectionable compound, ammonium chloride, is to be produced, (7) a continuous and automatic sulphate of ammonia plant is provided, (8) provision is made for a highly effective scrubbing plant working with a minimum of fresh water, (9) simplicity, reliability and easy control of working are the prime objects, (10) troubles arising from deposits of naphthalene in apparatus and pipe connections are to be avoided.

The gas evolved during the distillation of the coal leaves the ovens through apertures of 1 ft. in diameter, provided in the roofs of the carbonising chambers, and is led through ascension pipes into a semi-dry gas collector 1 of a U-shaped section extending over the whole length of each of the two batteries. The heads of the ascension pipes are provided with removable lids for cleaning purposes, and stop valves to enable the shutting off of each individual carbonising chamber during the discharging and charging operation. Through two openings provided with regulating slides, the gases pass from gas collector 1 through the suction or foul mains 2 on to the water-cooled condensers 4. In order to minimise the effects of the pitch deposits in the gas collectors and foul mains, tar is being circulated through same, and drained off into the so-called pitch basin 3 by means of a tar-sealed dip pipe. The pitch deposits are periodically removed from this basin by means of scrapers. Cleaning apertures about 4 in. in diameter, provided with tight-fitting cast iron plugs, and distanced about 3 ft., are found over the whole length of the gas collectors and foul mains, and a safe gantry is provided for the men to enable them to pass from aperture to aperture and scrape the pitch deposits down to the pitch basin whenever necessary.

The six water-cooled condensers 4 are arranged in two parallel lines of three each. The condensed products of tar and liquor are evacuated through seal pots, overflowing into collecting tank 12 and basin 12a.

Leaving the condensers, the gases are drawn towards the exhauster plant, which is contained in a substantial well-ventilated brick building, 95 ft. long by 33 ft. wide. Under the same roof are the two tar extractors, motors for driving pumps, and the rotary ammonia scrubbers. An overhead travelling crane running on a track extending over the whole length of the building has been provided for the convenience of executing repairs, &c. A well-lit pipe cellar below the engine-room floor contains all gas pipe connections, seal pots, &c., also tar and liquor pumps.

There are two sets of gas exhausters 6 of the Beale type, each capable of dealing with 260,000 cubic feet of gas per hour, and calculated to deal with the total amount of gas produced by the 80 coke ovens. Each set consists of two exhausters, driven direct by a steam engine placed between them.

An hydraulic by-pass governor 5 is provided for regulating the suction of the exhausters by opening or closing a compensating valve, always allowing a certain quantity of gas to return from the pressure main into the suction main, according to variations in the production of gas. From the exhausters the gas is conducted on to the two tar extractors 7, where the tar and tar fogs that have not been removed by the condensers are taken out by mechanical action. These apparatus are of an improved type working on the Pelouze-Audouin principle. The principal advantage of this system lies in the fact that the perforated plates are continuously being drawn through the tar and liquor contained in the apparatus, whereby the perforations of the plates are kept open and free from deposits of thick tar, thus obviating the periodical removal and cleaning of the bell. Furthermore, a scrubbing action is introduced through the continuous immersion of the rotating bell effectively assisting in the removal of the tar and impurities from the gas. The valves and pipe connections are so arranged as to enable the shutting off or by-passing of both tar extractors.

From the tar extractors the gases pass on to the two rotary ammonia scrubbers 13, where they are freed from the ammonia that has been refractory against removal by previous treatment. The two scrubbers are arranged in parallel, each calculated to deal with the total gas volume. They are of the well-known Standard type, each consisting of seven annular bays, the liquor flowing from bay to bay through pockets in an opposite direction to the movement of the gases.

All the tar and liquor produced is collected in tank 12 and basin 12a. From here it is pumped into the tar



or settling tank 21 where the tar settles down off into storage tank 23, whilst the ammoniacal liquor overflows into storage tank 22. All these tanks, with a total storage capacity of some 550 tons, are placed on circular brick buildings about 10 ft. above ground level.

The gases leaving the scrubbers are now practically free from all recoverable ammonia and at a temperature ranging between 20 degs. to 25 degs. Cent., pass on to the two benzol tower scrubbers 14, which are worked in series, the gas in each case entering at the bottom and leaving at the top. Each scrubber consists of a cylindrical steel shell 60 ft. in height and 10 ft. in diameter, filled with wooden grids offering a large scrubbing surface and thoroughly splitting up the gases. The absorbent used for the purpose of scrubbing the gases consists of a specially prepared creosote oil, and is fed into the scrubber through a 4 in. pipe, branching into a spider arrangement at the top with nine different feeding points.

Leaving the scrubbers, the gas is returned to the condensing plant, about 40 percent. of the total volume being sent to the coke ovens for heating purposes by way of mains 15 and 16, the balance being utilised for generating steam in the two Stirling boilers attached to the coking plant and at the power station of the Yorkshire Waste Heat Company Limited.

The pressure of the heating gas is solely dependent upon a gasholder 20 of about 3,500 cubic feet capacity, giving a constant pressure of about 3 in. water-gauge. This holder merely serves as a pressure regulator, and is so connected with an exhaust valve as to allow any surplus gas (after providing for the heating of the coke ovens and the boilers of the power station) to pass into a main which leads to the Terbeck gas burners under the two water-tube boilers 19, generating the steam required for the exhauster and sulphate plant.

The two boilers 19 referred to above are of the Stirling type, each designed to generate about 6,300 lb. of steam per hour at a working pressure of 125 lb. per square inch. A circular brick chimney, 80 ft. high by 4 ft. 6 in. diameter at the top, serves to give the draught required by the boilers.

The ammoniacal liquor is taken from storage tank 22 by means of a pump and delivered to the sulphate of ammonia plant for distillation and the manufacture of sulphate of ammonia. The whole of this plant is contained in a handsome brick building with an adjoining sulphate store, which has a storage capacity of about 350 tons. The ammoniacal liquor is delivered into an overhead tank of about 40 cubic feet capacity, and after passing through two multitubular preheaters, enters the ammonia stills 25. The preheaters are placed outside the building and are heated with the waste steam coming from the saturators. There are two steam-heated cast iron stills, each consisting of a sufficient number of bubbling sections to deal with 80 tons of liquor per 24 hours. An auxiliary lime still, fitted with steam agitator, is provided for each still, where the fixed ammonia is set free.

The ammonia vapours leaving the stills are led into the saturators 27. There are two saturators, of the enclosed so-called continuous type, each sufficient to deal with the whole of the ammonia produced. Each saturator is fitted with an automatic sulphate discharger, worked by a steam injector, which delivers the salts into a sulphate receiver and drainer prior to being delivered into one of the two centrifugal sulphate dryers 28. All mother-liquor drained off is automatically returned to the saturator by means of suitable collecting tanks and intermediate pipe connections. The finished salts are discharged from the dryers 28 by means of wooden shutters into the store, and wheeled to the stock of sulphate, where it is bagged and loaded into railway trucks ready for despatching. The daily production of sulphate of ammonia, when the ovens are working at full, amounts to about 8½ tons, the average yield per ton of coal carbonised approximating 3½ lb.

The by-product recovery installation, excepting the benzol scrubbing plant, was erected by the Compagnie pour la Fabrication des Compteurs et de Matériel d'Usines à Gaz, of Paris, who are represented in England by the Coke Oven and By-Products Company Limited, St. Stephen's House, Westminster, London, S.W.

#### Tar and Benzol Distilling Plant.

The yield of tar (specific gravity 1.16) amounts to about 111 lb. per ton of coal (dry) carbonised. From storage tank 23, situate near the exhauster-house, the tar recovered in the by-product plant is run off through a 6-in. main to the tar distilling plant.

For the purpose of dehydration the crude tar, which contains about 1 per cent. of water, is first delivered into a tank where there are two, each one working in series, and a tar still of about 20 tons capacity. The residue has a capacity of about 20 tons, and

consists of a cylindrical vessel provided with coils through which the hot vapours from the stills are passed on their way to the final condensers. The tar circulating around the coil is preheated, and the greater part of the water driven off in the form of steam, which is subsequently led to a water-cooled condenser, where it is reduced again to the liquid state. From the dehydrator the preheated tar is run off into the tar stills, where it is distilled by means of direct fire assisted by forced draught and injection of steam during the last stage of the process.

The gaseous products of distillation from the stills, after having passed through the dehydrators, are led on to the final water-cooled condensers. The condensed products, *i.e.*, ammoniacal liquor, crude naphtha, carbolic oils, cresote oils and anthracene oils flow into the

directly by means of pumps, or from the two overhead storage tanks, situate near the office close to the sidings.

The benzol distilling plant, in close proximity to the tar plant, is contained in a well-designed brick building, generally in keeping with the prevailing style. The benzolised creosote oil, containing about 2 to 3 per cent. of benzol, when leaving the benzol scrubbing plant, is passed through an oil heater, and subsequently through one or both of the preheaters, located above the debenzoliser or crude oil still (so called after the product "crude oil" obtained from same). Here the oil is heated by means of steam coils to a temperature ranging between 105 degs. and 110 degs. Cent., and then enters the still and traverses a series of segments containing serrated trays. Wet steam is fed in at the base of the still, which on meeting the pre-heated oil carries off



FIG. 8.—POWER STATION VIEWED FROM BARNSELY WAKEFIELD LINE.

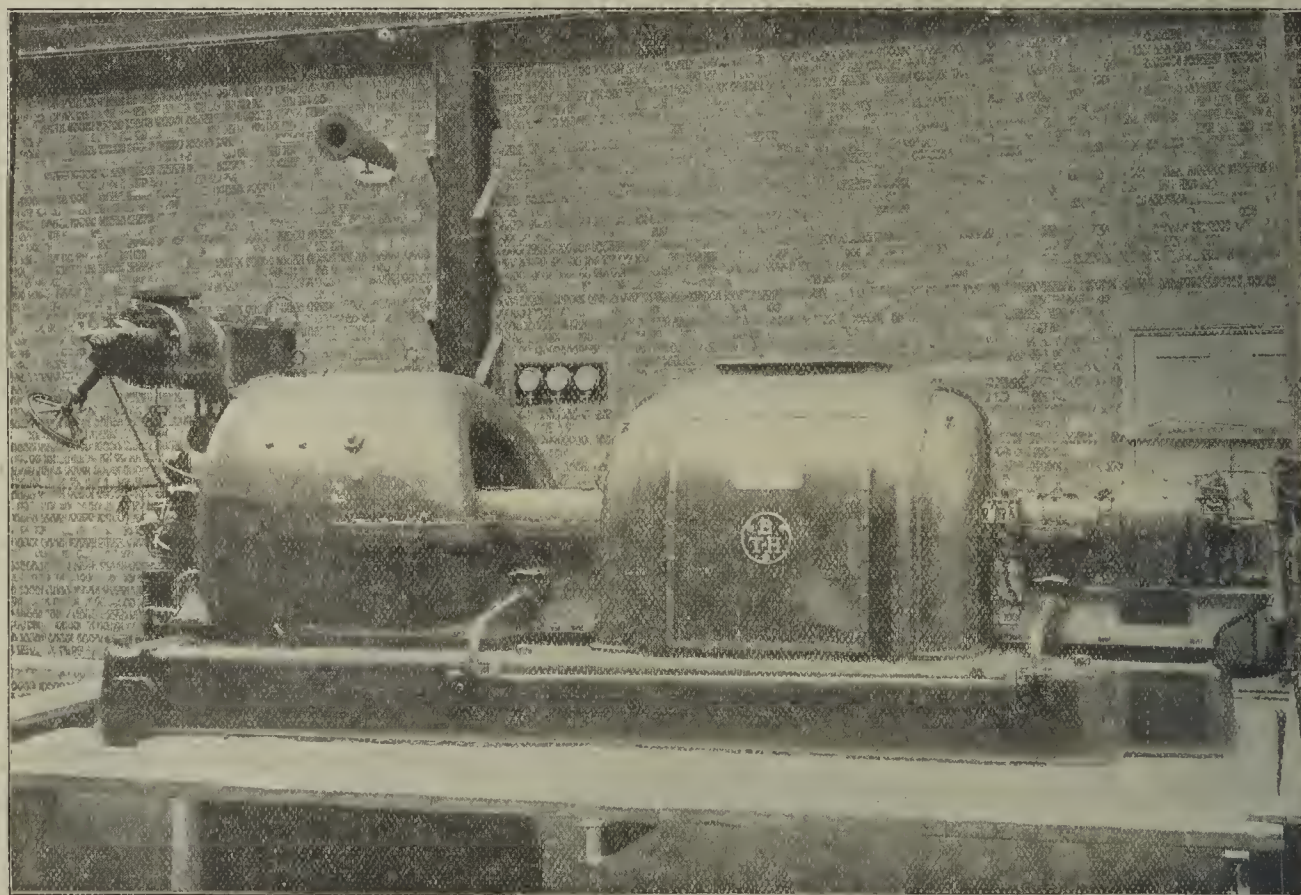


FIG. 9.—2,000 Kw. TURBO GENERATOR IN COURSE OF ERECTION.

receivers adjacent to the water-cooled condensers, thence they are run off into their respective storage tanks. The receivers are fitted with a steam ejector, which removes the foul gases and carries them into the furnaces under the stills, where they are burnt.

The residuary hot pitch, after the oils are distilled off as far as practicable, is run off the still periodically into a pitch cooler, consisting of a suitable wrought iron tank. From here the pitch, after having sufficiently cooled down to prevent ignition when brought in contact with the atmosphere, is run off into the open pitch bed, where it solidifies. For the purpose of transport, the pitch is broken up by hand, loaded into wheelbarrows and raised by means of an electric hoist to the proper level to be tipped into railway trucks. The different products of oils are filled into railway tanks either

the benzol. The top portion of the still fractionates the benzol from the heavy portion of the creosote likewise carried away by the "wet" steam. The benzol vapours next pass through the oil heater, which serves partially to preheat the oil and cool the vapours. From here the latter pass to a water-cooled condenser, the condensates passing from the coils to the lower part, where the crude benzol separates from the water, the former being run to a storage tank, and the latter withdrawn by a self-acting siphon.

The crude still is regulated to give a product which, when distilled in a retort, yields 65 per cent. of distillate at 120 degs. Cent. The debenzolised oil leaving the still passes through horizontal water-cooled refrigerators to a storage tank, from which it is pumped back to the scrubbers for the absorption of the benzol. Should it be



necessary at any time to stop the crude still for the purpose of repairs or on account of insufficient steam or water, the oil can be by-passed, and this convenience enables it to be circulated through the scrubbers until it is saturated.

For the first rectification the crude 65 per cent. benzol is pumped into an intermittent still, heated by a steam coil, and assisted by "wet" steam for the higher boiling products. The vapours from the still pass through a fractioning column to a water-cooled "analyser," and the vapours passing forward are condensed by a water-cooled condenser, the products, 90 per cent. unwashed benzol, toluol and naphthas, being run into their respective storage tanks. The residues from the intermittent stills are run off into a receiving tank and delivered from here by means of compressed air to the tar plant, where they are dealt with. After the first distillation the benzol and naphthas are taken from the storage tanks to undergo the process of chemical washing. For this purpose the crude 90 per cent. products are pumped into a cast iron washer provided with an agitator. Concentrated sulphuric acid (168 degs. Tw.) is added here and the mixture agitated for several hours. The acid is then allowed to settle and subsequently run off, whilst the remaining light oils are treated with a solution of caustic soda. The acid removes the basic impurities, and the caustic soda neutralises any acidity and also extracts the small amount of phenole present. The "waste" acid from the washer is run into iron pots fitted with fluted lids and outlet pipes, situated outside the benzol house, and is here heated with steam, which causes the lighter portion of the impurities to evaporate, leaving behind the acid and a spongy-like soft coke; the former is run off by a bottom cock to a tank below, whilst the coke is dug out and sent to the tip.

For the final rectification the washed 90 per cent. products are redistilled in a still similar to that used for the first rectification, and the finished products obtained are run into their respective storage tanks. The latter are situated at right angles to the concrete loading platform, which is parallel to the railway sidings. Here every facility is provided for the prompt despatch of the benzol, toluol, and naphthas in railway tanks or barrels. A product called "the Silkstone motor spirit" (high grade benzol), is supplied to customers in 50-gallon drums, or 2-gallon tins, special arrangements having been made for prompt execution of orders for this product.

The whole of the tar and benzol plant was erected by Messrs. Henry Ellison Limited., of Cleckheaton, Yorks.

#### Electric Power Station

The electric power station has been erected by the Yorkshire Waste Heat Company Limited, in conjunction with the Yorkshire Electric Power Company, and is designed to utilise all the surplus gas from the ovens continuously, day and night, for the production of electricity. The electricity so produced is distributed to the power company's customers through their extensive system of mains, and by operating the station in conjunction with the power company's principal station at Thornhill, all necessity for storage is avoided. The demand for electric power varies from hour to hour, and is much reduced at night time and week ends; this being so, the operation of the Barnugh power station by itself would not permit of a full and continuous use being made of the surplus gas; the co-operative working above mentioned simplifies all arrangements for the supply of gas, and the result is an economical combination which could not be attained in any other manner. The equipment of the power station represents the latest practice in machinery of this kind, reliability and efficiency being the requirements kept in mind in its design. The gas is led by steel pipes to the station, and consumed by Terbeck burners beneath two Stirling water-tube boilers; the burnt gases pass direct to a brick chimney 150 ft. high. Steam is generated at a pressure of 180 lb. per square inch, and superheated 150 degs. Fahr. The boiler feed pumps are of the rotary type, driven by small steam turbines. They are of the A.E.G. Electric Company's manufacture.

A turbo alternator of 2,000-k.v.a. of the British Thomson-Houston Company's make takes the steam, and supplies three-phase alternating current to the switchboard, which is connected to the Yorkshire Electric Power Company's mains. The switchboard, also of the British Thomson-Houston Company's manufacture, is of the most recent design, and is arranged to control the turbine at present at work, and a second turbine of 3,000 kw., which is now being installed, as well as the various electric mains conveying the electricity. The main switches are controlled by small electric motors operated from a distance.

The buildings consist of two main bays, the boiler-house and the turbine house, side by side. Outside the

station a Devonport cooling tower is erected for cooling the condensing water. Sidings are arranged to connect the station to the Lancashire and Yorkshire Railway.

The design of the station is by Mr. William B. Woodhouse, M.Inst.E.E., M.I.M.E., chief engineer of the Yorkshire Electric Power Company.

#### RESCUE APPLIANCES.

##### New General Regulation.

The Home Secretary has issued a draft of a regulation which he proposes to make under Sections 85 and 86 of the Coal Mines Act, 1911, amending Part IV. of the General Regulations of July 10 last. In a circular accompanying the draft, it is stated that the object of the proposed regulation is to make it clear that the breathing apparatus required to be used under Part IV. of the Regulations must be of a self-contained type and that the use of a smoke helmet supplied with fresh air by means of a pipe and bellows will not be a compliance with the requirements of the Regulations.

Throughout the greater part of the country the Rescue and Aid Order of April 2, 1912 (now embodied in the Regulations), has been interpreted in this sense but in two of the inspection divisions it has been contended by the owners that the use of the smoke helmet type of apparatus is also permitted, as an alternative to apparatus of a self-contained type. As the smoke-helmet type of apparatus necessarily restricts the movements of the wearer within a limited distance from the fresh air it is useless for the purpose of rescue work when a considerable area, filled with an irrespirable atmosphere, has to be traversed. This is illustrated by the circumstances of the disaster which occurred on August 3 last at the Cadder Colliery, Lanarkshire—one of the mines claiming the right to use the smoke helmet type of apparatus. In that case, timber in the intake airway near to the shaft bottom caught fire, and men working on the inbye side of the fire were cut off from the shaft and eventually killed by the fumes which were carried by the air-current into the workings. An attempt to reach the men was made by a party wearing smoke helmets, but these were found to be useless, and self-contained breathing apparatus brought from Cowdenbeath had to be employed. The commissioner who was appointed to hold the enquiry into the causes and circumstances of the disaster states in his report that apparatus of a smoke helmet type was not safe or suitable or sufficiently portable to be of use in an accident such as that at the Cadder mine, and that their uselessness was frankly admitted by the manager of the colliery.

In accordance with the requirements of the Act the Regulation is issued in the first instance as a draft. If within 30 days from this date a "general objection" is made to the Regulation—that is, an objection made either by or on behalf of owners of mines employing not less than one-third of the total number of men employed at the mines affected by the regulation, or by or on behalf of not less than one-third of the total number of men so employed, the objection will, under the statute, be referred to a referee appointed under Section 117 of the Act. Further, if any objection, though not a general objection, is made on behalf of the owners of mines of any particular class or mines in any separate area, and it is alleged in the objection that having regard to the special natural conditions or special methods of working in mines of that class or mines in that area the proposed Regulation ought not to apply to those mines, the Secretary of State will also, unless he is of opinion that the objection is frivolous, refer it to a referee.

The draft regulation is as follows:—In pursuance of Sections 85 and 86 of the Coal Mines Act, 1911, I hereby make the following regulation amending the General Regulations made under Section 86 of the said Act and dated July 10, 1913, and direct that the regulation shall apply to all mines to which Part IV. of those regulations applies:—

No apparatus shall be deemed to be breathing apparatus within the meaning of Part IV. of the General Regulations above mentioned, unless the apparatus is of such a character that the wearer carries with him all the means for respiration in an irrespirable atmosphere, and is not dependent for them, while in such an atmosphere, on any other person or persons.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, November 4, 1913, is as follows:—Aalborg, 1,175 tons, Amsterdam, 991; Antwerp, 500; Buenos Ayres, 17,287; Bremen, 1,180; Christiania, 1,297; Cronstadt, 7,772; Cuxhaven, 182; Danzig, 307; Drammen, 1,105; Degerhamn, 628; Drontheim, 197; Gothenburg, 2,260; Hamburg, 5,219; Harburg, 2,436; Harlingen, 1,647; Libau, 386; Marinople, 4,480; New-fairwater, 313; Odessa, 5,448; Oxelosund, 5,486; Port Said, 3,943; Riga, 3,464; Rouen, 5,969; Rotterdam, 677; Reval, 2,644; St. Petersburg, 16,128; Stettin, 2,701; Trieste, 545; Venice, 303; Wyborg, 1,171; Ystad, 507—total, 98,348 tons. Corresponding period November 1912, total, 56,227 tons.

#### MANCHESTER GEOLOGICAL AND MINING SOCIETY.

##### Firedamp in Mines: Dr. Harger's Plan for its Removal.

A meeting of the Manchester Geological and Mining Society was held on Tuesday last in the society's rooms, 5, John Dalton-street, Manchester. In the unavoidable absence of the president (Sir Thomas H. Holland) the chair was occupied by Mr. H. STANLEY ATHERTON, one of the vice-presidents.

Mr. Fred. J. Dixon, Assoc.M.Inst.C.E., Ashton-under-Lyne, was elected a member, federated.

##### FIREDAIMP IN MINES.

Dr. JOHN HARGER, of the Liverpool University, read a paper on "Firedamp in Mines, and the Prevention of Explosions."

He said the present paper was partly on a continuation of the work reported to the society in March of this year. In that paper, amongst other things, the quantity and composition of gases obtained from Barnsley "hard" and Barnsley "bottom soft" coals were given. It seemed desirable to have the other portions of the Barnsley seam examined in the same way. This had been done, and two Lancashire coals as well, and the results were in some cases rather surprising.

The coals, &c., gave the following quantities of inflammable gas up to and including that given off at 100 degs. Cent. He included the two already reported to complete the list. The following was the quantity, per 100 grain coal, in c.c. in each case:—

	C.c.
Barnsley hards .....	180
Bottom softs .....	200
Top softs .....	137
Bag dirt .....	39 7
Bags (coal) .....	528·6
Day beds coal .....	373
Two Lancashire coals were also done—	
Plodder .....	29 1
Three-quarters seam .....	263·0

Besides inflammable gas, they nearly all showed that the occluded gas contained considerable quantities of nitrogen: that from Day beds coal contained as much as 20 per cent. nitrogen. The inflammable gas in the Barnsley hards given off *in vacuo* at ordinary temperature was on the average equivalent to ethane, for the *n* value in the  $C_nH_{2n+2}$  formula was 1·95 (ethane = 2), and at a higher temperature it was on the average about equal to propane, the *n* value being 2·86 (propane = 3).

Name of coal.	<i>n</i> value in the firedamp.	
	Ordinary temperature 15 degs. C.	Residue given off at 100 degs. C.
Barnsley hards .....	1·95 ...	2·86
Bottom softs .....	1·34 ...	1·2
Top softs .....	1·49 ...	1·25
Bag dirt .....	1·45 ...	2·3
Bags (coal) .....	1·19 ...	1·25
Day beds (coal) .....	1·08 ...	1·41
Plodder .....	1·08 ...	1·3
Three-quarters .....	2·2 ...	1·1

##### THE VAGARIES OF FIREDAIMP.

It would be seen from these figures that the quantity, temperature and quality of the gases in the same bed varied with the different layers of coal, and very probably with the same layers in different places. (The last point has not been tested.) These results must do away with the comfortable supposition that the inflammable gas in coalmines in this country was pure methane. No doubt the bulk given off at the face on breaking down the coal and before was methane, and this had very likely existed in the coal in the gaseous condition. This did not apply to gas left in the coal, which required a vacuum and moderate heat to bring it off. Coal left in the goaf in the mines working the Barnsley seam must slowly give off these heavier hydrocarbons, especially if any air could get at it. It was the author's experience that an analysis of air containing firedamp coming from the old goaves seldom indicated pure methane.

It was a curious thing to find in a bed of coal, which had presumably been made millions of years ago, that the gas in the different strata only a few inches or feet apart was different in quality. One must conclude that this gas had not been free to diffuse, for if it had, the gas in the same seam must have become uniform in composition in three millions of years. It was evident that this gas (which could be sucked out *in vacuo*) when in the coal seam, was not possessed of the property of rapid diffusion—or, in other words, it was not there as a gas. One must conclude that this gas was absorbed and in solution of the coal substance, and in such condition it had the properties of a solid rather than of a gas.

It might be asked of what importance was the fact that certain firedamps, especially from old goaves, contain heavy hydrocarbons. The answer was—(1) that the heavier the hydrocarbon the less it took to make an explosive mixture.  $CH_4$  lower limit is 5·6,  $C_2H_6$ , 3·1;  $C_3H_8$ , 2·17, and  $C_4H_{10}$  only 1·6, and (2) what was perhaps of even more importance, was that these heavier hydrocarbon mixtures were more easily ignited. The calorific power of methane was 11,850 calories. If one calculated the calorific intensity of  $2\frac{1}{2}$  per cent. methane mixture in air, it was found that the result was a rise of 650 degs. Cent.—i.e., if air containing  $2\frac{1}{2}$  per cent. methane suddenly combined—the oxygen with the methane—the temperature of the whole mixture would be 650 degs. Cent. more than the initial temperature of say, 32 degs. Cent., giving a final temperature of 682 degs. Cent. The ignition temperature of marsh gas and air mixtures was given as 650 to 750 degrees Cent., and therefore an ignition of air containing a little over  $2\frac{1}{2}$  per cent. methane should be possible. Theoretically



It was possible to get an explosion of firedamp, per cent. in air. Sir F. Abel thought he had such ignitions by using certain non-combustible dusts with the mixture of gas and air. He was loth to think that a man of such ability as Sir F. Abel was led astray by the simple, straightforward phenomena involved.

It was difficult to see why the lower limit for methane explosions should be so high as about 5½ per cent.; it was still more difficult to find a reason why, at about 13 per cent. and above methane, the mixture again was non-explosive. There was 18·6 per cent. oxygen in the latter mixture, yet it would not explode when a light was applied to it. Dr. Harger said he had never seen any reasonable explanation of these facts given.

#### A NEW SCHEME OF VENTILATION.

It was evident that the removal of firedamp was a problem which offered great difficulties in some large mines of a fiery character; and after seeing several of them, and being acquainted with some rather intimately, it appeared to the author that the present system of ventilating a mine, although good in many respects, was open to improvement. No one would doubt that the main intake haulage roads were well ventilated—in fact, too well ventilated; but in some of the remote parts of the mine, and especially at “faults” and in roads being drawn off, the present system broke down rather badly. It was unable to cope with perhaps comparatively small quantities of firedamp without an excessive amount of labour, putting up sheets, &c., to coax the gas out into the main returns. It also broke down badly in removing gas at gob fires in some positions, and at the workings whenever a fall came at face, return or intake way.

He therefore put forward the following scheme, which was necessarily imperfect and lacking in detail.

The exhaust fan on the pit top remained as the chief ventilator, but it was proposed to supplement it by an air pump in each of the main districts to suck firedamp in as concentrated a state as it could be obtained, compress it at moderate pressure—say 20 lb. per square inch—and send it out of the pit in pipes in the main return airways. The air pump in a district would be placed at a convenient position in the main intake airway where the returns were near to or crossed the intake, and not more than about a mile from the pit top. From the pump three suction pipes would be taken to the face, one along each return road, and one along the intake haulage road; these, as well as the pipe conveying the compressed gas out of the pit, would be permanent pipes. At the face, collecting pipes of a temporary character would be used and branches put in to collect the firedamp from the most favourable positions in the roof.

He did not propose to go into any details about methods which might be adopted to collect the gas. In one case, boreholes might be drilled with advantage into the coal in advance of the face; in other places pipes might be put into cavities in the roof where the firedamp naturally collects. In other cases, roadways might be driven a few feet in advance of the general face and pipes put up to the top to collect the firedamp drained away. Pits which had several levels, such as are common in Lancashire, might have holes drilled from an upper to a lower mine to suck the gas off well in advance of the working face, &c.

The chief difficulty would be the moving of the pipes at the face, which would have to be done perhaps once every week or two weeks, and this difficulty could be overcome to a great extent by having the pipes made in short lengths with couplings that could be fastened quickly, or they could be connected together by rubber or other simple means. The actual branch collecting pipes could be made of very light material, like those used for enclosing electric cables.

There were four chief items:—

1. With such an auxiliary ventilation, quite independent of the main one, the bulk of the firedamp was removed as soon as it was evolved, and was placed in pipes.

2. By the use of this auxiliary the necessity for such large quantities of air in the main ventilating current disappeared, and it would be possible to reduce it to half or quarter and yet ventilate the out-of-the-way spots and abnormal places better than at present. The arrangement of the pump and pipes would be so made that the sucking power could be concentrated on one spot in case of a blower or outburst of gas coming.

3. By collecting the firedamp in concentrated form, this material, at present regarded as a danger and a nuisance, at once became a very valuable asset. A practical example best illustrated this: One mine in Yorkshire gave off 4,000,000 cubic feet of firedamp per 24 hours, sufficient to supply several large towns with gas. The 4,000,000 cubic feet of gas weighed about 82 tons, and, taking into consideration the more complete combustion possible with gas for heating, it was equivalent to 150 tons of the best bituminous coal; and if used direct in gas engines, was equivalent for power to 200 to 250 tons of coal per day, or nearly 100,000 tons per annum.

4. The fourth item was the most important of all. With this firedamp from the mine properly harnessed and burnt in properly constructed boilers, large quantities of inert gas were obtained which could be used to mix with the intake air to produce a reduced oxygen atmosphere, and the mine rendered absolutely explosion proof and fire proof, whilst the power for working the pit was obtained much more cheaply than at present.

With this auxiliary system the ventilation current of 250,000 cubic feet per minute would be reduced to 62,500 cubic feet. This 62,500 cubic feet would be made up of 11,360 cubic feet of inert gas and 51,140 cubic feet of fresh air, and to do

this would require 1,050 cubic feet of firedamp per minute—for fuel 56 tons of coal per 24 hours.

It might be argued that to obtain power by means of inflammable gas from the mine would be rather dangerous, but gas mixtures of this description in an iron tube could be rendered quite safe by wire gauges fixed across the pipes at suitable places. Also with 17 per cent. oxygen air, with CO<sub>2</sub> present, it was almost impossible to get a firedamp mixture which was inflammable in 17 per cent. oxygen air.

By the use of firedamp to make inert gas, the composition of the resulting gas was about 11½ per cent. carbon dioxide and 88½ per cent. nitrogen. The ventilation current formed by mixing 1 volume of this with 4½ volumes of fresh air would be of the composition:—

	Per cent.
CO <sub>2</sub> .....	2·1
Oxygen .....	17·1
Nitrogen .....	80·8
	100·0

If desirable, some of the carbon dioxide could be easily removed by solution in water whilst under pressure. The easiest way of obtaining the inert gas in a cool and dry condition was to adopt the plan of compressing the combustible gas and air before burning and to burn them under pressure in a tubular boiler filled with suitable catalytic material, then through a water-heater supplying the boiler, after which the still compressed gas was further cooled and the condensed water run off, when it was available for driving air engines to develop power, the cool and dry exhaust being sent to the down-cast shaft and mixed with ordinary air.

#### COOLING THE INTAKE AIR.

If 1,050 cubic feet per minute of marsh gas was not obtainable, the ventilation of 62,500 cubic feet of air should not be necessary, and it must be concluded that it was not used so much for removal of firedamp as to keep the mine cool. In mines which were hot and required excessive ventilation to make them workable, a system of cooling the air would be better in every way for the safety and the working of the pit. This was an engineering problem chiefly, and it was one which should be taken up without undue delay, because the time was approaching when deep mining must be faced. The easiest way to cool the air was to take it, or some of it (at the same point that he had indicated for the pump for sucking off marsh gas), compress it in a surface condenser to a suitable pressure, cool it to the temperature of the return, in the return separate moisture as liquid water, and then allow the cooled gas to expand again in air engines, using the power to compress the fresh quantity of air and put the exhaust into the intake air. A small amount of outside power in the form of electric current or compressed air would, of course, have to be used to make up for the heat used in the liquefaction of the water and in cooling down the compressed air, and the friction in the machines. The water separated from the compressed-air gas in the surface condenser, and that separated on expanding in the air engine, could be used to put on the outside of the tubes of the surface condenser, and so cool the compressed gas more quickly by its evaporation into the return air. This process would, of course, make the return air outbye from the surface condenser warmer, and more uncomfortable than at present.

In conclusion, Dr. Harger said he did not advocate a 17 per cent. oxygen atmosphere for mines with the huge quantities of ventilating current required, because it was so difficult to get one, and a 19 per cent. oxygen atmosphere with a little carbon dioxide was quite good enough to prevent dust explosions, and in case of a fire, all the plant necessary being there and working, the fresh air could be diminished so that the mine was supplied with 17 per cent. oxygen current or less to put it out.

#### THE DETECTION OF GOB FIRES.

Dr. HARGER also read a paper on “The Detection of Gob Fires.”

It would be well, he said, to mention the preliminary work used as the basis of the process. It was a repetition of some of Dr. Richters' experiments made 45 years ago, as a result of which Dr. Richters pointed out that coal removed oxygen from air without evolving carbon dioxide. In the paper on “The Absorption of Oxygen by Coal,” read at the recent meeting of the Institution of Mining Engineers, in Manchester, Mr. Winnill claimed that his results represented the first definite information as to the total quantity of oxygen which fresh coal would absorb when kept at a temperature of 30 degs. Cent. That statement was not strictly correct, and required to be qualified, for as early as 1868-9 Dr. Richters, of Waldenberg, had investigated and published his results of the absorption of oxygen by many different kinds of coal under many different conditions of temperature, &c. It was Dr. Richters who first pointed out the fact that perfectly dry coal, as well as air-dried coal, was able to absorb oxygen without exhaling CO<sub>2</sub>, both from dry air and from air saturated with moisture. He emphasised that point, as it appeared to be rather a curious phenomenon then. Dr. Richters' work on the absorption of oxygen by coal was very thorough and complete.

#### MR. WINMILL'S EXPERIMENTS.

Mr. Winnill's results on Barnsley coals were a very important contribution as far as the Barnsley seam coals were concerned. It was rather a pity that the experiments were done with such finely-powdered material—dust passing through a 200-mesh sieve—as the results could not be well applied to the conditions in an ordinary goaf, or other positions where gob fires originated. The action of gases on finely-powdered dusts was essentially different from the action on small lumps of material of the same chemical composition.

Finely-powdered material absorbed gas very rapidly, and if there was no chemical action equilibrium was soon effected; but with little lumps, where the process of solution was the chief one, the action was very slow and according to the size of the pieces—the larger the piece the more time would be required to get them into a state of equilibrium with gases. With coal the absorption of oxygen was complicated by the fact that in addition to those two physical actions there was also a chemical one which was complex, and there was very little known about it. Part of the oxygen was converted into water, part into carbon dioxide, and part of it was retained as oxygen combined to give compounds richer in oxygen than the original coal. The part converted into carbon dioxide was retained by the coal, for coal had an enormous capacity for holding carbon dioxide at the ordinary temperature—a property which was also discovered and investigated by Dr. Richters.

The investigation of the absorption of oxygen from the air by coal was a difficult problem, and to get at all reliable results one must be on the look-out for all sorts of sources of error. Mr. Winnill's method of calculating the oxygen absorbed by measuring the air after it had passed over the coal and by analysing it, was open to one or two objections. First, it was assumed that the gases already in the coal were inflammable gas only, but that was not the case. Secondly, it was assumed that no nitrogen was being absorbed, which was also incorrect. Recently he (Dr. Harger) had two samples of firedamp from a blower. No. 1 contained 87·4 per cent. inflammable gas and 12·2 per cent. of nitrogen and 0·2 per cent. oxygen; and the second sample contained 93·3 per cent. inflammable gas and 6·5 per cent. nitrogen, with no oxygen. Suppose the various Barnsley coals contained gas with 10·20 per cent. of nitrogen, and results given in previous papers showed that was the case, and suppose the nitrogen gas or some of it was given off by passing air over it, Mr. Winnill took that as evidence of absorption of oxygen. For every 8 parts of nitrogen evolved, 2 parts of oxygen would be put down as having been absorbed by the coal, when in reality none might have been.

By the absorption of nitrogen from air by the coal the error was in the opposite direction to the first, but did not take place at the same time. The tendency at first was to burn out more nitrogen than that going in afterwards, as the methane was displaced for the nitrogen to go in again. The simplest way to overcome those difficulties would be to measure the air going in as well as that coming out. Then the errors arising would be reduced to a minimum or entirely eliminated.

#### THE EFFECT OF SIZE.

In this paper the effect of size of particles of coal was investigated and discussed, and little difference was shown in the absorption of oxygen by coaldust passed through the 200-mesh sieve and by that passed through a 10-mesh sieve left on a 30-mesh, which on the average would be about 8,000 times as big. That did not at all agree with other observers. He recently had a sample of Barnsley softs taken at a rapidly advancing face and put in a glass tube (small pieces, about ½ in. × ¼ in. × ¼ in.), and the tube was so arranged that it could be sealed on to the Topley pump without opening the tube and without transferring the coal. It was sealed on the pump, the Topley evacuated, and then the cock was opened, and the air which had been in contact with the coal was sucked off and tested. The tube and stopcock were immersed in a mercury bath so that no air could leak in. It was 500 hours since it had been collected at the face and bottled up, and there were 28 grains of coal and a certain amount of gas, yet only 0·3 c.c. of oxygen had been apparently removed and retained by the coal, for the air on testing still contained 19½ per cent. oxygen. In another experiment, done about a year ago, some fresh Barnsley coal was roughly powdered and put into glass tubes connected together, making a total length of 18 ft., and a slow current of air passed over at the rate of 1½ litres per hour. The first lots were reduced in oxygen to 18 per cent. oxygen, which soon went up to 20·5. At that point, 1½ litres of that reduced oxygen air was collected and passed back over the same coal in the reverse direction, and after the second passage it tested 20·4 per cent. oxygen, showing clearly to his mind that reduced oxygen air did not lose so much oxygen to coal as air containing more oxygen. It was that experiment also which suggested the local reversal of air current when a heating of the goaf was detected, and that had been done in one or two cases with good results.

#### “MOTHER OF COAL.”

There was one place where Mr. Winnill applied his results to a consideration of spontaneous combustion. He said, “The substance least capable of spontaneous heating is the mother of coal—a charcoal-like substance which often occurs in partings.” Mr. Winnill was rather unfortunate there, for the reverse was the case as observed in actual gob-fires. Often when the coal was at a black heat red hot strings of fire ran over the surface in beautiful patterns, and on close examination he (Dr. Harger) had found that it was the mother of coal that was firing and not the bright compact portion. He had found in the laboratory, too, that coal residues which had been extracted with pyridine would often take fire if dried in an air oven a degree or two above the boiling point of water, and such residues had to be dried in a vacuum or in a current of inert gas. Mother-of-coal was an interesting substance, and on first sight one would take it to be wood which had been charred by heat, but a more reasonable explanation was that given by White, who said it was wood which had been subjected to dry rot before being compressed. In addition to occurring in partings, it formed quite a large proportion of Barnsley seam coals and of most other coals, and it occurred in veins or laminae of various thicknesses, and mixed up with the bright portion of the coal as to be almost unrecognisable as mother-of-coal.



The only way in which air could get into lumps of coal to any great extent was through the porous mother-of-coal. It must, therefore, be regarded as playing a very important part in the spontaneous heating. It was the porous nature and the enormous surface exposed that made mother-of-coal more easily ignitable than the compact part. That it was more easily lighted could be shown quite convincingly by taking two small conical piles, one of powdered mother-of-coal and one of powdered bright coal, from the same lump, and applying a light to the top of each. It would be found that the mother-of-coal burned, while the powdered bright coal did not.

#### INDICATIONS OF GOB FIRES.

The principle of the method of detecting gob fires at a very early stage, when the coal was just beginning to warm up above the natural temperature of the goaf, was based on the fact that coal absorbed oxygen, with which it apparently combined to form some complex organic compounds without evolving an equivalent quantity of carbon dioxide. Even when coal was warmed to 50 degs.—100 degs. Cent. in air—it absorbed far more oxygen than it gave out carbon dioxide. A lamp burning, or a man breathing on the contrary, gave out almost but not quite as much volume of carbon dioxide as oxygen used. In a mine the removal of oxygen could therefore be traced as to whether it had been caused by oil lamps or respiration on the one hand or by coal on the other. In a pit subject to gob fires by carefully designed sampling of the air in various parts, it had been found possible to detect places where heating up in the goaf was taking place, long before there was any petrol smell or gob stink. The samples must always be taken in exactly the same place every day, or every other day. A low percentage of oxygen without carbon dioxide had very little significance, and with carbon dioxide had less. The first merely showed that the air from the goaf had lost some of its oxygen, which was a normal state of affairs. It was the change in the composition of the samples taken day after day in the same place that must be watched. Suppose a sample taken at a certain position A, tests 20·2 per cent. oxygen, plus CO<sub>2</sub> on November 1, and 20·15 on November 2, 20·00 on November 3, 1985 on November 4, and so on. Those results indicated that the coal from which the air was coming was warming up. Little ups and downs did not count; they might be due to changes in barometer, but when one got a steady falling of oxygen plus CO<sub>2</sub>, it was quite certain there was heating-up in the goaf from which that air was coming. Sometimes the difference was due to alteration of ventilation, &c. When an enquiry was held on the spot and everything was gone into, if no changes had been made and yet there was this steady decline in the oxygen and CO<sub>2</sub> percentage, the place must be regarded with suspicion, and other places near selected for taking samples. At the same time all possible circumstances which might make a heating in that particular place must be considered. If the state of the air as regards firedamp would permit, the ventilation should be reduced, or locally reversed. If the place was near the working face and that had been kept back here for any reason, efforts should be made to get it advanced by putting more men on it, &c. If, in spite of any measures that were taken, the oxygen continued to decrease and a little CO<sub>2</sub> appeared, a scouring should be driven into the goaf at the most likely place indicated by experience and the air analyses. That had been done on more than one occasion, and a small pillar of hard coal found in a hot condition and removed. On many occasions, however, by the quick advance of the face or alteration of air-current, in quantity, or direction, the air analyses had shown a gradual increase in the oxygen, and the place became normal. The heating, being stamped out by the roof pressure, or the spontaneous heating, stopped by change of ventilation.

#### WHERE TO TAKE SAMPLES.

All the above remarks and what followed applied to longwall advancing method of mining. The selection of the places for taking samples was a matter which required much consideration. It must be remembered that generally the cases from a goaf came into the return air, but not invariably. At faults the gases from a heating sometimes appeared in the intake side of the goaf. That was because in that part there were sometimes places which were tight on the return side but open on the intake side. Nearly always a heating spread in the direction of fresh air travelling against the currents, while the hot gases passed the other way. It was useless to try to detect gob-fires or heating by taking samples of air in main returns, or in fact in any place where there was a considerable current of air. Places must be selected where the flow of air was very small, and so one must have a very large number of samples to cover the parts of a pit most liable to gob-fires. The more samples the better, and old places must be given up and new ones selected for taking samples as the pit advanced. They had found that decrease in oxygen was accompanied by increase in temperature, and also an increase in the humidity of the air. Therefore the man taking samples always took the wet and dry bulb temperatures. At every mine, and more especially at a mine subject to gob-fires, an instrument for registering and automatically recording the barometric pressure continuously should be in use. At every pit a barometer had to be provided at top and bottom, but the ordinary barometer was really of no use to a mine manager or a chemist. What was wanted was one giving a continuous record. He had found the barograph record of very great use in connection with the analysis of air samples for detecting heatings, as one could get the height and the direction of change at any time, and that was of great importance sometimes, as explaining a certain abnormal analysis or in confirming or otherwise a diagnosis.

Wet and dry bulb thermometers were used to get the percentage of moisture. When a heating was started up in coal, in addition to the reduction of oxygen and increase in temperature and moisture, there was generally found to be a slight increase in inflammable gas, and one would expect, from the results given in the previous paper, that this would be of the higher hydrocarbon variety. He had not had any practical evidence of that, as it had only recently appeared to him to be of importance. If chemists engaged in gob-fire pits would test that, it might turn out to be a valuable guide in confirming a diagnosis or otherwise of a heating. It might even be possible to say in what kind of coal of the seam the heating was taking place, or if it was in the shale, as some of the materials gave off hydrocarbons with very different  $n$  value in the  $C_nH_{2n+2}$  formula, as described in the first paper. Some shales found in the pits working the Barnsley seam gave off very heavy hydrocarbons, but as a rule not very much of them. He had found from one at 100 degs. Cent. a liquid product which was inflammable, and the air in contact with it on testing showed a hydrocarbon of average  $n$  value of 12·6 in the molecule. Later portions showed hydrocarbons with  $n$  value for the average carbon atoms in the molecule of 3·9, 4·7 and 5.

#### DISCUSSION.

On the motion of the CHAIRMAN, seconded by Mr. LEONARD FLETCHER, the thanks of the meeting were given to Dr. Harger.

Mr. JOHN GERRARD, H.M. inspector of mines, said they were all very much pleased to listen to Dr. Harger. He was not sure, however, whether the scheme proposed by Dr. Harger in his paper, for withdrawing gas in a mine, could be carried out successfully. He thought that Dr. Harger would withdraw a considerable quantity of air rather than a considerable quantity of firedamp. One did not know what diameter of pipe Dr. Harger proposed to use, nor was one at all clear that it would be possible to have the end of the pipe in proximity to the firedamp in all cases. His experience was that in working mines they had to search closely to find firedamp. One did not have large accumulations of firedamp throughout the mines. Undoubtedly they had feeders and blowers and large outbursts of firedamp, but he had been in many mines subject to these large outbursts—especially in the Barnsley district—before the Barnsley and Silkstone seams' records were published—where there were very large outbursts of gas, but he was quite sure no one connected with coalmines had any thermometrical warning of the approach of an outburst that did occur. He would like to ask Dr. Harger if in connection with gob fires the temperature was itself a reliable indication of the beginning of a gob fire. He quite appreciated the value of the analyses of the air. Dr. Harger had proved that in many cases. He would like him to tell the meeting whether—he at the same time concurring with the indication of the analyses of the air—the record of the temperature indicated the proximity of a gob fire. The analyses of gases and of coals were most interesting, and it seemed to him very desirable that they should have these analyses taken in connection with other seams than the Barnsley seam. In the Manchester district they should have, if Dr. Harger could give them, similar analyses to those he had given in connection with the Barnsley seam.

Mr. A. J. A. ORCHARD said the idea of picking gas out of a mine was not altogether new. He remembered some 20 or 25 years ago seeing a pit bank, in the Wigan district, lit up by gas from the mine. For the reasons given by Mr. Gerrard, he did not see how it was possible to tap the gas at its origin and convey it out of the mine; it was like following a will-o'-the-wisp.

Mr. PARKER (Manchester University) stated that in some recent experiments he had shown that it was possible to have ignitions in an atmosphere containing only 17 per cent. oxygen. It had also been found that methane could be fired with 13·5 per cent. of oxygen.

Mr. T. H. WORDSWORTH said that while many members did not agree with Dr. Harger, he thought they must all admire his pluck and pertinacity; he would have made a splendid mine manager, for he never knew when he was beaten. It seemed to him (Mr. Wordsworth), that if they were going to get the gas they must enter a horizontal plane in which the gas would be given out. With regard to the ability to live and work in mines with a diminished quantity of oxygen so as to render explosions impossible, he wished to know if anyone had tried to spend eight hours in a mine with only 17 per cent. of oxygen in the air, with or without work. He was sure Dr. Harger had sufficient confidence to do it himself, but it seemed a pity if the experiment had not been made.

Mr. G. S. CALDWELL, with regard to the ignition of firedamp, related an incident that came under his notice in a mine in China. On one occasion a joint blew out of a pipe and the steam impinged upon the flange of the exhaust pipe, which was thereby illuminated. He placed his finger where the steam was blowing out and

got the yellow or purple flame on his finger, and did not feel any appreciable heat. If flame could be produced in that way, would it be possible for such a flame to ignite coaldust or inflammable gas?

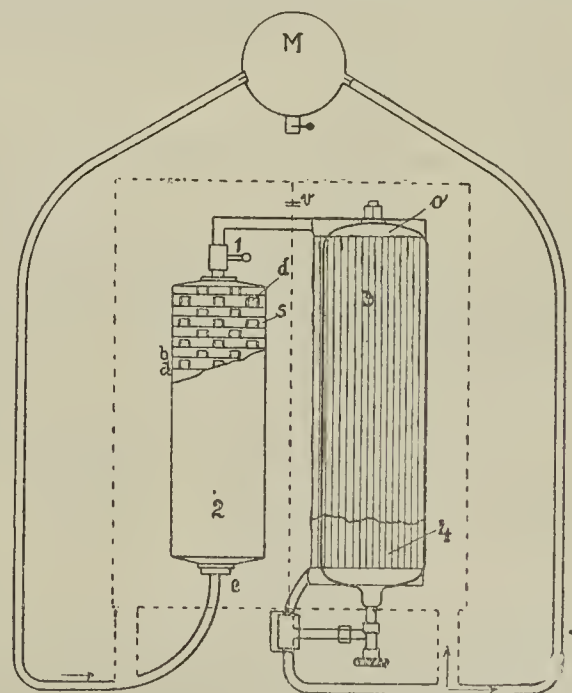
Mr. W. H. MURRAY, His Majesty's inspector of mines, said that, whatever one might think of Dr. Harger's views, he certainly gave his hearers something to think about. Dr. Harger's idea of piping out the firedamp seemed to fit in with his scheme for reducing the general ventilation of the pit, for if the firedamp were taken away there was no necessity for the same quantity of air going down. Consequently, it became easier to dilute the quantity of air and apply his theory of reduced oxygen to prevent explosions. But with due respect to Dr. Harger, he submitted that it would be better if, instead of making the colliery fit his theory, he should make his theory fit the conditions of colliery working. His own experience was that very few collieries had too much ventilation.

Mr. JOHN ROBINSON also joined in the discussion, and Dr. HARGER replied to one or two points, reserving his full reply to another meeting.

In answer to Mr. ROBINSON, he gave it as his opinion that all danger of explosions in mines from electric sparks or other causes would go if the oxygen in the air were reduced as he had advocated.

#### SIMPLIFIED WITKOWITZ RESCUE APPARATUS.\*

As the result of a number of experiments carried out in the laboratory of the Witkowitz collieries, several improvements have been made, so that a larger charge of oxygen can be used without increasing the total weight of the apparatus. At the same time the pneumatic rim of the mask has been replaced by rubber sponge enclosed in a rubber cover, so that the mask cannot be rendered useless in consequence of injury to this portion by puncture. The improved form of oxygen apparatus is shown in section in the drawing. It is carried on the wearer's back, and the oxygen bottle *o*, which weighs 11 lb., holds 12½ cubic feet of oxygen under a pressure of 150 atmospheres. The pressure is indicated by a gauge which is visible from the mask. The reducing valve is set to pass 120 cubic inches of oxygen per minute. Both the fresh and the regenerated oxygen pass through a small pipe *v* into a large breathing bag, and thence to the mask *M*. The cartridge is easily secured to the frame by a screw-down tube *l*, which makes a gas-tight connection. The new cartridge has been devised by R. Nowicki, chief chemist to the Witkowitz collieries. The granulated



caustic potash is placed on a series of dishes *a-b*, perforated with a number of holes and covered with perforated caps *d*, the dishes being so arranged that the perforations *s* in each are staggered with relation to those in the adjoining dishes. The side walls of the caps are splayed to allow the gas to pass through. The gas entering through the bottom of the cartridge traverses the perforations *s*, and is forced by the caps to flow through the layers of alkali on the dishes; and as the alkali becomes liquefied by the absorbed moisture, it is taken up by fragment of filter paper mixed in with the chemicals. Experiments have shown that the regenerated air contains no carbon dioxide at all at the end of two hours, 0·2 per cent. after three hours, and 0·6 per cent. after four hours. The purified air flows through a tubular cooler *3*, which is partly charged with asbestos (*4*) soaked in alcohol or other volatile liquid, the evaporation of which increases the cooling effect. The air is then delivered by the injector to the mask. The action of the injector delivers the exhaled air through a tube *5* into the bag, which communicates with the breathing bag through the pipe *v*, both bags being in one piece and separated by a partition. The bag fastenings are arranged above the cartridge and oxygen bottle respectively. The total weight of the apparatus is about 28 lb., and the oxygen charge is sufficient for a working period of three to three and a-half hours.

\* J. Popper. *Montanistische Rundschau*.



THE COAL AND IRON TRADES.

THURSDAY, NOVEMBER 13.

Scotland.—Western District.

COAL.

The position of the trade in the west of Scotland has undergone a welcome change. The weakness which was apparent in the market, largely owing to a scarcity of tonnage, has disappeared, and ellis, which were sold freely at 13s. per ton last week, have stiffened to 13s. 3d. to 13s. 6d. per ton. While Alexandria and the Bay ports have been purchasing freely, the volume of current business is not large, and the alteration in trade appears to be due to a concerted buying movement on the part of the "bears." All classes of large coal are well booked, and considerable notice is required in arranging for supplies of both navigations and steams. In smalls, treble nuts are somewhat easier, but doubles are much firmer and are difficult to obtain for immediate shipment. Singles, on the other hand, are very plentiful. Despite the comparatively mild weather, the demand for household coal is satisfactory and is in fact increasing, which along with restricted outputs is having a distinct effect on prices. Shipments from the various centres are well up to the average. At Glasgow the clearances were 72,544 tons, Bowling 207, Greenock 2,498, Ardrossan 4,069, Troon 7,068, Irvine 886 and Ayr 19,866—total 107,129 tons compared with 103,874 in the preceding week and 107,356 tons in the corresponding week of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/ to 13/6	13/
Splint .....	13/ to 15/6	13/ to 15/6
Treble nuts .....	13/3 to 13/6	13/3 to 13/6
Double do. ....	12/ to 12/6	12/ to 12/3
Single do. ....	10/6 to 11/	11/

IRON.

The recent dull conditions which have characterised the Glasgow pig iron warrant market continued during the week. Business was of a restricted nature, the total turnover not exceeding 9,000 tons. Owing to an absence of buyers and weak advices from abroad, coupled with the importation of German pig iron into this country in competition with local makers, prices showed a sharp decline of 1s. 3d. per ton compared with the previous week, Cleveland iron being quoted 49s. 9d. per ton cash buyers. Business with consumers is very quiet, as they continue to buy only against immediate requirements. There are now 80 furnaces in blast—the same number as last week, and eight less than in the same period last year. The imports of pig iron into Grangemouth from Middlesbrough and district amounted to 8,797 tons. Prices of Scotch makers' iron are unchanged from last week. Monkland is quoted f.a.s. at Glasgow, No. 1, 65s. 6d., No. 3, 64s.; Govan, No. 1, 64s., No. 3, 62s. 6d.; Carnbroe, No. 1, 70s., No. 3, 66s.; Clyde, No. 1, 71s. 6d., No. 3, 66s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 72s., Nos. 3, 67s.; Glengarnock, at Ardrossan, No. 1, 72s., No. 3, 67s.; Eglinton, at Ardrossan or Troon, No. 1, 66s. 6d., No. 3, 65s. 6d.; Dalmellington, at Ayr, No. 1, 68s., No. 3, 66s.; Shotts at Leith, No. 1, 72s., No. 3, 67s.; Carron at Grangemouth, No. 1, 73s., No. 3, 68s. per ton.

Scotland.—Eastern District.

COAL.

Business in the Lothians coal trade is largely confined to steam coal, trebles and doubles, and these qualities are in good demand. At Grangemouth 34,802 tons were shipped, Granton 10,275, Leith 43,835, Bo'ness 10,846—total 99,758 tons, compared with 106,866 in the previous week and 99,923 tons in the corresponding week of last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal .....	13/6 to 13/9	13/6 to 13/9
Secondary qualities .....	12/ to 12/6	12/ to 12/6
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/3 to 12/9	12/3 to 12/9
Single do. ....	10/9 to 11/3	11/ to 11/6

The activity in the Fife coal trade is well maintained. Collieries are dealing very promptly with the large demand consequent on a steady supply of tonnage at the various ports. The productions of the collieries are moving off satisfactorily. The total shipments amounted to 115,473 tons, against 115,408 last week and 111,662 tons in the same period of 1912.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	16/9	16/9
Unscreened do. ....	14/9	14/9
First-class steam coal.....	13/6 to 14/	13/6 to 14/
Third-class do. ....	11/ to 11/6	11/ to 11/6
Treble nuts .....	13/3 to 13/9	13/3 to 13/9
Double do. ....	12/ to 12/6	12/ to 12/6
Single do. ....	11/	11/

The aggregate shipments amounted to 322,360 tons, against 326,148 last week and 315,941 in the corresponding period of the previous year.

Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

COAL.

During last week 150,512 tons of coal and 2,408 tons of coke were shipped from Tyne Dock, an increase of 1,871 tons of coal and 1,871 tons of coke when compared with the corresponding week of last year. The total tonnage shipped amounted to 152,920 tons, against 148,616 tons in the corresponding week of last year, and an increase of 2,132 tons of coal and 1,085 tons of coke.

The Blyth shipments aggregated 89,576 tons of coal and coke, an increase of 1,932 tons. With reference to the contract for 60,000 tons of north-country steam coals for delivery to the Moscow-Windau Railways over next season—announced last week to have been placed with Russian merchants—it is stated that the price is about 13s. per ton f.o.b. for best Blyths. The contract to supply the Palermo Gasworks with from 20,000 to 30,000 tons of gas coal is stated to have been placed for Holmside coal at 22s. per ton c.i.f., delivery over next year. The Klagshamn Cement Works are stated to have purchased only 8,500 tons of coal in respect of their next year's requirements. Durham gas seconds have been taken, for delivery over the first half of the year, at 16s. 7d. per ton c.i.f. The Midi Railways, of France, are stated to have contracted for 60,000 tons of Durham best unscreened coking coal for shipment to Bordeaux, mainly, over next year, at 16s. 9d. per ton c.i.f. A small quantity is to go to Bayonne at proportionate prices. Steam coal sales include the following:—Cargoes of best Blyths, sold by second hand holders, for prompt shipment at 14s. 9d. per ton f.o.b., for shipment from November 20 to November 30, at 14s. 6d., for December despatch at 14s. 3d., and for January loading at 13s. 6d.; Blyth smalls, for delivery over next year, at from 7s. to 7s. 3d., second-hand sales; best Blyths, for December-April delivery, at 13s. 9d., and for January-March shipment, at 13s. A considerable "parcel" of good unscreened Durham bunkers is stated to have been arranged for next year's delivery at 11s. 7½d. per ton f.o.b., whilst ordinaries are said to have been sold at 11s. for the same period. For delivery over 1914, collieries are firmly quoting best Blyth steams at 13s. 6d. per ton f.o.b. The French State Railways are reported to be enquiring for a supplementary quantity of 17,500 tons of Durham unscreened coals for shipment to the channel ports. A Rotterdam firm is inviting offers of from 70,000 to 75,000 tons of coking coal for delivery over next year, and it is stated that tenders are being based on 11s. 6d. f.o.b. The prompt coal market has been rather quiet and tolerably steady during the week. Loading turns continue to be congested and supplies of the favourite qualities of fuel are difficult to secure for early loading. Coal tonnage is in adequate supply. F.o.b. quotations for prompt shipment have varied as follow, on the week:—Best Blyth steams are 3d. cheaper; Tynes, stronger; Tyne seconds, firmer; unscreened, easier; Blyth smalls, 3d. reduced; Tynes, ditto; gas bests, 3d. advanced; specials, in seller's favour; unscreened bunkers, Durhams, 3d. to 6l. higher; Northumbrians, inclined to fall; coking coal, 3d. reduced; coke: foundry, 6d. more; blastfurnace, 6d. higher. Other descriptions of fuel are steady.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	14/6 to 14/9	14/9 to 15/
Do. Tynes (Bowers, &c.).....	14/9 to 15/	14/6 to 15/
Secondary, Blyths .....	12/6 to 12/9	12/6 to 12/9
Do. Tynes (Hastings or West Hartleys) .....	12/9 to 13/	12/6 to 13/
Unscreened .....	11/6 to 12/6	11/9 to 12/6
Small, Blyths .....	7/6	7/6 to 7/9
Do. Tynes .....	6/6	6/6 to 6/9
Do. specials .....	8/6 to 8/9	8/6 to 8/9
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	15/3 to 15/6	15/ to 15/3
Secondary gas coals (Pelaw Main or similar) .....	13/6	13/6
Special gas coals .....	15/6	15/ to 15/6
Unscreened bunkers, Durhams	13/ to 13/9	12/6 to 13/6
Do. do. Northumbrians	11/6 to 12/6	12/ to 12/6
Coking coals .....	13/6 to 13/9	13/6 to 14/
Do. smalls .....	13/ to 13/3	13/ to 13/3
House coals .....	15/6	15/6
Coke, foundry .....	20/ to 23/	20/ to 22/6
Do. blast-furnace.....	17/6 to 18/6	17/6 to 18/
Do. gas .....	16/6 to 17/9	16/6 to 17/9

Sunderland.

COAL.

The exports from Sunderland last week amounted to 90,980 tons of coal and no coke, as against 99,300 tons of coal and 445 tons of coke for the corresponding period of 1912, being a decrease of 8,320 tons of coal and 445 tons of coke. The coal market keeps very firm, turns are well filled for both steam and gas qualities, and producers and holders find no difficulty in getting late figures for this month's loading, and, so long as collieries and holders can secure present figures, there is no likelihood of a fall—at all events just yet. Smalls, however, are plentiful and easy; coking fuel is steady. Bunkering qualities are in fair request and sellers are somewhat reserved, but the tone is on the easy side. Household coals are quiet and the demand for early shipment is good. Forward enquiry is also on a large scale, but the high prices asked check business. The

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/6
Secondary do. ....	13/9	14/
House coals:—		
Best house coals .....	16/6	17/
Ordinary do. ....	15/6	16/
Other sorts:—		
Lambton screened .....	15/6	15/6
South Hetton do. ....	15/3	15/3
Lambton unscreened .....	13/9	13/9
South Hetton do. ....	13/9	13/6
Do. treble nuts .....	16/	16/3
Coking coals unscreened ..	12/9	13/
Do. smalls .....	12/6	12/9
Smithies .....	15/6	15/6
Peas and nuts .....	16/	16/
Best bunkers .....	13/6	14/
Ordinary bunkers ..	12/9	13/6
Coke:—		
Foundry coke .....	19/6	20/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	18/6	18/9
Gas coke .....	16/6	17/

Klagshamn Cement Works have contracted for 8,000 tons of second Durham gas for shipment November to June at 16s. 7d. c.i.f., and the Midi Railway of France is reported to have bought 60,000 tons of best Durham with screened coking coal at 16s. 9d. c.i.f. Bordeaux, delivery over next year. The Palermo Gasworks contract is said to have been placed locally, but details have not yet transpired. The outward freight market is quiet, with easier rates all round. Recent fixtures include:—Coasting: London 3s. 3d., Rotterdam 3s. 4½d., Hamburg 3s. 4½d., Boulogne 4s. 3d., Bay: Bordeaux 5s. 1½d., St. Nazaire 5s. 6d., Cadiz 8s. 3d., Baltic: Stettin 5s. 6d., Raval 5s. 4½d., Riga 6s. Mediterranean: Genoa 8s., Algiers 7s., Palermo 9s. 3d., Barcelona 8s., Venice 10s., Port Said 8s. 3d., Alexandria 8s. 6d., Las Palmas 8s.

Middlesbrough-on-Tees.

COAL.

The fuel market is strong with a fair amount of business passing. Deliveries of gas coal are now very heavy, and best Durhams are 15s. 3d. to 15s. 6d., with second kinds at 14s.; and special sorts up to 16s. The fairly large demand for bunker coal is met by an ample supply. Ordinary Durham bunkers are in the neighbourhood of 13s. f.o.b., superiors are 13s. 6d. to 14s.; and specials, 14s. 6d. to 15s. Household coal is in good and improving demand at 15s. 6d. to 15s. 9d. Coking coal is well taken up at quotations ranging from 13s. to 14s. Coke is still very scarce, and there are many complaints of short supply of furnace kinds. The scarcity is due to ovens going out, and many makers selling their coal in preference to converting it into coke. Nothing under 18s. 6l. is named for average blastfurnace coke delivered at Teesside works, and for superior kinds up to 19s. 6d. is quoted. Foundry coke for shipment ranges from 19s. to 22s. 6l. f.o.b. Gas house coke is round about 18s.

IRON.

Traders take anything but a cheerful view of the pig iron industry. Fairly good enquiries are reported, but the firms who make them are not prepared to pay market rates, and there appears to be little likelihood of resumption of business to any extent until prices are further lowered. There are enquiries on American account for most descriptions of pig iron, but they do not promise to result in much business, as in every case delivery to particular analysis is insisted on. Current quotations for Cleveland pig are below cost of output, and this is leading makers to further reduce their make. Following on the blowing out of a furnace at their Redcar Ironworks, Messrs. Walker, Maynard and Co., are damping down both furnaces at their Coatham Ironworks. Other firms threaten to further reduce their production. There are sellers of No. 3 g.m.b. Cleveland pig at 50s. 3d. f.o.b., and in fact small odd lots might even be purchased at 50s. which is the lowest quotation since the beginning of March last year. No. 1 Cleveland is 52s. 6d., No. 4 foundry 49s. 6d., No. 4 forge 49s. 3d., and mottled and white iron each 49s. All the foregoing quotations are for early delivery. East coast hematite pig shows a further marked downward tendency. There are sellers of mixed numbers at 62s. 6d., but that reduced figure does not tempt buyers into the market, most of whom consider that the price should be 60s., and an impression prevails that the next business of moment will be transacted at round about the latter quotation. Foreign ore is lifeless. Sellers still base prices on 19s. ex-ship for rubio of 50 per cent. quality, but in the absence of transactions quotations are quite nominal. Producers of nearly all descriptions of finished iron and steel are busily employed, but orders come in slowly. A few contracts for railway material are being entered into. Further Australian orders are anticipated, and firms here hope to secure a fair share of a 50,000 tons order which is in the market for railway material for the Union of South Africa. Quotations are unchanged.

South-West Lancashire.

COAL.

The inland household trade is waiting the stimulus of a change in weather; otherwise, although there is a fair trade in progress, there is no pressure for supplies. Contract bunkering requirements are much the same as they were a week ago—viz., below the average. Open sale shipping enquiry, though still on the quiet side, is perhaps at the moment more slightly active than it was. There is no improvement in prices, which remain at 13s. to 13s. 3d. f.o.b. for ordinary grades of screened Lancashire bunker coals, and up to 13s. 9d. or 14s. f.o.b. for the best qualities. Household coals continue to be shipped in satisfactory quantities for the coastwise and cross-Channel trade and, with regard to the very best grades, there is a difficulty in providing a sufficiency. The consumption of slack locally is, week by week, getting a little nearer the output, and it is not likely that the latter can be increased.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/	17/
Do. (f.o.b. Garston, net) ..	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net) ..	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net) ..	13/9 to 14/6	13/9 to 14/6
Screened forge coal.....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/ to 14/	13/ to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

South Lancashire and Cheshire.

COAL.

The Manchester Coal Exchange was well attended on Tuesday. The demand for house coal is only moderate, the weather continuing mild. Furnace coal meets with fairly good enquiry, while there is a good call for shipping coal at full list rates. There is a moderate demand for slack, with ample supplies offering, and prices are rather unsteady.



Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 14/	13/3 to 14/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

IRON.

There was a fairly good attendance on 'Change in Manchester on Tuesday last, but the general trade of the district remains unchanged, with no alteration to report in pig iron. Forges are moderately employed at the associated rates—viz., £7 15s. for Crown bars, second quality £7 5s., hoops £8 7s. 6d. Steelworks are fairly busy with bars at £7 to £7 5s. less 2½ per cent., and £5 5s. net for billets, and there is keen competition for any new orders that may be about. Foreign material is still in evidence at low rates. Wagon builders, foundries and engineers could all do with more orders.

Yorkshire and Derbyshire.

Leads.

COAL.

The attendance at the market on Tuesday was full and representative. A large number of shippers from the Humber ports were present and there was a keen demand for prompt parcels of screened steam coal for shipment. Apart from this, however, the demand was quiet, very few orders for house and manufacturing fuel being given out. The pits have worked about five days this week, but stocks have been increased. Empty wagons are becoming scarce, as a large number are held up with stock.

**House Coal.**—The distant markets are taking very little beyond contract tonnage and in some of the secondary descriptions prices are appreciably weaker. The very best qualities, however, maintain their position, as supplies are quite inadequate to meet the demand. Reports of the retail trade in London are very disappointing. The coast-wise trade is moderately active, the principal demand being for the very cheapest grades. Freight is a little weaker since our last communication. In Leeds, Bradford, Huddersfield, Halifax and other West Riding towns, merchants report very little buying on the part of the public and ground stocking is being resorted to. There is no official alteration in pit prices, but concessions for prompt orders are frequently met with. Current quotations:—Haigh Moor selected, 18s. 6d. to 19s. 6d.; Wallsend and London best, 17s. 6d. to 18s. 6d.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other qualities 14s. to 15s. 6d.

**Gas Coal.**—There is nothing doing in the shape of new business, but the pits continue to work full time, as the demand ex-contract is exceptionally heavy. A fair tonnage of medium qualities is still being shipped to the nearer Continental ports. Stocks of gas coal all round are light, but those in the hands of the different authorities are said to be larger than at the corresponding period of last year.

**Manufacturing Fuel.**—Stocks of slacks all round are very heavy and, as the demand has fallen off still further, prices are very weak. Spot lots of slack have been sold during the past few days at prices ranging from 5s. 6d. to 6s. 6d. per ton at the pit, according to quality. Nuts and washed fuel are fairly strong.

**Washed Furnace Coke.**—With the further damping down of furnaces in several localities, the demand for coke has fallen to a very low level. Makers decline to take less than 12s. per ton at the ovens and are carrying fairly heavy stocks. Buyers absolutely decline to buy beyond the end of the year.

	Current prices.	Last week's prices.
House coal:—		
Prices at pit (London):		
Haigh Moor selected ...	15/ to 16/	15/ to 16/
Wallsend & London best	14/ to 14/6	14/ to 14/6
Silkstone best .....	14/ to 14/6	14/ to 14/6
Do. house .....	12/ to 12/6	12/6 to 13/
House nuts .....	11/6 to 12/	11/6 to 12/6
Prices f.o.b. Hull:		
Haigh Moor best .....	17/6 to 18/6	17/6 to 18/6
Silkstone best .....	16/6 to 17/6	16/6 to 17/6
Do. house .....	14/6 to 15/6	14/6 to 15/6
Other qualities .....	14/ to 14/6	14/6 to 15/
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 11/6	11/ to 12/
Unscreened gas coal ...	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	10/3 to 11/	10/6 to 11/6
Large double-screened engine nuts .....	9/9 to 10/6	9/9 to 10/6
Small nuts .....	9/ to 9/6	9/3 to 9/9
Rough unscreened engine coal .....	9/6 to 10/	9/9 to 10/3
Best rough slacks .....	7/3 to 7/9	7/6 to 8/
Small do. ....	6/ to 6/6	6/ to 7/
Coking smalls .....	6/ to 6/6	6/6 to 7/
Coke:—		
Price at ovens:		
Furnace coke .....	12/	12/

Hull.

COAL.

There is a fair amount of buying going on for prompt shipment, but with collieries competing to get rid of their stocks best Yorkshire steam hards are again lower on the week. This and moderate freights has not been without its influence, and trade may thus be said to be fairly active. Best Derbyshire and Nottingham steams are also a little easier, but maintain their values well, and can now command more than the Yorkshire sort. Nuts are in good request, but small coal shows no signs of improvement, while the house coal market requires the advent of cold weather to give it a fillip. Buyers are leaving the forward market severely alone and are not at all

disposed to negotiate on the prices mentioned by the colliery agents. Consequently there is nothing to report in this direction. The appliances at the docks continue to be well occupied and the shipments are still much larger than they were this time last year. In the freight market there has been very little done and only one or two fixtures are reported as having been made locally. Tonnage is on offer at 5s. 9d. for Riga, this being the basis for the Baltic, while about 8s. is the value for Genoa and 9s. 3d. for Odessa. The principal enquiries are for handy vessels for the Baltic and near Continental ports, large tonnage being in good request for South Russia. The export of coal from the Humber ports during the month of October reached a record total and showed an increase of over 175,000 tons as compared with the quantity sold to foreign buyers in the corresponding month last year. The following are the details:—

	October 1913. Tons.	October 1912. Tons.
Hull .....	413,717	349,114
Grimsby .....	99,231	126,939
Goole .....	114,852	98,261
Immingham .....	208,047	86,369
Total .....	835,850	660,683

A feature again has been the shipments to Black Sea ports in satisfaction of South Russian requirements, 46,776 tons having been despatched from Hull, and 39,181 from Immingham. For the 10 months to date there has been an increased foreign export (exclusive of bunkers) of 750,180 tons from Hull, 878,602 tons from Immingham, and 201,668 tons from Goole; while from Grimsby there is a decrease of 42,016 tons, leaving a net increase for the whole of the Humber of 1,788,374 tons—truly a remarkable expansion. The following are the approximate prices for prompt shipment f.o.b. Hull, etc.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	14/9	15/
Washed double-screened nuts .....	13/3 to 13/6	13/3 to 13/6
Unwashed double-screened nuts .....	12/9 to 13/	12/6 to 12/9
Washed single-screened nuts .....	13/ to 13/3	12/9 to 13/
Unwashed single-screened nuts .....	12/ to 12/6	12/3 to 12/6
Washed smalls .....	10/ to 10/6	10/ to 10/3
Unwashed smalls .....	9/3	8/9 to 9/
West Yorkshire:—		
Hartleys .....	14/	14/ to 14/3
Rough slack .....	9/ to 9/3	9/ to 9/3
Pea slack .....	8/3 to 8/6	8/3 to 8/6
Best Silkstone screened gas coal .....	14/3	14/3 to 14/6
Best Silkstone unscreened gas coal .....	13/3	13/ to 13/3
Derbyshire:—		
Best steam hards (Hull) .....	15/3	15/6
Do. (Grimsby) .....	15/	15/ to 15/3
Derbyshire nuts (doubles) .....	13/	13/
Derbyshire nuts (doubles) (Grimsby) .....	12/9	12/9
Derbyshire large nuts ...	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	15/3	15/6
Do. do. (Grimsby) .....	15/	15/ to 15/3

Barnsley.

COAL.

There has been no material alteration in the state of trade generally during the week, and the collieries are keeping at full work. The position with regard to the exports of large steam coal varies somewhat. With the requirements of the Baltic ports now practically completed, a considerable tonnage is in the hands of merchants, who are seeking to realise, with the result that prices are still being cut in order to place the fuel. There is a good bulk of business passing, the chief feature of which is the operations of representatives of Russian merchants who are buying largely for shipment to the Black Sea ports and are no doubt for the time being able to obtain concessions as compared with the official prices quoted by the coalowners direct. This remark applies more particularly to the secondary class of steams, which continue to be more largely produced. In regard to forward business, no further action appears to have been taken by the Humber trawler companies in placing the further tonnage which they will require over next year, the total consumption of these buyers being estimated at about three quarters of a million tons. Some of the railway companies have issued enquiries for the usual contracts for supplies over next year. The coalowners, it is understood, are acting in unity in seeking an advance of 1s. per ton, and it seems probable that the companies will pay 12s. 6d. per ton for the best hards, as some of the trawler companies have already done. In regard to other qualities of coal, it seems likely that there will be a keen struggle before this amount of increase is conceded. There is also a good enquiry on forward account for steam nuts,

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone .....	15/6 to 16/	15/6 to 16/
Best Barnsley softs .....	15/ to 15/3	15/ to 15/3
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	13/ to 13/6	13/ to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/ to 12/3	12/ to 12/3
Secondary do. ....	11/ to 11/3	11/ to 11/3
Best washed nuts .....	11/3 to 11/6	11/3 to 11/6
Secondary do. ....	10/3 to 10/6	10/3 to 10/6
Best slack .....	7/6	7/6 to 7/9
Rough do. ....	6/ to 6/6	6/6
Gas coals:—		
Screened gas coals .....	12/6 to 13/	12/6 to 13/
Unscreened do. ....	11/ to 12/	11/ to 12/
Gas nuts .....	12/ to 12/3	12/ to 12/3
Furnace coke .....	12/	12/

which are maintaining a steady position for the present time, and it is reported that in several cases good offers have been received from buyers on forward account. Washed nuts are in good request, but the market, comparatively speaking, is still sluggish with respect to slacks of all descriptions, and prices are still weaker. In regard to gas coal, buyers continue to meet with more frequent offers of surplus lots, and prices are hardly so strong as a few weeks ago. There has been a slight improvement in the demand for house coal, but business is hardly so pressing as expected. So far as the best class of fuel is concerned, prices are still maintained, but not without difficulty. The position with regard to coke is unaltered, and in spite of the reduced output, business is only quiet, though a good bulk of fuel is still being taken for the North district.

Chesterfield.

COAL.

Due to the mildness of the season, there is a marked falling off in the number of orders coming to hand for house coal, and only a spell of cold weather can bring about a revival. Fortunately, stocks are lower than usual at this time of the year, and for this reason it has not up to now been found necessary to reduce the number of working days at the pits. Prices are firmly maintained. A steady demand is experienced for fuel for manufacturing purposes, and now that the strike of Sheffield moulders is settled and the men again at work, it is probable that more of this class of coal will be required. Cobbles and nuts for gas producers continue to move freely and there is a good winter's trade in prospect in this department. The demand for slack for boiler firing is rather quiet, so far as secondary kinds are concerned; the best sorts, however, are in good request. With the improved labour conditions, it is hoped and believed that more small fuel will come into requisition. Many contracts for slack have recently been renewed at 6d. per ton advance upon those which will expire at the end of the year. Notwithstanding the fact that the upper Baltic ports are now closed for the present season, there is quite a good demand for steam coal for export, and prices remain steady for current requirements. No business for next year has been arranged up to the present, although enquiries are numerous enough. These, however, are obviously put forward for the purpose of testing the market. The difference between the prices quoted by the collieries and the buyers' opinion of what these should be is so marked that it is quite impossible to come to terms at the moment. Still, negotiations are not allowed to be broken off altogether, and in the course of a few weeks, when it will be possible to take a clearer view of the prospect of trade for 1914, there will no doubt be a narrowing down of the existing difference of opinion, and as a result, some substantial contracts will be entered into for next year's requirements of steam coal. In the meantime, shipments are keeping up remarkably well. There is a brisk demand for cobbles for near Continental ports, but the supply is not sufficient at present to satisfy the needs of the market. There is a steady business passing in washed nuts and washed slack without any change in prices. There is a slight improvement in the demand for coke and prices are firmer. There is a feeling that the recent reduction of the output, owing to the falling off in the demand, has been overdone, with the result that in some districts there is an actual shortage of coke. Coking fuel is in steady request and prices are unchanged.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	8/6	8/6

IRON.

There is no change in the condition of the local iron trade. The demand for pig iron is on restricted lines, consumers being satisfied to buy only sufficient to meet their immediate wants. Taken as a whole, the finished iron trade is no better, and it is not probable that any improvement will take place this side of Christmas.

Nottingham.

COAL.

It cannot be said that the coal trade in Nottinghamshire is in a robust condition, for the comparative mildness of the weather has tended to keep business less active than is customary at this time of the year. Nevertheless, a fair amount of trade is being done, but the advance of marked activity, combined with the collieries making a practically full output, has had the effect of slightly weakening prices in some directions. The tone in the household section has shown little change from a week ago, merchants hesitating to purchase in large quantities, particularly in reference to better class fuel. Medium qualities are just now in improving demand. Most pits have a fair amount of stock on hand, and there is a keenness amongst owners to maintain prices. A falling off in the demand is noticeable in the section for steam fuel, as the amount sent away on export account is less weighty. The orders, however, in the home market are coming to hand satisfactorily. Railway companies are taking full supplies of locomotive fuel on contract account. Although stocks are in irregular request for the moment, an early improvement is anticipated, with the result that prices are being generally maintained. Both gas coal and coke are in moderate demand.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	14/	14/ to 14/6
Good house coals .....	13/ to 14/	13/ to 14/
Secondary do. ....	11/ to 12/	11/ to 12/
Best hard coals .....	11/3 to 11/9	11/6 to 12/
Secondary do. ....	10/3 to 11/	10/6 to 11/
Slacks (best hards) .....	8/3 to 8/6	8/3 to 8/
Do. (seconds) .....	7/ to 7/6	7/ to 7/6
Do. (soft) .....	7/ to 7/6	7/3 to 7/



**Leicestershire.****COAL.**

There has been perhaps a little more animation in business in the past week. The colder weather to some extent increased the demand for household coal. But there is not any improvement in the current week. There is, of course, a fair amount of coal being sent away on account of placed orders, but present sales are quite slow. Until the weather becomes colder there apparently is not much chance of any marked improvement in household coals. But the demand for steam coals continues good for all sorts. Not only for coal and cobbles, but slacks are in good request, nut slacks for special use being generally wanted. Local merchants are not at all busy just now, the return of warmer weather has checked their sales. The collieries have maintained their output on the whole, and stocks on hand are moderate, but rather heavier than they have been. The trade prospects do not as yet give any great cause to feel uneasiness. The current quotations continue much on the same level as for some time past. There is some effect felt in the household coal market by the offering of a neighbouring coalfield of reduced prices for household coal. This naturally influences the home quotations. But for other kinds of coal the quotations are fully held.

**South Staffordshire, North Worcestershire and Warwickshire.****Hednesford.****COAL.**

There is not much change to report this week in connection with the coal trade of the Cannock Chase district; on the whole a satisfactory business is being done, and a brisk time may be expected. Orders are fairly plentiful, and most of the collieries are working full time. As the season advances there is increasing activity in the house coal trade. The demand for fuel for manufacturing purposes is much the same as when last reported. There is still room for improvement in the demand for slack. Railway sales are fairly satisfactory, and business is improving at the landsale depots.

**Birmingham****COAL.**

Most of the pits are making fairly full time, but there is no rush, and merchants can get their wants supplied promptly. The house trade is sagging owing to the mild weather. Slacks are fairly plentiful, but the demand for works fuel keeps steady. Prices are unaltered in the main, though in a few cases special lots are procurable on slightly easier terms. Quotations:

**Prices at pit.**

	Current prices.	Last week's prices.
<b>Staffordshire (including Cannock Chase):—</b>		
House coal, best deep.....	18/6	18/6
Do. seconds deep.....	16/	16/
Do. best shallow.....	14/9	14/9
Do. seconds do.....	14/	14/
Best hard.....	15/	15/
Forge coal.....	11/	11/
Slack.....	7/6	7/6
<b>Warwickshire:—</b>		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked cobs.....	14/	14/
Best hard spires.....	15/	15/
Forge (steam).....	11/	11/
D.S. nuts (steam).....	10/	10/
Small (do.).....	8/3	8/3

**IRON.**

The market was dull and lifeless. For the small amount of business going competition was keen, and in almost every case prompt delivery is stipulated for. Merchant stocks stand at the lowest level compatible with safety. Producers say they must come on the market soon, but meantime they content themselves with ordering lots of 25 and 50 tons where in ordinary circumstances hundreds of tons would be required. A fairly good demand is experienced for foundry iron, but for forge qualities the coal is on a meagre scale and prices are weak. Northamptonshire is 50s. to 52s., Derbyshire 51s. 6d. to 52s. 6d., and best Staffordshire 51s. 6d. to 52s. 6d. Standard bar iron is in steady request for the higher class of engineering work at £9 a ton, but there is no accumulation of orders. Good second-class bars command £7 to £7 2s. 6d. delivered Birmingham, and the lower figure is practically cost. Common iron for nuts and bolts at £6 12s. 6d. to £6 15s. a ton, delivered Darlaston and Wednesbury, is in competition with Belgian iron at £5 12s. 6d. to £5 15s. a ton, but while the foreign material is net cash the local iron is subject to 2½ per cent. discount. The mills are going about four days a week. A smaller demand is being experienced for galvanised corrugated sheets, and prices are dropping. A large number of sales have been effected at £10 12s. 6d. a ton, and the highest is £11 2s. 6d. The black sheet industry is languid. Scarcity of work compelled makers of gas strip to reduce prices a few days ago by 7s. 6d. a ton, the basis now being £7 to £7 2s. 6d. a ton, according to quantity delivered in the district. The reduction was necessary in order to prevent orders going outside the district. Steel strip varies from £7 a ton for the heavier gauges to £7 10s. for light. This department is also languid. Steelmakers report some influx of orders as a result of the recent reductions in sections, but complain that the high rate of wages and the dearth of coal make business almost profitless. They welcome a reduction of 10s. in spiegel. Targets and billets are obtainable at £4 15s. to £4 17s. 6d., with 2s. 6d. extra for Siemens qualities. German and Belgian makes vary from £4 10s. to £4 12s. 6d. The heavy trades of the district are fairly prosperous, and full work is assured till the end of the year. Copper sheets have fallen £3 a ton to £86.

**Forest of Dean.****COAL.**

There is no change in the condition of the house coal trade, the demand still keeping only within moderate

dimensions. The mild, muggy weather which has been our portion of late is much against the consumption of coals suitable for domestic purposes. The pits are only engaged four and five days in the week and there are fair stocks to be noticed. Slacks are going better at the lower price of 6s. 6d. at pit. Business in steam and manufacturing fuel is dull and the pits are experiencing much difficulty in working full time.

**Prices at pithead.**

	Current prices.	Last week's prices.
<b>House coals:—</b>		
Block.....	17/6	17/6
Forest.....	16/6	16/6
Rubble.....	16/9	16/9
Nuts.....	15/	15/
Rough slack.....	6/6	6/6
<b>Steam coal:—</b>		
Large.....	12/ to 13/	12/ to 13/
Small.....	8/ to 9/	8/ to 9/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

**THE WELSH COAL AND IRON TRADES.**

THURSDAY, NOVEMBER 13.

**North Wales.****Wrexham.****COAL.**

During the past week, the coal market of this locality has been generally satisfactory. Practically all the collieries are working at full stretch, though some experience some little difficulty occasionally through lack of empty wagons. With regard to the various grades of fuel raised here, the demand for best large house coal is all that can be desired, and orders are coming to hand quite freely. There is also brisk business being done in main coal and cobbles for household purposes. In the steam coal department a large tonnage has been sent on account of locomotive contracts with the railway companies, and to works in the district for manufacturing purposes, while the shipping trade at the Mersey ports has been up to the average. Gas companies are pressing for all arrears to be made up, and in some cases are asking for extra supplies, and the colliery people are doing all they can to meet this extra demand for this class of fuel. Nuts as usual are very scarce, the majority being sold under gas coal contracts, and there are very few for the open market. Slack continues to improve slightly in price, and buyers anticipate that for their next year's contracts they will have to pay a higher price than they are now paying. Generally prices are pretty much the same as were ruling at the time of writing last week, being as below:—

	Current prices.	Last week's prices.
<b>Prices at pit f.o.b.:</b>		
Best house coal.....	15/6 to 16/6	15/6 to 16/6
Secondary do.....	14/6 to 15/6	14/6 to 15/6
Steam coal.....	12/6 to 13/6	12/9 to 14/
Gas coal.....	13/ to 13/9	13/ to 13/9
Bunkers.....	12/3 to 12/6	12/6 to 12/9
Nuts.....	11/6 to 12/	11/3 to 12/3
Slack.....	6/6 to 8/	6/ to 8/6
Gas coke (at works).....	13/4 to 15/	13/4 to 15/
<b>Prices landsale:—</b>		
Best house coal.....	17/6 to 18/9	17/6 to 18/9
Seconds.....	16/8 to 17/6	16/8 to 17/6
Slack.....	10/ to 12/6	10/ to 12/6

**Monmouthshire, South Wales, &c.****Newport.****COAL.**

A rather better tone develops slowly in the steam coal trade, enquiry being a little brisker, while shipments continue at a high average. The stormy weather of the past few days has delayed the arrival of expected tonnage, but not to an extent to seriously interfere with the course of business. The improvement shown is seen more in the higher quotations for eastern valleys and other secondary coals than in best qualities, nuts and throughs also being better values. House coals remain at unchanged figures, as yet there being no seasonable increase in consumption to warrant higher prices. Pitwood is rather better value at 23s. for best French fir ex-ship. In the freight market depressing conditions prevail. Chartering has been quiet, and with orders so comparatively scarce owners have been accepting rates now offering with great reluctance.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
<b>Steam coals:—</b>		
Best Black Vein large ...	17/ to 17/3	17/ to 17/3
Western-valleys, ordinary	16/ to 16/6	15/9 to 16/
Best Eastern-valleys.....	15/9 to 16/	15/6 to 15/9
Secondary do.....	15/3 to 15/6	15/3 to 15/6
Best small coals.....	8/3 to 8/6	8/3 to 8/6
Secondary do.....	7/9 to 8/	7/9 to 8/
Inferior do.....	7/ to 7/6	7/ to 7/6
Screenings.....	8/6	8/3 to 8/6
Through coals.....	12/ to 12/3	11/9 to 12/
Best washed nuts.....	13/6 to 13/9	13/ to 13/6
<b>Other sorts:—</b>		
Best house coal.....	18/ to 19/	18/ to 19/
Secondary do.....	17/ to 18/	17/ to 18/
Patent fuel.....	19/ to 20/	19/ to 20/
Furnace coke.....	19/ to 20/	19/ to 20/
Foundry coke.....	23/ to 25/	23/ to 25/

**IRON.**

Conditions in the local iron and steel trades still continue in a very unsatisfactory state, and very little hope is felt of any improvement for the remainder of this year. Business generally is of a very meagre description, with enquiry falling away to almost nothing. At bar mills, work is moderately good on account of old orders, with only small fresh business at the moment. Quotations, whilst nominally unaltered, trend downwards in sympathy with prices of Continental bars, which are somewhat easier. Imports of foreign bars for last week amount to 7,500 tons. There is

hardly so much moving in the rail department, but specifications are coming in well and mills continue fully engaged. Quotations remain firm. Blastfurnaces maintain a fair output of pig iron, with values of Welsh hematite as last recorded. Iron ore is a shade firmer at 18s. 6d. to 19s. for best rubio c.i.f. Newport. In the tinplate trade there is only a small business passing, with some hope that there are signs that the nadir of values has now been reached, and expectations of improvement in the early year. Buyers, however, remain very reluctant, and few orders are being placed. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tinplate bars (Welsh): Bessemer steel, £4 15s.; Siemens steel, £4 16s. 3d. to £4 17s. 6d. Tinplates: Bessemer primes, 20 × 14 × 112, 13s.; Siemens primes 20 × 14 × 112, 13s. to 13s. 1½d. Finished black-plate, £9 10s. ton. Pig iron: Welsh hematite, 70s. to 71s., delivered locally.

**Cardiff.****COAL.**

This market continues to display unusual strength. There is practically no best coal to be had direct from the collieries for prompt shipment. In fact, for the whole of this month there is but little free coal available. No doubt, the reduction in the outputs has curtailed the supply very considerably. Roughly speaking, there is a shortage of 10 per cent. and even more to what is usually expected during the month of November. The price for best steam coals direct from the collieries is 20s. 3d. to 20s. 6d., and the latter figure is being firmly quoted for delivery to the end of the month. From all appearances there is little likelihood of a set-back till after December has turned. Tonnage is in good supply and freights are still on the downward grade. Genoa has been done at 7s. 6d. for a very large boat, whilst there have been several charterings at 7s. 9d. This, no doubt, has a hardening effect on the price of coal. The British Fleet in the Mediterranean is also the cause of a large quantity of coal being sent to that quarter, and as far as can be at present ascertained, the fleet is likely to remain there for some time to come. There is considerable enquiry for best steams over next year. The Admiralty are in the market for their usual requirements, which, it is estimated, will amount to about 1,500,000 tons. The usual course has been adopted of asking collieries to state what quantity of coal they will be prepared to supply during the year and at what price. It was requested that tenders be sent in towards the end of this week, but some days will probably elapse before the result is known. It is expected that prices, as a rule, will show an advance of 9d. to 1s. per ton on those sent in last year. One well-known second-class colliery on the Admiralty list has contracted to supply an unusually large quantity over next year at 17s. net f.o.b. The same buyers are said to have paid 16s. 9d., less 2½ per cent., 12 months ago, so that the present price would represent an advance of about 8d. per ton. Other contracts have been made of second Admiralty coals, which bring up the aggregate to something like 450,000 tons. This includes about 100,000 tons purchased by the Cordoba Central Railway at 17s. net. For prompt shipment, superior second Admiralties are 19s. 3d. to 19s. 9d.; ordinary seconds 18s. 6d. to 18s. 9d. Considerable satisfaction is expressed at the action of some of the large steamship companies. The French Transatlantique Company, which during the last few years have taken the bulk of their supplies from the north, are once more in the market for something like a-quarter of a million tons of Welsh coals. The Peninsular and Oriental Steamship Company are also asking for prices for the supply of from 300,000 to 400,000 tons. As was the case last year, depot owners and other local merchants have been holding out very firmly against the prices asked by collieries, but in the end they may have to capitulate. In fact, some have already done that. Whether history will again repeat itself, only the future will disclose. Last year, many buyers, through leaving their purchases till late in November, had to pay at least 1s. per ton more than they could have bought at a couple of months previously, and judging from the present state of the market it almost looks as if a similar thing will occur again. Indeed, it is not improbable that some buyers, when they attempt later on to make their arrangements, may

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
<b>Steam coals:—</b>		
Best Admiralty steam coals.....	20/3 to 20/6	20/3 to 20/6
Superior seconds.....	19/3 to 19/9	19/6
Ordinary do.....	18/6 to 18/9	18/3
Best bunker smalls.....	10/9 to 11/	10/9 to 10/10½
Best ordinaries.....	10/3 to 10/6	10/ to 10/6
Cargo qualities.....	7/6 to 7/9	7/9 to 8/
Inferior smalls.....	7/	7/ to 7/3
Best dry coals.....	18/9 to 19/	18/9 to 19/
Ordinary dries.....	16/6 to 17/	16/ to 16/6
Best washed nuts.....	16/	16/
Seconds.....	15/	15/
Best washed peas.....	14/	14/
Seconds.....	13/	13/
Dock screenings.....	12/6	11/9 to 12/
<b>Monmouthshire:—</b>		
Black Veins.....	17/3 to 17/9	16/9 to 17/
Western-valleys.....	16/3 to 16/6	16/ to 16/3
Eastern-valleys.....	15/6 to 15/9	15/6
Inferior do.....	15/ to 15/3	15/
<b>Bituminous coals:—</b>		
Best house coals (at pit)	20/6	20/6
Second qualities (at pit)	17/6 to 18/	17/6 to 18/
<b>No. 3 Rhondda:—</b>		
Bituminous large.....	16/6 to 17/	16/6 to 17/
Through-and-through... Small.....	14/6 to 15/	14/6 to 15/
Small.....	12/	11/6 to 12/6
<b>No. 2 Rhondda:—</b>		
Large.....	13/6	13/6
Through-and-through... Small.....	11/ to 11/3	11/
Small.....	7/9 to 8/	8/3 to 8/6
Best patent fuel.....	22/6	22/6
Seconds.....	19/6 to 21/6	19/6 to 21/6
Special foundry coke.....	28/ to 29/	28/
Ordinary do.....	25/ to 26/	23/ to 26/
Furnace coke.....	20/	20/ to 21/
Pitwood (ex-ship).....	23/	22/3

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.



find colliery books closed against them altogether. In addition to the enquiry for 15,000 tons of best Admiralty coals for the Russian Navy for delivery between now and the second week of December, the board of directors of the Russian Volunteer Fleet are enquiring for tenders for the coaling of their vessels over 1914 at Constantinople, Port Said, Aden, Perim, Djibouti, Colombo and Sabang. Tenders are to reach St. Petersburg by November 15 (old style) and are to include trimming into bunkers. The actual requirements are stated to range from 250,000 to 300,000 tons. Tenders will also be considered for three years' requirements. There is said to be still a great shortage of coal for the Russian Railways, and the Government have authorised further importations free of duty. There is no material change in the small coal market. Shipments to Italy are still below the average, but a large increase is expected in the course of next week. Bunkerings are 10s. 9d. to 11s., cargo qualities between 7s. 6d. and 7s. 9d. Prices of Monmouthshire coals are firm with a decided upward tendency. Tonnage is in ample supply, and in some cases owners have more vessels on hand than they can conveniently deal with. Black Veins are 17s. 3d. to 17s. 9d., and western valleys 16s. 3d. to 16s. 6d. f.o.b. Cardiff. Tenders have been sent in for the supply of 107,000 tons of Monmouthshire large coals for the French State Railways, to be delivered at the usual range of ports over next year. It was currently reported on 'Change that the tenders ran from 26½ fr. to 27½ fr. c.i.f., leaving the price of coals about 15s. 6d. net f.o.b. An outlet for Rhondda bituminous coal seems to be sadly needed. Though No. 3 large is quoted at 17s., owners are glad to take 16s. 6d. No. 2 large is steady at 13s. 6d. There has been a very heavy shipment of patent fuel, the total for the week being 37,886 tons, of which the Crown Company despatched 18,691 tons, Swansea 17,495 tons and Newport 1,700 tons. Prices of best brands continue steady at 22s. 6d., and others in proportion. For delivery over next year 18s. 9d. is firmly quoted for best qualities. In the coke market there is no improvement, special foundry being 28s. to 29s., ordinary foundry 25s. to 26s., and furnace coke 20s. per ton. Pitwood has gone up to 22s. 3d., or 9d. above last week.

IRON.

All business in the tin-plate trade is of a hand-to-mouth character. Stocks are still heavy, amounting to 328,000 boxes, as compared with 171,000 boxes at the corresponding date of last year. In order to keep their mills going, some owners are accepting 12s. 9d. for 14 x 20 cokes. Ordinary oil sizes are 13s. 3d. to 13s. 4½d. Owing to the strike at the Cwmfelin Tin-plate Works there are now 19 mills idle. The steelworks, however, belonging to the company, are as yet unaffected. The unsuccessful attempt made by some of the members of the local steel bar association to reduce the price of Siemens tin-bars caused considerable disappointment. It was generally anticipated that there would be a reduction of about 5s. per ton, but the meeting decided to adhere to the old figure of £4 16s. 3d. There is but little improvement in the galvanised sheet trade. The only orders of any moment coming in are from India. Prices are practically unchanged, ranging from £10 10s. to £10 15s. for 24-gauge corrugateds. The exports from the United Kingdom during October amounted to 69,447 tons, being a decrease of 1,623 tons as compared with the corresponding month of last year. For the 10 months ended October, however, there was an increase of 96,868 tons, no less than 51,394 tons of this being credited to India. A good start has been made at the new works of the Wellfield Galvanising Works, Llanelly, and two additional sheet mills are to be at once started. Employment will be afforded for nearly 200 men. Nothing definite is yet known as to the intentions of the Mannesmann Tube Company re the selection of a site for their projected new works. The Swansea Harbour Trust at their last meeting decided to ask the company to reconsider their decision as regards Swansea, in view of the increased shipping facilities afforded by the port, and the excellent sites available near the docks. The rail mills are well employed, and during the week no less than 6,000 tons of railway material has been despatched from Newport to Africa and Australia. Some of the sections rolled were from 80 lb. to 100 lb. to the yard. Welsh pig iron is 67s. 6d. to 68s. f.o.t. Considerable quantities of German pig iron have been imported at Newport during the week.

Swansea.

COAL.

During the past week the returns of the business done were again of a very satisfactory nature. There was considerable activity in the coal and patent fuel trades, the shipments together amounting to 111,700 tons. There was a capital attendance on 'Change this morning, and a steady tone was in evidence on the anthracite coal market. Swansea Valley large was in excellent request, with last

Prices f.o.b. Swansea (cash in 30 days).

Anthracite:—	Current prices.	Last week's prices.
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/6 to 21/6	19/6 to 21/6
Big Vein large (less 2½ per cent.) .....	17/6 to 18/6	17/6 to 18/6
Red Vein large do. ....	14/6 to 16/	14/6 to 16/
Machine-made cobbles (net) .....	21/6 to 24/6	21/6 to 24/6
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 26/	23/6 to 26/
German do. do. ....	23/6 to 26/	23/6 to 26/
Beans (net) .....	16/6 to 18/6	17/ to 18/9
Machine-made large peas (net) .....	13/ to 13/9	13/ to 13/9
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	5/ to 5/6	5/ to 5/6
Duff (net) .....	4/ to 4/6	4/3 to 4/3
Steam coals:—		
Best large (less 2½ p.c.) ...	19/ to 20/	19/ to 20/
Seconds do. ....	14/3 to 15/	14/3 to 15/
Bunkers do. ....	10/6 to 11/6	10/6 to 11/6
Small do. ....	7/ to 7/6	7/ to 7/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) .....	10/ to 11/	10/ to 11/
Patent fuel do. ....	17/6 to 18/	17/6 to 18/

prices fully maintained. Red Vein large also continued very strong. There was a good demand for machine-made nuts and cobbles; beans, on the other hand, were very weak. Rubbly culm and duff both continued slow. In the steam coal market there was a better demand for large, but other qualities were still easy.

IRON.

There was little change in the iron and steel trades last week. The blastfurnaces were busy with a pressing demand for pig iron. The output of steel bars for the last month showed an increase, several additional furnaces smelting than in the previous month. The tinplate trade improved a little, although it is still very bad; the shipments during the past week were 112,960 boxes, receipts from works, 110,243 boxes, and stocks in the dock warehouses and vans 328,070 boxes. The Mannesmann tube works were busily engaged as usual, and the engineering and fitting shops were fully employed.

Llanelly.

COAL.

There is not the firmness in the coal trade which characterised the market a few weeks ago, and the demand for most coals seems to have eased down. This is probably more due to the mildness of the weather than to any falling off in the trade. Heavy, close weather, similar to what has been experienced during the past week or so, has an adverse effect on the market. There has been a big falling away in the enquiry for horticultural coals, and collieries are again short of orders. Only a month ago order books were so full that it seemed improbable that prices would again come down. The position of the machine-made sorts is also none too satisfactory, and prices are again easy. Rubbly culm is being quoted lower than has been the case for a considerable time. The manufacturing qualities show no improvement, and collieries have a difficulty in keeping going. Prices this week are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	21/ to 22/6	21/ to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	18/ to 19/	18/ to 19/
Red Vein do. ....	13/6 to 14/6	14/ to 15/
Machine-made cobbles ...	19/6 to 20/6	19/6 to 20/6
German nuts .....	23/ to 25/	23/ to 25/
French do. ....	23/ to 25/	23/ to 25/
Paris do. ....	23/ to 25/	24/ to 25/
Machine-made beans .....	18/ to 20/	17/6 to 19/6
Do peas .....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	4/6 to 5/	5/6 to 6/
Duff .....	4/ to 5/	4/3 to 6/
Other sorts:—		
Large steam coal .....	16/ to 17/	16/ to 17/
Through-and-through ...	11/ to 11/6	11/ to 11/6
Small .....	9/6 to 10/	9/ to 10/
Bituminous small coal ...	11/ to 11/6	10/6 to 11/

INDIAN AND COLONIAL NOTES.

Africa.

*The Coal Industry and the Railways.*—According to the annual report for 1912 on the S.A.R. the total amount of coal consigned from the various collieries of the Union during 1912 was 7,942,343, as against 7,432,201 in 1911. Since the year 1909 the total output has increased by 1,909,856 tons, equal to 31·7 per cent., or, expressed in another way, the output of the coalmines of South Africa during the three years immediately subsequent to Union has increased by 6,216,697 tons, or 38·8 per cent., as compared with the output during the three years prior to Union. The total tonnage of coal for export and bunkering carried at the export coal rate was 2,092,496 tons as compared with 1,935,913 tons in 1911—an increase of 156,583 tons, or 8·1 per cent. Mr. Hoy, the general manager, admits that, notwithstanding the large increase in the engine and truck supply, the greatest difficulty has been experienced at times in meeting the demands of the collieries. At the majority of the Transvaal coalmines, he says, there are no storage bins, as at many mines in Natal, while the majority of the goldmines possess storage capacity for only two days' supply of coal. The general manager expresses the opinion that if the mines would do a little more to assist themselves by the provision of storage accommodation, it would facilitate matters considerably. With reference to the shortage of truckage in Natal, caused by the delays to wagons under load with coal at Durban, the general manager reports that a very considerable improvement has been effected in this respect. There is still much room for improvement, but the colliery owners now appear to be impressed with the necessity of introducing arrangements which would result in the more expeditious release of the stock, and there is every probability of an agreement with this object being arrived at shortly. To further develop the coal trade, it is recognised as essential that an adequate supply of trucks should be maintained, but Mr. Hoy contends "it is unreasonable to expect the Administration to supply trucks to be utilised for the storage of coal awaiting arrival of steamers."

Canada.

*Coalmining in Alberta in 1912.*—The annual report of the Department of Public Works of the Province of Alberta for 1912 contains particulars of the coalmining industry in that year. The output shows an increase of 1,751,785 tons over 1911 (in which year there was a strike), and an increase of 409,592 tons compared with 1910. The output was made up as follows: Lignite, 1,341,389 tons; bituminous, 1,926,371 tons; anthracite, 178,589 tons. In the production of coke,

170,818 tons were used, 105,684 tons of coke being made, whilst 90,000 tons of briquettes were manufactured. Of the total short tons of coal produced—viz., 3,446,349 tons, 1,524,816 tons were produced in the Crow's Nest Pass district, 760,687 tons in the Lethbridge district, 526,963 tons in the Calgary district, and 633,883 tons in the Edmonton district; 2,102,246 tons were sold for consumption in Alberta, 594,280 tons for consumption in other provinces, and 93,123 tons for export to the United States. The number of mines now open is 243, 46 having been opened during 1912. The average number of persons employed was 6,661, giving a *per capita* output of 517 tons, or, taking only the underground workers, 708 tons. There were 16 deaths from accident during the year inside the mines, and five outside. In the Lethbridge district a number of mines have been commenced and several modern plants installed; and in the Calgary district a considerable amount of prospecting has been carried on, especially in the lignite field. In the lignite field 56·21 per cent. of the total output was mined by machinery. The coal deposits in the district tributary to the main line of the Grand Trunk Pacific Railway are being opened out and developed by six companies, namely: Jasper Park Collieries Limited; North Alberta Coal Syndicate; Yellowhead Pass Coal and Coke Company Limited; Pacific Pass Coal Fields Limited; Mountain Park Coal Company Limited; and the Macleod Collieries Limited. Practically all these mines are now equipped with surface plants capable of handling from 800 to 1,500 tons per day. In March 1912 a mine rescue station was installed and equipped at Blairmore on the Crow's Nest Pass branch of the Canadian Pacific Railway; it is equipped with "Proto" apparatus. Negotiations have been completed with the railway company for obtaining a railway car which will be moved from mine to mine for training purposes, and will be readily available in case of emergency. The following are examples of the wages paid during 1912 according to scale:—Fire bosses, 110 to 115 dols. per month; hoisting engineers, 3·20 dols. per day (8 hours), 3·78 dols. (10 hours), and 4·40 dols. (12 hours); outside firemen, 2·89 dols. (8 hours) and 3·85 dols. (12 hours); shot-lighter or timberman, 3·30 dols. (8 hours); motorman, 3·05 dols.; driver, 3·03 dols.; ditto (wet places), 3·20 dols.; couplers (men), 2·75 dols.; loaders, 2·75 dols.; miners, 3·30 dols.; ditto (wet places), 3·75 dols.; rock miners, 3·75 dols.; labourers, 2·75 dols.; miners on contract average 3·50 dols. to 6 dols.

The report on the Fifth Census of Canada gives an idea of the growth of the coal and coke industry during the 10 years between 1900 and 1911. As a mineral producer, British Columbia has fallen from first to second place, exchanging positions with Ontario. The Yukon falls from third to sixth place, Nova Scotia, Quebec, and Alberta each being promoted one place. The following table, which relates to coal and coke only, has been compiled from the report:—

	1900.	1910.
Number of mines or works .....	56	223
Number of anthracite coal mines...	1	1
Do. bituminous mines .....	41	94
Do. lignite mines .....	14	128
Value of buildings and plant (dols) .....	25,377,790	44,444,538
Average value of buildings, &c., per mine or works .....	453,175	199,303
Average salaries of officers... (dols) .....	950	1,210
Do. wages of employees (dols) .....	509	616
Production of anthracite .....	17,549	269,787
Do. bitu. coal .....	5,213,257	12,015,265
Do. lignite .....	50,869	824,584
Imports of bituminous coal (tons) .....	2,439,764	5,966,466
Do. do. (dols) .....	4,310,964	11,919,341
Do. anthracite coal and dust .....	1,654,401	3,266,235
Do. do. (dols) .....	6,602,912	14,735,062
Do. bituminous coal dust (tons) .....	330,174	1,365,281
Do. do. (dols) .....	98,349	1,795,598
Consumption of coal .....	7,795,461	20,678,199
Do. do. per capita (tons) .....	1,451	2,869
Number of engines and motors ...	363	880
H.P. do. do. ....	34,671	104,178

*Cost of Coal Production.*—At the annual meeting of the Wilsons and Clyde Coal Company Limited, held last week in Glasgow, Sir John Wilson, Bart., chairman, in presenting the annual report and accounts, said the costs of production had advanced even more quickly during the past three or four months, with the result that profits were rapidly diminishing. Formerly, when an advance of 12½ per cent. (or 6d. per day) in miners' wages was conceded, the increase in costs of production due to such advance could be definitely calculated, but now it had been found that the actual increase was almost double what it was formerly. This had arisen from various causes—namely, the reduction of outputs caused by irregular work, the great advance in the cost of all mining materials, and also excessive legislation, which had caused great additional expenditure, in many cases unnecessary and wasteful. If the Miners' Federation adhered to their determination not to allow wages to go down with prices, and insisted upon a minimum of 7s. per day, then the outlook for all the industries of this country was black indeed. Other countries were now producing much more cheaply; for instance, the United States, with 600,000 miners, produced over 400,000,000 tons of coal, whereas it took 1,000,000 miners in Great Britain to produce about 240,000,000 tons of coal, with the result that the selling price of coal was about 3s. per ton less in the States than here. The chairman added that the company were busy opening up the Douglas coalfield, fitting up the permanent plant at colliery and building workmen's houses. They had found several seams of coal of fair thickness—one being 7 ft. thick, of excellent quality as a house coal and with only 1½ per cent. of ash, and another being 6½ ft. thick and a good seam of coal.



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(A Classified List appears on page 1024.)

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## The Colliery Guardian

AND

Journal of the Coal and Iron Trades.

Joint Editors—

J. V. ELSDEN, D.Sc. (Lond.), F.G.S.  
 HUBERT GREENWELL.

LONDON, FRIDAY, NOVEMBER 14, 1913.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during October was 14s. 0.3d. per ton, as compared with 12s. 9.7d. in October 1912 and 11s. 6.4d. in October 1911.

The value during the first ten completed months of the present year is 13s. 11.7d. per ton, as compared with 12s. 7.4d. and 11s. 4.6d. respectively in the corresponding periods of 1912 and 1911.

Of the total exports of coal during October, the mean value of the large coal exported was 15s. 4.04d.; through-and-through (unscreened) coal, 12s. 7.3d.; and small coal, 11s. 2.8d. The average value of all kinds of coal exported was 13s. 10.1d., an increase of 0.3d. as compared with the preceding month. Otherwise divided, it fetched the following values:—Steam coal, 14s. 0.08d.; gas coal, 12s. 8.8d.; anthracite, 16s. 7.2d.; household coal, 13s. 3.9d.; and other sorts of coal, 12s. 8.5d. The value of the coke exported was 17s. 10.9d. per ton, and of the manufactured fuel 18s. 0.1d. per ton.

During October the quantity of coal, coke and manufactured fuel exported from the United Kingdom amounted to 7,059,928 tons, valued at £4,953,102, as compared with 7,058,442 tons, valued at £4,522,135, in October 1912, and 5,875,867 tons, valued at £3,389,591, in October 1911.

The aggregate quantity exported during the first completed ten months of the present year was 63,958,136 tons, valued at £44,708,995, as against 54,605,209 tons, valued at £34,461,901, and 55,442,836 tons, valued at £31,556,255, in the corresponding periods respectively of 1912 and 1911.

Dr. Aubrey Strahan, F.R.S., has been appointed Director of the Geological Survey of Great Britain, in succession to Dr. J. J. H. Teall, who retires on January 5 next. Dr. Strahan is president of the Geological Society, and was a member of the Royal Commission on Coal Supplies. His work in the South Wales coal-field is well known.



The explorers at the Senghenydd Colliery have met with considerable success during the past week, and several more bodies have been recovered. The total relief funds now amount to over £90,000.

The Scottish Coal Trade Conciliation Board will meet to-day (Friday) to consider the claim by the Scottish Miners' Federation for an increase in wages of 18½ per cent. on the 1888 basis.

It has been decided by the Durham Coal Trade Conciliation Board that the wages for the county for the next three months shall remain unaltered.

At a special meeting of the Miners' Federation of Great Britain, held at Southport on Tuesday, it was decided to again urge upon the Home Secretary the need of holding a special court of enquiry into the disaster at the Senghenydd Colliery.

An Institution of Petroleum Technologists has just been inaugurated. Sir Boverton Redwood is the first president.

At a meeting of the Manchester Geological and Mining Society on Tuesday, Dr. John Harger read a paper on the question of firedamp in mines and the prevention of explosions. The author also contributed a paper on "The Detection of Gob Fires."

The Home Secretary has issued a draft regulation amending Part IV. of the general regulations, the object of which is to make it clear that the breathing apparatus required to be used under sections 85 and 86 of the Coal Mines Act, 1911, must be of a self-contained type, and that the use of a smoke helmet will not be in compliance with the requirements of the regulations.

The evidence taken by the Departmental Committee on Spontaneous Combustion of Coal in Mines is to be issued in daily parts. An instalment of the evidence will be found elsewhere in these columns.

At a meeting of the Institution of Mining and Metallurgy, on November 20, the following papers will be submitted for discussion:—"The Treatment of Tin Ores in Cornwall: A Description of the Geevor Mill," by Horace G. Nichols; and "The Occurrence of Gold in Ontario," by J. B. Tyrrell.

Sir Henry Cunynghame, K.C.B., who conducted the enquiry under section 83(1) into the circumstances attending the accident at the Cadder Colliery, on August 3 last, has issued his report [Cd. 7133]. He regards the cause of the accident as uncertain, but thinks it is far more likely to have arisen from the accidental setting alight of some material by a match or otherwise than by electricity. Dealing with various points that arose in the course of the enquiry, the Commissioner considers that a bottomer should have been appointed, but that it is doubtful whether he would have seen the fire, if there had been one. He thinks that the opening of a door from the intake into the return at an early stage would have saved some of the men. The company was in default in the provision of rescue apparatus, although Sir Henry does not think that it is in the least likely that a rescue brigade would have saved lives. If the alarm of fire had been given earlier, however, the speedy arrival of apparatus might have been effective. He considers that the telephone service should be independent of injuries to the wires, that cabins should be fireproof; that not only firemen but some man or men in each group of workmen should be acquainted with the roadways and be well instructed what to do in the case of danger, and that there is need for teaching firemen the danger of smoke containing CO.

# **The Economics of Coal Production.**

WHEN Prof. ARMSTRONG, at the British Association, declared that "we are hopeless spend-thrifts of fuel," he was only giving utterance to a truism, for we are still far from being able to employ profitably even a moiety of the potential energy stored in coal or other fuels. But there are hopeful signs that it is a matter upon which the consumer is less disposed to be callous or negligent than in days gone by, and the fuel question is one that touches all of us at a great many more points than in the past.

It is difficult, where nearly every practical scheme has been dimly foreshadowed by some visionary or other, to say very much that is new on this subject. There is a point, however, that should be accentuated more than it has been if these discussions, like their subject-matter, are not to evaporate into nothingness; for, so far, at least, as coal is concerned, the question has two branches, namely, (1) the economical treatment and (2) the economical utilisation of the fuel. The Royal Commission on Coal Supplies roughly divided their enquiry under two heads—"waste in working" and "waste in use." It has become clear, however, that, even when the mining engineer has learnt how to reduce the wastage below ground to the minimum, and the ultimate consumer has adopted the most efficient methods of conserving his fuel, there is still a hiatus. In other words, there are three steps in the fuel process, each requiring special treatment, and the mining engineer is just as incompetent to manage a power company as is a power engineer to manage a coalpit. It is equally true, however, that nothing will be done that really counts unless these interests co-operate.

The description given in this issue of the plant erected by the Old Silkstone Collieries Limited at Barugh, near Barnsley, is a forcible example of a practice that will, we believe, be quite common in another 10 years. As Mr. W. B. WOODHOUSE observed in his address before the Yorkshire Section of the Institution of Electrical Engineers last week, this is the first occasion upon which a Yorkshire colliery has co-operated with a power supply company to secure the full utilisation of its product, although the outstanding example of Durham deprives it of the element of novelty. At Barugh the surplus gas from the coke ovens produces continuously some 2,000 kw. of power. Attention may here be drawn to the remarks made by Mr. C. VERNIER, in his inaugural address delivered before the Newcastle section of the same institution. The advantages of the power supply system are, he pointed out, threefold: (1) the low capital cost per kilowatt of generating stations, and the increased economy in running charges obtained by the use of very large generating units; (2) the development of high load and diversity factors resulting from the varied uses which are made of the electrical energy supplied; and (3) low fuel costs obtained by the favourable location of generating stations and the opportunities afforded for the utilisation of waste heat and other forms of waste fuel.

These are facts that are fairly well recognised to-day, although some of the failures of the past can be directly attributed to their neglect; but there are some other considerations arising from them that are less generally appreciated. Thus, Mr. VERNIER insists that, in general, the higher the price of fuel, or the poorer the load factor, the less a high capital cost can be defended; also, in a large scheme, the cheaper the fuel, the more desirable it is to run the plant at a high load factor. It is due to these facts that the use of electricity from

public supply sources in that portion of the north-east coast which is served by the power companies has increased by over 3,200 per cent. within the past 10 years, and if full consideration is given to them the advantages of the waste heat station are obvious. Mr. VERNIER estimates that the waste heat from coke ovens and blastfurnaces in this country would, if fully utilised, be more than sufficient to operate the whole of our existing public electric supply stations, with a combined maximum load last year of between 700,000 and 800,000 kilowatts.

Now, we are not greatly impressed by these and similar calculations, which presume the fact that the sole function of the colliery is to produce coal for the benefit of the consumer of electrical energy, an attitude too frequently adopted, as we have already hinted in so many words, by those involved at some point or other in the fuel question. The uses of coal are many, and the production of power is only one of them. Nevertheless, it is undeniable that the power supply company does offer the colliery almost the most favourable means of reaching the consumer of energy, especially when we remember how large a user of power is the modern colliery itself.

This is, perhaps, the gist of the whole question. As Mr. VERNIER points out, "the utilisation of waste heat to its fullest extent for electrical purposes is only possible to those power companies with widely ramifying networks, as much of it is only available at some distance from the large centres of population and chief points of power utilisation, but by feeding into the main network at so many points remotely situated from the chief power stations, considerable economies in the transmission system and its losses may be attained." In this respect the North of England is singularly well situated, there being few other instances of industrial activity comparable with that of the Tyne, Wear and Tees, within so close reach of the fuel supply. The least favourable case that we can think of is the South Wales coalfield; but in certain parts of South Yorkshire and Lancashire conditions exist that are practically similar. Further, an increased use of electricity resulting from a cheapening process, such as the extension of electro-chemical and electro-technical industries within the boundaries of the coalfields and the electrification of the railways—which must come within a few years—would largely solve the problem in other centres. Of course, it is impossible to ignore the very serious obstacles to progress that are presented by municipal selfishness and Board of Trade apathy, but we agree with Messrs. WOODHOUSE and VERNIER that private enterprise will probably, by the force of example, break down these hurdles. With the colliery the chief difficulty lies in securing a constant supply of waste heat. The logical solution, if strikes and other stoppages are to be discounted, is to bring coal from a number of collieries to a central point, or to pipe the gas to a common reservoir.

There are other developments which require to be considered by the colliery, such as the scheme at Saltley, where the Corporation of Birmingham, following the example of several Belgian cities, have substituted coke ovens for gas retorts, with a special view to the cultivation of a business in coke and by-products. There are other ways in which coke oven gas is being utilised on a large scale as an illuminant; the town of Middlesbrough has recently entered into a contract with a firm of ironmasters to take the whole of its town gas supply from coke ovens. Finally, there is the case of collieries like Birchenwood where the production of by-products outweighs all other considerations.



The owners of the Old Silkstone Colliery are showing an intelligent appreciation of these developments and what they mean to the coal industry: but it may well be that there are collieries so situated that experiments on such a scale would be risky in the extreme. We confidently believe, however, that there are few to which these latter-day developments do not hold out some promise of profit, and, we need scarcely add, the proper utilisation of our fuel is a matter of supreme interest not only to the colliery but to the country as a whole. We cannot expect the colliery to alter its methods simply to please Professor ARMSTRONG, but it should be realised that Professor ARMSTRONG and the colliery have some interests in common.

THE Manchester Geological and Mining Society had an opportunity, on Tuesday last, of listening to a suggested solution of the problem of colliery explosions which can only be considered second in imaginative power to the sensational proposals authoritatively enunciated some years ago for burning the coalseams *in situ* and recovering the gases at the pithead.

In the paper read on the present occasion, entitled "Firedamp in Mines and the Prevention of Explosions," Dr. HARGER in the first place endeavoured to show, as the results of analyses carried out by himself, that an inflammable gas exists in coal which has the composition of ethane and other heavy hydrocarbons, and can only be expelled by the aid of a vacuum and moderate heat. He also maintains that the nature of this gas differs in various seams and even in adjacent parts of the same seam, and that it exists in the coal substance in a peculiar physical condition, with the properties of a solid rather than of a gas.

His inference is that the prevalent notion that the hydrocarbons of firedamp always consist of pure methane and is a gas of constant composition, is fallacious, and he considers that the presence of the heavy hydrocarbons may assume practical importance by rendering ignition of a mixture of firedamp and air under certain conditions more easy to produce even by natural agencies. Thus far, he is apparently merely interpreting his analytical results, which are in themselves interesting, but require confirmation before they can be unreservedly accepted. This question has a further practical application in regard to the fireman's test. If such wide variations are found in a single seam, the suggestion that natural firedamp should be used for this purpose is to open grave suspicion. If there is no guarantee that natural firedamp has even an approximately constant composition, the proposal in South Wales to take gas from particular collieries for use in firemen's tests would seem to be of doubtful value. M. TAFFANEL has, we believe, experienced similar difficulties with natural firedamp in his experiments at Liévin. Dr. HARGER's efforts to drag in the now discredited experiments of Sir F. ABEL upon the influence of non-combustible dust in promoting ignition do not, in our opinion, tend to strengthen his case, but rather give additional reason to pause before accepting as final experimental results, however authoritative they may be, until they have been confirmed by further work.

Coming now to the more romantic portion of Dr. HARGER's paper, what he proposes to do is to extract the gases from the coal face by means of pipes and air pumps, to collect and convey them to the surface, to burn them in a boiler for the production of power, and to

utilise the residual gases after combustion as the safe inert gas which he has been seeking, in furtherance of his well-known scheme, to reduce the oxygen content of the ventilation current.

Omitting all criticism of this suggestion from the practical standpoint, and regarding it for the moment as a feasible proposition, it would certainly go far to simplify the ventilation problem; it would serve as an auxiliary ventilation at the working face, and it would furnish power gas, the value of which might be considerable if it could be collected by the method the author of this scheme has proposed. He says: "There is no doubt that in many places firedamp fairly concentrated could be sucked away in large quantities before it had mixed to any great extent with the air." A very slight modification of method of working would make the collection of a big portion of the total gas given off, not easy, certainly, but feasible and profitable." Further on he remarks that a mine in Yorkshire is known to give off every 24 hours as much as 4,000,000 cubic feet of firedamp, weighing 82 tons, and equivalent, on burning, to 200 tons or so of the best bituminous coal, or nearly 100,000 tons of coal per annum. Dr. HARGER's reasoning, however, hangs entirely upon the practical possibility of collecting the gas, and it is here that he would perhaps have done well to have further elaborated his scheme before giving it to the world.

We do not deprecate the introduction of a little imagination into so matter-of-fact an occupation as colliery engineering so long as that faculty is not made to pose as necessarily sound doctrine, and we give Dr. HARGER full credit for his open confession that he himself regards his proposal as somewhat crude in its present form.

#### Trade Summary.

The London coal trade for the past week continues very quiet for the season of the year. Wholesale prices are unaltered, but the frequency of "spot lots" of house coal offering below the recognised current price keeps the market very stagnant. The wharves and depots are congested with loaded wagons and, as the stacking ground is limited and already over full, the purchasing power is very small. Kitchen coals and bakers' nuts are moving very slowly. Hard steam coal and gas coals are gradually hardening, but coke continues in poor demand. Smalls are again quoted at a considerable reduction.

The market at Newcastle is quietly steady, with prices a shade easier.

The Durham coal trade is firm, although small coals and household sorts are quiet.

The Lancashire house coal trade is easy and other classes of coal are without marked animation. The consumption of slack, however, is on the up grade.

In West Yorkshire the demand is at a ebb, except as regards steam coals for export, for which there is some pressure.

In South Yorkshire, export prices have been shaded slightly. House coals sell rather better. Small coals generally are weak.

The Derbyshire house coal trade is dull, but prices are firmly maintained. Slacks are plentiful. Steams are still being sold for export.

The Cardiff market is unusually strong and there is little free coal available. Small coals are unchanged. Monmouthshire coals are firm. Bituminous coals are a drug on the market.

In Scotland, tonnage is more plentiful and the elements of weakness noticeable recently have now disappeared. Small coals are much firmer.

#### THE TIN-PLATE TRADE

##### Liverpool.

There is practically no change in the position. Forward business continues very slow, but a good deal of buying is reported in small lots for spot and early delivery. Prices ruling are exceedingly low, and makers all assert they are now below the cost of production. Several works talk of closing down unless matters quickly improve. Quotations for coke tins, shipment over next three months, run:—I C 14 x 20 (112 sh. 108 lb.), 12s. 10½d. to 13s. per box; I C 28 x 20 (112 sh. 216 lb.), 25s. 9d. to 26s. 3d. per box; I C 28 x 20 (56 sh. 108 lb.), 13s. 3d. to 13s. 4½d. per box; I C 14 x 18½ (124 sh. 110 lb.), 13s. 4½d. to 13s. 6d. per box; I C 14 x 19½ (120 sh. 110 lb.), 13s. 4½d. to 13s. 6d. per box; I C 20 x 10 (225 sh. 156 lb.), 18s. 10½d. to 19s. per box; I C squares and odd sizes, 13s. 3d. to 13s. 4½d. basis for approved specifications. Charcoal tins rule easy at 15s. 3d. basis and upwards, according to tinning. Coke wasters are in quiet but steady request. Quotations:—C W 14 x 20, 12s. 1½d. to 12s. 3d. per box; C W 28 x 20, 24s. 10½d. to 25s. per box; C W 14 x 18½, 10s. 10½d. to 11s. per box; C W 20 x 10, 14s. 10½d. to 15s. per box—all f.o.b. Wales, less 4 per cent.

#### LABOUR AND WAGES.

##### North of England.

The quarterly financial report and balance-sheet of the Northumberland Miners' Association, issued last week, showed that the membership comprised 35,079 adults and 5,165 half-members. Eighty branches and sub-branches were affiliated with the association. The income totalled £6,325 6s. 7d. and the expenditure £9,163 19s. 10d., the total assets being returned at £33,407 3s. 9d. The amount expended in stoppage allowance was £2,011 1s. 9d., the chief items being £2,000 8s. 3d. for strike pay at Walbottle; £259 10s. was paid in death legacies. The payment of "back rent" as a result of the national strike cost the association £4,678, and to meet this expenditure £5,000 was advanced by the C.W.S. Bank. The total indebtedness to the bank stood at £13,030. Originally it exceeded £70,000, and was incurred to pay the national strike liabilities.

A meeting was held in Newcastle, on Friday, of the Durham Coal Trade Conciliation Board, Sir Lindsay Wood presiding, to fix the miners' wages for the next three months. This year the men have received advances totalling 13½ per cent. At the close it was officially announced that the wages will remain unchanged for the next three months.

The New Hartley miners, who came out on strike last week over an alleged grievance regarding the quality of their household coal, have now resumed work.

The notices of 2,500 workmen engaged at the collieries owned by the Ashington Coal Company have been handed in. The notices will terminate on 20th inst. This action is the outcome of prolonged negotiations which have taken place with respect to the claim of the men to force all the employees at Ashington, Woodhorn, Linton and Ellington to join the miners' union. As there are nearly 9,000 men and boys employed at the collieries named, it does not appear that the extreme step has been attended with the success which was anticipated, and doubts are expressed as to whether the collieries will be closed down. The consent of the Northumberland Miners' Union has not been obtained to the course pursued.

The miners of North Seaton Colliery have also decided to hand in their notices owing to a dispute on the same question. The vote shows a majority of about seven to one in favour of stopping work unless the non-unionists at the colliery join the men's association. About 800 employees are affected in this case.

A mass meeting of miners was held at West Wylam, on Saturday afternoon, to protest against the recent award of Lord Mersey, in respect of the revision of rules and rates of pay in the county of Northumberland under the Minimum Wage Act. The following resolution was unanimously carried:—"That we, the miners of Mickley, Prudhoe, Eltringham and West Wylam lodges, in mass meeting assembled, express our keen disappointment and strong disapproval of Lord Mersey's award, especially for not having regard to the existing daily rate of wages, and not reducing the 100 per cent. of time; that we request the Northumberland Miners' Association to ask the President of the Board of Trade for an early interview on the subject."

The Northumberland Miners' Association has received a reply from the coalowners in respect to the request of the men for a modification of the three-shift system, which is in operation at about 17 collieries in the county. The executive committee of the union has decided to report on the matter to a special council meeting of the association, to be held immediately after the close of the half-yearly council meeting, which begins at Burt Hall, Newcastle, to-morrow (Saturday).

##### Miners' Federation of Great Britain.

A special meeting of the executive committee of the Miners' Federation of Great Britain was held at the Victoria Hotel, Southport, on Tuesday, to consider the reply of the Home Secretary to the Federation's request for a special court of enquiry into the Senghenydd Colliery disaster. Mr. Robert Smillie (Lanarkshire), president, was in the chair. The only report given to the Press was as follows:—"The question of the public enquiry into the Senghenydd disaster was further considered, and it was agreed that the officials, Messrs. R. Smillie, W. E. Harvey, M.P., and Thomas Ashton, with Mr. William Brace, M.P., again approach Mr. McKenna in connection with the claim of the miners to have a composite court at the enquiry."

It was agreed to accept the Kent Miners' Association as a branch of the Federation, and to give them any assistance necessary in improving their organisation.

It was also decided to endorse the candidature of Mr. Thomas Gibb, checkweigher, in South Lanark by-election.

##### Scotland.

With a view to bringing the strike at Douglas Park and Parkhead Collieries (Messrs. Wilsons and Clyde Coal Company), Bellshill, to an early termination, the local strike committee have determined to ask the county union executive to withdraw all the men, oncost, &c., working at these collieries who are members of the union.

In connection with the demand by the Scottish Miners' Federation for an increase in wages of 18½ per cent. on the 1888 basis, a meeting of the Scottish Coal Trade Conciliation Board will be held at Glasgow to-day (Friday), to discuss the claim. The present wage is 7s. 3d. per day, a reduction of 3d. having come into force on Lord Balfour of Burleigh's award.

It is intimated that a satisfactory adjustment has been arrived at in the dispute between the Midlothian and Had-



dingtongshire doctors and the Miners' Federation for the attendance upon the workmen's families and dependants. The men are to have absolutely free choice of doctor, and to pay a flat rate of 1½d. per week for attendance, or 2d. per week including medicine. The doctors will be supplied with duplicate cards to enable them to know how many persons the respective colliery companies are to be responsible for.

## THE IRISH COAL TRADE

THURSDAY, NOVEMBER 13.

### Dublin.

Although the coal trade has got over the difficulties occasioned by the labour disputes without any serious stoppage or material general rise in the price of coal, the work of effecting deliveries continues to be restricted owing to an in-ufficiency of motor lorries, and the Coal Merchants' Association have thousands of orders waiting to be carried out with which they are only partly able to cope. A large quantity of coal is distributed straight from the quays, and police protection is still in requisition, not only at the yards, but all along the route until the coal is delivered. Operations on the quays have been proceeding on a larger scale owing to the importation of free labour, and considerable consignments of malting coal which have been lying at the docks almost since the strikes began have now reached their destination. City prices remain unchanged, as follow:—Best Orrell, 28s. psr ton; best Arley coal, 27s.; best Wigan, 26s.; best kitchen, 26s.; best slack, 22s. per ton; steam coals, from 22s. to 23s. per ton; coke, 23s. per ton delivered in the city; house coal, retail, 1s. 10d. per sack. Arigna coal (county Leitrim) from 15s. 10d. to 18s. 4d. per ton; culm or slack, from 9s. 2d. to 10s. per ton, all at the pit mouth. Stocks in the port are still low, but there is no actual scarcity. The coaling vessels arriving during the past week amounted to 34, as compared with 41 the week previously, chiefly from Garston, Newport, West Bank, Glasgow, Ayr, Liverpool, Workington, Preston, Partington and Troon. The total quantity of coal discharged upon the quays was 13,199 tons.

### Belfast.

Consumption of house coal is still limited, but there is a fair amount of activity in other departments of the trade, prices generally remaining unchanged. The cross-channel trade is active, and supplies in the port are plentiful. Quotations in the city are:—Best Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current rates for steam coals ex-quay are:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton. From October 19 to November 1 the total number of colliers entering the harbour was 115. Cargoes arriving during the week were chiefly from Ayr, Glasgow, Ardrossan, Silloth, Troon, Burryport, Garston, Workington, Cardiff, Irvine, Preston, Partington, Point of Aire, Ellesmere Port, Gt. van, Neath Abbey, Maryport, and Campbelltown. During recent mining operations near Stewartstown (County Tyrone) the miners struck a 3 ft. seam of coal, at a distance of 53 ft. from the surface. The coal is stated to be of good quality, highly bituminous, with strong heating powers.

## OBITUARY.

The death has taken place in London of Sir Walter Menzies, who was a son of the late Mr. James Menzies, of the Phoenix Tube Works, Rutherglen. On the death of his father in 1887 he succeeded to the management of the business. In 1898 the firm was amalgamated with the firm of Stewart and Clydesdale, Coatbridge, the combined firm being now known as Stewarts and Lloyds Limited. At that time deceased severed his connection with the company to devote himself to politics. At the time of his death he was the Liberal member for South Lanarkshire.

The death is announced of Mr. Archibald Wilson, coal-master, Glencairn, Larkhall. Deceased at one time, along with his brother, Mr. Robert Wilson, had the management of Fairholme Colliery, belonging to the Glasgow Iron Company. Latterly they acquired Broomhill Colliery, which they carried on successfully for many years. Ten years ago they disposed of this concern to the United Collieries Limited, and since then the deceased had lived in retirement.

The death has taken place of Mr. James Richmond, manager of the North British Tube Works, Govan. Mr. Richmond was appointed manager at the Govan works on the incorporation of the firm of Messrs. David Richmond and Co. with the Scottish Tube Company Limited.

The death has occurred of Mr. Benjamin Brown. Deceased once occupied the position of departmental manager in the steelworks of Messrs. Cammell, Laird and Co., at Workington.

We regret to announce the death of Mr. James McKillop, ex-M.P. for Stirlingshire. Mr. McKillop, who was educated at the Andersonian University, Glasgow, studied engineering and mining at home and abroad, and was for many years actively associated with the coal and iron industries in Scotland.

Regret will be felt at the death, which recently occurred at Stratford-on-Avon, of Mr. John Sankey, the well-known chairman of Joseph Sankey and Sons Limited, ironmasters, of Bilston.

Sir William Preece, F.R.S., the distinguished electrical engineer, has died at his residence Penrhos, Carnarvon. Sir William served as president to the Institution of Civil Engineers in 1898, and twice acted in the same capacity for the Society of Telegraph Engineers (now the Institution of Electrical Engineers).

The Leeds Chamber of Commerce last week held a special general meeting for the purpose of consideration of the Trades Disputes Act, and a resolution was passed with one dissentient for the amendment of the Act, in the following directions:—(1.) By limiting the number and powers of pickets who may under section 2 of the Act have authority to act. (2.) By applying the ordinary law of agency, with proper limitations, to acts committed by or on behalf of trade unions.

## COLLIERY ACCIDENTS.

### Bromley (Somerset).

The inquest was conducted by Dr. Craddock, the North Somerset coroner, at the Lecture Hall, Stanton Drew, on the 10th inst., on the bodies of three men killed on the 8th inst. at the Bromley Colliery. Ten men of the morning shift were ascending to the surface when a broken cotter-pin caused the winding apparatus to reverse, and the cage fell into 5 ft. of water at the bottom of the pit. Before the machinery could be righted the three occupants of the bottom deck of the cage were drowned.

The engineman said the effect of the pin dropping was to reverse the valve gear of one cylinder, causing that cylinder to tend to lower the cage, whilst the steam in the other cylinder, not being reversed, tended to raise the cage, but the weight of the men in it, being unbalanced and there being only one cage in the shaft, helped the cylinder which had reversed to send the cage down. In the ordinary way the brakes would be strong enough to pull up the cage, but the impetus of the fall at the outset was too powerful to give the brakes the chance to act in the distance.

The jury's verdict was as follows:—"Accidentally killed by drowning, through a cage, in which the deceased men were going to the surface, accidentally reversing and falling into the sump, through the cotter-pin falling out of another pin in the rocking arm of the engine."

A rider was added to the effect that, as regards the fixing of a cotter-pin, it would be safer if a taper pin should act as a circular key driven through a washer (which ought to be used), and then the pin ragged at the other end to prevent it slipping.

## THE BY-PRODUCTS TRADE.

*Tar Products.*—Apart from the continued firmness of benzols there is not much change in the market. Pitch keeps steady and in fair request. Naphthas are virtually unchanged, and creosote the same. Carbolic acids seem to have come to a standstill, but are very quiet thereat. Nearest values are:—

Benzols, 90's .....	1/1½ to 1/2
Do. 50's .....	1/
Do. 90's North .....	1/0½
Do. 50's North .....	1/11
Toluol .....	1/10½
Carbolic acid, crude (60 per cent.) .....	1/0½ to 1/1
Do. crystals (40 per cent.) .....	3/5
Solvent naphtha (as in quality and package) ...	9/4
Crude ditto (in bulk) .....	5/
Creosote (for ordinary qualities) .....	3/5
Pitch (f.o.b. east coast) .....	42/ to 42/6
Do. (f.a.s. west coast) .....	41/6 to 42/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

*Sulphate of Ammonia.*—Business is quiet, and prices more or less nominal. As regards forward business, things are naturally almost at a standstill. At any rate, the decline of even paper prices seems to have come to an end, a change largely due to the firmness of producers. Closing prompt prices are:—

London (ordinary makes).....	£12/7/6
Beckton (certain terms) .....	—
Liverpool .....	£13/2/6
Hull .....	£13
Middlesbrough .....	£13
Scotch ports.....	£13/2/6 to £13/5
Nitrate of soda (ordinary) per cwt. ...	10/7½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good gray quality; allowance for refraction, nothing for excess.]

The Lectures on Statistics at London University have for their subject this session, "The National Output, as Shown by the First Census of Production," the lecturer being Mr. A. W. Flux, M.A., F.S.S., Director of the Census of Production Branch of the Board of Trade.

*Partnerships Dissolved.*—The *London Gazette* announces the dissolution of the following partnerships:—C. Chorley, R. J. Chorley, and J. Hughes, carrying on business as tool, file and hinge manufacturers, at Warrington, under the style of Joseph Hughes; W. Rees and T. Rees, carrying on business as ironmongers, at Church-street, Llandebie, Carmarthen, under the style of W. and T. Rees; R. J. Scattergood and E. Rosten, carrying on business as steel merchants, at City Works, Mary-street, Sheffield, under the style of Scattergood and Rosten; J. Kendall and A. Kendall, carrying on business as coal and stone merchants, canal carriers, and builders, at Ashley-lane, Shipley, and at Kirk Ings Wharf, Calls, Leeds, under the style of Abraham Kendall and Sons; J. Hogg and T. Williamson, T. Hogg and J. Hogg the younger, carrying on business as brass-founders, brass finishers, plumbers, and coppersmiths, at Bull Ring and at Lawson-street, North Shields, under the style of Proud and Hogg, so far as regards T. Williamson; S. F. Birks, J. A. Stevens, and H. G. Stevens, carrying on business as steel manufacturers and merchants, at West-street and Edward-street, Sheffield, under the style of Birks, Stevens and Son; E. Hopper, C. E. Jobling, and R. H. Grahame, carrying on business as civil, mining and consulting engineers, at Moorgate-street, E.C.4, under the style of Edward Hopper and Partners, so far as concerns R. H. Grahame; W. Siddall and J. Siddall, carrying on business as general smiths, at Bradshaw-street, Oldham, under the style or firm of Robert Siddall; J. G. Fiegehen and J. H. Brasher, under the style of the Bedford Engineering Company, at Bedford, in the business of engineers and crane makers, by the death of J. G. Fiegehen.

## CONTINENTAL MINING NOTES

### Austria.

*Official Wholesale Coal Prices Vienna Exchange*—Pilsen coals, large, 33 90 kronen psr ton in truck loads, ex Franz-Josefs Bahnhof. Ostrau-Dombrau-Karwin coals: Large 30-30-10 kr., cubes 29-60-30-60 kr., nuts 29-30 kr., small 23-23-20 kr., washed smithy coals 30-30-50 kr., coke 38-40 kr. psr ton net cash, ex shutes Nordbahnhof. Rossitz-Zbaschau-Oslawan coals: Best washed smithy coals, coarse or fine, 30-50-31-50 kr., coke 30-30-20 kr. per ton, ex shutes Nordbahnhof or Staatsbahnhof. Upper Silesian coals: Best large or cubes 32-90-33 70 kr., intermediate large or cubes 32-10-32 90 kr., seconds large or cubes 27-30-23-40 kr., best nuts I. 33-30-34 10 kr., II. 29-60-30-10 kr., best small 23-50-24 kr., seconds 22-50-23 kr. per ton net cash, ex shutes Nordbahnhof. In truck loads: Best large or cubes 31-30-32 10 kr., best nuts 31-70-32-30 kr. per ton, ex Nordbahnhof. Gas coke from Vienna Gas-works, 33-60-35-40 kr. per ton ex works. Lignite: Dux large 22 10-23-60 kr., Brux or Dux cubes 22-10-23-60 kr., nuts 21-60-23 10 kr., Mariaschein cubes 24-10-25 60 kr., nuts 23-60 25 10 kr. per ton, ex shutes Franz-Josefs or Nordwest Bahnhof.

### Belgium.

The National Miners' Congress has decided to continue the agitation for a minimum wage. The movement has been strengthened by the decision recently come to by several of the companies in the Central coalfield to reduce wages from 10 to 15 per cent.

### France.

M. Simon has just been appointed managing director (*administrateur*) of the Liévin mines, his place as manager (*directeur*) being taken by M. Morin. M. J. Humenry succeeds M. Morin as chief engineer, and M. Chavy becomes chief underground manager.

Complaint is made in the report of the Escarpelle Company of the shortage of labour. At one of the pits a number of Algerians have been employed, and a small Spanish colony has also been induced to establish itself in one of the company's mining towns; but these measures have not proved adequate.

Exports and imports during the first nine months of the present year were as follow:—

	Imports.		Exports.	
	1912.	1913.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.
Coal .....	11,516,800	13,862,800	1,459,089	971,214
Coke .....	2,031,300	2,369,300	141,075	164,650
Briquettes ..	830,100	805,600	155,824	152,047

During the nine months imports of British coal have risen from 6,349,400 tons to 8,426,100 tons, and those of Belgian coal from 2,530,600 tons to 2,671,800 tons. The quantity of German coals imported was 2,547,500 tons, as against 2,449,600 tons in the corresponding nine months of 1912. In that period France has absorbed 354,700 tons of Belgian coke and 1,956,100 tons of German coke, as against 293,000 tons and 1,694,500 tons respectively. In September 1,535,300 tons of coal were imported, as against 1,413,900 tons in September 1912, Great Britain sending 902,700 tons (802,400 tons), Belgium 297,600 tons (306,900 tons), and Germany 317,000 tons (283,400 tons); 226,500 tons of coke were imported, as against 251,000 tons, and 82,900 tons of briquettes, as against 95,700 tons.

*New Mines Regulation.*—The Minister of Public Works recently issued an important circular with regard to changes in the mining regulations which have been in force since February 1912. Subsequent experiences, he says, has pointed to certain modifications, notably in regulations Nos. 52, 89 to 94, and 142. In regard to the first of these it now proposed that the provision of ladders shall not be obligatory where there are two distinct ways of egress to the surface, equipped with independent winding gear, in constant readiness for use. Articles 89 to 94 are those which relate to the functions of winding ropes. Article 90 provided that on any rope under test showing a degradation of 30 per cent. its use should be discontinued. This has given rise to serious difficulties in application, and it is proposed to substitute for it a rule laying down the conditions under which a rope shall be withdrawn. These are as follow. (1) In the case of a metallic rope, when the bending test shows that the rope has lost its initial flexibility; (2) in the case of a textile rope, when the resistance is found to have been reduced below 400 kilogs. per square centimetre of cross-section. According to the new regulations, which have since been issued, all metallic cables must have a safety factor of 6, which is reduced to 4 in the case of textile ropes. A rope is to be withdrawn if, taking a length of 2 m. at any place, the broken wires exceed 10 per cent. of the total number of wires.

The last modification is important. Article 142 provided that every mine should be divided into separate independent ventilating districts containing not more than 150 persons each, and that steps should be taken to prevent the extension of explosions from one district to another. The experience gained at La Clarence and in experiments has indicated the desirability of certain alterations. The Minister points out that it is important, in order to prevent the generalisation of a coal dust explosion, to deter the







SPONTANEOUS COMBUSTION IN COALMINES.

A Digest of Evidence before the Committee.

In this and following issues we give a digest of the evidence tendered during the first half of the present year before the Departmental Committee on spontaneous combustion in coalmines, which was appointed shortly after the explosion at the Cadeby Colliery, in 1912.

It may be recalled that the Committee consists of Mr. R. A. S. Redmayne, H.M. Chief Inspector of Mines, chairman, Sir Arthur B. Markham, Bart., M.P., Messrs. C. E. Rhodes, F. Rigby, and Herbert Smith, with Mr. Granville Poole, secretary. Up to July 16, 1913, seven meetings had been held for the taking of evidence.

Mr. CALEB JOHNSON.

Mr. CALEB JOHNSON, manager of the Mossfield Colliery, Longton, gave evidence on February 12, 1913. At the Mossfield Colliery, he said, they had had trouble with heating in a goaf. Their coal had a very high percentage of volatile constituents, and he thought that might have some bearing on the question of spontaneous combustion. Witness also referred to the presence of hussle, or carbonaceous shale, over the coal. They could take it in their hands and rub it, and it fell away like dust. The seam also bled water. He had only known of a hussle to heat itself on one occasion. It was a heading by the side of the fault. After standing for some time the hussle began to crush down. At the same time the coal was ground into fine slack. When they came to open that they found that it was extremely hot. The air had been working through it, and they filled it out as quickly as possible. In the goaf where there were faults there was always a danger, and they had had two fires in the goaf in the neighbourhood of faults, but the majority of the heatings had not been in the neighbourhood of faults.

METHOD OF WORKING.

Mr. Johnson said their method of working was to drive two headings in the solid up to the boundary, the lower one to be main intake and haulage road, the upper one main return. When driving out, these headings were connected every 50 yards, the last one driven always being used to bring coal away from the top head, the others being closed up with 14 in. brick stoppings. On these roads reaching the boundary they took the coal out to the rise in "panels" along the wall. From three to four gate roads were set off, each with about 50 yards of coal face, except the one at far end, which had usually 25 yards and was main intake to face. Owing to the tender roof the drift faces were not kept in one straight line, each one leading the other by a few yards; from 15 to 20 yards was often found the best. By this means the roof could not break down and block up a considerable length of face at one time. They advanced their panel from 100 to 120 yards, and the panels were from 100 to 150 yards from the main haulage road. No two panels were ever against each other. The coal was holed at 4 ft. 6 in. from the floor, and taken out in 6 ft. lifts, all got by hand labour, no shuffling being allowed. When the bottom coal was removed, the packs were built under the top coal; the tops were then cut by side of packs, and timber taken from under them; the coal was afterwards dropped in waste and loaded out. The packs were built with roof dirt taken out of waste, the sides being of the strongest stones, and the inside of packs being the smallest. Dirt was then thrown in and packed as tightly as possible. They filled with a box and a rake and shovel. The loss of small coal in the waste would be 5 per cent. of the tops dropped. Should they get a tender or broken roof or be in the vicinity of faults, the loss would be more. The fires were set up in the goaf. When the hussle fell into the waste and was mixed with slack, it would be liable to fire. The packs were built under the top coal, but they were not so liable to fire in the packs as in the waste.

Continuing, witness said they got squeeze back from the face, and their packs were liable to crush. Gas was given off moderately. Witness said the conditions under which they had found heating mostly were where there had been fine coal and hussle laid on the floor. They found that the packs were crushed from being 4 ft. 6 in. high at 2 yards from working face down to 3 ft. at 14 yards from the face, but were only reduced by 3 in. for the next 38 yards. The following figures give actual measurements:—

	High.
	Ft. in.
At face .....	4 6
2 yards from face.....	4 3½
6 do. do. ....	3 2
10 do. do. ....	3 1½
14 do. do. ....	3 0½
18 do. do. ....	3 0
24 do. do. ....	2 11½
30 do. do. ....	2 10½
50 do. do. ....	2 9

this being the rate of settlement with a uniform rate of face advances of 2½ yards per week. The method of ventilation was to take fresh air to the far end of the bottom level, up far end jig, back along coal face, leading it downwards from drift to drift by short dipping airway until it reached the main return. It was between these two points where the air left the main intake, to where it came to the main return, that every precaution had to be taken to prevent heating. Packs must not be brought too near the face, brattice cloths not hung too near packs, a pack wall on breaking down being put up again as quickly as possible, any place becoming restricted in area being at once enlarged, every measure and means being taken to keep air out of the goaf, and bring it to main return, which, of course, was in the solid coal. As each drift finished the rib of coal between intake and return

headings (where the drift started from) was taken out, each 50 yards being closed off with dirt stoppings, and the air thus short-circuited.

AIR SAMPLES IN THE COCKSHEAD SEAM.

Witness next gave the quality and analysis of the air in the Cockshead seam at different places, as follows:—

	Oxygen.	Nitro-	Fire-	Carbon
	Per	gen.	damp.	dioxide.
	cent.	Per	Per	Per
	cent.	cent.	cent.	cent.
Main intake ...	20.92	79.02	—	0.06
Main return ...	20.50	78.76	0.62	0.12
At working face	20.47	78.78	0.61	0.14

In the main intake the oxygen was found to be 24.9 per cent.

The sample in the main intake was taken at a point 650 yards from the pit bottom. The sample in the return was taken from the middle drift of three. The air had to travel to the drift face. The velocity of air-current in front of pack wall was 3.75 ft. per second. The velocity of air-current in front of waste 2.55 ft. per second. The temperature of the air at face was 73 degs. Fahr.; the temperature at 8 yards down waste 77 degs. Fahr., and the temperature in borehole 4 ft. deep, at face 79 degs. Fahr. Hygrometric tests showed that the intake air carried 4.6 grains water vapour per cubic foot, the main return 6.58 grains per cubic foot. Of the places where heating had been most frequently observed, one was where the air travelling down one drift face to the next had a tendency to enter the waste below the carving, leak over or through the pack, and heating began. Another place was in the jig waste on account of porosity of pack, but this was usually confined to a few yards from the face and generally easily detected. Witness added that they had a large area in connection with the faulty ground where they had had oil come down from the roof, and it had been a great source of danger and risk, and had necessitated extraordinary precautions wherever they had had oil shales. In the stone drifts they had come across some oil measures. They were in two heds, not very thick, being probably 4 ft. through them horizontally; vertically they would be about 18 in. The last one he saw was about 12 yards up the Cockshead seam. These shales, which were brought down by falls in the goaf, were liable to spontaneous combustion. Where that oil was coming down, the smell was quite distinct from that which arose from a heating of the slack and hussle. The first symptom that they got of heating of the hussle and slack was disposition of moisture on cold surfaces of shale in waste or on coal over packs. The second symptom was the rise of temperature, and the third was a peculiar sour smell—different from the oil smell. Any official who could not detect a sour smell was no use. Witness considered that they would get the oil, however tightly they packed. It had dropped from the roof in the jigs when the roof coal had not been taken down, but not in the jigs at the fast side. They mostly saw it between the jigs and packs.

DEALING WITH HEATINGS.

Continuing, witness said that whenever a place was found with moisture deposited the first thing was to find out the cause. It might be due to brattice cloths hung at the face to turn air on edge of roof coal, to prevent gas accumulating, being so tightly put up as to force air on the waste, and the strata breaking down in waste giving off heat, met with the colder air and condensation resulted. The brattice cloths were re-arranged, or taken down altogether, and if in a few hours this did not prove effective in removing the moisture, pointed iron rods ¾ in. or ½ in. diameter were thrust into the goaf packs, left there for a short time, then taken out and examined to find whether heating was going on in the waste or pack. At the same time that these observations were being taken a thermometer was brought into use to find out progress of heating. It was first hung at the coal face and the temperature taken was taken as the standard for that place. It was then taken in the suspected waste, and readings were booked and kept. At the time that drifting commenced preparatory stoppings were built in main intake and main return on the outbye side of working places. The site being selected, the top, sides and bottom were got out to hard ground, and the stoppings were built up with wedge-shaped openings, namely, wider on inbye than outbye side, leaving sufficient room only for ventilating and haulage purposes. These stoppings were usually 3 ft. thick, with no timber in them, except over openings, each piece of timber being 3½ in. higher than the other, so as not to have a straight joint, thus making it much better and easier to close off, with less liability to leakage. Calculations were made as to the number of bricks which would be required to close the openings; these were sent down and stocked close to site of stoppings. When building off a worked-out panel or district both stoppings were proceeded with at the same time; in the top head stoppings they usually built in a 3 in. pipe with tap attached, this was left open until the bottom stopping was being finished, when the top was shut and the place left. After the stoppings had been finished it had taken as much as 48 hours for area worked out to charge with gas, although in 24 hours they had had a cap of gas showing on a lamp flame at the top head stopping.

Witness said in the three instances which had come under his notice the longest time taken to close-off was eight hours; the last and shortest was six hours from when they left the bank to when they closed the tap with the work completed. In 15 years they had only found it necessary to build off three times, losing only a very small area of coal. But in no case had they seen fire, nor had smoke that they could see or smell.

HYDRAULIC PACKING.

Witness said they had never considered the use of hydraulic packing. They had not sufficient material at surface for that purpose for long. The water would be

bad for the seam. It would affect the floor of the jigs, and cause them to lift very badly. It would be difficult, if not impossible, to keep the jig roads open with water in the roof, and the floor would be lifted up very badly.

Witness said the preparatory stoppings were put in for one panel only; if there was any sign of heating those stoppings were closed up, and a rib of solid coal left between one panel and the other, but later years' experience had taught them that it was not necessary. Timbers were put in the stoppings for carrying the roof over the road, but the opening was only left 5 ft. 6 in. to the lowest timber, and they must have brickwork to carry it over the opening. The timber was left in, but they had never found any danger from the timbers. When they put girders in, the girders being so much harder than the brickwork, they cut the brickwork.

Witness said he had never known a fire in any of the ribs of coal left in permanently. As to the recovery of timber, they had a silvester in every stall and tried to get out all the timber they could, but if timber was lost they did not work back into the gob to get it. Speaking generally, the men knew the advantage of going to a fair amount of trouble to see that the timber was not left in.

Mr. Johnson said they left 3 ft. 6 in. of coal over the packs. It was left for the commercial reason that it would not pay to work. The roof would not allow them to take it out even if they left larger packs.

Witness said that if they had a distinct cap in the working face they immediately withdrew the men. The fireman usually used his judgment in that. It was generally due to a fall in the barometer. They had had heatings where they had 2 per cent. of gas. He was rather inclined to favour stonedusting, but had not done it so far. They swept up the dust on the roads systematically.

GOAF TEMPERATURES.

Witness thought it would be a great advantage if they were able to tell the heat at any part of the goaf.

Sir Arthur Markham pointed out that Dr. Haldane had recently arranged in the Yorkshire collieries a plan by which he used a small coil of wire costing a few pence, which he placed in the waste with a piece of insulated wire attached to it, and the officials could go round with a galvanometer and take the heat. The whole apparatus could be put in for a few shillings, and each coil of wire cost 2d.

Continuing, witness said that in 1889 they had a most serious gob fire; it resulted in explosion, and caused the death of 67 or 69 lives. As to the method of working adopted, witness admitted that if, instead of working only these small areas, they wanted to apply the same methods and system to a colliery where they wanted a considerable output, and to work very much longer lengths, they would have great difficulties, but he thought they would be able to control them. With regard to withdrawing men, witness said he would withdraw men if he had less than 2 per cent. of gas cap if there was heating. It depended on the state the heating had got to. However, he would qualify that so far as to say he should like to be free to keep men back to deal with the difficult situation. He would not withdraw all the men and leave the pit to blow itself up.

Mr. A. M. HENSHAW.

Mr. ALBERT MAYON HENSHAW, director and general manager of the Talk-o'-th'-Hill Colliery, Stoke-on-Trent, also gave evidence on February 12, 1913, with particular reference to gob fires in the Bullhurst seam, which was, he said, notoriously liable to spontaneous combustion.

GEOGRAPHICAL DISTINCTIONS.

In the North Staffordshire coalfield spontaneous combustion conditions varied very much, as did the seams. In one part of the district fires were frequent; in other parts they were absent. The same seam of coal on the west side of the district was very prone to spontaneous combustion, whereas on the east side of the district spontaneous combustion was almost unknown; and that also obtained with regard to other seams of coal. In his own mind he drew the line at the anticlinal of the North Staffordshire coalfield. There was another rather remarkable feature, and that was on the west side of the anticlinal some of the seams were bituminous and coking; whereas the same seams on the east side of the anticlinal were semi-bituminous and non-coking. The bituminous seams were most liable to spontaneous combustion, although he did not say that the bituminous property of the coal had anything to do with it. A large number of the upper seams were denuded along the top of the anticlinal; but the highly bituminous seams on the west side did not crop out except in one or two individual cases. That might have some bearing on the matter. It was possible that the lower seams, the Eight-feet Banbury and the Bullhurst, which were the lowest workable seams on the west side not cropping out of that anticlinal, were more highly bituminous than the measures above those seams on the same side, simply because they did not crop out at all. On the west side the seams prone to spontaneous combustion were bound in by the anticlinal on one side and the red sandstone on the other, and had no outcrops. On the east side of the anticlinal all the seams, although not cropping out at the anticlinal, cropped out naturally to the surface at the east. The Bullhurst seam was the deepest seam of the coalfield. Also on the west side the Bullhurst seam was more faulted, and witness thought that had a great effect on its liability or otherwise to spontaneous combustion. It forms the deepest seam of the district and lies on strong thick rock. Above the seam there was softer material. The coalfield had been so faulty that the sliding bending movement of the strata had produced its greatest effect in and over the Bullhurst seam. Also the seams were thicker and more associated with



and of inferior coal and carbonaceous shale. The coal also contained more finely-disseminated pyrites—fine flakes and threads of pyrites in the coal itself—distributed throughout the whole mass down to microscopic particles. Lately he was inclined to the opinion that pyrites had no effect except its mechanical effect, in producing rapid disintegration of the coal by the oxidation of the pyrites itself, though he did not think pyrites as a heat-producing material had a large effect. Some pyrites would oxidise almost completely, and others very little. It existed both in layers and in nodules, but more particularly in the fine laminated state in the interstices of the actual coal itself. The analyses of the seams prone to gob fire on the west side of the district showed generally from 1½ to 2½ per cent. of sulphur, and on the other side probably less. In cases where gob fires had been known on the east side of the district, the sulphur might be even up to 2 per cent. It was at the same time to be noted on the west where a gob-fire seam was less faulted, was harder, thinner, and has a good roof, fires were rare or unknown. There were seams on the east side that were being successfully coked to-day in patent ovens when stamped.

#### IMPURITIES IN THE COAL.

After further questions, witness said the strange thing was that, antinatural or no, in the same seam of coal gob-fires occurred at one colliery under almost every conceivable condition, and never occurred at the next colliery although the conditions were identical and the system of working the same. In the colliery where no gob-fires took place the coal was better and more of it got out. In the colliery where gob-fires took place the seam in many parts was inferior. A great deal of coal was lost in working. But one colliery that did not fire was Mr. Rigby's, and three collieries which adjoined, which had always fired, were the Talk-o'-th'-Hill Colliery, Jammage on the other side, and Elliott's old collieries on the other. He did not think Mr. Rigby would say his colliery had been worked on a different system to any other colliery or very much better. Mr. Rigby, however, said he did think so.

Witness said his experience was that where the Bullhurst coal had inferior top coal, and that top coal was left in the goaf, nothing would prevent it taking fire, and in most of the collieries where fires had happened it had been because of the coal lost in working and left behind in the goaf. Both good and inferior coal left in quantities in the goaf would fire spontaneously. At the same time, he believed there was some peculiar impurity in the coal itself which rendered it more liable to spontaneous combustion than when the coal was good. To put it briefly, the more coal they got out, the less liability there was to spontaneous combustion. Impure coal was more liable to disintegration than pure coal, and weathered more easily.

Witness said the Bullhurst was a thick seam, 15 ft. or so; in places sometimes as little as 4 or 5 feet. It had below it a considerable thickness of hard sandstone rock and shale. Sometimes there was underclay, and sometimes it lay immediately on the rock. The roof was soft shale—usually broken shale that had taken the thrust and crush and had been reduced to a crumbled slickensided slate, so that nips would break into innumerable smaller pieces, each presenting a black polished surface, which was locally called "hussle." The hussle itself was very fine and highly carbonaceous shale, and might under favourable conditions take fire spontaneously, but, as a rule, it did not fire. Where it fired, or where it was liable to fire, it was due to the presence of coal intermixed with the hussle—thin threads. The content of moisture was 1½ to 3 per cent. Owing to the number of faults and the variations in gradient (from flat to 43 degs.), the method of working had been necessarily irregular. In working only 300 acres over the past 25 years, witness had had upwards of 30 cases of spontaneous combustion. Stone drifts, levels, planes and roads generally had been unavoidably crooked in recovering faults, or following the course of the coal. In the earlier years the seam was opened without regard to gob-fires, but later plans were adopted wherever possible to isolate one section from another. The object was to be able to build off one fire without losing a large area of coal or workings. A characteristic section of the Bullhurst seam consisted of 2 to 3 feet of bottom coal, 4 to 6 feet of middle coal, and 2 to 3 feet of top coal. Bands of dirt or hussle are often found between the bottom and middle coals, and almost invariably between the middle and top coals. Immediately on the coal was a bed of 1 to 5 feet of grey shale, and above that 2 to 6 feet of mixed shale and clay (hussle) and inferior coal, and on this a seam of 2 to 3 feet of coal called the Rider. The bottom coal was frequently absent or very thin, and sometimes the top coal disappeared. The shale roof occasionally disappeared or thinned out, and the Rider came closer to the seam. The broken glassy shale, or hussle, in the roof was rarely absent. The bottom coal was invariably of inferior quality, having several intergrown bands of black pyritic rock. This part of the seam was left down unworked. Witness did not know of any fire in the bottom coal itself.

Witness said he had made some tests of the point of combustion as between coal and hussle. The tests were merely to ascertain at what temperature inflammable vapours were given off—in other words, the flash-point of the vapours from coal, hussle, and wood chips. At the Talk-o'-th'-Hill Colliery they confined their workings to the middle coal, varying from 4 to 6 feet in thickness, leaving down the bottom coal consisting of 2 ft., with stone bands and working 5 ft. in thickness, or thereabouts. They recovered the top coal in the waste, and in pillar and stall recovering as much as they could from the fallen goaf. The bottom coal at Talk-o'-th'-Hill Colliery was very hard and interlaid with bands of sandstone. As a rule the seam is dry and hard, but it is occasionally found at faults. Fire-

damp is given off freely from the coal and roof. Witness said it was evident from the above description that quality restricts the output to from 60 to 90 per cent. of the coal contained in the whole seam, and although where the bottom coal is left down, and the top coal is packed up intact, the loss of broken coal left in the goaf may be reduced to less than 10 per cent., it frequently reached 25 per cent. when the whole seam is worked. The nature of the coal is such that the waste at the time it is left is estimated to comprise 40 per cent. over 6 in., 20 per cent. 6 to 3 inches, 15 per cent. 3 to 1 inches, and 25 per cent. 1 in. to dust. Of the latter 25 per cent., 60 per cent. would be below ¾ in. There would thus, with a 25 per cent. loss, be sufficient fine coal to cover the floor all over 3 in. or 4 in. thick. It is, however, left in heaps along with other pieces which fall to dust, eventually being buried under falls, or on the other hand is thrown into the packs. Witness thought the fires in the waste were due to the coal dust left.

#### FLOODING WITH FIREDAMP.

As to the precautions, witness said they were—first, to prevent loss and stowage of coal in the mine, or reduce it to the minimum; and second, to control the ventilation, and prevent circulation and leakage of air through the packs, goaves, pillars and disused workings. It had been suggested that a brisk ventilation of the goaves would prevent ignition by carrying away the heat as fast as it is generated. This plan, in witness's opinion, is rarely practicable, and when goaves are fallen, blocked and inaccessible, fires would be more likely to follow this course. In a gob-fire seam no ventilation ought to be allowed where a man cannot travel and inspect its effect. Witness said that latterly they had adopted a method, but this is not in the Bullhurst seam. It is having the gateways as close together as possible, only 17 yards apart, for the purpose of working the face as quickly as possible and regulating the falls that occur in the goaf. In that way the waste forming the goaf is only a few yards wide between roadside pack and roadside pack. There would be a difficulty in the way of getting material sufficient to pack the goaf solid. That could not be done in the Bullhurst seam without packing it with coal or dangerous material. He doubted whether the goaf could be fully packed with coal in the Bullhurst. If the coal were sufficiently thick and there was enough inferior material to pack the goaf solid, he should hesitate to do so, because he should fear leakage from the roads in some way into the goaf setting up spontaneous combustion. A method has been frequently adopted in North Staffordshire of heading to the rise, and cutting out into pillars, which are extracted in descending order. The goaf thus formed to the rise is allowed to fill with firedamp down to a short distance above the working places. Where the gradient is sufficiently steep, this method prevents the entry of air into the old goaf, where fires would otherwise be likely to occur, the new near goaf being less liable to spontaneous combustion. In one favourable instance, it was successful, and many North Staffordshire managers who adopt the plan regard it with great favour, and would speak as to its success. There is danger inherent in that method, with a variation in the inclination of the seam. They might have a fire occurring on the dividing line between air and incombustible firedamp owing to the bringing about of combustion. The seam should always be steep enough to keep the gas down to a comparatively low point.

Mr. Rhodes suggested that, instead of working from the rise downward, it might be possible to work uphill with a pure longwall face, and at a certain point absolutely stow up tight and make a soft dam right across the whole of those advancing faces, and then go on again. Witness admitted that that would obviate the objection to accumulation of firedamp in the rise working to which the system of working downhill gave rise, if they could so effectively put their dam across as to pen the firedamp in. In addition to that, they could at stages, say of 100 yards or whatever distance it might be, stow by tight gob roads and create gob dams as they went up. That would be quite a proper thing to do, and was very like the method witness practised himself. But the roof in the Bullhurst seam at Talk-o'-th'-Hill and the adjoining collieries frequently broke down to a very high point right up to the Rider coal, and it would be a tremendously high dam that would have to be put in. If they wanted regular settlement, their area must be as extensive as possible and the face as long as possible. If under those favourable conditions for longwall working they could occasionally run cross packs, they would then get below those cross packs the safest possible condition under the circumstances. One difficulty was that the rate of settlement varied, and witness said he did not know of any seam in the country which was so subject to sudden changes. It was not one, but three or four seams. A drift would probably have to stand a considerable time before they would get solidity over the whole of the area. As a general proposition he agreed with Mr. Rhodes, but thought his suggestion was not applicable to that particular seam.

#### CAVERNS AND HYDRAULIC PACKING.

Sir Arthur Markham observed that, in order to obviate the formation of caverns after a fall when the timber was buried, he progressed a distance of 30 to 40 yards, and then headed back through the pillar. The weights then came on, and that prevented a gasometer being formed. He recovered the timber then, packed solid, and retreated.

Witness said he had never tried that system. He did not see any practical means of avoiding the caverns; and after they were formed he did not see what could be done. Where a fault broke up the roof, it would be practically impossible to go back into that fall and do anything further there. It was so dangerous as to be impracticable. Witness added that the gob fires occurred generally where there was an air space over

the buried material. In a seam like the Bullhurst, where the thickness varied from 6 or 8 feet up to 20 feet quite suddenly, when they came to a thick pocket of coal like that it was advisable in the interest of safety to get that coal out, notwithstanding that a cavern would be formed. If they did not get the coal out the probability was it would fire. The only way possible to avoid caverning was by a system of hydraulic stowing to keep the goaves tight and prevent the seam coming down. Hydraulic stowing, witness believed, could be successfully adopted in many cases, and would largely prevent fires in goaves. It had other advantages and one great disadvantage—namely, high cost of installation, and in difficult situations high cost in application and maintenance. In some collieries the variations both in section and cross-section were so great that there would be difficulties in the way of carrying the material through the pipes. It would mean an exploring and developing of the whole of the field before any coal was worked. As to the supply of suitable materials, witness thought the old pit heaps would soon become exhausted. Witness said he quite agreed that it was mechanically possible to run the shaft along the level road to a point 300 yards deep at 1,500 yards away. But his point was this: having opened the seams at the bottom at 420 yards deep and recovered them to a point 300 yards deep, all the recoveries being actually going upstairs step by step with faults, it would be impracticable then to apply hydraulic stowing by means of roads already made. Of course, he admitted that mechanically any part of that pit could be stowed hydraulically if whenever they got to a difficult place they abandoned their present roads and drove new roads, and made new drifts, and so on. Witness added that the pit heaps would make good material for stowing. It was burned material. Some collieries would have to buy it; others would have their own for a time. There were no beds of sand or marl in Staffordshire, except what were used for brickmaking. They would have to go to Alsager on the one side, or Trentham on the other, to get suitable material.

Witness admitted that, generally speaking, the actual cost of the hydraulic installation was very small relatively; but there was also the grinding machinery, the transport of the material to the surface and the pumping machines to bring the water back. The latter was a very considerable item. The cost of pipes was very high, and the wear and tear was severe. Further, their floor was siliceous rock and a good deal of clay, and under the action of water it broke up quite easily. The roof is of clay up to the coal, and hydraulic stowage would mean wet conditions in all the workings of the seam, and wet conditions of the Bullhurst seam make it almost unworkable.

Witness's general conclusion was that hydraulic packing in North Staffordshire was practicable at a cost. The cost would be so great that the seams would not be worked. There would be no difficulty as to water supply. At present they pumped 3 tons of water with every ton of coal. With hydraulic stowing, another difficulty would be timbering to the height required. He admitted that they timbered to great heights in Silesia and South Staffordshire, but the difficulties are increased in North Staffordshire owing to the bad roof. The roof is so broken and of such a soft character that it breaks in narrow headings. If the stowage has been carried out successfully to a little distance back from the coal face, the roof being supported where the coal was extracted, the effect would be to bring weight on the coal face. Witness put the subsidence at 30 per cent.

Mr. Rhodes said in South Yorkshire he could give 65 per cent. over a dozen large collieries down to depths of 800 yards; where they had worked under the canal for a distance of a mile there was an extraordinary opportunity of taking exactly the result, because the roof of the tunnel had to be taken down to get the boats through, and it worked out at exactly 63 per cent.

Witness said that in the Bullhurst seam they had two weights following each other too quickly; immediately after the first they had the weight of the rock.

#### VARIOUS METHODS OF WORKING.

Passing on next to various methods of working, Mr. Henshaw said that in addition to the North Staffordshire practice of allowing the gas to accumulate, they had another method of driving to the deep and working back to the rise, allowing the goaf to fill with water. That had been practised, but not largely. In the first place it was a question of exploring the coalfield to find out where the lowest point is. It would take 20 years to find out the deepest places for water first, and if they did not they would be drowning other parts afterwards.

Witness said a longwall face was more systematically worked than pillars. The coal is less broken, and the roof better controlled, so that there is less natural loss of small coal, and less loss of whole coal in the shape of corners, punches, and thin ribs left against falls. A longwall goaf is more systematic and accessible than a pillar goaf, allowing roof coal to be either properly gotten, or, when fallen, to be cleared away. In pillar working, the roof coal is often buried, the control of the roof proper being impossible in the way a longwall roof is controlled. In the case of a floor coal which is left unworked, the packs of longwall are calculated to preserve it in a more unbroken state than in a pillar goaf, where the absence of support causes it to lift, and become a broken and crushed part of the buried debris. For the purpose of controlling the ventilation of goaves, longwall is again to be preferred to pillar and stall. In either case ventilation must be coursed round the working face, and in longwall this is done systematically; in pillar work often promiscuously. On the other hand, the goaves of a longwall district are unavoidably subject to leakage of air from the roads passing through the district, whilst the goaves of a pillar district are left



behind, and may eventually be outside the ventilated area. There is generally a period, however, in pillar work when the ventilation of the goaf is difficult to control, or is uncertain, and its open character permits of a circulation of air, the extent of which cannot be exactly determined. In the case of an outbreak of spontaneous combustion, it is more likely to be detected at an early stage in a longwall district with an open and continuous face, frequent roads, and a defined ventilating current, than in a pillar goaf, where the seat of heat may be far removed, inaccessible, and where it is often impossible to form any estimate of the amount of air or gas that must be present behind the face. In the case of heating in a seam where loading out is practised, longwall enables this to be done from the roads near, whereas in pillar and stall it would generally be impossible. On the other hand, where damming off is necessary, the "strait" roads of pillar and stall lend themselves more readily to the making of a secure and airtight stopping than the peaked roads of longwall work, but when the fires are frequent, and a system of panel work is adopted, the facilities are the same in both cases. Witness said he had practised both longwall and pillar-and-stall in gob-fire seams, and had no hesitation in saying that longwall is the better plan. At the same time, modifications of either may, under some circumstances, be usefully employed. Next to the removal of all possible coal, the most important operation in longwall work is the packing of the roads. On this depends the entire system of ventilation, and the control of leakage into the goaves. The packs should be of substantial width and strength to support the roof, and settle without falling, and they should be close and solid to prevent leakage of air. Walls of selected stones should be built on the waste side as well as on the road side. Cross walls are better avoided, as they are apt to form open passages for leakage. These packs which they built, added witness, were 5 yards thick, and never less than 4 yards. The middle pack was 4 yards. If the roads are a greater distance in, there is another waste of 7 yards, and then another pack. The waste of 7 yards goes to the pack of 4 yards. On the retreating system, witness said, they could examine their goaves.

(To be continued.)

#### NEW COKE OVEN INSTALLATIONS.

The Koppers' Coke Oven and By-product Company, of 301, Glassop-road, Sheffield, inform us that the following plants have been ordered from the Koppers' Company since February this year:—Zeche Neumühle (60 waste heat ovens), Halbergerhütte (40 regenerative ovens and by-product plant), Ewald III. (60 regenerative ovens and by-product plant), Salm-schacht (benzol plant for 120 ovens), Glückhelf-Friedenshoffnung (benzol plant for 120 ovens), Stahlwerk H&sch (90 combination ovens), Friedrich-Wilhelmshütte (110 combination ovens), Witkowitz Steinkohlenwerk, Marisch-Ostrau (40 regenerative ovens and by-product plant), Zeche Zollverein (60 regenerative ovens and by-product plant), Graflich-Larisch Monnsche, Zentral Direktion in Karwin (benzol plant for 14 tons of benzol per day), the Miike Mining Company (30 regenerative ovens and by-product plant), the Maryland Steel Company (120 regenerative ovens and benzol plant), the Laclede Gas Company, St. Louis (56 combination ovens and by-product plant).

In addition to the above the following plants are under construction in this country at the present time:—The Harrington Coke Ovens Limited (50 ovens), the Oughterside Coal Company Limited (40 ovens and by-product plant for tar, ammonia and benzol), the Tinsley Park Colliery Company Limited (40 ovens and by-product plant for tar, ammonia and benzol), the Low Moor Company Limited (25 ovens and by-product plant for tar and ammonia), the Ebbw Vale Steel, Iron and Coal Company Limited (100 ovens and by-product plant for tar and ammonia), the Yorkshire Coking and Chemical Company Limited (120 ovens and by-product plant for tar, ammonia and benzol), the Cargo Fleet Iron Company (50 ovens and by-product plant for tar, ammonia and benzol for 150 ovens), the Horden Collieries Limited (60 ovens and by-product plant for tar, ammonia and benzol), the Birmingham Corporation Gasworks (54 chamber ovens), the Moresby Coal Company Limited (10 ovens).

Benzol plants are also being erected for the North Bitchburn Coal Company Limited (40 ovens), and the Moresby Coal Company Limited (60 ovens).

**Minimum Wage Test Case.**—His Honour Judge Macpherson gave judgment at Chesterfield, on Friday, in a case in which he had been asked to decide whether the Butterley Colliery Company were liable to pay the minimum wage under the Coal Mines (Minimum Wage) Act to an employee named Hooley, of Somercotes. At the hearing a fortnight ago, Mr. Ellison, for the defence, urged that his Honour had no jurisdiction, and the judge now stated that he had come to the conclusion that he was bound by the High Court judgment in the case of *Randall v. the Clay Cross Coal Company*, and that that precluded him from trying the plaintiff's case in the absence of a certificate from the District Wages Board. —Mr. C. F. Elliot Smith, for the defendants, observed that the case was of great public importance, as it affected a large number of miners, and he asked for costs on scale C.—Mr. B. Mather, for Hooley and the Derbyshire Miners' Association, raised no objection, and asked for a copy of the judge's notes with a view to an appeal.—His Honour consented.

#### A DEFENCE OF THE FLAME SAFETY MINE LAMP.\*

By E. A. HAILWOOD, M.I.M.E.

It is somewhat unfortunate that the tricks which could be played on the old Davy lamp have so fascinated professors and many so-called Government experts that they have not been able to realise that the same tricks cannot be played upon the modern safety lamp. These people still devote considerable time in writing about and showing experiments on the safety lamps, and fail to draw attention to the fact that their experiments and their writings really refer to the Davy lamp, and that they cannot be performed on the modern lamp. The natural result is that an unnecessary nervousness is created in the minds of miners and coal operators, who have not the time or means at their disposal of learning that these tests do not apply to the modern flame lamp; and whilst the writer agrees that experiments on the Davy lamp are instructive, he contends that it is unfair to the flame lamp manufacturers that more emphasis is not placed upon the fact that the demonstrations refer only to obsolete lamps.

Persons who have witnessed the intense heat—viz., white-hot heat—which is necessary to cause flame to pass from the inside of a well-constructed bonneted lamp to the outside, and which can only be attained after reaching a velocity of over 3,500 ft. per minute of an explosive mixture of from 8 to 9 per cent., will realise that it is a mistake to talk of creating an explosion in a mine by the overheating of a well-designed lamp. Many an explosion has been wrongly put down to this cause. The majority of lamps now in use are fitted with bonnets or shields, and the writer has had lamps of this description in explosive mixtures and the gas inside the gauze burning for hours and the gauze red hot, and yet an outside explosion has not occurred. The writer submits that it will be a very rare occurrence to find in a mine a velocity of 3,500 ft. per minute of an explosive mixture of gas, and at the same time for the lamp to be placed in such a position as to receive the full force of this velocity, and also to have a miner stand by oblivious of the remarkable occurrence which was happening.

In another series of tests, the gas flame was kept burning in a lamp surrounded by an explosive mixture of gas; at intervals coaldust was scattered inside the lamp, also over the outside of the gauze. The lamp being constantly shaken about in the gas, and finally coaldust allowed to remain on the crown of the gauze for some hours, the gas flame burned immediately underneath the top of the gauze and had ample opportunity to heat up and coke the coaldust. The lamp had a single gauze only, and the test was carried out at Messrs. Ackroyd and Best's Pittsburg factory with natural gas, and yet the flame did not communicate with the surrounding gas, notwithstanding the fact that the gauze was often red hot. If, therefore, single gauzes will not under such conditions pass flame, it is evident that double gauzes will aid an enormous extra amount of safety to a lamp.

In other tests the writer has utilised a lamp having the glass so slack that on shaking the lamp the glass has freely rattled. The glass was split from top to bottom and a crevice cut right across the top and also at the bottom of the split, the crevice being more than  $\frac{1}{8}$  in. wide. This lamp was placed in a most explosive mixture of compressed gas and kept there for over half-an-hour with the gas blazing inside the lamp. This failed to cause an outside explosion. In the test the gas mixture was compressed down to two-thirds its original volume, and the gas, therefore, was in a most explosive condition.

In other tests, a lighted bonneted lamp has been passed into an explosive mixture of gas, a hole was pierced in the top of the gauze quite  $\frac{1}{2}$  in. diameter, and yet the flame failed to pass through the hole and ignite the surrounding gas—no doubt the reason for this being that the product of combustion from the lamp flame covers the hole in the top of the gauze with a barrier of incombustible gas, through which the flame could not pass to the outside gassy atmosphere.

To users of flame safety lamps this test will no doubt be interesting, as it is the upper part of the gauze which is subject to the most wear and tear, and fortunately the test demonstrated that it is the top part of the gauze which is usually protected by the barrier of incombustible gas. The writer admits that if the lamp in question be allowed to be extinguished and the products of combustion allowed to escape and the lamp filled with an explosive mixture of gas and an internal friction igniter operated so as to cause a flame to form in the lamp and ignite the gas inside the lamp, it is possible that this flame would pass through the hole in the gauze to the outside of the lamp, but this, of course, only refers

\* From a paper read at the American Mining Congress, Philadelphia (Pa.), October 1913.

to this particular type of lamp, and would not refer to lamps of the type which must be completely enclosed when being re-lit.

Some authorities have made much ado about the possibilities of the heat from the flame of the miner's lamp cracking the glass. As regards this point, it is only a question of a few dollars, as fine clear glasses can now be supplied for miners' lamps of such quality that they may be heated up to about 340 degs. Fahr., and sprinkled with water from a watering can, and yet the glass fails to crack.

Some people have been afraid that a fall of roof on a safety lamp may cause an explosion and ignite the gas; but in the tests so far carried out by the writer, they seemed to prove that before the lamp is dangerously damaged the flame of the lamp is extinguished by the "crushing down force."

In one series of tests a lamp was placed upon an iron piston and the piston moved rapidly upwards into a cylinder containing gas, so that the top of the gauze came into violent contact with the crown of the cylinder and the gauze was crushed down. No outside explosion followed, the light in the lamp apparently being extinguished by the "crushing force" or by the concussion of the atmosphere. Whereas in the coalmine it is very unlikely that this condition of affairs would be so severe as it was in the test in question, as in the event of the gas preceding the fall of the roof, the gas would most likely extinguish the lamp flame before the crush came upon the lamp. Whilst if the stone got down ahead of the gas, and crushed the lamp, the stone would crush out the light before the gas reached it; and in any case there would have to be an immense volume of gas released to reach a lamp crushed on the floor.

In another test an unbonneted lighted lamp was placed in a big jet of explosive gas, and the gauze smashed by a violent blow from a mallet. This also failed to ignite the gas, the blow invariably extinguishing the lamp flame. The writer therefore contends that when using a well designed bonneted lamp, fear from this "cause" may also be discounted.

We now come to the consideration of the question of the detection of "gas," and the checking of the state of the atmosphere of the mine. It would no doubt appeal more to the present "wise" generation if the lamp could be fitted with a series of levers, switches, indicating dials, and necessitate reference to elaborate tables of square root, cube root, &c. It would then, no doubt, be looked upon as a marvellously clever device, and more attention would be devoted at colleges and mining schools to the elaboration of its mysterious workings.

Up to a few years ago it was a comparatively rare thing to find miners who knew how to test for and read "gas caps." The best course to pursue will no doubt be to educate the miners more and more into the best methods of using the flame safety lamp and also as to how best to test for gas.

It has been proposed by some parties to place a flame safety lamp at the entrance to each working place, and give it into the charge of the "gangman." This lamp will, however, generally be neglected, and as the principle object of the "gangman" is to get as much coal as possible, he will no doubt fail to take a lamp into his working place at sufficiently frequent intervals. Whereas, if each worker be provided with a flame safety lamp, the chances of early detection of the presence of gas are more certain.

The next question is that of illumination. A miner's light may on the surface seem to be a miserable one, yet in the darkness of the coalmine this same light is quite good and sufficient for the work. Certain parties blame the flame of the safety lamp as being the cause of certain diseases of the eyes of miners, but it would now appear that there are miners who have had the benefit of the increased light from acetylene lamps and who now complain that this increased light hurts their eyes. This would seem to raise the question as to what is the proportion of miners whose eyes are *naturally weak*, and who would suffer pain whether the light be good or bad. The elimination of these cases will possibly show that the remainder will be quite satisfied with the existing miner's flame lamp; if not, the illumination of the flame safety lamp can now quite easily and simply be increased to 1½-candle power.

The Workington Harbour and Dock Board propose to have another store for general cargo erected on the harbour side. The site selected is at the town end of the harbour so that cartage may be minimised. Further substantial progress is being made with the deepening, piling, strengthening and straightening of the harbour wall. Messrs. Brotherton Ltd., hope to have their chemical and tar distillery plant on Lonsdale Dock in operation in about a month. The anti-breakage coal conveyor which the Harbour Authority is erecting on the Dock will be ready for use by the end of the year.



## THE MINERAL PRODUCTION OF INDIA.

In Part II. of the *Records* of the Geological Survey of India, Mr. H. H. Hayden, the director of the Survey, has an article on "The Mineral Production of India During 1912." The total value of minerals for which returns are available was £9,321,486 in 1912, an increase of £1,340,318, or 16·8 per cent. The value of the coal produced was £3,310,365, an increase of £807,749, or 32·2 per cent. At the same time there was a considerable rise in pit's mouth value, from Rs. 2-11-4 to Rs. 3-6-0 per ton. Consequently the increase in the output was not so great as might be supposed from the rise in value. The total quantity produced, however, amounted to nearly 14,750,000 tons, or nearly 16 per cent. more than was produced in the previous year, and nearly 2,000,000 tons more than was produced during the famous boom of 1908 when the output was over 12,750,000 tons, and the pit's mouth value rose to Rs. 3-15-0. With the exception of those of Baluchistan and Bengal most of the fields show a slight rise in pit's mouth value. In Baluchistan, however, the value fell from Rs. 10-11-1 in the previous year to Rs. 9-0-7 in 1912, whereas in the Jherria field the pit's mouth value rose to Rs. 2-14-1 and in the Raniganj field to Rs. 3-10-0.

AVERAGE PRICE (PER TON) OF COAL EXTRACTED FROM THE MINES IN EACH PROVINCE DURING THE YEAR 1912.

Province.	Average price per ton.
	Rs. a. p.
Assam	4 12 4
Baluchistan	9 0 7
Bengal	3 11 3
Bihar and Orissa	2 15 8
Central India	3 3 5
Central Provinces	4 1 8
Nizam's Territory	6 0 0
North-west Frontier Province	5 0 0
Punjab	5 3 2
Rajputana (Bikaner)	3 6 2

As usual, the Gondwana fields produced nearly the whole of the output for the year.

There was a slight increase in the amount of coal exported during the year under review, the total quantity being 897,194 tons, as against 860,788 tons in 1911. It is clear, therefore, that the increased amount produced in 1912 over that of 1911, amounting, as it does, to nearly 2,000,000 tons, must have been absorbed by the country. Of this increased consumption, the Indian railways are responsible for rather more than one-fifth, the total quantity of coal burned by them during the year being 4,590,618 tons, as against 4,223,020 tons in 1911. There consequently remains a balance of increase of over 1½ million tons, most of which must have been employed in other industries. This is an indication of remarkably rapid industrial expansion.

## EXPORTS OF INDIAN COAL.

	1911.		1912.	
	Quantity. Tons.	Value. £.	Quantity. Tons.	Value. £.
Aden	11,667	6,382	12,577	8,385
Ceylon	493,511	274,119	578,412	335,082
Straits Settlements	224,794	124,846	148,391	101,799
Sumatra	109,319	64,687	119,427	80,027
Other countries	21,497	12,950	38,387	24,949
	860,788	482,984	897,194	600,242
Coke	1,389	1,286	1,545	1,576
Total of coal & coke	862,177	484,270	898,739	601,818

While the increase in the exports of coal was small the rise in imports was very considerable—namely, from 340,106 tons, including coke and patent fuel, in 1911, to 611,732 tons, or nearly double the amount, in the year under review. This is no doubt attributable to the increased use by steamships of coal other than Indian. There are marked increases in the amount of Natal and Japanese coal imported, a considerable increase, amounting to more than 100 per cent. in the imports of Australian coal, and a decrease in the imports of coal from the United Kingdom.

## IMPORTS OF COAL, COKE AND PATENT FUEL DURING 1911 AND 1912.

	1911.		1912.	
	Quantity. Tons.	Value. £.	Quantity. Tons.	Value. £.
From Australia including New Zealand	35,703	37,824	92,087	96,835
From Japan	6,795	6,975	97,288	102,570
„ Natal	15,086	13,516	96,076	105,864
„ United Kingdom	232,865	267,214	136,791	175,603
„ Other countries	15,561	14,800	130,007	155,116
Total	306,010	340,329	552,249	635,983
Coke	7,661	14,405	3,142	7,355
Patent fuel	4,998	8,262	5,400	11,966
Government stores	21,437	35,016	50,941	81,533
Total	340,106	398,012	611,732	736,842

With the exception of Hyderabad (Singareni) and the North-west Frontier Province, the production of which latter is negligible, there was an increase in the outturn of every province. This increase was of course greatest in Bihar and Orissa—that is to say, in the Jherria and Raniganj fields. Of the former the output rose from 4,311,956 tons to 4,944,268 tons, and of the latter from 6,373,728 to 7,653,452 tons. Of the

other Gondwana fields the output of Bellarpur in the Central Provinces decreased by about 10,000 tons, and that of Singareni by over 20,000 tons. All the other fields show increases, the outturn of the new Hingir field in Sambalpur having risen from 5,669 tons to 21,314 tons.

## PROVINCIAL PRODUCTION OF COAL DURING THE YEARS 1911 AND 1912.

Province.	1911. Tons.	1912. Tons.
Assam	294,893	287,160
Baluchistan	45,707	54,386
Bengal	11,463,904	4,306,129
Bihar and Orissa	—	9,126,385
Central India	143,558	149,921
Central Provinces	211,616	233,996
Hyderabad	505,380	481,652
North-west Frontier Province	140	50
Punjab	30,575	38,409
Rajputana (Bikaner)	14,761	18,251
Total	12,715,534	14,706,339

## OUTPUT OF GONDWANA COALFIELDS FOR THE YEARS 1911 AND 1912.

Coalfields.	1911.		1912.	
	Tons.	Per ct. of Indian total.	Tons.	Per ct. of Indian total.
Bengal, Bihar & Orissa—				
Daltonganj	70,662	0·55	71,917	0·49
Giridih	704,443	5·54	730,530	4·97
Jherria	6,373,728	50·13	7,653,452	52·04
Rajmahal	1,978	0·02	2,775	0·07
Ramgarh-Bokaro	468		8,258	
Raniganj	4,311,956	33·95	4,944,268	33·76
Sambalpur, (Hingir-Rampur).	5,669		21,314	
Central India—				
Umari	143,558	1·13	149,921	1·02
Central Provinces—				
Bellarpur	96,603	0·76	86,417	0·59
Pench Valley	63,030	0·50	90,722	0·62
Mohpani	51,983	0·41	56,857	0·39
Hyderabad—				
Singareni	505,380	3·97	481,652	3·28
Total	12,329,458	96·96	14,298,083	97·23

Similarly all the tertiary fields show a steady rise in their outturn.

## OUTPUT OF TERTIARY COALFIELDS FOR THE YEARS 1911 AND 1912.

Coalfields.	1911.		1912.	
	Tons.	Per ct. of Indian total.	Tons.	Per ct. of Indian total.
Assam—				
Makum	294,893	2·32	296,615	2·02
Khasi and Jaintia Hills	—	—	545	
Baluchistan—				
Khost	42,410	0·33	45,477	0·31
Sor Range, Machi, &c.	3,297	0·03	8,909	0·06
North-west Frontier Province—				
Hazara	140		50	
Punjab (Silt Range)—				
Jh-lum District	26,982	0·24	33,192	0·26
Mianwali	2,522		1,600	
Shahpur	1,071		3,617	
Rajputana—				
Bikaner	14,761	0·12	18,251	0·12
Total	386,076	3·04	408,256	2·77

There was a considerable rise in the total amount of labour employed in the coalfields during the year. The average number of persons employed daily was 132,567, as against 116,155 in 1911. There was also a slight increase in efficiency; the output per person employed rising from 109·47 tons in 1911 to 110·93 tons in the year under review. The number of deaths by accidents in the mines was 174 or one less than the number for the previous year, while the death-rate per 1,000 persons employed fell from 1·5 to 1·3.

Some further statistics are given by Mr. G. F. Adams, Chief Inspector of Mines in India, in his annual report for 1912. These relate to mines administered under the Indian Mines Act, 1901.

Mr. Adams says during 1912 those employed in coalmines increased by 14,794. This increase corresponds with that in the number of those working in the coalmines of Bengal and Bihar, which was 14,736. In the district of Manbhum, which may be taken here to mean the Jharia coalfield, it is reported that the supply of labour was not in excess of the demand, while in the Raniganj coalfield there was a distinct shortage of labour. Owing to the new large undertakings in the latter coalfield, considerable additions to the present labour force will be required and considerable difficulty will be experienced in fulfilling those requirements, unless more systematic methods of recruiting, than those adopted up to now, are employed.

Speaking of output, it is to be expected that a larger comparative increase will accrue from the Raniganj field in the next few years. During last year, a depth of 1,000 ft. has been reached at one shaft, another has been sunk to a depth of over 900 ft., and a third, expected to be about the same depth, is in course of sinking. These are three separate undertakings. For operations of this magnitude to be successful, a large output is essential.

## Accidents.

During 1912, at mines regulated by the Indian Mines Act, there were 133 fatal accidents, being a decrease of

four as compared with the number in 1911, and an increase of four as compared with the average number of last four years. These accidents involved the loss of 185 lives. This is an increase of 11 upon the number of deaths in 1911. In that year, however, only two accidents caused more than three deaths (14 and four), whereas in 1912 one accident caused 23 deaths and two caused four deaths. Of these 133 accidents, Mr. Adams regard (A) 49 as being due to misadventure, (B) 37 to the fault of the deceased, (C) nine to the fault of fellow workmen, (D) seven to the fault of subordinate officials, and (E) 31 to the fault of the management. Supervision, all over India, is on the whole very much better than it used to be a few years ago. Still, more remains to be done. The death-rate per thousand employed was 1·12, that of the preceding four years being 1·18. At coalmines only these figures were 1·29 and 1·34. The death-rate per million tons raised at coalmines only was 11·17, that of the preceding four years being 12·62; 157 of the deaths occurred in coalmines.

One person lost his life by explosion of firedamp; 79 by falls of roof and sides; 24 in shafts; eight by explosives; five by suffocation of gases; 23 by irruption of water; 16 by haulage; seven by other accidents underground; and 22 on the surface.

There is a substantial decrease in the number of deaths from falls of roof and sides. In the Bengal and Bihar coalmines, where the large majority of the statistical accidents occur, there were 137 deaths compared with 118 in 1911. If the one accident which caused 23 deaths, and which was a drowning accident, due to misadventure, and caused by an irruption of rain flood water, is eliminated, there were 114 deaths, and this, with the very much increased output, works out at a death-rate of 8·48 per million tons raised as compared with 10·50 for the preceding four years.

The necessity of fencing boiler feed-water tanks, the fixing of safety chains to shaft cages, and the providing of second stopblocks on haulage inclines and of shaft harness when men are working in shafts was proved by the occurrence of accidents, which in all probability would not have occurred, had these provisions for safety been adopted.

At one coalmine, the manager has offered rewards to the subordinate Indian officials for proficiency in knowledge of the vernacular translation of the general rules. Owing to considerable delay in the preparation of an official Bengali translation of the special rules for coalmines in these provinces, their introduction is still in abeyance. This work has just been completed, and it is intended that these rules shall be established during the ensuing cold season.

As mentioned in the last report, salvage operations were commenced in the case of a fire at the Baraboni Coal Concern's Haripur mine. Two attempts were made, but were unsuccessful. The management, however, feel confident that the mine will soon be regained. The above remarks apply also to the East Indian Coal Company Limited's Kendwadiah mine, referred to in the last report. Certain progress has been made in salvage operations, which, it is hoped, will eventually be successful.

## Health and Sanitation.

Altogether there were known to be 66 deaths from cholera at coalmines in Bihar and Orissa and 62 at coalmines in Bengal. Seven deaths occurred in the Jharia coalfield from smallpox.

One case of plague was found in the Jharia bazar on January 20, and, on investigation, it was proved that the patient had come from Dhanbaid. A few cases of plague occurred in the early part of the year at Mohpani coalmine, in the Central Provinces. The outbreak was, however, stamped out in March, owing to the special measures taken by the manager to get his people inoculated. There were six deaths.

Plague and cholera were also reported from Ballarpur coalmine, in the Central Provinces. There were 21 deaths from plague and 24 from cholera. Malaria was reported from the Khost coalmines in the autumn, and from an area in the Madras mica mines.

## Ambulance Work.

This movement again made considerable headway during the year under report. Ten classes for Indians and Europeans were held at seven local branches—viz., Charanpur, Dishargarh, Jharia, Kusunda, Mugua, Raniganj, and Sijua, and were attended by 493 students. Of these 162 were examined, with the result that 151 passed. Certificates of proficiency in "First Aid" were gained by 149 candidates and two gained vouchers. Classes were also started for instruction in the vernacular, and proved a great success. It is very gratifying to note the increase in the number of cases in and about the mines treated by first-aiders before the arrival of the doctor. This, more than anything, goes



to justify the inception of these classes. The Central Committee has under consideration a scheme for presenting medals instead of certificates of proficiency to successful Indian candidates.

The formation of ambulance brigades at suitable stations for members of the classes who have made themselves proficient in "First Aid" is receiving the attention of the committee. Enrolment will entitle the trained men to wear uniforms approved by the King-Emperor himself, and they will qualify after a certain number of years' service for a decoration given by the King-Emperor, exactly similar to the volunteer decoration.

#### Education.

Mr. E. H. Robertson, the professor of mining at Sibpur College, has reported that the number of students on the roll at the beginning of session 1912-13 was 17, of whom 12 were enrolled in Course I. and five in Course II. A proposal is on foot to renew the special scholarships in a modified form, which it is to be hoped will be successful, as there is no doubt of the ambition and high endeavour of these young men.

One meeting of the Mining Educational Advisory Board was held during the year. The lecturers of the session 1911-12 report that the total number of names on the register was 260. This is an advance of 23 on the numbers of the previous year. The average number of students who attended the courses was 20.15 per lecture, 75 students (34 Europeans and 41 Indians) made 50 per cent. or more of the possible number of attendances and thus became eligible candidates for the sessional examinations. These figures are practically the same as for the previous year. Complaint was made of the difficulty in teaching mining to students who were deficient in the knowledge of arithmetic and elementary mathematics. There is no doubt that deficiency in ordinary, if not primary, education, in the case of many students prevents them assimilating the lectures on mining. The consideration of the whole question of mining education generally in the coalfields has been retarded, owing to the uncertainty as to the future of the Sibpur Engineering College. It is, however, understood, says Mr. Adams, that a final decision on this matter will be come to soon, and, whatever the decision is, the necessity of a more comprehensive scheme of local technical education must be met, if Indian and Anglo-Indian managers are to take their proper place in the rapid development of coalmining in India.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinion expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### "B.Sc. PETROLEUM MINING," BIRMINGHAM.

SIR.—In his letter, Sir Thomas Holland states very clearly and in very moderate language his objections to the petroleum mining course at Birmingham.

Before attempting to deal with his arguments, let me say that his very definite denial that any such course was ever contemplated at Manchester comes as a surprise to me, as, I believe, it may to others. I need hardly say that I fully accept his statement, and very much regret that I was misinformed.

If I may venture to summarise Sir Thomas's letter, it comes to this: In his view, it is only the specialist class, comprising (a) refinery chemists and (b) petroleum geologists, which can be catered for satisfactorily at a university.

I have no doubt, as I said in my last letter, that there are a number of good posts in the oil industry open for specialists in both those branches; but, so far as I know, there has never been any dearth of qualified chemists or geologists to fill them.

I went on to state, however, that, in my opinion, there was a large demand for quite another class of man with engineering training and a good knowledge of chemistry, geology and drilling practice. The position I had in mind for such a man was that of field manager.

Sir Thomas now says:—"Mr. Cochrane will admit, doubtless [I, in fact, said so in my letter], that no young student of either class is likely to be entrusted at once with a field managership; he has yet to show his technical worth and to acquire commercial experience. Assuming, then, that both prove to be well-balanced men of the world, who will have the first offer of promotion?" Sir Thomas, of course, answers this in accordance with

his line of argument. I say, on the other hand, that for the position of field manager, which is the point under discussion, the refinery chemist is entirely, and the petroleum geologist almost entirely, unsuited.

I think that the field manager has got to be, to some extent, a Jack of all trades (though he need not necessarily be master of none), and the man who is only a chemist or only a geologist—however admirable he may be as such—is quite incompetent for such a position.

On the other hand, the man who has taken a university course, comprising the subjects I have mentioned, plus a period of field training, should not only be competent for the position, but should be a good deal more competent than the present type of "practical" man who knows a great deal about drilling, but very little about anything else.

These, Sir, are my reasons for thinking that the Birmingham course is not "enticing young men into a blind alley," and that it is preferable to the system adopted at Manchester. To refer briefly to one or two other points. Why should it be suggested that a man with the degree of "B.Sc. (Petroleum Mining)" hold himself out, or is held out by the University, as being fully qualified to take charge at once of an oilfield? The man who graduates with a B.Sc. (Engineering) is not expected to be capable at once of assuming the management of Messrs. Vickers.

In conclusion, to get at the real point at issue between us, may I ask Sir Thomas to state (1) whether he agrees that there is a genuine demand for men qualified to fill the post of field manager? (2) What, in his view, are the qualifications for such a post, in order of importance? (3.) Whether he thinks it possible to acquire any, and if so which, of these qualifications at a university, apart from the period of field training which we both agree is essential and must come after the University course.

T. G. COCHRANE.

The University, Edgbaston, Birmingham,  
November 4, 1913.

SIR,—Sir Thomas Holland's letter in your issue of the 7th inst. I am afraid Sir Thomas has misunderstood some parts of my letter of October 27. I did not say that the Birmingham University deserved the greatest credit for instituting a B.Sc. of Petroleum Mining, but that the credit was due to them for their attempt to provide facilities for instruction in petroleum mining.

I reiterate the statement as to the advantages to the students of one or more drilling rigs for their instruction, assuming that qualified demonstrators are employed.

I regret that anything in previous letter should have further ruffled Sir Thomas's feelings, as there was no intention so to do, though I objected strongly to his condemnation of the drilling rigs in course of erection, knowing that if these rigs are handled by the students under the tuition of practical demonstrators they will be able to acquire not only useful knowledge but a knowledge of detail that might never be learnt in the field except at the expense of the company for whom the erstwhile student happened to be working.

In conclusion, I would like to see co-operation among all concerned rather than a process of destructive invective. If it is possible (and I believe it is) to arrange a course of useful instruction in petroleum mining at the University of Birmingham or elsewhere, it certainly deserves every assistance and encouragement from all members of the profession. JOHN WELLS.

Cross Keys House, 56, Moorgate-street,  
London, E.C., October 11, 1913.

**Shipments of Bunker Coals.**—During the month of October, the quantity of coal, &c., shipped for the use of steamers engaged in the foreign trade was 1,888,794 tons, as against 1,818,431 tons in October 1912 and 1,670,669 in October 1911. The aggregate quantity shipped during the first ten months of the present year has been 17,434,411 tons, as compared with 15,020,522 tons and 16,017,616 tons in the corresponding periods of 1912 and 1911 respectively.

**Grimsby Coal Exports.**—The official return of the quantity of coal exported from Grimsby during the week ended November 6 showed that a total of 15,432 tons foreign and 1,073 tons coastal were shipped, as compared with 22,652 and 892 respectively during the corresponding week last year. The various shipments were:—Foreign: To Antwerp, 536 tons; Aarhus, 1,220; Barcelona, 1,165; Christiania, 250, and 404 tons coke; Copenhagen, 1,314; Dieppe, 503; Esbjerg, 729; Gothenburg, 866; Malmo, 919; Nexø, 980; Hamburg, 980; Helsingborg, 413; Randers, 504; Reval, 2,382; Rotterdam, 689; Sodertelje Uthamn, 1,137; Svancke, 184; and Tonsberg, 661. Coastal: To Gravesend, 420; London, 103; and Lowestoft, 550.

### MINING AND OTHER NOTES.

The annual meeting of the Cleveland Institution of Engineers was held at Middlesbrough on Monday, Mr. Henry Crowe presiding. The balance-sheet showed the expenditure to have been £280, and there was a balance at the bank of £341. The total membership of the institution was 306. The report was approved. The institution will celebrate its fiftieth anniversary next year.

The Harton Coal Company has offered a donation of £3,000 to the Durham Aged Miners' Homes Association for the provision of homes for aged miners at Boldon, Marsden, and St. Hilda collieries. At present the men at Harton Colliery have not decided to join in the scheme; but should they do so, the company will increase their gift to £4,000.

In Hamilton Sheriff Court on Saturday, James M'Laughlan, winding engineman, appeared before Sheriff Shennan, charged with having caused the death of Patrick Lyons, assistant pitheadman. The charge was that accused had on 7th inst., at Neilsland Colliery, Hamilton, in breach of his duties, culpably and recklessly lowered a cage from the pit-head down the shaft without being requested by distinct and definite signal to do so, in consequence of which Patrick Lyons, who was engaged on the pithead fixing a crossbar to the cage, was crushed between the cage and the side of the shaft, and was so seriously injured that he died within a few minutes, and the said James M'Laughlan did thus kill the said Patrick Lyons. The accused, who declined to emit a declaration, asked the Sheriff to fix bail, and this was ultimately fixed at £25.

On Monday the Dudley (Staffordshire) Fire Brigade was called to a colliery at Redhill, where they found fierce flames and smoke issuing from the shaft. Happily there were no men in the pit at the time, but a pony perished. Considerable damage was done to the pit. The shafts were afterwards sealed down, and the fire allowed to burn itself out.

It is announced that Messrs. Manning, Wardle and Co. have just appointed as their agent in South Wales the firm of Messrs. Scrivener, Breffit and Co., 34, Park-place, Cardiff, and as their agent in Newcastle and district Mr. W. B. Wilson, 19, West-parade, Newcastle-on-Tyne.

Mr. T. L. Devitt, chairman of Lloyd's Register and president of the Institute of Marine Engineers, gave an address to the members of the institute last week, and spoke of the shipping developments during the past half-century.

Sir Guy Granet, general manager of the Midland Railway Company, has been elected chairman of the General Managers' Conference for the ensuing year.

It is understood that the three principal Scottish railway companies have come to an arrangement with the view to reducing unremunerative expenditure. In connection with competitive traffic it is recognised that there is a large amount of outlay which could be avoided, and as the result of recent conferences that have taken place between the chairmen of the companies it is stated that an agreement has been arrived at under which the bulk of the competitive traffic on the three systems will be pooled and the proceeds distributed in certain proportions.

It is officially stated that the Queen, during her visit to Lambton Castle, Durham, at the end of the present month, will visit the homes established for aged miners in different parts of Durham county. Lord Durham, who is entertaining the King and Queen, has made arrangements for the visit, and Mr. John Wilson, Labour M.P. for Mid-Durham, will meet her Majesty at the homes at Ushaw Moor, near Durham.

The President of the Board of Education has appointed Dr. Aubrey Strahan, F.R.S., to be director of the Geological Survey and Museum, in succession to Dr. J. J. H. Teall, F.R.S., who will retire from the post on January 5 next. Dr. Strahan is president of the Geological Society, and one of the assistant directors of the Geological Survey of England and Wales.

Mr. Malcolm Delevingne, C.B., has been appointed Assistant Under-Secretary of State for the Home Department in place of Sir William Byrne, K.C.V.O., C.B., who has been appointed chairman of the new Board of Control under the Mental Deficiency Act. Mr. Delevingne has been a principal clerk at the Home Office since 1903, and was British delegate at the international conferences on Labour Regulation at Berne in 1905 and 1906.

Among the new mayors, the names of several interested in the coal and kindred trades are to be found. The new Lord Mayor of Newcastle, Mr. Johnstone Wallace, has for some time carried on business as a coal and iron merchant in that city; Thornaby's new chief magistrate, Ald. W. F. Whitwell, J.P., is an iron and steel manufacturer; whilst Mr. E. Stephenson, who has been chosen for Stockton, was until a few months ago, the managing director of the engineering firm of Messrs. Worth, McKenzie and Co.

At Murton Colliery, East Durham, on Tuesday, the foundation stone was laid of the first of 103 houses which are to be erected by the Easington Rural District Council at a cost of £23,300. The houses are being built under Part III. of the Housing of the Working Classes Act, 1890. The land was purchased from Lady Knaresborough at an average cost of 1s. 2½d. per yard, and the money for the land, buildings, &c., is being borrowed from the Public Works Loan Commissioners. Every house is to be provided with a bath. It is proposed that the rents shall be from 6s. to 6s. 6d. per week.



recognition of his gratuitous sacrifices as neutral man and vice-chairman for 10 years, Canon Sutton, of Huddersfield, has received from the Cumberland Coal Trade Conciliation Board a gift of £100. The canon intends to devote it to the purchase of a piece of plate, which will be handed down as a cherished family heirloom.

A dispute with regard to the issue of additional capital in J. J. Charlesworth Limited, colliery owners, of Lofthouse near Wakefield, again came before Mr. Justice Joyce in the Chancery Division on Tuesday. The case came up on a motion by Col. Albany Hawke Charlesworth and his family against Mr. Charles E. Charlesworth and his sons, John S. Charlesworth and Wm. G. Charlesworth, all directors of the company, against the company itself, and against the family of Mr. Jos. E. Charlesworth. Plaintiffs' motion was to restrain the defendants from allotting additional shares in the company or from exercising the voting power given by such shares when allotted. His lordship said he had no doubt that the object in distributing shares as was proposed in this case, instead of in proportion to the holding of the shareholders, was to alter the balance of voting power. Whether that was justifiable or not was very debatable. In his view, this was a case which the plaintiffs were entitled to have investigated, and therefore it was his intention to keep matters *in statu quo* until the trial. There would be an injunction restraining the directors and the company from allotting any more new shares, and restraining Mr. Charles E. Charlesworth from exercising the voting power given by that third of the new issue which he had taken up until the matter was tried.

We are informed that as Sir Francis Brain will be out of the country for some months to come in quest of better health, he has requested the various organisations in the Forest with which he is connected to accept his resignation. For a considerable number of years Sir Francis has held the important position of secretary of the following:—Forest of Dean Coalowners' Association, Forest of Dean House Coal Owners' Association, Forest of Dean Conciliation Board, Forest of Dean Minimum Wages Board, and the Forest of Dean Employers' Mutual Indemnity Society. These organisations have accepted Sir Francis's resignation, which was seconded with many regrets, the members expressing the hope he might soon be restored to his usual condition of health, and be able to return to some at least of his many industrial, social and other activities. With regard to the question of a successor, Sir Francis Brain's splendid capabilities increased the difficulties of filling up the vacancies, but as Mr. W. R. Champness, manager of Foxes Bridge Collieries, when approached, ultimately consented, the management committees of each of the institutions above mentioned have been very glad to appoint him to the posts.

A correspondent says, following upon the announcement that the Hulton Colliery Company propose sinking new collieries in the neighbourhood of Rainhill, it is reported that a Liverpool syndicate are to initiate boring operations in the adjoining Huyton and Knotty Ash localities, with a view to opening out coalfields there. Hitherto, these districts have been mainly residential and agricultural.

Speaking at Hull, the new mayor of Hull, Councillor J. H. Hargreaves, a member of the coal trade, said he had been told that the new joint dock would be opened for traffic in May or June next year, and it was hoped the King would perform the ceremony.

With regard to the firedamp whistle invented by Prof. Haber described last week, we understand that Col. Williams, of Cark-in-Cartmel, near Barrow-in-Furness, has recently undertaken experiments with a similar apparatus. Col. Williams claims that he is able to reduce the bulk of the coal dust created in a coalpit to the condition of inert material.

The Royal Society of Arts will commence its 160th Session on the 19th November with an address by the chairman of the council, Colonel Sir Thomas H. Holdich, K.C.M.G., K.C.I.E., C.B., D.Sc. Before Christmas there will be four meetings besides the opening meeting. There will be five courses of Cantor lectures. The first, by Prof. Coker, on "The Measurement of Strains in Materials and Structure," will comprise, amongst other matters, the results of his own investigations into the application of polarised light to the measurement of stresses. Prof. Bone, during March, will deliver three lectures on "Surface Combustion." Amongst the papers to be read after Christmas is one by Mr. Fr. W. Goodenough on "Coal Gas as a Fuel for Industrial Purposes."

An interesting suggestion was made in the course of a case heard by the Pontefract magistrates last week, when Herbert Cotton, by-workman, was summoned for having contravened colliery by-laws. A deputy said that on searching defendant on his going down the Warrenhouse seam of the Ackton Hall Colliery, he found in one of his waistcoat pockets a box containing nine lucifer matches. The chairman of the Bench, in fining the defendant 5s. and 3s. 6d. costs, said it had been suggested to him that colliers might think it advisable to have no pockets at all or to have them sewn up. The Bench did not for a moment consider that the sum stated was an adequate penalty for such a case. The man admitted to the Bench that he had taken his pit clothes and only used two—one for his "nap" and the other for his bottle.

Boring operations have been commenced in the Longniddry district by a Dumfermline company. This development will probably result in a colliery being opened to work the coal under the sea at Port Seton. East Lothian is providing orders for machinery furnishers, and this new pit will be the farthest east coal worked in that county.

The public examination in bankruptcy of Richard Fosdick, trading under the style of Richard Fosdick and Co., at Castle-buildings, Hull, and Mariners-street, Goole, was closed recently at Hull. The gross liabilities were shown by the statement of affairs to be £20,818 5s. 8d.; expected to rank for dividend, £11,982 8s. 2d.; net assets, £967 7s. 6d., leaving a deficiency of £11,015 0s. 8d. The debtor attributed his failure to bad debts, colliery and railway strikes, non-delivery to him of coal under contract, and living beyond his income during the last few years.

A joint meeting of the Midland branch of the National Association of Colliery Managers and the Notts and Derbyshire branch of the Association of Mining Electrical Engineers was held at the University College, Nottingham, on Saturday, November 8. Mr. James Strachan, of Stanton Hill, president of the local branch of the N.A.C.M., was in the chair, and there was a good attendance representative of both branches. The meeting had been specially convened to hear a paper read by Mr. E. Kilburn Scott on "Large Prime Movers and Boilers for Power Houses," and also to discuss Part III. Electricity (section 60) of the General Regulations. At the close of the paper a discussion ensued in which the chairman, Mr. H. R. Watson (Codnor), Mr. W. Tate (late manager of Gedling Colliery), Mr. R. Laverick (Nottingham), Mr. L. G. F. Routledge, president of the local branch of the A.M.E.E., (Eastwood), Mr. E. E. Beadsmore (Tibshelf), and Mr. F. Cusworth (East Kirkby) took part. As there was no time left to discuss the Electricity Rules, it was agreed that another joint meeting should be arranged for that purpose.

At Whitehaven Police Court, on the 7th inst., the Whitehaven Brick and Tile Company were summoned by Mr. Kellett, inspector of factories, Preston, for neglecting to securely fence dangerous parts of brickmaking machinery on October 3. Mr. Kellett, in stating the case for the prosecution, said that a man was working on a scaffold connected with a brickmaking machine, the scaffold being about 5 ft. from the floor and in it was a hole, in which were some knives known as "pug knives." It was the man's duty to stand on this platform, and he had been found by the foreman with one of his legs in these "pug knives." The Bench decided to convict, and ordered the company to pay a fine of £20.

Mr. H. Greener, the resident manager at Messrs. Pease and Partners' Colliery at Thorne, will shortly be leaving the town to take up the appointment as manager in Durham County of the several colliery undertakings of Messrs. Pease and Partners, which his father has relinquished. The freezing process is still being continued at Thorne Colliery, and it is understood that probably a further period of 18 months will elapse before the completion of the work and the resumption of sinking. In regard to the Hatfield Colliery, which is only a few miles removed from that of Thorne, it is hoped before long strata will be reached that will be favourable to a far more rapid progress than has hitherto been attainable. Developments are now proceeding in connection with the Harworth Colliery. Plant is being assembled and a commencement has been made with a large boring to secure an adequate water supply for the new village that will shortly come into being. Tests are being made to locate clay suitable for brickmaking. It is stated that prior to the actual sinking, some process for keeping the water out of the shaft sinkings will be put into operation. Sidings are now being put down to connect the proposed pit with the Great Northern main line between Scrooby and Ramskill.

The Glamorgan County Council completed at Aberdare on Saturday another set of examinations for colliery firemen under the Coal Mines Act, 1911. About 500 candidates were examined by Prof. Galloway. In order that the candidates might be tested by results produced from actual firedamp, a plan had been adopted whereby a supply of this gas was collected at a South Wales colliery and transferred to the examination room in cylinders. This plan is also to be carried out for the training of students at the council's evening classes.

The ensuing year's income of the Tyndall Mining Research Fund, established in memory of the late Prof. John Tyndall, will be devoted to the establishment of a studentship for study and research on subjects relating to mining and the safety of miners. The value will be about £35. It will be open to any British subject. The application should be sent in to the assistant secretary of the Royal Society, Burlington House, London, W., not later than November 15. The student elected will be at liberty to follow his ordinary avocation if it is consistent with the aims of the studentship.

The Electrical Engineering and Equipment Company Limited (of Bank Buildings, 109-111, New Oxford-street, London, W.C.) inform us that they have secured the sole selling rights in this country and the British Colonies for the machinery and apparatus manufactured by Messrs. Ateliers de Constructions Electriques, of Charleroi, including large A.C. and D.C. motors and generators, traction motors, electric cranes, haulage and winding gears, etc.

## LAW INTELLIGENCE.

### SUPREME COURT OF JUDICATURE.

#### COURT OF APPEAL.—November 7.

Before the MASTER OF THE ROLLS, and Lords Justices SWINFEN EADY and PHILLIMORE.

#### A Conveyor Patent.

**Norton v. W. H. Barker and Son.**—This was an appeal of the plaintiff in an action brought by Bertram Norton (of Dudley) against W. H. Barker and Son (of Etna Works, Fenton, Staffordshire) from a judgment of Mr. Justice Warrington in the Chancery Division in favour of the defendants. The plaintiff brought the action for an injunction to restrain the infringement by the defendants of his letters patent, granted in 1900, the alleged invention relating to vibrating trough conveyors used for the tipping, screening, sorting, and conveying of coal at mines. The objects were to reduce vibration by balancing the conveyor trough, to reduce the power required to operate it, and to avoid the necessity of making the conveyor trough heavier towards the driving end in the case of long conveyors. The defence mainly relied upon was that the plaintiff's patent was bad for want of subject matter. Mr. Justice Warrington held that the balancing method for reducing vibration and the method of balancing adopted in the plaintiff's specification were well known, and that having regard to the state of knowledge there was want of novelty, and he therefore dismissed the action with costs. From this decision the plaintiff now appealed.

The Master of the Rolls said he had had the opportunity of considering the judgment of Lord Justice Swinfen Eady, and agreed with it.

Lord Justice Swinfen Eady, in the course of a written judgment, said that no inventive skill was required nor was there any novelty in balancing to prevent vibration, which was an old engineering device. The patentee had urged that whereas formerly two or more separate screens for coal were necessary, he used only one conveyor separated in sections. That, according to him (the Lord Justice) was a distinction without a difference. Having regard to the state of public knowledge, he was of opinion that there was want of subject matter in the method adopted by the patentee of dividing and balancing a conveyor. He thought that the judgment of Mr. Justice Warrington appealed from was correct, and that the appeal ought to be dismissed, with costs.

Lord Justice Phillimore also agreed that the appeal failed, and it was accordingly dismissed, with costs.

## HIGH COURT OF JUSTICE.

### KING'S BENCH DIVISION.—November 3.

Before Mr. Justice BRAY and Mr. Justice LUSH.

#### Inspection of Shafts and Signalling.

**Hodgson v. Cory Bros. and Co.**—This was an appeal from the decision of the Pontypridd county court judge. Following an accident, which occurred in one of Messrs. Cory Bros. and Co.'s pits at Treherbert, an action was taken to the Pontypridd county court by an electrician named Hodgson, who sued for damages against Messrs. Cory Bros. because a tramload of coal had been emptied from an upper seam upon the top of the cage on which he was engaged on electrical work. The judge in the county court held there was no evidence to go to the jury. From this decision Hodgson now appealed to the higher court, submitting that there was no adequate code of signals. The judge held there was no defect in the signalling apparatus, but only in the system of working it. Mr. Henry Davis, the under-manager, sent Hodgson down to discover a defect in the electric wire, and the cage was descending slowly in order that he might make his tests. When the cage had passed the upper seam the hitcher there, apparently under the impression that it had stopped, released a tram. Appellant complained that there existed signals for winding coal and bringing up men, but no signal or any code to indicate the time when the cage was no longer wanted at a particular seam. When no longer required at one seam it was automatically removed to the other. A signal had been contrived since the accident to indicate that the cage was to be employed elsewhere.

Mr. Justice Bray said the case was very near the line, and was a difficult one. It was said the accident arose under one or other of the first two sub-sections of the Employers' Liability Act, 1880. The county court judge came to the conclusion that there was no evidence under either of these subsections. As to the first point, he was right. Nothing was wrong with the cage or the machinery for hauling it; neither was there a want of proper means of signalling. The apparatus was there. But was there negligence in respect of superintendence? He thought it could be held that there was some evidence of an omission to give adequate instructions to the banksman, and that omission was an omission in the exercise of superintendence. He would not say whether it was evidence on which the jury would act. The banksman had told the court he received no instructions with regard to the signals.

Mr. Justice Lush concurred, and their lordships allowed the appeal, with costs, and ordered a new trial.

It is reported that the Swedish Academy of Science has decided to award the year's Nobel prize for chemistry to Prof. Alfred Werner, of Zurich. The prize is worth about £7,880.



## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**More State Officials in the Mines—The Considerations on Both Sides Set Out—Llanhilleth Men's Demand for Removal of Officials—An Important Colliery Case—What Constitutes a Nuisance?—Interesting Definition by the Judge—Renewed Demand for Special Court of Enquiry as to Senghenydd Explosion—Another Seam Reached at Nantgarw—Surfacemen's Wage Rate—Great Developments at Port Talbot—Presentation to Mr. and Mrs. Tallis, Tredegar.**

The suggestion that working practically in the mines there should be a State official seems to be "catching on" in some quarters; or, indeed, more than one State official, for the suggestion refers to firemen. The idea has found expression chiefly in connection with the disputes at Llanhilleth and Blaina. Although in these instances there is no specific demand, it is fundamentally this idea which is involved. The allegation is that firemen's duties have multiplied, not alone because of the operation of the Eight Hours Act, but also because of the Minimum Wage Act, the need of closer supervision being so very much greater. There is also the desire to keep down working costs, each official in this position having to consider the outlay in repairs, and upon day wagemen. The burden of the work upon firemen has grown so much, and the comparison of their wage-rate with that of some of the better-placed hewers is so unfavourable in many cases, that there is said to be really a shortage of good men for this position.

One part of the argument is that it would be far better to have more firemen than to have more Government inspectors, because additional inspectors might bring about a shifting of responsibility or, at any rate, a sharing of responsibility, instead of it resting solely upon the manager, as at present.

The idea of firemen becoming State officials is, however, opposed on the ground that it would practically bring about a duplication of the present staff. The State-employed men would only discover shortcomings, and another staff would be needed to superintend the carrying out of the necessary work.

Should not the firemen, it is asked, be more independent than at present and in a position of greater freedom, though not of less responsibility, and certainly delivered from their duty of considering so closely the working costs? One answer is that the State, by its provision in regard to the colliery manager, has put into every colliery a properly qualified official, for he has to have knowledge of the law as it affects the industry, he has to have knowledge of mechanical and electrical matters, as well as of mining proper, and to be of such experience in chemistry, &c., as enables him to deal with the numerous questions that arise.

At present, however (so the argument runs), he is not in a position of perfect freedom when dealing with matters of safety, nor is his salary of such amount as corresponds to his duties—especially in those cases where under-managers get little more than a well-paid coal-cutter. A proposal of fixity of tenure has been put forward, so that he may feel more free in dealing with the safety of the mine, and may be delivered from the risk of supersession by younger men who possess influence with the directorate or the like.

Managers secure of their position would, it is further contended, work the mine with primary regard to safety and with no excessive regard for reducing costs of working, so that unrest among the men, as well as accidents, would be more fully guarded against. Fixity of tenure would carry with it a retiring pension.

Inasmuch as this matter has come up for discussion, and that discussion is likely to be prolonged—even carried into Parliament by Labour members—the foregoing summary of the argument demands consideration; all the more so because of the suggestion that the workmen should, availing themselves of the provisions of the existing law, have a permanent staff of inspectors of their own, paid by the Federation, it being open to them to inspect the mine by "any two persons."

With regard to the Llanhilleth case (the workmen being on strike originally because of allegations of accumulation of gas, and later because they demand the dismissal of officials, which the employers will not concede), the miners' executive have now taken up the question, and upon hearing the report of a deputation that has visited the colliery, has resolved to grant strike pay during the stoppage.

The Llanhilleth workmen refuse to submit the question to an impartial arbitrator, and this decision is based upon their belief that the reports of their examiners are correct, and that there is nothing to arbitrate upon. But on the other side it is contended that the reports submitted to them will not bear the test of investigation; and that the men, rather than risk disclosure, have changed the issue, and now insist upon officials being dismissed. It is admitted, even on their side, that the pit is now safe; and the sole remaining question is as to the dismissal of officials, a demand which the company resist, because their reports have been sustained by his Majesty's inspector. These officials have also been for some time in their posts, and have always been found trustworthy.

After a three days' stoppage, the workmen at the South Griffin Colliery, Blaina, numbering about 800,

resumed work. They had refused to descend the pit because of alleged defective ventilation, due to a heavy fall; but after a mines inspector, with the agent and representative of the workmen had gone round, they decided at a meeting to resume operations.

A case of unusual interest and importance to colliery proprietors has occupied the Court at Glamorgan Assizes for a whole week, the hearing having been adjourned one day in order that the jury might visit the colliery. A butcher at Ystalyfera, in the Swansea Valley, sued the Pwllbach Colliery Company to recover damages for nuisance caused by defendants' screening and washery plant. Plaintiff owns a slaughter-house and several dwellings about 130 yards from the colliery, where breaking, screening and washing of anthracite is carried on, and his case was that dust from those operations had spoiled his meat and entailed closure of the slaughter-house, much evidence being brought to show also that the dust was a nuisance to occupants of the dwellings and gardens. The defence was that the nuisance was not caused by the colliery plant, which was covered; but witnesses for plaintiff stated their opinion that other protective measures, such as putting up a Sirocco fan or carrying on the work in an enclosed building, should be adopted. Defendants showed that their taking of the land was prior to plaintiff's. At the close of the plaintiff's case, the judge said there would be two questions for the jury: (1) Whether defendants' operations substantially interfered with the comfort of the plaintiff, and (2) whether those operations interfered with his business as a butcher. Were defendants carrying on their business in such a way as to damage plaintiff's property and create a nuisance? After hearing evidence for the defence, the jury found that the defendants had caused a nuisance which affected plaintiff's slaughter-house, but which did not affect the other houses, and that the nuisance was not caused by the negligence of defendants, the screening having been carried on with reasonable care. His lordship said this was a judgment against defendants on the issue as regarded the slaughter-house; but he would not give judgment for the plaintiff in the whole action. The parties are to meet the judge in London, for further discussion of the legal aspects.

It is to be noted that his lordship made a pronouncement of special interest. The jury could not answer affirmatively or negatively whether there was a nuisance as regarded the dwelling-houses; and the judge said that meant that the operations did not cause a nuisance. What was a nuisance in a residential district was not a nuisance in a colliery district; because, when one went to live in a neighbourhood, he took the neighbourhood as a whole.

A curious point came before the Cardiff County Court, the judge being called upon to decide in a case brought against the Ffaldau Colliery Company whether the plaintiff was entitled to the bonus turn. According to custom, riders were entitled to this extra payment, and up to the coming into operation of the Coal Mines Act plaintiff had been in the habit of riding on the load; but as this is now illegal, and although he does precisely the same work, he is termed a haulier, and the bonus has not been paid. In the event his Honour gave judgment for the colliery company and against the claim.

Another question of definition affecting the same company came up before the judge. The question was whether a particular man was a leading haulier or only a haulier. In the one case the standard rate would be 3s. 10d., and in the other only 3s. 6d. The judge did not fix the definition, but said it was not conclusive that a man was a leading haulier simply because he operated signals. Here again judgment was for the colliery company.

At a special meeting of the Miners' Federation of Great Britain executive, held in Southport on Tuesday, it was decided to approach the Home Secretary again with the request that a special court of enquiry should be appointed to investigate the circumstances of the disaster at Senghenydd. The prevalent idea in South Wales is that, under the powers of the Mines Act, two assessors should sit with the Home Office representative; and that these should have technical knowledge of mining—one to come from the coalowners and one from the workmen.

In connection with the fund now being raised for Senghenydd, to which Messrs. Guest, Keen and Nettlefolds have this week contributed 1,000 guineas, there is further discussion upon the pooling of all such funds into one national organisation. The Senghenydd fund now totals approximately £90,000, but much more is required to meet the needs of 700 dependants.

Monmouthshire Education Committee, at their meeting on Tuesday, decided to co-operate with the Mining Board of South Wales coalowners, and will co-relate the county classes mining instruction with the scheme which the Board has arranged.

Mr. T. Richards, M.P. for West Monmouth, who holds the position of secretary to the South Wales Federation, has formally notified his intention to withdraw from Parliament, his duties as secretary having now become so onerous. Withdrawal will not take place until the Dissolution.

At Nantgarw Colliery, near Pontypridd, Mr. T. Taylor has now reached the steam-coal seam, at the depth of 780 yards, and finds it 5 ft. 10 in. thick.

Although the coal shipments in South Wales for 10 months of this year total nearly four millions of tons above those for the corresponding period of 1912, the one month of October compares unfavourably. Last year was, however, altogether abnormal, the later months manifesting replacement of stocks exhausted during the strike; whilst this year business has been on steady—and progressive lines.

This district is likely to witness renewed and determined agitation with regard to surfacemen's wages, for the employers hold the men's representatives to the present agreement, which has still a good term to run, and will not increase the rates now prevailing.

The Port Talbot Company purpose to seek Parliamentary powers next year for extension of the southern breakwater by no less than 1,800 ft., and there is also a scheme for extending the north breakwater by 500 ft. Inside the dock the company propose to erect much additional wharf area, and adjacent to one wharf there is probability of the erection of a new blast furnace, and also of the erection of by-product works. The dock itself is to be deepened from 27 ft. 6 in. to 32 ft., and a new lock will be constructed to the south of the existing lock, and will be 875 ft. long by 90 ft. wide. The total cost of these extensions will be no less than three-quarters of a million sterling, and operations will extend over three or four years. The entrance channel will gain an additional depth of over 10 ft., and this even at low tide will give about 16 ft. of water, whilst at high tide there will be 45 ft. of depth.

The miners' council have resolved that no opposition should be offered to the introduction of electrical lamps at collieries, provided that ordinary safety lamps were easily accessible to every workman when required for examination of his place as to the presence of gas.

Mr. A. S. Tallis, managing director of the Tredegar Iron and Coal Company, was, with Mrs. Tallis, the recipient of a series of presentations, among them a magnificent silver service and dressing case, canteen of silver, and other valuable articles. Special reference was made at the meeting (where Mr. W. S. Davies presided over a large gathering) to the work that Mr. and Mrs. Tallis had done in connection with the Cottage Hospital, ambulance work, and other movements. Mr. A. Onions, treasurer of the Miners' Federation, bore testimony that the colliery had been worked with the greatest possible regard for safety. The method of sprinkling dust on roads to prevent the spreading of fire was one of the first experiments of the kind in the coal-field, and the results were believed to be most satisfactory. Mr. Tallis has been at Tredegar for 14 years.

Because the managers at the Black Vein Colliery, near Pontypool, declined to afford facilities for show cards, the workmen left in a body, the number of men affected being about 70. At a subsequent meeting of the Eastern Valleys district of the Federation it was decided to support the men, and allow them strike pay.

## GOVERNMENT PUBLICATIONS.

**\*\* Any of the following publications may be obtained on application to this office at the price named post free.**

Workmen's Compensation: Rules, October 17, 1913 (No. 1092), 1½d.; Ditto, Forms Nos. 1 and 3, 1½d. each.

Notes on West African Colonies, with Map, 6½d.

Consular Reports, 1912: China, Trade of Tsinan and Tsingtau, 4½d.; Nyassaland Report for 1912-13, 5d.

Factory Form, No. 36, Health Register, 4½d.

Trade and Navigation Returns for October, 1s. 10d.

Boiler Explosion Report: No. 2262, 2½d.

Report of an Explosion which Occurred at the Works of Messrs. G. Laing, Son and Co., of Holt Town, Manchester, on March 11, 1913, 5½d.

EXPLOSIVES IN COALMINES: Order of September 1, 1913, in Sheet Form, 1½d.

Act, 1913: Hull and Barneley Railway, 1s. 10d.

Strikes and Lock-outs: Report for 1912 1s. 2½d.

SPONTANEOUS COMBUSTION IN COALMINES: Minutes of Evidence of Departmental Committee, First to Seventh Days, 1s. 8d.

## PUBLICATIONS RECEIVED.

SOUTH WALES COAL ANNUAL, 1914. Edited by Joseph Davies and C. P. Harley. London and Cardiff: The Business Statistics Company Limited. Price 7s. 6d. net.

A DICTIONARY OF APPLIED CHEMISTRY. Vol. 5. By Sir Edward Thorpe, C.B., LL.D., F.R.S. 1913. London: Longmans, Green and Co. Price 45s. net.

A GENERAL SUMMARY OF THE MINERAL PRODUCTION OF CANADA, 1912 (Canada Department of Mines). By John McLeish. 1913. Ottawa: Government Printing Office.

"Bulletin et Comptes Rendus Mensuels de la Société de l'Industrie Minérale" (Tome 4, No. 10), October; "Transactions of the Mining and Geological Institute of India" (Vol. 7, Part 3), May, price 4s.; "The Manchester Geological and Mining Society 'List of Council and Officers, Session 1913-14,' 'List of Members, Year 1912-13'"; "Proceedings of the South Wales Institute of Engineers" (Vol. 29, No. 5), price 5s.



## THE FREIGHT MARKET.

There has been a fair volume of business in the outward freight market this week. On the north-east coast tonnage is in excessive supply, and, with only a poor demand, rates continue easy. Coasting business is being done at about 3s. 3d., Tyne to London, and from 3s. 4½d. to 3s. 9d. to Hamburg, with Antwerp at 4s. and Rotterdam at from 3s. 4½d. to 3s. 6d. The Bay is based on from 5s. 3d. to 5s. 6d. to Bordeaux, and 5s. to 5s. 3d. to St. Nazaire. The Baltic is quoted at from 5s. 9d. to 6s. to Riga, with Stockholm at 5s. 6d. The Mediterranean is worth about 8s. to Genoa. At South Wales congestion of loading turns retards any improvement in rates, and the general tone is dull and easy. At the Clyde business is extremely quiet, with rates weak. Homewards, New York advices report the market as quiet, with tonnage ample for all requirements. Grain rates favour shippers. Cotton rates are steady. The demand for timber and lumber tonnage is slack, and the tone is weak. Time-charter rates are steady, with little doing. At the Black Sea the market is very dull. Tonnage is in small demand and in plentiful supply, with the result that rates are falling. There is an easy tone at the Danube and Azof also. The Indian market is quietly steady. The Mediterranean and ore trades are firm. The Baltic is unaltered. The River Plate is weak. Australian rates are substantially steady.

Tyne to Antwerp, 2,600, 4s. 1½d.; 1,000, 3s. 6d., part cargo; 1,500, 4s.; Algiers, 2,700, 7s. 6d.; Alexandria, 4,800, 8s. 6d.; 5,800, 8s. 6d.; 3,000 9s. 1½d., from Dunston; Bordeaux, 3,200, 5s. 3d.; 2,100, 5s. 6d.; Boulogne, 1,800, 4s. 3d., from Dunston; 1,800, 4s. 3d., from Jarrow; Barcelona, 3,200, 9s., coke, from Dunston; 4,200, 8s.; Bilbao, 1,800, 6s. 6d.; Copenhagen, 2,100, 5s.; Calais, 3,000, 4s. 1½d.; Cherbourg, 1,700, 5s. 6d.; Castellon, 1,200, 10s., from Dunston; Constantinople, 4,600, 10s. 6d.; Carthage, 1,400, 9s. 3d.; Chilean copper port, sail, 22s.; Dahlsbruck, 1,700, 6s.; Genoa, 4,500, 8s. 3d.; 5,400, 8s.; 3,300, 8s.; 4,300, 8s.; 2,500, 8s.; Hamburg, 1,900, 3s. 6d.; 2,000, 3s. 7½d.; 1,400, 3s. 9d.; 2,800, 3s. 4½d.; 3,000, 3s. 4½d., from Jarrow; Havre, 2,000, 4s. 3d.; Islands, 2,000, 8s.; Kiel, 2,600, 5s.; Lisbon, 2,700, 7s. 3d., 350; London, 1,200, 4s.; 1,900 3s. 3d.; Memel, 3,600, 4s. 3d.; Mariager, 1,300, 5s. 6d.; Malta, 2,500, 7s.; Marseilles, contract, 50,000, 7s. 6d., voyages over 1914; Monaco, 1,800, 10s.; Mentone, 2,000, 10s. 3d.; Nantes, 1,600, 5s. 9d.; Norresundby, 2,000, 5s.; Nice, 2,100, 8s. 3d.; Naples, 2,700, 8s. 7½d.; Palermo, 4,600, 9s. 4½d.; 2,300, 9s. 3d.; Port Said, 5,400, 8s. 3d.; Rotterdam, 1,800, 3s. 6d., from Derwenthaugh; 2,500, do, do.; 2,600, 3s. 4½d., from Derwenthaugh; Riga, 3,000, 6s.; 2,200, 5s. 9d.; Rendsburg, 1,450, 5s. 3d., 400; Reval, 2,200, 5s. 4½d., from Jarrow; Randers, 1,700, 5s. 1½d.; St. Nazaire, 1,600, 5s. 6d.; 3,000, 5s.; Solvesborg, 1,300, 5s. 9d.; Stettin, 1,600, 5s. 6d.; Stockholm, 2,000, 5s. 6d.; Venice, 4,300, 9s. 9d.; 5,500, 10s.; Zeebrugge, 2,500, 3s. 3d.

Cardiff to Alexandria, 4,700, 8s. 9½d., 500; Ancona, 5,000, 9s., November 20; Algiers, 2,000, 8½ fr.; 4,100, 8½ fr.; 3,200, 8½ fr., November 17; Aden, 5,500, 11s., mid-November; Aguilas, 1,300, 10s.; Bayonne, 1,800, 5½ fr., voyages over next year; Brindisi, 5,000, 8s. 3d., latter half November; Brest, 800, 5s. 3d.; Boucan, 2,000, 5½ fr., voyages over 1914; Bona, 2,000, 10½ fr., November 17; Calais, 2,600, 4s. 6d.; 3,600, 4s. 3d.; Constantinople, 3,800, 8s. 9d.; Cape Verds, 4,500, 8s. 3d., November 24; 4,300, 7s. 9d.; 7s. 10½d.; Campana, 5,000-5,500, 15s.; Catania, 2,200, 9s., 600; Dartmouth, 480, 4s. 4½d.; Dieppe, 2,800, 4s. 6d.; Devonport, 2,400, 2s. 4½d.; Admiralty; Ferrol, 1,100, 7s. 6d.; Genoa, 5,200, 7s. 9d.; 8s. 6d., November; 7,300, 7s. 9d.; 2,900, 8s. 6d., November 15; 4,700, 7s. 9d.; 4,000, 8s.; Gibraltar, 1,200, 7s. 9d., end November; 1,600, 7s. 3d.; 700, 6s. 3d.; Gaeta, 4,000, 8s. 9d.; Honfleur, 680, 5s. 6d.; Islands, 5,300, 8s.; 4,500, 7s. 9½d., November 24; 2,600, 7s. 9d., November 17; 4,600, 7s. 7½d., November 25; 3,300, 8s., November 17; 4,300, 7s. 9d., November 15; Java, 13s. 9d., early December; Kustendje, 3,000, 10s. 4½d., November 17; Leghorn, 5,200, 7s. 9d.; 4,000, 8s. 6d.; 4,000, 7s. 9d., 800, 10d.; 8s. 6d., 500, November; 4,600, 8s. 3d., November 20; 4,800, 8s. 3d., 500; Lisbon, 3,300, 6s. 1½d., 500, November 19; 1,800, 7s. 1½d.; 1,700, 6s. 9d., 250; 2,400, 6s. 9d., 350, November 18; 2,200, 6s. 9d., 350; 2,900, 6s. 3d., 500, end November; 2,600, 6s. 1½d., 500; 1,900, 6s. 6d., 500; Las Palmas, 4,500, 7s. 9d., November 20; 4,300, 7s. 9d.; 7s. 7½d.; 3,000, 8s. 1½d.; 3,200, 8s.; La Pallice, 2,000, 6 fr., November 15; 3,100, 5½ fr.; 2,800, 6 fr.; Marseilles, 2,600, 9½ fr.; 5,900, 9½ fr., November 18; Messina, 5,000, 8s. 6d., 400, November 20; Madeira, 4,500, 7s. 9d., November 20; 2,600, 7s. 9d.; 3,000, 8s. 1½d.; Malta, 2,800, 6s. 3d., Admiralty, 3,500, ditto, ditto; 4,200, 6s., ditto; 4,500, 6s. 9d., December 3; 4,600, 6s. 9d.; 4,400, 6s. 9d., November; Naples, 4,000, 8s. 6d.; 8s. 6d., 500, November; 5,000, 7s. 10½d.; 4,600, 8s. 3d., November 20; 4,800, 8s. 3d., 500; Nantes, 1,800, 6½ fr.; Oran, 1,600, 9½ fr., November; Oporto, 1,200, 8s.; 850, 8s. 3d.; Port Said, 5,300, 8s. 3d.; 5,500, 8s. 6d.; 5,800, 8s. 3d.; Port of Spain, 2,800, 7s. 9d., Admiralty; Portsmouth, 2,400, 2s. 6d., Admiralty; Portland, 480, 4s. 4½d.; 2,400, 2s. 6d., Admiralty; Palermo, 5,000, 8s. 6d., 400, November 20; Port Nolloth, sail, 23s. 6d., coke, January; River Plate, 14s. 6d., early December, reported; 4,500, 15s.; 14s. 9d., December; 5,000, 14s. 7½d., November 17; 4,800, 14s. 9d.; Reggio, 3,500, 9s. 1½d., 300, 10d., November 17; Rosario, 4,200, 16s., November; Riode Janeiro, 16s.; 14s. 9d.; 6,900, 14s. 6d., November 17; 6,900, 14s. 6d., November 28; 14s. 6d., end December; 6,300, 14s. 6d.; Savona, 5,200, 7s. 9d.; 2,900, 8s. 6d., November 15; 4,700, 7s. 9d.; Spezzia, 5,200, 7s. 9d.; Santos, 14s. 9d.; St. Nazaire, 1,000, 6½ fr.; St. Malo, 1,200, 4s. 6d.; Tangier, 900, 14s. 6d.; Trinidad, 3,000, 7s. 9d., Admiralty; Tarragona, 3,300, 8s. 3d., 400, November 18; Torre Annunziata, 5,000, 8s. 6d.; Venice, 5,000, 9s., November 25; Zarate, 3,600, 15s. 6d., 200, November 20; Zeebrugge, 2,000, 4s. 3d.

Newport to Bayonne, 1,800, 5½ fr., voyages over 1914; Algiers, 4,000, 8½ fr.; Naples, 4,900, 7s. 10½d., 800, November 19; 4,300, 7s. 9d., 800; Genoa, 4,700, 7s. 9d., Savona, 4,700, 7s. 9d.; Madeira, 4,400, 7s. 9d.; Las Palmas, 4,400, 7s. 9d.; Cape Verds, 4,300, 7s. 9d.; Dieppe, 2,800, 4s. 6d.; Aguilas, 1,300, 10s., November 23; Bordeaux, 1,500, 6½ fr., 500; Bona, 2,000, 10½ fr.; Zeebrugge, 2,400, 4s. 3d.; Liston, 2,700, 6s. 1½d., 500.

Port Talbot to Algiers, 2,600, 8½ fr.; Ferrol, 1,100, 7s. 6d.; Fécamp, 900, 5s. 9d.; Alexandria, 5,000, 8s. 3d., November 23; Oran, 1,750, 9½ fr.

La Rochelle, 2,000, 6½ fr.; Rochefort, 2,000, 1,400, 4s. 9d.; 1,200, 5s. 4½d.; Caen, 900, 5s. 3d.; Catania, 3,000, 10s.; Venice, 2,900, 10s.; Cetta, 1,400, 9s. 6d., 300; Valencia, 300, 9s. St. Malo, 1,300, 5s.; Seville, 1,100, 8s. 6d.,

November 20; Civita Vecchia, 4,000, 9s. coal, 9s. 9d. fuel; Rouen, 1,200, 5s. 6d.; St. Brieux, 750, 5s. 9d. coal, 6s. 6d. fuel; Bordeaux, 2,000, 6s. 6d., November 15; Genoa, 1,400, 9s. 3d. coal, 10s. fuel; Savona, 1,400, 9s. 3d. coal, 10s. fuel; Leghorn, 1,400, 9s. 3d. coal, 10s. fuel; Lisbon, 1,250, 6s. 10½d., voyages.

Blyth to Constantinople, 4,000, 10s. 6d.; Dahlsbruck, 1,700, 6s. coal, 8s. 6d. coke; Aalborg, 2,000, 5s. 5d., 350, 84 hours, November; Riga, 2,200, 5s. 9d.

Hartlepool to Venice, 4,500, 9s. 9d.; 4,000, 10s. 3d., 500; Genoa, 3,500, 8s. 4½d.; Bordeaux, 2,900, 5s. 3d.; Randers, 1,700, 5s. 4½d.; 1,700, 5s. 1½d.; Stockholm, 2,000, 5s. 6d.; London, 1,200, 4s.; Hamburg, 950, 3s. 6d.; 1,900, 3s. 6d.; Savona, 3,500, 8s. 4½d.

Wales to Mexillones, sail, 16s. 3d., March-April; nitrate ports, sail, 17s. 6d., January; Callao, sail, 20s.; direct nitrate ports, sail, 17s., January-February; West Coast South America and home to United Kingdom-Continent, sail, 40s. basis, first-class insurance.

Manchester to Buenos Ayres, pipes, end November.

Tyne, Wear or Blyth to Cronstadt, contract, 20,000 tons, 4s. 6d., delivery over next Baltic season.

Hull to Alexandria, 4,000, 9s. 3d.; 4,000, 9s.; Theodosia, 4,200, 9s. 7½d.; Marseilles, 2,800, 8s. 9½d., November; Gefle, 1,950, 5s. 4½d., 400; 2,000, 5s. 6d.; Buenos Ayres, 5,000, 14s. 3d., 250, 14s. 6d., 200, December 13; Reval, 2,200, 5s. 4½d.; Hamburg, 2,500, 3s. 4½d.

Forth to Horsens, 950, 5s. 7½d.; Bordeaux, 1,250, 7½ fr.; Aarhus, 900, 5s. 10½d.; Riga, 1,900, 5s. 9d.; Bruges, 900, 4s. 6d.

Fife port to Kiel, 1,900, 5s. 6d.; Libau, 2,000, 5s. 9d.

London to two ports West Australia, 23s. 9d., December.

Rotterdam to Bagnoli, 4,500, 7s. 6d.; Marseilles, 3,300, 10 fr.; Bordeaux, 4,200, 5s.; 3,300, 5s. 3d.; St. Nazaire, 3,100, 5s. 3d.; 480, 5s. 1½d., 580, Trignac terms, November 15; Gravosa, 4,100, 12s. 3d., coke.

Glasgow to Genoa, 8s. 6d.; Savona, 8s. 6d.; Leghorn, 8s. 6d.; Barcelona, 1,900, 9s. 1½d.

Methil to Genoa, 8s. 9d.; 3,400, 9s. 4½d.; Savona, 8s. 9d.; 3,400, 9s. 4½d.; Leghorn, 3,400, 9s. 4½d.; 8s. 9d.

Humber to Riga, 3,100, 6s.

Wear to Genoa, 4,800, 8s. 3d.; Bordeaux, 3,200, 5s. 3d.

Liverpool to Sydney or Newcastle, N.S.W., sail, 15s. 3d. Seaham Harbour to Cadiz, 1,900, 8s. 3d.; Zeebrugge, 2,500, 3s. 3d.

Leith to Kiel, 2,200, 5s. 6d.

Glasgow and Liverpool to River Plate, p.t., November.

Burntisland to Kiel, 2,200, 5s. 6d.; Stockholm, 1,400, 5s. 6d. Immingham to Marianople, 4,500, 15s.; Buenos Ayres, 5,000, 14s. 3d., 250, 14s. 6d., 200, December 13; Gefle, 2,600, 5s. 4½d., 400.

Homeward charters:—Baltimore, 5,800, Naples 12s. 9d., coal, November-December; 2,000, 10 per cent., Bayonne, 3s. 3d., December; Savannah, &c., 2,304 net, Liverpool or Bremen, 32s. 6d., Havre 33s. 9d., December; 2,311 net 137 ft., Liverpool or Manchester or Bremen 30s., Havre 31s. 3d., December; San Lorenzo, 5,500, 10 per cent., United

Italy or Sicily, 105s. one port, 107s. 6d. two ports, 110s. three ports; 750 stds., 10 per cent., Genoa 105s., option second port West Italy or Sicily 107s. 6d., December; Sulina, 3,000-3,300, Bordeaux, 10s., ppt.; 4,900 max., Rotterdam, 7s. 9d., option Danube loading 9s., with 3d. less barley up to half-cargo and 1,000 tons oats 1s. 6d. extra, November 20-30; 4,400, 9s. n.c. or any, 9s. 6d. Hamburg, 3d. extra two ports loading, December 3-15; 3,500-3,700, 9s. 3d. n.c. or any, 9s. Hamburg, November 25-December 10; 4,500, 10 per cent., Denmark, 11s. 3d. one port, 11s. 6d. two ports, 11s. 9d. three, 12s. four, ppt.; 5,800, Antwerp or Rotterdam, 8s. 3d. less barley, November 25-December 15; La Calera, 3,000, Middlesbrough, 7s. 9d., November; Norfolk, 4,000, Campana, 17s. 6d. coal, January; Australia, 5,000, United Kingdom-Continent, 30s., less 6d. direct, February; Melbourne, sail, 26s. 3d., Callao; New Caledonia, sail, 30s., United Kingdom, chrome, option nickel ore; time charter, States and West Indies, £900, two years; Danube, 4,800, Marseilles and Port Vendres, 12½ fr. on d.w., option South Spain, 13 fr. one port, 13½ fr. two ports, November 10-25; Kilis or Ismail, 3,850, 11s. n.c. or any, 11s. 6d. Hamburg, November 15-30; Gulf, 3,173 net, Liverpool or Bremen 33s. 9d. Havre 35s., November-December; Sydney, N.S.W., 6,500, United Kingdom-Continent, 30s., with options, January; Kurrachee, 2,308 net, London 14s., Dunkirk 14s. 6d. both ports 15s., net terms, December; 14s. 9d. Antwerp, 15s. 3d. Hamburg, 15s. 9d. France; Saigon, 8,300, France, 22s. 6d. one port, 23s. 3d. two ports, option part meal 2s. 6d. extra, December; Madras Coast, 2,733 net, Marseilles, 25s. 6d., kernels, option 1,000 tons unshelled 20s. extra, December; La Falaise, 3,400, Barrow, 8s., November 24; Valencia, 3,200, Barrow, 7s. 3d., November; Barreiro, 1,600, Brest, 8s. 3d., November; Ghenitcheak, 3,850, 11s. 6d. n.c. or any, 12s. Hamburg, ppt.; Hornillo Bay, 3,600, Calais, 6s. 6d., November; Santander, 2,200, Rotterdam, 5s. 3d., November; Burmah, 7,800, United Kingdom-Continent, ex France and Hamburg, 22s. 6d., February; Pensacola, 1,000 stds., 10 per cent., Rosario, 125s., December; Villa Constitucion and San Pedro, 5,000, 10 per cent. Antwerp, 10s., ppt.; Sulina or Kustendje, 4,000, 10 per cent., 9s. n.c. or any, 9s. 6d. Hamburg, 3d. extra two loadings, December 3-15; Columbia River, sail, 52s. 6d., Dunedin; Aalborg, sail, 18s., Santos; Gray's Harbour or Columbia River, 52s. 6d., Valparaiso, option Auckland 52s. 6d., other New Zealand ports 55s.; time charter, West African trade, 4s., one round trip; Newcastle, N.S.W., 14s. 3d., Singapore; Savannah, 30s., Liverpool, Manchester or Bremen, 31s. 3d. Havre, December.

## COASTWISE SHIPMENTS DURING SEPTEMBER.

According to the monthly coal tables, the quantities of coal shipped coastwise during the month of September were as follow:—

From	Total cargo.		Total bunker.	
	1912.	1913.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.
Bristol Channel ports .....	329,231	340,058	20,322	22,000
North-western ports .....	278,399	255,140	64,274	65,408
North-eastern ports .....	708,987	691,088	25,022	22,852
Humber ports .....	221,939	207,478	13,171	13,997
Other ports on east coast .....	19,645	8,916	8,076	8,568
Other English ports .....	2,983	3,152	8,730	4,921
Total from England and Wales .....	1,561,234	1,505,832	139,595	137,746
Ports on east coast of Scotland .....	116,564	115,056	19,580	16,431
Ports on west coast of Scotland .....	125,196	114,324	36,706	36,814
Total from Scotland .....	241,760	229,380	56,286	53,245
Irish ports .....	15	—	3,085	2,793
Total from United Kingdom .....	1,803,009	1,735,212	198,966	193,784

Kingdom-Continent, 11s. 6d. o.c., less 6d., December; 4,200, 10 per cent., 11s. o.c., 11s. 9d. two ports, no reduction direct, seed 1s. extra, spot; Bahia Blanca, 5,500, 10 per cent., United Kingdom-Continent, 14s. 6d. o.c., less 6d., option lower Plate ports 1s. less, January-February; New York or Philadelphia, 20,000 qrs., 10 per cent., Mediterranean, 3s. 3d. one port, option two ports Mediterranean, different countries, 3d. more, end November; Novorossisk or Theodosia, 6,300, Rotterdam 7s. 6d., Antwerp 7s. 9d., November; Kherson or Nicolaieff, 6,300 max., Weser 8s. 6d., Hamburg 8s. 9d., 3d. less barley, ppt.; South Russia, 5,000 max., Rotterdam 8s. 3d., Weser 8s. 6d., Hamburg 8s. 9d., 3d. less barley, November-December; Port Said, 2,443 net, Singapore, about 9s. 6d., end November; San Juan, 2,400, Tyne, 6s. 6d., early December; 3,000, Calais, 7s., November; 2,400, Rotterdam, 6s. 9d., November; Bilbao, 3,450, Middlesbrough, 4s. 9d., November; 4,000, 4s. 6d., ppt.; 2,500, Cardiff, 4s. 4½d., November; 2,450, Antwerp, 5s., free commissions, ppt.; 2,300, Newport River, 4s. 9d., ppt.; 2,500, Rotterdam, 4s. 4½d., ppt.; Carthage, 6,200, Rotterdam, 5s., end November; South Australia, Melbourne, Geelong or Sydney (N.S.W.), 8,000, United Kingdom-Continent, 29s. 6d., less 6d. direct, with options, January-February; Bombay, 2,508 net, Garston, 16s., ore, December-January; 2,576 net, United Kingdom-Continent, 16s. 6d. one port, 17s. two ports, including Aberdeen, 6d. extra France on d.w., December; 2,775 net, 16s. 6d. one port, 17s. two ports, 3d. extra Havre or Dunkirk, on d.w., December; 2,307 net, 16s. 6d. one port, 17s. two ports, including France, on d.w., November-December; Calcutta, 2,576 net, Aden, Rs. 6, December; 3,067 net, Bombay or Kurrachee, Rs. 4 10, November; 2,257 net, Rs. 4 10, November; 3,090 net, Penang, Rs. 3 8, November; Fremantle, sail, 28s. 6d., United Kingdom-Continent, 24s. Cape, option Spencer's Gulf 30s., Cape 25s.; South Australia, Melbourne or Geelong, sail, 31s. 6d., United Kingdom-Continent; time charter, Transatlantic trade, 4s., one or two round trips, delivery Rotterdam, re-delivery United Kingdom-Continent, via Gulf; 4s. one trip, delivery and re-delivery Mediterranean, via States; Pensacola, 13s. 6d., Hamburg; 1,000 stds., West

The following was the destination of cargo shipments:—

To ports in	Sept. 1912.	Sept. 1913.
	Tons.	Tons.
England and Wales .....	1,284,971	1,236,208
Scotland .....	113,300	112,289
Ireland .....	404,738	386,715

Shipments to London aggregated 758,306 tons.

**Hull Coal Imports.**—According to the returns made by the Hull Corporation's coal inspector, Mr. W. Herbert Truman, the quantity of coal imported into Hull in October was 702,392 tons—653,257 tons by rail and 46,135 tons by river—as compared with 648,234 tons in October 1912. The total imports for the first 10 months of the year were 6,783,450 tons as against 5,804,468 tons in the corresponding period of last year. The principal contributing collieries were:—The Denaby and Cadeby Main, Carlton Main, Grimthorpe and Frickley, Bentley, Brodsworth, Glass Houghton, Manvers Main and the South Kirkby, Featherstone and Hemsworth collieries.

**Iron and Steel Institute.**—The Bessemer gold medal for the Iron and Steel Institute for 1914 will be awarded to Dr. Edward Riley, F.C.S., F.I.C. Thursday and Friday, May 7 and 8, 1914, have been fixed as the date of the next annual meeting of the institute. The annual dinner will take place on Thursday, May 7, at the Connaught Rooms, Great Queen-street. By the kind invitation of the Comité des Forges de France, the autumn meeting will be held in Paris, the dates of Friday and Saturday, September 18 and 19, having been provisionally fixed for the business sessions. The first half of the following week will be devoted to excursions to the chief ironmining and manufacturing districts of France.



EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During October and the first ten months of 1911, 1912 and 1913.

To		October, 1913.						October.					
		Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
		Tons.	£	Tons.	£	Tons.	£	1911.	1912.	1913.	1911.	1912.	1913.
Russia .....	76,706	50,700	22,936	14,829	656,470	479,262	454,342	520,800	756,112	253,667	336,738	544,791	
Sweden .....	91,325	53,538	42,127	27,526	370,411	255,193	367,526	500,925	503,863	189,645	301,365	336,257	
Norway .....	66,766	33,547	8,982	5,994	124,331	83,333	174,045	209,015	200,079	82,391	118,632	122,874	
Denmark .....	80,062	49,851	67,708	46,593	133,599	89,067	260,840	274,656	281,369	132,125	166,427	185,511	
Germany .....	322,270	186,205	307,574	181,089	205,995	137,508	819,741	876,134	835,839	384,418	463,973	504,802	
Netherlands .....	73,413	43,001	53,297	35,388	40,599	26,676	174,137	226,419	167,299	85,307	127,011	105,065	
Belgium .....	84,942	41,413	43,139	26,876	53,510	36,031	162,745	188,661	181,591	69,587	98,494	104,320	
France .....	408,850	221,567	273,275	171,851	395,394	306,398	868,523	985,570	1,077,519	475,351	591,538	699,816	
Portugal, Azores, and Madeira .....	15,915	9,728	16,366	10,697	62,467	50,573	79,927	138,330	94,748	49,853	92,111	70,998	
Spain and Canaries .....	76,893	46,945	109,701	63,869	142,467	115,143	219,381	374,674	328,971	141,266	251,955	230,957	
Italy .....	146,856	62,902	200,898	129,578	562,759	460,441	665,492	1,027,991	910,513	397,315	681,185	652,921	
Austria-Hungary .....	22,192	12,608	24,509	16,883	56,732	43,029	79,374	62,264	103,433	42,117	36,037	72,520	
Greece .....	5,516	4,375	24,174	16,046	51,343	44,545	50,492	42,311	84,033	28,903	27,964	64,966	
Turkey .....	3,606	3,248	3,892	2,530	54,230	43,574	10,939	32,351	61,723	7,219	22,574	49,352	
Egypt .....	17,072	8,592	30,167	20,658	181,861	139,828	214,198	232,621	229,100	137,001	156,207	169,078	
Algeria .....	24,558	13,317	39,556	24,555	44,308	34,230	85,122	120,766	103,422	46,791	72,333	72,102	
United States of America .....	—	—	—	—	47	55	203	49	47	268	58	55	
Chile .....	563	761	1,928	1,337	32,819	27,146	57,230	13,373	35,310	43,457	10,509	29,244	
Brazil .....	4,212	3,696	5,216	3,912	138,515	123,892	163,615	167,163	147,943	121,206	135,188	131,500	
Uruguay .....	5,806	2,522	—	—	27,806	24,653	75,439	96,312	33,612	57,234	77,236	27,180	
Argentine Republic .....	15,977	12,988	—	—	231,171	235,220	327,650	424,219	297,148	245,848	331,269	248,208	
Gibraltar .....	3,570	1,648	4,219	2,826	17,522	13,621	46,495	24,635	25,311	29,736	16,608	18,095	
Malta .....	9,574	4,774	10,367	6,981	22,127	18,310	33,943	59,791	42,068	21,450	38,641	30,065	
British South Africa .....	383	361	5	8	6,644	5,476	4,436	3,089	7,032	2,868	2,532	5,845	
„ India .....	821	735	—	—	13,395	11,497	14,143	17,288	14,216	8,559	12,559	12,232	
Straits Settlements .....	332	495	—	—	—	—	2,607	658	332	1,672	1,003	495	
Ceylon .....	—	—	—	—	23,764	20,600	23,481	10,881	23,764	17,858	8,254	20,600	
Other countries .....	27,871	21,550	12,044	8,032	148,156	125,814	202,694	168,822	188,071	143,433	123,939	155,396	
Total {	Anthracite .....	131,510	97,678	—	—	149,933	136,024	222,276	278,321	281,443	179,722	229,852	233,702
	Steam .....	1,182,639	623,627	284,089	176,870	3,485,915	2,668,136	4,096,150	4,989,452	4,952,643	2,385,416	3,227,077	3,468,633
	Gas .....	79,219	45,469	360,923	547,468	86,355	60,667	928,793	1,017,126	1,026,497	454,099	552,493	653,604
	Household .....	50,938	32,245	—	—	108,435	73,941	160,177	195,014	159,373	84,576	118,152	106,186
	Other sorts .....	141,645	92,048	160,068	98,720	17,804	12,352	231,364	319,855	319,517	112,732	179,926	203,120
Total .....		1,585,951	891,067	1,305,080	823,058	3,848,442	2,951,120	5,638,760	6,799,768	6,739,473	3,216,545	4,307,500	4,665,245
Total (October 1912) .....		1,600,444	824,323	1,334,311	727,371	3,865,013	2,755,806	—	—	—	—	—	—
Total (October 1911) .....		1,325,035	585,296	1,060,655	512,669	3,253,070	2,118,580	—	—	—	—	—	—
Coke .....		—	—	—	—	—	—	126,194	122,298	150,955	90,684	107,074	135,168
Manufactured fuel .....		—	—	—	—	—	—	110,913	136,376	169,500	82,362	107,561	152,689
Total of coal, coke & manufactured fuel .....		—	—	—	—	—	—	5,875,867	7,058,442	7,059,928	3,389,591	4,522,135	4,953,102
First ten months of 1913.								First ten months.					
Total {	Anthracite .....	1,152,958	812,056	339	339	1,317,637	1,164,639	1,984,480	2,048,811	2,470,934	1,496,271	1,638,076	1,977,034
	Steam .....	10,860,024	5,905,588	2,934,062	1,823,573	30,914,030	23,845,132	38,831,231	37,799,653	44,708,116	22,407,044	24,340,918	31,574,293
	Gas .....	817,439	457,676	7,825,180	4,772,999	967,590	682,450	8,672,664	8,772,149	9,610,209	4,218,602	4,654,503	5,913,125
	Household .....	446,914	275,435	2,425	1,722	1,045,867	702,962	1,258,758	1,341,407	1,495,206	653,882	796,670	980,119
	Other sorts .....	1,326,714	829,831	1,547,109	953,353	98,973	69,646	2,510,317	2,588,171	2,972,796	1,200,664	1,389,542	1,852,830
Total .....		14,604,049	8,280,586	12,309,115	7,551,986	34,344,097	26,464,829	53,257,450	52,550,191	61,257,261	29,981,463	32,819,709	42,297,401
Total for ten months of 1912 .....		12,064,192	5,986,822	10,958,170	5,807,895	29,527,829	21,024,992	—	—	—	—	—	—
Total for ten months of 1911 .....		12,026,859	5,309,161	10,813,501	5,199,178	30,417,090	19,473,124	—	—	—	—	—	—
Coke .....		—	—	—	—	—	—	837,891	803,011	989,010	630,866	663,397	935,191
Manufactured fuel .....		—	—	—	—	—	—	1,347,495	1,252,007	1,711,865	943,927	978,795	1,476,403
Total of coal, coke & manufactured fuel .....		—	—	—	—	—	—	55,442,836	54,605,209	63,958,136	31,556,256	34,461,901	44,708,995

COAL, IRON AND ENGINEERING COMPANIES.

**Anglo-Westphalian (Chislet, Kent) Colliery Limited.**—This company has been registered, with a capital of £230,000 in £1 shares, to carry on the business of colliery proprietors, miners, and manufacturers of and dealers in coal, iron, steel, metals and minerals, &c.; also to enter into an agreement with the Agency Assets Company Limited. Minimum cash subscription, £7. First directors: Joseph Shaw, 36, Bryanston-square, W.; A. W. Hart, 14, Devonshire-place, W.; W. Peritz, The Drive, Bartonfields, Canterbury; William Mewburn, Hawkwell-place, Pembury, Kent; and C. B. O. Clarke, 4, St. Dunstan's-alley, E.C. Qualification, 1,000 shares. Remuneration, £300 each per annum, and a percentage of the profits.

**Athus Grivegne Company Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of ironmasters, steel makers and converters, colliery proprietors, &c. First directors: L. Phibea, E. Pellerling and H. Dubar. Registered office, 4, Lloyd's-avenue, E.C.

**British Coalite Company Limited.**—A special meeting of this company in London has confirmed the scheme for the reorganisation of the capital and affairs of the company.

**Broomhill Collieries Limited.**—The directors have decided to pay another six months' dividend on the preference shares, bringing up the arrears to December 31, 1910. So far this year a distribution of 9 per cent. has been made on these preference shares.

**Cory (William) and Son.**—An extraordinary general meeting was held in London on Tuesday, when resolutions were passed altering the articles of association in order to place the directors in a position to make regulations as to the issue to employees, retired employees, and their representatives of shares in the company's capital and the payment of dividends on these shares, also the holding and transfer of them. The chairman, in explaining the resolutions, mentioned that the business would be carried out through the Thrift Club which the employees had formed amongst themselves. He hoped the employees would take up shares in the company, and thus secure an interest in the economical working of the company.

**Cumberland Coal and Boring Syndicate Limited.**—This company has been registered, with a capital of £30,000 in £1 shares, to search for and deal in coal, minerals, metals and similar substances, and to carry on the business of ironmasters, steelmakers and converters, colliery proprietors, miners and smelters, &c.; also to enter into an agreement with R. W. Tweedy and N. G. Prince, who are the first directors, residing at 114, Priory-road, West Hampstead, and at 34, Buckingham-mansions, West Hampstead, respectively.

**Dominion Steel Corporation Limited.**—The net earnings for the quarter ending September 30, 1913, after making provision for depreciation, sinking funds and bond and other interest, amounted to £43,641 dols. Dividends on preferred stocks absorbed 245,000 dols., and the 1 per cent. dividend on the common stock required 318,977 dols., leaving a surplus of 279,664 dols. The surplus for the preceding quarter was 141,285 dols., the total for the six months being 420,949 dols.

**Dorman, Long and Co. Limited.**—Final dividend of 6 per cent., less tax, making 8½ per cent. for the year.

**Enfield Electric Cable Manufacturing Company Limited.**—This private company has been registered, with a capital of £50,000 in £1 shares, to carry on the business indicated by the title. First directors: William Bakewell, Frederick Plutte, H. W. A. Weuste, G. Ziegler, and George J. Andrews. Registered office: 47, New Broad-street, E.C.

**Fairfield Shipbuilding and Engineering Company Limited.**—The accounts for the year to June 30 last show, including £4,825 brought forward, an available balance of £91,553, which has been applied as follows:—Interest on debenture stocks, £23,750; preference dividend, £15,000; directors' fees, £2,175; transfer to income-tax account, £1,250; transfer to general reserve, £25,000; transfer to depreciation account, £7,500; carried forward, £16,878.

**Fraser and Chalmers Limited.**—The report covering the year ended June 30 last shows a net profit of £4,604, after payment of debenture interest and after making the usual provision for depreciation, to which must be added £75,446, being the credit balance brought forward, making a total of £80,050 to credit of profit and loss account. Out of this sum the directors have paid the full preference dividend for

the year of £4,725, and have transferred a sum of £60,000 to a general reserve account, leaving a balance of £15,325 to be carried forward. There has also been added to general reserve an amount of £4,194 previously standing at credit of capital reserve. A sum of £1,993 has been applied in writing down patterns, drawings and patents to a nominal sum, and £100 in writing off the book value of the shares in the Allis Chalmers Company. The decrease in profits has been due to a continued falling-off in the South African business. The balance of the 5 per cent. registered debentures, amounting to £21,400, was redeemed on February 1, 1913. A new issue of 5 per cent. debentures for a total of £100,000 has been created, and £50,000 of these debentures have been issued as collateral security for advances.

**Fuller Accumulator Company Limited.**—This company has been registered, with a capital of £65,000 in £1 shares (20,000 preference), to carry on the business indicated by the title, and that of general and electrical engineers; also to enter into agreements (1) with George Fuller, George J. A. Fuller, and L. Fuller, and (2) with John C. Fuller and Son Limited. Minimum cash subscription, 2,000 shares. First directors include: George John A. Fuller, Badwell Cottage, Draycot-road, Wanstead, and Frederick J. Gordon, 7, Tennyson-avenue, Wanstead.

**Horden Collieries Limited.**—The directors, in their report for the year ended September 30 last, state that after carrying £9,077 to depreciation and £4,000 to income tax, the profit remaining amounts to £156,442, and, with £4,363 brought forward from last year, makes a total of £160,806. Of this sum, £16,168 has been paid or provided as interest on debenture stock and calls on shares paid in advance, and £28,653 has been paid as interim dividend, leaving £116,985, which the directors recommend shall be disposed of as follows:—In placing to Shotton Colliery depreciation account the cost of Bacheve ovens, £16,271; in placing to reserve account, £15,000; in payment of a final dividend of 8 per cent., making 12 per cent. for the year, £57,336; balance to be carried, £27,406.

**Leeds Fireclay Company Limited.**—The report for the twelve months to June 30, 1913, states that the trading profits amount to £8,036, to which is to be added £1,153 from the previous year. Debenture interest absorbs £12,000 and depreciation of investments £1,400.



**Midland Fan Company Limited.**—This private company was registered with a capital of £2,000 in £1 shares, to carry on the business of ventilating engineers, and is managed by Hubert Humphreys at 55, County Chambers, Corporation-street, Birmingham, under the style of the Midland Fan Company, and to carry on the business of consulting and general engineers, and manufacturers of and dealers in fans, &c.; also to enter into an agreement with Hubert Humphreys (manager) and Ralph Parr, who are the first directors, and residing at 55, County Chambers, Corporation-street, Birmingham, and at Drakeness Cottage, Holliswood, Birmingham, respectively.

**Murton and Varley Limited.**—This private company has been registered, with a capital of £20,000 in £1 shares, to acquire the business now carried on at the Anchor Works and Victoria Works, Keighley, Yorks, under the style of Murton and Varley, and to carry on the business of iron-founders, toolmakers and agricultural implement manufacturers, &c.; also to enter into an agreement with Eli Murton, E. Murton and F. Moore (executors of the will of the late William Henry Murton), and William S. Varley. First directors, Eli Murton and William S. Varley. Registered office, Anchor Works, Longcroft, Keighley, Yorks.

**Newthorpe Collieries Limited.**—This company has been registered, with a capital of £50,000 in £1 shares, to search for and explore mines supposed to contain minerals, ores and coal, &c., and to prepare for market and deal in ores, metals, coal and mineral substances of all kinds. Minimum cash subscription, £10,000. First directors, B. Brookman, D. R. Broadbent, S. L. Evans and J. O'Mahony. Qualification, £250. Remuneration, £150 each per annum and a share of the dividends. Registered office, 9, Angel-court, E.C.

**Octo Welding Limited.**—This private company has been registered, with a capital of £500 in £1 shares, to carry on the business of welding iron, steel and brass, &c., and of steelmakers and converters, smelters, brass and metal founders, &c. First directors include: Charles William Brett, 94, Portsdown-road, Maida Vale, W., and James H. Osborne, 15, Manor-street, Berkhamsted.

**Oddy Development Syndicate (United States) Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of iron-founders, mechanical engineers, toolmakers, brassfounders, metal workers and iron and steel converters, &c. First directors, Thomas Oddy and P. J. Foster. Registered office, 12, Hudson-street, Rochdale.

**Roberts (Wm.) (Tipton) Limited.**—The directors announce an interim dividend at the rate of 10 per cent. per annum, free of income tax, on the ordinary shares for the half-year.

**Weardale Steel, Coal and Coke Company Limited.**—The profits for the year ended September 30 amounted to £121,821. This, with £32,247 brought forward, makes a total of £154,068. The directors recommend, in addition to the dividend of 6 per cent. on the preferred and deferred ordinary shares, a further distribution, in accordance with the articles of association, of £10,000 on the preferred ordinary shares, being 2 per cent. thereon, and the same sum on the deferred ordinary shares, being 4.44 per cent. thereon. They also propose to reserve for depreciation £40,000 and to carry forward £34,568. The output of coal during the year was adversely affected by a serious shaft accident at Wheatley Hill Colliery in February, which resulted in No. 1 pit being idle for four days, and No. 2 pit for two months. The reduction of quantity resulting from this stoppage, and from strikes—one on the part of the railway company's employees, which caused Thornley and Wheatley Hill collieries to lose four days in December; and one on the part of the workmen at Wheatley Hill, who absented themselves from work for five days in January—together with an abnormal loss of time by workmen individually since the adoption of weekly pays, the coming into operation of the National Insurance Act, and the existence of the high rates of wages prevailing, has resulted in a large diminution of output. This reduction of output, and higher wages, more costly materials, and the extra expenditure due to recent legislation, have all contributed to increase the working cost. Prices of coal and coke have been well maintained during the year, and it is to this fact, in face of the serious increase in cost already referred to, that the profit shown is attributable.

**Wilson (Charles) Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire the business now carried on at Atlas Foundry, Staveley-road, Sheffield, under the style of "Charles Wilson," and to carry on the business of iron and brass founders, smelters, refiners, coal and colliery agents and proprietors. First directors: Charles Wilson, William G. Wilson, and George H. Wilson. Registered office, Atlas Foundry, Staveley-road, Sheffield.

**Managers and Mines Legislation.**—A meeting of the South Staffordshire, Warwickshire and Worcestershire branch of the National Association of Colliery Managers was held at the Imperial Hotel, Birmingham, on Saturday, Mr. W. Charlton (president of the branch) presiding. A discussion upon the new mines regulations was opened by Mr. Cashmore, who, dealing with Part I., said it was especially lamentable that a section in the old regulations dealing with the enginewright's duties had been omitted, as the enginewright's duties were totally different from those of the other officials. In the regulation with regard to a person finding himself in the presence of inflammable gas, certain precautions with regard to the lamp were prescribed, but why should the man not extinguish the light at once? Mr. J. Bell (Polesworth), dealing with Part II., considered the subsection with regard to the measurement of the air current at a point 100 yards back from the first working place unsatisfactory. Such a measurement gave no indication of the state of the ventilation. He could see no reason either for prohibiting the use of ordinary electric lamps with 100 yards of the coal-face when it was possible to use a battery of cells in connection with other electrical machinery. Mr. Bell, however, reasonable precautions, was allowed to be taken. The extra light would be an incalculable saving by reducing accidents to a minimum.

COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES  
During the month of October 1913, compared with the corresponding month of 1912.\*

Port.	October 1913.		October 1912.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle .....	887,792	28,944	930,648	26,426	—	42,856	2,518	—
North Shields .....	119,210	434	113,354	—	5,856	—	434	—
South Shields .....	179,841	1,757	137,920	797	41,921	—	960	—
Sunderland .....	244,660	6,661	244,858	6,482	—	198	179	—
West Hartlepool .....	111,937	2,275	132,029	902	—	20,092	1,373	—
Goole .....	114,852	2,088	98,264	3,104	16,588	—	—	1,016
Blyth .....	337,589	595	355,824	753	—	18,235	—	158
Newport .....	378,851	697	408,393	1,880	—	29,542	—	1,183
Liverpool .....	32,558	3,945	31,982	3,169	576	—	776	—
Methil .....	241,737	2,341	228,084	1,769	13,653	—	572	—
Glasgow .....	175,447	5,680	187,012	954	—	11,565	4,726	—
Kirkcaldy .....	11,832	—	14,276	40	—	2,444	—	40
Burntisland .....	193,351	1,649	177,530	1,686	15,821	—	—	37
Cardiff .....	1,714,955	13,826	1,859,673	7,089	—	144,718	6,737	—
Borrowstoness .....	41,601	2,741	60,401	1,410	—	18,800	1,331	—
Llanelli .....	22,190	—	14,600	—	7,590	—	—	—
Middlesbrough .....	3,070	5,602	889	3,861	2,181	—	1,741	—
Seaham .....	78,028	219	61,994	193	16,084	—	26	—
Swansea .....	325,722	805	334,571	110	—	8,849	695	—
Granton .....	12,479	3,525	11,509	2,636	970	—	889	—
Port Talbot .....	157,113	—	172,365	551	—	15,252	—	551
Alloa .....	13,111	—	15,453	—	—	2,342	—	—
Grangemouth .....	128,418	7,518	147,717	13,549	—	19,299	—	6,031
Neath .....	14,590	—	8,389	—	6,201	—	—	—
Hull .....	490,398	8,186	376,074	7,759	114,324	—	427	—
Amble .....	45,640	—	48,230	—	—	2,590	—	—
Troon .....	9,262	—	5,020	—	4,242	—	—	—
Grimsby .....	99,234	1,159	126,939	723	—	27,705	436	—
Ayr .....	4,011	—	1,231	—	2,780	—	—	—
Greenock .....	—	—	—	—	—	—	—	—
Leith .....	172,110	—	180,176	—	—	8,066	—	—
Ardrossan .....	3,582	—	2,400	—	1,182	—	—	—
Stockton .....	—	—	—	—	—	—	—	—

COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.\*

Port.	Oct. 1912.		Oct. 1913.		Port.	Oct. 1912.		Oct. 1913.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle .....	401,726	380	403,358	430	Ayr .....	70,953	—	63,560	—
North Shields .....	—	—	—	—	Irvine .....	3,426	—	5,180	—
South Shields .....	2,770	—	285	—	Alloa .....	1,392	—	1,770	—
Blyth .....	33,548	—	33,900	—	Whitehaven .....	19,217	—	18,355	25
Amble .....	5,073	—	5,957	—	Liverpool .....	181,956	—	148,410	—
Sunderland .....	113,964	—	123,298	—	Grimsby .....	6,608	—	3,390	—
Seaham .....	87,781	—	84,630	—	Granton .....	14,980	—	21,859	—
Hartlepool .....	57,540	—	67,595	5	Borrowstoness ..	15,705	25	17,145	—
Stockton .....	—	—	—	130	Burntisland .....	1,465	—	20,175	—
Middlesbrough .....	376	100	—	—	Kirkcaldy .....	1,047	—	1,745	—
Hull .....	86,804	500	67,754	—	Methil .....	18,930	—	34,707	—
Goole .....	129,920	—	129,509	—	Port Talbot .....	14,807	272c 300 pf	12,287	273c 959 p.f.
Swansea .....	32,222	—	25,334	100	Glasgow .....	37,494	822	28,585	448
Cardiff .....	251,858	1,220	278,638	110	Grangemouth .....	14,536	600	9,912	1,760 p.f.
Llanelli .....	5,666	—	4,758	—	Greenock .....	777	—	1,939	—
Newport .....	67,620	—	57,071	7	Neath .....	8,333	—	17,060	—
Troon .....	20,283	8	14,649	—	Leith .....	6,172	16	3,342	—
Ardrossan .....	5,799	—	4,885	—					

\* From Browne's Export List.

CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

**HAMPSTEAD, NOVEMBER 25.**—The Borough Council invite tenders for the supply of 10,000 tons of Midland counties small nuts or peas to be delivered at the electricity works, Lithos-road, Finchley-road, N.W., for 12 months from April 1 next. Specification, tender and full particulars can be had of the chief electrical engineer and manager at the works. Tenders to be sent in to me by 9 a.m. on Tuesday, November 25, the prices quoted to hold good for seven days. By order, Arthur P. Johnson, town clerk, Town Hall, Haverstock Hill.

Abstracts of Contracts Open.

**ALEXANDRIA (EGYPT), DECEMBER 1.**—Tenders are invited for the supply of 4,000 tons of Cardiff coal and 40 tons of Newcastle coal, 180 tons of petroleum, and 7 tons of benzine, required by the Egyptian Coast Guard Administration during the year 1914. Forms from the Director of Stores, Coast Guard Administration, Alexandria.

**BEVERLEY, NOVEMBER 24.**—Coal, for the Corporation. Particulars obtainable from Mr. J. Willis Mills, clerk to the Local Education Authority, 31, Lairgate, Beverley.

**BOOTLE (LANCS.), NOVEMBER 19.**—About 2,000 tons of steam coal and 2,000 tons of slack, for the Corporation. Forms at the Borough Electrical Engineer's Office, Electric Light Station, Pine-grove, Bootle.

**CARDIGAN, NOVEMBER 28.**—Best Staffordshire screened coal (cobble size), to the County School, for the Governors. Tenders must be sent to Mr. Ivor Evans, clerk to the Governors, 3, Green-street, Cardigan.

**CHACELEY, NOVEMBER 18.**—About 20 tons of good household coal, for the offices of the Chaceley Unknown Donors Charity, delivered at Chaceley Stock. Endorsed tenders to Mr. T. Healey, Woodbine Cottage, Chaceley.

**CHESTER, NOVEMBER 25.**—Slack, for the directors of the Chester Waterworks Company. Tenders to Mr. Wm. S. Moss, secretary, 15, Newgate-street, Chester.

**GOOLE, NOVEMBER 19.**—About 7,000 tons of gas coal, or portions thereof; supply of 700 tons of steam coal, for the Urban District Council. Forms from Mr. J. Fazakerley, gas and water manager, Gasworks, Goole.

**HUDDERSFIELD, NOVEMBER 17.**—Slack, for the Corporation. Particulars from the borough electrical engineer, St. Andrew's-road, Huddersfield.

**LIMERICK, NOVEMBER 18.**—About 300 tons best steam coals, for the Guardians. Forms from Mr. H. J. Guinane, clerk of union.

**LONDON, NOVEMBER 18.**—About 4,000 tons of South Wales coal, to be delivered at Gibraltar during 1914, for H.M. Government. Forms from the Crown Agents for the

Colonies, Whitehall-gardens, S.W., on payment of the sum of £1 (returnable).

**LONDON, NOVEMBER 19.**—About 50 tons house coal (best Silkstone or Derby Brights), for the Poplar Guardians. Forms from Mr. G. Herbert Lough, clerk to the Guardians, 45, Upper North-street, Poplar, E.

**LONG LAWFORD, NOVEMBER 28.**—About 30 tons of good house coal (named), for the trustees of the United Charities of Sir Edward Boughton and others, Long Lawford, to the various cottages in the parish of Long Lawford. Tenders to Mr. Edwin Wright, clerk to the trustees.

**LOWESTOFT, NOVEMBER 22.**—About 90 tons of best seaborne coals, for the trustees of Kirkley Poor's Land Estate. Tenders to Mr. James Burcham, clerk to the Trustees, 8, Grosvenor-road, Lowestoft South.

**RAINHILL (LANCS.), NOVEMBER 24.**—Slack for the Lancashire Asylums Board. Forms from Mr. J. Gornall, clerk and steward, Rainhill.

The date given is the latest upon which tenders can be received.

CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

**ABERDEEN, NOVEMBER 24-27.**—Stores.—For the supply of stores, for the Great North of Scotland Railway Company.

**ANTWERP, JANUARY 26.**—Cranes.—Tenders are invited by the Municipal authorities of the above city for six electric cranes for the Bassin-Canal extension.\*

**ASHCHURCH, NOVEMBER 18.**—Water Main.—For laying of a water main for a distance of about 4½ miles in the parish of Ashchurch, and other works in connection therewith, for the Tewkesbury Rural District Council. Specification obtained, on payment of £1 ls. (returnable), from Mr. H. A. Badham, clerk to the Council, Tewkesbury.

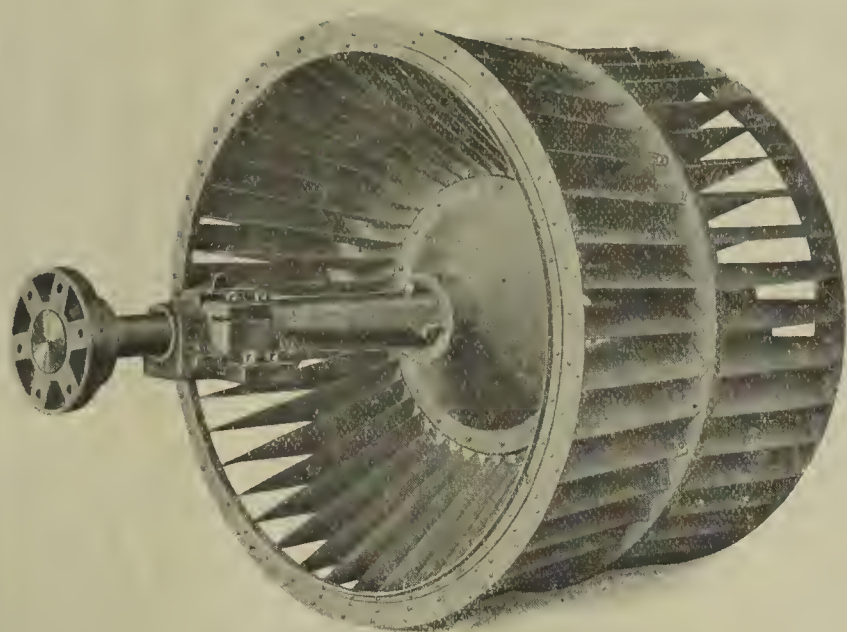
**BARGOED, NOVEMBER 18.**—Gas Mains.—Supply of 1,850 yards of 6 in. and 10 yards of 4 in. steel mains, together with the necessary specials, for the Bedwellty Urban District Council (Gas Department). Forms from Mr. Dan H. Price, engineer and surveyor to the Council, Aberbargoed.

**BARGOED, NOVEMBER 18.**—Water Mains.—Steel mains, for the Bedwellty Urban District Council (Water Department), viz.:—1,640 yards 3 in. diameter, 2,130 yards 4 in. diameter, 780 yards 6 in. diameter, 590 yards 8 in. diameter, together with the necessary specials. Forms from Mr. Dan H. Price, engineer and surveyor to the Council, Aberbargoed.

**BRADFORD, NOVEMBER 20.**—Gas Retorts, &c.—Gas retorts, firebricks and fireclay required in the fixing of such retorts, for the Corporation. Forms from Mr. Chas. Wood, gas engineer, Town Hall, Bradford.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 7, Basinghall-street, E.C.





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## MINE VENTILATION.

Surface & In-by Fans.

Single & Double Inlets.



KEITH MINE FAN exhausting 127,000 cubic feet of air per minute.

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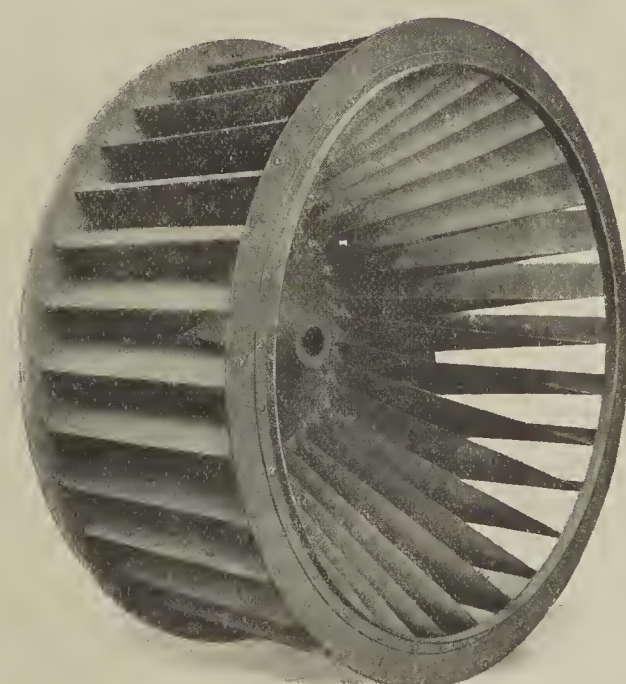
INDUCED DRAUGHT.

DUST EXHAUSTING.

SMOKE REMOVAL.

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POWER HOUSE VENTILATION.



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27, Farringdon Avenue, LONDON, E.C.

AND AT NEWCASTLE, MANCHESTER, LEEDS, CARDIFF, GLASGOW, &c.



(AUSTRALIA), NOVEMBER 24.—*Pumping Plant.*—Tenders are invited by the Commonwealth Department of Public Works for the supply of waterworks pumping plant for the new Federal capital in New South Wales. The contract is divided into two sections, viz.:—(1) Pumps, motors and switchboards; (2) transformers and transformer switchgear. Forms, &c., from the works director for New South Wales, Custom House, Sydney.\*

CHRISTIANIA (NORWAY), NOVEMBER 28.—*Steel Rails, &c.*—Tenders are invited by the Norwegian State Railway authorities for the supply of about 17,976 tons of steel rails and fishplates and about 2,473 tons of headplates. Sealed tenders marked "Anbud paa Skinner m.v." will be received at "Hovedstyrets Kontor for Baneanliggende, Statsbanerne," Christiania.\*

CHRISTIANIA (NORWAY), DECEMBER 1.—*Coal Discharging Machinery.*—Tenders are invited by the Norwegian Main Railway for the supply of two coal-discharging machines, each capable of discharging at least 50 tons per hour.\*

COMBS (SUFFOLK), NOVEMBER 18.—*Well, &c.*—A bored well, pumping station, covered tanks, and water mains and other appurtenances complete, for the East Stow Rural District Council. Specification at the offices of the Engineers, Caxton House, Westminster.

EPSOM, NOVEMBER 24.—*Pipes.*—About 800 12 ft. cast iron water pipes and specials, 15 in. in diameter, for the Epsom Urban District Council, according to specification of Mr. W. V. Graham, M.I.C.E., 5, Queen Anne's-gate, Westminster.

EPSOM (SURREY), NOVEMBER 24.—*Pumping Plant.*—Pumping plant at the waterworks in East-street to raise water from the well 80 ft. deep and deliver it to the reservoir on the Downs against a combined head of about 350 ft., for the Urban District Council. Specifications from Mr. W. Vaux Graham, M.I.C.E., 5, Queen Anne's-gate, Westminster.

HASTINGS (NEW ZEALAND), DECEMBER 18.—*Turbo Pumps, &c.*—Tenders are invited by the Hastings Borough Council for the supply and erection of two sets of high-lift turbo pumps and electro motors, together with suction and delivery piping, &c. Specification, &c., may be obtained on payment of £2 2s. (returnable), from the Town Clerk, Hastings, New Zealand.\*

LATCHINGDON (ESSEX), NOVEMBER 25.—*Reservoir.*—For (1) concrete reservoir to hold 10,000 gallons, small engine shed and foundations for overhead tank; (2) small combined oil engine and pump; (3) overhead tank to hold 10,000 gallons, on steel staging, for the Maldon Rural District Council (Purleigh District Water Supply). Specification obtained at the office of Mr. Almond, council surveyor, 6, Market-hill, Maldon.

LYMM, NOVEMBER 20.—*Cast Iron Pipes.*—About 2,600 yards of 6 in. cast iron pipes (spigot and socket) and 6 in. connections, for the District Council. Particulars from the Council's gas manager, Mr. W. L. Donaldson, Gasworks, Lymm.

MANCHESTER, NOVEMBER 28.—*Boilers, &c.*—Two water-tube boilers and superheaters, economisers, coal chutes, ash conveyor, pipe connections, additional stoker shafting and clutches, and pneumatic ash handling plant, for the electricity committee of the Corporation. Specification from Mr. F. E. Hughes, secretary, Electricity Department, Town Hall, Manchester, on payment of two guineas (returnable).

MELBOURNE (AUSTRALIA), JANUARY 7.—*Steel Bars, &c.*—Tenders are invited by the Victorian Railways Commissioners for the supply of the following:—(1) 150 steel channel bars for engines; (2) 45 copper plates for engines; (3) seamless copper tubes for engines; (4) 10,000 porous pots for batteries; (5) 180 steel boiler plates for engines; (6) 60 Yorkshire iron angles for engine hoilers; (7) 17 tons of copper rod for engines; (8) 3,960 brass locomotive hoiler tubes; and (9) 237 cast steel wheel centres for engines and tenders. Specifications from the secretary, Victorian Railways Offices, Spencer-street, Melbourne.\*

MERTHYR, NOVEMBER 21.—*Cast Iron Pipes.*—About 880 tons of 10 in. cast iron socket pipes (and also as an alternative for 14 in. pipes), with specials, hends, and regulars, &c., for the Corporation. Forms from waterworks engineer, Town Hall, Merthyr.

OUGHTERARD (IRELAND), NOVEMBER 30.—*For the sinking of 23 new wells, and deepening, enclosing and improving 21 existing wells, for the District Council.* Tenders to Mr. P. A. Joyce, clerk to the Council, board room, Oughterard, Galway.

RHYL, NOVEMBER 19.—*Diesel Engine Set.*—For the Rhyl Urban District Council, one 160-kw. Diesel engine set. Specification from electrical engineer, Mr. E. H. Wright, Electricity Works, Rhyl, on payment of a deposit of £1 ls. (returnable).

SHEFFIELD, DECEMBER 2.—*Retort Fittings, &c.*—Hydraulic mains, ascension pipes, cast iron floor plates, &c.; also 250 mouthpieces, 24 in. by 16 in., Q shape, both for the Grimesthorpe Works, for the Sheffield United Gaslight Company. Specifications upon application to the engineer, Mr. J. W. Morrison, M.I.C.E., Commercial-street, Sheffield.

SWANSEA.—*Cranes.*—Erection *in situ* complete of three portable hydraulic, or, alternatively, electric cranes, with fixed jibs; and also three portable hydraulic, or, alternatively, electric cranes, with jibs fitted with compensating luffing gear, for the Harbour Trustees. Forms can be obtained on payment of £3 3s. (returnable) to Mr. Talfourd Strick, clerk, Harbour Offices, Swansea.

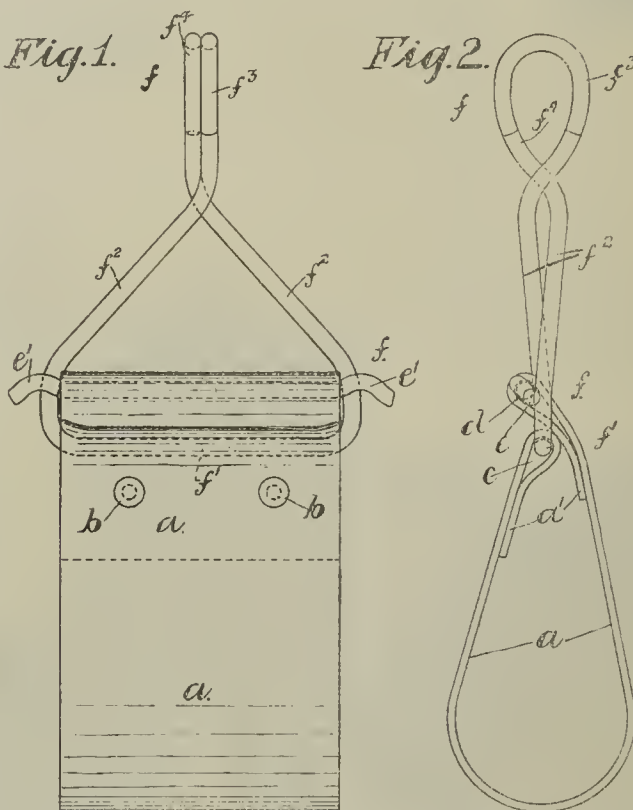
SYDNEY (AUSTRALIA), DECEMBER 15.—*Pumping Machinery.*—Tenders are invited by the Sydney Water Supply and Sewerage Board for the manufacture, supply, and delivery of a complete set of turbine-driven centrifugal pumping machinery. Specifications from the President, Metropolitan Board of Water Supply and Sewerage, 341, Pitt-street, Sydney, N.S.W.\*

WORKINGTON.—*Shaft Sinking.*—For sinking present shaft at Moorhouse Guards. Particulars obtainable from Mr. G. Kennedy, Seaton Fire Brick and Ganister Company, Workington, Cumbs.

YORK, NOVEMBER 25.—*Bar Iron, &c.*—For the directors of the North-Eastern Railway Company, quantities of bar iron and steel plates, &c. Forms from Mr. E. H. Gateshead-on-Tyne.

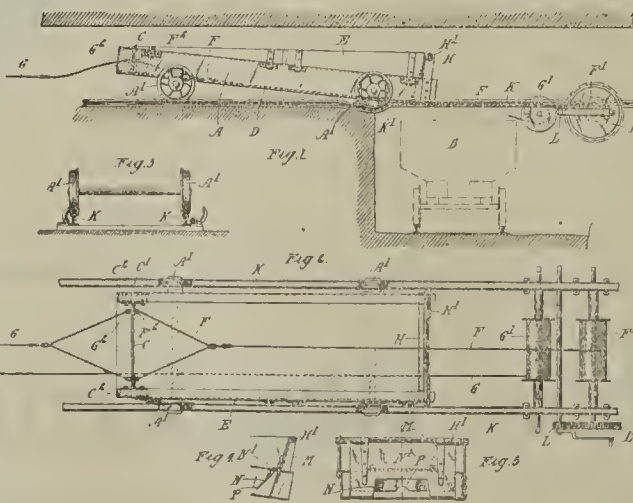
## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

2449 (1913). *Improvements in or relating to Suspenders for Electric Cables and the like.* P. Huntington, 13, Cumberland-street, Liverpool, Lancashire.—Relates to suspenders for electric cables and the like of that kind in which the cable or the like is supported in a sling or double band of canvas, leather, or other suitable flexible material which is suspended from a wire rope, hook, nail, or other convenient support above. Each end or extremity of the sling or band is doubled or turned backwardly and secured by means of rivets or the like (or it may be otherwise provided with a passage), and within the passage or loop so formed at one extremity of said sling or band there is disposed in a replaceable manner a rod constructed of wire or other suitable material, and being of greater length than the width of said sling or band in order that the ends projecting or protruding from the sides thereof may engage with or lock against the sides of the hereinafter-mentioned connector frame. Within the passage or loop of the other end of said sling or band there is—in one arrangement—disposed (being



fitted prior to the closing of said loop or passage) the base of a frame whereby the sponder is connected to a support, said frame being preferably constructed of wire rod, the portions whereof which project or protrude from either side of said band passage being so curved or bent at the desired distance from the base that they cross each other. When said wire frame or loop is to be attached to a wire rope, hawser, or the like, the outer portions thereof are twisted at right angles in opposite directions, and the extremities are bent to form hooks which lie side by side, and are oppositely or reversely disposed; if, however, said sponder is to be attached to a hook, nail or the like, said hooked extremities need not necessarily be reversed. Or in an alternate construction a wire frame may be employed of, say, triangular shape or configuration, the portions which constitute the base thereof being turned inwardly and inserted into said loop or passage of the sling or band, the ends are fitted prior to the closing of said sling loop. Figs. 1 and 2 illustrate in front and side elevation respectively, one mode of embodying same. (Four claims.)

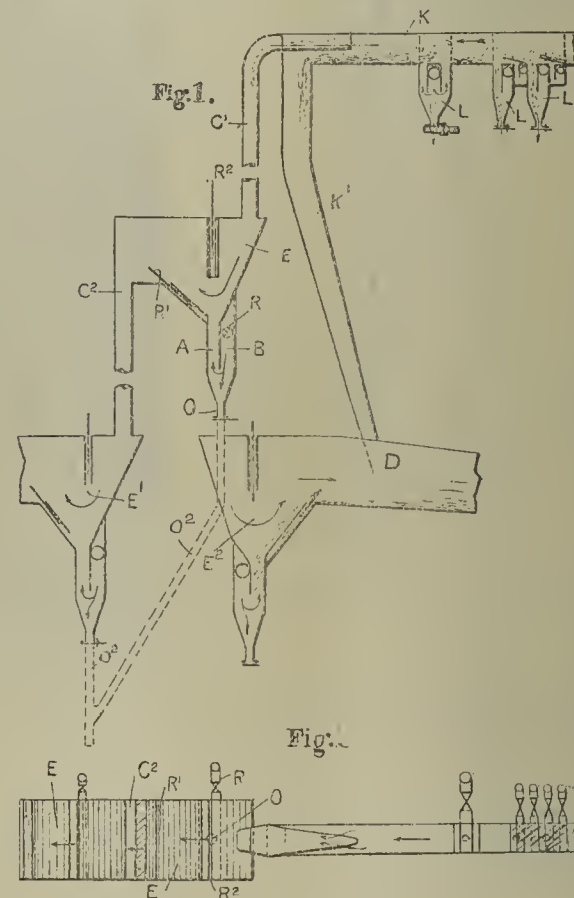
2963 (1913). *Improved Apparatus for Conveying Coal in Mines.* C. A. Nelson, Glenview, Kings-road, Wallsend-on-Tyne.—Relates to improvements in apparatus for conveying coal in mines, and is designed particularly for use on the longwall system of mining. The object is to provide an improved apparatus to facilitate the transport of the coal from the hewers or fillers working on the coal face to a delivery point established in a transverse gateway, and also to avoid cutting the large number of gateways now necessitated by the ordinary methods of transport. The apparatus is of the type which comprises a truck capable of discharging its load from one end, main-and-tail haulage lines for the truck and means operatively connected with the haulage lines, whereby when the truck is brought to its discharging point, continued haulage effects the discharge of the load, the truck itself being held from motion. Accordingly, the invention consists in the combination, in coal-conveyor apparatus, with the truck of a scraper disposed within and at the rear of the truck hut free to travel along the same to the front or discharging end, the scraper being directly connected to the main hauling lines so that the tractive effort is imparted directly to the load



through the scraper for the double purpose of propelling the truck through the medium of the load and finally discharging such load from the truck, with or without reducing gear in the hauling apparatus, which can be

brought into operation when discharging. The bottom of the truck may be sloped downwards towards the delivery end so that the discharge of the load is facilitated, and, if desired, side extensions may be provided to make the top edge of the truck level, whereby the capacity of the truck is increased. Preferably the front or discharging end of the truck is provided with a movable door which can be closed and secured during haulage and opened for discharging. In the preferred construction the truck is provided with longitudinal guides at each side, and wheels or rollers are provided on the scraper to engage these guides and decrease the friction as the scraper is moved backwards and forwards. Fig. 1 shows a side elevation of the truck in position for discharging, fig. 2 is a plan of the same, fig. 3 is an end elevation showing a detail modified relative to the form shown in fig. 1, and figs. 4 and 5 are views of a particular construction of end door for the truck. (Six claims.)

5519 (1913). *Improvements in Apparatus for Washing Coal and other Minerals.* P. Hahets, of Montegnée, Belgium, and A. France, of Rue de l'Espérance 233, Liège, Belgium.—This invention is an improvement in or a modification of the invention of Specification No. 22655 of 1912. The object is to eliminate still further the lighter foreign matters from the coal or other minerals delivered by the apparatus, and if necessary to grade or classify the discharged material to a greater degree. The accompanying drawing illustrates diagrammatically one mode of carrying out the invention, fig. 1 being a side elevation and fig. 2 a plan. As the coal comes from channel C' it reaches a chamber E where the stream from C' to C<sup>2</sup> meets an ascending stream from a chamber B through a chamber A originating from a valve or gate at R. In chamber E there extends in a vertical position a shutter R<sup>2</sup> and in an oblique position a shutter R<sup>1</sup> taking up the whole width of chamber E. By this means the length and height of the waterway and velocity of the stream may be regulated. These different streams from C<sup>1</sup> to C<sup>2</sup> as well as the ascending one are so regulated that only a certain size of coal can drop and pass the outlet O, which is closed by a suitable regulating device which allows that only coal of a certain size will find its way through. The lighter parts



of coal or mineral are carried by the stream over the shutter R<sup>1</sup> to another apparatus E<sup>1</sup> in which the process is repeated, and the different streams are so regulated that the next smaller size will be obtained. This is carried on until in the last apparatus a fine dust settles through O, which may be washed if desired in a similar apparatus of this type. Instead of separating out different sizes in the first apparatus E and the second E<sup>1</sup> these two may have their upward washing streams and shutters so regulated as to deliver the same grade. The duplication of the separation thus ensures a complete exhaustion of the material of that particular size of particle or grain and thereby prevents choking in subsequent stages. When the operation of separation is duplicated the discharge openings are inter-connected as by the pipes O<sup>2</sup> O<sup>2</sup> shown in dotted lines. Fig. 1 shows further how different apparatus may be arranged in such a way that a certain grade of coal or mineral may always be collected at a single place. The ascending stream in A may be replaced by a fluid of greater density than water in such a way that by means of this fluid regulated by a valve R a constant level is maintained in the chamber A. In fig. 1 R represents the inlet for the ascending stream. This may be constructed as a valve, and a fluid of greater density than water may be used, so as to obtain a desired grade of coal or the like. The rectangular form of the apparatus as shown in fig. 2 is arranged in groups or batteries so that larger quantities of minerals may be washed without interfering with the regulation of each apparatus. (Two claims.)

6910 (1913). *Improvements in and relating to the Manufacture of Coal Briquettes.* B. Grätz, of 25, Bergmannstrasse, Berlin, Germany.—Relates to a briquette which, owing to its particular composition or the particular manufacturing process thereof, leaves behind a heavier and more solid ash, and may thus be used for purposes for which briquettes as previously manufactured could not be. These ashes do not possess such a fine grain and their particles are more compact, so that they are unaffected by air-currents. This new effect is attained by adding a fusing agent to the briquette mass or to its constituents. This addition must exert a sintering action on the ashes so as to render them more compact and less fine. By way of example, the following known chemical compounds may be used as sintering or



BRUSSELS EXHIBITION: "GRAND PRIX."

ROUBAIX EXHIBITION, 1911: GRAND PRIX."

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PATENT

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Graded opening—no sudden rush of steam in opening.

No bye-passes necessary, thereby saving their cost.

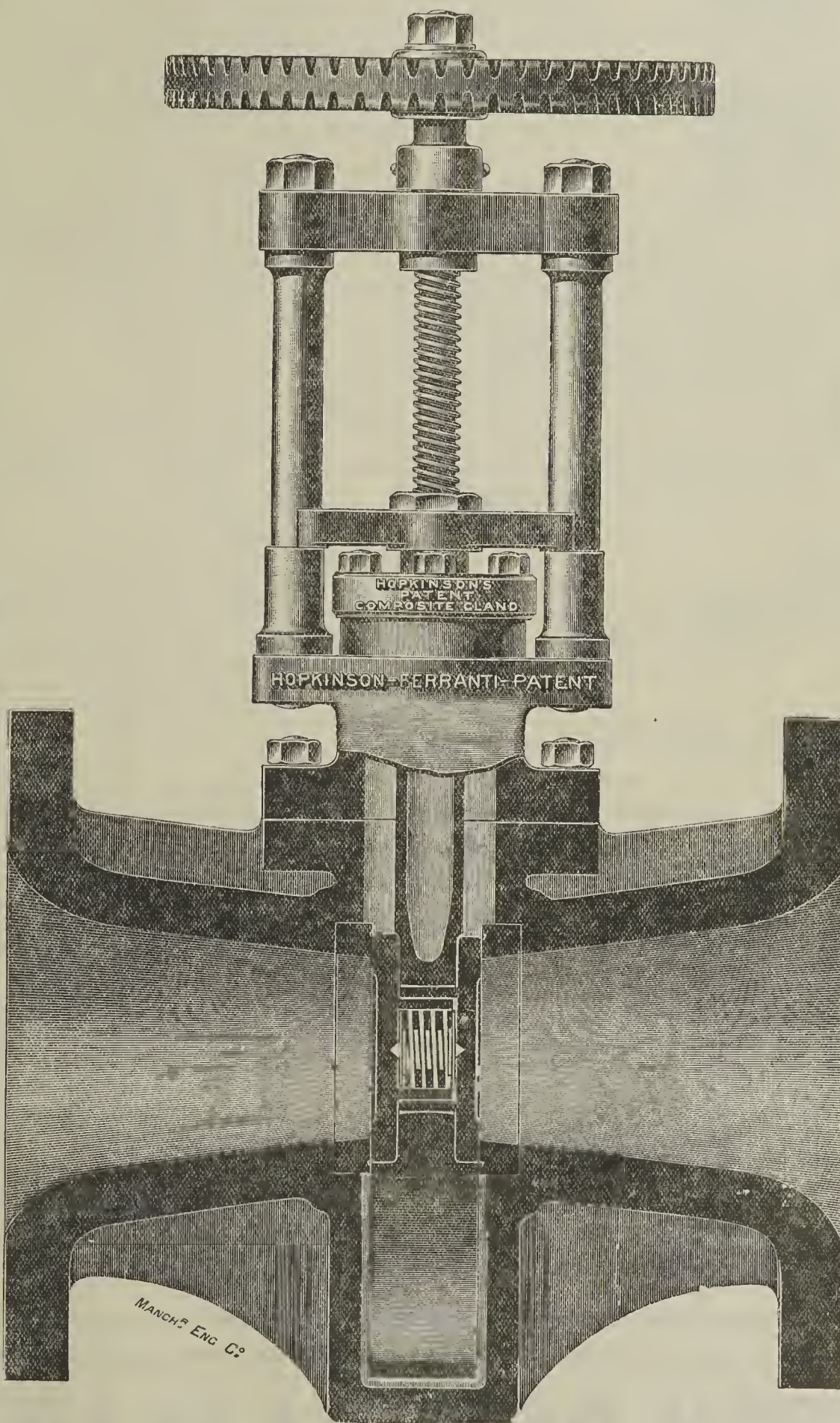
Is not subject to wedging action or mechanical strain.

The discs slide with a flexible pressure upon the seats, thereby preventing cutting and scoring.

When the valve is open the seats are protected from the flowing fluid by the eyepiece.

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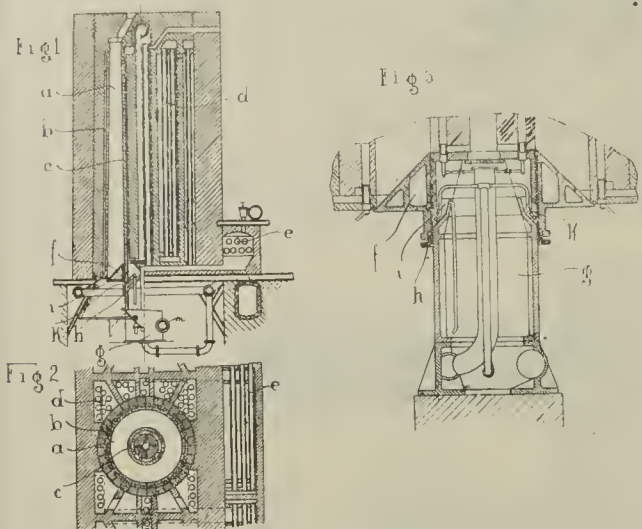
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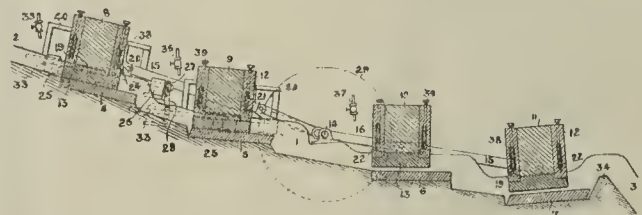
fusing agents: potash salts, sodium salts, lime salts, magnesium and aluminium salts, carbonates and sulphates, as well as chlorides, fluor compounds and the like. The process may be carried out as follows:—A certain percentage of aluminium sulphate is added to the binding medium and is intimately mixed therewith. The mixture is combined with the coal nuts in the known manner, conveyed to the forming machine, is formed and is further treated, if necessary, in the known manner. (Three claims.)

26301 (1912). *Improvements in or relating to Apparatus for Making Gas and Coke.* H. Nelsen, of 117, Julienstrasse, Essen-Rüttenscheid, Germany.—Relates to an improvement in or modification of the vertical annular coke oven which forms the subject matter of prior Patent Application No. 14376 of 1912. According to the present invention, the stopper closing the bottom of the annular coke chamber of the oven is packed relatively to the central part of the oven by means of a stuffing box. A water receptacle is arranged in the interior of the central part or column of the annular



oven, and when the stopper is lowered for the purpose of emptying the oven the water contained in the said receptacle can flow on to the coke. Moreover, quenching nozzles are provided to enable the coke to be quenched from the inside. It is preferable to arrange this latter quenching device, so that the cocks of the quenching pipes are opened automatically by the lowering of the stopper. A constructional example of the invention is shown in the drawings, in which figs. 1 and 2 show the complete oven, and fig. 3 illustrates on a somewhat enlarged scale the adjustable stopper. (Four claims.)

28417 (1912). *Improvements in Crushing and Grinding Mills.* T. Angus, of the Ariston Mine, Ariston, Transvaal, South Africa.—Relates to apparatus for both crushing and grinding ores and the like. The accompanying drawing



shows a sectional elevation of apparatus designed for crushing and grinding quartz and similar hard ore. (Seven claims.)

#### CATALOGUES AND PRICE LISTS RECEIVED.

The A.E.G. Journal for October contains, amongst other attractive features, articles on factory lighting and power transmission at Berlin.

The latest date-card issued by Messrs. Mavor and Coulson Limited (47, King-street, Mile End, Glasgow), gives data of the performances of a "Pick-Quick Baby" electric coal-cutter in an inclined and faulted seam.

In the *Brush Budget* for October there are some interesting photographs of the Lungstrom turbine, the first example of which installed in this country has now been running for some months at the Willesden Station of the North Metropolitan Electric Power Supply Company. There are also photographs of crane motors and steel wagons for India.

In commemoration of the recent visit of the Institution of Mining Engineers to their Park Works, Manchester, Messrs. Mather and Platt Limited have published a handsome brochure describing the various departments. A description of these up-to-date works has already appeared in the *Colliery Guardian*.

#### NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

##### Applications for Patents.

24967. Washington apparatus for the separation of substances varying in specific gravity. E. M. Blythway.
24979. Fans, ventilators, and the like. K. M. Anderson.
25025. Jigging machines. E. Schuchard.
25040. Process and apparatus for the production of tin-plates and tin-plate substitutes. S. O. Cowper-Coles.
25041. Production of tin-plates and tin-plate substitutes. S. O. Cowper-Coles.
25042. Coating metallic sheets with other metals. S. O. Cowper-Coles.
25049. Apparatus for the manufacture of tin, terne, and like plates. P. B. Taylor and G. A. Taylor.
25063. Method of and apparatus for actuating the stamping mechanism of coal and other stamping machines. Hartung, Kuhn and Co., Maschinenfabrik Akt.-Ges.
25064. Pumps. H. Davey.
25065. Hydraulic compressor. H. Davey.
25117. Turntable used for shipping coal. A. Kennedy.
25123. Governing arrangements of turbines. E. D. Rendell.
25153. Mechanism for driving reciprocating pumps. D. James.
25155. Rock-drilling machine chucks. T. S. Jory.
25159. Railway and like wagons. W. H. Lewers. (Percy Grant and Co. Limited, Argentine.)
25171. Electric furnaces. F. T. Snyder.
25179. Process of welding rails or the like, and apparatus to be used therein. T. Goldschmidt Akt.-Ges.
25182. Welding rails and other fixed constructional parts. T. Goldschmidt Akt.-Ges.
25190. Method of forming sheet metals into rods or supports. J. E. Sonnier.
25204. Driving mechanism for well-boring and like appliances. J. Wells.
25210. Miners' electric safety lamps. J. G. Patterson.
25219. Mechanical telegraphs particularly adapted for use in connection with coalmines and the like. Mechan and Sons Limited and J. Wilkinson.
25260. Air compressors. J. Orten-Böving.
25279. Steam generators for Lancashire or Cornish boilers and the like. J. P. Davies.
25285. Method of forming sheet metals into rods or supports. J. E. Sonnier.
25287. Brick press. J. Stretch.
25291. Apparatus for pulverising coal. T. M. Coyle.
25301. Ropes and the like. A. Erbe.
25311. Process for the manufacture of a rustless internal-bore steel or iron tube. W. H. Gold and W. Gold.
25318. Method of and means for preventing the accumulation of firedamp in coal and like mines. J. Kempermann.
25322. Automatic mining signal indicator. J. Skipsey and R. Urwin.
25323. Lubricating device for axle bearings. H. Poetter.
25335. Earthing and bonding clip. J. H. Powell.
25341. Vehicles and apparatus employed in transporting, weighing and discharging minerals and the like. A. Redford and Sir W. Williams.
25366. Conveyors for use in coalmines and other places. J. Bowman and J. Jackson.
25367. Conveyors for use in coalmines and other places. J. Bowman and J. Jackson.
25405. Process for the preparation of a solution which ensures a considerable economy in coal. H. Lewison.
25412. Miners' safety lamps. Schoeller and Co.
25431. Stacking, drying, and discharging peat fuel and other like substances. J. Phillimore.
25478. Crucible furnaces. A. C. Ionides, jun.
25520. Centrifugal pumps. C. F. Chance and W. T. Gidden.
25527. Safety-hook for use with chains. F. Lody.
25539. Gas and coal dust expeller for use in coalmines. W. Birtles, R. R. Craven, and E. V. Garton.
25567. Hard commercial pitch. C. N. Stevens.
25582. Rotary drilling or boring heads, crowns, bits, and the like. F. G. de Ferrières and S. L. Kling.
25585. Ammonia gas condensers. J. Dwyer.
25588. Reversing regenerative furnaces. L. L. Knox.
25590. Manufacture of fireclay gas-retorts and the like. G. V. Evers and J. Pearson Limited.
25598. Leakage protective devices for alternating-current distribution systems. British Thomson-Houston Company Limited and E. B. Wedmore.

##### Complete Specifications Accepted.

To be published on November 27, 1913.

1912.

21560. Smelting furnaces. Holroyd.
22240. High explosives. Pierce.
22355. Waterproof covering of electric cables. Beaver and Claremont.
25081. Gates for pit cages. Dando.
25251. Process for dephosphorising pig iron. Pasquier.

25326. Apparatus for obtaining gases from solids. Weston.
25370. Refractory and heat-insulating material. British Thomson-Houston Company (General Electric Company).
25385. Treatment of peat and other organic bodies to facilitate the removal of water therefrom. Keeble and Keeble.
25417. Internal combustion engines. Mather and Chorlton.
25484. Rotary drying-machines. Maycock.
25490. Apparatus for ore concentration. Broadbridge Howard, and Minerals Separation Limited.
25635. Automatic couplings for railway vehicles. Andronikoff.
25832. Process of and apparatus for distilling petroleum and other hydrocarbon oil. Turner.
26637. Drilling, boring, and like machines. A. A. Jones and Shipman Limited, and Shipman.
26718. Two-speed gear for driving-rolls in the manufacture of tinplates and such like. Power Plant Company and Wiesengrund.
26888. Control of air in mines when a fire or an explosion occurs. McCarrick.
27298. Draw-bench wagons. Hayes.

1913.

1001. Safety suspending grip for mine cages and the like. Morris, Hulme, and Bufton.
1190. Centrifugal liquid pumps. Woodroffe and Hodgson.
1635. Gas furnaces. Wefer.
1831. Transporters, trucks, and the like. Vickery.
1928. Explosives and their use for blasting. Soc. L'Air Liquide. (Soc. Anon. pour l'Etude et l'Exploitation des Procédés Georges Claude.) (February 1 1912.)
2218. Settings of boilers and the like. Poulton and Timms Limited and Woods.
2314. Portable breathing apparatus. Schumann and Hanseatische Apparatebau Ges. vorm. L. von Bremen and Co.
4494. Roller mills. Schuchard.
6587. Explosion-proof inner cover for cable wells. Eickhoff.
7647. Centrifugal ore separator. Habermann.
10482. Centrifugal machine for the manufacture of foundry cores. Fauquet.
11228. Method of manufacturing combustible substances in an agglomerated form. Rossi.
12441. Jigging machines. Schuchard.
12444. Electric furnaces. Compagnie pour le Traitement des Metaux et des Minerais par Electricité.
12521. Conveyors for use in furnaces and analogous apparatus. Anderson, Meikle and Fulton.
15536. Rotary feed pumps. G. and J. Weir Limited and Petermoller.
15555. Combined buffer and drawgear for railway and like vehicles. Davis.
15657. Surface condensers. Akt.-Ges. Brown, Boveri et Cie.
15951. Safety devices for electric conductors. Giles.
16183. Drawbenches. Rahm.
17197. Balancing means for steam or gas turbines. Aktiebolaget Ljungstroms Angturbin.

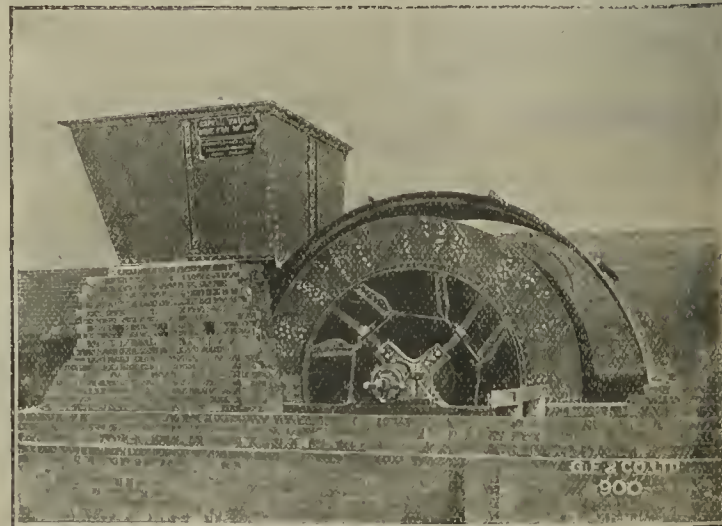
##### Complete Specifications open to Public Inspection before Acceptance.

1913.

14230. Process and apparatus for continuous distillation. Raschig.
19445. Method and apparatus for separating substances of different specific gravity. Gündler.
18031. Feed apparatus for bucket conveyors or transporters. Soc. Burton Fils.
21380. Method of manufacturing division plates for centrifugal apparatus. Christenson.
21381. Method of manufacturing division plates for centrifugal separators. Christenson.
23109. Masks, helmets or the like for use with respirator apparatus. Dragerwerk Heinr. and Bern. Drager.
24479. Apparatus for extinguishing fire by means of carbonic acid. Aktiebolaget Luc.

**The Edward Medal.**—The King has awarded the Edward Medal of the second class to Thomas Thomas, a colliery mechanic, for his plucky conduct in descending a shaft by means of a rope and rescuing a party of seven men who while engaged on a stage walling the shaft in a pit at Gilfach Goch, Glamorganshire, were precipitated to the bottom. His Majesty has awarded a similar decoration to Matthew Withers, a colliery deputy who, at great risk, rescued a dataller who was buried by a fall of roof at Annesley Colliery, near Nottingham. After Withers had partially extricated the man another fall occurred, burying both men. Withers managed to get free, and in spite of the injuries he had received and the danger of further falls persisted in his efforts until his fellow workman was freed.

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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

FRIDAY. NOVEMBER 21. 1913.

No. 2760.

## ELECTRIC WINDING ENGINES.

[SPECIALLY CONTRIBUTED.]

An electric winding engine may be classified according as the winding motor is an alternating, or a direct current, machine. Each of these two classes has its merits and demerits, and the decision as to which to adopt in any particular case must depend upon the duty for which it is to be designed, and upon the local conditions. Every proposition for winding electrically, therefore, must be carefully examined, and without reference to precedents. No definite rule can be enunciated for determining the type of winder to instal. Each system has its opponents and adherents, and it is by no means unusual for two manufacturers tendering for winding plant for the same duty to offer totally different types of plant. In the limit, however, it is probable that the true criterion as to which type of plant to adopt in a particular instance is the relative importance of the initial and running costs. Even this rule is only arbitrary, and it can only be regarded as forming a basis on which to make a decision. A useful (though not strictly logical) corollary to this rule is that where the power supply is limited, and where heavy fluctuations of load are therefore not permissible, the direct-current system is the better. Where, on the other hand, electrical supply is cheap and plentiful, or where the initial outlay is to be reduced to a minimum, the alternating system is preferable.

The electrical supply available to any colliery company contemplating electrification of their winding engines, is most invariably three-phase alternating current. The adoption of a direct-current system of winding, therefore, involves conversion from alternating to direct current. In the A.C. system, on the other hand, the alternating supply may usually be applied directly to the winding motor without the intervention of any additional electrical plant other than the necessary switchgear. Thus, in the one system of winding, converting plant and a direct-current winding motor are employed; in the other system only a slip-ring induction motor is required. Being the simpler of the two, let us consider this system first.

### A.C. System: Rheostatic Control.

In this system an A.C. winding motor is used. This motor is almost invariably of the slip-ring induction type—induction, owing to the difficulty of obtaining adequate speed control on other types of A.C. motors such as synchronous and commutator motors; and slip-ring, in order that resistances may be inserted in the motor rotor circuit to obtain the necessary speed control. The motor usually drives the winding drum through a single or double reduction gearing, as by this means a high-speed—and therefore a comparatively cheap—motor may be used. Furthermore, a better power factor is obtainable with a high-speed than with a low-speed motor. The control gear for such an equipment consists merely of a variable resistance inserted in the rotor circuit, control and reversing switches in the stator circuit, and the necessary recording and indicating instruments, together with adequate protective devices. A sketch of the electrical connections for such an A.C. rheostatically controlled winding engine is shown in fig. 1. In this figure, M represents the motor,  $S_1$  and  $S_2$  the stator reversing switches, and R the controller in the rotor circuit. In the case of small (and therefore usually low-voltage) winding motors, the stator reversing switches and the rotor rheostat may be combined into a single controller—usually of the drum type. With large (and therefore usually high-voltage) motors, it is not permissible so to combine the stator and rotor control gear in the one controller. Such a combination would be dangerous in view of the liability of the high-tension circuit to make contact with the low-tension circuit, and of the possibility of shock to the driver. All speed control is obtained by varying the rotor resistances—*i.e.*, by adjusting the main controller. Reversal of rotation is obtained by changing over from the one stator switch to the other, because these switches are so interconnected that the changing from the one to the other inter-

changes two of the stator leads, and thus reverses the direction of rotation.

The advantages of this system are (a) it is comparatively inexpensive, (b) it is simple to operate and control, and (c) there are no small auxiliary apparatus to get out of order. Its great disadvantages are (a) the load on the motor is very variable, and the peak loads are of comparatively long duration; in consequence, a very fluctuating demand is made upon the supply, (b) the motor is very inefficient at the low speeds, so that the electrical consumption is high. The reason of the low efficiency is that in the induction motor the power input is proportional to the product of the torque and the synchronous speed. The power taken out of the motor, however, depends upon the product of the torque and the actual speed. The efficiency of the motor is, therefore, evidently proportional to the ratio of the actual speed to the synchronous speed—*i.e.*, it varies inversely with the slip of the motor. Thus, with a constant torque, the efficiency of the induction motor at half speed is only half that at full speed. The surplus

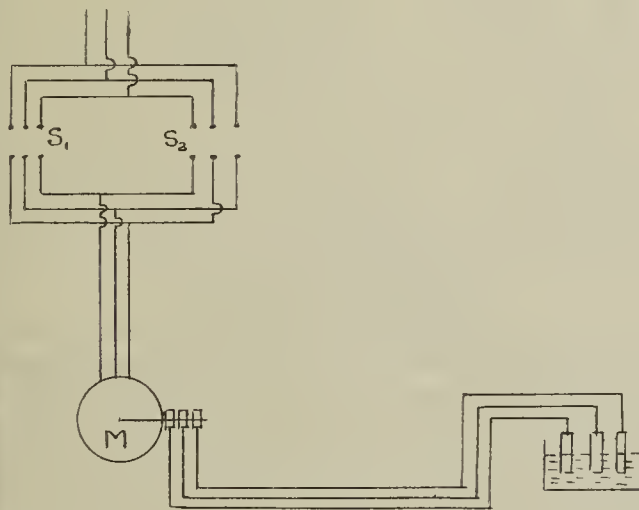


FIG. 1.

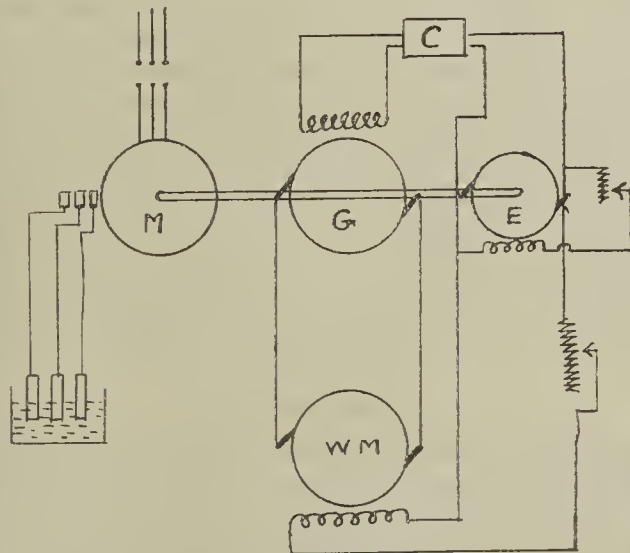


FIG. 2.

power supplied into the motor must be absorbed in the rotor circuit. As this surplus power is, under certain conditions (*i.e.*, at half normal speed), actually equal to the useful load on the motor, it will be appreciated that the controller in the rotor circuit has to dissipate a large amount of heat, and therefore soon becomes unwieldy to handle unless specially designed. The small controllers may have metallic or liquid resistances. All large controllers, however, are of the liquid type. In the especially large ones the electrolyte is continuously circulated by means of a small pump, the electrodes being fixed. The resistance of the controller is varied by varying the position of a small sluice gate which controls the depth of the electrolyte, and therefore the area of the electrodes immersed therein.

### D.C. System: Ward-Leonard Control.

In this system the winding motor is a direct-current machine, and is supplied directly from a special variable voltage generator. Since, in most cases, the supply available to any colliery is three-phase alternating current, this generator is usually driven by a slip ring

induction motor. If the supply is direct current, on the other hand, it is driven by a direct-current motor. The armature of the special variable voltage generator is connected directly to that of the winding motor. The winding motor is separately and constantly excited, all speed regulation being obtained by adjusting the excitation of the generator, *i.e.*, by varying the voltage applied to the motor. Reversal of rotation of the winding motor is effected by reversing the generator field, *i.e.*, by reversing the sense of the voltage applied to the winding motor. This system of control is known as the Ward-Leonard system. The electrical connections are shown in fig. 2.

The equipment consists of the motor generator, the exciter for the generator and winding motor, the winding motor, and the necessary control and protective gear. The exciter is usually direct coupled to the motor generator. In fig. 2 M represents the motor of the motor generator set (in this case a slip ring induction machine), G the Ward-Leonard generator, E the exciter, and WM the winding motor. It is seen from this figure that the armature of the generator is connected directly to that of the motor, and that the generator and winding motor fields are excited from a separate exciter. In the field of the generator, a special controller C is inserted to enable the generator excitation to be varied and reversed. For the sake of convenience of adjustment, a rheostat is also usually placed in the winding motor field.

These are the fundamental features of the Ward-Leonard system. The fundamental principle of the system is that the speed and direction of the direct-current motor may be varied by varying the magnitude and the sense of the voltage applied to its armature, the motor being constantly and uni-directionally excited. To enable the voltage applied to the motor to be varied and reversed at will, and without any rheostatic losses, a special generator is required of which the voltage may be varied and reversed. Of course, in many cases, the speed of a simple direct-current motor is controlled by varying the voltage applied to it by means of series resistances. The difference between this series system of control and the Ward-Leonard system is that the voltage in the latter case is controlled by controlling the excitation of the generator, and not by the insertion of series resistances. By this means, the rheostatic losses inseparable from the series system of control are avoided, and herein lies the great advantage of the Ward-Leonard system. In the Ward-Leonard system, therefore, all speed control is obtained by controlling the excitation of the generator. As the current flowing in this circuit is, in any case, comparatively small, it follows that the controller is light and easy to handle.

In addition to the various gear enumerated above, protective devices are required with the Ward-Leonard equipment to protect the plant against overload, failure of supply voltage, accidental overwinding, excessive speed, excessive acceleration, and other undesirable or dangerous conditions.

The most important advantages of the Ward-Leonard system are that it involves no rheostatic losses (excepting the small losses in the controller), and that it affords a very delicate speed control. Furthermore, it dispenses with the necessity of providing reversing switches in the incoming supply feeder. Its disadvantages are its high initial cost as compared with the straight A.C. rheostatic winder, and the complication and insecurity involved by so many machines and auxiliaries. As already indicated, the straight A.C. rheostatic winder is generally preferable to the Ward-Leonard winder in cases where initial cost is the determining factor. As regards consumption and economy of running generally, the Ward-Leonard system is economical when the length of the acceleration period of the winding cycle is large compared with the total time of the wind. In cases where the winding cycle is long, and the acceleration period short, a straight A.C. winder usually gives better results than the Ward-Leonard. In such cases, however, the supply system must be extensive enough to withstand, without disturbances, the heavy load fluctuations incidental to a winder designed for such a duty.



An important feature of the Ward-Leonard system is that it is a regenerative system. During braking periods the winding motor can be used as a generator, and thus to feed back on to the supply system.

#### Equalised Systems.

In the two methods of winding just described, the fluctuations of load during the winding cycle have been ignored. In practice, however, one cannot always afford to do this, owing to the limited capacity of generating plant and distributing systems. For this reason, special means are occasionally resorted to for preventing such fluctuations and for taking a reasonably constant demand from the supply system throughout the winding cycle. Of course, it is not possible to keep this demand absolutely constant. It is evident that during the acceleration period of any cycle the power taken is considerably more than during any other period. Winding systems involving these special means of equalising the electrical input are known as "equalised systems."

Practically all equalising schemes depend upon the principle that a rotating mass will give out energy if its speed be reduced. The amount of energy so given out is proportional to the product of the weight of the rotating mass and the difference between the squares of the maximum and minimum speeds. The actual equation, in fact, is:

$$\text{Energy given out} = \frac{W}{2g} (V_1^2 - V_2^2) \text{ footpounds,}$$

where  $W$  represents the weight of the mass in pounds, and  $V_1$  and  $V_2$  the maximum and minimum speed in feet per second of a point fixed on the circumference of gyration. Conversely, of course, if the speed is raised from  $V_2$  to  $V_1$  the flywheel will absorb the same amount of energy. This principle is used for equalising purposes on winding engines by arranging a heavy flywheel automatically to impart energy to the winding drum during periods of heavy loads, and to store energy during periods of light load.

From what has been said, it will be seen that equalisers are employed solely in order to obtain better

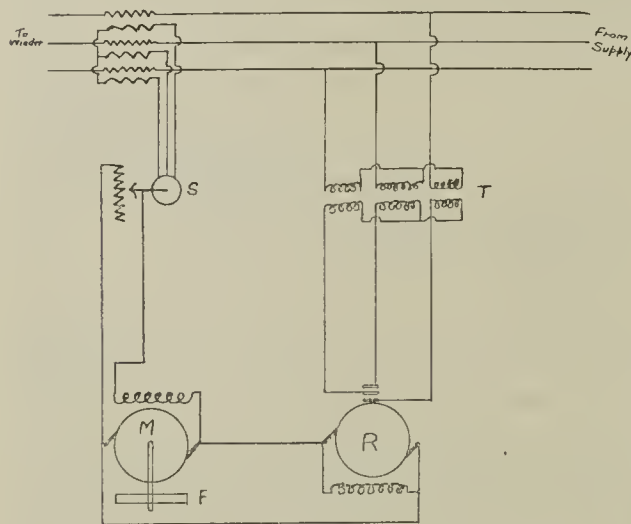


FIG. 3.

load factors. This, of course, is of benefit only to the power supply company, and affects the colliery owner only in so far that, by improving his load factor, he is often able to get more favourable terms from the supply company. Equalising, therefore, should be resorted to only where the supply system is small, and where heavy fluctuations will therefore be prohibitive. Equalised systems have the inherent objection that money must be expended on plant which cannot be utilised except for equalising purposes. In many cases, in fact, it is economically better to expend the same amount of money upon increasing the capacity of the supply system—i.e., upon generating plant, and thus dispense with the necessity of equalising.

#### Equalised A.C. Systems.

The best known example of this is the Westinghouse rotary converter equalising system, a simple diagram of connections of which is shown in fig. 3. In this system, a small rotary converter is employed to convert from the A.C. supply, and to feed a variable speed direct-current, shunt-wound motor direct coupled to a flywheel. This rotary converter is supplied from the A.C. feeder supplying the winding motor. By means of a device known as a "slip regulator," a heavy current in the H.T. mains is made automatically to increase the excitation of the direct-current motor. This causes the speed of the motor, and of the flywheel coupled to it, to drop, and the back E.M.F. of the motor increases to such an extent that it exceeds the continuous current voltage of the rotary and feeds back into the A.C. supply, the rotary then running inverted. During braking periods, therefore, the energy stored in the flywheel is returned to the line, thus partly relieving the demand on the generators and so tending to equalise the load

thereon. During periods of light loads, the reverse action takes place—i.e., the slip regulator reduces the excitation of the motor, thus raising the speed of the flywheel and re-energising it.

The great advantage of this rotary equalising system is that the rotary (with the motor-flywheel set and slip-regulator) may be erected anywhere without regard to the actual location of the winding engine. The only essential point is that the rotary is connected in parallel with the winding motor and to a point on the feeder which is intermediate between the winder and the generating station. It is further easy to see that one rotary may be arranged to equalise the load on a feeder supplying more than one winder. Furthermore, the rotary need be only of a small capacity, because it converts only the difference between the average and the maximum load on the feeder. Finally, the rotary may

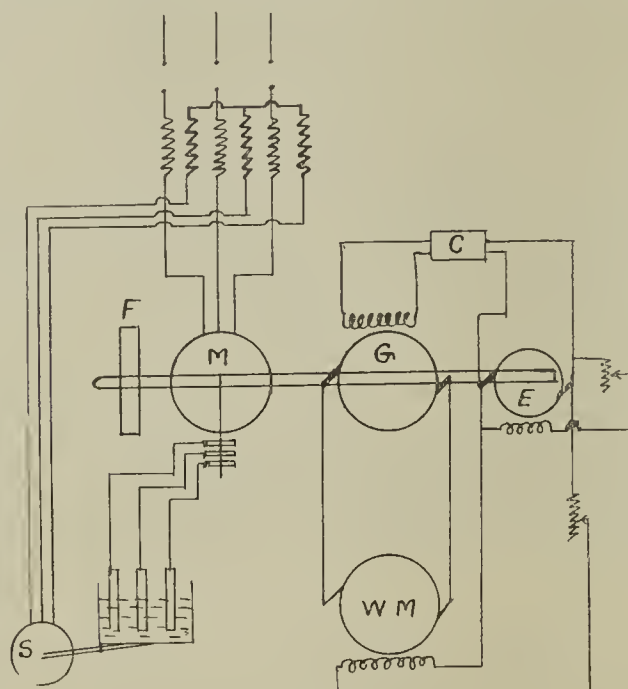


FIG. 4.

be employed as a power factor rectifier, and thus to counterbalance the lagging current taken by other induction plant connected to the system.

#### Equalised D.C. System.

The most important example of this is that known as the Ilgner system, and is used with Ward-Leonard winders. The flywheel in this case is coupled directly to the Ward-Leonard motor generator, and the slip regulator is so arranged as automatically to increase the resistance in the rotor circuit of the induction motor of the motor generator as the load on the motor generator increases. This increase in the rotor resistance causes a drop in the speed of the motor generator, and therefore in the speed of the flywheel. The flywheel, therefore, imparts energy to the motor generator. With low load, the slip regulator decreases the rotor resistance; the speed of the motor generator therefore increases, and the flywheel re-energises itself. Thus the energy taken from the line tends to remain constant. It is thus seen that the Ilgner system is nothing more than the Ward-Leonard system with a flywheel and slip regulator added. The disadvantage of the Ilgner system is that it can be applied only to the Ward-Leonard winders. Its advantage is that it is comparatively cheap.

**Claim for Demurrage at Hull.**—In the Hull Admiralty Court last week, his Honour Judge Lock heard an action for demurrage brought by the owners of the ss. "Kinsale" against Messrs. Michael Whitaker Limited, coal exporters, as indorsees of a bill of lading. By the charter party it was provided that the "Kinsale" should proceed to Genoa or Spezzia and deliver her cargo, and that the cargo was to be taken from alongside by the consignees at the port of discharge free of expense and risk to the consignees at the average rate of 500 tons per day. If longer detained the consignees were to pay the owners of the steamer demurrage of 4d. per net register ton per running day. The time was to commence when the steamer was ready to unload, and written notice given whether in berth or not. The bill of lading was dated June 21, 1912, and the cargo of 3,600 tons of coal shipped at Hull was to be delivered at Spezzia. The bill of lading was duly endorsed by T. P. Rose Richards Limited to the defendants, as receivers and owners of the cargo. The "Kinsale" was ordered to Spezzia, where she arrived on the evening of July 1, but plaintiffs contended that the cargo was not taken from the vessel at the rate mentioned in the charter party, and that the unloading of the vessel was not completed on July 11, but one day two and a-half hours beyond the time allowed. For this demurrage of £28 6s. 1d. was claimed. The evidence in the case had been taken on commission. After lengthy arguments by Mr. George Langton for the plaintiffs, and Dr. T. C. Jackson for the defendants, his Honour gave judgment for the plaintiffs for £22 8s. 7d. and costs.

#### THE FIRE AT THE CADDER COLLIERY.

A report of a formal investigation under section 83 (1) of the Coal Mines Regulation Act, 1911, of the accident which occurred at the Cadder Colliery on Sunday, August 3, 1913, and of its causes and circumstances, by Sir Henry Cunynghame, K.C.B., has been issued as a White Paper. [Cd. 7133.]

#### The Colliery.

The Cadder Colliery, of which the Carron Company are owners, lies about four miles to the north of Glasgow. The entrance to the mine is by means of a downcast shaft called No. 15 pit, at which the men descend and ascend and the coal is drawn to the surface. This shaft is about 169 fathoms deep. At the bottom the main haulage road, or "main dook brae," which also serves as an intake airway, goes 45 yards in an easterly direction. It then turns N.N.E. and runs in that direction, dipping downwards for about 1,500 yards. About 125 yards from the pit bottom there is a cabin which is used by several of the firemen and where books are kept. This cabin is built partly of brick, being formed of an old bricked and arched roadway which led in a northerly direction into the mine. When this old roadway was abandoned and a new one driven, the corner became dangerous and a fall of roof occurred; consequently the roof of the new roadway was strengthened by means of iron girders, and upon the top of them a quantity of timber was laid. In technical language the roof was "lofted." The timber so placed consisted of props laid crossed upon one another as is done in building an ordinary "cog." The depth of the layer of timber was from 10 to 13 ft. Next to the cabin was a telephone space, and next to this again an electric switchboard room, roofed with steel I girders, upon the lower flanges of which were placed steel plates and on the top a packing of timber similar to that over the cabin. The main cables led down the shaft to a switchboard placed in the switchboard room. They were single cables armoured; from the switchboard two unarmoured cables led back to a lighting switch 70 ft. from the pit bottom. These cables consisted of seven strands of No. 14 wire, rubber-insulated, taped and braided, and were supported on porcelain insulators as far as the haulage-switch; after that they were suspended by flexible cords affixed to nails in the timber of the roof.

Direct current was supplied at 500 volts and the lamps were put in groups in series on this cable. Some were of 120 volts and some of 250 volts. Electricity had been used in this pit in 1906, but in June 1913 it was reconstructed and remodelled. Single cables (armoured) led inbye from the switchboard into the mine to work coal-cutters and pumps. There was no suggestion made by anyone but that the electrical work was well and substantially done. It will be observed, however, that the lighting cables were unarmoured.

The main haulage road ran on, as has been said, N.N.E. Out of it side levels branched off. The first was No. 1 level at about 750 yards from the pit bottom, then followed No. 2 level, leading on the east side to the communication road to No. 17 pit; Connor's level, No. 3 level, Stewart's level, and No. 1 machine level, all crossing the main haulage road as shown on plan. The faces lay in a large irregular circle about 700 yards in diameter, having its centre in a point in the main airway some 1,000 yards from the pit bottom. The parts being worked on Sunday, August 3, 1913, when the accident happened, were No. 1 machine section at the extreme north-east of the mine, and No. 2 machine section at the north-west of it. Repairs to the roof were also being done, but no coal was being drawn to the surface. These parts were fed with air from the intake airway, which split right and left at various parts of the haulage road. The main return airway led from No. 2 machine section from west to east, right across the mine, crossing the main intake airway at a point about 1,000 yards from the pit bottom. It then took a south-easterly, and finally a southerly direction, ending in an upcast shaft called No. 17 pit, about ½ mile from No. 15. This return airway was called "the communication road."

It will be seen that a fire occurring at the cabin would give rise to smoke, which would be carried into and distributed into all the airways of the mine, and finally emerge from the upcast shaft at 17 pit. One way of preventing the smoke going in so as to reach the men working at No. 1 or No. 2 machine level would be to open a door somewhere, either into the communication road or into some one or other of the levels, and thus divert the incoming air and smoke with it directly or indirectly into the return airway, leaving the air in the working places uncontaminated with smoke. In this way the men working there could have remained with, in all



probability, sufficient air to breathe till they could be rescued. The other way, when once it was known that the fire was near No. 15 pit bottom, of course was to reverse the air current so as to send the smoke up No. 15 pit. In this mine the arrangement provided for this purpose was a steam jet which was led about 40 fathoms down the shaft and then turned upwards. The quantity of air sent down into the mine was usually 20,000 cubic feet per minute, and it was agreed by all parties that the mine was well worked and that the officials and men were efficient.

The pit was a naked light pit. The firemen had safety lamps, the miners carried the small tin oil lamps usually employed in Scottish mines.

The district general manager is Mr. James Bonar. The manager of No. 15 pit is Mr. Archibald Spiers. The total number of men employed underground is about 290. The total output of coal was about 400 tons per day.

The Day of the Accident.

On Sunday, August 3, at about 3 p.m., a back shift of 25 men, under the charge of fireman Reilly, went down No. 15 pit. Their departure was superintended by J. Owens, the under-manager. They had all naked lights except Reilly and McCann, the last-named of whom was going to work in an exploring place to the extreme north of the mine. The men were substantially divided into three groups. One, of eight men, was to work in No. 2 machine section; two men, Alexander Brown and

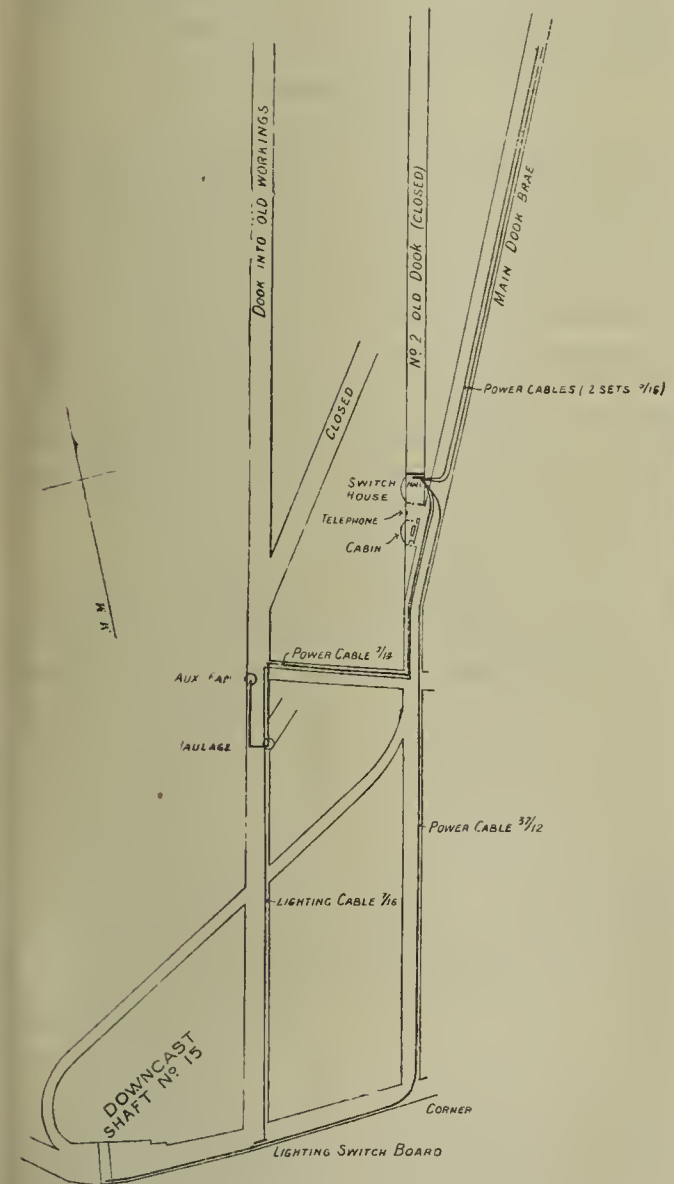


FIG. 1.—PLAN SHOWING POSITIONS OF CABLES, SWITCH PANEL, ETC., IN PIT BOTTOM.

Hugh McCann, were to work at pumps at the extreme north of the mine, and the remaining 15 were to work a coal-cutter and do other work in No. 1 machine section on the eastern side. Charles Reilly, the fireman, was to superintend them all. As it was Sunday, the usual pit headman was not employed, but John Lees, a boiler furnaceman, acted at the pithead and took the names, as required by the Eight Hours Act. No coal was to be drawn, and the checkweighman was not present. A set of rules was in force at the colliery, made under the Coal Mines Regulation Act of 1887, which provided that, in the absence of a bottomer, the signals might be given by the fireman if duly appointed for that purpose. The new regulations do not allow the fireman to act as bottomer. It was usual to have a regular bottomer on weekdays: on Sundays it was usual, if the man Etherson who usually acted as bottomer on weekdays went down, to send him to work away from the bottom. The fireman usually acted as bottomer on Sundays. On the day of the accident, Sunday, August 3, Etherson did not go down the mine at all, but Reilly, the fireman, rang the men down, and then went to his duties of examining the mine, leaving the bottom of the shaft unattended until he returned.

**Lamps and Matches.**

The back shift, as has been said, descended about 3 p.m. and proceeded to the cabin at the top of the brae, 125 yards from the pit bottom. Here some of them took off their coats and left them hanging near the cabin and some in the telephone space. Most likely the coats contained matches and perhaps pipes—they generally took their matches and pipes to their working places. Others carried their coats further inbye. They then all proceeded down the main dook brae to the lamp station, where they waited until Reilly had inspected the workings.

The lamps used by Scottish miners differ much from the candles usually employed by miners in England. They consist of a small tin something like a coffee pot with a lid that snaps down and a wick about 1/4 in. in diameter. The men provide their own oil for which

pockets. On going into the mine, each man sees that his lamp is trimmed and full of oil, and throws away an exhausted wick. While still burning, he will often cast it on the ground, and tread it out after he has lit his new wick from it. There is no evidence that the officials or men at the mine were careless in the use of their lamps.

**The Outbreak of the Fire.**

The men in the machine section No. 1 appear to have reached their station at about 4.30 p.m. and commenced work. Soon afterwards a fire broke out at or close to the cabin, and no doubt extended to the timber which lay over it. The smoke of this fire was, of course, at once carried along the main dook brae, and rapidly spread into the workings. At some time—probably about 6 p.m.—the fireman Reilly smelt smoke, and concluded that something was wrong. He appears to have

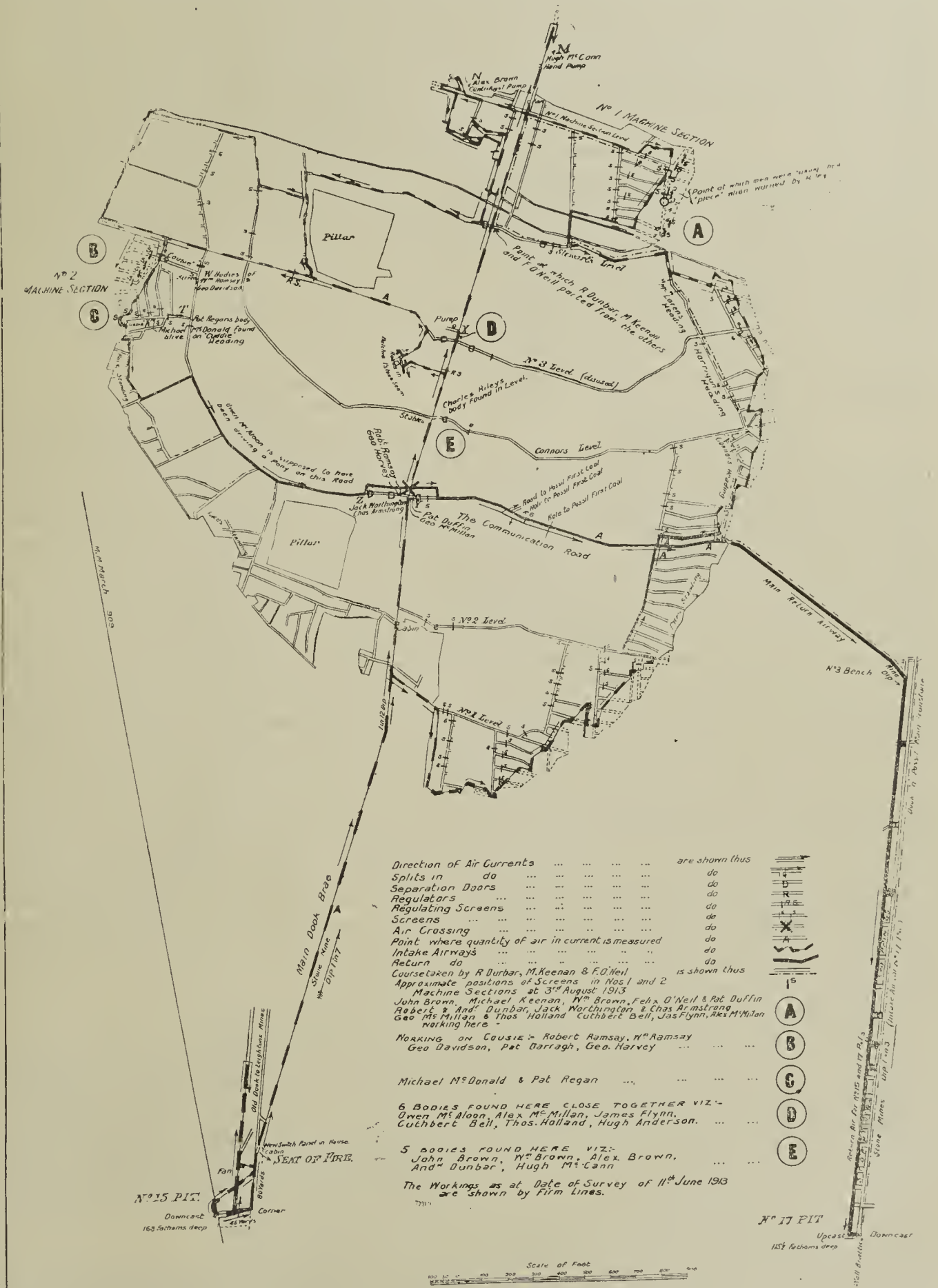


FIG. 2.—PLAN OF UNDERGROUND WORKINGS AT NOS. 15 AND 17 PITS.

they pay about 2s. 3d. per gallon. This oil is called "seal oil," but is composed in reality of fish and cheap mineral oil, with upwards of 50 per cent. of heavy Scottish paraffin oil mixed with it. The flash point of the compound is high, and Sir Henry Cunynghame says he could not learn that it is specially inflammable or dangerous. The lamps are hooked on to the miners' caps, and in consequence of the movements of the wearer his cap and clothes become more or less impregnated with oil, which sometimes causes them to be set alight. In naked light pits the miners carry pipes and matches, and smoke when and where they please. This custom has existed for years and years, and they do not consider it dangerous, because there have been so few accidents from fire. The oil is carried down the pit in small tin flasks, and most miners have one in their

warned the men in No. 2 machine section, and then gone across to No. 1 section and warned the men there. The men in No. 1 section then went by way of No. 1 machine level and turned southwards into the main airway, down which the smoke was coming; they thus were going straight into danger. The two pumpmen went the same way. If a communication door had been opened, so as to short-circuit the air and smoke, and if the men had remained in their working places, it is probable that the whole of them might have been saved. It must, moreover be remembered that Reilly is reported to have said that he did not know where the fire was. He had never seen such a thing as a fire in his pit before, consequently his omission was only what many men would have done in like circumstances.

Among the men following this path was Robert



Dunbar, a man who was well acquainted with the roads and workings. He was followed by Keenan and O'Neil. Having, with very proper courage, waited for and revived O'Neil, who was one of his party of three, and finding the smoke very thick in the main brae, he turned eastwards into Stewart's level, in the direction shown by the dotted lines on the plan and, having gone through a door, got into the return airway (to a point he might have more directly reached from the place where he was working). Thence he went on by McLaren's and Harrigan's headings into Connor's heading, finally along the communication level and through the two doors at No. 3 bench, and into the downcast fresh-air way of No. 17 pit, which was supplying air to another mine, and so with his party escaped. His coolness, knowledge of the mine, and good sense saved his party; and had the others followed him, all might have been saved. His action illustrates the use of Rule 60 of the new regulations, which provides that where one of two ways of egress from a mine is along a road not usually travelled, every fireman shall at least once a quarter traverse the whole of such way in order to make himself thoroughly acquainted with the same.

The rest of the men who had been working in No. 1 machine section went into the main airway, and as they started about 6.30 p.m. it seems probable that by 7 p.m. or 7.30 they were all dead. Of the men in No. 2 machine section, four went along the return eastwards, but instead of continuing in the return and passing along the cross-road over the main airway, which was their only chance, they all went through the door leading into the main airway and perished. Of the four who remained in No. 2 machine section three died, but one, Michael McDonald, got into a "dead-end" of air, lived till Monday forenoon and was rescued. The total number of men who perished was 22.

#### The Rescue Operations.

There was no rescue apparatus at the pit. Although preliminary steps had been taken to form a brigade, no brigade had been formed, nor rescue apparatus of any description provided. Canaries and the other apparatus specified in section 5 (c) of the Rescue and Aid Order of April 2, 1912, had been provided. At 12 midnight Mr. McLaren, the senior inspector of the western part of the Scotland Division, arrived, and at once went down No. 17 shaft. By this time the reversal of the air-current had considerably cleared away the smoke and poisonous gas, and he was therefore enabled to get to the main road near where it is crossed by Stewart's level. Meanwhile, a rescue brigade had been telephoned for. The nearest was at Cowdenbeath, in Fife, about 50 miles away. They got the men together at 11 p.m., started at midnight, and arrived about 3 a.m. At first they were told that smoke helmets and bellows were all that was required, and Forrester went down with some, and some men, only to find they were useless and to come up and go down again with a party provided with the W.E.G. self-contained oxygen breathing apparatus. He came to where Inspector McLaren was, who asked him to take a canary and go southward along the main road—that is to say, backwards towards where the fire was. He fitted on the mouthpiece of the apparatus and did so, and found a number of bodies. As the canary was not affected, showing that the reversal of the air-current had now made that part of the mine safe, the ordinary rescue parties were able to complete their task of finding the bodies, and by mid-day on Monday all had been discovered. One, as before mentioned, Michael McDonald, was still alive, and was brought completely round with the help of Dr. Miller.

#### The Cause of the Fire.

In the first place it appears that the origin of the fire must have been either some failure of the electrical apparatus, or else a misadventure due to the accidental ignition of clothes, or a lamp wick or some timber. The expert witnesses, including Prof. Thornton, who was called on behalf of the miners, Messrs. Johnstone and Walker, divisional inspectors, and Mr. McLaren, senior inspector, were all of opinion that though it was possible that the fire had been caused by some failure of the electrical apparatus, yet that it was most probable that it was due in some way to lights or to lucifer matches. Sir Henry agrees in thinking that the cause of the disaster is uncertain, but that it is far more likely to have arisen from the accidental setting alight of some material by a match or otherwise than by electricity. In this connection a question arises whether the electric lighting cables should have been armoured. They would have been better armoured. The question of the legal position as to armouring is a difficult one, depending upon the interpretation of the Act of 1911 and regulations.

#### The Provision of a Bottomer.

A question that arises is whether there ought to have been a regular bottomer on August 3, and if not, whether one, whether he would have seen the

fire. The duty to appoint a bottomer is laid down by section 53 (2) of the Act of 1911 which came into force on July 1, 1912. It is true that by this Act the old rules under the Act of 1887, Nos. 56-65, which allow a fireman to act as bottomer were still in force when the accident happened, but the better opinion is that they were superseded so far as the necessity for a bottomer is concerned by section 53 (2) above alluded to. There should have been a bottomer, but the question is not free from doubt, and Sir Henry does not think that great blame can be attributed to the manager if he took a different view of the law. If there had been a bottomer constantly in attendance to answer signals as the Act requires, he does not think he would have seen the fire. All the witnesses who saw the fire concur in saying that they could not see it except by going to the corner, and this would have taken the bottomer out of hearing of the signal bell. Moreover, on that Sunday, he would not have had any cause to go there—there was no coal being drawn, and hence no necessity to clean up any fallen coal from the tubs.

The next question is, whether the opening of a door from the intake into the return would have saved the men. Sir Henry thinks it is proved that it would probably have done so if opened at an early period after the fire broke out, and if the men had then stopped in their working places. It is impossible to blame Reilly, the fireman, for not doing this, for his position was unknown, or it is not certain whether he could have opened a door without being overcome by the fumes. From the position of his body in Connor's level close to a door, it appears not improbable that he was actually going to open this door when he was overcome by the fumes.

#### Rescue Apparatus.

The next question relates to rescue brigades. The managers of the Cadder Colliery, on receipt of the circular, at once proceeded to obtain the names of men willing to form brigades, but they did not train their men, or provide any apparatus other than oxygen reviving apparatus and sick and ambulance box required by regulation (4) (c). The case they put forward was that they were determined in this matter to act in common with the other coalowners of Lanarkshire, and on a regular system. This plan would have been a good one, only unfortunately it was not carried out. In a circular letter dated April 8, 1913, Mr. Redmayne, the Chief Inspector of Mines, called attention to their failure, and on April 19, 1913, a circular was sent round by the Lanarkshire Coal Masters' Association to its members advising them to form the brigades and get the reviving apparatus, &c., but the circular went on to say that the kind of breathing apparatus required by the Act was being discussed with the provincial inspectors of mines for Scotland, and that a test case would be raised to determine the matter. On April 22, 1913, a letter was written to Mr. Walker by Mr. Baird, secretary to the association, in which it was stated that the question in the area covered by the association was "not one of emergency in the interests of safety," and that the executive were of opinion that for these mines smoke helmets and bellows apparatus were "the safest and most suitable," and that they "complied with the Act."

It is not necessary definitely to decide the legal question whether or not smoke helmets comply with the letter of the Act. It is certain that, however useful they may be to cope with fires which are restricted to small areas, they are not safe, or suitable, or sufficiently portable to be of use in an accident like this. Their uselessness in cases where considerable lengths of roadway are filled with smoke or fumes is not in dispute, and this was frankly admitted by the agent and manager of the Cadder mine.

The Commissioner continues:—

It has next to be considered whether, had the apparatus been provided, it would have saved life. It is, I think, as certain as any fact can be that depends on circumstantial evidence, that before the first alarm of fire was given upon the surface about 7.55 p.m., Reilly and all the men who worked in No. 1 machine section and at the pumps were dead. As to the men who had been working in No. 2 machine section, I do not think that a brigade, even if it had existed with the necessary apparatus at the mine, could have been got together in time to save them. The reason for this view was given at some length by Mr. Johnstone, who has probably more experience of underground fires than anyone in the United Kingdom. I agree with his views. I think that it is most probable that the smoke first began to be felt by the men in No. 2 machine section before 3 p.m. as said by McDonald in his deposition, and not at the later hour, 8.30, mentioned by him in his evidence. Mr. Walker's view coincided with that of Mr. Johnstone. I do not think that it is the least likely that a rescue brigade would have saved the lives of any of those who perished. Had they been alive at the time when such a brigade could have reached them they would, I think, have been revived and saved by the reversal of the air-current. As I have said, the

Cadder Company was in default in the provision of rescue apparatus as required by the regulations in force at the time of the accident. They had not even provided smoke helmets and bellows, nor had they acquired the privilege of calling for them from a rescue station within 10 miles distance, nor did any such station exist in that part of Scotland.

Some excuse might at first have been made for delay in complying with the Order, for there has been some doubt as to which is the best make of self-contained apparatus to employ, and some sorts of self-contained apparatus are, I believe, faulty, and even dangerous. They, however, do not seem to have been delayed by this consideration, for the association to whose decisions they adhered took the view that no self-contained oxygen rescue apparatus of any sort was necessary, and that smoke helmets and bellows were the safest and most suitable for the mines within the association. Although it is well known that self-contained oxygen rescue apparatus are as yet not all that can be desired, yet there is now, and was long previously to the Cadder accident, apparatus that was efficient, and that had been successfully employed in saving life.

In the present case, as I have said, I do not think that the absence of the apparatus was the cause of loss of life, but if the alarm of fire had been given earlier, it might well have been that the speedy arrival of apparatus on the spot would have saved the lives of the men. If a similar case were to arise to-morrow, and lives were lost for want of self-contained apparatus, what would be the position of owners who, in spite of every remonstrance, and in spite of the warning afforded by this case, failed to provide it? I shall be surprised if, after the experience gained in this accident, the colliery masters of Lanarkshire will be found still to maintain the position they took up. I can hardly believe that they will take their stand on legal grounds, even if they were valid, and decline to recommend to the members of their association the use of the only apparatus proper to deal with all difficulties that may arise.

#### Air Reversal.

As to the adequacy of the air reversal apparatus, Sir Henry Cunynghame thinks that must be a question of fact in each case. Mr. Walker, in the course of his evidence, said that reversal by means of a steam jet was not in general advisable—that it had been put in as a temporary measure, and was now being replaced by arrangements for reversing the air by means of a fan. It appears that a "spade" or blank flange had been put into the steam pipe by the engineman on his own initiative, without the knowledge of the officials of the mine. It was removed in three or four minutes when the air reversal was effected, and does not seem to have had any influence on that operation; he thinks that the air reversal proved "sufficient" in this case.

#### Underground Telephones.

There was a telephone circuit in this pit, consisting of a single wire leading from No. 17 to No. 15, and then down the downcast shaft and along the main dook brae. At various points of it, telephones were fixed with earth returns. The circuit did not lead right round to the upcast shaft. One of the disadvantages of this arrangement is that an accident to one part of the line may throw out of action all the telephones on the rest of the circuit. No telephone message of the fire was sent up. This, no doubt, was because telephonic communication was severed at the cabin. The severance seems to have destroyed communication not only between the main dook brae and the surface, but also between the two pit heads on the surface. If an independent telephone circuit had existed along the return air road it might possibly have saved all the men in this case.

In future, telephonic communication should, so far as possible, be independent and arranged so as not easily to be put out of working by injuries to parts of the circuit, and Mr. Murray, who appeared for the company, expressed the same view. A new telephone system has been devised for use in mines, which will be independent of accidents to the wires. If this turns out to be practicable it ought to be very useful, and might, in cases of disaster, be invaluable in ascertaining the position of men in the pit, and of assisting in the direction of the operations of the rescue parties.

#### Other Recommendations.

Sir Henry adds:—

I think also that this case shows the desirability of making cabins as fireproof as possible, especially in mines where naked lights are employed. Here, above the cabin, there was a pile of timber exactly in the position most calculated to burn fiercely if lighted. It would have been better if there had been a stone packing instead.

I may add that this accident shows how desirable it is that not only firemen but that some man or men at least in each group who are working independently should be acquainted with the roadways of the mine and should be well instructed what to do in case of danger. This prearrangement and organisation is desirable in factories and in ships, and it is especially necessary in mines where escape is usually only to be effected by one or two roads. I would also call attention to the need for teaching firemen the danger of smoke containing carbon monoxide. I do not think they all understand the difference between carbon monoxide and carbonic acid and other gases found in ordinary smoke, and it appears to me doubtful whether they are all sufficiently acquainted with the best methods of dealing with the dangers arising from it.



AN INTERESTING REVIEW OF COALMINING.\*

By Dr. R. T. MOORE.

I venture to think that I need make no apology for addressing an institution of engineers on coal, for it is the foundation of modern engineering. Only when it was discovered that work could be got from coal by means of the steam engine did modern industry begin. Here was a concentrated medium for carrying power that nobody had dreamed of. It could be taken anywhere. Men were no longer restricted to the rivers. They put down works in the most convenient places. They were independent of wind and tide, and were masters of the sea. They made railways and conquered distance on land. The philosopher's stone only turned the baser metals into gold—coal turned stones into men. A ton of it gave the power of 1,000 men for a day. And thus it is that our modern civilisation may be said to rest upon coal.

I doubt if many of us realise how recently this universal use of coal began, and how rapidly it has grown. In 1800 the production of coal in the world was some 15 million tons; in 1850 it had increased to 75 million tons; and in 1910 it was 1,164 million tons. The whole output of the world in 1800 was less than the present output of the county of Lanark. That of 1850 was less than the quantity now being exported annually from the United Kingdom. Fig. 1 shows the outputs from the chief coal-producing countries from 1800 to 1910. In 1800 the outputs of the various coal-producing countries were: Great Britain, 10 million tons; Belgium, 2½ million tons; other countries, including Germany and France (which were each under 1 million tons), 2½ million tons. This country produced twice as much coal as the rest of the world combined, and it still held

the steam engine with James Watt. We forget that in 1712, 50 years before Watt's discoveries, Newcomen had installed a steam engine for draining mines. It is true that his engine worked wholly with a vacuum, which was made by injecting water into the cylinder itself, and that it was a most uneconomical machine, but it was largely employed in mines. We are thus indebted to mining for the invention of the steam engine, and for 70 years the only use to which it was put was the draining of water from mines. Its invention was a godsend to mining. At the beginning of the eighteenth century the mines were drained by adit levels driven from the surface; many of them began at the sea, and were continued inland for miles. The raising of the most trifling quantity of water was a most expensive operation, and where there was more than a trifling quantity to be dealt with the working was unprofitable, and the coal had to be abandoned. The fire engine (as it was called) gave a ready means of dealing with water, and effected a revolution in mining methods. It immediately rendered available the vast stores of coal which lay under water level.

It was not till 1780 that Newcomen engines were adapted for winding—Watt's engines were introduced shortly afterwards. It is interesting to note that a Newcomen engine, which was erected in 1810, is still in use for winding at Farne Colliery, Rutherglen.

The introduction of gunpowder to mines—about the middle of the last century—rendered easy the sinking of shafts and stone work. Now that we have the assistance of high explosives, in addition to gunpowder, it is difficult to imagine how it was possible to accomplish the work that was done in bygone days. On examining ancient workings and old roads driven through hard rock, with the marks of the pick still on it, one is lost

At the beginning of the century the deepest workings were 900 ft. from the surface. In 1847, at Monkwearmouth, the shaft was sunk to a depth of 1,742 ft. Coal is now being worked at a depth of 3,700 ft. The largest shafts were 12 ft. in diameter; they are now 20 ft. From 300 to 400 tons a day was a large output; now over 4,000 tons have been drawn in a day. This remarkable progress and development is largely due to the introduction of improved mechanical appliances. In 1835 cages running in guides were adopted in shafts. About the same time wire ropes replaced hemp ropes. There was strong prejudice against their introduction, and the greatest difficulty was experienced in getting men to travel with them. In 1864 centrifugal fans for ventilation were first used. The great advantage which they possessed over furnaces was immediately recognised, and they were largely adopted.

Up to the latter part of the nineteenth century one great difficulty which had not been overcome was the transmission of power in mines. It was only when electricity was adopted that a satisfactory solution of the problem was found. It was an immense improvement. It rendered easy the dealing with water in dip workings, the application of coal-cutters and conveyors at the coal face, the employment of mechanical haulages, and solved the many difficulties for which mechanical power was required underground. I am inclined to think that the application of electricity to mining is the greatest improvement which has taken place since the invention of the steam engine.

Much of the progress which has been made has arisen during the past 40 years, and it is interesting to compare collieries of 40 years ago and now. Then ventilation was carried on by a furnace placed underground, and there was practically no machinery in the pit. The machinery on the surface consisted of the winding and pumping engines, and possibly a haulage engine. The boilers were egg-ended, and worked at a pressure of from 40 to 50 pounds per square inch. The coal as it came to the surface was divided by fixed bar screens into two sizes—large and small. Where there were coke ovens these were of the beehive type, and only coke was made.

At a modern colliery power is carried underground by means of electricity, and there are mechanical coal-cutters for hewing the coal, mechanical conveyors for drawing along the face, haulages for drawing the tubs from the faces to the pit bottom, and electric pumps for dealing with the water found in the workings. The important points are also lighted by electricity. Ventilation is achieved by a fan placed on the surface. In addition to the winding engines, which are much larger than of old, there is an electric power plant probably actuated by an exhaust-turbine driven from the exhaust steam which was formerly sent to waste. The boilers are of the Lancashire type, and the steam pressure in the boilers ranges from 120 lb. to 150 lb. per square inch. There are travelling tables on which the stones are picked from the large coal, and an elaborate system of washing the stones from the small coal, and dividing it into suitable sizes for the various markets. In the coke ovens, ammonia, benzol, and tar are recovered from the waste gases. The whole is a most elaborate factory, requiring the highest and most varied technical skill to direct.

Notwithstanding the increased amount of machinery, and the higher pressure at which operations are conducted, it is satisfactory to find that the tribute which has to be paid for coal in men's lives has been steadily lessened. I have shown in fig. 2 the death-rates per 1,000 men employed, from the different classes of accidents for each of the decades from 1851-1860 to 1901-1910. It gives a more accurate idea of the trend of the figures to take decades, for single years are often unduly inflated by a single accident. Taking the period of 60 years, from 1851 to 1910, we find that the average death-rate per 1,000 persons employed underground, has fallen from 4.888 for the 10 years 1851-60 to 1.499 for the 10 years 1901-10. For persons employed on the surface, it has fallen from 1.003 to 0.770.

More than half of the men who are killed in mines meet their deaths from falls of ground. They are killed singly, day by day, and the single life lost leaves less impression on the mind than when a number are killed by one accident. But there has been improvement under this heading of "Falls of Ground," for the death-rate has fallen from 1.931 for the decade ending 1860 to 0.753 for that ending 1910. It has not improved much since 1890, the death-rate for the decade 1891-1900 being 0.792; while the death-rate for the year 1910 was 0.760, or higher than the average for the decade 1900-10. About 10 years ago the Government established special rules enforcing systematic timbering at stated distances, whether the roof appeared to require support or not, and a reduction of accidents was expected to result, but, unfortunately, there has been no improvement in this respect.

Government inspectors, in their reports, have given many and varied reasons why the rules have not produced a reduction in the death-rate, but none of them is very convincing. It is the more disappointing, as in some Continental countries there is a lower death-rate from this cause than there is in Great Britain. It seems to be open to argument whether systematic timbering is an improvement. The setting up of props at regular intervals, like a number of routine regulations, may secure uniformity at the expense of hampering the judgment of the miner, who would otherwise examine the roof and put up props where he considered they were required. At all events, the regulations have done nothing to reduce the accidents from falls of ground, and it is rather striking that the decrease in the death-rate from this cause, which had uniformly continued for 50 years prior to their introduction, stopped immediately they were put in force.

The death-rate from explosions has fallen from 1.257 to 0.177. This is largely due to better ventilation, to

COAL OUTPUT OF WORLD  
1800-1910

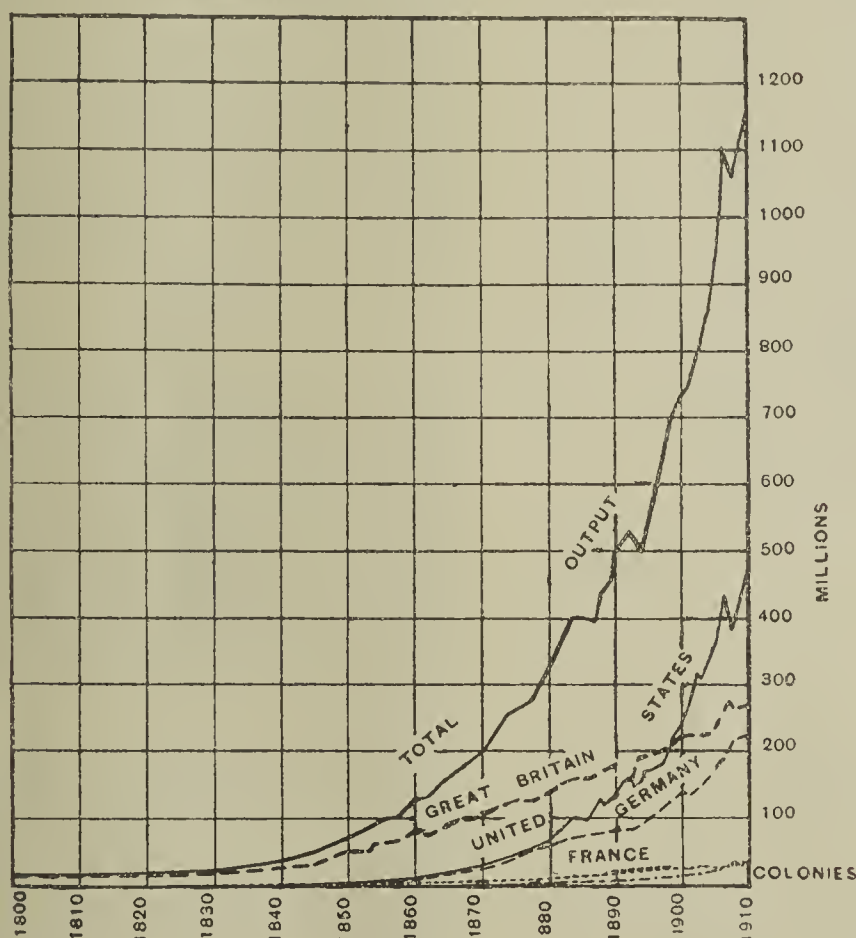


Fig. 1

ts preponderating position in 1850, when the outputs were: Great Britain, 50 million tons; Belgium, 6 million tons; Germany, 6 million tons; France, 4½ million tons; United States, 3½ million tons; other countries, 5 million tons; total, 75 million tons.

It is since 1850 that the great development of coal production has taken place. Everybody wanted coal. New coalfields were discovered and developed, and all the world started to produce it, so the output increased by leaps and bounds. In 1875 it was 285 million tons, in 1900 it was 766 million tons, and in 1910 it was, as already stated, 1,164 million tons. Great Britain is no longer the leading coal producer. She was overtaken by the United States in 1899, and since that date the output of the latter country has increased at the enormous rate of 20 million tons per year, and now produces 40 per cent. of the world's output. Germany, too, is rapidly overtaking Great Britain; her output is increasing at the rate of 9 million tons per year, against 3½ million tons in this country. It is somewhat comforting to note that the output of the British colonies is fifth in the list, and is increasing at the rate of nearly 3 million tons per year—nearly the same rate as that of the Mother Country. The combined output of all the British possessions was, for 1910, 312 million tons.

Though this country no longer occupies the premier place among coal-producing countries, yet the annual production of 269 million tons is no mean achievement. The Great Pyramid is said to have taken 20 years to build, and 100,000 men were employed at the work. The million of men employed in the British coalmines raise each year sufficient coal to build over 90 pyramids. The power which the output represents is that of 750 millions of men. We are a little apt to associate the invention of

in admiration of the patience and perseverance of the miner that has passed and gone. Truly, the introduction of gunpowder must have been a new epoch in mining. About this time the furnace was introduced for producing ventilation.

Previous to the middle of the 18th century iron was very sparingly used in mines, even pipes for pumps were made of wood, but one very important use of iron was made by the introduction of cast-iron rails. Previously coals had been barrowed or dragged on sledges to the main roads, which were laid with rails of wood.

About the end of the 18th century pits had become deeper, and much trouble was caused by firedamp, and many explosions occurred, causing much loss of life. A committee was formed in Sunderland, in 1813, for the purpose of considering what could be done to prevent the great loss of life which was being caused by explosions. In 1815 the committee consulted Sir Humphry Davy, who, after visiting the mines and making careful investigation on the subject, invented the "Davy" lamp, which solved the problem of giving the miner a light which did not ignite firedamp. Though many improvements have been made on safety lamps the principle of Davy's invention, the surrounding of the flame with wire gauze, is the foundation of all safety lamps at the present day.

With the nineteenth century coalmining entered on a new era. The extending use of steam engines for factories and works of all kinds, the establishment of railways and steamships, the use of coal gas for illuminating purposes, the increase of iron smelting—all made a great and rapidly-increasing demand for coal, and arrangements were made at the collieries to meet it. The characteristic features of coalmining during the nineteenth century have been the increase in the size of the fittings, and the increased application of machinery.

\* From the presidential address delivered before the Institution of Engineers and Shipbuilders in Scotland, October 21, 1913.



recognition of the part played by coal dust in explosion, and to greater care in the use of explosives.

The death-rate from shaft accidents has been reduced from 1.097 to 0.117—due to the improvement in winding appliances.

The death-rate from miscellaneous accidents has fallen from 0.602 to 0.451. Nearly three-fourths of these are haulage accidents, such as men getting run over by tubs. They do not show so great a decrease as the other classes of accidents, possibly because of the larger amount of machinery which has been introduced and the higher pressure at which everything is now worked, owing to the shorter hours of labour. When all is said and done, the death-rate is not high. It would appear that there is less risk of being run over and killed in the underground railways of a mine than there is in the streets of London; for while in 1911, out of the million men employed, there were 264 killed in mines, during the same year 416 people were killed by being run over in the streets of the metropolitan district of London.

The death-rate from surface accidents has decreased from 1.003 to 0.770. The decrease in the latter periods has not been so marked as in other classes of accidents; and this is probably due to the great increase of machinery at the surface of collieries.

It has become the fashion to attribute the lessening of the death-rates of mines to the effects of legislation. I think the influence of legislation is greatly over-rated.

fluctuations, the whole period shows a steady increase, and this is especially marked after 1897. Prior to that date there were brisk times in 1854, when the price was nearly 7s. a ton; in 1866, when it was 6s. 4d.; in 1884 and in 1890, when it was nearly 7s.; and the boom time of 1873, when it was 15s. For the rest of the period coal sold at a low price, being as low as 4s. a ton in 1885-6-7-8; and 4s. 4½d. in 1896. Since 1896 there have been brisk times—in 1900, when the average price was 11s.; in 1907, when it was nearly 9s.; and in 1912, when it was above 9s. In the intervening dull times, however, prices never fell so low, the smallest price being 5s. 10d. in 1904-5. There is thus an increase in the minimum price of nearly 2s. a ton, and I am afraid this must be regarded as a permanent increase in the price of coal.

This has arisen from various causes, the principal of which are:—1. Increase of wages; 2. Shorter hours of labour; 3. Legislation; 4. Exhaustion of the cheaply worked seams. Miners' wages have always risen and fallen roughly in proportion to the price of coal. When coal was dear wages were high; when it was cheap wages were low. In the earlier period wages rose as high as 9s. 6d. per day, and fell as low as 3s. As late as 1896 they were 4s. 2d. Since 1896, however, through the action of the miners' union, the new principle of the minimum wage has been established. It fixed that no matter how prices should rise or fall, wages should never come below a fixed wage, which was called the minimum wage. This was fixed first at 5s. per day, then at 5s. 6d.,

11 per cent. in hours worked. (The extra reduction of output probably arises from the fact that in both cases there is a fixed loss of time in the men getting to the faces and starting work—so that the reduction of hours actually worked is from 7½ to 6½, instead of from nine to eight.)

The eight hours fixed by the union was an elastic arrangement. There was nothing to prevent men working a little longer to make up for any irregularity. This, however, was altered by Parliament, in 1908, passing the Eight Hours Act, which fixed a cast-iron eight hours limit, with a penalty for any man who remained down the pit for a longer time. Since the Eight Hours Act came into operation there has been a steady reduction in the output per person employed underground over the whole Kingdom, the figures being:—

	Tons.		Tons.
1906 .....	374	1910 .....	329
1907 .....	372	1911 .....	331
1908 .....	346	1912 .....	311
1909 .....	339		

and this notwithstanding the fact that prior to the passing of the Act many of the districts were already voluntarily working only eight hours, and that since the Act every exertion has been made to increase the output by the employment of mechanical coal-cutters (of which the number employed in the mines has increased from 1,659 in 1908 to 2,444 in 1912) and other mechanical apparatus. But practice is still ahead of legislation in Lanarkshire, for there the miner works only five days a week.

During the past few years there has been a flood of mining legislation. In addition to the Minimum Wage Act, the Eight Hours Act, the Workmen's Compensation Act, and the Insurance Act, which affects all trades, a new Mines Act has been passed. Whether the innumerable minute regulations have done much good is a debatable question, but they have had one result about which there can be no argument, they have increased the cost of raising coal.

So far as Lanarkshire is concerned, there is a further factor making for increased costs, and that is the exhaustion of the thick and cheaply worked seams. The seams from which the output is now being got are much thinner and more costly to work than prior to, say, 1890. The seams upon which the Lanarkshire pits were established were from 4 ft. to 7 ft. thick. Seams as thin as 18 in. are now being worked, and the cost of working is much greater.

For the reasons which I have indicated, there is no doubt that coal in Lanarkshire will be considerably more costly in the future than it has been in the past. Dearer coal means dearer pig iron; dearer pig iron means dearer steel; and dearer steel means dearer machinery and dearer ships. All these industries were founded on the Clyde on account of the cheap coal which was to be had in Lanarkshire. Whether they can continue and compete with the foreigner while higher prices are being paid for raw material is a question for earnest consideration. There need be no lack of coal at a moderate price, for though Lanarkshire coal may become exhausted, there are great stores in the east of Scotland which could be brought to supply the industries on the Clyde, if the railway companies charge reasonable rates of conveyance.

Scottish railway rates for the conveyance of coal are a burden on the consumer. They are higher than those on other mineral railways in Britain, and with the agreements between railway companies stifling competition it seems difficult to get any reduction. Doubtless, however, as time goes on, and railway companies get more enlightened, they will see that it is to their advantage to carry east country coals to the Lanarkshire works at rates something like those charged in other countries. There is no reason why large trains of coal should not be brought to Lanarkshire from the Lothians and Fife, and a handsome profit made, at cheaper rates than are presently being charged for carrying it from Hamilton; but even when that does take place the cost of coal in Lanarkshire will be higher than it was prior to 1897.

Any notes on coalmining nowadays are not complete without some reference to the exhaustion of our coalfields. For Great Britain we have within the last few years had a Commission which has gone into the subject carefully and estimated that there was enough coal to last nearly 300 years at the present rate of increase of output. It should be noted that these estimates have a tendency to increase as time goes on—the estimate of this Commission showing 12 per cent. more coal remaining than the previous one, though over 5½ thousand million tons of coal has been worked in the 30 years which elapsed. Since the Commission reported in 1901, extensions of the coalfields have been proved in the Midlands and in the Kent coalfields. Who knows whether the Coal Commission of 1930 may not report a still greater quantity of coal.

There has been this year a most valuable investigation into the coal resources of the world made by the International Geological Congress in Canada, which estimates the reserves of coal in the principal European countries as:—

	Thousand million tons.
Germany .....	423
Great Britain .....	189
Russia .....	64
Austria .....	54
France .....	18
Belgium .....	11

If one applies the rate of increase of output during the past 20 years to each of the countries, it would appear that none of the reserves would last more than 300 years, so we are not in a much worse position than our Continental rivals.

DEATHS PER 1000 PERSONS EMPLOYED UNDERGROUND  
IN DECADES FROM 1850 TO 1910.

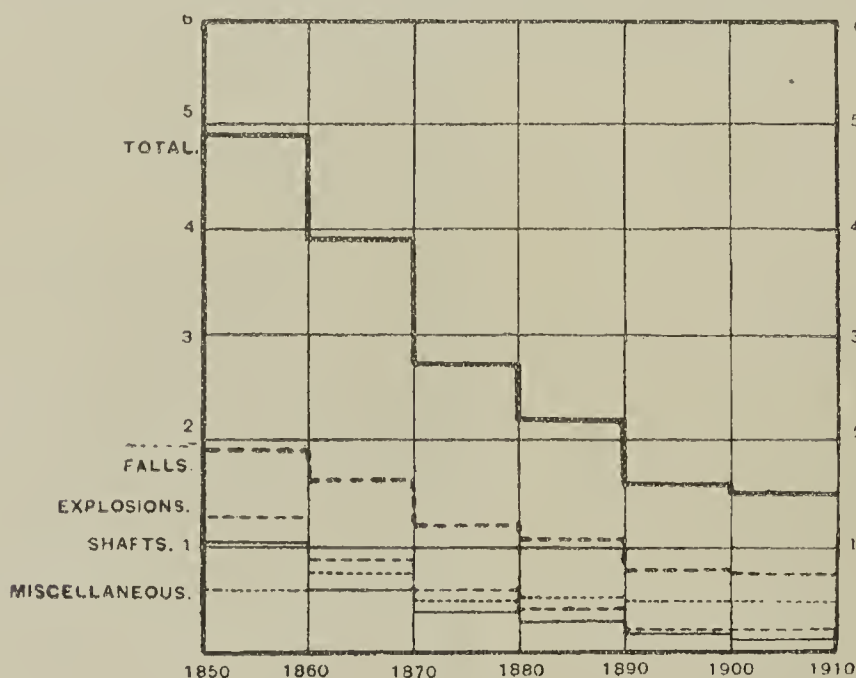


Fig. 2

AVERAGE YEARLY PRICES OF COAL AND MINERS DAILY WAGE IN  
LANARKSHIRE FROM 1850 TO 1912

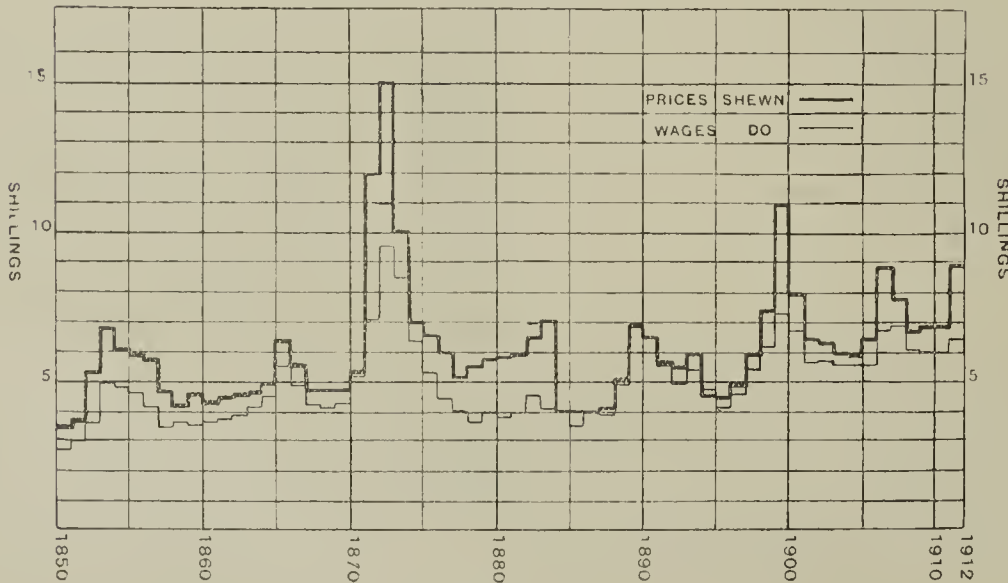


Fig. 3.

The improvements in mining and in the saving of life are due to a very large extent to the educative influence of the mining institutions which have been formed in various districts. The part which these institutions have played in the advancement of mining has not been properly appreciated. Legislation makes no new discoveries—all it can do is to make regulations and appoint officials to punish those who do not carry them out. No doubt modern mining legislation is well intended; but it is full of regulations about the most trivial details which have a tendency to enforce routine at the expense of individual initiative. There are elaborate provisions regarding the treatment of horses, and special inspectors are appointed to see that they are carried out. There are others dealing with the provision of baths for workmen—noting the amount of soap which is to be supplied to each workman, and the number of grains of impurity in the water with which he is to be washed. If too little soap is supplied, or if there are too many grains of impurity in the water, the manager may be held responsible and fined or imprisoned. Surely this is not the spirit in which to legislate for the safety of a great industry!

The strikes the consumer is the steady price of coal. To illustrate this, I have in Fig. 3 the average prices realised at the pits in Lanarkshire from 1850 to 1912. Though there are violent

and later at 6s. Now trades unions are agitating to have it raised to 7s. The principle was rigidly enforced, and its effect at once did away with low wages. It is now the law of the country, for, as the result of the general strike of 1912, Parliament passed an Act making it compulsory that no man should work underground for less than the minimum wage.

The hours of labour have also been reduced. We are often told that with shorter hours labour is more efficient, and as much work is obtained in eight hours as in 10. It is interesting to note the effect of a reduction from nine hours to eight in Lanarkshire. In 1896 there was a 10 hours day, with about nine hours winding shift, and the output per person employed underground was 483 tons. During 1897 and 1898 an agitation for an eight hours day was started, and the output fell to 480 and 472 tons respectively. The agitation became more widespread in 1899, and the output fell to 454 tons. In May 1900 it was agreed that all the collieries should be on an eight hours winding shift, and during that year the output per man was 440 tons. During 1901 all the collieries wound coal for only eight hours, this being rigidly enforced, and the output fell to 405 tons. The diminution of output from 1896, when there was a nine hours winding day, to 1901, when it was eight hours, was from 483 to 405 tons—or 78 tons. There was thus a reduction of 16 per cent. in output for a reduction of



The same Commission estimates the coal in the world as :—

	Thousand million tons.
Oceania .....	170
Asia .....	1,280
Africa .....	58
America .....	5,105
Europe .....	784
	7,397

Taking as before the average increase for the past 20 years, it would appear that the world's store of coal would be exhausted in some 600 years.

It is somewhat consoling to note that our country, with the customary foresight of our predatory ancestors, has secured nearly one-fourth of all the known coal in the world. For the British Possessions contain :—

	Thousand million tons.
Great Britain.....	189
Canada .....	1,235
Oceania .....	169
India .....	79
South Africa .....	57
	1,729

I do not think we need be unduly worried about the exhaustion of our coal in 300 years, or of that of the world in 600 years; either period is a very long time, and we have really very imperfect data upon which to base our calculations on future outputs. All our experience of the extended use of coal goes back for only some 60 years, and conditions may be very different in the future. When coal is exhausted in this country probably there will still be large quantities available in Canada. Might we not have long-distance electrical transmission over the Atlantic in 300 years? I think we may rest assured that our descendants will find a solution to the problems that may arise through the exhaustion of our coal. Indeed, before the lapse of another 300 years people may have given up using coal altogether. In the year 2200 coal may be as great a curiosity as that then extinct animal—the horse—and antiquarians poring over the ancient records may rejoice over the superseding of that smoky fuel which was the source of so much unhealthiness and discomfort in the ancient towns of the nineteenth and twentieth centuries.

While this may be so, there should be no waste of coal, and every endeavour should be made to save it. The erection of large central electric stations for the distribution of power, and more economical steam engines and gas engines tend in this direction.

**Minimum Wage and Abnormal Place.**—Before Judge Hill Kelly, at Newport County Court last week, Edward Barwell, collier, claimed 11s. 3d. balance, to bring his wages up to the minimum, from the Newport-Abercarn Colliery Company. The case was taken under the Coal Mines (Minimum Wage) Act, 1912, and was taken on the award of Viscount St. Aldwyn, under which the minimum was put at 4s. 7d. per day plus percentages. For the week ended April 27 plaintiff had earned, after certain deductions, £1 3s. 1d., which left 11s. 3d., for which he claimed. Evidence was given as to earnings by Barwell, and the judge said he was bound to give judgment for the defendants on the ground that plaintiff had not produced a statutory declaration that his place was an abnormal one —*Pro forma* judgment was entered accordingly.

**Colliery Development at Rotherham.**—The colliery developments in the Rotherham district proceed apace. A further step forward was taken on Thursday, 13th inst., when the sod-turning of a new venture, of which Earl Fitzwilliam is the promoter, took place. To the south of the Low Stubbin Colliery, belonging to his lordship, in Greasborough, and about four miles from Rotherham, preparations have been made for the sinking of a pit to reach the Parkgate seam of coal which lies, it is estimated, about 300 yards below the surface. At Low Stubbin the Barnsley bed is being gradually worked out. Mr. Thomas Newbould, the general manager of the Fitzwilliam collieries, and under whose direction the mine is being laid out, spoke of the past history of the Stubbin district. He said there had been an erroneous impression with regard to fires. There had been two distinct fires at Stubbin. There was the old gob fire which occurred in 1824-25, a sum of £325 10s. being spent in fighting it at that time. That gob fire had been burning 89 years. Under the system of working in those early days there was left from 10 to 11 per cent. of coal, and when once a fire got going it went along the ribs and pillars, and continued from year to year. So recently as September last he noticed the gob stink in a hole in the land not far away. The second fire was in the Barnsley seam itself in 1861. On that occasion furnaces were built to produce carbonic acid gas, which was sent down to the seat of the trouble, and which was very helpful in dealing with it. The pit they were now commencing would be 18 ft. in shaft diameter and about 300 yards deep. The coal area was about 3,000 acres. It was being laid out to do about 2,000 tons per day when fully developed, and from 1,800 to 2,000 hands would be employed. Seeing that the Low Stubbin Colliery was getting nearly exhausted, Lord Fitzwilliam told him to prepare to sink a pit to the lower seam, and this was being done. Earl Fitzwilliam said they were now living in days of development and chemical adventure, and they had discovered during the last 10 or 15 years that this soft coal could be used in a way in which the old steam coal could not. At the present moment he was engaged in experiments at Elsecar in trying to produce petrol or motor spirit from soft coal slack.

**THE DRAGON STONE MILL.**  
**For Grinding Stonedust.**

With respect to the interest which is aroused in the use of stonedust in underground roadways as a preventative of explosions, the question arises as to the best and most economical type of machine for producing the dust required.

There are many machines on the market which are capable of crushing and grinding to powder the "bind" or hard shale produced in the workings, but there are two duties to be carefully considered as follows:—(1) To take the material as practically "run of mine." (2) To produce dust which contains the proper proportion of grits to allow the latter to fulfil its duty in the "workings" in the most efficient manner. There are machines upon the market which are capable of producing this dust, but owing to their design it is necessary that they should be preceded by a crusher and followed by a screen, thus forming quite a small complete grinding plant with the necessary elevators and transmission gear.

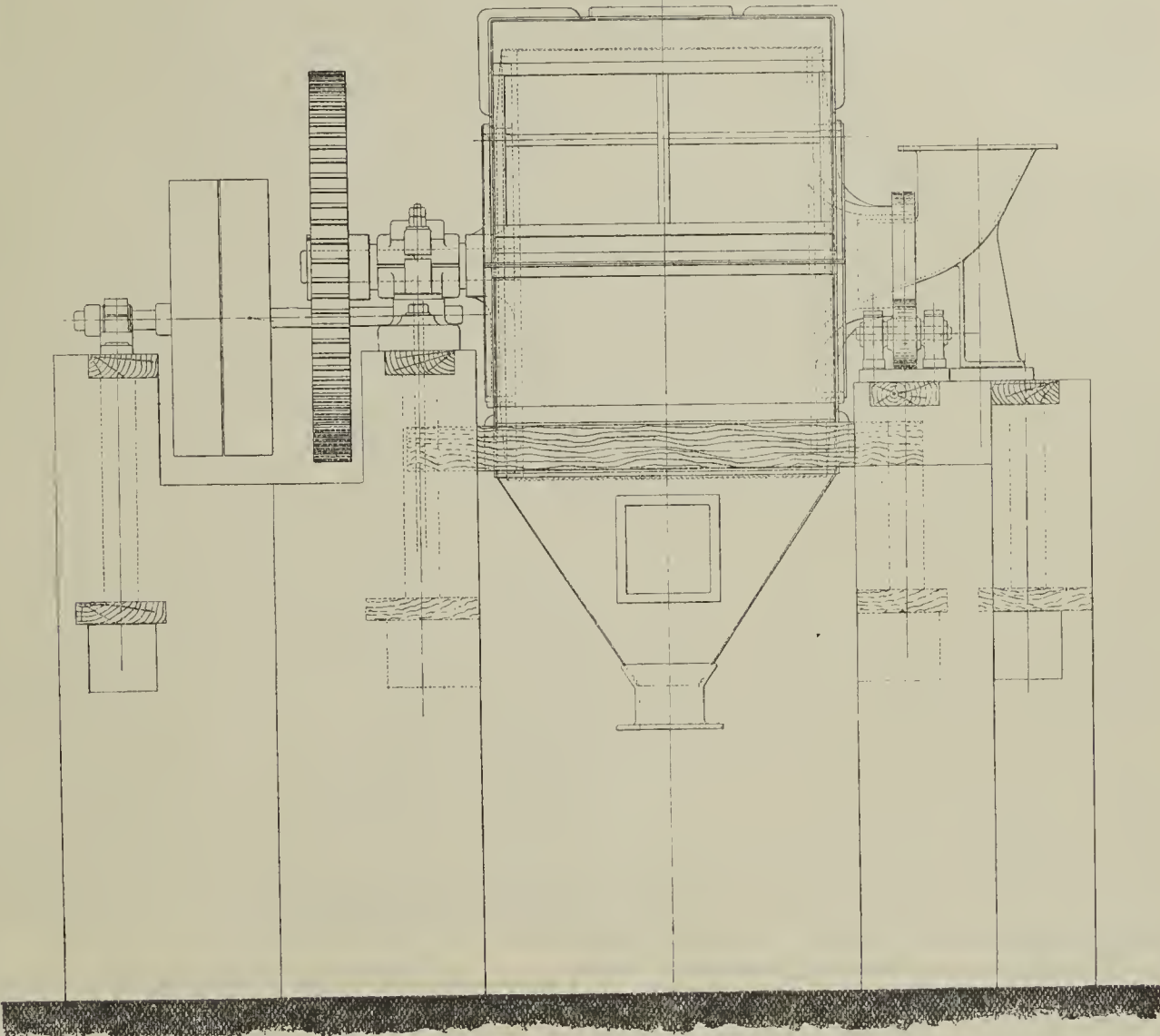
Messrs. Wm. Johnson and Sons (Leeds) Limited, Castleton Foundry, Armley, Leeds, have given this matter their careful attention with a view to producing a self-contained machine to effect the whole of this duty without the necessity of the accessory plant mentioned above, keeping in view economy in horse-power and

approximately 85 degs. to the horizontal, where they drop. The balls crush the material by impact against the plate, the heavier balls being useful for breaking the large pieces of material, and the smaller balls for flouring same.

During the revolution of the mill a constant flow of fine material is going through the coarse perforations on to the rejecting screens, and so on to the finishing screens, the tailings being guided back into the mill to be re-ground by means of scoops. The fine material, going through the finishing screens, enters a dust-tight casing, and is guided by same down to the outlet spout. This combined action is continuous, and the product is absolutely a screened one; thus, by an arrangement of the screens, a product of all one mesh can be effected or varying meshes as may be desired.

It will thus be seen that this machine combines in one tool a complete grinding plant, comprising the efforts of a crusher, grinding mill and screen, and when the area taken up by the mill and the power absorbed is compared with that of an ordinary type of grinding plant, the enormous advantage of this tool will be readily appreciated.

The whole of the body is contained in a dust-tight casing ending in a spout, so that the material can be either bagged or delivered into tubs as may be desired. The feeding orifice is of sufficient size to take materials



ELEVATION OF DRAGON STONE MILL.

space. They have put upon the market a mill which effects this duty entirely in one operation, and can be arranged to be driven direct by an electric motor or other motive power, or by belt, as may be most suitable. The machine consists of a revolving body built up of perforated plates, rejecting screens and finishing screens, arranged in steps, the crushing medium being steel balls.

With reference to the accompanying drawing, it will be seen that the mill body consists of two side plates suitably carried in bearings between which are attached permanent segments, acting also as distance pieces, having coarse perforations arranged in steps in the direction of running. These permanent segments are lined by means of manganese steel plates, also perforated. Immediately behind the permanent segments, and across the flanges of same, are arranged a series of coarse rejecting screens, and around the periphery of the mill body, stretching across same from side plate to side plate, are arranged a series of finishing screens. Scoops are provided which guide the tailings from either the rejecting screens or the finishing screens back through slots provided in the vertical drop of the permanent plates, and so into the mill for further reduction.

A charge of steel balls of varying sizes is put into the mill, and the action of same is as follows:—

The material is fed in and the revolution of the mill carries same along with the balls up to a height of

up to, say, the size of an ordinary building brick, and the machine reduces this material to the required fineness in one operation.

Messrs. Johnson manufacture these mills in several sizes, but find that the size which is taking best upon the market is a machine which is capable of delivering 10 to 15 hundredweights of dust per hour. This can be effected in a machine taking a ground space of 11 ft. 6 in. by 7 ft., and requires only 5 to 7 B.H.P. to drive.

**Reduction in Steel Prices.**—At a meeting of the West of Scotland and North-east of England Steel Makers' Association, held at Carlisle, on Friday, it was decided to reduce the prices of steel plates and angles by 10s. per ton. This is the fourth reduction of a similar amount made within the last two months. It was decided that the rebate system should be abandoned forthwith in view of the difficulty of making it effective. A meeting of the three associations of steelmakers is to be held in London next week to consider the rebate question. Since its introduction in October 1911, the scheme, which provided for a rebate of 5s. per ton, has not worked smoothly, and one company has already withdrawn, while another west of Scotland firm has already given notice of withdrawal. The situation is regarded as critical, and may (a correspondent says) endanger the very existence of the Steelmakers' Association. Important consumers have expressed strong disapproval of the scheme, and refused to support it.



## THE COAL AND IRON TRADES.

THURSDAY, NOVEMBER 20.

## Scotland.—Western District.

## COAL.

The coal trade in the west of Scotland now occupies a stronger position than before the set-back of two weeks ago. Tonnage is now plentiful, and collieries are well booked up for some considerable time. Business in ell coal is very satisfactory, the best qualities being in heavy demand, while secondary qualities are commanding more attention and prices generally are very firm. All brands of splint are extremely active at firm rates, and prices will probably be higher within the next two weeks. Navigations and steams are moving off in large quantities, and prices remain firm. In smalls, treble nuts are much the same as last week, but doubles are much more plentiful and a shade easier, while singles also show an easier tendency, trade in the last-named being very dull. Shipments from the west of Scotland ports, though fairly well up to the average, show a decrease of about 20,000 tons compared with the previous week. At Glasgow 59,007 tons were despatched, Bowling 117, Greenock 1,460, Ardrossan 5,196, Troon 4,824, Irvine 2,095 and Ayr 14,663—total 87,362 tons compared with 107,129 in the preceding week and 95,013 tons in the corresponding week of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/ to 13/6	13/ to 13/6
Splint .....	13/3 to 16/3	13/ to 15/6
Treble nuts .....	13/3 to 13/6	13/3 to 13/6
Double do. ....	12/3 to 12/6	12/ to 12/6
Single do. ....	10/6 to 11/	10/6 to 11/

## IRON.

There has been a satisfactory increase in business in the Glasgow pig iron warrant market during the week, and while Cleveland iron closed at 49s. 4½d. per ton cash, a decrease of 4½d. per ton compared with the preceding week, the tone of the market is much steadier. The present low price of Cleveland appears to have attracted some outside interest, and it is generally believed that if the consumers who at the moment are only purchasing against immediate requirements could be induced to operate more freely, an upward tendency would soon be apparent in the market. Though the better qualities of pig iron are meeting with fair enquiry, business in the ordinary qualities is of a meagre description, even in face of the fact that makers have frequently adjusted prices in order to induce business. Monkland is quoted f.a.s. at Glasgow, No. 1, 65s., No. 3, 63s. 6d.; Govan, No. 1, 63s. 6d., No. 3, 62s.; Carnbroe, No. 1, 70s., No. 3, 66s.; Clyde, No. 1, 71s. 6d., No. 3, 66s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 72s., Nos. 3, 67s.; Glengarnock, at Ardrossan, No. 1, 72s., No. 3, 67s.; Eglinton, at Ardrossan or Troon, No. 1, 66s. 6d., No. 3, 65s. 6d.; Dalmellington, at Ayr, No. 1, 67s. 6d., No. 3, 65s. 6d.; Shotts at Leith, No. 1, 72s., No. 3, 67s.; Carron at Grangemouth, No. 1, 73s., No. 3, 68s. per ton. Scotch hæmatite is quoted 64s. 6d. per ton for west of Scotland delivery. There are 79 furnaces in blast in Scotland, compared with 80 in the preceding week and 88 in the corresponding week of last year. The import of pig iron into Grangemouth from Middlesbrough and district amounted to 11,548 tons. Any alteration which has taken place in the manufacturing branches of the trade has not been for the better. Black and galvanised sheet makers are only managing to keep works employed and the wrought iron trade is in much the same position. The depression in the malleable iron trade has reached a very acute stage. Makers have very few contracts on their books and with foreign competition continuing as keen as ever, prospects of securing fresh contracts are anything but bright. Owing to the condition of the trade the Scottish malleable iron makers met in Glasgow on Monday of this week, when they decided to reduce minimum selling quotations by 5s. per ton. The basis therefore is now £6 17s. 6d. per ton less 5 per cent. for "Crown" bars for Glasgow delivery, which shows a reduction of £1 12s. 6d. since the beginning of June.

## Scotland.—Eastern District.

## COAL.

Collieries in the Lothian district are very active. The demand for secondary steams and treble nuts is the outstanding feature. Doubles and singles are also moving off well. The shipments are unusually heavy, and amount to 126,850 tons compared with 99,758 in the previous week, and 115,887 tons in the corresponding week of last year. At Grangemouth 67,048 tons were cleared, Granton 11,445, Leith 37,156, and Bo'ness 11,201 tons.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/6 to 13/9	13/6 to 13/9
Secondary qualities .....	12/ to 12/6	12/ to 12/6
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/3 to 12/9	12/3 to 12/9
Single do. ....	10/9 to 11/3	10/9 to 11/

The position of the trade in the Fifeshire district is unchanged. All classes of coal are in satisfactory demand, and prices are well maintained. There is a regular supply of tonnage, and work at the docks is proceeding steadily. The shipments were from Burntisland 46,872 tons, Methil 69,805, Charleston 148, Tayport 755, Alloa 2,693, Dysart 1,521, Wemyss 902—total 122,696 tons compared with 115,887 in the preceding week, and 115,887 tons in the corresponding week of last year. The aggregate shipments from the ports amounted to 336,908 tons compared with 322,760 in the previous week, and 329,794 tons in the corresponding week of last year.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/9	16/9
Unscreened do. ....	14/9	14/9
First-class steam coal .....	13/3 to 13/6	13/6 to 14/
Third-class do. ....	11/ to 11/3	11/ to 11/6
Treble nuts .....	13/3 to 13/9	13/3 to 13/9
Double do. ....	12/ to 12/3	12/ to 12/6
Single do. ....	10/ to 10/3	11/

## Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

## COAL.

During last week 150,267 tons of coal and 5,716 tons of coke were despatched from Tyne Dock, an increase of 11,308 tons of coal and 4,648 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances totalled 59,020 tons of coal and 689 tons of coke, an increase of 3,691 tons of coal and a decrease of 1,632 tons of coke. The Blyth shipments aggregated 95,495 tons of coal and coke, an increase of 6,958 tons. Several parcels of Marley Hill bunker coals, aggregating about 200,000 tons, are stated to have been sold direct by the colliery for delivery over next year at from 12s. 6d. to 13s. per ton, f.o.b. This business is mainly in renewal of old contracts and the colliery is said to have now closed its books at the figures named. The Paris, Lyons and Marseilles Railways have contracted for 50,000 tons of coking coal for delivery over next year at Rouen. Half the quantity is to be Durham unscreened and the other 25,000 tons are to be drawn from Germany. The prices have not been divulged. Some 24,000 tons of best Blyth steams are stated to have been sold by second-hand sellers for delivery over next year at the rate of 2,000 tons per month at 12s. 9d. per ton, f.o.b. Gasworks at Genoa, which recently invited tenders of gas coal for delivery over next year, are stated to have postponed allotment of their contract because of the highness of tendered prices. Merchants are stated to have been offered from 17s. 3d. to 17s. 6d. per ton, c.i.f. Cronstadt, for best Blyth steams for delivery over next Baltic season. This offer, with an estimated freight of 4s. 6d., would leave from 12s. 9d. to 13s. per ton, f.o.b. No business has been done at these figures. Considerable sales of blastfurnace coke are stated to have been made for delivery over the next three months at Middlesbrough at 19s. per ton. In the present unsettled state of the iron market, there is not much disposition to contract ahead for a longer period. Tenders of 100,000 tons of best Northumbrian steams for delivery to stipulated ports during the first three months of next year have been forwarded to the Swedish State Railways. The Portuguese State Railways are enquiring for 16,000 tons of Durham steams for delivery over the first four months of next year and for 22,000 tons for delivery from May to December. Second-hand holders of Durham gas bests are stated to be offering supplies for delivery over the first three months of next year at 14s. 3d. per ton, f.o.b. It is announced that the Belgian State Railways have arranged with Belgian collieries for the supply of 150,000 tons of steam coals over next year and that the balance—from 150,000 to 200,000 tons—of their requirements will be drawn from collieries foreign to that country. The prompt coal market has been rather quiet during the past week and prices have not shown a great deal of alteration. F.o.b. quotations for prompt shipment have varied as follows on the week:—Best Tyne steams are 3d. cheaper; Blyth seconds, 3d. down; Tyne seconds, weaker; special smalls, 3d. increased; gas bests, 3d. to 6d. advanced; specials, 6d. dearer; foundry coke, in sellers' favour; blastfurnace, 6d. improved; and gas coke, 3d. down. Collieries are generally very well supplied with tonnage and there still is a good deal of congestion of loading turns, but the very windy weather during the last few days is tending to throw incoming steamers behind their time and, should unfavourable conditions continue, inconvenience to some collieries may be anticipated.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	14/6 to 14/9	14/6 to 14/9
Do. Tynes (Bowers, &c.) .....	14/6 to 14/9	14/9 to 15/
Secondary, Blyths .....	12/6	12/6 to 12/9
Do. Tynes (Hastings or West Hartleys) .....	12/6 to 13/	12/9 to 13/
Unscreened .....	11/6 to 12/6	11/6 to 12/6
Small, Blyths .....	7/6	7/6
Do. Tynes .....	6/6	6/6
Do. specials .....	8/6 to 9/	8/6 to 8/9
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	15/6 to 16/	15/3 to 15/6
Secondary gas coals (Pelaw Main or similar) .....	13/6	13/6
Special gas coals .....	15/6 to 16/	15/6
Unscreened bunkers, Durhams	13/ to 13/9	13/ to 13/9
Do. do. Northumbrians	11/6 to 12/6	11/6 to 12/6
Coking coals .....	13/6 to 13/9	13/6 to 13/9
Do. smalls .....	13/ to 13/3	13/ to 13/3
House coals .....	15/6	15/6
Coke, foundry .....	21/ to 23/	20/ to 23/
Do. blast-furnace .....	18/ to 19/	17/6 to 18/6
Do. gas .....	16/3 to 17/6	16/6 to 17/9

Sunderland.

## COAL.

The exports from Sunderland last week amounted to 113,030 tons of coal and 335 tons of coke, as compared with 78,910 tons of coal and 605 tons of coke for the corresponding period of 1912, being an increase of 34,170 tons of coal and a decrease of 270 tons of coke. The coal market is quiet owing to the present congested loading turns. There has not been much prompt business passing, and forward buyers continue to hold off in the hope of securing concessions later on. All the leading collieries are fully booked for this month, and supplies promise to be well taken up for December. There is a disposition on the part of some

holders of gas coal to sell for January-March shipment at a marked reduction below current prices. Meanwhile for prompt shipment gas qualities are sparingly offered. Smalls are on the easy side, and coking coal is more in evidence. Bunkers are fairly steady at late prices. Households are still quiet. There is a steady demand for coke. Two hundred thousand tons of best Durham unscreened bunkers for shipment over next year is reported to have made 12s. 6d. to 13s. f.o.b., and best steam December to April are said to have realised 13s. 9d. The Italian di Gaz of Genoa have postponed buying owing to the high prices asked, while the Paris, Lyons and Marseilles Railway have contracted for 50,000 tons, half of Durham unscreened and the balance Westphalia, delivery Rouen over next year, but particulars have not yet transpired. Current quotations are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/9	15/6
Secondary do. ....	14/	13/9
House coals:—		
Best house coals .....	16/6	16/6
Ordinary do. ....	15/6	15/6
Other sorts:—		
Lambton screened .....	15/6	15/6
South Hetton do. ....	15/3	15/3
Lambton unscreened .....	13/6	13/9
South Hetton do. ....	13/6	13/9
Do. treble nuts	16/3	16/
Coking coals unscreened ..	13/9	12/9
Do. smalls .....	12/6	12/6
Smithies .....	15/	15/6
Peas and nuts .....	16/	16/
Best bunkers .....	13/6	13/6
Ordinary bunkers ..	12/6	12/9
Coke:—		
Foundry coke .....	19/9	19/6
Blast-furnace coke (dlvrd. Teesside furnaces) .....	18/6	18/6
Gas coke .....	16/6	16/6

The outward freight market is still weak, and lower rates are accepted. Recent fixtures include:—Coasting: London 3s. 3d., Hamburg 3s. 6d., Dieppe 4s. 4½d., Havre 4s. 6d., Calais 4s. 3d., Boulogne 4s. 6d., Antwerp 4s. Bay: Bordeaux 5s. 1½d., Rochefort 5s. 9d., Bayonne 5s. 6d. Baltic: Helsingfors 6s., Stettin 5s. 3d., Libau 5s. 6d., Pillau 5s. 9d. Mediterranean: Genoa 8s., Catania 9s., Piræus 8s. 6d., Algiers 7s. 3d., Naples 8s. 1½d., Marseilles 7s. 9d., Port Said 8s., Constantinople 8s. 9d., Kherson 11s., and Las Palmas 8s.

Middlesbrough-on-Tees.

## COAL.

Coal is in good request for early delivery and prices are well maintained, but forward buyers persist in holding off in the hope of a fall in values. That prices are expected to be lower next year is emphasised by the fact that best Durham gas coal for January-March shipment has been offered at 14s. 3d. whereas the current quotation is 15s. 3d. to 15s. 6d., with seconds at 14s., and special kinds in the neighbourhood of 16s. Deliveries of gas coal, especially best sorts, are heavy. A good supply meets the continued rather heavy call on bunker coal and prices are a little easier. Ordinary Durhams are 12s. 10½d., f.o.b., superiors 13s. 6d. to 14s., and specials 14s. 6d. to 15s. Household coal shows some improvement both in demand and price, quotations ranging from 15s. 6d. to 15s. 9d. Coking coal is fairly well taken up at prices varying from 13s. to 14s. Coke continues scarce, especially furnace kinds, for which high rates are being realised. Nothing under 18s. 6d. is named for average quality of blastfurnace coke delivered at Teesside works, and several sales have been recorded at 19s. Foundry coke for shipment is quoted up to 22s. 6d., f.o.b. Gashouse coke is in the neighbourhood of 18s.

## IRON.

Quietness still continues to characterise the pig iron trade. Producers complain that current rates for Cleveland kinds are now several shillings below cost of output, and there is every reason to believe that more blastfurnaces will be put out of operation in the near future unless relief is forthcoming by improvement in pig quotations or reduction in cost of raw material. Some sales of No. 3 g.m.b. Cleveland pig have been recorded this week at 49s. 6d. for early f.o.b. delivery, but 49s. 7½d. has also been paid, and the latter is now regarded as the general market quotation, whilst No. 1 is 52s., No. 4 foundry 49s. 3d., No. 4 forge 49s., and mottled and white iron each 48s. 9d. East coast hæmatite pig is dull and lifeless. Offers to sell Nos. 1, 2 and 3 at 61s. 9d. for either early or forward delivery have failed to tempt customers into the market. Buyers consider that 60s. should be the price for mixed numbers of hæmatite, and probably contracts over periods next year will be made at round about that figure. Foreign ore prices show an easing, but so far as can be ascertained there is no business passing. Some sellers still quote on the basis of 19s. ex-ship Tees for rubio of 50 per cent. quality, but 18s. 6d. is also named, and even that might be shaded. Producers of most descriptions of manufactured iron and steel keep busy, and quotations for all descriptions are unaltered. A contract for nearly 40,000 tons of cast iron pipes for South America is understood to have been placed with a Middlesbrough firm.

## South-West Lancashire.

## COAL.

There is not as much demand inland for household coal as may be expected when such weather conditions set in as will make its use more of a necessity. In most grades, however, the whole of the output goes away daily. Forges are quiet in their takings of screened coal, full turns the week through being the exception. Shipping continues quiet, contract bunkering requirements being under the average, and open sale enquiry is, if anything, less than it was a week ago. Quotations for screened Lancashire steam coal are about as they were—viz., 13s. to 13s. 3d. f.o.b. for ordinary descriptions, and up to 13s. 9d. or 14s. f.o.b. for the best qualities. The coastwise and cross-Channel shipments continue brisk, except that Dublin is now practically a closed port, and generally there is quite as much required as collieries are able to send. The consumption of slack is



quietly on the increase, and there is less of it standing awaiting delivery orders. Renewals for contracts that expire at the end of this year are being made at an advance of about 6d. per ton on expiring prices.

Prices at pit (except where otherwise stated).		
	Current prices.	Last week's prices.
House coal:—		
Best	17/	17/
Do. (f.o.b. Garston, net)	16/9 to 17/3	16/9 to 17/3
Medium	15/3	15/3
Do. (f.o.b. Garston, net)	15/ to 15/6	15/ to 15/6
Kitchen	13/	13/
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.)	13/ to 14/	13/ to 14/
Best slack	10/3	10/3
Secondary slack	9/6	9/6
Common do.	9/	9/

South Lancashire and Cheshire.

COAL.

There was a good attendance on the Manchester Coal Exchange on Tuesday. The demand for house coal continues below the average at this time of the year, but prices are firm. Furnace coal is on the quiet, yet steady side. There is a moderate call for shipping coal. Slack is moving away in good quantities, with plentiful supplies offering, and prices not very steady. Prices of outside slack are cut in cases seriously in order to effect sales.

Prices at pit (except where otherwise stated).		
	Current prices.	Last week's prices.
House coal:—		
Best	17/3 to 18/	17/3 to 18/
Medium	16/ to 16/9	16/ to 16/9
Common	13/3 to 14/	13/3 to 14/
Furnace coal	12/6	12/6
Bunker (f.o.b. Partington)	14/	14/
Best slack	10/ to 10/6	10/ to 10/6
Common slack	9/ to 9/6	9/ to 9/6

IRON.

Good foundry iron is now offering at about 58s. with very few buyers. Prices of hematite vary according to quality—about 73s. might be taken as a fair price for No. 3 hematite. The foundries are not busy—in fact, the whole district is suffering from want of confidence, and the outlook is far from cheery. Forges are only working middling time, although the associated prices keep up. Steelworks are suffering from foreign competition. Bars are quoted at anything from £6 15s. to £7 5s. The talked-of reduction of 10s. per ton in the price of angles is likely to upset even these prices. There is no good feature to report to lighten the gloom that is hanging over the district.

Yorkshire and Derbyshire.

Leeds.

COAL.

There was an average attendance at the Yorkshire Coal Exchange on Tuesday, but there was no feature of exceptional interest. It was said that the pits have averaged about five days this week, and that stocks are not appreciably bigger. The supply of empty wagons has been unsatisfactory, but apart from this there are very few complaints just now as to traffic difficulties.

*House Coal.*—There is no improvement in the demand from London and the southern and eastern counties. Merchants generally are taking barely contract tonnage, and open market business is limited to small parcels of special qualities. There is a slight weakness in the prices, although official quotations are unaltered. Coastwise shipments are also affected by the open weather, and special offers of the medium qualities of Silkstone house coal have been frequently made this week, without, however, influencing very much business. Freights continue to show a slight downward tendency. In the West Riding markets merchants complain of the slowness of the retail trade, the only sorts selling readily being the cheaper qualities, in bags. Current pit prices:—Haigh Moor selected, 18s. 6d. to 19s. 6d.; Wallsend and London best, 17s. 6d. to 18s. 6d.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other qualities, 14s. to 15s. 6d.

*Gas Coal.*—The output of the pits is readily cleared from day to day, chiefly in satisfaction of contracts. New business is quiet, although a number of enquiries for

Prices at pit (except where otherwise stated).		
	Current prices.	Last week's prices.
House coal:—		
Prices at pit (London):		
Haigh Moor selected	14/8 to 15/	15/ to 16/
Wallsend & London best	14/ to 14/6	14/ to 14/6
Silkstone best	14/ to 14/6	14/ to 14/6
Do. house	12/ to 12/6	12/ to 12/6
House nuts	11/6 to 12/	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best	17/ to 18/	17/6 to 18/6
Silkstone best	16/ to 17/	16/6 to 17/6
Do. house	14/6 to 15/6	14/6 to 15/6
Other qualities	14/ to 14/6	14/ to 14/6
Gas coal:—		
Prices at pit:		
Screened gas coal	12/ to 12/6	12/ to 12/6
Gas nuts	11/ to 11/6	11/ to 11/6
Unscreened gas coal	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts	10/3 to 11/	10/3 to 11/
Large double-screened engine nuts	9/9 to 10/6	9/9 to 10/6
Small nuts	9/ to 9/6	9/ to 9/6
Rough unscreened engine coal	9/3 to 9/9	9/6 to 10/
Best rough slacks	7/ to 7/6	7/3 to 7/9
Small do.	6/ to 6/6	6/ to 6/6
Coking smalls	6/ to 6/6	6/ to 6/6
Coke:—		
Price at ovens:		
Furnace coke	12/ to 12/6	12/

delivery next year are circulating. It is said that business has been booked at prices averaging 1s. per ton below the present season's contracts. There are practically no stocks of gas coal.

*Manufacturing Fuel.*—There is very little change in the position this week. Slacks are abundant, but washed nuts and other special classes of fuel continue in active demand. There is a very large quantity of coking slack on offer on the open market at special prices.

*Washed Furnace Coke.*—Average samples of washed patent oven coke are still being sold at from 12s. to 12s. 6d. per ton at the ovens, and there is a little more life in the demand from the north, but supplies to the Frodingham district are on a low level. Forward business is difficult to book, even at the present low prices.

Barnsley.

COAL.

Although the upper ports on the Baltic are now closed the export trade for large steam coal continues to be of good volume, but there is much keener competition by the collieries for business which has to be placed for the Black Sea ports. There is not a large tonnage of best hards in the market, but where this fuel is in the hands of merchants, prices are being quoted much less than by collieries direct. The greater proportion of foreign trade is in regard to secondary classes of large steams, and with the collieries working the full six days the output is unusually large, and almost exceeds the enquiry, substantial as this may be. Prices show considerable fluctuation and buyers are finding not a little encouragement in holding back in anticipation of the position becoming weaker. In regard to forward business there is little to add in addition to what has been announced with respect to the Trawler Company's contract and the railway companies. The former, of course, have yet a large tonnage to place, but as far as is known nothing has been decided in this direction, and the railway companies are evidently not rushing business in face of the demand for 1s. per ton advance on the best hards. With respect to the cheaper grade coal the opinion prevails that last year's prices will be renewed. The demand for manufacturing fuel is hardly so brisk, although nuts appear to be maintaining a steady position and enquiry forward is fairly encouraging. Best slacks have improved a little on the week, but rougher kinds have accumulated, and prices are not so firm even as a week ago, and a large tonnage is being offered on the market. Buyers of gas coal are still able to make more satisfactory bargains in taking up spot lots. With regard to house coal, the colder weather has quickly had a stimulating effect on business and stocks are being more readily got rid of. The best quality of coal, however, is still, perhaps, the weaker feature of the market, but values are fairly well maintained. The demand from West Yorkshire and nearer districts for secondary descriptions of coal is better and nuts are more freely enquired for. With regard to coke the demand is still of a hand-to-mouth character with no confidence in regard to the future. The output is still heavy. Prices lack strength, about 12s. per ton being the prevailing figure.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone	15/6 to 16/	15/6 to 16/
Best Barnsley softs	15/ to 15/3	15/ to 15/3
Secondary do.	12/6 to 14/	12/6 to 14/
Best house nuts	13/ to 13/6	13/ to 13/6
Secondary do.	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals	12/ to 12/3	12/ to 12/3
Secondary do.	11/ to 11/3	11/ to 11/3
Best washed nuts	11/3 to 11/6	11/3 to 11/6
Secondary do.	10/3 to 10/6	10/3 to 10/6
Best slack	7/3 to 7/6	7/6
Rough do.	6/ to 6/6	6/ to 6/6
Gas coals:—		
Screened gas coals	12/6 to 13/	12/6 to 13/
Unscreened do.	11/ to 12/	11/ to 12/
Gas nuts	12/ to 12/3	12/ to 12/3
Furnace coke	12/	12/

Hull.

COAL.

South Yorkshire steam hards have rallied a little during the week, and are now worth about 15s. for prompt shipment at Hull, which is about 3d. better, but the rise is not regarded as a permanent character. Large quantities are on the market, and are more than sufficient to meet

Approximate prices for prompt shipment f.o.b. Hull.

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards	15/	14/9
Washed double-screened nuts	13/6 to 13/9	13/3 to 13/6
Unwashed double-screened nuts	12/9 to 13/	12/9 to 13/
Washed single-screened nuts	13/ to 13/3	13/ to 13/3
Unwashed single-screened nuts	12/ to 12/6	12/ to 12/6
Washed smalls	10/ to 10/3	10/ to 10/6
Unwashed smalls	9/ to 9/3	9/3
West Yorkshire:—		
Hartleys	13/6	14/
Rough slack	9/ to 9/3	9/ to 9/3
Pea slack	8/3 to 8/6	8/3 to 8/6
Best Silkstone screened gas coal	14/3 to 14/6	14/3
Best Silkstone unscreened gas coal	12/	13/3
Derbyshire:—		
Best steam hards (Hull)	15/3	15/3
Do. (Grimsby)	15/	15/
Derbyshire nuts (doubles)	13/	13/
Derbyshire nuts (doubles) (Grimsby)	12/9	12/9
Derbyshire large nuts	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby)	14/	14/
Nottinghamshire hards	15/3	15/3
Do. do. (Grimsby)	15/	15/

immediate and near prospective requirements. *Derbyshire* and *Nottingham* steams are easier, and their value at *Grimsby* and *Linningham* practically approximate to that of *South Yorkshires* at *Hull*. Secondary sorts are unchanged, but smalls are easier, and rough slack for industrial purposes is in very poor request indeed. House coal and large coal are, however, scarce, the advent of colder weather having had a stimulating effect on the demand. Best gas coal is also somewhat dearer. In the forward market little definite business has been done. The *Hull Corporation Electricity Department* are inviting tenders for their requirements over next year, 38,000 tons of unwashed slack being called for, besides 2,000 tons of *South Yorkshire* nuts for next *December-January*. The *Steam Cutter Coal and Ice Company* are also in the market, their requirements consisting of 30,000 tons or more for delivery over next year at *Hull* or *New Holland*. Tenders are due in next week—*Wednesday* in the former case and *Friday* in the latter. Shipments at the docks continue to be above the normal, large quantities still being sent to *South Russian* ports. The *Humber* freight market is dull and little business passing. Rates are thus largely nominal, *Baltic* ports being quoted on the basis of *Riga* 5s. 9d. to 6s., *Reval* 5s. 6d. to 5s. 7½d., *Swedish Sound* 5s. 6d., *Mediterranean-Genoa* 8s., *Alexandria* 8s. 3d., and *Black Sea-Odessa* 9s. 3d., *Novorossisk* 9s. 3d. to 9s. 6d.

Chesterfield.

COAL.

The tone of the coal trade of this district generally is good, and apart from the house coal department the demand is fairly satisfactory. Fuel for domestic consumption is in slow request at present owing to the continued mildness of the season, and there will be no increased demand until the weather becomes colder. Fortunately, orders coming to hand prove sufficient to keep stocks at a low level. Coal for manufacturing purposes moves freely, and the prospects for the winter are satisfactory. Owing to the active condition of the heavy steel trades of *Sheffield* and district, the requirements of cobbles and nuts are as heavy as at any time during the present year, and the demand is likely to be maintained on the present level for many months to come. Prices show no signs of weakening. Gas coal is active, and heavy deliveries are the rule just now. For steam coal for locomotive use the demand is brisk. Several contracts for this class of fuel will expire at the end of the year, when it is expected that the prices quoted for a renewal will show an advance of 1s. per ton upon those which were accepted a year ago. The export trade is brisk, and a good demand is experienced for steam coal. Heavy shipments are being made to the *Black Sea* on account of the large purchases which were recently made for the *Russian* railways. Prices keep firm at 15s. to 15s. 3d. per ton free alongside steamer at *Grimsby*. Even at these figures supplies of best *Derbyshire Top Hards* are not plentiful by any means. No contracts have yet been arranged for next year. Foreign buyers are still holding back, hoping that by waiting they may be able to secure more favourable terms. It remains to be seen whether in this they will be successful. In the meantime, collieries are well off for orders, and the contracts already on hand will not expire until the early months of 1914. There is a good business passing in cobbles for near *Continental* ports, and prices are a shade firmer. Washed nuts are in slightly better demand, but washed slack is not much called for at the moment. Prices are unchanged on the week. Coke is in greater demand, and prices are now showing signs of advancing. If the present demand should be maintained, it might become necessary to put into work again some of the ovens that were recently set down. This would give an improved tone to the market for slack.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals	15/6	15/6
Secondary do.	13/6	13/6
Cobbles	12/6	12/6
Nuts	11/6	11/6
Slack	8/6	8/6

IRON.

There is no relief to the depression which has characterised the pig iron market during the last few months. Buyers are still disinclined to buy for forward delivery. Prices are weak. The same condition of things is apparent in respect of the finished iron branch of the trade, where orders are scarce and the plant only working up to about 50 per cent. of its capacity.

Nottingham.

COAL.

With the exception of the domestic fuel section, in which there has been a slight improvement, the coal trade in *Nottinghamshire* is much the same as a week ago. On the whole a fair trade is being done, but there is not that buoyancy which sometimes characterises the industry at this period of the year, the comparatively mild weather no doubt being a retarding factor. For domestic fuel more orders are coming to hand, but these in the main are for small lots. Best qualities are in steady request, and for the time being secondary sorts are in better demand. What is wanted to infuse activity into this branch is a spell of wintry weather. There is a moderate tone in the steam coal section. The export trade is fair considering the lateness of the season, but the demand for industrial fuel in the home market is hardly so good, but owners are showing a disposition to maintain recent contract rates. Gas coal is having a fair sale, customers taking reasonable supplies on contract account, while sales on current account

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights	14/ to 14/6	14/
Good house coals	13/ to 14/	13/ to 14/
Secondary do.	11/ to 12/	11/ to 12/
Best hard coals	11/3 to 11/9	11/3 to 11/9
Secondary do.	10/ to 10/9	10/3 to 11/
Slacks (best hards)	8/ to 8/6	8/3 to 8/6
Do. (seconds)	7/ to 7/6	7/ to 7/6
Do. (soft)	7/ to 7/6	7/ to 7/6



factory. Little improvement has been manifested in the sale of slacks, the demand for which continues somewhat irregular.

**Leicestershire.**  
**COAL.**

The return of milder weather has made itself markedly felt in the business doing in household coals. For the best qualities there is scarcely any enquiry. For the middle qualities the demand is much slower and also for small household coals. Steam coals of all descriptions are in very good request. The reduced demand has caused a reduction in the output but not to a very great extent, and stocks on hand are not very heavy and are mostly household coals. A return of seasonable weather would quickly reduce them. Local merchants are not any busier. The current quotations show no alteration generally from those of last week. There may be a little easiness in some quarters, but in the main, late prices are held out for.

**South Staffordshire, North Worcestershire and Warwickshire.**

**Hednesford.**

**COAL.**

Although there is no particular rush, the condition of the coal trade of the Cannock Chase district is on the whole satisfactory, with a tendency to become somewhat brisker. Prices have varied very little since last report. The collieries are well employed, most of them working practically full time. Any slight change there may be in the enquiry for house coal is in the right direction, and there is a steady demand for coal for manufacturing purposes. There is a plentiful supply of slack. Railway and canal sales have not altered much since last report, and business at the landsale depots is fairly satisfactory.

**Birmingham.**

**COAL.**

The coal trade maintains a firm tone. The house fuel branch is still on the weak side, but is improving. Slacks have hardened, but prices generally are not quotably altered. They are as follow:—

**Prices at pit.**

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/6
Do. seconds deep .....	16/	16/
Do. best shallow .....	14/9	14/9
Do. seconds do. ....	14/	14/
Best hard .....	15/	15/
Forge coal.....	11/	11/
Slack .....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked .....		
cobs .....	14/	14/
Best hard spires .....	15/	15/
Forge (steam) .....	11/	11/
D.S. nuts (steam) .....	10/	10/
Small (do.) .....	8/3	8/3

**IRON.**

There was a fair attendance, but reports did not indicate any improvement in conditions. An exception might be made in the case of galvanised corrugated sheets. Last week sales were made at £10 12s. 6d. a ton Liverpool. Now, under the influence of the receipt of several good orders, the principal houses are not doing business under £10 15s. for export and £11 for the home trade. Makers of standard bars are doing fairly well on orders from rolling stock makers, but the common bar branches are severely hit by Belgian competition. Belgian No. 3 iron, which is equivalent to the nut and bolt iron here, is brought to Darlaston and Wednesbury districts at from £5 12s. 6d. to £5 15s. a ton, whereas the local product cannot be sold under £6 12s. 6d., although this is subject to 2½ per cent. discount. Orders for merchant qualities are taken at irregular prices—£7 being the maximum—and this branch generally is languid. The official price for small rounds (three-eighths basis) is £7 7s. 6d., and is obtained for good quality; for lesser qualities, such as common chain iron, 2s. 6d. less is readily taken. It is this material that is most affected by foreign competition, and local makers cannot touch the prices, which are 10s. to 15s. below their own. Roughly speaking, in the finished branches generally fairly steady work is assured up to Christmas, though it is not anticipated that the remaining weeks of the year will yield any material improvement. Despite curtailment of output, stocks of pig iron are fairly heavy, though these would speedily disappear at the first signs of a revival. Prices are no better, and producers would be happy to know that the minimum has been reached. Present rates are certainly unremunerative, because there has been no corresponding reduction in the cost of output. The wages ascertainment for September and October will shortly be out, and a substantial reduction in the puddling rate is anticipated. The steel trade is on the weak side, though a fair amount of new business has resulted from the recent heavy reductions in price. Bridged roofs, boilers, tanks, and railway plant and machinery are providing steady employment. A meeting of the Steel-makers' Association will be held, it is understood, to-day to consider prices in relation to the development in Scotland where the rebate system has been abolished.

**Forest of Dean.**

**Lydney.**

**COAL.**

The position throughout the coal trade of this district remains practically without any material change calling for special notice. The mildness of the season still keeps back any pressure of demand for house-fire coals, and the enquiry to keep the pits employed about the same. Steam coals are in poor request just now, but prices on short time. Prices are anything but firm, and are occasionally offered to clear

**Prices at pithead.**

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	17/6
Forest .....	16/6	16/6
Rubble .....	16/9	16/9
Nuts .....	15/	15/
Rough slack .....	6/6	6/6
Steam coal:—		
Large .....	12/ to 13/	12/ to 13/
Small .....	8/ to 9/	8/ to 9/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

**Devon, Cornwall, and South Coast.**

**Plymouth.**

**COAL.**

Messrs. W. Wade and Son state that marked dullness can still be reported of the south-coast coal trade, both as to the wholesale and retail demand. Imports outside contract fixtures are very limited, and those collieries that are quoting advanced prices for winter shipment are meeting with little or no encouragement. The same remarks apply to the rates for steam tonnage. The retail competition is very keen, this being stimulated by the low-priced rail coal that is offered from all the Midland districts.

**THE WELSH COAL AND IRON TRADES.**

THURSDAY NOVEMBER 20.

**North Wales.**

**Wrexham.**

**COAL.**

The North Wales coal market is, at the present time, in a satisfactory condition. Practically all the collieries are working full time, unless precluded from so doing by lack of empty wagons, and all the output is easily disposed of at fairly satisfactory prices, with a slight tendency to advance. In the house coal business, wholesale and retail orders are fairly numerous both for present and forward delivery, and the outlook is decidedly encouraging. Steam coal also has a ready sale. Of course, a considerable proportion of this is taken by the various railway companies against contract, but after taking these and other contracts into consideration, the coalowners, in most cases, are practically sold up to the end of the present year, and there are now enquiries abroad in respect of next year's contracts. In regard to coal for shipment, trade is good, but we have labour trouble again, owing to the scarcity of dock labourers at the Mersey ports, especially at the beginning of the week. All the gas coal obtained is at once sent away under the running contracts, and nuts are particularly scarce. Relatively speaking the small coal is in as good demand as the other classes of fuel, and several good contracts have been fixed for supplies of slack for the year commencing January 1 next, at slightly better prices than present contracts. In reference to gas coke, some of the smaller companies have made an attempt to advance prices, but the largest works in the district (Wrexham) are still selling at from 13s. 4d. to 15s. per ton at the works, so that this may be taken as being the market price.

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal .....	15/6 to 16/6	15/6 to 16/6
Secondary do. ....	14/6 to 15/6	14/6 to 15/6
Steam coal .....	12/9 to 13/6	12/6 to 13/6
Gas coal .....	13/ to 14/	13/ to 13/9
Bunkers.....	12/3 to 12/9	12/3 to 12/6
Nuts .....	11/6 to 12/	11/6 to 12/
Slack .....	6/6 to 8/	6/ to 8/
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 18/9	17/6 to 18/9
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

**Monmouthshire, South Wales, &c.**

**Newport.**

**COAL.**

A good week's shipments have been recorded, the tonnage supply keeping up fairly well, with quite a number of steamers now in dock awaiting their turn at the tips. Throughout the market a stronger tone has developed, more especially for best qualities of large, although the volume of business actually placed does not seem to be up to sellers' expectations. These gentlemen, nevertheless, maintain a firm attitude as to prices, and show no weakness whatever. Colliery stems are fairly well filled, chartering going along at an even rate without any noticeable variation in freights. It is stated in business circles that a small portion of the supplies for the French State Railways has been secured by Messrs. Pyman, Watson and Co. Tenders were recently sent in for the supply of 187,000 tons of Monmouthshire semi-bituminous large, but the bulk of the order has been sent to Germany. It is understood that the price will be around 15s. f.o.b. German coalowners have

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	17/6 to 18/	17/ to 17/3
Western-valleys, ordinary	16/3 to 16/9	16/ to 16/6
Best Eastern-valleys .....	15/9 to 16/3	15/9 to 16/
Secondary do. ....	15/3 to 15/9	15/3 to 15/6
Best small coals .....	8/3 to 8/9	8/3 to 8/6
Secondary do. ....	7/9 to 8/	7/9 to 8/
Inferior do. ....	7/ to 7/6	7/ to 7/6
Screenings .....	8/6 to 8/9	8/6
Through coals .....	12/3 to 12/9	12/ to 12/3
Best washed nuts .....	13/6 to 14/	13/6 to 13/9
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/ to 20/	19/ to 20/
Furnace coke .....	19/ to 20/	19/ to 20/
Foundry coke .....	23/ to 25/	23/ to 25/

also, it is said, secured orders for the Paris, Lyons and Mediterranean Railway, for which local tenders have been passed over. Small coals have developed a firmer tone this week, also throughs and nuts, but house varieties remained unmoved since early summer. Pitwood is a much stronger market, up to 25s. having been given for good French wood, supplies being scanty.

**IRON.**

Generally speaking there is very little alteration to report in the conditions of the local iron and steel trades; there is not much business passing, and very little enquiry coming along. Work at bar mills is fairly good, and output normal. Enquiry of tinplate bars is somewhat better, and prices remain firm at last quoted figures. Imports of foreign bars for last week total 9,500 tons. Rail mills continue well engaged, and a considerable amount of new business has been put through during the past week. Quotations are firm at last values. At blastfurnaces there is a better enquiry coming along, and it is said that one more furnace is to be blown in early in the year. Welsh hæmatite is steady at last quoted rates. Conditions in the tinplate department remain as a week ago, but there has certainly been a better enquiry coming to hand, also more inclination to do business, but orders are only of a small size. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tin-plate bars: Bessemer steel, £4 15s., Siemens steel £4 16s. 3d. to £4 17s. 6d. Tin-plates: Bessemer primes, 20 × 14, 13s.; Siemens primes, 20 × 14 13s. to 13s. 1½d. Finished black-plate, £9 10s. ton. Pig iron: Welsh hæmatite, 69s. delivered locally.

**Cardiff.**

**COAL.**

The outstanding feature of the market just now is the scarcity of best steam coals. This is reflected in the shipments. Notwithstanding that there has been an ample supply of tonnage and great pressure for coals, the shipments last week from the South Wales ports to foreign countries showed a great falling off as compared with the corresponding period of last year. The total quantity of coal exported from Cardiff, Penarth, Barry, Newport, Port Talbot and Swansea only amounted to a little over 500,000 tons, being a decrease of considerably over 142,000 tons. This reduction is attributed to the diminished output which has been so long in evidence at nearly all the collieries. Of course, the explosion at the Senghenydd colliery accounted for a considerable loss of trade, but other factors which have influenced the market have been the stoppages at the Llanhilleth and other collieries, and the less amount of work done per man at a great many places where operations were continued. Now that Christmas is within measurable distance, it is hoped that the miners will work better, but even if they do, the effect on the market will scarcely be appreciable, so strong is the demand for coals. There are practically no best Admiralty coals on the market at present. Indeed, some of the collieries declare that they can entertain no more business for this month, whilst for December delivery they are quoting firmly 21s. Through middlemen, however, it is possible to obtain cargoes here and there for early shipment at 20s. 6d. Superior second Admiralties are 19s. 9d. to 20s. 3d., and ordinary seconds 18s. 9d. to 19s. per ton. Though the tenders for the Admiralty supplies went in at the end of last week, nothing was known as to the result at the time of writing. A contract for the supply of 120,000 tons of Admiralty coals for the Central State Railway of Brazil has been secured by Messrs. Cory Brothers. Delivery is to extend over the first six months of next year, and the price obtained is reported to be 34s. 2d. c.i.f. Rio de Janeiro. It is also said that the same company have contracted to supply 20,000 tons of American coal at 31s. 3d. c.i.f. It is stated that Messrs. Pyman, Watson and Co. have secured an order for about 25,000 tons of Monmouthshire coals for the French State Railways. The tenders sent in by Welsh exporters were at about 16s. f.o.b., or 1s. 6d. under German prices. The bulk of the business went to Germany. There is an unconfirmed report that the French Transatlantique Steamship Company have arranged for a considerable portion of their requirements on the basis of 17s. 6d. f.o.b. for superior second-class Admiralty coals. Messrs. Elder, Dempster and Co. are also in the market for about 150,000 tons of Admiralty coals, whilst at the beginning of this week enquiries came to hand from the Portuguese railways for 46,500 tons of Cardiff second steams or best Monmouthshires for delivery from January to April, and for a further quantity of 93,000 tons for shipment over the whole of 1914. Tenders have to be in on December 3, and remain open until the 15th. There are also further enquiries from Russian consumers. The charterings last week only amounted to 264,700 tons, being a decrease of 60,000 tons as compared with the previous six days. Freight generally are still on the easy side, with little prospect of any improvement in the near future. It is now very generally admitted that the supply of tonnage has overtaken the demand. With regard to the trimmers' half holiday on the Saturday afternoon, which is now in full swing, shipowners complain that matters have turned out worse than they expected, especially for those engaged in the coasting trade. Not only are vessels delayed in sailing, but in some cases tips are prevented from being got in readiness for the commencement of work on the Monday morning. This, however, is not the view generally entertained. In not a few instances it is admitted that the half holiday has resulted in a speeding up of the loading operations both on the Friday and Saturday morning, as trimmers are anxious to get boats away so as to enable them to start in the following week on a fresh vessel. So far as small coal is concerned, the market is in a very lifeless condition, and is likely to be so until shipments to Italy are fully resumed. Bunkerings, however, still command from 10s. 9d. to 11s., best ordinaries 10s. 6d., cheap qualities 9s. 6d., and cargo sorts from 7s. 6d. to 7s. 9d. per ton. The Belgian State Railways have arranged for at least a portion of their requirements for next year. Messrs. Morgan, Wakley and Co. have secured about 40,000 tons, whilst a similar quantity has been placed with Messrs. Pyman, Watson and Co. Small orders have been secured by Messrs. Tabb, Burtleson and Co., of Newcastle, and by Mr. Hugo Stinnes. The prices, it is understood, are from 15 fr. to 15½ fr. delivered at Antwerp, Bruges, and Ghent. An advance of about 6d. per ton has taken place in Monmouthshire coals, Black Veins being quoted at 18s. to 18s. 3d., Western Valleys at 17s. to 17s. 3d., and best Eastern Valleys at 16s. to 16s. 3d., in each case f.o.b. Cardiff. The returns of the



exports to foreign countries for the month of October are very disappointing. According to the Customs authorities, from the whole of the Bristol Channel ports they only amounted to 2,616,148 tons, as against 2,793,364 tons in the corresponding month of last year, being a decrease of 177,216 tons. From Cardiff, on a shipment of 1,715,356 tons, there is a decrease of 140,192 tons, whilst from Newport the decrease was 55,478 tons, and from Port Talbot a decrease of 7,750 tons. The only port which showed an increase was Swansea, which shipped 323,595 tons, or 16,322 tons more than last year. For the ten months of the year, however, there is an increase from the Welsh ports of 3,940,518 tons. The following table shows the exports in October to the chief foreign countries as well as for the same month last year:—

	Oct. 1912.	Oct. 1913.
	Tons.	Tons.
Russia .....	67,394	48,515
Sweden .....	20,877	20,791
Norway .....	12,141	13,242
Germany .....	20,286	25,297
Netherlands .....	15,560	9,423
Belgium .....	40,500	42,116
France .....	575,216	600,534
Algeria .....	68,030	61,386
French Somaliland .....	—	5,861
Portugal .....	67,251	56,249
Azores .....	6,838	2,593
Madeira .....	20,498	3,963
Spain .....	113,227	135,954
Canary Islands .....	86,096	38,354
Italy .....	674,832	587,049
Austria-Hungary .....	9,198	29,392
Greece .....	21,724	49,315
Bulgaria .....	3,494	9,073
Roumania .....	21,192	33,288
Turkey (European) .....	13,827	22,785
„ (Asiatic) .....	1,284	20,192
Egypt .....	146,126	165,332
Tunis .....	1,929	13,268
China (exclusive of Hong Kong) .....	5,622	—
Chili .....	11,844	20,522
Brazil .....	133,002	128,129
Uruguay .....	82,031	32,609
Argentine Republic .....	364,299	261,358
Channel Islands .....	8,927	6,646
Gibraltar .....	15,868	18,834
Malta .....	48,659	36,731
Cape of Good Hope .....	—	5,351
Aden .....	15,714	20,831
British India .....	11,544	13,198
Ceylon .....	10,881	23,764
Hong Kong .....	—	12,064
West Africa (French) .....	4,942	7,671
„ (Portuguese) .....	32,358	10,908
„ (British) .....	15,693	4,194

There is no change in fancy house coals, but Rhondda bituminous coals are rather firmer, No. 3 Rhondda being 17s. 3d. to 17s. 6d., and No. 2 13s. 6d. to 13s. 9d. There was an exceptionally heavy shipment of patent fuel last week, the total for the Channel being 40,202 tons, of which the Crown Company despatched 17,937 tons and other local makers 1,500 tons, Swansea 18,965 tons, and Newport 1,800 tons. Best brands are still held for 22s. 6d. The Portuguese State Railways are in the market for 50,000 tons for delivery over next year. The coke market is slightly weaker, special foundry being 27s. to 28s., ordinary ditto 23s. to 25s., and furnace coke 19s. to 21s. The pitwood market is very strong. Owing to the boisterous weather and the floods in France there is very little wood coming forward, and prices are now 24s. to 24s. 6d.

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	20/6 to 21/	20/3 to 20/6
Superior seconds .....	19/9 to 20/3	19/3 to 19/9
Ordinary do. ....	19/ to 19/3	18/6 to 18/9
Best bunker smalls .....	10/9 to 11/	10/9 to 11/
Best ordinaries .....	10/6	10/3 to 10/6
Cargo qualities .....	7/6 to 7/9	7/6 to 7/9
Inferior smalls .....	6/6 to 7/	7/
Best dry coals .....	19/ to 19/6	18/9 to 19/
Ordinary dries .....	17/ to 17/6	16/6 to 17/
Best washed nuts .....	16/ to 16/6	16/
Seconds .....	15/ to 15/6	15/
Best washed peas .....	14/3 to 14/6	14/
Seconds .....	13/ to 13/3	13/
Dock screenings .....	12/6 to 13/	12/6
Monmouthshire—		
Black Veins .....	18/ to 18/3	17/3 to 17/9
Western-valleys .....	17/ to 17/3	16/3 to 16/6
Eastern-valleys .....	16/ to 16/3	15/6 to 15/9
Inferior do. ....	15/3 to 15/6	15/ to 15/3
Bituminous coals:—		
Best house coals (at pit) .....	20/6	20/6
Second qualities (at pit) .....	17/6 to 18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/3 to 17/6	16/6 to 17/
Through-and-through .....	14/6 to 15/	14/6 to 15/
Small .....	12/ to 12/6	12/
No. 2 Rhondda—		
Large .....	13/6 to 13/9	13/6
Through-and-through .....	11/6	11/ to 11/3
Small .....	8/ to 8/6	7/9 to 8/
Best patent fuel .....	22/6	22/6
Seconds .....	20/ to 21/6	19/6 to 21/6
Special foundry coke .....	27/ to 28/	28/ to 29/
Ordinary do. ....	23/ to 25/	25/ to 26/
Furnace coke .....	19/ to 21/	20/
Pitwood (ex-ship) .....	24/ to 24/6	23/

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

#### IRON.

Things are rather brighter this week in the tin-plate trade. The shipments amounted to 183,826 boxes as against 118,546 boxes received from works, so that stocks

have been reduced by 65,280 boxes and stand now at 262,790 boxes. One pleasing fact in connection with the shipments is that they include a large consignment to Roumania. Prices, however, continue to rule low, some prompt lots of 14 x 20 cokes having changed hands at 12s. 7½d. to 12s. 9d., but these were exceptional cases. Makers generally quote from 12s. 9d. to 12s. 10½d. Ordinary oil sizes are 13s. 3d. to 13s. 4½d. The dispute at the Cwmfelin works, by which about 700 men were thrown out of work through the action of some 20 sorters and wheelers, has been satisfactorily settled. The management offered the sorters 6d. and the wheelers 4d. per day advance and this was accepted. There have been further considerable imports of sheet bars from the Continent, but prices of Welsh bars are still quoted at £4 16s. 3d. for Siemens and £4 15s. for Bessemer. As far as Siemens bars are concerned, the price is being shaded by firms outside the association, and there is some talk by members of making another appeal to the association to reduce the official quotation. There is no material change in the galvanised sheet trade. One or two of the leading makers, who have lately booked some good lines from India, are talking of putting up their prices, but at present buyers can supply their requirements at £10 10s. and, in a few cases, even at £10 7s. 6d. Welsh hematite has fallen to 65s. f.o.t. Some fairly good orders have been given out for German basic pig at a little over 60s. Best rubio iron ore is 18s. 6d. to 19s., seconds 16s. 6d. to 17s. 6d., and Almeria 18s. New steel crop ends have fallen to 57s. 6d., but heavy wrought has gone up to 52s., whilst cast scrap is 55s. to 57s. 6d.

#### Swansea.

#### COAL.

The returns of the trade of the port last week were less than for some months past. There was a considerable drop in the shipments of coal, but exports of patent fuel were fairly good. The shipments of coal and patent fuel together amounted to 81,524 tons. A capital attendance assembled on Change this morning, but there was no material alteration in the general conditions prevailing on the anthracite coal market. There was a strong demand for Swansea Valley large, and last prices were fully upheld. Red Vein large continued steady. Machine-made nuts and cobbles were not so firm as during last week. Rubby culm and duff were both weak. In the steam coal market there was a strong demand for large, and bunker through was in slightly better request.

Prices f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/6 to 21/6	19/6 to 21/6
Big Vein large (less 2½ per cent.) .....	17/6 to 18/6	17/6 to 18/6
Red Vein large do. ....	14/6 to 16/	14/6 to 16/
Machine-made cobbles (net) .....	21/6 to 24/6	21/6 to 24/6
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 26/	23/6 to 26/
German do. do. ....	23/6 to 26/	23/6 to 26/
Beans (net) .....	16/6 to 18/6	16/6 to 18/6
Machine-made large peas (net) .....	13/3 to 13/9	13/ to 13/9
Do. fine peas (net) .....	—	—
Rubby culm (less 2½ p.c.) .....	4/6 to 5/6	5/ to 5/6
Duff (net) .....	3/ to 4/	4/ to 4/6
Steam coals:—		
Best large (less 2½ p.c.) ..	19/ to 20/	19/ to 20/
Seconds do. ....	14/6 to 15/6	14/3 to 15/
Bunkers do. ....	10/6 to 11/6	10/6 to 11/6
Small do. ....	7/ to 7/6	7/ to 7/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) ..	10/ to 11/	10/ to 11/
Patent fuel do. ....	17/6 to 18/	17/6 to 18/

#### IRON.

The iron and steel trades continued brisk during the past week. Steel bars were in good request, and prices are firmer than they were a few weeks ago. The tin-plate industry again exhibited a brighter aspect, but there is still not much demand, and prices continue to rule low. The shipments of tin-plates last week were 183,826 boxes, receipts from works 118,546 boxes, and stocks remaining in the dock warehouses and vans 262,790 boxes.

#### Llanelli.

#### COAL.

The weakness which has been noticeable during the past couple of weeks in the market still continues, and most coals are more or less difficult to dispose of. A change of this description was not expected by anyone, as a few weeks ago the demand was excellent, with every reason to expect a continuance. Possibly the very mild weather accounts for the weak enquiry in the horticultural and stove kinds, and spot lots of both kinds can now be bought cheaply. A change in temperature will quickly alter the position. There

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	21/ to 22/6	21/ to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	18/ to 19/	18/ to 19/
Red Vein do. ....	13/6 to 14/6	13/6 to 14/6
Machine-made cobbles ..	20/ to 21/	19/6 to 20/6
German nuts .....	23/ to 25/	23/ to 25/
French do. ....	23/ to 25/	23/ to 25/
Paris do. ....	24/ to 25/	23/ to 25/
Machine-made beans .....	18/ to 20/	18/ to 20/
Do peas .....	12/ to 13/	12/6 to 13/6
Rubby culm .....	4/9 to 5/3	4/6 to 5/
Duff .....	4/ to 5/	4/ to 5/
Other sorts:—		
Large steam coal .....	16/ to 17/	16/ to 17/
Through-and-through ..	11/ to 11/6	11/ to 11/6
Small .....	9/ to 10/	9/6 to 10/
Bituminous small coal ..	10/ to 11/	11/ to 11/6

is not the least improvement noticeable for the manufacturing coals, and not for a very long time has the market been so dead. Works are overstocked with coals of all kinds and sellers are offering at low prices. Unfortunately, there is no improvement expected over the next few months. Machine-made beans and culm are also moving very slowly.

#### THE IRISH COAL TRADE

THURSDAY, NOVEMBER 20.

#### Dublin.

Matters have become more complicated since the holding up of the port last week, but in spite of this the local coal trade is rapidly recovering much of its accustomed activity, and the cartage by motor lorries and other vehicles is now being carried out on a more extensive scale than it has been since the commencement of the labour disturbances. This is particularly noticeable in the consignments conveyed under military escort from the docks to the biggest barracks in the city. The work of discharging the coal vessels has been proceeding since the importation of free labour, and there appears to be no immediate apprehension of a shortage of coal, as it is stated that there are sufficient supplies to tide over a considerable period. Best Orrell coal and best Arley have been advanced 2s. per ton this week, the prices being 30s. and 28s. per ton respectively, less the usual 1s. per ton discount for cash, and some of the coal merchants are at present only selling these two qualities. As regards other classes the various firms regulate their own prices according to the extra expense incurred in delivery. The coaling vessels arriving during the past week amounted to 48 as compared with 34 the week previously, chiefly from Garston, Ayr, Preston, Troon, Liverpool, Point of Aire and West Bank. The total quantity of coal discharged upon the quays was 20,651 tons.

#### Belfast.

The local market is fairly active, although demand is below the average for the time of year in the household branch. Prices are firm, but without further change, best qualities of English coal now being difficult to obtain. There is a fairly good supply in the port, although recent gales at sea have been detrimental to the import trade. Quotations in the city are as follow:—Best Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Prices of steam coals ex-quay are:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton. Cargoes arriving during the week were chiefly from Garston, Ayr, Girvan, Troon, Manchester, Irvine, Partington, Maryport, Glasgow, Neath Abbey, Point of Aire, Preston, Whitehaven and Swansea.

#### THE TIN-PLATE TRADE.

#### Liverpool.

Business in small lots for early delivery is fairly good, but there is little or no buying ahead. Makers say they are now selling below cost, and prefer not to book forward unless at an advance. Buyers, however, are not anxious to buy, and are only covering their actual requirements. Quotations for shipment over the next six months may be called: Coke tins:—I C 14 x 20 (112 sh. 108 lb.), 12s. 9d. to 13s. per box; I C 28 x 20 (112 sh. 216 lb.), 25s. 10½d. to 26s. 3d. per box; I C 28 x 20 (56 sh. 108 lb.), 13s. 3d. to 13s. 6d. per box; I C 14 x 18½ (124 sh. 110 lb.), 13s. 4½d. per box; I C 14 x 19½ (120 sh. 110 lb.), 13s. 4½d. per box; I C 20 x 10 (225 sh. 156 lb.), 18s. 10½d. to 19s. per box; I C squares and odd sizes, 13s. 3d. to 13s. 4½d. basis for approved specifications. Charcoal tins are in moderate request. Quotations run:—I C 14 x 20, 15s. per box and upwards, according to finish. Coke wasters meet with a fair demand, and are quoted:—C W 14 x 20 12s. 1½d. to 12s. 3d. per box; C W 28 x 20, 24s. 10½d. to 25s. 1½d. per box; C W 14 x 18½, 10s. 10½d. to 11s. per box; C W 20 x 10, 14s. 10½d. to 15s. per box—all f.o.b. Wales, less 4 per cent.

#### THE BY-PRODUCTS TRADE.

**Tar Products.**—The market is steady, but there is not a great amount of business passing. Pitch is easy. There is practically no change in naphthas or carbolic. Creosote steady. Benzols of all kinds keep firm. Nearest values are:—

Benzols, 90's .....	1/2
Do. 50's .....	1/
Do. 90's North .....	1/0½
Do. 50's North .....	1/11
Toluol .....	1/10½
Carbolic acid, crude (60 per cent.) .....	1/1 to 1/1½
Do. crystals (40 per cent.) .....	3/3½
Solvent naphtha (as in quality and package) ..	9/3½
Crude ditto (in bulk) .....	5/
Creosote (for ordinary qualities) .....	3/3½
Pitch (f.o.b. east coast) .....	41/6 to 42/
Do. (f.a.s. west coast) .....	41/ to 41/6
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—The market has soon recovered from its recent depression, which was more apparent than real. Substantial premiums on current values are asked for forward delivery to the value of anything from one to three half-crowns, according to period. Spot values also firmer, nearest prompt prices being:—

London (ordinary makes) .....	£12/7/6
Beckton (certain terms) .....	—
Liverpool .....	£13/2/6
Hull .....	£13 to £13/1/3
Middlesbrough .....	£12/18/9 to £13
Scotch ports .....	£13/5
Nitrate of soda (ordinary) per cwt. ...	10/7½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]



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(A Classified List appears on page 1076.)

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## The Colliery Guardian

AND

**Journal of the Coal and Iron Trades.**

Joint Editors—

J. V. ELSDEN, D.Sc. (Lond.), F.G.S.  
HUBERT GREENWELL.

LONDON, FRIDAY, NOVEMBER 21, 1913.

Notice is given by the Home Office that an Order has been made by the Secretary of State allowing the use of the permitted explosives on the old List (contained in the First Schedule to the Explosives in Coal Mines Order of May 21, 1912) to be continued until March 15, 1914, instead of December 31, 1913, as provided in the Explosives in Coal Mines Order of September 1 last.

The Northumberland Miners' Association in council on Thursday discussed the attitude of the county coalowners to the three-shift question. It was decided to put to the county the question of tendering 14 days' notice, and, if necessary, of striking to secure the abolition of the three-shift system.

The coalowners and miners of Lancashire are about to make a further effort to settle the troublesome question of the wages of surface-men. A further joint conference has now been arranged, which will be held in Manchester on December 1. The decision of the Manchester meeting will have a considerable influence upon the national conference to be held in London on December 11.

An extensive strike of Indians in Natal has broken out as a protest against the Government poll tax of £3 per head. Many of the collieries have been seriously affected.

As a protest against the action of the French Chamber in relation to the law establishing an eight-hour day for miners, a general strike involving 30,000 men has taken place in the Pas-de-Calais coalfield.

It has been decided by the Parliamentary Committee of the Trade Union Congress to hold a special congress in London on December 9 to consider the labour situation in Dublin.

The recent award of Lord Mersey under the Minimum Wage Act is causing much dissatisfaction amongst the miners of Northumberland, and at the half-yearly council meeting of the local association, which is being held this week, it was decided to ask the President of the Board of Trade to appoint another chairman for the Northumberland district.

The meeting of the Scottish Coal Trade Conciliation Board, which was held on Friday to consider the application of miners for an increase of 18½ per cent. on the 1888 basis, has been adjourned until the 28th inst.



The council of the South Derbyshire Miners' Association have unanimously decided to hand in notices on a date not yet fixed in order to compel non-unionists to join the association.

The South Wales Miners' Federation, at the Coal Conciliation Board, have entered an application for a revision of the rates and rules under the Minimum Wage Act. It has been arranged to hold a meeting on December 8, with Lord St. Aldwyn to consider the matter.

The South Wales and Monmouthshire Miners' Federation has refused the request of the owners to lend its support to the South Wales School of Mines, at Treforest. They state as a reason that they consider the fees are too high to allow the working collier to make use of the school.

Messrs. Dorman, Long and Co. have taken an interest in the Channel Collieries Trust Limited, a company holding extensive mineral rights in Kent.

The explorers' task in the Senghenydd mine of discovering the bodies of the ill-fated miners who lost their lives in the recent disaster has now been brought to an end. The remaining bodies, numbering 130, were found on Monday, and will be brought out as soon as possible. It is stated that, in spite of the serious damage caused by the explosion, the mine will be reopened for work very shortly. The relief funds total £103,000.

An explosion causing the death of 24 miners has occurred in America in a coalmine at Birmingham, Alabama.

Mr. McKenna received a deputation on Tuesday from the miners' permanent relief societies who desired exemption from the Bill to amend the Truck Acts, which prohibits employers from making deductions from wages of subscriptions to benevolent societies; and also that surpluses of mining disaster funds should be handed to the relief societies for administration in single accident cases. Mr. McKenna was unable to comply with the latter request, but his answer was satisfactory to the deputation.

**Stonedust.** THE Fifth Report of the Explosions in Mines Committee was issued last night. It deals with the effect of incombustible dusts on the inflammation of coaldust. We are only able to give the conclusions in this issue, but we propose to deal more fully with the subject next week. The report is of the utmost importance, and although much remains to be done before the work of the Committee can be considered complete, the results of this part of the investigation are the most practical that have yet been achieved. It should, however, be noted that the Committee distinctly state that this report should be regarded as preliminary and of a provisional character. We defer further comment for the present.

**The Cadder Report.** THE official enquiry into the circumstances attending the fatal fire in the Cadder Colliery, Lanarkshire, which occurred on August 3 last, has resulted in the satisfactory conclusion that loss of life would scarcely have been avoided even though rigid compliance with ideal conditions of management had been observed. If the bottomer had not left the pit bottom, if a fully-trained rescue brigade properly equipped had been available, if a reversing fan had been installed in place of the steam jet, still, in Sir HENRY CUNYNGHAME'S opinion, life would have been lost. The reasons for these conclusions are obvious. A fire occurred near the downcast shaft, and the ventilation current rapidly filled the whole pit with smoke and carbon

monoxide gas. Only the fact that one man knew a road not usually travelled, by which access was gained to a downcast fresh-air way supplying air to an adjoining pit, supplied a means of escape for the men, but only two followed him, and all three were saved. The others walked right into danger, into the main intake, meeting all the fumes and smoke from the smouldering fire, and quickly perishing—save one man in No. 2 machine section, who collapsed in a pocket of air in a dead end and was found alive on the following day.

In a sense this disaster was such as might happen just as easily above as below ground and indeed has been paralleled in more than one factory or hotel conflagration. But although in the Cadder case the men were dead at least half-an-hour before there was any knowledge at the surface that a fire had broken out, as it was Sunday and no coal was being drawn, yet there is a moral to be deduced from the occurrence, and that is—that men working in a pit should make themselves acquainted with every means of egress which might be available in an emergency. Still more important is it that efficient telephone communication should exist, with alternative independent circuits in case one of them should fail. Sir HENRY CUNYNGHAME refers hopefully to modern developments in wireless telephony, and to the immense advantages which would result from such a system in the location of men awaiting rescue in a pit. Perhaps, however, one of the most useful appliances in such cases as the Cadder disaster would be the installation, if possible, of automatic fire alarms, to give early warning of an outbreak not only to the men in the working places, but to the surface also. Cadder pit is an open light one, in which men smoke freely and carry flaming oil lamps with little concern, and although fires in such cases are exceptional, the possibility of an outbreak is never far removed.

The most interesting feature of this disaster is the discussion which has centred round the question of rescue appliances at collieries, in the provision of which this pit was keeping more or less in line with the other pits of the Lanarkshire Coal Masters' Association. For some time there has been a tendency in Scotland to interpret Part IV. of the General Regulations in a somewhat special way, relying largely upon the view that the question of rescue apparatus is not one of urgency in that area. For some time also the impression has prevailed that the legal requirements of the case would be sufficiently covered by the provision of smoke helmets.

It is useless now to enter into the merits of this controversy, for the SECRETARY OF STATE has made it clear that the Home Office will not accept the view that a smoke helmet, supplied with fresh air by a pipe and bellows, will meet the requirements of the Act; but that the breathing apparatus required to be used under Part IV. of the General Regulations must be self-contained in the sense that "the wearer carries with him all the means for respiration in an irrespirable atmosphere, and is not dependent for them, while in such an atmosphere, on any other person."

It is true that the new Draft Regulation, a copy of which appeared in our issue of last week, can still be opposed where grounds can be shown in favour of a difference of treatment in any special area. Thus the Scottish coalowners can still urge the sufficiency of smoke helmets for their particular requirements, but it is extremely doubtful whether such a claim would even reach a referee. For the Cadder disaster formed a striking object-lesson on the insufficiency of the smoke helmet in such a case, and self-

contained breathing apparatus had to be used before any serious attempt could be made to enter the workings. Not that lives could have been saved in this instance. Sir HENRY CUNYNGHAME is quite definite upon that point. But it is possible that earlier notice of the fire might, in other circumstances, have reached the surface, in which case the absence of suitable rescue appliances might have been serious, and might possibly have been directly responsible for loss of life.

THE threatened strike in the north of France over the eight-hours question is naturally an event of lively interest to the British coal trade. The stoppage, although prefaced by years of agitation, has come with startling suddenness, and is the direct result of amendments introduced by the Senate in the Bill extending the eight-hours day, at present granted to hewers only, to persons of every class employed in collieries.

This extension in itself concedes a good part of the miners' demands, and the refusal of the Senate to limit the hours of labour of metal-liferous miners and quarrymen probably would not have caused the present reprisals; these can almost entirely be traced to the decision of the Senate to increase the aggregate overtime permissible in any one year to 150 hours, and to give the State power to suspend the Act during times of national emergency. This total of 150 hours is five times that proposed by the Chamber of Deputies, and, curiously enough, is 60 hours in excess of the total proposed by the Senate itself in 1910. The reasons for this change of view are to be found in the experience gained from the working of the Law and the impossibility of fulfilling the new requirements in regard to national military service and at the same time maintaining the output at its previous level.

This is one of the factors that disturb the comparison between Great Britain and France. Colliery enterprise in the Nord and Pas-de-Calais has been singularly remunerative, due partly to skilful mining and administration and partly to local geographical advantages; but the industry, which is threatened also with a new tax on profits, has certainly suffered from the restriction of the hours of labour, and there are signs that the non-competitive zone is gradually becoming narrower.

Not very long ago M. DE PEYERIMHOFF, the secretary of the Comité Central des Houillères contributed to the *Revue Financière Universelle* an interesting survey of the French coal trade, in which he deplored the fact that in two-fifths of the French Departments foreign coals are consumed more largely than French. Thus a line may be drawn from the eastern limit of Seine-Inférieure to the eastern extremity of the Basses Pyrenees, to the west of which the whole country is tributary to English coal, and to this may be added Algeria, Corsica and the Maritime Alps. Including Algeria, nearly 11 million tons of English coal are consumed, over 2 millions being used by the railways, over a million by the merchant marine, and 7 millions for general purposes. A similar line drawn from the western frontier of the Ardennes to the western boundary of Doubs will, making allowance for certain indentations—the most important being that of Haute-Saône—define the zone in which Belgian and German coals are paramount. About a million tons of Belgian coal are consumed by the French railways, 60,000 tons by the merchant marine, and 4,600,000 tons for other purposes, whilst the corresponding figures in the case of German



coals are 400,000 tons, 40,000 tons and 4,100,000 tons respectively. In the areas referred to, French coal is practically unknown; but, on the other hand, English coal is sold in the Pas-de-Calais, Belgian coal in the Nord, and German coal in Saône-et-Loire. The national purse, as M. DE PEYERIMHOFF puts it, is burdened with an annual expense of 400 millions of francs for the purchase of foreign coal.

The causes are partly to be attributed to the differences in quality and type, which will induce the consumer to go further and pay more for coal that satisfies his needs; and partly to commercial organisation, which introduces other considerations than those merely of cost. As regards the latter, M. PEYERIMHOFF says the French producers, due to the individualism of the race, are not well armed, with their simple *ententes* limited to the various coalfields, to struggle on their frontiers against the Westphalian Coal Syndicate. But the dominant factor is the cost of transport. The progressive reduction in sea-borne freights has facilitated the exportation of English coal. Another factor is not without influence, namely, the *douane* duty of 1½ fr. levied upon foreign coals. This tax was instituted in 1860, and has never since been modified or suspended. If abolished, as has been proposed, it would mean the extinction of the smaller undertakings, notably those of Haute-Saône, Isère, Alpes, Hérault, Vendée, Loire-Inférieure and Gard. The disappearance of this "chaplet of little collieries" would definitely consecrate the economic hegemony of the foreigner over nearly half the territory of France.

Speaking of the French coalmining industry, M. PEYERIMHOFF summarises the position as follows:— 300 concessions, covering about 300,000 hectares; an annual production of 40 million tons, valued at some 600 million francs; 200,000 workers, earning 300,000,000 fr. in wages; 20 millions in taxes and 50 millions in social charges; 1,500 millions in first cost, and a valuation of 3,000 millions in Stock Exchange values.

Apart from the great coalfield of the Pas-de-Calais and Nord and the secondary basins of the Loire and Gard, the deposits are small and scattered. Those at Montceau, Carmaux and Decazeville-Aubin have no prosperous neighbours, and the whole of the rest of France presents no prospects of future expansion. The Gard coalfield, which is small in extent, isolated in the mountains, and beset with special technical difficulties, has developed very slowly, whilst in the Loire coalfield, in which the depth of mining is rapidly increasing, the output only suffices to satisfy the local demand, and has for some time been stationary. The possibilities of expansion are virtually restricted to the Nord and Pas-de-Calais; but, valuable as these deposits are, they do not represent the extent of the Westphalian basin, the purity of Cardiff, nor the regularity of the seams of Yorkshire or Northumberland. The geographical situation of the coalfields is by no means happy. They are, indeed, in a position to feed the most populous and the chief industrial region in the country by means of an admirable network of railways and navigable waterways, but beyond it the question of distance is prohibitive. Despite the difficulties that have to be overcome, despite the depth and thinness of the deposits discovered, it is these considerations that endow with importance the Lorraine coalfield, which is splendidly situated with respect to the ironmines and metallurgical establishments of Eastern France. There the new element has been the inconceivable

timidity of the Government in the granting of concessions.

Just as the coalfields in the north of France are to be correlated geologically with the older Belgian coalfields, so the conditions governing the industry in the two countries have many points in common. The mining law of both is based upon the Code Napoleon, and the attitude of the Government is not dissimilar. Thus, there has been an unreasonable delay in the granting of concessions, both in France and Belgium, and, as a counterpart of the new tax on profits in France, there is the proposed new *patente* tax on mining and other commercial undertakings in Belgium, which, it is estimated, will draw large sums from the coalmining industry.

In Belgium, as in France, the State has intervened to restrict the hours of labour below ground; but in the former country the maximum period of work has, so far, been limited to nine hours. The effect, however, has been rather more marked there than in France, no doubt owing to the fact that all classes of workmen have been included. The Belgian Minister of Industry and Labour has recently issued a report on the administration and effect during 1911 of the law of December 31, 1909, which fixed the hours of labour in mines. Transitory conditions, it may be observed, were created by Article 16 of the Law, which authorised the extension until January 1, 1912, to nine and a-half hours instead of nine hours, as provided by the Law; further numerous exemptions were granted to enable collieries to adapt themselves to the special circumstances during the transition period. As regards organisation, the most notable fact disclosed is that the single shift has been almost universally abandoned. The overtime exemptions referred chiefly to hauliers, and it is stated that the hours of about 14 per cent. of the total number of persons employed were extended by half an hour. On the other hand, the exemptions on account of unforeseen emergencies have not been numerous, and there has been very little litigation. Amongst other consequences mentioned are the increased application of pneumatic drills for coal-getting and improvements in haulage methods. A table is given which enables some notion to be gained of the growth of expenditure:—

1. Total working expenses per annum ...fr.	1901-06. 278,551,375...	1907-10. 338,136,187...	1911. 343,402,900
2. Capital expenditure per annum ...fr.	21,942,058...	30,506,787...	38,442,500
3. Proportion of 2 to 1.....p.c.	7.9 ...	9 ...	11.2

A chapter in the report is devoted to an enquiry of the effect of the Law upon the individual capacity of the workmen and the cost of production, but the figures are without any great value, owing to the intervention of other factors and the doubtful method adopted to arrive at the cost. The latter, however, has grown consistently since 1906. The report states that there is little doubt that in 1911 the workmen were at special pains to maintain the output at its former level. In 1912, according to the official statistics, just issued, the output of coal in Belgium amounted to 22,972,140 metric tons, as compared with 23,053,540 tons in 1911, but there was a considerable rise in value, the average value per ton raised increasing from 14.76 fr. to 16.56 fr. The reduction in output was due to the strike in the Borinage in January 1912, but it is noteworthy that for the first time in the history of the industry the production last year showed no extension, whereas in the past it has increased fairly consistently at the rate of about three million tons per decade.

The most striking figures, however, are those given below. Less than 10 years ago Belgium exported a considerable quantity of fuel in excess of that imported, but gradually the position has been inverted:—

Year.	Excess of exports. Tons.	Excess of imports. Tons.	Consumption Tons.
1904 ...	2,536,910	—	20,228,577
1905 ...	1,668,906	—	20,991,347
1906 ...	541,880	—	22,805,210
1907 ...	351,710	—	23,242,620
1908 ...	457,600	—	22,582,940
1909 ...	135,630	—	23,754,770
1910 ...	—	512,400	24,126,460
1911 ...	—	1,584,900	24,844,660
1912 ...	—	2,826,302	26,081,221

The following table is not without interest although, as already stated, the materials for calculation are not above suspicion:—

Year.	Value per ton.	Cost of production per ton.	Wages per ton.	Profit per ton.	Output per annum per person employed.
	Fr.	Fr.	Fr.	Fr.	Tons.
1904 ...	12.59	11.84	7.14	0.75	920
1905 ...	12.64	11.81	7.08	0.83	896
1906 ...	15.0	13.09	8.02	1.91	938
1907 ...	16.86	14.70	8.99	2.16	938
1908 ...	16.14	14.71	8.74	1.43	928
1909 ...	14.37	13.63	7.85	0.75	940
1910 ...	14.59	14.09	8.06	0.50	950
1911 ...	14.76	14.90	8.45	0.14	926
1912 ...	16.56	16.22	9.16	0.34	927

The trading results, moreover, are very unequally distributed. Last year, of the 126 mines working, 67, according to the official returns, closed with a profit and 59 with a loss, totalling 18,124,700 fr. There was a balance of loss in Hainault and Namur; in the Liège district a net profit of 8,715,900 fr. was earned, but this would be insufficient to defray the capital expenditure in the new Campine coalfield (not included above), which in 1912 amounted to 10,506,400 fr.

It may be observed that the optimism of the Belgian authorities is not confirmed by the facts related in the reports of the colliery companies. An example may be given in the following extracted from the report of the Horloz Company just issued:—

Our financial results in the future will be equally affected by the new taxes, which will mean a sensible increase of our expenditure. The coal industry has the sad privilege that, whether it be a new social charge that is imposed on industry, or an increase in railway rates, or new taxes to be levied, it is the first to serve as a field of experiment or to be burdened by taxation. . . . Unfortunately, the bad condition of the coal wrought, due to carelessness and too rapid work, has had the effect of reducing, by reason of the eliminations, the merchantable tonnage, and introducing fresh cost, from which consumers, employers and workmen have all suffered. We have always foreseen the consequences of the Law which regulates work in mines; we hope that the future will not impose upon those employing their labour and their capital in them still harder tests, with still more disastrous consequences.

Most of the companies comment on the dirtier condition of the coal since the adoption of the nine hours day. The Courcelles-Nord Company report that "the coals were very much dirtier than in 1911, and the loss due to washing and cleaning was sensibly greater, whilst increased attention had to be given to preparation." The Gosson-Lagasse collieries, in the Liège basin, experienced a rise of 1.53 fr. in the cost of production, together with a reduction in output and greater difficulties in obtaining an adequate supply of labour. The same story is told by the Nord du Flénu Company and La Louvière-Sart Company, who were compelled to pay penalties to the French railways, averaging over a franc per ton, on account of the bad condition of the coal delivered.

We are accustomed in this country to look on the future with gloomy eyes, but it must be conceded that the outlook in France and Belgium is blacker still. The industry in both countries



has been heavily laden with burdens, and neither possesses the same resources or powers of recuperation that belong to a country like Great Britain. So far there has been a certain elasticity in the French Law regulating the hours of work, but the experience gained in Belgium would seem to indicate that the restriction of the hours of the transit hands is a much more serious impediment to successful operation than a limitation of the hewing period. The truth of this France is now called upon to test.

Trade Summary.

The London coal trade during the past week has begun to show signs of returning animation. Factors who have long delayed buying, except in very small parcels, are beginning to purchase more freely any special spot lots offering at tempting prices. The delivery trade is slow and the reports from the depots are not encouraging, but more wholesale orders are in evidence and the general public are also ordering more freely. The best qualities of hard steam coal fully maintain their prices, but all second qualities are weak. Smalls (especially slacks) are very plentiful and are offering at reduced quotations. Coke is very difficult to sell, but bakers' nuts and cobbles are recovering.

The prompt market at Newcastle has been rather quiet, and prices have not varied greatly. Gas coals are slightly dearer, and foundry and furnace coke is rather firmer.

The Durham coal trade is dull, the leading collieries being well booked ahead.

The sale of Lancashire house coal is maintained much about the same level. More slack is going into circulation, but the demand for forge and shipping sorts is quiet.

There is no improvement in the demand for West Yorkshire house coal, and trade generally is without change.

Trade in South Yorkshire hard coals is still good, but prices are fluctuating to some extent. House coal is selling better. Coke continues dull.

The Derbyshire coal trade is fairly brisk, with the exception of the house coal branch, which lacks animation.

Best Cardiff steams are very scarce, principally due to the low output. The small coal market is lifeless. Monmouthshire coals are up in price. House coals are rather firmer. Coke is weaker. Shipments of patent fuel have been exceptionally heavy.

Conditions in Scotland are rather better and prices are stronger.

EXPLOSIONS IN MINES COMMITTEE.

Fifth Report on the Influence of Incombustible Dusts in Preventing the Inflammation of Coaldust.

The Fifth Report of the Explosions in Mines Committee has been issued as we go to press. It deals with the influence of incombustible dusts in preventing the inflammation of coaldust. The following subjects are dealt with:—

- (1.) On the Quantity of Coaldust Needed to Produce an Inflammable Mixture with Air.
- (2.) Inflammability of the Dust as Affected by its Chemical Combustion.
- (3.) Fineness of the Dust as Affecting its Inflammability.
- (4.) On Different Means of Causing the Ignition of Coaldust.
- (5.) On the Effect of Incombustible Dusts.

We give the Committee's conclusions in full:—

(1) The behaviour of coaldust varies with the method of ignition. For example, a large flame of burning gas, unaccompanied by any concussion or violent disturbance of the air, will fail to cause even pure coaldust to propagate flame for more than a limited distance, when the dust is simply deposited in the path of the flame. In order that a self-propagating inflammation of coaldust should be produced by such a flame, it is necessary that the dust should be in suspension in the air as a fairly dense cloud for a considerable distance. When the flame is accompanied by concussion, as is the case with a blown-out or over-charged shot, or an explosion of firedamp, it is no longer necessary for the coaldust to be previously in suspension in the air; but it must be so disposed in the region of the shot that the flame therefrom shall have every chance of igniting a considerable volume of dust-cloud raised by the concussion. In other words the coaldust must be thickly in the air before it can be fired.

(2) A mixture in equal proportions of coal and incombustible dust, lying close to the path of the discharge, did not give rise to a spreading inflammation when a charge of 24 oz. of blasting powder was fired from a cannon in the gallery. It is therefore very unlikely that such a mixture lying on the floor or other surfaces in a mine would give a spreading inflammation when subjected to the flame of a blown-out shot from a similar charge.

A mixture in these proportions (1:1) is, however, capable of being raised and ignited by a pure coaldust inflammation (started by means of a cannon shot), and the inflammation, so started, may then be propagated through such mixture. (See Experiment 342.)

Under the same conditions a mixture containing two parts by weight of incombustible dust to one of coaldust is capable of prolonging the flame of an inflammation

started by a gunpowder shot in pure coaldust, and the flame may continue for a considerable distance through such mixture before it dies out. Possibly such a mixture might propagate flame indefinitely if the zone of combustion were under still higher pressure. Our experiments have only dealt as yet with inflammations in the clear gallery open at one end and without artificial constrictions.

(3) A slowly travelling inflammation, such as is produced when a ready-made dust cloud is ignited by a large jet of gas (unaccompanied by concussion), is at first capable of licking up coaldust deposited upon the surface of an incombustible dust and propagating itself for some distance until sufficient violence is developed to raise the incombustible dust also; and this raising of the incombustible dust is more readily effected when a lighter or more buoyant dust, such as fluedust or fuller's earth, is employed, both coal and incombustible dust being raised in suspension together, and the flame soon dying down.

(4) A cloud of ignited coaldust may travel a considerable distance along a clear gallery free from coal or other dust.

In many cases also we found that an ignition caused by the cannon and tube succeeded by 250 ft. of pure coaldust travelled 500 ft. along a gallery strewn with a 2:1, or even a 3:1 mixture of incombustible dust and coaldust—the mixture of incombustible dust and coal being partly blown out of the gallery in front of the flame, and partly burned on mingling with the pure coaldust driven forward from the inflammation zone of pure coaldust. When the coaldust forming the inflammation zone is previously diluted so as to contain 40 per cent. of incombustible dust, the inflammation is not propagated through a 2:1 mixture strewn in front of it along the gallery, since the mingling of the two mixtures cannot form a combustible cloud for any considerable distance.

(5) Incombustible dust is more effective in preventing the ignition of coaldust than in checking an inflammation that has started. It should, therefore, be distributed uniformly throughout those galleries of the mine subject to the danger of coaldust ignition, and if maintained in the proportion of between one and two parts by weight of incombustible dust to one of coaldust, the chances of such ignition taking place would be very small. Even a small proportion of incombustible dust (20 or 30 per cent., by weight) has a marked effect in checking an incipient inflammation.

(6) The disposal of incombustible dust in zones or in easily-disturbed masses concentrated in certain positions, leaving portions of the roads untreated, is, we think, not likely to be effective.

(7) In the case of mild inflammations, an incombustible dust that is readily raised and floats in the air has been found to be more effective than one which, owing to its shape or density, is less buoyant.

Shaledusts, or even heavier dusts, such as sand, are, however, effective when sufficient violence has been attained to raise them in suspension in the air.

Having thus formulated the conclusions which appear to us to follow from the experiments we have described, we think it desirable to make such suggestions as would be practical and would afford a degree of security from coaldust explosions such as our experiments indicate to be attainable at this moment, though we are well aware that this security is relative and not absolute.

It must be distinctly understood that our experiments have traversed, as yet, only a portion of the subject, and that what we propose is advanced as a *provisional* precaution which may be found on further experience to need extension. But since these experiments have clearly shown the great difficulty of initiating an explosion in a gallery where the coaldust has been mixed with an easily raised incombustible dust so that the mixture contained at least 50 per cent. of incombustible material, we are confident that the dust in a mine so treated would be relatively safe from ordinary ignitions, and consequently that the chance of a disastrous explosion would be greatly diminished. It is true that such a mixture might not extinguish the fierce flame due to the explosion of a cloud of pure coaldust, or to an explosion of firedamp and air, either of which has gathered violence in its passage along a roadway—these conditions, and the effect of firedamp in the air, have still to be tested; but a mixture containing 50 per cent. of incombustible matter may be raised in a cloud and brought into contact with a flame of equal or even greater intensity and volume than those ordinarily met with in a mine, such as might be produced by the ignition of a blower or an accumulation of firedamp, an accidental electric arc, or by a blown-out gunpowder shot, without inflammation being propagated through it. Since this admixture with 50 per cent. of incombustible matter, which can be carried out in a simple and practical way, confers on coaldust such power of resisting inflammation, it might be, in our opinion, most usefully adopted now, even if further experiments may lead to extensions, or other methods be found more efficient.

We therefore think that, as an alternative to watering, the treatment of coaldust by an incombustible dust—so as to maintain an excess of incombustible matter in the mixed dust—might be adopted as fulfilling the requirements of the Coal Mines Act, 1911.

By section 62 (3) and (4) of that Act it is enacted that

“The floor, roof, and sides of the roads shall be systematically cleared so as to prevent, as far as practicable, coaldust accumulating;

and “... systematic steps, either by way of watering or otherwise ... shall be taken to prevent explosions of coaldust occurring or being carried along the roads.”

Such a systematic step as is laid down in the above clause would be taken, in our opinion, if the roads were treated with incombustible dust, *provided* that the

clearing of the roads required above and the treatment with incombustible dust were carried out in such a manner that at no time should such fine dust as was capable of being raised in suspension from the exposed surfaces of the roads contain less than such a quantity of incombustible matter as would make a mixture yielding on incineration at least 50 per cent. of ash.

It should be clearly understood that in recommending this limit of 50 per cent. of ash we are putting it forward provisionally and as a *minimum*.

The incineration test has been proposed by us to apply to shales and other similar forms of incombustible dusts. But it is not intended to condemn the use of other tests provided they yield trustworthy and equivalent results.

It is not possible to prescribe the quantity of incombustible dust to be applied or the periods of its application, since these will vary according to the conditions of each mine, and of different parts of the same mine. But the *proportion* of incombustible to combustible matter in the dust—which is the main factor of security—can easily be tested.

We do not think it practicable to prescribe the methods by which incombustible dust should be applied. The best method would depend upon the circumstances and conditions of each mine; but the incombustible dust should be so applied as to free the timbers and higher ledges as far as practicable from coaldust, and to replace it by incombustible dust.

Inasmuch as in practice the incombustible dust will be applied at intervals, it is obvious that for some time after its application the roadways may contain a proportion of incombustible matter larger than that which we have recommended as the *minimum*.

For the purpose of examination it is suggested that each sample should be collected not from one spot only, but from the dust deposited generally on the floor, roof and sides over some yards of roadway.

The several samples collected should be well mixed, and a portion sieved through a piece of metallic gauze (such as safety lamp gauze) with a mesh of 28 to the linear inch; any dust that will not pass through such a sieve should be omitted from the determination.

For the purpose of the incineration test a weighed quantity of the fine portions so separated should be brought to a red heat in an open vessel until it no longer loses weight. In this process all the natural ash in the coal is reckoned as incombustible dust, and on the other hand any combustible or volatile matter in the incombustible dust is reckoned as coal. Shales usually contain a small quantity of carbonaceous matter, which is rightly reckoned as coal in the mixture, since it might act as fuel in a mine explosion; but shales always contain also a considerable quantity of incombustible volatile matter, mainly water, which is driven off at a red heat. It will be obvious that this incombustible volatile matter will afford a margin of safety, since in the method of evaluation recommended such lost matter, although not contributing to make up the 50 per cent. of ash required, will really be effective in the quenching of inflammations in the mine. For example, in a mixture of equal parts by weight of shale and coaldust in our experiments, we found on incineration 48 per cent. of ash. The coal contained 36 per cent. of ash, so that 50 parts of it contained 18 parts of ash. The shale lost 76 per cent. at a red heat, so that 50 parts lost 38 parts, and left 46·2 parts of ash:—

	From coal.	From shale.	Total.
Ash .....	18	46·2	= 48
Matter lost at red heat .....	48·2	38	= 52
Total .....	50·0	50·0	100

Consequently this 50 per cent. mixture (equal parts by weight) yielded a total of 48 per cent. of ash—*i.e.*, would have been returned as falling 2 parts below the proposed minimum requirement, although in reality the mixture contained over 50 per cent. of incombustible matter. We have borne in mind this margin of safety in recommending the minimum of 50 per cent. of ash on incineration.

A considerable difficulty arises with regard to practical application of such a suggestion to the working faces of a mine and to the roads immediately adjoining. This is a matter on which we think it desirable that both further experimental *data* and practical experience should be acquired.

It is possible that the presence of small percentages of firedamp may influence the inflammability of mixtures of coal and of incombustible dusts. But if this is found to be the case it would not affect our suggestion for the treatment of the roadways, since in the main haulage roads, where the coaldust is most dangerous, the amount of gas is usually very small.

We have not as yet dealt experimentally with the question of watering, nor with other methods of rendering coaldust harmless.

It is desirable that experiments should be continued upon incombustible dust and coaldust, the effects of gas upon ignitions and explosions of coaldust, and the best sorts of shales or other non-inflammable materials to employ. We hope also to experiment upon the effect of wetting coaldust by various methods and upon modes of shot-firing.

Lastly, it is most important to determine how far the effect of incombustible dust in diminishing the explosibility of coaldust extends to explosions of a very violent character—experiments which are difficult to carry out owing to their destructive character.

The report is signed by Sir Henry Cunynghame, Mr. R. A. S. Redmayne, Capt. A. Desborough, Prof. Harold B. Dixon, and Mr. W. C. Blackett.

There is also an appendix giving a description of Altofts shale, communicated by Dr. Mellor, director of the Pottery School, Stoke-on-Trent.



## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### "B.Sc. PETROLEUM MINING," BIRMINGHAM.

SIR,—Mr. Cochrane now gracefully assumes the rôle of examiner, and if I thought his diploma of approval would be worth as much as the degree to which he aspires, I should tackle the paper he sets. But the questions are unequal in value, and a sufficient answer to No. 2 would be longer than your readers would tolerate.

Some kind friend might advise Mr. Cochrane that the incursion of an undergraduate into a controversy, which would ordinarily be undertaken by the responsible officials of his university, is lending itself to uncharitable comment. If I were inclined to judge by individual specimens, the incident of this correspondence might be quoted in support of my remarks regarding the way in which the freedom of university life tends sometimes to clash with the requirements of discipline. Most of your readers know well what would happen to a young mine apprentice who hastily usurped the functions normally performed by the principals of his firm. I should advise Mr. Cochrane, therefore, not to "rush in" to a situation which apparently engenders feelings of trepidation in his angelic superiors—and to return to his lesson-books. THOMAS H. HOLLAND.

Alderley Edge, November 18, 1913.

[This correspondence is now closed.—ED. C.G.]

### BOOK NOTICES.

**A Text-book of Assaying, for the Use of those Connected with Mines.** By C. and J. J. BERINGER. Revised by J. J. Beringer. Thirteenth edition revised. xvi. + 459 pp.; 82 figs.; 8 in. x 5½ in. Price 10s. 6d. net. London: Charles Griffin and Co.

Notable additions in this edition are an extended description of the assay of wolfram and a revised description of the wet assay of tin ores. The earlier chapters deal with various methods of assaying—the dry and wet gravimetric methods, volumetric assays, &c. In Part II. the different mineral substances are taken in turn.

**Gas Testing and Air Measurement.** By CHARLES CHANDLEY. vii. + 77 pp.; 14 figs.; 7½ in. by 5 in. Price 1s. 6d. London, Methuen and Co.

Mr. Chandley, who is the lecturer and organiser of mining instruction under the Notts Education Committee, has written an inexpensive and compact little treatise, which is eminently suitable for candidates for certificates under Section 15. From this point of view it has two conspicuous qualities: it is written in simple language and indicates the legal aspect, which has caused more trouble probably than the practical application of methods of examination. It has the further merit that emphasis is placed on no particular apparatus, and the book therefore does not require a costly outfit to illuminate it.

**Working of Steam Boilers.** By ED. G. HILLIER. Fifth edition. 5½ in. x 8½ in., 147 pp.; 85 ill. Manchester: Taylor, Garnett, Evans and Co. Price 1s. 6d. and 2s. (cloth).

These notes are intended primarily for the use of those in charge of, and responsible for, the working of steam boilers insured with the National Boiler and General Insurance Company, of which Mr. Hillier is the chief engineer. The first portion refers to boilers in general, and notes respecting special features of vertical, locomotive type, and water-tube boilers, superheaters, economisers, and steam pipes follow. The manual, which is well illustrated, should amply fulfil its purpose.

**The Cyanide Process of Gold Extraction.** By JAMES PARK. Fifth English edition, revised and enlarged; xiv. + 347 pp.; 20 plates and 19 figs.; 8 in. by 5½ in. Price 8s. 6d. net. London: Charles Griffin and Co.

This book, the author of which is the professor of mining at Otago University, is an authorised textbook in the Australian schools of mines. It has already passed through 10 editions in England, Germany and New Zealand. In the past few years notable advances have been made in the filtration of slimes by ingenious application of the vacuum principle, and the author's continuous cyanide treatment—the dream of miners—seems well within the bounds of

successful achievement. The volume also deals with further applications of agitators, utilising mechanical stirrers, compressed or hydraulic pumps for leaching with cyanide. In some of these directions Prof. Park has been clearly in advance of the times, and now has the gratification of witnessing the adoption of methods devised and advocated by him a considerable number of years ago. The volume is one of the most important of Messrs. Griffin's admirable metallurgical handbooks.

### THE LONDON COAL TRADE.

THURSDAY, NOVEMBER 20.

The London coal trade for the past week seems to have slightly recovered itself from the lethargy of the previous week or two, but the demand is still very weak, and the wholesale orders very slow. The lessened enquiry for house coal, and the retention of the orders lately is beginning to make itself felt, and although the weather has not been sufficiently cold to warrant any great increase in the consumption of coal in any other rooms than the ordinary living rooms, yet the household fires, once started, are continuous, and absorb a good quantity day by day. In many cases also the London houses are so constructed that no very great stock can be stored away for winter use, and the general public are therefore largely dependent upon the smaller tonnage delivered month by month, or even week by week, by the merchants. The delivery trade has improved somewhat, and the reports from the depots are slightly better, but the principal increase in the volume of trade doing is from the factors, who have recommenced buying after a lapse of some few weeks, when for the most part they held aloof from purchasing except in very small parcels, and only such coals as were definitely ordered. The prevailing opinion in the mind of many of the London merchants is that by holding back orders, the general prices charged by collieries must yield to a reduction, but as the winter advances, and all colliery prices remain firm, the time for buying cannot be delayed much longer, so the factors are beginning to take up any spot lots that are tempting enough to induce them to buy more freely. Seaborne prices are still quoted at 21s. 6d. best Wallsend, and 20s. 6d. for seconds. The number of vessels arriving in the Thames for Monday's market was 35, and for Wednesday's 12, but all were sold before arrival. The shipping trade seems to be easing off slightly, but the reports are still good. The depreciation in the iron trade is the worst feature at present, and sooner or later this must have a telling effect on the demand for fuel. Coke is already feeling the slump very keenly, and smalls of all kinds, especially slacks, are very difficult to sell. The better qualities of hard steam coal are still very firmly held, but the second qualities are becoming more and more plentiful, and consequently offering at lower prices. The stocks at the various depots are very heavy, and loaded wagons have in many cases become a source of increased anxiety with many of the merchants, to clear before the siding charges begin to accrue. Charlston Wallsend prices are quoted by sea at 21s., and Charlston Main at 19s. 6d. Enquiries are also becoming more abundant for what is known as Christmas gift coal, and although the deliveries are delayed until nearer Christmas and the new year, yet the quantities are more or less fixed up at this season of the year. Collieries, however, are quoting very steadily, and for the most part are well fixed up for the winter. The closing of the Baltic ports has made a difference in the shipping demand.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/	13/
Do. nuts .....	12/	12/
Birley cube Silkstone .....	12/6	12/6
Do. branch coal .....	16/	16/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	13/6	13/6
West Riding Silkstone .....	13/	13/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	12/	12/
Do. nuts .....	12/	12/
Do. hard steam .....	12/	12/
New Charlston Wallsend .....	15/	15/
Wharfedale Silkstone branch .....	16/	16/
Do. Flockton Main .....	15/6	15/6
Do. Athersley house coal .....	12/	12/
Newton Chambers best Silkstone .....	17/	17/
Do. Grange best Silkstone .....	15/6	15/6
Do. Hesley Silkstone .....	14/	14/
Do. Rockingham selected .....	14/	14/
Do. Rockingham Silkstone .....	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best .....	12/6	12/6
Do. large nuts .....	12/3	12/3
Do. small nuts .....	10/	10/
Do. kitchen coal .....	10/6	10/6
West Hallam Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/3	12/3
Do. London brights .....	11/	11/
Do. bright nuts .....	11/	11/
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Shipleigh do. brights .....	13/	13/
Do. do. nuts .....	12/6	12/6
Mapperley brights .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Cossall Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Trowell Moor brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Grassmoor Main coal .....	13/	13/
Do. Tupton .....	11/6	11/6
Do. do. nuts .....	11/6	11/6

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal .....	13/	13/
Do. do. cubes .....	13/	13/
Do. special Derbys .....	12/	12/
Do. house coal .....	11/6	11/6
Pilsley best blackshale .....	13/	13/
Do. deep house coal .....	11/6	11/6
Do. hard screened cobbles .....	11/	11/
Hardwick best Silkstone .....	13/	13/
Do. Cavendish brights .....	12/6	12/6
Do. cubes .....	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/6	12/6
Do. small hards .....	12/6	12/6
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	13/
Do. cobbles .....	13/	13/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/6	14/6
Bestwood hard steam coal .....	13/	13/
Do. bright cobbles .....	11/9	11/9
Hucknall Torkard main hards .....	12/9	12/9
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. .....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. bakers' nuts .....	11/3	11/3
Do. loco Two Yard hards .....	14/6	14/6
Do. Ryder nuts .....	11/9	11/9
Do. do. cobbles .....	13/	13/
Nuneaton steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Haunchwood steam .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Wyken steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Exhall Ell coal spires .....	14/3	14/3
Do. brights .....	12/6	12/6
Do. large steam coal .....	12/	12/
Do. best screened cobbles .....	12/3	12/3
Do. large nuts .....	12/3	12/3
<b>Leicestershire.</b>		
Snibston steam .....	10/	10/
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
South Leicesters steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	18/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	9/9	9/9
Do. large nuts .....	9/6	9/6
Do. bakers' nuts .....	9/	9/
Do. Main nuts .....	9/6	9/6
Do. hards .....	9/3	9/3
Granville New Pit cobbles .....	11/	11/
Do. Old Pit cobbles .....	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/	13/
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	14/	14/
Do. cobbles .....	13/	13/
Apedale best .....	13/	13/
Do. seconds .....	12/9	12/9
Podmore Hall best .....	13/	13/
Do. seconds .....	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London .....		
Do. brights .....	11/	11/
Do. shallow one way .....	11/	11/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	10/9	10/9
Coppice deep coal .....	14/6	14/6
Do. cobbles .....	14/	14/
Do. one way .....	12/	12/
Do. shallow coal .....	13/6	13/6
Cannock Chase deep main .....	16/	16/
Do. Deep kitchen cobbles .....	11/6	11/6
Do. best shallow main .....	13/	13/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/9	11/9

### From Messrs. Dinham, Fawcett and Co.'s Report.

Friday, November 14.—The seaborne house coal market was fairly steady to-day. A cargo of Yorkshire was sold, but no Durham on offer. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Charlston (W.E.) 21s., Charlston Main 19s. 6d. Cargoes 27.

Monday, November 17.—There was no alteration in the seaborne house coal market to-day, no cargoes pressing for sale. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Charlston (W.E.) 21s., Charlston Main 19s. 6d. Cargoes 35.

Wednesday, November 19.—The seaborne house coal market was quiet to-day, with no sales reported. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Charlston (W.E.) 21s., Charlton Main 19s. 6d. Cargoes 12.



**MINERS' RELIEF.****Deputation to the Home Secretary.**

A deputation representing the seven miners' permanent relief societies in England and Wales waited upon Mr. McKenna at the Home Office on Tuesday afternoon to ask that the administration of the surpluses of the colliery explosion relief funds which have been raised from time to time may be placed in the hands of those societies, and that those societies should be exempted from any such provision as that contained in the Bill to amend the Truck Acts, 1831-1896—read a first time in the House of Commons on July 30 on the motion of Lord H. Cavendish-Bentinck—that an employer shall not make any deduction from wages in respect of any subscription to a benefit society. The Home Secretary's reply was on the whole satisfactory to the deputation.

The deputation represented the Northumberland and Durham, the Lancashire and Cheshire, the West Riding of Yorkshire, the North Staffordshire, the Midland Fatal Accident Society, the South Wales Society, and the North Wales Society, which together form the Central Association of Miners' Permanent Relief Funds, and last year had an aggregate membership of 335,254, a revenue of £313,634, and accumulated funds amounting to £943,326. Since the Central Association was formed in 1878 to December 1912 the societies have dealt with 1,537,496 disablement cases, and 15,824 fatal accidents, bringing upon the funds 10,356 widows and 19,235 children, over £6,000,000 having been distributed to members and dependants. The objects of the funds are similar, but the Northumberland and Durham Society pay in addition old age pensions to some 5,000; the Midland Society pay for fatal accidents only.

**The Truck Act.**

Sir T. R. RATCLIFFE-ELLIS, law clerk and secretary of the Mining Association of Great Britain, who introduced the deputation, said the objects of these societies were to pay a weekly sum to the widows and orphans of men who might unfortunately have lost their lives in some mining accident, and similar relief to men incapacitated in mines. Since those societies were formed, the Workmen's Compensation Act had provided similar relief; but it was necessary that this should be supplemented by the funds subscribed by the miners themselves through the societies. One great advantage of the societies was that the relief was given immediately. The cost of management was very low, being only about 8 per cent of their entire income, as compared with the 38 per cent. in collecting societies. It was absolutely necessary that the contributions should be collected at the collieries when the wages were paid—in point of fact, deducted from the wages at the colliery. This was a vital matter if the societies were to continue their existence. As a matter of fact, those deductions were made in all cases with the consent of the workmen. A Departmental Committee on "truck" had recommended, however, that deductions from wages for benefit societies should not be allowed by law, although Mr. Delevingne, of the Home Office, appended to the report a memorandum stating that that recommendation seemed to him to be against the weight of evidence, and Mr. A. F. Yarrow concurred in the view that the prohibition of such deductions would be most undesirable. Parliament would be taking a great responsibility if, by passing such a Bill as that introduced last Session, they put an end to societies to which more than 300,000 belonged.

Mr. McKenna asked if there was any evidence given that there was no compulsion in Lancashire and Cheshire to join those societies.

Sir THOMAS said they had never heard of any complaints of compulsion. If there should be any difficulty in collecting these contributions it would inevitably bring these societies to the ground. It was, he added, a very great responsibility for Parliament, or anybody else, who would adopt any measure which would cause such a result.

**Disaster Funds.**

Proceeding to deal with the question of mining disaster funds, Sir THOMAS said there had been a great deal of correspondence lately about the establishment of a central fund. So far as he understood it, the proposal was to appropriate to this central fund any unapplied funds which might have been raised from time to time for the relief of mining disasters. Another suggestion was that any such surplus should be placed in the hands of the Public Trustee. What he suggested was that the actual existing cash surplus which was now unnecessary in connection with funds which had been already contributed should be handed over to the permanent relief societies. This would enable those societies to make better provisions for single cases of accident which were constantly happening, and of which [the

public never heard. For every single death caused by a disaster, there were probably three caused by single accidents. He understood that the balance available after provision had been made for the incumbents upon the relief funds would not exceed £130,000 or £150,000.

Mr. McKenna said it would be nothing like that amount. He also asked if an Act of Parliament would be necessary?

Sir THOMAS replied that he thought it would. That was why he was placing the matter before the Home Secretary. He pointed out that some years ago there was a distribution of money in connection with the Hartley disaster, and it was distributed among districts where there were permanent relief societies and districts where there were none.

Mr. McKenna observed that the public subscribed to those funds for a particular object. If it was not all spent, the deputation were proposing that any balance should be expended for another object.

Sir THOMAS said it was for the same object—the relief of distress. There should be a distribution by Act of Parliament of any present surplus among the permanent relief societies. They should not put into a central fund money which would be so much better used immediately.

Mr. McKenna observed that in the case of a great disaster no amount of private provision could possibly have been adequate. Take the Senghenydd disaster in South Wales. Even if there had been a membership proportionately as large as the Lancashire membership, that society could never have provided for such a disaster as this. The public generally came in and subscribed in the case of great disasters, but in the case of individual fatality cases, they said the trade should make this provision. The public held that these surplus funds should be reserved for great disasters.

Sir THOMAS thought the public did not subscribe towards individual cases because they heard nothing about them.

Mr. McKenna said they were moved by the knowledge that at the moment so many lives had been lost in that place, and no local provision could possibly provide for it. If only one person were killed in one place, and another in another place, and a third in a third place, although the total number killed in each area would be much greater, the means of meeting it are so much better.

Mr. WILLIAM BARNES, secretary of the Northumberland and Durham Miners' Permanent Relief Society, gave an account of the history and work of his society. The society's success was largely due to the economical, regular, and methodical system by which contributions were deducted.

**Home Secretary's Reply.**

Mr. McKenna said that in regard to the first part of the case, the question of the Truck Acts, like the gentlemen present, he did not feel at all satisfied that the majority report of the Committee was sufficiently founded upon the evidence, and in the Bill they would introduce dealing with truck, they would not introduce or contain any clause forbidding deductions for societies of that kind. He was bound to add that as a Departmental Committee had reported in favour of a Bill forbidding such deductions being made, he should have to keep an open mind in Committee in order that he might hear all the arguments which might be brought forward, and which at present were not apparent to him on the report in favour of forbidding such deductions being made.

In regard to the second point, he said the funds were now in the hands of separate sets of trustees. If those bodies came to him and asked to be allowed to hand their funds over to other bodies in whom they had confidence, and who would be perfectly competent to administer the funds in pursuance of the original idea of the trust, though not its particular purpose, he would do his best to help them. But it was quite a different thing when another body of gentlemen who were not trustees came to him and said, "Stretch out your hands, take those funds from the trustees; if they won't give them by force they can give them by Act of Parliament, and hand them over to us in order that we might administer the funds." They might have to put certain restrictions upon the purposes for which the money should be given, but he fully recognised the excellence of the permanent relief funds, their integrity, and their capacity. But he could not say anything which would lead them to suppose that he should be willing to put any pressure whatever upon the trustees of the separate funds until they had dealt with them first of all, and brought them there willingly and in support of their proposals.

Sir THOMAS RATCLIFFE-ELLIS said he thought they should be quite satisfied with what the Home Secretary said. He added that he did not contemplate an attack being made on the funds, but their feeling was that if

there was to be any diversion of the funds, they should rather be diverted to the permanent relief societies than to a central fund.

Mr. McKenna, in conclusion, said his position would be to listen with great attention to any proposal which the trustees themselves put forward, because they were the parties who were responsible. He had not considered the matter from the point of view of the trustees, and he must not be understood as being committed to any opinion until he had heard them.

The deputation, having thanked Mr. McKenna, withdrew.

**The Central Association and a Central Fund.**

Prior to the meeting with the Home Secretary, a short paper was read by the SECRETARY (Mr. Booth) to the delegates of the societies, at the Westminster Palace Hotel. In the course of this he dealt with the various suggestions that had been advanced in regard to the formation of a central fund.

The Hulton Colliery (1910) Relief Fund General Committee, at a meeting held on October 22 last, presided over by the Mayor of Bolton, decided that the Home Secretary be asked to receive a deputation from that committee to discuss the question of a national fund for mining accidents, and that such deputation be authorised to assure the Home Secretary that in the event of a national fund being established the Hulton committee would consider the propriety of transferring to such fund the available balance of the Hulton Colliery (1910) Explosion Relief Fund, on the condition that a representative of the committee was appointed on the administration of such national fund.

In a letter to the *Manchester Guardian*, October 22 last, Sir Lees Knowles suggested (1) the establishment of a uniform system for the treatment of distress; (2) the collection of information as to the amount of relief required in each specific case; (3) the power to apply surplus funds for the relief of individual cases; and (4) the centralisation of donations, subscriptions, legacies, and other subscriptions.

The editor of the *Colliery Guardian* (Mr. H. Greenwell), in an article in *The Times* of October 23 last, suggested the formation of a permanent relief society from which money can be obtained as soon as an accident has occurred, to meet the immediate necessities of the sufferers, and that the surpluses and unused balances of former funds be gathered into a central fund.

*The Times*, in a leader dated October 25 last, pointed out that the establishment of a central fund in London with the Lord Mayor as chairman, with full powers to apportion the funds according to their discretion would lead to the removal of all the drawbacks incidental to the present system and would be able to give immediate relief instead of waiting on the action of the law for the arrangement of permanent assistance in individual cases as well as on occasions of widespread distress, and they might well consider the advisability of giving practical encouragement to the organisations of the miners' permanent relief societies.

The subject of "mining disaster funds" and the formation of a "national fund" has occupied the attention and been deliberated upon at the conferences of the association on several occasions. At the conference in 1890 the following resolution was adopted:—

"That in the opinion of this conference it was exceedingly desirable that public committees having charge of colliery explosion relief funds should in all cases take powers to appropriate any surplus that may remain in their hands for the promotion and encouragement of permanent organisations for dealing with mining accident distress."

At the conference in 1894 held at the Mansion House, London, the chairman, the Earl of Crawford, on a paper being read by Mr. Geo. L. Campbell, the then secretary to the conference on "Great Disasters Relief Funds," moved:

"That it be recommended to the council of the association that careful attention be given to all proposals to deal with such surpluses, especially having in view the importance of their being appropriated to the assistance of miners' permanent relief societies."

At the conference of the association in London in 1910, the council reported that they had given consideration to the questions raised at the last conference by one of the societies as to the desirability of formulating some scheme of national provision for dealing with disasters in collieries, but considered the present time inopportune for dealing with a subject of such magnitude.

At the conference in 1911 the following resolution was carried:—

"That having regard to the valuable services rendered by the miners' permanent relief societies of the United Kingdom through the voluntary subscriptions of the workmen, in dealing with disasters caused by mining accidents, this conference is of the opinion that any surplus funds subscribed for colliery disasters might be properly utilised to assist such miners' permanent funds to meet the serious strain placed upon their resources by a great mining disaster, and that public committees and others having charge of colliery explosion funds be requested to allocate for this purpose any surplus that may remain in their hands."

It is estimated that the surpluses of all the colliery explosion funds would, at the most, probably not exceed £100,000 to £150,000.

Now, with regard to the suggestions put forward as to the operations of a national or central fund, viz.:—

(1) To assist colliery disaster funds in the future;  
(2) To assist the sufferers by single fatalities;  
the association suggested that in the event of a central fund being formed:—



(d.) That the miners' permanent relief societies of association shall be represented on the central fund, on account of their experience in dealing with this work.

(b.) That the Permanent Relief Fund be asked to act as the medium in dispensing the funds and be responsible to the central committee.

(c.) That a special grant be made to the Permanent Relief Fund established in the county in which an explosion takes place.

(d.) That the interest on capital, or some portion, be given to existing permanent relief societies already established, so as to encourage men to join these organisations.

(e.) To encourage the establishment of miners' permanent societies in other counties either for fatal or non-fatal accidents.

With regard to single fatalities, seeing that the average number of deaths caused by small mining accidents was 1,243 per annum for the five years ended December 31, 1912, it would be extremely difficult for a central fund administered in London to deal with this large number of single fatalities in every part of the country, as the cost of administering the relief would be considerable if the work were centralised and worked on the same principle as miners' permanent relief societies are—that is, the investigation and supervision of its cases.

## CONTINENTAL MINING NOTES

### Belgium.

The Railways Administration has come to terms with the native collieries, and supplies of the various classes of fuel required will be made on the following bases:—Bituminous and semi-bituminous small, 16 fr.; *quart-gras* ditto, 15 fr.; lean ditto, 13 fr. 75 c.; briquettes (type I), 21 fr.; ditto (type II), 23 fr.; superior semi-bituminous slack, 17 fr. The contract, it is stated, will be made in two sections, one being for the whole of 1914, and the other for the first half of the year. From July next a further contract will be made on similar terms. In addition, considerable quantities of Welsh bituminous coal have been taken at an average of 15 fr. 50 c. per ton. The prices generally show a reduction of from 2 to 2½ francs for coal and 3 fr. for briquettes.

### France.

*The Eight Hours Law.*—The Senate has adopted some important amendments of the Eight Hours Law of 1905. For some time the miners' delegates have clamoured for amendments in the Law, of which the most important are the extension of the Law, which at present applies to hewers only—firstly, to all the workmen employed in coalmines; and secondly, to the workers employed in metalliferous mines and quarries. The new measure passed by the Senate gives effect to the first but not to the second demand; it also introduces other changes in the existing Law.

The Bill as it now stands substitutes certain new articles for Articles 9 and 12 of Book II. of the Labour Code. It is provided that the working day of persons employed in the underground workings of coalmines shall not exceed eight hours in duration. This period is to be calculated, for each shift and for each class of workmen, from the arrival at the end of the gallery of access up to the return of the workmen to the same spot. When this is distant from the mouth more than 1,200 m., and there are no mechanical means of conveying the workmen, the period is to be calculated from the arrival at the 1,200th metre in the said gallery up to the return to the same spot, with the proviso that a notice shall be issued fixing, according to the working arrangements, the period of employment below ground of enginemen and their assistants, timbermen, horseleaders and their assistants, stablemen, firemen, the workmen charged with the maintenance of the shafts and appliances relating to the circulation of air, water and men, and special workmen not engaged in the ordinary work of the mine. This notice must be signed and approved by the chief inspector of the district, communicated to the miners' delegate, and published by means of posters so as to reach the notice of all those concerned. A similar notice, approved and published in the same manner, is to be issued making known for the workers in each shift and each class the hour of commencement and end of descending, the period of collective repose, the hour at which the appliances for raising shall be placed in operation, as well as the time allotted for ascending. The same notice is to specify in the case already alluded to the point substituted for the end of the gallery of access. These regulations are to be based on the time reasonably necessary for the operations to which they refer, having regard, on the one hand, to the nature of the mine, and on the other, to the installations, keeping in view the conditions of working and management. The total time occupied in raising a shift shall not exceed by more than half-an-hour the time taken to lower. In cases of dispute the Minister has power to refer the matter to the Conseil Général des Mines. It is permissible to allow workmen to descend after the regulation hour fixed by the law for their class. In this case they shall be subject to the same obligations as the workers of the same shift. Exemptions may be granted by the chief inspector of the district in cases of accident or in the

interests of safety. The miners' delegates are to be notified on such occasions. The employer can, on his own responsibility, in cases of pressing danger, prolong the period of work in advance of the authorisation which he is required to obtain from the chief inspector. The total exemptions, which may not exceed 150 hours per year and two hours per day, may also be utilised by the employer to preserve certain local customs. A period of more than 30 minutes is reckoned as one hour. No exemption can be granted for a period less than half-an-hour. The sum of the exemptions is calculated from January 1 to December 31 in each year. In cases of exceptional crisis due to shortage of fuel, or in the interests of national security, the Government may authorise supplementary exemptions for stated periods.

The action of the Senate has not satisfied the miners. The Bill as sent to the Senate by the Chamber of Deputies provided for overtime to the extent of 30 hours per man per year. The Senate have increased the amount of permissible overtime to 150 hours. It is to this vote that the movement is directly due, but the opportunity is also being taken to raise again the old grievance of long shifts. The men demand a return to 30 hours as the limit of overtime in one year, the suppression of long shifts, and the imposition of a fine upon all miners who remain for more than eight hours in the pit. The National Federation of Coalworkers met on Tuesday to discuss the situation, and a considerable number of men were idle. The Miners' Congress, which was held at Douai, decided to declare a general strike, to take effect on Wednesday. This was obeyed to a partial extent, but in the meantime the Government had decided to precipitate the consideration of the Senate's amendments in the Chamber of Deputies, and by this means it is hoped to allay feeling. On Wednesday it was estimated that in the northern districts the morning shifts were some 30,000 men below the usual strength. The pits chiefly affected are Escarpelle, 1,030 strikers; Dourges, 3,235; Ferfay, 650; Ostricourt, 1,695; Carvin, 500; Nœux, 2,350; Liévin, 2,500; Lens, 4,800; Courrières, 4,200; Drocourt, 400; and Aniche, 1,097. It is thought that a compromised figure of 60 or 90 hours may be accepted.

### Germany.

*Ruhr Coal Market.*—Business continues to fall off, and there are no signs of the revival which might be expected at this time of the year. Shorttime is no longer an isolated feature, and though it is being attributed in some quarters to the scarcity of railway wagons, this factor is in reality insufficient to account for the decline in the volume of traffic. For example, in the last week of October the shortage of wagons was only 880 (out of a total of over 247,000 ordered), as compared with 70,602 at the corresponding period of last year. In view of the growing depression in the iron industry it would seem that even the restriction of the coal output to 87½ per cent. of the participation will not be sufficient. Of the various classes of fuel coking coals are going off the worst, owing to the great reduction (35 per cent.) of the coke output; and the blastfurnace coke trade is also in a very unsatisfactory condition. Shipments of coal to South Germany have been delayed by the low state of the river; but as the local stocks are large and the demand slack there is no scarcity. In the export trade the conditions remain normal, except that the shipments of blastfurnace coke to Belgium are on a reduced scale.

*Coal Market in Upper Silesia.*—The traffic returns for October show an increase of nearly 39,000 wagons over last year, and the daily deliveries for the present months average about 12,000 wagons, in spite of the slack demand for house coal, owing to the very mild weather. In other kinds of fuel, the general interest is well maintained. The coke manufacturers still complain of delays in delivery, and the trade in gas coal is improving, whilst the unsatisfactory state of the iron industry does not seem to have had much effect on the turnover in industrial coals. The export figures are growing, but the requirements of the home market prevent this branch from developing in a manner commensurate with the Austrian and Russian demand. In the coke market the conditions are good, the output of blastfurnace coke being absorbed completely; and the demand for smaller grades is more active.

### Russia.

It is proposed to raise a loan of two million roubles for the purpose of developing collieries in the Donetz region, probably near Almaznaia. The Minister of Public Ways has instructed the various railway executives to curtail orders to one year ahead, which is taken to be an indication of the imminence of State enterprise.

Owing to the scarcity of oil fuel, the Municipality of Moscow is purchasing an extra million poods of coal, raising the total requirements over the winter to 6,684,000 poods. It is proposed to take a certain quantity from the collieries at Soudjinka and Tcheremkovo, in Siberia, the Municipality having decided to forward the application of these collieries for reduced railway rates to enable them to compete with the Russian collieries.

A circular has been issued inviting subscriptions to a fund for erecting a bust of the Right Hon. T. Burt, M.P., in some public institution in Newcastle.

## SPONTANEOUS COMBUSTION IN COALMINES.

A Digest of Evidence before the Committee.

Mr. A. M. HENSHAW.

(Continued from page 1011.)

CONSTRUCTION OF PACKS

Mr. Henshaw gave further evidence on March 5. Witness said extra care should be exercised and extra width is necessary where manholes are required. The material should be such that settlement takes place uniformly, and with this object, where chocks are used they should be of soft round timber. Posts should always be drawn. In one North Staffordshire seam, where the chocks were of hard squared timber, causing unequal settlement and forming cavities for the entry of air, fires were common, but ceased when the use of hard wood chocks was discontinued. Waste packs should be built in the goaves between the gate roads, according to the character of the roof, and they should be built with the same care as the road side packs. Complete packing of the goaf is wise where possible. Material may often be brought from other parts of the mine or even from the surface. Soft dirt will make an airtight job and settle uniformly, and practically make a long pack stopping round a goaf. Great care should be taken to keep the working face open to prevent restriction of the air-current and consequent pressure on the roadside packs. The position of doors should also be carefully selected to prevent intermittent pressure. Roads and faces should be as large as possible, to reduce the ventilating pressure to the minimum consistent with the necessary volume. Old disused roads and workings should be properly dammed off and, if practicable, stowed full, and the ventilation confined to roads and places in actual use. The system of ventilation should be arranged to avoid high water gauge and high velocity. When the ventilation of a section is controlled by a scale or regulator, its position should be carefully considered, and fixed preferably in the intake rather than the return, securing in this way a reduced pressure on the goaves. Waste timber, chips, paper, brattice cloth, grease, or other combustible material should not be left or thrown into the goaf. Tarred brattice cloth should not be allowed in any pit where gob-fires occur. Its pungent odour may prevent gob stink being discovered in the early stage, or conversely be mistaken for gob stink.

### DETECTION OF GOB STINK.

In its early incipient stage gob stink has been variously described as sour, fermentation, decaying vegetation, rotten timber, a taint of onions or garlic. In the early stage the description sour, or fermentation, is not inapt. It progresses to a paraffin, benzol, naphtha, or tarry stage, similar to the smell one gets near the distillery of a coke-oven plant. It then grows more pungent and irritating to the nostrils and throat, and is accompanied by visible vapour from the expelled moisture. Carbon monoxide and carbonic acid may be detected, oxygen is low, and lamps burn dimly. Its progress is now more rapid, and smoke is shortly smelt and seen. Ignition follows quickly. The time elapsing between the first indication and ignition varies greatly. In one case where the whole process was carefully observed, the period was 52 hours, and in another, six and a-half weeks from the first faint smell to the appearance of smoke. Where the seat of heat is some distance away from the possible point of detection, or the ventilation is brisk, the early indications may not be noticed until the fire has made considerable progress. An experienced observer is able to form a reliable opinion as to progress by the various changes of smell and other indications. Deposition of moisture or "sweating" of the roof in the vicinity of the fire on the return side at the outlet is often noticed at a comparatively early stage. A rise in the temperature of the air-current is rarely observed, and thermometer readings for this purpose are not to be relied upon to indicate the inception of a fire. Witness had never known heating to be discovered with a thermometer before the characteristic smell was well advanced. When the seat of heat has been discovered, thermometers inserted in tubes with the end sealed and pointed, thrust into the mass may often be of use. Hygrometer readings on the intake and return sides of the locality may be taken, but are rarely likely to show differences until after discovery by smell. Samples of the stink for analysis should be frequently taken, and Dr. Haldane's portable apparatus will be found useful on the spot. The blood test should be used for carbon monoxide. The use of mice is a wise precaution where men are required to work at or near the seat of heat. It is possible that a system of regular analyses of air from goaves to ascertain the depletion of oxygen might be a useful means of early detection. Rescue apparatus and the assistance of a brigade should be available if required. In dealing with gob-fires the witness had on several occasions found a cylinder of oxygen to be invaluable when men have been affected by the fumes, and an oxygen reviving apparatus should always be at hand. He had found a "smoke box" consisting of bottles of strong ammonia and hydrochloric acid (described in Dr. W. N. Atkinson's annual report) of great service in detecting slight leakages through stoppings and packs, impossible to detect by any other means. In all cases, the greatest care should be taken to discover, and if possible remove, all traces of firedamp from the vicinity of a gob-fire, and as a precaution, after an outbreak, the roads in the neighbourhood should be watered or treated with stonedust. Where there is danger of firedamp encroaching on the fire by reduced ventilation, the full current should be maintained, or indeed increased, up to the last moment, even at the risk of accelerating the progress of the fire. This depends to some extent upon the position of the fire relative to the direction of the air current. In the absence of firedamp, and



where the goaf is found by analysis or the effect on lamps to contain an atmosphere which will not support combustion, or is approaching that point, ventilation may be restricted in the immediate neighbourhood of the heating, and hopes entertained that further measures may be successful in preventing ignition. Such cases are, however, rare.

Mr. Henshaw said he had never found cooling by a brisk ventilation to be effectual after heating has once commenced, without digging out. He had never known heat, after once reaching the middle stage (odour of paraffin, naphtha, or tar) to subside, unless assisted by some smothering operations. Nothing short of loading out or complete damming should be relied upon. The first faint indication should immediately receive most serious attention, and most searching investigation by responsible and competent persons, and plans should be at once considered and set out for dealing with the case promptly and thoroughly.

#### METHODS OF FIGHTING GOB FIRES.

In combating gob fires, one of three general methods are pursued: flooding with water, loading out, damming-off by stoppings. Flooding of dip workings may be done with success where there is time and water, but it must be done thoroughly. Favourable circumstances are comparatively rare, unless the workings are laid out with that object. Water mains installed in a district where fires are to be expected may at times be useful, but it is often difficult to get water to the seat of heat, and the effect of water and steam on the roof and strata causes falls, and steam interferes with the vision and efforts of men at the work. Water may, however, be often used to assist in digging out. Loading out may, under certain circumstances, be successful, but, anticipating failure, preparations for damming-off should be going on at the same time. Conditions favourable to loading out are near point of access to the seat of heat, freedom from firedamp, good roof, and prompt action before ignition. He himself had been successful in loading out in three cases only. Early detection and prompt action may result in finding the heat confined to a few cubic feet of material easily removed, but oxidation accelerates as the temperature increases, and the heat spreads rapidly in the mass. Acceleration may also result from the measures taken, by causing access of air, when otherwise combustion would be retarded for want of oxygen. Where the fire is in the pack, loading out may be attempted with greater probability of success than when in the goaf. Where the fire is in the goaf, the roof bad, the *débris* considerable, and the heat stage advanced, attempts to load out may be disastrous, having in effect the same result as poking the domestic fire to make it burn. Rules for the guidance of persons on the question of loading out are impossible. Each case must be considered with its special circumstances, and the decision left with the competent man in charge.

Damming off by stoppings is the method he had been generally obliged to resort to. Where fires are to be expected, the area of the section should be limited, and preparatory work done when opening out, such as the selection of suitable places for stoppings, partial building of same, and storage close at hand of suitable material for completion. If the workings are laid out in panels the roads forming entrances should be restricted if possible to two or three, thus reducing the number of stoppings to a minimum. Preparatory stoppings should be put in these roads ready for emergencies. When damming off is decided upon the work cannot be done too quickly. The first stoppings may be of a somewhat rough and temporary character, but they must at the same time be airtight and strong; if possible sufficiently substantial to withstand an explosion. They may be afterwards faced and finished in a permanent manner. When there is the slightest indication of firedamp near the heating during the erection of the stoppings, and at the same time it is to be feared the heat is approaching the ignition stage, ventilation should never be reduced but fully maintained up to the last possible moment. This can be done by leaving sufficient openings through the stoppings, whilst the greater part of the building is being done, the openings being finally closed quickly with easily handled material. In adopting this plan the position of the fire relative to the direction of the air current and source of gas must be considered. In one case under similar circumstances, with a rapidly growing fire in a district which immediately fouled with firedamp if the ventilation was slackened, and where the stoppings were large and difficult to build, witness increased the ventilation by scaling down other splits. Pack stoppings of dirt and sand were being put in 12 ft. thick, but up to the last moment holes 4 ft. square were left through the stoppings to maintain the ventilation of the district whilst the stopping work was going on. Meanwhile a large number of bags of sand were prepared, weighing 50 lb. each, and with these and loose sand, the final closing of the openings was done in 32 minutes. A hasty retreat to the shaft followed. Under similar circumstances at another colliery, where it seemed not unlikely that gas would get to the fire before the stoppings could be finished, doors were hastily fixed and closed. They had the same effect as the stoppings, though not strong. A few hours after the doors were closed and the men had left, an explosion wrecked the pit. If work had been continued the men would have been lost.

#### CONSTRUCTION OF STOPPINGS.

Stoppings may be built of various materials. The first stoppings, generally put in hurriedly in a rough and ready way, should nevertheless be substantial and tight. They may be better finished later, when the period of danger has passed. Where preparatory stoppings are ready, and materials in stock, the work is much facilitated, and valuable time saved. It may happen, however, that there are no preparatory stoppings, or that they are not in the best position for

dealing with the outbreak at close quarters. In this emergency excellent pack stoppings can be built of stones and small rubbish collected from the roads, of which there is generally a plentiful supply within easy reach. Emergency stoppings of this kind should be 4 to 6 yards thick, according to the area of the road. Good stone walls should be built at the back and front, and props set against them to prevent slipping. Pack stoppings of this description can be put in very quickly by ordinary workmen, and they can be made thoroughly efficient for the immediate purpose. They can be faced later with brickwork. Pack stoppings afford a great measure of security against an explosion. A buttress of this description is always to be recommended as a part of any stopping. A good emergency stopping can be made of posts and rails packed with sand or fine dirt. By selecting a manhole on one side of the road, and making another opposite, laying the posts and rails across, closely together, filling the spaces with small rubbish or sand, and making good at the top with long split timber as wedges, a good job can be made in a short time. This material is always handy. Permanent stoppings should, of course, be built afterwards. Squared chock timber may be used in much the same way, especially when material has to be carried some distance. It is important that spaces should be well filled. A sandbag stopping may be used with good effect, and the material is easy to transport. The bags are built across the road as a thick barricade, an occasional bag being emptied to fill the spaces between the full bags. Sand should be rammed tightly, otherwise air passes through. Preparatory stoppings should not be mere brick walls. They should be thick, or double, with filling between, and built on both sides and across the roof, leaving a passage through for the tubs. Witness had found the circular form to be the best in bad ground. Toothings should be left to make a bond with the new brickwork. The places selected for preparatory stoppings should be in good ground, in roads not too large, and as near as possible to the workings, to avoid enclosing a large volume of air. Materials for completion should be kept near by. A pipe fitted with a tap should always be left through the stopping for taking samples of air, and recording the water gauge. After the final closing of the stoppings, the air should be short-circuited outbye to take the water-gauge pressure off the stoppings. The pit should, in most cases, be vacated for a time to await results. In considering this precaution, the circumstances of each case must be taken into account. The completion of permanent stoppings later should always be a first-class job. The brickwork should be as good as in the case of dams for water. It should extend well into the sides, roof and floor, and every brick should be floated in mortar. Cross joints are particularly liable to be neglected, and the slightest leakage either through the walling or strata may render the work useless, and all the efforts futile. Repairs should be as carefully attended to, and a system of regular inspection by competent men instituted. Witness next described a few of the Talk-o'-th'-Hill fires in the Bullhurst seam.

He also put in a series of analyses coincident with the change of smell—a record taken of a recent gob-fire at another colliery. The analyses were made by Mr. T. W. D. Gregory, Mining School, Stoke-on-Trent.

#### RESCUE APPARATUS.

Continuing, witness said that in dealing with gob-fires, the rescue apparatus of the present day was a great help. In 1901, in reopening after the Talk-o'-th'-Hill gob-fire and explosion (which happened when the pit was idle during holidays), he used the pneumatophore. That explosion was initiated by the gob-fire which was discovered about five weeks after the explosion. The pneumatophore at that time had many defects and was regarded with suspicion. With the modern apparatus and splendid organisation of brigades good work can be done. Witness also referred to the Jammage and Norton fires, and said that Norton had established a record in the use of rescue apparatus.

With regard to hydraulic stowing, witness said he had quite recently had some information on the subject from a friend in the Pas-de-Calais district, and learnt that there are now five companies using the hydraulic method of stowing in the Pas-de-Calais district, and it is being done from the surface. It is being carried horizontally, distances varying from two to eight times the depth. The maximum distance has been something like 3 kiloms. at a depth of 195 m., the quantity of water being two and a-half times that of the rubbish. His friend considered it impossible to properly work the system uphill 150 m. with a total head of 400 m. That is a vertical height up rising workings. The total quantity of hydraulic stowing in that district in 1911 was 290,000 cubic metres. The effect is to reduce the subsidence on the surface which under the old method was 65 per cent. of the thickness taken out to 18 per cent. of the thickness taken out over the hydraulic stowing. One colliery has come to an agreement with the railway companies to bring sand from the seashore—they are so short of suitable material. In a flatter and less faulty field it would be possible, and he believed it would be adopted to some extent in this country in the future.

Witness described several typical cases of gob-fire in the Bullhurst seam at one North Staffordshire colliery, and showed the character of the seam at other collieries. At the Bunkers Hill and Birchenwood collieries, gob fires are almost unknown, although the conditions are very similar to the others, at all of which many fires have occurred. He said he was unable to explain why fires should happen at one colliery and not at another. This element of mystery was one of the distressing features of these unfortunate and dangerous occurrences. The conditions that seem to be conducive to spontaneous combustion here are, a thick and comparatively soft seam of coal, which makes considerable waste in working.

The waste coal is left behind in loose heaps partially buried, with a large percentage of loose coal in the mixture. The shale lying with it, and by which it is also covered like a blanket, permits air to enter but retains the heat generated. These are the necessary physical conditions for combustion. The shale called hussle has been often blamed by practical men for their fires, but it is its blanketing character that makes it dangerous. It breaks up into the size of nuts and cobbles, and in that way lies closely on the buried coal, allowing the air to enter, but close enough to retain the heat generated. It is at the same time a highly carbonaceous shale, and possibly would itself take fire under suitable conditions. It is, however, from the buried coal itself that danger arises, and it may be said with absolute confidence that if no coal is lost, there will be few or no fires.

#### CAUSES OF OXIDATION.

The next condition necessary to heating is the presence of air for oxidation. This is in most cases unavoidable; in others, it may be avoided or reduced. The chemical reactions accompanying oxidation are not yet fully understood. It has been said that pyrites assists, and Mr. Henshaw thinks it plays an important part in the way it is intermixed in the coal, and by oxidation assists rapidly the disintegration of the coal itself, thus increasing the exposed surfaces. One finds in the goaves heaps of coal reduced to powder, covered with crystals of ferrous sulphate like hoar frost. It is questionable whether moisture has any direct influence on oxidation. Many practical men believe that it has, and fires often occur where moisture is present. A heating goaf is generally found to be damp, but this is due to the chemical reaction and condensation of moisture. Washed slack also takes fire when stored in hoppers at the surface, or in heaps, but witness has found that dry slack heats more readily. It is a curious feature that such heated slack loses its coking property. He is inclined to think that moisture contributes when it is intermittent, by assisting disintegration of coal. Since writing that note he had reviewed 37 gob fires and cases of heating that he had had close experience with, and of the 37, moisture was present before heating in only four cases. The cause is not to be found, perhaps, in any specially subtle ingredient, but rather in a combination of chemical and physical conditions that may be found at times in many seams of widely different general character. Fresh coal oxidises more rapidly than old coal, but in the pit it takes a long time before the temperature rise reaches the danger point. Slow oxidation is always going on, and nothing happens, but under certain conditions a point is reached when rapid acceleration begins, and the temperature will not of itself subside. It is at this stage, witness thinks, that they get the first evidence by smell, and this is nearly always some months after the gob has been made. He could not recall a single fire in gob less than four months old, and the average would be more than six months. When acceleration begins, progress is rapid, varying with the circumstances. At what temperature ignition takes place is extremely doubtful. Coal itself ignites in the goaf at probably less than 300 degs. Cent. He had found by experiment that inflammable vapour is given off from coal at 167 degs. Cent., from wood chips at 163 degs. Cent., and from hussle shale at 158 degs. Cent. This is interesting, but it is not self-ignition. Sulphuretted hydrogen is a part of gob stink. Self-ignition takes place at about 260 degs. Cent. Carbon bisulphate is another gas, with an ignition temperature of 150 degs. Cent., but these gases are associated with others in gob stink, and are not free. There are also light hydrocarbons of low ignition temperature present, the products of distillation, and there may be material in the *débris* which will ignite at a much lower temperature than the coal itself. On all these points we need information to enable us better to understand the process of spontaneous combustion, and devise safeguards. One cannot help feeling, after years of experience, how little one knows.

(To be continued.)

**Colliery Mechanics and Unemployed Insurance.**—An important Insurance Act case came before the Sheffield stipendiary magistrate on Tuesday, when the Nunnery Colliery Company were summoned for failing to pay insurance contributions in respect of William Storey, a fitter. There were three charges, and the total amount of the contributions was 3s. 11d. Mr. F. W. Dust, prosecuting on behalf of the Board of Trade, stated that Storey entered the company's employment as a first-class fitter in the colliery engineering workshop on July 14, but his unemployment book was refused by the timekeeper, and later the chief engineer told him that an unemployment insurance book was not required by him, owing to the class of work on which he was engaged. The Board of Trade contended that Storey's employment came under mechanical engineering, which was included in the unemployment section of the Act. In February last the umpire, appointed under the Act, issued the following decision:—"Smiths, mechanics, and their assistants, employed wholly or mainly in workshops and engaged in the construction or maintenance, or repair of colliery machinery, are insurable under provisions of Part 2 of the National Insurance Act." Mr. T. E. Ellison, for the defence, contended that Storey did not come within the Act, because he was not employed in the workshop, but was engaged in maintaining colliery plant on the colliery premises, although he did filing or scraping work in the workshop. Storey was only 24.8 per cent. of his time in the engineering shop, as against 75.2 per cent. outside. The stipendiary magistrate said he considered Storey came within the Act, and imposed a fine of 2s. 6d. and costs in each case. Mr. Ellison asked the stipendiary to state a case.



INDIAN AND COLONIAL NOTES.

Canada.

Our Toronto correspondent says:—The merger of several western Canadian coal companies as the Canadian Coal and Coke Company Limited, has been completed, the arrangement having been approved of by the shareholders and bondholders concerned. The new company has taken over the properties of the Western Coal and Coke Company Limited, the Pacific Pass Coal Fields Limited, the St. Albert Collieries Limited, and the Lethbridge Collieries Limited. The authorised capital is 15,000,000 dols., of which 4,000,000 dols. is preferred and the remainder common stock. Of this, about 3,750,000 dols. preferred, and between 9,000,000 dols. and 10,000,000 dols. common stock have been issued, the balance remaining in the treasury. An issue of 3,000,000 dols. bonds has been authorised, of which 2,000,000 dols. will be put out immediately to raise funds to meet current liabilities and complete the development and equipment of the properties.

*Analyses of Canadian Coals.*—In vol. vi. of the report on the coals of Canada, conducted at McGill University, Mr. Edgar Stansfield gives the following interesting table showing the average analyses of regular coal samples in each of the coalfields investigated:—

	Sydney, Cape Breton county, Nova Scotia.	Inverness county, Nova Scotia.	Pictou county, Nova Scotia.	Springhill, Cumberland county, Nova Scotia.	Joggins, Chignecto, Cumberland county, Nova Scotia.	Grand Lake, Queens County, New Brunswick.	Souris, Saskatchewan.	Edmonton, Alberta.	Belly River, Alberta.	Frank Blainmore, Alberta.	Crowsnest, British Columbia.	Cascade, Alberta.	Similkameen, British Columbia.	Nicola Valley, British Columbia.	Nanaimo-Comox, Vancouver Island, British Columbia.	Alert Bay, Vancouver Island, British Columbia.	Whitehorse, Yukon Territory.
Number of samples included in average ...	9	2	6	3	3	1	2	3	3	6	8	4	3	2	5	1	3
Moisture in coal—																	
Total moisture.....per cent.	3.7	7.0	2.4	2.6	2.9	1.3	29.7	22.9	8.8	1.9	2.3	1.5	2.6	3.7	2.1	7.0	—
Moisture left after air drying ...	2.6	5.3	1.7	2.1	2.2	0.9	18.1	19.0	7.8	0.8	0.9	0.7	—	3.1	1.5	—	—
Proximate analysis of dry coal—																	
Fixed carbon (FC) by difference...	56.3	49.0	57.5	59.0	46.4	53.4	43.1	49.6	47.2	56.8	64.2	71.6	53.2	47.2	52.3	42.7	56.0
Volatile matter (VM) .....	36.4	38.5	29.6	33.0	37.8	32.2	44.5	40.3	34.5	26.3	24.6	14.7	32.7	39.1	36.5	34.3	26.5
Ash .....	7.3	12.5	12.9	8.0	15.8	14.4	12.4	10.1	18.3	16.9	11.2	13.7	14.1	13.7	11.2	23.0	17.5
Ultimate analysis of dry coal—																	
Carbon (C) .....	75.8	65.4	73.0	76.6	64.8	70.3	58.7	64.6	61.9	70.7	76.8	76.6	70.4	68.3	72.3	—	70.4
Hydrogen (H) .....	5.1	4.5	4.5	4.9	4.4	4.6	4.6	4.5	4.6	4.2	4.5	3.7	4.5	5.0	4.6	—	4.2
Sulphur .....	2.9	6.9	1.2	1.5	6.2	5.8	0.6	0.4	1.1	0.6	0.5	0.6	1.9	0.8	0.9	—	0.5
Nitrogen .....	1.4	0.9	1.9	1.6	1.2	0.6	1.0	1.3	1.6	1.0	1.2	1.1	—	1.6	1.1	—	0.8
Oxygen, by difference .....	7.5	9.8	6.5	7.4	7.6	4.3	22.7	19.1	12.5	6.6	5.8	4.3	—	10.6	9.9	—	7.6
Calorific value of dry coal—																	
By determination.....calories	7,590	6,650	7,210	7,510	6,590	7,160	5,650	6,110	6,030	6,830	7,440	7,270	—	6,620	7,150	6,170	6,600
By calculation from ultimate analysis ..	13,660	11,960	12,970	13,520	11,860	12,890	10,170	11,000	10,850	12,300	13,400	13,080	—	11,920	12,870	11,100	11,880
By calculation from ultimate analysis ..	8,190	7,600	8,280	8,170	7,830	8,360	6,460	6,800	7,400	8,220	8,380	8,420	—	7,670	8,050	8,010	8,000
Ratio FC/VM.....	1.55	1.27	1.94	1.79	1.23	1.66	0.97	1.23	1.37	2.16	2.61	4.87	1.62	1.21	1.43	1.24	2.12
Ratio C/H .....	14.9	14.5	16.2	15.6	14.7	15.3	12.8	14.3	13.5	16.8	17.1	20.7	15.6	13.6	15.7	—	16.8

LABOUR AND WAGES.

North of England.

The half-yearly meeting of the council of the Northumberland Miners' Association was commenced on Saturday at the Burt Hall, Newcastle. The president of the union, Mr. Joseph English, was in the chair. Previous to the meeting, Mr. W. Straker (secretary) was instructed by the men's side of the District Board under the Minimum Wage Act, to write to the President of the Board of Trade to call his attention to the recent award of Lord Mersey, independent chairman of that Board. Mr. Straker, in his letter, pointed out that the Board met on July 21 and 22 and on October 14 this year for the purpose of discussing a proposed revision of rules and rates of pay for the Northumberland district, the workmen having been very much disappointed with Lord Mersey's previous award, made on May 10, 1912. The men's representatives laid the whole position before his lordship, but they alleged that his last award was evidence that he had totally disregarded the facts, and the workmen felt that they could not possibly trust to Lord Mersey deciding fairly between the two sides of the Board, and that, therefore, the question be laid before the President of the Board of Trade and the Prime Minister. Mr. Buxton, in reply to his letter, stated that he was advised that he had no power under the Coal Mines (Minimum Wage) Act to take the action suggested, *i.e.*, declare Lord Mersey's award null and void. It was agreed to enter a protest against the award of Lord Mersey under the Minimum Wage Act, and also to ask the President of the Board of Trade to appoint another chairman for the Northumberland district. The question of Lord Mersey's award has been sent to the Miners' Federation of Great Britain. The committee of the Federation had agreed to place the matter on the agenda for the Federation conference to be held on December 10 and 11, when the question of improving the conditions of surface labour will be specially considered. It was further agreed that an interview be sought with the Prime Minister and the President of the Board of Trade in order to lay the whole matter before them, and also that the officials be instructed to get high legal opinion on the question of whether or not Lord Mersey's award under the circumstances is legally binding. At the afternoon session, resolutions from branches on a variety of questions came up for consideration. It was asked the coalowners to agree to a working time of 30 minutes to the mile for the workmen was carried. The Aslington Colliery, empowering the management committee to interview the miners in order to ask them what they were

prepared to give in lieu of the present colliery house system, was defeated. It was agreed to ask the coalowners for an allowance of 3s. per week for house rent for men living in rented houses; and if the request be declined, to take a ballot vote of members as to whether or not they were in favour of striking to enforce the claim. It was also decided to request the colliery owners to grant all workmen a week's holiday each year.

At the resumption on Monday the council passed a resolution protesting against the treatment of the men's leaders in Vancouver. The following resolution was defeated:—"That we ask to have the joint committee re-established on the basis that no reduction of wages shall take place, except it be proved that the coalowners are unable to work their mines at a profit at the existing tonnage rates."

The meeting was continued on Tuesday, and a resolution calling upon the Government to institute a special court of enquiry into the cause of the recent Senghenydd disaster was adopted. The Wylam branch moved, and it was agreed to unanimously:—"That we request the Miners' Federation committee to at once approach the Government, and request that in future 20 mines inspectors be drawn from the ranks of the miners."

The meeting was continued on Wednesday. The following resolution was defeated:—"That we endeavour to secure legislation to prevent the Board of Trade interfering in trade disputes when questions of wages are involved, unless such board has power to inspect the

number of accidents is slightly lower when compared with the figures of the previous year; but for the Newcastle district, which embraces Cumberland, North Durham and Northumberland, Mr. English regrets to say that out of 123,181 persons employed they had to record a total of 18,229 minor accidents and 114 fatal accidents. Many of the accidents were preventible if men would take more time to timber their places. According to statistics of compensation issued during 1912, the figures for nystagmus were remarkable. In the first full year—1908—during which the new provisions as to industrial diseases were in operation, the number of nystagmus cases was 460. In 1909, 631 new cases arose; and in 1910 there were 956 cases. In 1911 the numbers rose to 1,375; and last year there were 1,376 cases. The figures showed that the proportion of long-continued disablement cases was very high.

A mass meeting of the lodges in North and North-West Durham was held at Chopwell on Tuesday, when the following resolutions were adopted:—(1) "That this mass meeting of Durham miners do hereby record our detestation of the unjust award issued by Sir Robert Romer, and call upon our representatives to take immediate steps to secure its abrogation, not by the making of protests or appeals to hostile Ministers of the Crown, but by a direct demand, backed by an ultimatum from the workers indicating our intention to 'down tools' in support of our demand." (2) "This meeting demands that there shall be no appeal to the Board of Trade until the opinion of the county

employers' books." The same fate happened to the motion to initiate a national movement to secure the abolition of all piecework in the coalmines of Great Britain. The Ellington branch moved:—"That we request the executive of the Miners' Federation of Great Britain to convene a conference of representatives of miners, railway workers, transport workers, and other associations for the purpose of considering an agreement under which, in case of the members of one association being on strike or locked out, the members of other associations may 'down tools' to assist those locked out or on strike." This was also lost.

A pamphlet has been issued by the Newburgh Miners' Lodge Committee, entitled "The Case of the Amble Miners," and it was promulgated last week at a largely-attended meeting of the miners at Amble. In dealing with the Insurance Act, the pamphlet states that it was a policy of degradation. All the arguments of social reform and helping the poor were "blarney." The friendly societies were the best thrift societies in the world. Was not the Act intended to break the power of the trade unions? In dealing with the three-shift system, the pamphlet referred to it as the most important part of a degrading policy, not because it affected the largest number of people—probably it concerned less than 10,000 miners in Northumberland—but because it was the most drastic and the most callous attempt to destroy all that distinguished a free man from the lowest slave. The pamphlet explodes the strike idea altogether, and states that strikes are never successful, as the master invariably wins. With one or two exceptions, their leaders had given them very bad advice both inside and outside of Parliament. It was absurd for Labour members to pretend they represented the cause of labour in Parliament.

Being unable to agree, the Cumberland Coal Trade Joint District Board has decided to call in the services of the neutral chairman, Sir William Collins, who made the awards under the Minimum Wage Act. The question in dispute is an application from the Whitehaven Colliery Company, who are paying from 3d. to 6d. per day above the county minimum, to be placed on the same basis as the rest of the county. The Whitehaven Colliery Company is the largest employer of labour in the Cumberland coal trade.

Mr. Joseph English, compensation agent to the Northumberland Miners' Association, has forwarded to the branches his annual statement showing the number of fatal accidents and mentioning some non-fatal cases which have occurred as the result of accidents at collieries in the county in the year ended September last. Twenty-two fatal accidents are reported, in respect of which £3,094 10s. 6d. was paid in compensation. The

has been ascertained, and a mandate from the county given." It was decided to hold mass meetings in other centres, the next to be held in Newcastle, when lodges from both sides of the Tyne will be invited. The date for the meeting was fixed for November 29.

At the Coal Trade Offices, Newcastle, on Monday, Mr. Edward Shortt, K.C., M.P., the chairman of the joint committee in the Durham coalfield, sat to hear over 30 applications from the Auckland district.

The council of the Yorkshire Miners' Association met at Barnsley on Monday, when Mr. H. Smith presided. The non-union question was again considered, and the council learnt there were still a fair number of men and boys working at collieries in West and South Yorkshire who were still outside the association. It was decided before considering the question of taking action throughout the country to send a report to the branches and call a special meeting to deal with the whole question. In regard to the grievances of surface workers in West Yorkshire the matter was referred back to the committee with power to seek a general settlement of the chief questions—*viz.*, the cokemen's wages and hours, and the hours of enginemmen and firemen. The council agreed to allow the men at the Monckton Main Colliery to take a ballot on the question of giving notice owing to the dispute regarding the price list in No. 1 district. Mr. Wadsworth was requested to ask again for an interview for the revision of the price list before further action was taken. In regard to the question of taking out the forks at the Brodsworth Colliery, it was decided to request an interview to see if the matter could not be settled without further action being necessary. The branches are to decide whether the men at the Ravensthorpe Colliery are to be allowed to tender notices owing to grievances.

It was officially announced on Tuesday that the South Derbyshire miners would hand in their notices, on a date to be settled by the executive of the association, as the preliminary to a strike against the employment of non-union men. This decision had been reached at a meeting of the council of the association.

Scotland.

The ballot on the question of raising the contributions from 3½d. per week to 6d. per week has been taken part in by 16,000 members of the Fife and Kinross Miners' Association. With very few exceptions, the district votes show a majority in favour of the increase.

A meeting of the Scottish Coal Trade Conciliation Board was held at Glasgow on Saturday to consider the application of miners for an increase of 18½ per cent. on the 1888 basis. This is equal to 9d. per day, and would make the miners' wages 8s. The meeting was adjourned until Friday, November 28.



## MINING AND OTHER NOTES.

The officials and workmen employed at No. 1 Kenmuirhill Colliery, Carmyle, Lanarkshire, have presented Mr. James Veitch, manager, with a silver mounted dressing case, on the occasion of his marriage. Mrs. Veitch was made the recipient of a beautiful gold watch and chain.

The smoking concert on behalf of the Coal Trade Benevolent Association was well attended on Friday evening the 24th ult., at the King's Hall, Holborn Restaurant. W. G. Phillips Esq., of Ansley Hall Colliery, the president of the association for the year, occupied the chair, and about 850 attended. An unusually good programme of music was provided, and it was reported that £75 had been collected during the evening, independent of the sale of all the tickets.

The council of the Institution of Civil Engineers have made the following awards for papers published in the *Proceedings* without discussion during the Session 1912-1913:—A Telford Gold Medal to Mr. James Mackenzie (Johannesburg); Telford Premiums to Messrs. H. Hawgood (Los Angeles), J. K. Robertson (Bombay), G. S. Perry (Sydney, N.S.W.), and Gervaise Purcell, B.A. (Los Angeles); and the Crampton Prize to Mr. William Mason, M.Sc. (Liverpool). The council have made the following awards in respect of students' papers read before provincial associations of students during the past session:—The James Forrest Medal and a Miller Prize to Mr. P. M. Chadwick, B.Sc. (Birmingham); and Miller Prizes to Messrs. A. J. S. Pippard (Bristol), T. P. Geen (Bristol), C. E. Holloway, B.Sc. (Bristol), J. W. Burns (Glasgow), and B. A. E. Heilig (Birmingham).

Before Viscount Allendale and other magistrates at Hexham, last week, John Moore, miner, employed at the Mickley Coal Company's pit, was charged with breaches of the Mines Regulation Act by stemming a shot with inflammable material, also with having a naked light within four feet of a tin of explosive, and also with having endangered the lives of the men in the mine. The prosecution stated that the stemming was done with coaldust, the most explosive thing a man could possibly have used. In regard to the case of the naked light, the man stuck his candle on to a box only 40 inches above his box of explosives, into which it might easily have fallen. The man then took two cartridges out of the box of explosives, and placed the cartridges in the palm of his hand, and stuck the candle between the fingers of the hand in which the explosives were. The chairman said disasters took place very often without any explanation of the cause, and possibly that sort of carelessness was responsible for such disasters. They fined defendant £3 and costs for the first offence, and £1 and costs in each of the other cases.

Mr. Thomas Yates, who, for some time past, has been manager at the Brynkinallt Collieries, Chirk, and who made somewhat of a reputation when last year these collieries were the only ones to work in the strike period, has been appointed managing director of Messrs. W. Y. Craig and Sons Limited, and his place as manager of the collieries mentioned has been taken by his brother, Mr. R. Yates.

Mr. A. I. R. Butler and Mr. Hubert Butler, it is stated, have severed their connection with Messrs. Baldwins Limited.

A course of six educational lectures on "Reinforced Concrete: Its Commercial Development and Practical Application," will be given by Mr. H. Kempton Dyson, secretary of the Concrete Institute, lecturer on reinforced concrete and structural engineering at the London County Council School of Building, M.Int. Assn. for Testing Materials, &c., at 5.30 p.m., on the following Wednesdays, November 12, 19, 26, December 3, 10 and 17, 1913. The lectures will be given in the lecture hall of the Concrete Institute at Denison House, 296, Vauxhall Bridge-road, Westminster (close to Victoria Station). There is no fee for the course. Admission will be by ticket obtainable on application from the secretary of the institute.

Boring operations are being carried on in a field close to Cumbernauld village, and also in the neighbourhood of Cumbernauld station. It is anticipated that this district will be opened up by new pits.

The Wilsons and Clyde Coal Company are opening up the Douglas coalfield in Lanarkshire. They are at present fitting up the permanent plant at the colliery, and building workmen's houses. Several seams of coal have been found of good thickness, one being 7 ft. thick of excellent quality as a house coal, and with only 1½ per cent of ash, and another being 6½ ft. thick and a good steam coal. There has been a very large outlay in plant and underground work.

Under the auspices of the West of Scotland Branch of the Association of Mining Electrical Engineers, a public meeting "open to all interested in the handling of colliery electrical plant" will be held in the Dick Institute, Kilmarnock, on Saturday, 29th inst. Mr. Alexander Anderson, Motherwell, the president of the association, is to deliver an address on "The Transmission of Electricity." Mr. John Samson, of Sanquhar, has consented to take the chair, while quite a number of technical experts have expressed a willingness to be present to answer any questions that may be put by members of the audience.

Mr. William Jones, director of the Bute Shipbuilding, Engineering, and Dry Dock Company Limited, has left estate of the gross value of £17,350, of which £16,469 is net personalty.

Mr. Isaac Armstrong, late engineer at the Ellenborough Colliery, near Maryport, has been appointed manager at the new by-product works at Oughterside.

At Prestonpans on Friday, the 14th inst., in the Gothenburg Hall at a social meeting of the officials and workmen connected with Messrs. the Edinburgh Colliery Company Limited's Prestonlinks pit, Mr. Adam P. Nimmo, on the occasion of his leaving the company to enter business with his father, was presented with a gold watch and a suit case, as a small token of the great esteem and respect in which he was held by the employees of the colliery. Mr. Nimmo, who came as mining surveyor at Preston Links ten years ago, was promoted to the responsible position of manager, and has been in charge of the pit for almost five years. During that period he showed great talent as a manager and mining engineer, this fact being manifest in the many improvements and developments which have taken place. Most of the coal is won from the undersea workings and everything tends to point to a very large output from this colliery in the near future, due to the skilful and efficient way he has laid off and equipped the workings both mechanically and electrically. Mr. Penman, a very old miner, who made the presentation, gave those present some very interesting facts in connection with the family history of the Nimmo's, who opened up and worked extensively the coalfields of Slamannan in the early "sixties," their name is still connected therewith, and is held in great respect in that district.

Dean Henson, in the course of a sermon on Sunday, referred to the gravity of the housing question in Durham. He was assured that within recent years, much had been done to improve housing in Durham. The good work was grievously hindered by the bad conduct of the people primarily concerned. The reckless destruction of landlords' property by the worst kind of tenant was very discouraging to well-intentioned landlords, and offered a serious obstacle to the necessary and indeed urgent work of improvement. It would be well worth consideration, whether the law as it stood was adequate to deal with the cases of those degraded and destructive tenants who must be housed somewhere, but whose habits were so bad that such housing as they preferred could scarcely be tolerated in a self-respecting community. The law, bringing home its demands by sharp penalties, was perhaps the only moral teacher some of them could as yet benefit from.

Amongst the orders placed quite recently with the Ceag Electric Safety Lamp Company Limited, for Ceag lamps are one outright order for 5,000 lamps for the Powell Duffryn Steam Coal Company Limited, of Aberdare, South Wales (in addition to some 1,300 supplied previously), and another one for 2,000 lamps for Henry Briggs, Son and Co. Limited, of Normanton, Yorkshire, (in addition to 2,500 lamps now in use). This brings the total of Ceag lamps sold to British collieries in less than 18 months to about 40,000.

A very interesting event occurred on the Manchester Coal Exchange recently. At the conclusion of the business Mr. John Tomlinson, J.P., took the chair as the oldest member of the Exchange, and said that Mr. James Roscoe was elected a member of the committee in 1889, vice-president 1891, president for the first time in 1892, and president for the second time this year. He took a leading part in the provision of a café, and was elected on the management committee of that institution. Mr. Freeman also referred to the enthusiasm which Mr. Roscoe displayed in the success of the Coal Exchange. Mr. Ralph Peters made the presentation of a very fine framed portrait of Mr. Roscoe, as a token of esteem and regard by the members of the committee, and in commemoration of his long connection with the Exchange. Mr. Roscoe returned thanks for the honour which the members had done him, in presenting him with the photograph. It was stated a replica of the portrait will be produced and placed in the large room of the Exchange.

The Nova Scotia Mining Society has moved its headquarters from Halifax to Sydney, Cape Breton. Owing to the decline of the goldmining industry on the mainland of Nova Scotia, and the great economic importance of the rapidly expanding coal and steel industry of Cape Breton, it has for some time been apparent that if this old-established mining society was to retain its existence and importance it would be necessary to move nearer to the centre of present activity. The two large companies in Cape Breton—namely, the Nova Scotia Steel and Coal Company and the Dominion Steel Corporation, have undertaken to guarantee a certain minimum membership, thereby assuring an income to the society which, with the present membership and the grant given by the Provincial Government, will enable the society to more properly represent the mining industry, and to print presentable copies of the *Transactions*.

The Railway Rates Committee of the Birmingham Chamber of Commerce has received particulars of the revised regulations of the railway companies in regard to demurrage on railway companies' trucks and sheets, and they recommend that a strong protest be presented to the Board of Trade against the excessive charge of 1s. 6d. per wagon per day for ordinary wagons. It has also been reported to the committee that the railway companies recently gave notice that, as from November 1, the rates for

demurrage would be insisted upon, even when the rates for carriage included delivery by the railway companies, and they were unable to deliver. The committee recommend a strong protest be made to the Board of Trade against this condition. The Chamber decided to communicate with the Board of Trade.

A letter from the Board of Trade, on the subject of recent increases in railway rates, was read at a meeting of the Birmingham Chamber of Commerce last week. The letter points out that where it is sought to justify a general increase of rates under the Railway and Canal Traffic Act, 1913, only one case would appear to be necessary to decide questions arising under section 1, subsection (1) (a) and (c) of the Act in the case of any particular railway company. As regards the question of procedure before the Railway and Canal Commission, the letter states that certain proposals on the subject were contained in Clauses 14 and 15 of the Railways Bill of last Session, but that it was not found practicable to proceed with the Bill. It is not necessary for an individual trader to take proceedings before the Commission, as section 7 of the Railway and Canal Traffic Act, 1888, provides that certain public authorities and any such association of traders or freighters or Chamber of Commerce or Agriculture, as may obtain a certificate from the Board of Trade, that it is, in the opinion of the Board, a proper body to make such complaint, may make complaint to the Commissioners without proof that they are aggrieved by the matter complained of.

The German winner of the Nobel prize for chemistry, Prof. Alfred Werner, of Zurich University, is very well known in Germany as an authority on inorganic chemistry. He has been professor at Zurich since 1895. Prof. Werner's chief subject is the investigation of atoms, and in particular the composition of the complex nexus.

The annual statement of the navigation and shipping of the United Kingdom for the year 1912 has been issued. The tables relating to foreign trade show that 74,057 vessels of 76,190,616 tonnage entered our ports with cargoes during the year under review, and there has been a further decrease in the number of sailing vessels, and a corresponding increase in steam vessels from 17,997 in 1911 to 20,879 in 1912.

In the annual report of James Nimmo and Co. reference is made to legislation and the Home Office regulations having imposed serious burdens upon the industry. In common with other collieries' undertakings, the company has incurred a considerable increase in costs, while there has been no recognition of this in the relative adjustment in wages to values of coal.

The extension of the Durham coalfield into the south-eastern portion of the county, through the enterprise of Messrs. H. Stobart and Co., promises to be successful. Three seams of coal have been found near the village of Fishburn, which is situated close to the Wynyard Park, and two shafts, 40 yards apart, have been sunk to a depth of 90 fathoms.

The increase in the mineral traffic in the Doncaster district is leading to considerable alterations being made by the railway company. The Great Northern Railway Company are now credited with the consideration of a scheme which will make Doncaster a big centre of transport traffic in connection with the South Yorkshire collieries. The present mineral sidings lie between Balby Bridge and the Carr sheds, and it is intended to extend these. The construction will involve, it is stated, the making of a new approach road, and the whole scheme is put down as probably costing £10,000.

The annual report of the Humber Coal Exporters' and Shippers' Association draws attention to the issue of legalised certificates for coal shipments to Russia. The association was compelled to draw the attention of the Secretary of State for foreign affairs to the fact that all of a sudden the Custom House authorities at Cronstadt or St. Petersburg demanded that the original colliery certificates, legalised by the Russian consul at Hull, must be presented along with the other shipping documents, although hitherto the practice had been for shippers of coal cargoes to Cronstadt and St. Petersburg to supply their own certificates legalised by the Russian consul in Hull, and to forward the respective original colliery certificates a day or two after shipment. The whole matter is now under the attention of the Russian Foreign Office. The Russian consul for Hull is now in Russia, and Humber coal exporters hope he will bring back with him a satisfactory reply.

At a meeting of the Liverpool Geological Society held last week, Mr. C. B. Travis briefly described the small inlier of the coal measures which extends, roughly, north-north-west and south-south-east across and beyond Croxteth Park for a distance of about 2½ miles, the greatest breadth being about ½ mile. Judging, he stated, from the character of the strata, which consists of dark purple and red sandstones with clay partings, it is probable that the outcrop belongs to the upper coal measures, and in that case it would in all likelihood be necessary to sink through some 1,200 ft. of rock in order to reach the middle measures in which the productive seams are found.

The Royal Society has this year awarded a Royal Medal to Prof. Bailey Dixon for his researches in physical chemistry, especially in connection with explosions in gases. The Davy medal has been granted to Prof. Raphael Meldola for his work in synthetic chemistry.



## SPECIFYING AND BUYING MINING ELECTRICAL PLANT.

At the monthly meeting of the West of Scotland branch of the Association of Mining Electrical Engineers, held in the Royal Technical College, Glasgow, on Saturday evening, an interesting paper was read by Mr. J. P. C. KIVLEN on "The Specifying and Buying of Mining Electrical Plant." Mr. MATTHEW BROWN, general manager of the Banknock Coal Company, occupied the chair.

The author, at the outset, said his chief aim was to give prominence to a number of details often overlooked when ordering material or installing apparatus, and to offer suggestions—the outcome of long practical experience in every phase of the work—that would be beneficial alike to manufacturer and customer. With every confidence he could say that there was no branch of the nation's industry which excelled mining in its wide application of electrical power; and this, perhaps, not from choice, but from necessity. The interests of manufacturer and consumer were so closely interwoven that it behoved the former to give every consideration to the actual requirements of the latter. In turn the consumer ought carefully to discriminate and buy only one class of material—the best. That such consideration had not been given in the past was generally known.

It would surprise many members present when he said that at the moment a great many British firms did not, or would not appreciate mining conditions. That this was due to lack of enterprise and prejudicial to their best interests the following instance would show. Six copies of a specification were sent out to six first-class firms for certain apparatus some time ago. There was nothing faddish or abnormal in the specification. It gave the manufacturer full and definite instructions as to what was wanted, with an offer of blue prints if necessary. The result was that there were only two legitimate offers, three apologetic letters regretting inability to quote, and an offer of unsuitable stock material. The customer had also a duty to perform in that he should carefully define his requirements—indeed, he would suggest to those in the habit of ordering electrical material who had little or no technical knowledge of the work that they should be as explicit as possible. For instance, it was useless to couch an order in the following terms:—"Please supply one 20-horse power starter for direct-current compound motor, 500 volts. Cheapest type; present one burnt out." The maker, in response to that, would very probably send on a starter with a smaller rating than the one burned. The result, of course, was another burn-out. Such an order as that should have been given in the following terms:—"Please supply a starter to start a 20-horse power compound-wound motor, 500 volts, against load 10 times per hour, taking a given number of tubs up an incline 1 in 20 in a stated number of minutes at a given speed." The tare of tubs and weight of coal would, of course, be given, and, if the road was of considerable length, the weight of the rope also. Another, and perhaps better, method was to ask for a starter to start at 50 per cent. overload during one minute in five or 10, as the case might be.

Continuing, the author said that if cable makers would arrange to give them a concentric cable with twin-shunt cores for field connecting in the case of a reversing shunt machine, or multiple core in the case of a reversing compound-wound motor, they would confer a great boon on direct-current underground working. Straggled wiring would, in consequence, be completely obviated. Then, again, development could not always be foreseen, and when ordering fuse or distributing boxes preference should be given to material that could be extended by simply placing one piece of apparatus against another and inter-connecting by bus-bars. This class of apparatus was now in the market for concentric working. Further, a distributing system should be arranged with care, so that if a fault occurred in one section of the working the other section could be kept going. Nothing smaller should be used than a 25-ampère fuse bridge. From a mechanical point of view a 10-ampère fuse would work cooler in a 25-ampère bridge than in a 10-ampère one. Although it was not specially stipulated in the new Regulations, an ammeter was desirable on every motor. It was the eye of the machine, and quickly denoted any erratic occurrence. They could get these instruments properly protected integral with the switch-gear. When ordering instruments for concentric working, it should be pointed out that there was a continuous potential difference of, say, 500 volts between the working parts and the case when operating. The lack of proper appreciation of this point was responsible for 90 per cent. of the instrument failures. Finally, he was of the opinion that every manufacturer should be asked to quote on the same basis. This would not only be advantageous to the buyer, but would give the offer of every reputable firm that consideration which was its due. Second-hand machinery was always dangerous to buy unless examined by an expert, and should be severely left alone excepting in cases of breakdown or urgency. This particularly applied to three-phase motors, which might have had many "standstill" currents and rough them while they looked all right.

which was taken part in by the branch and Mr. A. McGUFFIE and A. B. MUIRHEAD, turned up next meeting.

## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Exclusion of Non-union Men from Employment—Serious Proposal to the Conciliation Board—The Mining School: Federationists Refuse Support—American Coal Lands Purchase Attributed to Mr. D. A. Thomas—Cost of Living Raised Only 20 per Cent, while Wages Rise 40 to 50—Question of Double Shift—Workmen's Levy for Senghenydd Fund—The Demand for Dismissal of Officials at Llanhilleth—Loss of £90,000 in One Colliery During a Few Years—Colliery Subsidence Entails Sinking New Pit—Claim that Workmen Should be Enabled to Initiate Prosecutions.**

It has been decided by the workmen's representatives to bring forward at the next meeting of the Conciliation Board the question of trade-union members alone being engaged for work at the collieries; and herein is to be witnessed a development upon lines similar to those laid down in Staffordshire recently. The idea has been mooted over and over again in South Wales, but never before in definite practical form, as now.

Under the old sliding scale, which came to an end in 1898, the owners aided the local trade unions, of which there were four or five, by collecting the union money at the colliery offices on pay-day, and handing it over to the officials of the union. It is said that in one case in these earlier days a colliery manager would not employ non-union men. The circumstances at that time were totally different from the present, both the Sliding Scale arrangement and the Miners' Permanent Fund agreement operating to some extent through the colliery offices. For the past 15 years, however, the Federation has covered the whole coalfield, and different conditions have existed.

The demand for facilities for taking show-cards will, it is expected, be one of the proposals which the Federation will submit to the employers in the near future.

It is not desired at the present time that the contributions should be kept back in the colliery offices, as was the case during the sliding-scale era. Work through the lodges is considered too valuable in its "educative" aspect, as well as in its effect of maintaining interest in the trade union itself; and therefore the idea is that any action of the employers should be restricted to the refusal of non-union labour, and that the men themselves should make the collection of subscriptions.

Both the Minimum Wage Act as well as the operation of the Conciliation Board and the legal assistance of the workmen in regard to compensation, &c., entail heavy outlay and the maintenance of a trained staff; and it is upon these facts that the Federation found their demand for payment by every employee.

The coalowners of South Wales, having established their mining school at Treforest and linked it with the University College on one hand and with the County Council's mining classes on the other, approach was made to the Miners' Federation for its support, a deputation waiting upon the executive to explain the scheme. At the meeting of the Federation executive council on Friday the subject came up, and it was decided that the council could not associate itself with the mining school. In addition, the council passed a resolution calling upon the public authorities of South Wales "to provide instruction in mining in convenient centres available to the workmen."

The reasons which the miners' council set forth as occasioning their unsympathetic action is that the School of Mines, being under the control of the coalowners, will not be of such service to workmen students as would be rendered by a mining school under public authority—such as the University College, Cardiff, where it was originally proposed to establish it. They take exception to the scale of fees, regarding them as beyond the means of workmen, pointing out that the fee for a part-time course is £2 10s., and that the loss of one day per week would be involved in attending school—perhaps even more. For the whole-time course the fees are £10 and £5. This, it is urged, is above the means of the ordinary collier.

Further, there is an objection to the Mining School authorities acquiring power to grant mining certificates; and it is probable that direct representations will be made to the Government upon this matter, for the Federation Council desire that the Home Office shall keep control of examinations, and not surrender it to the Mining School authorities.

It is added that whilst the coalowners now finance their own institution, they have in the past given insufficient financial support to the college, notwithstanding the high position of Prof. Galloway as a mining authority. Several other points are raised, and the attitude of the Federation at the moment is that of sustaining the University College as the proper medium of instruction, rather than that an institution maintained and governed by the coalowners should serve the district in respect of mining.

In a case heard during a sitting of the Newport County Court, a collier who claimed a balance of money, in order to bring his wages up to the minimum, had judgment given against him, because he did not produce a statutory declaration that his place was an abnormal one.

A statement circulated by the *American Coal Trade Journal* is to the effect that Mr. D. A. Thomas, chief of the Cambrian Combine in South Wales, has purchased in the New River territory about 30,000 acres of land; and Mr. Thomas, when asked to verify this report, declined to make any statement.

Mr. D. A. Thomas, who has spoken in Cardiff upon prevalent labour struggles and strikes, said that industrial unrest was not confined to this country, but prevailed both in the old world and the new. Recent legislation might be a contributory cause, because the Trades Disputes Act to some extent, by removing the financial responsibility of labour organisations, might cause labour leaders to care less whether they were involved in a strike or not. Another thing that might have contributed was the establishment of Conciliation Boards by the Government, and the interference by the Board of Trade. That, again, led to removal of responsibility. That kind of thing removed the responsibility of labour leaders and employers, who would not make themselves unpopular by making concessions when they knew that the Board of Trade would intervene. Half the trouble was due to the slowness in adjusting wages to the increased cost of living. But in the South Wales coalfield the rate of wages had increased to twice the increase in the cost of living; for whereas the cost of living had increased by 20 per cent. during the last 20 years, wages in the coal trade had increased by 40 or 50 per cent., and this would not be the reason why they had last year a great national strike. If the profits shared amongst the owners had been shared amongst the workmen it would not amount to a great deal. Safety should be the first consideration of owners and men, and there were 20 per cent. less accidents at collieries now than in 1899.

At the meeting of the Conciliation Board on Monday two complaints were considered—one from the employers' side, and the other from that of the workmen—and both had relation to the question of double shifts.

At Penallta collieries the men seek to abolish the double shift, arguing that it is a breach of the agreement; and at the Ammanford Colliery men engaged in the Red Vein object to the working of double shifts where the company have considered it absolutely necessary, and therefore the owners came to the Board to ask that action should be taken in order to ensure continuance of work. In both cases the dispute was referred to a representative of each side for enquiry.

By the intervention of the Rev. Canon Lewis, of Ystradfordwg, the long-standing dispute at Gelli Colliery once again came under consideration. The two chairmen of the Board (Mr. F. L. Davis and Mr. W. Brace, M.P.) were appointed to discuss the circumstances with representatives of both the owners and the workmen.

The owners agree to deduct at the colliery offices the workmen's levy of 6d. per head in support of workmen out of employment in consequence of the Senghenydd explosion; but Mr. F. L. Davis, on behalf of the owners, whilst assenting to make the deduction on this occasion, said that consent was given upon the understanding that it was not to form a precedent. The workmen's representatives must arrange at each colliery with the men whether they will agree to the levy; and, if the men do agree, the workmen's committee must then make the request to the colliery company in each instance.

The local miners' council has decided to request the executive of the Federation to call a general conference of South Wales, in order to consider the two stoppages at Risca and Llanhilleth. It was further agreed that a levy of 6d. per week per member should be made in support of the workmen of Llanhilleth, and also to ask the Federation executive to take the necessary steps for a levy of 1s. per month throughout the coalfield for the same purpose.

In the course of a Chancery case concerning workings at Llangynwyd it was asserted that Miss Talbot (Margam) the owner of vast mineral estates in South Wales, had lost £90,000 during the past five or six years, but had continued operations because 600 workpeople were employed. The gradients were said to be very abnormal, and most of the coal raised consisted of small and slack.

The workmen and officials of the Penallta Colliery (Powell Duffryn Company) have presented Mr. Walter Jones with a gold watch, in token of their esteem; and Mrs. Jones with a silver kettle and tray. Mr. Jones has been promoted to the management of Llettyshenkin Colliery.

Rhondda Council was offered by the Cambrian Combine a supply of gas from the by-product plant, the price named being 7½d. per 1,000 ft. After consideration, the Council has asked for a lower quotation, but this is refused. The Council estimated that the capital expenditure involved in adapting the colliery supply for use in the district was so large that nothing would be gained if 7½d. per 1,000 were paid.

Between Mr. Frowen, organising secretary of the Colliery Examiners' Association, and Mr. Hartshorn, miners' agent, an interesting point of controversy has arisen, upon the subject dealt with in this column last week—the appointment of firemen. Mr. Hartshorn argues that, instead of being appointed by the employers, as at present, they should be appointed



by the workmen; but Mr. Frowen, whilst contending that a change is necessary, declares that "if the remedy is to be complete and effective, then the examiners must be free both from employers and workmen." Here he indicates State appointment; but Mr. Hartshorn retorts: "The main question is the right of the miner to exercise effective control over the conditions which govern the safety of his own life and limb. If the fireman fails through neglect, timidity, incompetence or toadyism, it is the miner's life that is imperilled. So the miner, and the miner alone, should decide who shall be the men in whose keeping he places his own life."

About 600 men have been thrown out of work by the stoppage at Bodringallt Colliery, in the Rhondda, owing to a subsidence in old workings, which has affected the upcast shaft. This was so serious that the original idea of repairing the upcast has been abandoned, and another shaft will be sunk in its place. In the meanwhile, work will be provided for the displaced men in other pits of the same company—Messrs. D. Davis and Sons.

It was stated at a meeting in Caerau of the Workers' Education Association, that although builders had been very busy in the Welsh coalfield during the past 10 years, the number of houses is at the present time at least 10,000 below the needs of increased population. Mr. Chappell, secretary of the South Wales Garden City and Town Planning Association, made an appeal to local authorities in the mining areas that they would undertake town planning schemes, so as to avoid mistakes of development, which he held to be largely responsible for the failure of private enterprise to build dwellings lettable at rentals which the wage-earners could afford to pay.

Speaking upon the question of baths at the pithead, he urged that these should be installed, if only for the sake of the women in coalmining districts. He declared that the worst sweated women in the country were miners' wives, and said that the adoption of pithead baths was essential in their interest.

The question of the enginemakers, stokers, &c., joining the Miners' Federation has been under consideration for a long time, and the voting taken a few weeks ago was not conclusive, because it did not afford the necessary three-fourths majority which the rule of the Enginemakers' Association requires. A new ballot was, therefore, ordered, and this was taken last week, with the result that 4,081 voted in favour, whilst 2,007 voted against. Therefore, although the majority in favour is 2,074—more than 2 to 1—it does not meet the requirements of the rules, and the executive has decided to take legal opinion as to whether a two-thirds majority is indispensably necessary.

A demand is being put forward that the workmen should have the right to prosecute for breaches of the Mines Act, the allegation being made that, because of the lack of such power, "many clauses of the amended Mines Act are already a dead letter."

There are 540 married men unemployed in consequence of the Senghenydd explosion, and 94 single men. The dependants number 721, and the fund now exceeds £102,000.

Workmen at Crumlin Navigation (new seam) have decided, according to the report made to the miners's executive, that they will stop work in order to enforce the new schedule of rates.

**Grimsby Coal Exports.**—The exports of coal from Grimsby during the week ended Friday, 14th inst., were shown by the official returns as follows:—Foreign: To Aarhus, 1,679 tons; Antwerp, 724; Copenhagen, 403; Dieppe, 993; Drammen, 692; Esbjerg, 311; Gefle, 1,700; Gothenburg, 1,546; Hamburg, 942; Hargshamn, 513; Hasle, 330; Helsingborg, 1,958; Hudiksvall, 1020; Karrabecksmünde, 592; Malmo, 595; Narvik, 3,281; Oxelosund, 1,712; Ronne, 329; Rotterdam, 691; Sodertelje, 1,347; Stockholm, 2,362; and Ystad, 2,429; total, 26,149 tons, as compared with 13,114 during the corresponding week last year. Coastal: To London, 99 tons; Southwold, 40; and Whitstable, 252; total, 391 tons as compared with 1,328 during the corresponding week last year.

**Housing in Mining Areas.**—At Caerau last week a lecture on "Garden Cities and the Housing Problem" was delivered under the auspices of the local branch of the Workers' Educational Association. The lecturer (Mr. Edgar L. Chappell) pointed out that, whereas in other coalfields in the United Kingdom the building activity during the last 10 years was ahead of the demands, in the Welsh coalfields builders had erected 10,000 fewer dwellings than were necessary to meet the needs of the increased population. In six counties only throughout the country was the average number of persons per inhabited dwelling less in 1911 than at the previous census, and five of these counties were in Wales. He urged that the local authorities in the mining areas should undertake town-planning schemes, and so prevent in the future the mistakes of development, which were largely responsible for the failure of private enterprise to build dwellings to let at rentals which the working classes could afford to pay. He also condemned a lack of recreative facilities in our mining villages, and urged an adoption by miners of the powers conferred upon them to commend the installation at pitheads of baths and changing houses.

## THE FREIGHT MARKET.

The outward freight markets have been moderately active during the past week, although less has been done from Welsh ports. On the north-east coast, coasting rates are based on about 3s. 3d. to London and 3s. 6d. to Hamburg, with Havre at 4s. 6d. The Bay is worth 5s. 1½d. to Bordeaux, whilst 6s. to Pillau is a typical Baltic rate. The Mediterranean has Genoa at the comparatively low figure of 8s. At South Wales Mediterranean rates are steady, and the shorter trades are receiving more attention. There is not much variation in quotations on the week. At the Clyde business is quiet, at easy figures. Homewards, there has been a good average amount of chartering. The Black Sea is dull, and the bulk of the demand is on Roumanian account. The Azof and Danube are quiet. Indian business is inactive on late figures. The Mediterranean and ore ports are steady. The Baltic is firm. American freights are weaker, and little is doing from the River Plate. Australian figures are steady.

Tyne to Algiers, 2,000, 7s. 6d., from Dunston, 1d. less if from Tyne Dock; Ancona, 6,000, 9s. 6d., two loading places; Antwerp, 1,500, 4s.; Boulogne, 1,200, 4s. 6d.; Bordeaux, 3,800, 5s. 1½d.; 3,300, 5s. 1½d.; Bayonne, 2,800, 5s. 6d.; Catania, 2,200, 9s., 300; 2,800, 8s. 3d.; Calais, 2,600, 4s. 3d.; Constantinople, 4,000, 9s. 9d.; Civita Vecchia, 2,900, 9s. 6d. coal, 13s. coke; Dartmouth, 1,600, 4s. 3d.; Genoa, 3,000, 8s. 3d. coal, 12s. 3d. half coke, from Dunston; contract, 7s. 6d., coals, April-October 1914; 5,200, 8s., river loading; 2,500, 8s.; Gibraltar, 1,700, 7s. 3d.; Havre, 2,000, 4s. 6d.; 1,800, 4s. 6d., from Dunston; Horsens, 1,500, 5s. 6d.; Hamburg, 2,200, 3s. 7½d.; 2,300, 3s. 9d., from Derwenthaugh; 2,600, 3s. 6d.; 3,200, 3s. 4½d.; 2,000, 3s. 6d.; Islands, 2,700, 8s.; Kherson, 4,000, 11s.; Libau, 1,500, 5s. 6d.; Las Palmas, 2,600, 8s., November; 2,200, 8s.; London, 1,300, 3s. 6d.; 1,800, 3s. 3d.; Marseilles, 3,200, 7s. 9d., 600, from Dunston; Naples, 2,600, 8s. 4½d., 700; 2,700, 8s. 7½d., 800; 3,000, 8s. 4½d.; Nantes, 1,800, 6s., 600, from Dunston; Newfairwater, 1,600, 5s. 9d.; Nykjøbing Falster, 1,200, 5s. 3d.; Oran, 3,000, 7s.; Piræus, 3,200, 8s. 6d.; Port Said, 6,300, 8s.; Portland, 1,600, 4s. 3d.; Pillau, 1,500, 6s.; Palermo, 1,800, 9s.; Rotterdam, 1,800, 3s. 6d.; Rochefort, 3,200, 5s. 9d.; Santander, 2,000, 7s.; Stettin, 2,900, 5s. 3d.; Stockholm, 1,600, 5s. 4½d.; 1,100, 8s. 3d., coke; Savona, 5,200, 8s., river loading; 3,000, 8s. 3d. coal, half coke 12s. 3d., from Dunston; San Francisco, sail, 22s., d.w., December-January; Trapani, 2,100, 8s. 9d., 300.

Cardiff to Alexandria, 3,500, 8s. 6d., November 24; Algiers, 4,400, 8½ fr., November 25; 3,200, 8½ fr.; Ancona, 4,600, 8s. 6d.; Barcelona, 1,600, 8s. 9d.; 4,000, 8s. 3d.; 3,200, 8s. 6d.; 3,000, 8s., early December; Bari, 3,600, 9s. 6d.; Bourgas, 4,700, 9s.; Bordeaux, 3,000, 6½ fr.; 3,600, 6½ fr.; Bilbao, 1,700, 6s.; Colombo, 5,000, 11s. 3d., early December; Charente, 1,800, 6½ fr.; Chantenay, 2,300, 6½ fr.; Dakar, 2,400, 8s. coal, 8s. 9d. fuel, December 1-15; Dieppe, 1,100, 5s.; dockyards, several vessels aggregating 10,000 tons, on the basis of 2s. 4½d. to Devonport; Genoa, 5,000, 7s. 9d.; 4,000, 7s. 9d.; 3,700, 8s.; 5,000, 7s. 9d., November 24; 5,400, 7s. 9d., November 26; 6,200, 7s. 7½d., November 25; 5,200, 7s. 6d., November 25; 8s. 1½d.; 4,700, 7s. 9d., November 24; 3,700, 7s. 9d., November; 3,100, 8s.; Islands, 3,200, 8s., November; Lisbon, 3,300, 5s. 9d.; 2,500, 5s. 9d.; 500, December 5; 1,900, 6s. 3d.; 400; 1,900, 6s. 1½d.; Libau, 2,200, 4s. 9d., 350, net terms; La Rochelle, 2,000, 6 fr.; Leghorn, 3,800, 7s. 2d.; La Pallice, 3,200, 5½ fr., with option; Monte Video, 4,700, 13s. 9d., November 24; Malta, 7s., November; Monte Video, Buenos Ayres or La Plata, 14s. 6d., option up river, 1s. extra one port, 1s. 6d. two ports; Marseilles, 2,800, 9½ fr. and 10½ fr.; 3,700, 9½ fr.; Malaga, 1,600, 7s. 6d.; Massowah, 5,000, 11s. 9d., November; Nantes, 1,400, 6½ fr.; 900, 6½ fr.; 3,600, 6 fr.; 2,300, 6½ fr.; Nice, 1,650, 9s. 6d. coal, 10s. 3d. fuel, December 1; Ortona, 2,500, 12s. 6d.; Oporto, 1,100, 8s.; Port Said, 5,000, 8s. 3d., November; 7,500, 8s., December 5; Pernambuco, sail, 17s.; Port Sudan, 6,000, 12s.; Palermo, 2,600, 9s.; Perim, 11s., early December; Piræus, 5,100, 8s. 3d., November 25; River Plate, 4,600, 14s. 6d.; 4,000, 14s. 6d.; 4,200, 14s. 6d., November 26; 3,200, 14s. 6d.; 6,000, 15s., December 5; 5,000, 15s.; Reval, 2,200, 4s. 9d.; Rouen, 2,000, 5s., November 24; 1,100, 5s. 6d.; Rio de Janeiro, 5,500, 14s. 6d., November 24; 4,500-4,700, 14s. 6d.; 4,700, 14s. 6d., December 1; Rosario, 4,000, 15s.; St. Michael's, 3,000, 7s. 9d., 250, early December; St. Malo, 1,250, 5s. 1½d.; Savona, 3,800, 7s. 9d.; 6,200, 7s. 7½d., November 25; 4,700, 7s. 9d.; 3,700, 7s. 9d., November; St. Servan, 1,800, 4s. 9d.; Syra, 5,100, 8s. 3d., November 25; Sveaborg, 2,200, 4s. 9d., 350, net terms; St. Nazaire, 1,050, 6½ fr.; Santa Liberata, 3,600, 8s. 9d.; Salonica, 3,200, 9s. 6d., November 27; Tarragona, 1,250, 6s. 6d., 75 c. tax, November; Taranto, 3,000, 9s. 4½d.; 4,500, 8s. 3d., 600, November 24; Valencia, 1,200, 7s. 9d., 300; 1,900, 7s. 6d.; 8s., 400, November; 4,700, 9s.; Varna, 4,700, 9s.; Venice, 4,600, 8s. 6d.; Zee, 5,100, 8s. 3d., November 25; Messina, 5,200, 6s. 1½d., net terms, December 1.

Port Talbot to St. Nazaire, 2,900, 6 fr.; Chantenay, 2,150, 6½ fr.

Swansea to Genoa, 3,300, 8s. 3d., November 26; 1,700, 8s. 9d.; 3,100, 8s.; 4,500, 8s. 1½d., November 25; 1,300, 9s. 3d. coal, 10s. fuel; Savona, 1,700, 8s. 9d.; 1,800, 9s. 3d. coal, 10s. fuel; 3,300, 8s. 3d.; Spezzia, 1,300, 9s. 3d. coal, 10s. fuel; Leghorn, 1,300, 9s. 3d. coal, 10s. fuel; Dieppe, 750, 5s. 3d.; Civita Vecchia, 2,800, 9s., 500; Ronen, 1,550, 5s. 6d.; Beyrout, 1,300, 10s.; Sebenico, 4,800, 9s. 8½d.; Tunis, 1,400, 12 fr.; Savona, 3,300, 8s. 3d., November 26; La Rochelle, 2,200, 6 fr.; Rochefort, 2,200, 6½ fr.; Calais, 1,800, 4s. 9d.; Havre, 600, 5s. 3d.; Jaffa, 12s. coal, 12s. 9d. fuel; Almeria, 2,400, 8s. 6d.; Melilla, 1,000, 14s. coal, 14s. 9d. fuel, November 22; Taranto, 3,000, 9s. 4½d.; Naples, 2,900, 8s. 3d. coal, 9s. fuel; Catania, 2,600, 8s. 9d. coal, 9s. 6d. fuel; Marseilles, 3,200, 9½ fr., early December.

Blyth to Helsingfors, 1,350, 5s. 9d.; Fredericia, 1,800, 5s. 3d.; Calais, 2,800, 4s. 3d.; Reval, 2,100, 5s. 10½d.; Trapani, 2,100, 8s. 9d., 300; Havre, 1,400, 4s. 6d.; Nykjøbing Falster, 1,300, 5s. 3d.

Wear to Helsingfors, 2,100, 6s.; Dieppe, 1,400, 4s. 4½d.; Bordeaux, 2,900, 5s. 1½d.; Bayonne, 2,800, 5s. 4d., 500; Rochefort, 3,200, 5s. 9d., 500.

Rotterdam to Valparaiso, 1,991 net, sail, 25s., coke; 26s., coke; 1,779 net, 25s., coke, December; Bordeaux, 2,900, 5s., steam coals, 5s. 9d., fuel; 4,200, 5s., steam coals, 5s. 9d., fuel; Adelaide, sail, 17s., superphosphates; Barcelona, 4,800, 8s. 6d.; 4,200, 8s. 6d.; Bagnoli-Porto Ferrajo, 4,500, 7s. 6d.; Honfleur, 1,500-2,000, 4s. 6d., November 24-29; St. Nazaire, 3,800, 4s. 10½d., steam coals, 5s. 10½d. fuel, November 24; 3,400, 4s. 9d.; Port Said, 4,500, 8s. 3d., November 24-25.

Hamburg to Jacksonville, 4,000, 11s., November. Hartlepool to Reval, 1,900, 5s. 9d.; Hamburg, 2,000, 3s. 6d. Burntisland to Rio de Janeiro, 15s., November. Mersey to Riga, 2,000, 5s. 3d. Fife port to Genoa, 2,200, 8s. 9d.; Malmo, 1,660, 5s. 6d.; Helsingfors, 1,400, 6s. 3d.; Riga, 2,000, 5s. 9d. Seaham Harbour to Pillau, 1,800, 5s. 9d.; Fredericia, 1,900, 5s. 4½d.

Methil to Rouen, 3,500, 5s. 6d.; Lubeck, 1,950, 5s. 6d.

Alloa to Sundsvall, 6s. 6d., November.

Newport to Lisbon, 2,700, 6s. 1½d.; Alexandria, 5,400, 8s., December 6; 5,000, 8s. 1½d., November 28; Genoa, 3,000, 7s. 9d., November 25; Almeria, 2,400, 7s. 6d.; Marseilles, 3,700, 9½ fr.

Hull to Swedish Sound port, 1,450, 5s. 3d.; 1,400, 5s. 4½d.; Riga, 2,650, 6s.; 2,300, 5s. 9d.; Reval, 2,000, 5s. 7½d.; Pernau, 1,200, 6s.; 6s. 3d., 48 hours; Cronstadt, contract over next season, 4s. 3d.; Dieppe, 4s. 4½d.; Gsfe, 2,000, 5s. 6d.; Sebastopol, 5,400, 9s. 6d., November; Novorossisk, 4,200, 9s. 6d.; Sebastopol, 5,000, 9s. 6d.

Forth to Genoa, 3,500, 8s.; Oran, 2,000, 6s.

Goole to Ostend, 900, 4s. 3d.

Tyne, Wear or Blyth to Civita Vecchia, contract, steamers of 4,500 to 5,000 tons over all next year, 8s. 6d. per ton, 500 delivery, 10d. discharge, coals.

Llanelly to Calais, 1,250, 5s.; Boulogne, 1,250, 5s.

Immingham to Pernau, 1,300, 5s. 9d.

Glasgow to Alexandria, 9s.; Genoa, 3,700, 7s. 9d., November; 2,500, 8s. 3d.; Savona, 8s. 3d.; 3,700, 7s. 9d., November; Leghorn, 2,500, 8s. 3d.; 3,700, 7s. 9d., November.

Grangemouth and Wear to River Plate, 4,000, 15s. 9d., December.

Bo'ness to Horsens, 1,200, 6s.

Newport River to Algiers, 2,600, 9½ fr., December 10, with option.

Homeward charters:—Narvik, 7,000, Northern States, 7s., December; Norfolk, Va., 2,539 net, La Plata, 15s., December; 17s., Campana; Gulf timber port, 750 stds. max., Buenos Ayres 12s., Santa Fe 12s. 6d., December; San Lorenzo, not above, 6,500, 10 per cent., U.K.-Cont., 14s. 6d. o.c., less 6d., less a further 6d. if picked port, January 15-February 15; 5,000, 10 per cent., 11s. 6d. o.c., less 6d., December 10-25; 4,500, 10 per cent., New York, 11s., no reduction direct, November; Batoum, 5,900, Baltimore, 15s., f.t., November-December; Sulina, Novorossisk or Theodosia, 20,000 qrs., 10 per cent., 400, 9s. n.c. or any, 9s. 6d. Hamburg, December 25-January 20; Barreiro, 1,650, Goole, 8s., mid-December; 2,300, Rotterdam, 6s. 9d., November; Santander, 1,650, Rotterdam, 5s., end November; 1,800, 5s. 4½d., November; New York, 20,000 qrs., 10 per cent., Avonmouth, Rotterdam, Leith, Hull or Tyne 2s., option c.f.o., 2s. 4½d., December 5-25; Hobart, 2,779 net, Colombo, 29s., January; Madras Coast, 2,777 net, Marseilles, 25s. 6d., less 5 per cent., January; Larmes, 4,600, Havre, 8s. 6d., 600-600, zinc ore, November; West Australia, sail, 30s. 6d., United Kingdom-Continent, February-March; time charter, Transatlantic trade, 5s., one trip, delivery Gulf, redelivery United Kingdom-Continent; 4s. 9d.; time charter, Eastern trade, 3s., one trip, delivery Hamburg, redelivery East; 3s. 3d., one trip, delivery Antwerp, redelivery Bombay or Kurrachee; Iquique, 24s. La Pallice, option 23s. 6d. Bordeaux; Kherson, Nicolaieff or Odessa, 2,500, 10 per cent.; 9s. 3d. n.c. or any, 9s. 9d. Hamburg, November 25-December 5; 2,531 net, Rotterdam, 7s. 6d., ppt.; Nicolaieff, Odessa, Novorossisk or Theodosia, 5,000-7,000, London or Rotterdam 8s. 3d., Antwerp, Hull or Weser 8s. 6d., Hamburg 8s. 9d., no reduction barley, February; Kustendje, 7,500, London, 9s. 9d. per ton oats, November 25-December 4; Nicolaieff, 7,200, Marseilles, 11½ fr., November-December; Portland, Me., 3,000, 10 per cent., Hull, 2s. 1½d., December-January; nitrate ports, 2,283 net, United Kingdom-Continent or United States, 24s., December; Anguar Island, 2,786 net, Fremantle, 14s., January-February; South Australia, 8,000, United Kingdom-Continent, 29s., December-January; Calcutta, 2,303 net, Bombay, Rs. 4-8, November; 4,066 net, Rs. 4-4, December; Japan, 2,820 net, Singapore, 4 dols., December; Aguilas, 3,400, St. Nazaire, 7s., end November; Bilbao, 2,400, Newport, 4s. 7½d., ppt.; 3,500, Rotterdam, 4s. 6d., ppt.; 4,000, 4s. 6d., ppt.; Melbourne or Geelong, sail, 39s., United Kingdom-Continent, option 24s. Cape; Concepcion Bay, sail, 23s. 9d., United Kingdom-Continent, March-April; time charter, States and West Indies, £812 10s., two years; 4s. 3d., one round trip, delivery and re-delivery north of Hatteras; Baltimore, 17,000 qrs., 10 per cent. Barry, 1s. 10½d., November-December; 25,000 qrs., 10 per cent., Avonmouth, 1s. 10½d., December; 25,000 qrs., 10 per cent., Cardiff, 1s. 10½d., December; 18,000 qrs., Avonmouth, Antwerp, Hull, Tyne or Leith, 1s. 10½d., December; 5,000, 10 per cent., Rio de Janeiro, 16s. 6d., coal, December; Vladivostok, 3,369 net, United Kingdom-Continent, 37s. 8d., December; Azof, 4,400, Marseilles, 13 fr., Marseilles, St. Louis or Cette (two ports), 13-50 fr., option Tarragona, Barcelona or Valencia, 14 fr. one port, 14-50 fr. two ports, November-December; Danube, 4,600, Rotterdam 9s. 6d., Antwerp 9s. 9d., Hamburg 10s., with 3d. less barley up to 2,000 tons, November-December; 5,000, Antwerp or Rotterdam 9s. 6d., Hamburg 10s., November-December; Sulina, 4,300, Rotterdam, 8s., option Danube loading 9s., ppt.; 5,000, Continent, 9s. 3d., December 5-20; 6,000, Rotterdam 7s. 7½d., Antwerp 7s. 10½d., option 1,000 tons oats 1s. 6d. extra, November-December; Huelva, 4,300, New York, Philadelphia or Baltimore, 9s. 9d., f.d., November; Puget Sound, sail, 60s., Payta; 85s., two ports United Kingdom; North Pacific, sail, 47s. 6d., West Coast South America; Fremantle, sail, 30s. 6d., United Kingdom-Continent, option Geraldton loading 31s. 6d., or South African discharge 26s. 6d., February-March; time charter, States and West Coast South America, 4s., one round trip, delivery New York, re-delivery States; Odessa or Novorossisk, 6,500, Rotterdam 7s. 9d., Hamburg 8s. 3d., with 3d. less barley, December 1-15; La Falaie, 4,500, Barrow, 7s. 9d.; December 8; West Australia, 5,800, United Kingdom-Continent, 28s. 9d. one port, 29s. two ports loading, less 6d. direct, with options, January-February; Bombay, 2,883 net, Antwerp and Hamburg, 16s. for 4,200 tons, on d.w., early December; Kurrachee, 4,800, Antwerp, 13s. 6d., with 3,000 tons light guaranteed, early December; Burmah, 2,257 net, United Kingdom-Continent, 22s. 6d. o.c., 22s. Holland, February; Philadelphia, 25,000 qrs., 10 per cent., Avonmouth, Barry or Rotterdam, 1s. 10½d., December; Bixarta, 5,800, Philadelphia, 8s., American full terms, November; South Australia, sail, about 28s. 9d., United Kingdom-Continent, charterers paying extra insurance, February-March; 31s. 6d., February-March.



## COAL, IRON AND ENGINEERING COMPANIES.

**Anglo-Westphalian (Chislet, Kent) Colliery Limited.**—The above company have issued particulars, for public information only. The chairman is Mr. Joseph Shaw, chairman of the Powell-Duffryn Steam Coal Company. The capital is £230,000, of which £168,000 is to be immediately issued. Of this £120,000 is to be subscribed for in cash in consideration of an allotment of £12,000 shares. The purchase price for the leases of the 2,400 acres of coal lands to be acquired is stated to be £36,000, to be satisfied in shares. The property lies about 3 miles east of Canterbury, and has been favourably reported on by Mr. E. M. Hann, general manager of the Powell-Duffryn Company.

**Bengal Coal Company Limited.**—The profits for the half-year ended October 31, including the amount brought forward, amount to Rs. 13,50,000. It is proposed to pay a dividend at the rate of 50 per cent., and to set aside Rs. 4,45,000 for depreciation and mines development.

**Blake Boiler, Wagon and Engineering Company Limited.**—At an extraordinary general meeting of the shareholders it was decided that the capital be further increased from £60,000 to £105,000. The new capital is to be divided into 30,000 6 per cent. cumulative preference shares and 15,000 ordinary shares, all of £1 each. It was also resolved that the company might, if necessary, borrow £10,000, in addition to the £30,000 already authorised.

**Cargo Fleet Iron Company Limited.**—The report for the year to September 30 last states that the balance brought forward, after writing off for depreciation £50,000, is £4,065, which, with the profits for the 12 months ended September 30, 1913, amounting to £124,219, makes £128,284. Debenture and other interest absorbed £46,051, leaving a disposable balance of £82,232. The directors propose that £60,000 be placed to depreciation and the balance of £22,232 carried forward. The extensions of plant referred to in last year's report are nearing completion. During the year 4½ per cent. first mortgage debentures to the value of £11,100 have been cancelled, in accordance with the provisions of the trust deed, thereby completing the annual redemption for 1913, and anticipating to the extent of £5,900 the annual redemption for 1914.

**Chinese Engineering and Mining Company Limited.**—At the first annual general meeting, to be held early in December, a final dividend of 4½ per cent. (making 8 per cent. for the year) will be proposed.

**Coledale Syndicate Limited.**—This private company has been registered, with a capital of £2,000 in 1s. shares, to search for and prepare for market tin, ore, coal, copper, iron and other mineral substances, and to carry on the business of metal brokers, ironmasters, steelmakers and converters, colliery proprietors, miners, smelters and engineers, &c. Signatories, Cecil E. Currie and E. Berry. Registered office, Lawrence-lane, Cheapside, E.C.

**Cory (William) and Son Limited.**—An interim dividend of 4 per cent. has been declared.

**Cumberland Waste Heat Owners Company Limited.**—This private company has been registered, with a capital of £50,000 in £1 shares, to carry on the business of manufacturers and suppliers of electrical energy, repairers and dealers in electrical and waste heat plant, &c. First directors include Charles S. Hunting, 13, Milburn House, Newcastle-on-Tyne.

**Dominion Steel Corporation Limited.**—This company has invited subscriptions for an issue of £700,000 five-year 6 per cent. secured notes, due December 1, 1918, part of a total authorised issue of £1,000,000. The corporation, which is incorporated under the laws of the Province of Nova Scotia, has an issued capital of 36,897,700 dols. (£7,581,500) ordinary shares, and 7,000,000 dols. (£1,438,350) 6 per cent. cumulative preference shares. The notes will be to bearer in denominations of £200 and £100, may be registered as to principal only, and will bear half-yearly coupons for interest payable on June 1 and December 1, free of all Canadian taxes. The notes will be a direct obligation, both as regards principal and interest.

**Dorman, Long and Co. Limited.**—The directors, in their annual report for the year ending September 30, 1913, state that there was a profit of £257,862 14s. 8d.; balance brought forward from last year, £77,117 9s. 6d., making £334,980 4s. 2d., which it is proposed should be applied as follows: Interest on debenture stock for year to September 30, 1913, first debenture stock, £16,000; second debenture stock, £11,190; interim dividend of 2½ per cent. paid June 10, 1913, £31,489 17s.; final dividend for the year of 6 per cent., payable December 17, 1913, £75,575 12s. 10d.; directors' fees for year to September 30, 1913, £3,000; writing off for depreciation, £60,000; carried to 6 per cent. debenture stock redemption account, £30,000; balance carried forward, £107,724 14s. 4d. The capital expenditure for the year, amounting to £37,063, consisted chiefly in the erection of an additional steel furnace at the Britannia Works. The balance of the call on the ordinary shares of Bell Brothers Limited, amounting to £30,000, has been paid by the company. The money is being used in important developments at Clarence and the collieries. The sum of £8,500 has been devoted to the purchase of second debenture stock, and the balance of £2,000 has been handed to the trustees of this stock, thus making the total of £10,500 required, to be set aside each year. The directors have availed themselves of an opportunity of taking an interest in the Channel Collieries Trust Limited, who hold extensive mineral rights in the county of Kent.

**East Kent Colliery Company Limited.**—The directors have issued a circular stating that in September last it was resolved to create £200,000 of first mortgage debentures carrying interest at the rate of 10 per cent. per annum until December 31, 1914, but otherwise reducible to 7½ per cent. upon a certificate by the company's auditors that for a period of six months preceding the date of such certificate the working profits of the colliery, after providing for interest and all outgoings, were sufficient to provide the preferential dividend of 10 per cent. per annum upon the ordinary shares. The debentures are redeemable by 1925 by 10 annual drawings of equal amount. The object of the board in creating these debentures was to provide funds in part (1) to complete the permanent equipment of the colliery, and (2) to enable it to be worked at a profit; (2) to provide funds to be used in the purchase of land and buildings at Kent, and (3) to repay advances by the company to the Kent Coal and Financial Company and other companies. In September £61,440 of these debentures

were privately subscribed by shareholders and duly allotted. Out of the proceeds the bank loan of £50,000 has been discharged. The balance of the debentures, £88,560, are now offered at 97 per cent. The output has been raised to upwards of 300 tons per diem.

**Edford Colliery Company Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to acquire the business now carried on by H. James Ridler at Holcombe, Somerset, under the style of the Edford Colliery Company, and to carry on the business of colliery proprietors and patent fuel manufacturers; also to enter into an agreement with Howard James Ridler, of Flint House, Holcombe, who is one of the first directors. Qualification, £100.

**Hunt and Mitton Limited.**—This private company has been registered, with a capital of £25,000 in £1 shares (10,000 preference) to acquire the business now carried on by Thomas E. Mitton and E. J. Mitton at Oozells-street North, Birmingham, under the style of Hunt and Mitton, and to carry on the business of engineers, brassfounders, gun-metal casters and copper-smiths, &c.; also to enter into an agreement with T. E. Mitton and E. J. Mitton, who are the first directors, both residing at 13-19, Oozells-street North, Birmingham.

**Midland Iron Company Limited.**—The profit for the year, after providing for debenture stock interest and all other charges, is £4,090 3s. 8d., to which is added the balance brought forward, £635 8s. 2d., making an available total of £4,725 11s. 10d. This, it is recommended, should be appropriated as follows:—Interim dividend on preference shares at the rate of 5 per cent., paid in May, £625; final dividend on preference shares at 5 per cent. per annum, £625; dividend on ordinary shares at 5 per cent. for the year, £1,250; depreciation of plant, £1,581 3s. 10d.; balance carried forward, £644 8s.

**Millom and Askam Hematite Iron Company Limited.**—The report covering the year ended September 30, 1913, states that, including £10,161 brought forward from the previous year, and after paying preference dividend to March 31, 1913, and interim ordinary dividend (and after providing £7,500 for the year's debenture interest), there is a balance at credit of profit and loss account of £77,907. From this sum the directors have written off £25,000 for depreciation, and transferred £25,000 to reserve (raising this to £50,000), and they recommend the payment of a half-year's preference dividend to September 30, 1913, and of 7 per cent. on the ordinary shares, making, with 5 per cent. interim dividend, 12 per cent. for the year, carrying forward £12,157. The boring operations at Ullbank, Cumberland, have again proceeded systematically throughout the year, and continue, much of the royalty leased to the company being still unproved. In addition to the ore discovered by five bores in previous years, ore has since been proved in five additional bores during the financial year just closed. Arrangements are now made for sinking one shaft to a depth of about 1,000 ft. fully equipped with modern plant capable of handling a large annual tonnage on economical lines. It is probable a second shaft will be required, and, if so, the outlay originally contemplated will be practically doubled. During the year an adjoining royalty has been acquired, giving the company direct access to the main railway.

**Morgans Patent Royalties Limited.**—This private company has been registered, with a capital of £1,100 in £1 shares, to acquire and carry on the business of manufacturers of and dealers in the Keystone patent steel split pulleys, subject for the sole manufacture and sale of the same in the United Kingdom granted by John Henry Morgan to the Skerme Works Limited, for the term of duration of the patent relating to such pulleys, which is numbered 28408/1909, and to acquire the joint interest in a certain patent, No. 6409/1911, and to carry on the business of metal workers, iron, steel and brass founders and engineers, &c.; also to enter into an agreement with John Henry Morgan, who is the first director. Qualification, £50. Registered office, 28, James-street, Harrogate, Yorks.

**Morton Gibson Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of ironfounders, mechanical engineers, and suppliers of electricity, &c. First director, Leslie Edward Brown, 26, East Parade, Leeds. Qualification, £25.

**North-Eastern Steel Company Limited.**—The annual report shows a profit for the year ending September 30 of £72,338, which with the balance brought forward makes a total of £76,380. After deductions for interim dividend, interest paid on debenture stock, redemption of second debentures, directors' fees, &c., a disposable balance remains of £49,342. Payment is recommended of a 6 per cent. dividend, free of tax, £15,000 for depreciation, and £10,342 carried forward.

**North Wylam Colliery Company Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of colliery proprietors, ironmasters, steelmakers and converters, miners, smelters, engineers and ironfounders, &c. Signatories include George F. Mounsey, Denecroft, Newcastle-on-Tyne.

**Porhydrometer Company Limited.**—At an extraordinary general meeting on Friday a resolution was submitted for winding up the company voluntarily, and was carried with some dissentients. Mr. J. C. Gardner, of Messrs. Chalmers, Wade and Co., chartered accountants, was appointed liquidator.

**Portobello Colliery Company Limited.**—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of colliery proprietors, miners, smelters, steelmasters and converters and engineers, &c. Registered office, High-street, Portobello, Willenhall, Staffs.

**Rochester Engineering Company Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of ironfounders, mechanical engineers, &c., and to acquire the business now carried on at Wickham, Kent, under the style of the Rochester Engineering Company; also to enter into an agreement with S. Rosenfield. First directors, W. Todhunter, Hans Illner and S. Rosenfield. Registered office, Wickham, Rochester, Kent.

**Shotts Iron Company Limited.**—The report for the year to September 30 last states that the balance brought forward was £23,075, and the sum at credit of profit and loss account for the current year, after deduction of usual depreciation,

a sum to reserve and the interim half-yearly dividend of 2½ per cent. paid on the preference shares, is £28,593, together £51,668. The directors recommend a dividend on the ordinary shares at the rate of 6s. per share, less tax, carrying forward £27,758.

**South Durham Steel and Iron Company Limited.**—The profit for 12 months ending September 30 last amounts to £302,955 8s. 4d.; add the balance brought forward from the previous year, £22,898 13s.; making a total of £325,854 1s. 4d.; deduct interest on debenture stock to September 30, £13,500; dividend on 6 per cent. cumulative preference shares paid to June 30, £13,500; first interim dividend of 2s. per share on 350,000 ordinary shares, paid March 31, £35,000; second interim dividend of 2s. per share on 350,000 ordinary shares, paid August 30, £35,000; income-tax, £4,155 3s. 4d.; directors' fees, £1,250; trustees for debenture stockholders' remuneration, £315; depreciation, £100,000; leaving a balance of £123,133 18s., which the directors recommend should be appropriated as follows: Further dividend on 350,000 ordinary shares to September 30, 1913, of 1s. per share, payable November 26, 1913, making 25 per cent. for the year, £17,500; provision for dividend on 6 per cent. cumulative preference shares accrued to September 30, 1913, £4,500; reserve account, £75,000; leaving to be carried forward, £26,133 18s.

**Stanton Ironworks Company Limited.**—The directors have declared an interim dividend of 7½ per cent., free of tax, payable on December 10.

**Sunturbo Engineering Company Limited.**—This company has been registered, with a capital of £220,000 in £1 shares, to acquire that portion of the business now carried on by the Sun Patent Evaporator Company Limited at Tower-buildings, Water-street, Liverpool, and also the business formerly carried on by Peter Pilkington Limited, Bamber Bridge, Lancashire, and to carry on the business of engineers, metal workers, founders, and electricians, &c.; also to enter into agreements with the Sun Patent Evaporator Company Limited and Peter Pilkington Limited. Registered office, 79, Queen-street, E.C.

**Treorky Colliery Company Limited.**—This private company has been registered, with a capital of £4,000 in £10 shares, to acquire the business of colliery proprietors, now carried on by W. Jones, N. Thomas Williams, Thomas Hopkins and John Davies at the Treorky collieries, Treorky, Glam., under the style of "The Treorky Colliery Company"; and to carry on the business of coal merchants, manufacturers of and dealers in iron and steel, &c. First directors include Noah Thomas Williams, Mining Department University, Manchester, and John Davies, 89, Regent-street, Treorky.

**Vulcan Motor and Engineering Company Limited.**—The directors recommend a 5 per cent. dividend, free of tax, on the ordinary shares, making 10 per cent. for the past year.

**Wankie Colliery Company Limited.**—The report for the year ended August 31 last states that the company has paid off as at December 31, 1912, £15,000 of the 6 per cent. first mortgage debentures, under the provisions of the trust deed, and a further £5,000 will be paid off on December 31 next, thus reducing the debenture debt to £40,000. The accounts show that the operations for the period under review, after writing off depreciation, have resulted in a profit of £36,944. The directors recommend a dividend for the year of 17½ per cent., less income-tax. An instalment of 7½ per cent. on account of this dividend was paid on March 29, and the final instalment of 10 per cent. on November 19. The payment of the dividend absorbed £35,458, leaving £16,512 to be carried forward, from which has to be deducted £834 for the directors' additional remuneration. The coal sales for the year amounted to 170,326 tons. The sales were considerably affected during the months October 1912 to January 1913 by the severe drought, which restricted business generally throughout Rhodesia. The bench of beehive coke ovens referred to in the last report was completed in November 1912, since which date it has been in constant commission, the coke sales to the end of the financial year amounting to 19,853 tons. The erection of a coal-washing plant to deal with the whole of the small coal at present produced was completed in February last. Orders have been placed for a duplicate electric generating set and additional coal-washing plant.

**Welgedacht Exploration Company Limited.**—The report for the year ended June 30 states that the active development of the company's colliery was continued throughout the year. The South African agents report that there is already a proved area of 96 acres estimated to contain 666,000 tons of marketable coal, sufficient to maintain for over five years the company's present output. The total coal sales for the year under review amounted to 108,270 tons, realising with sundry items incidental to this section £29,434, or 5s. 5½d. per ton. The cost of working and handling this output amounted to £23,832, or 4s. 4½d. per ton. The coal section thus shows a working profit of £5,602, or 1s. 0½d. per ton. The average output per month for the financial year was 9,023 tons. Although considerably interrupted by the strike of miners in the goldmines, the average monthly output for the four months ended October 31 last amounted to 9,722 tons. An agreement has been entered into with the Rand Water Board for the purchase of the water pumped from the shaft.

Notice is given in the *London Gazette* that at the expiration of three months the names of the undermentioned companies will, unless cause is shown to the contrary, be struck off the register and the companies be dissolved:—Derbyshire Minerals Limited, St. Roch Slate Quarries Financial Syndicate Limited, and Standard Oil Company of Scotland Limited.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, November 11, 1913, is as follows:—Alexandria, 2,751 tons; Antwerp, 736; Amsterdam, 1,072; Abo, 1,011; Bordeaux, 1,815; Bremen, 1,826; Christiania, 2,562; Constantinople, 3,315; Copenhagen, 2,225; Drontheim, 132; Ghent, 299; Harlingen, 1,120; Hamburg, 7,003; Helsingfors, 1,049; Leghorn, 1,024; Lihau, 796; Landsrona, 2,034; Oxelesund, 5,730; Oporto, 1,520; Rouen, 4,463; Rotterdam, 791; Reval, 2,368; Riga, 12,564; Stockholm, 2,128; Stettin, 2,249; Skiën, 593; Svanehoe, 1,416; Thorshavn, 19; Trelleborg, 1,270; Wyk, 196; total, 66,077 tons. Corresponding period November 1912, total, 82,825 tons.



# CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

HAMPSTEAD, NOVEMBER 25.—The Borough Council invite tenders for the supply of 10,000 tons of Midland counties small nuts or peas to be delivered at the electricity works, Lithos-road, Finchley-road, N.W., for 12 months from April 1 next. Specification, tender and full particulars can be had of the chief electrical engineer and manager at the works. Tenders to be sent in to me by 9 a.m. on Tuesday, November 25, the prices quoted to hold good for seven days. By order, Arthur P. Johnson, town clerk, Town Hall, Haverstock Hill.

## Abstracts of Contracts Open.

ALEXANDRIA (EGYPT), DECEMBER 1.—Tenders are invited for the supply of 4,000 tons of Cardiff coal and 40 tons of Newcastle coal, 180 tons of petroleum, and 7 tons of benzine, required by the Egyptian Coast Guard Administration during the year 1914. Forms from the Director of Stores, Coast Guard Administration, Alexandria.

BALDERTON, NOVEMBER 26.—About 60 tons of good quality coal to the Balderton Charities Trustees. Tenders to Mr. W. Holmes, clerk.

BEVERLEY, NOVEMBER 24.—Coal, for the Corporation. Particulars obtainable from Mr. J. Willis Mills, clerk to the Local Education Authority, 31, Lairgate, Beverley.

CARDIGAN, NOVEMBER 28.—Best Staffordshire screened coal (cobble size), to the County School, for the Governors. Tenders must be sent to Mr. Ivor Evans, clerk to the Governors, 3, Green-street, Cardigan.

CHESTER, NOVEMBER 25.—Slack, for the directors of the Chester Waterworks Company. Tenders to Mr. Wm. S. Moss, secretary, 15, Newgate-street, Chester.

GAYTON, DECEMBER 17.—About 35 tons of good house coal, for the Gayton Fuel Allotment. Tenders to Mr. Robt. J. Cullum, of Gayton.

HULL, NOVEMBER 24.—Steam coal, for the Sculcoates Guardians. Forms from Mr. J. H. Wild, clerk to the Guardians, Harley-street, Hull.

KILLARNEY, DECEMBER 6.—About 400 tons of best house coal, for the Guardians. Tenders, chairman, Mr. P. Carey, clerk of Union, Boardroom, Workhouse, Killarney.

KINGSTON-UPON-THAMES, DECEMBER 1.—Coal and coke, for the Surrey Standing Joint Committee. Forms from the County Hall.

LA ROCHELLE (FRANCE).—Coal, anthracite, and hrickettes for dredger service. Préfecture de la Charante-Inférieure. Deposit required, £20.

LONG LAWFORD, NOVEMBER 28.—About 30 tons of good house coal (named), for the trustees of the United Charities of Sir Edward Boughton and others, Long Lawford, to the various cottages in the parish of Long Lawford. Tenders to Mr. Edwin Wright, clerk to the trustees.

NENAGH, NOVEMBER 27.—About 50 tons of best double-screened Scotch coal, for the Guardians. Tenders to Mr. H. J. Sheehan, clerk of Union.

RAINHILL (LANCS.), NOVEMBER 24.—Slack for the Lancashire Asylums Board. Forms from Mr. J. Gornall, clerk and steward, Rainhill.

RUGBY, NOVEMBER 24.—About 150 tons of Whitwick Deep coal, for the rector and churchwardens. Tenders to Mr. W. T. Simmonds, Elborow House, Rugby.

WALLASEY (CHESHIRE), NOVEMBER 25.—About 1,500 tons of freshly-wrought, double-screened hard steam coal, for the Ferries Department of the Corporation. Forms at the manager's office, Seacombe Ferry.

The date given is the latest upon which tenders can be received.

# CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ABERDEEN, NOVEMBER 24-27.—Stores.—For the supply of stores, for the Great North of Scotland Railway Company.

ANTWERP, JANUARY 26.—Cranes.—Tenders are invited by the Municipal authorities of the above city for six electric cranes for the Basin-Canal extension.\*

BEMBRIDGE (ISLE OF WIGHT), NOVEMBER 26.—Water-works.—For pumping, &c., at the Bembridge Waterworks, for the Isle of Wight Rural District Council. Specification on application to Mr. H. Eldridge Stratton, clerk to the Council, Rural District Council Offices, 80, Pyle-street, Newport, Isle of Wight.

CAIRO (EGYPT), NOVEMBER 30.—Steel Bridges.—Tenders are invited for the supply, and erection on abutments already constructed, of 20 foot bridges and 14 road bridges in steel for the Central Gharbia Drainage Projects. Specifications from the resident engineer, Central Gharbia Drainage Projects, 3, Shari Soliman Pasha, Cairo.

CHRISTIANIA (NORWAY), NOVEMBER 28.—Steel Rails, &c.—Tenders are invited by the Norwegian State Railway authorities for the supply of about 17,976 tons of steel rails and fishplates and about 2,473 tons of bedplates. Sealed tenders marked "Anbud paa Skinner m.v." will be received at "Hovedstyrets Kontor for Baneanliggende, Statshærne," Christiania.\*

CHRISTIANIA (NORWAY), DECEMBER 15.—Coal Discharging Machinery.—Tenders are invited by the Norwegian Main Railway for the supply of two coal-discharging machines, each capable of discharging at least 50 tons per hour.\*

DURBAN (SOUTH AFRICA), JANUARY 7.—Gas Electric Plant.—Gas electric plant for that town. Specification obtained at the office of the borough electrical engineer, Municipal-buildings, Durban, on deposit of £1 ls. (returnable).

EPSOM, NOVEMBER 24.—Pipes.—About 800 12 ft. cast iron water pipes and specials, 15 in. in diameter, for the Epsom Urban District Council, according to specification of Mr. W. V. Graham, M.I.C.E., 5, Queen Anne's-gate, Westminster.

EPSOM (SURREY), NOVEMBER 24.—Pumping Plant.—Pumping plant at the waterworks in East-street to raise water from the well 80 ft. deep and deliver it to the reservoir on the Downs against a combined head of about

350 ft., for the Urban District Council. Specifications from Mr. W. Vaux Graham, M.I.C.E., 5, Queen Anne's-gate, Westminster.

GOSPORT, DECEMBER 2.—Steel Main.—A new steel steam main, including necessary valves, &c., at the air-compressing station, Westfield, Gosport, for the Gosport and Alverstoke Urban District Council. Specification on receipt of a cheque for £1 ls. (returnable), from Mr. H. Frost, engineer and surveyor to the Council, Gosport.

GLEN (ORANGE FREE STATE, SOUTH AFRICA), JANUARY 7.—Pumping Plant.—Complete pumping plant required in connection with the irrigation scheme at Glen, Orange Free State.\*

HASTINGS (NEW ZEALAND), DECEMBER 18.—Turbo Pumps, &c.—Tenders are invited by the Hastings Borough Council for the supply and erection of two sets of high-lift turbo pumps and electro motors, together with suction and delivery piping, &c. Specification, &c., may be obtained on payment of £2 2s. (returnable), from the Town Clerk, Hastings, New Zealand.\*

JOHANNESBURG (SOUTH AFRICA), DECEMBER 16.—Steel Rails, &c.—Tenders are invited by the South African Railways Administration for the supply of (1) 8,600 tons of 60 lb. steel rails and 531 tons of fishplates for same, and 31,700 tons of 80 lb. steel rails and 1,810 tons of fishplates for same; and (2) 400 tons of 60 lb. chairplates and 5,183 tons of 80 lb. chairplates.\*

LATCHINGDON (ESSEX), NOVEMBER 25.—Reservoir.—For (1) concrete reservoir to hold 10,000 gallons, small engine shed and foundations for overhead tank; (2) small combined oil engine and pump; (3) overhead tank to hold 10,000 gallons, on steel staging, for the Maldon Rural District Council (Purleigh District Water Supply). Specification obtained at the office of Mr. Almond, council surveyor, 6, Market-hill, Maldon.

LONDON, NOVEMBER 26.—Pig Iron, &c.—Grey hæmatite pig iron, materials for steel foundry (aluminium, black-lead, anthracite coal, ferro-manganese, ferro-silicon, ganister, and silica sand), for the East Indian Railway Company, as per specifications to be seen at the company's offices, Nicholas-lane, E.C.

LONDON, NOVEMBER 26.—Turbo-alternator.—A 2,500 kw. turbo-alternator with condensing plant, for the Fulham Borough Council. Specification can be obtained from Mr. A. J. Fuller, borough electrical engineer, Townmead-road, Fulham, S.W.

MANCHESTER, NOVEMBER 28.—Boilers, &c.—Two water-tube boilers and superheaters, economisers, coal chutes, ash conveyor, pipe connections, additional stoker shafting and clutches, and pneumatic ash handling plant, for the electricity committee of the Corporation. Specification from Mr. F. E. Hughes, secretary, Electricity Department, Town Hall, Manchester, on payment of two guineas (returnable).

MELBOURNE (AUSTRALIA), JANUARY 7.—Steel Bars, &c.—Tenders are invited by the Victorian Railways Commissioners for the supply of the following:—(1) 150 steel channel bars for engines; (2) 45 copper plates for engines; (3) seamless copper tubes for engines; (4) 10,000 porous pots for batteries; (5) 180 steel boiler plates for engines; (6) 60 Yorkshire iron angles for engine boilers; (7) 17 tons of copper rod for engines; (8) 3,960 brass locomotive boiler tubes; and (9) 237 cast steel wheel centres for engines and tenders. Specifications from the secretary, Victorian Railways Offices, Spencer-street, Melbourne.\*

OUGHTERARD (IRELAND), NOVEMBER 30.—Wells.—For the sinking of 23 new wells, and deepening, enclosing and improving 21 existing wells, for the District Council. Tenders to Mr. P. A. Joyce, clerk to the Council, board room, Oughterard, Galway.

PONTEFRAC.—Well Sinking.—Sinking of a surface water well at the liquorice refinery, Skinner-lane, Pontefract. Particulars from W. Wrigley, King-street, Wakefield.

PRETORIA (SOUTH AFRICA), JANUARY 7.—Pumping Plant.—Tenders are invited by the Union Tender Board for the supply and erection of a pumping plant at Glen, Orange Free State. Specifications obtainable from the Director of Irrigation, P.O. Box 399, Pretoria, on deposit of the sum of £2 (returnable).

RICHMOND AND TWICKENHAM, DECEMBER 5.—Tunnel and Water Mains.—For the construction of a tunnel under the Thames, together with the necessary shafts and other auxiliary works, and the supplying, laying and fixing of mains at Richmond and Twickenham, for the Metropolitan Water Board. Specification, &c., can be inspected at the offices of the Board (Chief Engineer's Department), Savoy Court, Strand, W.C.

SHEFFIELD, DECEMBER 2.—Retort Fittings, &c.—Hydraulic mains, ascension pipes, cast iron floor plates, &c.; also 250 mouthpieces, 24 in. by 16 in., Q shape, both for the Grimesthorpe Works, for the Sheffield United Gaslight Company. Specifications upon application to the engineer, Mr. J. W. Morrison, M.I.C.E., Commercial-street, Sheffield.

STOCKHOLM (SWEDEN), NOVEMBER 22.—Tenders are invited by the Swedish State Railways for the supply of 100,000 tons of locomotive coal.\*

SYDNEY (AUSTRALIA), DECEMBER 15.—Pumping Machinery.—Tenders are invited by the Sydney Water Supply and Sewerage Board for the manufacture, supply, and delivery of a complete set of turbine-driven centrifugal pumping machinery. Specifications from the President, Metropolitan Board of Water Supply and Sewerage, 341, Pitt-street, Sydney, N.S.W.\*

WORKINGTON.—Shaft Sinking.—For sinking present shaft at Moorhouse Guards. Particulars obtainable from Mr. G. Kennedy, Seaton Fire Brick and Ganister Company, Workington, Cumb.

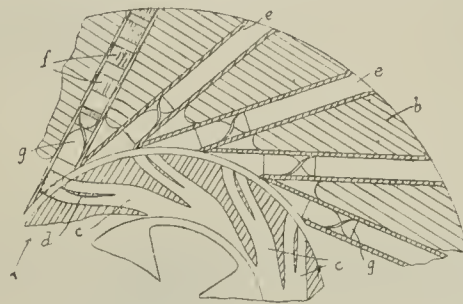
YORK, NOVEMBER 25.—Bar Iron, &c.—For the directors of the North-Eastern Railway Company, quantities of bar iron, iron and steel plates, &c. Forms from Mr. E. H. Clark, stores superintendent, Gateshead-on-Tyne.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

The chairman of the Board of Inland Revenue has agreed to receive a deputation from the Income-tax Committee of the Association of Chambers of Commerce of the United Kingdom on the subject of income-tax allowances.

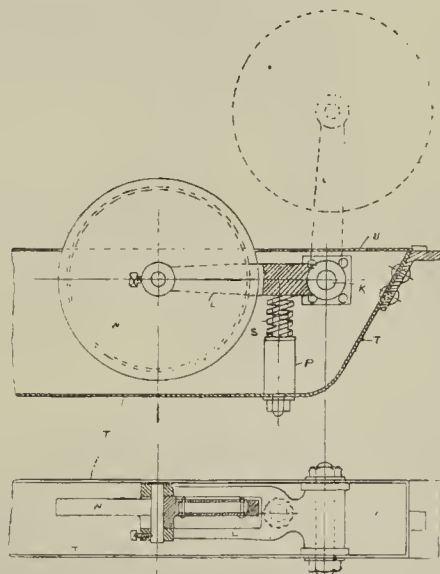
# ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

2373 (1913).—Improvements relating to Centrifugal Pumps or Compressors. R. A. Hayes, of 54, Wheelley's-road, Edgbaston, Birmingham.—Relates to centrifugal pumps or compressors adapted to compress air and gases by means of water or other liquids. The invention consists in the application to apparatus of the type wherein the compression of the gas takes place in channels in a stationary member of means for imparting a movement of rotation to the liquid in said channels, the means in question being substantially the same as the means employed according to Patent Specification No. 17538 of 1912 for imparting the rotary movement to the plugs in the type of apparatus having the



channels in a rotating member. When channels of spiral form or provided with spiral guide surfaces are employed, it is made possible to employ channels of larger size and of comparatively constant sectional area in the stationary member, while securing effective compression; the apparatus is thus made capable of working more economically than hitherto. The accompanying drawing gives a sectional view showing a portion of an apparatus of the general type described in the specification of Patent No. 14439 of 1907, modified in conformity with the present invention. (Three claims.)

2733 (1913). Improvements in Apparatus for Automatically Lubricating the Axle Bearings of Corves and the like. J. Hailwood, of The Bungalow, Pollitt-street, Barnsley, Yorkshire.—A lubricating or grease-carrying wheel (which is free to revolve on a pin which is carried by one end of an iron or steel forked lever) is suspended in a bath of oil or grease, the other end of said lever being fixed on or carried by a suitable pin, which is also fixed in or carried by suitable bearings in the sides of an iron or steel plated box or trough which forms the oil or grease bath. The forked lever rests upon and is supported by a suitable spiral or coil spring, which is placed in a vertical position at a short distance from the fixed end of the forked lever. The coil spring rests on and is carried by an iron or steel pillar, which is reduced in diameter at the top end to fit the inside of the coil spring and to project a distance up the inside of the spring to act as a free support for the spring. And in order to regulate or vary the level of the lubricating wheel to suit different diameters of corf wheels, one or more iron washers may be placed under the bottom end of said coil spring where it rests upon said pillar. The bottom end of said pillar is secured to the bottom plate of the grease box. The lubricating wheel is made in the form of a hollow iron or steel disc having the sides flush with the outer rim of



the wheel. The boss, one side, and the rim being by preference cast in one piece, and a thin iron or steel disc is riveted on the other side. The rim of the said lubricating wheel may be made either plain or slightly corrugated. The grease box or trough is by preference made of thin steel or iron plates with welded joints, and is supported or carried by suitable brackets riveted on each end, which rest on, and are fastened to the road sleepers. The grease box is also provided with a loose iron or steel plate cover in which an opening is provided to allow the lubricating wheel to project out of the grease box to a suitable height for lubricating the corf axles as they pass over the wheel. The cover is flanged on each side, and is held in position lengthways by lugs formed on the top face of said brackets. When the apparatus is arranged and fixed in a position for oiling or greasing the axles, the top of said lubricating wheel is fixed at a slightly higher level than the bottom of the axle, so that, as the corf axle passes over the said lubricating wheel, the axle depresses the wheel into the oil or grease bath, and at the same time turns the wheel slightly round, the axle becomes lubricated, and passing forward the said coil spring lifts the lever and wheel into their original position ready to receive another axle. When in operation a duplicate pair of grease boxes are suitably arranged on the road sleepers, and fixed in the ground so as to lubricate the hearings of the axle on both sides. The accompanying drawings show a longitudinal section and a plan. (Three claims.)

4312 (1913). A Safety Scotch or Lock for the Wheels of Mining Corves and Similar Vehicles. G. Harrison, 8, George's-terrace, Orrell, and J. Farrell, 44, Church-street, Orrell, near Wigan, Lancashire.—The scotch is constructed of  $\frac{1}{2}$  in. wrought iron, and its particular shape and form must

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

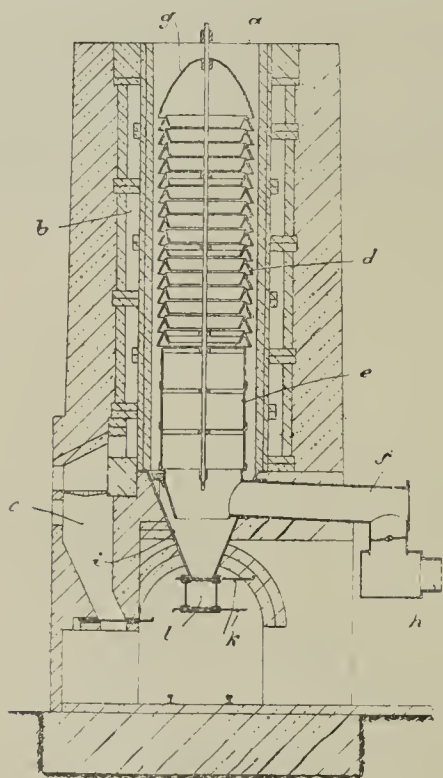


maintained as shown on the drawing. The mode of using the above is by inserting, with the hand, one end of the scotch upon the rim of the wheel between two adjacent spokes so securely that all fear of the scotch slipping out of position when descending an incline is nullified. When not in actual use the scotch is carried on the end of the corve or



vehicle. The scotch itself is brought into operation by the instrument tightening against the frame of the mining corve—thus the operator is allowed full and free action in control. The strength of material can be increased according to the varying sizes of the corves or similar vehicles. (One claim.)

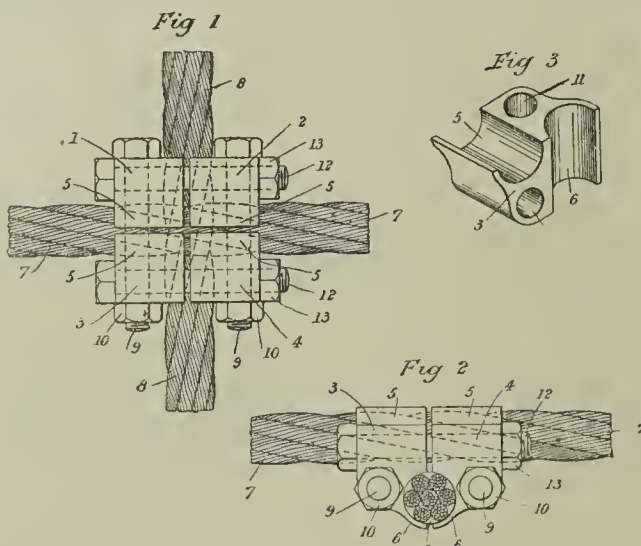
7601 (1913). *Improvements in Apparatus for Distilling Fuel.* H. Koppers, of Moltkestrasse 29, Essen-Ruhr, Germany.—In the distillation of bituminous substances, such as coal and the like, it is found that at low temperatures a large amount of tar is obtained, whereas at high temperatures, whether applied immediately or reached step by step, the highest proportion of ammonia is obtained. It is now usual to adopt a middle course, resulting in a medium output of tar and a medium output of ammonia, but the process of distilling in two stages at a lower and higher temperature has also been proposed, the production of ammonia at the higher temperature being assisted by introduction of steam. The object of the invention is to provide improved apparatus for carrying out this last-mentioned process. In the invention a retort or oven is used, which is heated at the lower part to a higher temperature than at the upper part, and in which fuel is held in a thin layer against the wall by means of shields, plates or the like placed in the interior, and having openings or gaps for the passage of gas into the space which they surround. The novel feature of the invention consists in confining the said shields or plates, which have apertures or gaps, to the upper part of the retort, and holding the layer of fuel at the lower, hottest part of the retort against the wall of the



latter by means of an imperforate inner wall or plate, the steam being introduced between this imperforate wall and the wall of the retort. The invention is illustrated in the accompanying drawing, which is a vertical section of the apparatus. The fuel is fed into the annular space from above, and forms a thin layer therein, which is heated from the outside by the wall of the retort. The gases pass between the rings *d* into the cooler interior of the retort, and are sucked off. In the first stage of the distillation the fuel, passing downwards through the upper part of the retort, loses its tarry constituents. In the second stage the whole of the ammonia is removed. The output of ammonia is increased by introducing steam into the lower part of the distillation chamber, and this steam assists in preventing decomposition of the ammonia. The fact that the cylinder *e* has no apertures in its wall ensures that the steam is compelled to traverse the entire length of the space between that cylinder and the wall of the retort, whereas if the cylinder had apertures, such as the gaps between the members *d*, a large amount of steam would pass into the central chamber without traversing any considerable thickness of fuel. The resultant coke is in small hard pieces, suitable for many purposes, and affording a smokeless fuel. The high proportion of by-products obtained, in conjunction with the good quality of the coke, renders the process very economical and efficient. (Two claims.)

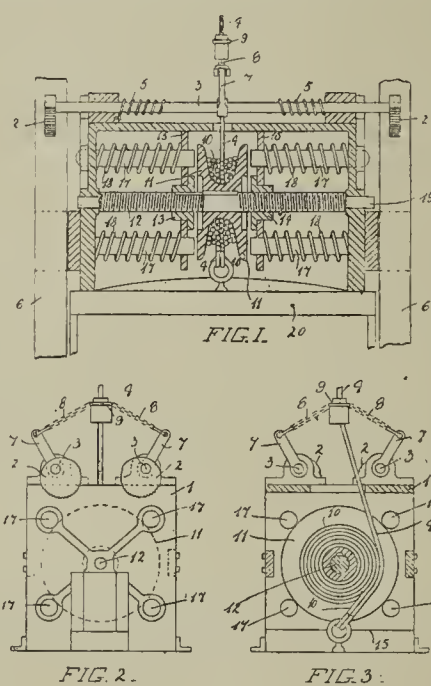
10674 (1913). *Improvements in Means for Securing Together Angularly Arranged Wires, Ropes, Rods, or the like at their Place of Junction.* F. A. Bullivant, of 72, Mark-lane, London, and G. M. Selby, of West Ferry-road, Millwall, London.—A clamping device is employed consisting of four parts, each of which has two semi-cylindrical sockets arranged at an angle to each other in accordance with the position of the wire ropes to be secured together. The four parts of the clamping device are arranged, one at each corner of the juncture of the wire ropes in such a

manner that the eight semi-cylindrical sockets embrace the respective cross wire ropes so that by drawing the said parts of the clamping device together, which is effected by suitably arranged bolts and nuts, the said wire ropes are securely clamped together and any movement of one wire-rope in respect to the other is effectually prevented.



Figs. 1 and 2 illustrate, in elevations at right angles to each other, a clamping device adapted to secure together, at their place of juncture, wire ropes arranged at right angles to each other. Fig. 3 shows in perspective one of the four parts of the clamping device. (Two claims.)

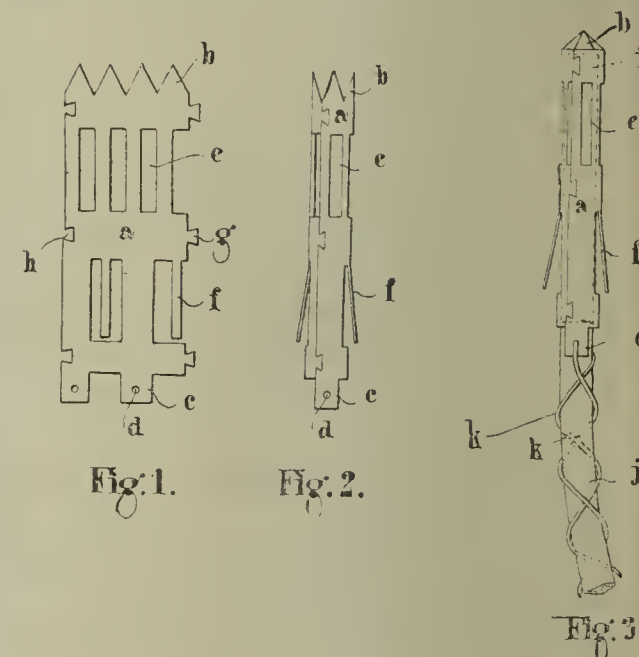
11769 (1913). *Improved Safety Apparatus for Mining Cages.* S. W. Richardson, of Sewell-street, Hokitika, and W. Staveley, of Park-street, Hokitika, Westland, New Zealand.—The invention provides improvements in the class of safety apparatus used in connection with mining cages to minimise shock when the safety grips come into operation. According to the invention, the cage is suspended from a carriage which bears the safety grips by a rope independent of the main hauling rope, the suspension rope being coiled upon a drum which is mounted on the carriage, the rotation of which is gradually retarded by springs compressed by a screw rotated by the drum. Fig. 1 is a front sectional elevation; fig. 2 an end elevation; and fig. 3 an end sectional elevation through the centre of fig. 1. The carriage 1 is provided with a well-known form of grip apparatus consisting of the eccentric grip dogs 2 fixed upon rocking spindles 3 which, upon breakage of the rope 4 are partly rotated by coil springs 5, thereby causing the grip dogs to engage the cage guides 6. Arms 7 fixed upon said rocking spindles are connected by a chain 8 having a ring 9 through which the rope passes; a collar or the like upon the rope engaging the ring and causing the rope to take the



weight of the cage. The cage is suspended by an independent rope 10, which is fixed at one end to and coiled upon a drum 11 fixed upon a spindle 12 rotatably mounted in the carriage. The spindle 12 is screwed upon one side of the drum with right-hand and upon the other side with left-hand thread, and these screws respectively pass through nuts 13 and 14 fixed in horizontally sliding crossheads 15 and 16, which are guided in the carriage, and have holes for the passage of spindles 17, projecting inwardly from the sides of the carriage and having upon them the spiral compression springs 18. The main rope 4 is carried past the drum 11 and secured to the top of the cage 20. Upon breakage of the rope the grip dogs first come into action in the usual manner and grip the carriage to the mine shaft guides. The cage continuing to descend, the rope attached thereto causes rotation of the drum, the rotation being increasingly retarded by the friction between the nuts and the screws due to the compression of the springs 18 between the crossheads 15 and 16 and the sides of the carriage until the cage is gradually brought to rest. A side end 19 of the spindle 12 enables a handle to be applied for turning the spindle when required. (Three claims.)

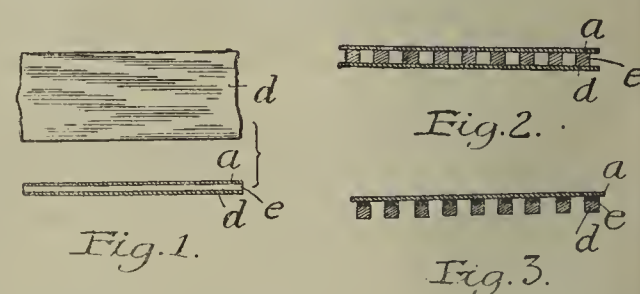
16903 (1912). *Improvements in and relating to Shot-firing by Powder Fuses and the like.* A. Price, of 10, Sunny-bank, Cwmpark, Treorkey, and W. Pryse, of 41, Vicarage-terrace, Cwmpark, Treorkey, near Pontypridd.—Relates to the use of detonators ignited by powder fuses. In Patent No. 29406 of 1910 is described a method and means for protecting detonators in connection with electrical shot-firing, while in Patent No. 7651 of 1911 is described means for rendering the insertion and re-insertion of the detonators and the preparation of the charge generally safe in connection with such method and means as set out in the prior specification referred to. Difficulties arise, however, in applying such method and means to the preparation of shots employing detonators fired by powder fuses; for instance, a knot

cannot satisfactorily be made in connection with powder fuse even when protecting wires are provided, the knot tending to mutilate the fuse. Further, the fuse becomes fragile after firing, and cannot be withdrawn with the defective detonator which has failed to ignite, and any method of attachment which relies upon the fuse itself to take the pull in case of misfire is uncertain and dangerous. The invention consists in providing means independent of the powder fuse itself for effecting withdrawal of the element which surrounds and shields the detonator, as, for example, one or more coils or braiding of wire attached to the shield and extending along the powder fuse. In fig. 2 is shown a detonator shield applicable for the purpose referred to, in fig. 1 being shown a suitable form of stamping which, when rolled up, can constitute the shield shown in fig. 2. In fig. 3 the shield shown in fig. 2 is indicated as it would appear in use containing the detonator and provided with the wires or the like for withdrawing the shield when desired. The method of insertion is as follows:—The charge is first inserted into the shot-hole by means of the tubular



part of the tool or the whole tool, except the spike, which is detached, and the space surrounding the tube is then carefully rammed in with clay in the usual way. Then the rod is withdrawn and the spike attached. The rod and spike are then put in place through the tube up to the predetermined point on the handle of the tool. The spike thus pierces the charge for the reception of the detonator and shield. The rod and spike are then withdrawn again and the spike detached. A detonator is then enclosed in a shield, and a fuse armoured with wire as above is introduced through the tube by means of the rod along the groove in which lies the wired fuse. The tube and rod are then withdrawn together or separately, the projections on the shield holding the latter in the charge. Then the mouth of the hole is tamped round the fuse and the shot is ready for firing. The spirally laid wire, braiding or the like when tensioned binds upon the fuse and will stand a considerable pull, while it holds together any parts of the fuse which might tend to get across the hole and cause an obstruction to withdrawals. (Seven claims.)

24334 (1912). *Improved Conveying Belt.* C. J. W. Scholtz, of No. 18/28, Bertha Strasse, Hamburg-Barmbeck, Germany, and the Balashol Belting Company Limited, of Portland-street, Ashton-under-Lyne.—Relates to metal conveying belts and consists in providing metal band conveying belts the outer or load-carrying portions of which are thermally insulated from their inner portions, i.e., from those portions which bear on and frictionally engage the surface of the driving and driven pulleys. The object of thermally insulating the inner and outer portions of the belt is to enable the inner portions to be protected when the belt is employed for the transport of hot material. Fig. 1 shows an inverted plan view and in longitudinal section a conveying belt, the



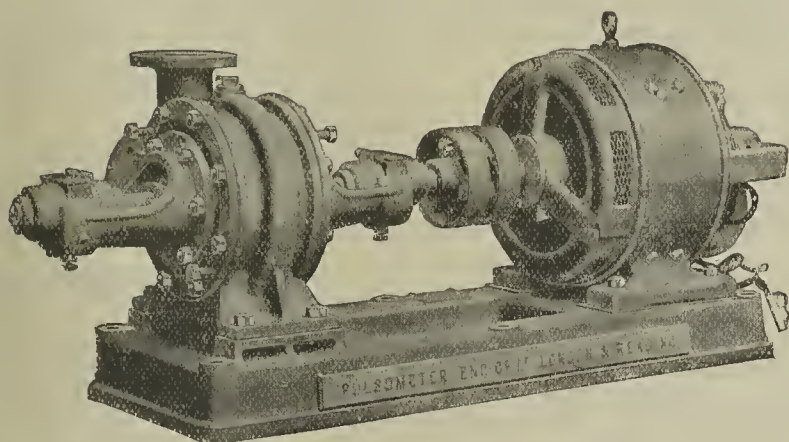
outer portion *a* of which is of metal, the intermediate portion *e* of heat insulating material, and the lower portion *d* of a material adapted to frictionally engage the driving and driven pulleys. Fig. 2 shows in longitudinal section a conveying belt, which differs from the above in that the insulating portion *e* of heat insulating material is arranged in parts; and fig. 3 shows in longitudinal section a conveying belt, wherein both the intermediate portion *e* and the inner portion *d* are arranged in parts. The portion *d* for frictionally engaging the said pulleys may run flat or trough shape. (Two claims.)

27752 (1912). *An Improved Steam Throttle Valve.* A. Martin and B. B. Waller, both of Phoenix Ironworks, Stroud, Gloucestershire.—Relates to steam throttle valves of the type wherein a transversely disposed valve member is adapted to be moved in a clockwise direction within the circular valve chamber so as to place said valve member in a state of equilibrium, and the present invention is characterised in that the circular valve chamber is provided with three ports, two of which are placed diametrically opposite one another, and within this valve chamber there is arranged transversely thereof a valve of S-shape in cross-section, having its seating faces formed as parts of lobes adapted when said valve is closed to seat on the faces of the diametrically oppositely disposed ports, the seats of said ports being formed on lobe-shaped recesses, in the circular seat of the valve chamber, both faces of the valve when the same is

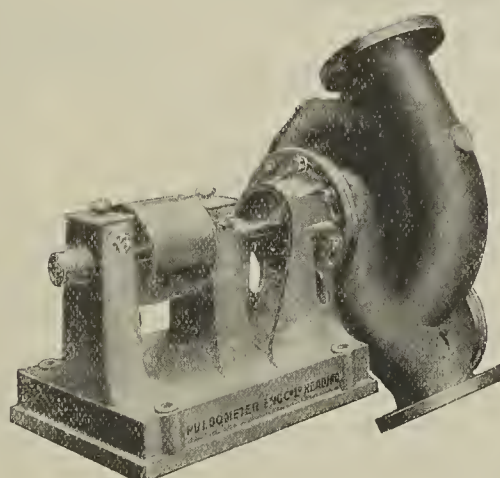


# PUMPS

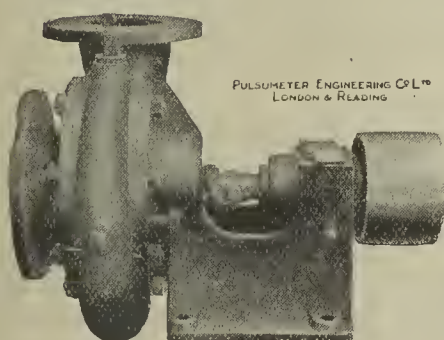
## FOR ALL PURPOSES.



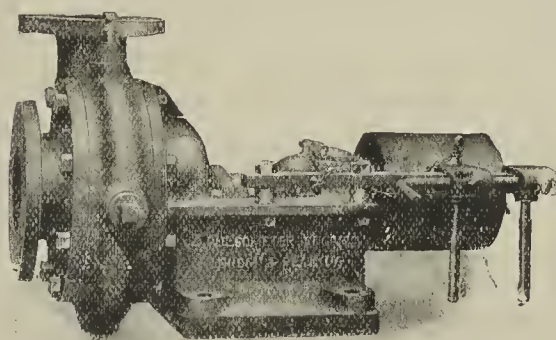
HIGH LIFT CENTRIFUGAL PUMPS.  
**TYPE C.**  
For Lifts up to 150 ft.  
List No. 522.



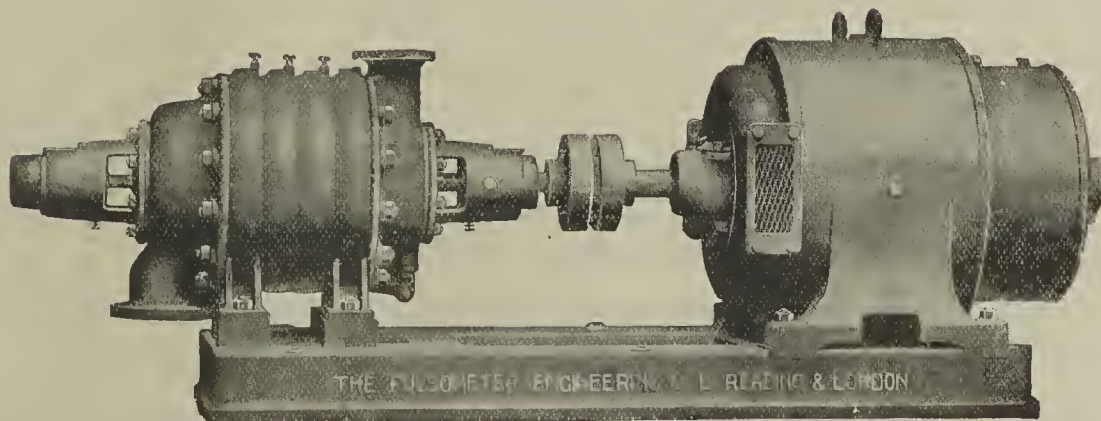
CENTRIFUGAL PUMPS.  
**TYPE V.**  
For Lifts up to 80 ft.  
List No. 523.



**TYPE A.**  
CENTRIFUGAL PUMPS.  
For Lifts up to 40 ft.  
List No. 524.



**TYPE A.**  
CENTRIFUGAL PUMPS  
with Fast and Loose Pulleys.  
List No. 524.



TURBINE PUMPS.  
Motor or Belt Driven.  
For Lifts up to 1,200 ft.  
List No. 527.

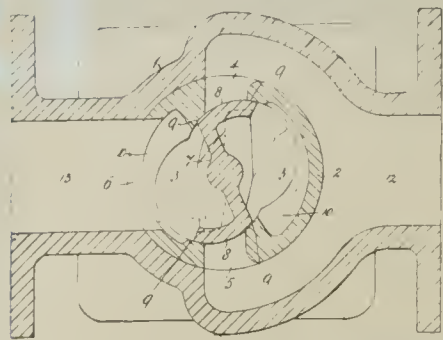
# Pulsometer Engineering Co., Ltd

Offices—11, Tothill Street,  
LONDON, S.W.

Nine Elms Iron Works,  
READING.



rotated in a clockwise direction moving from off the seats of the oppositely disposed ports, so permitting the passage of the fluid from inlet to outlet by way of all three ports, the controlled fluid at the same time filling the interior of the



valve chamber all round the valve, placing said valve in a state of equilibrium, the valve moving from off its seats without friction. The accompanying drawing shows a longitudinal vertical section. (Two claims.)

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

25624. Miners' safety rescue chamber with direct air communication to alarm station on surface. L. Phillips and T. C. Wickett.
25678. Manufacture of steel cylinders or cylindrical pieces by fitting a cast iron liner thereto. A. Girel.
25682. Apparatus for impregnating wood and other porous materials under pressure. P. F. Berk. (Friedrich Moll and Andreas Kossel, Germany.)
25701. Device for discovering fractures in wire cables. R. Wahn.
25706. Hydraulic power transmission apparatus. H. S. Hele-Shaw and T. E. Beacham.
25719. Jig conveyors. Geb. Hinselmann.
25723. Means of control for locomotive or other steam reversing gear of the type actuated by steam pressure and locked by fluid in a cataract cylinder. F. V. Le Manquais.
25756. Rope clip for attaching coal bogies or tubs to haulage rope in coalmines. T. E. Sample.
25762. Coupling gear for wagons and the like. J. A. Deakin and H. J. Pickles.
25766. Combustion of elementary fuel. I. E. Robinson.
25779. Manufacture of motor spirit and fuel oils. J. Moeller.
25782. Constructions suitable for the shells of steam condensers and the like. C. F. Higgins and Contraflo Condenser and Kinetic Air Pump Company Limited.
25786. Clinometers or gradient meters. W. S. Boulton.
25790. Insulating covering for overhead wires. G. H. Vaughan.
25799. Transportable furnace for use in hardening, annealing and tempering steel tools of all kinds, and like purposes. J. Acres. (Johann Albert Blankertz, Germany.)
25832. Machines for treating compound rails. J. Noll.
25897. Device for arresting the motion of pit cages, lifts, and hoists when the haulage rope breaks. R. Hollins and G. A. Tomlinson.
25911. Device for holding wheel hubs on axles. R. Schlathau.
25914. Joint for metallic conduits and fittings for electric cables. Simplex Conduits Limited, and L. M. Waterhouse.
25948. Safety appliance for mines and other places. J. W. Kemp.
25954. Secondary storage batteries or electrical accumulators. O. Oldham.
25955. Turbines and other like machines. V. Kaplan.
25962. Apparatus for treatment of peat. T. E. Brown.
25975. Method of and means for the electric transmission of signals and speech in mines. R. Haddan. (Josef Heinrich Reineke, Germany.)
25999. Apparatus for charging refuge destructors and other furnaces. H. N. Leask.
26001. Apparatus for indicating the presence and estimating the proportion of gas in air and in mixtures of gases. H. R. Webster.
26036. Distributions of compressed-air hammers. L. Rorive and E. Rorive.
26051. Piping for various purposes, such, for example, as the sand-filling of mines. J. L. Clark.
26076. Rotary pumps. J. R. Kinney.
26089. Method for the elimination and/or estimation of sulphur and sulphur compounds in hydrocarbon fuels such as benzol and the like. G. Stephenson.

26101. Variable pulley, having convex or conical faced flanges, suitable for belts, bands, or ropes. J. E. Cockshott.
26109. Electrical knock locator for use in connection with engines, pumps, and the like. J. L. Cochrane.
26116. Method of converting a single-stage compressor into a fluid-pressure engine, and vice versa. H. Gibbs.
26135. Iron-rolling process and mill for manufacturing T and I irons. F. Martens.
26162. Manufacture of solid fuels from mineral and other oils and the like. P. Baxter.
26177. Jig-conveyors. S. Peisen.
26184. Conveyors for coal and other substances. E. A. Ironside.
26210. Weighing machines. H. Pooley and Son Limited and J. Dobson.
26218. Metallurgical and other furnaces. A. Williams.
26231. Manufacture of briquettes or block fuel. E. F. Baker.
26235. Process of rolling pure iron and pure iron alloys. C. A. Allison. (International Metal Products Co., United States.)
26239. Checking-device preferably for use in coalmines for checking the number of corves or tubs of coal delivered by the miner or for other analogous purposes. G. Hughes. (E. Nack's Nachfolger, Germanv.)
26240. Rolling-mills. H. Magness.
26260. Pumps, motors, and the like. S. Z. de Ferranti.
26284. Construction of water-tube boilers. Soc. Anon. des Etablissements Delaunay-Belleville.

### Complete Specifications Accepted.

To be published on December 4, 1913.

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14956. Fluid-pressure apparatus. Walker.
18205. Machines for forming gear teeth by rolling. Anderson.
18450. Process for the production of ammonia. Wallace and Wassmer.
20408. Apparatus for unloading ships. Falke.
24505. Method of producing chilled bearings in wheel centres. Leach and Leach.
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1913.

1520. Pit cages, hoists, and the like, and more especially the former. Broad.
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## Complete Specifications open to Public Inspection before Acceptance.

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20371. Electric furnaces. Keller.
25318. Method of and means for preventing the accumulation of firedamp in coal and like mines. Kempermann.
25412. Miner's safety lamp. Schoeller and Co.

## GOVERNMENT PUBLICATIONS.

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- Annual Statement of Navigation and Shipping for 1912, 3s. 5d.
- Light Railways, Rules, October 1913, 1½d.
- FIRE AT CADDER COLLIERY, Lanarkshire, Scotland, Report on, 10d.
- Acts, 1913: Great Northern Railway, 4s. 5d.; Halkyn District Mines Drainage, 2s. 3½d.; Great Western Railway, 5s. 11d.; North-Eastern Railway, 2s. 10d.
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- Customs and Excise Report, 1912-13, 11½d.
- Consular Reports: Turkey, Trade of Baghdad, 2½d.; Germany, Togoland, 2d.
- Labour Gazette, November, 2d.
- Graduated Income Taxes in Foreign States, Reports on, 1s. 11d.

## PUBLICATIONS RECEIVED.

- NORTH COUNTRY COAL AND SHIPPING ANNUAL, 1913-14. Edited by Joseph Davies and Graham Wallis. London: The Business Statistics Company Limited. Price 7s. 6d.
- THE INSTITUTION OF MECHANICAL ENGINEERS: PROCEEDINGS, 1913 (Part 1-2).
- "The 22nd Annual Report of the Bureau of Mines, Ontario, for 1913"; "Revue Universelle des Mines de la Métallurgie" (Tome 4, No. 1), October; "The Engineering Magazine" (Vol. 46, No. 2), November, price 25 cents; "Annales des Mines de Belgique" (Tome 18, No. 4); "Russische Börsen- und Finanz-Nachrichten Warchen-schaft"; "The Mining Magazine" (Vol. 9, No. 5), November, price 1s.; "Transactions of the Institution of Engineers and Shipbuilders in Scotland" (Vol. 57, part 1); "The Journal of the Manchester Geographical Society" (Vol. 28, parts 3 and 4, 1912).

**The Maintenance of Electrical Mining Plant.**—At the monthly meeting of the East of Scotland Branch of the Association of Mining Electrical Engineers, held in the Royal Hotel, Dunfermline—Mr. H. Gordon Fraser, Leven, the branch president, in the chair—an interesting address was delivered by Mr. C. C. Reid, Cowdenbeath, on "The Repair and General Maintenance of Electrical Plant in Collieries." The speaker held that no one could be acquainted with the ordinary working of the average electrical installation at a colliery without being impressed with the great expense involved for general repair and renewals. Indeed, he knew of no branch of mining where economy and carefulness had received less attention and consideration than the electrical repair department. Whatever was the reason, he held that something had got to be done to minimise the evil, for such it certainly was. He suggested as a remedy that a proper electrical stores department should be kept in connection with each colliery, and that that department should be under the control of an individual would be responsible for the stock of spare parts, &c. His experience was that the more difficult it was for a man to get a spare part, the more disposed he was to take care of what he actually got. Further, he maintained that proper enquiry should be made into all the breakages of electrical material, and that a register should be kept for each motor at the colliery, in which particulars should be systematically entered of each repair and breakdown. The discussion was taken part in by the branch president, Messrs. C. A. Carlow (Fife Coal Company); Henry Rowan, Cowdenbeath; R. W. Peters, Lochgelly; Weston, Fordell; Beveridge, Kelty; Wilkie, Cardenden; R. G. M. Prichard, and H. J. Humphreys, H.M. inspectors of mines.

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# THE COLLIERY GUARDIAN

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FRIDAY, NOVEMBER 28, 1913.

No. 2761.

## EXPLOSIONS IN MINES.

### The Influence of Incombustible Dusts in Preventing the Inflammation of Coaldust.

The conclusions contained in the Fifth Report of the Explosions in Mines Committee were given in full in last week's *Colliery Guardian* (p. 1061). We now give an abstract of the remainder of the report, in which the various experiments are described.

It may be mentioned that in addressing the report to the Home Secretary, Sir Henry Cunynghame, the chairman, makes the following observations:—

"This Report has been circulated to the Consultative Committee and has this day been considered in consultation with them with a view of obtaining their opinion as to the practicability of the proposal that stonedust should be mixed with the coaldust in dry and dusty mines in the proportion of one to one, or any higher proportion. The matter was discussed, but the Consultative Committee did not feel themselves in a position to express an opinion upon this question without further time to consider the matter and without consulting other persons. We considered that it was our duty to submit to you without delay the results at which we had arrived, and we have therefore decided that it would be the best course to present our report at once, and afterwards to send in any opinions which the Consultative Committee may desire to offer. If you should decide to publish the Report, this will enable the members of the Consultative Committee to discuss the subject with those whose advice they desire to obtain."

At the outset, the Committee point out that the investigation in which they are now engaged involves a study not only of the conditions necessary to produce a coaldust explosion, but also of the influence of incombustible dusts in preventing the ignition of coaldust, or in retarding or extinguishing an explosion. It also involves the determination of what quantities of incombustible dust should be employed, and how it may most advantageously be used. This stage of the enquiry takes considerable time, and requires frequent repetition of the experiments. Certain results seem clearly to have been attained, but much remains to be investigated. The questions involved, however, are of such practical importance to the coalmining industry that it has been thought best not to wait until knowledge was more complete, but at once to publish such of the results obtained as appeared likely to be useful. Accordingly this report should be regarded as preliminary, and of a provisional character.

### ON THE QUANTITY OF COALDUST NEEDED TO PRODUCE AN INFLAMMABLE MIXTURE WITH AIR.

According to the Committee's analysis of Altofts Silkstone coal, the oxygen in 1 cubic foot of air can completely burn 0.118 oz. of the coal to form carbon dioxide and steam; therefore 100 cubic feet of air would suffice, theoretically, for the complete combustion of  $\frac{3}{4}$  lb. of coaldust disseminated through it. In practice, however, more than this amount of coal seems to be needed for initiating inflammation. According to the experiments of M. Taffanel made at Liévin, 1 lb. of bituminous coaldust to the 100 cubic feet appeared to be the least quantity likely to be practically effective. In experiments in their large gallery (7 ft. 6 in. in diameter), the Committee find that  $\frac{1}{2}$  lb. of Altofts Silkstone coaldust per foot run of the gallery—that is to say, 1 lb. to about 88 cubic feet of air—gives a spreading flame, which if carried far enough develops into an explosion.

### INFLAMMABILITY OF THE DUST AS AFFECTED BY ITS CHEMICAL COMPOSITION.

1. *Ash Content.*—It has already been shown (Second Report) that the effect of adding incombustible dust to coaldust is to decrease its inflammability, the relative ignition temperatures of a coaldust (No. 227 N) and of the same dust mixed with shaledust so that the mixture contained 20 per cent. of the latter, being 1,005 degs. and 1,095 degs. respectively.

The effect of admixture of an incombustible dust with coaldust on the propagation of inflammation is also very marked. This is well shown by a series of experiments

on a large scale made in the Altofts gallery.\* In the course of the experiments referred to, it was shown that the admixture of so small a quantity of incombustible dust as to form 10 per cent. only of the mixture greatly retards the development of an explosion. Thus, comparative experiments with (1) pure coaldust and (2) coaldust containing 10 per cent. of shaledust, the

incombustible dust, like the inert gas, takes up heat from the contiguous molecules, and, not being combustible itself, reduces the average temperature. If the temperature is sufficiently reduced the flame cannot be propagated.

The Committee particularly emphasise the fact that the "limiting mixture"—half coaldust and half incombustible dust, like the inert gas, takes up heat from the

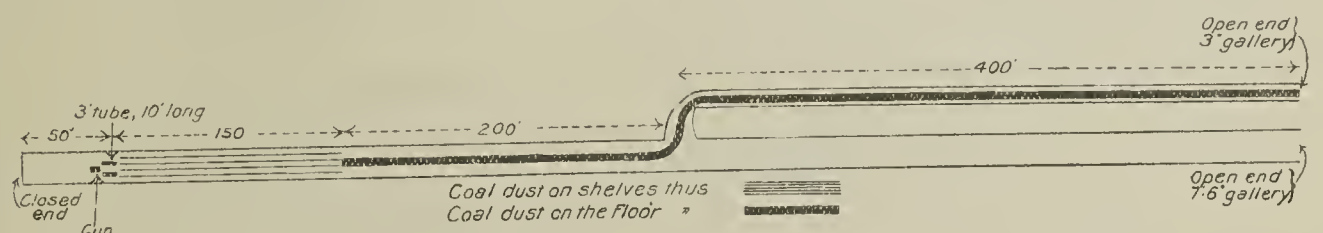


FIG. 1.—SHOWING ARRANGEMENT OF CANNON AND DUST TUBE ADOPTED FOR EXPERIMENTS UPON THE INFLAMMATION OF COALDUST.

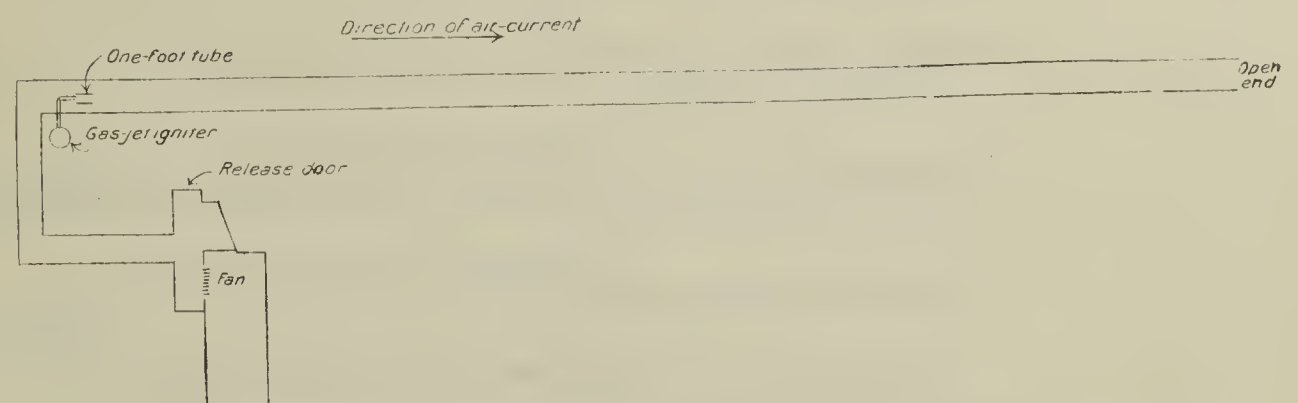


FIG. 2.—SHOWING ARRANGEMENT OF GAS-JET IGNITER AND DUST TUBE ADOPTED FOR EXPERIMENTS UPON IGNITION OF COALDUST BY A LARGE FLAME WITHOUT CONCUSSION

The results are shown diagrammatically in fig. 3.

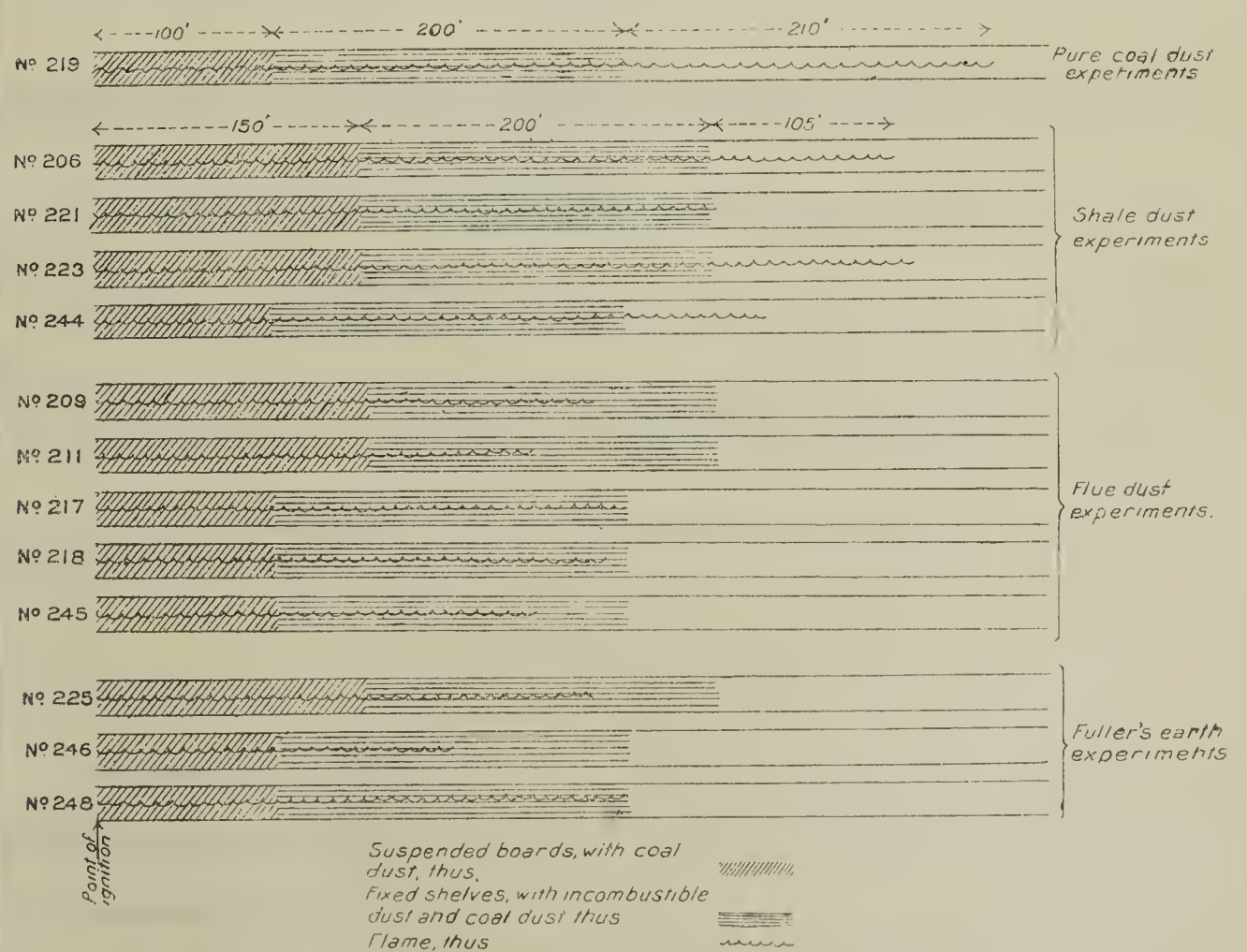


FIG. 3.

conditions being otherwise identical, gave the following results:—

	Mean rate of propagation of flame.	Maximum pressure developed.
(1) Pure coaldust.....	1,700 ft. per sec. ...	50.0 lb. per sq. in.
(2) Coaldust containing 10 per cent. of shale dust .....	185 ft. „ ...	4.8 lb. „

The admixture of an incombustible dust with the coaldust appears to act in the same way as the admixture of an inert gas with an explosive gas mixture; the

\* Record of the Mining Association, p. 106.

bustible dust—suggested as unflammable by the above experiments, only holds for the conditions of those experiments, and for the means of ignition employed. A more violent means of ignition, such as has been obtained by starting the flame in a mixture of coaldust and air *per se*, may cause propagation of flame with mixtures containing an equal proportion of incombustible dust. Coals contain variable quantities of ash. The average quantity of ash in British coals is probably under 5 per cent. This ash has an undoubted effect in reducing their inflammability, and may be treated as so much added incombustible dust.



*Constitution of the Coal-substance.\**—In their Second Report the Committee showed that, given the same degree of fineness, dryness and freedom from ash, the relative inflammabilities of different coaldusts depend upon the proportions of readily decomposed constituents† that they contain, and not upon their contents of "volatile matter." The dusts collected from the roadways of mines no doubt differ in inflammability from dusts obtained artificially from the same seams by pulverising the lump coal; chiefly by reason of their contamination with incombustible road-dust (as distinct from ash), which tends to make them less inflammable; and partly by reason of their greater dryness, which tends to make them more inflammable. The presence of "occluded" gases in mine dusts may also perhaps affect their inflammability slightly; but the determination of the extent to which this may be so has little practical value on account of the changes that are continuously taking place in the composition of such gases, the volume of which is considerably less than that of the gases in freshly pulverised coal.

The most useful comparison of the inflammabilities of dusts from different seams is therefore obtained by excluding, as far as possible, the influence of adventitious

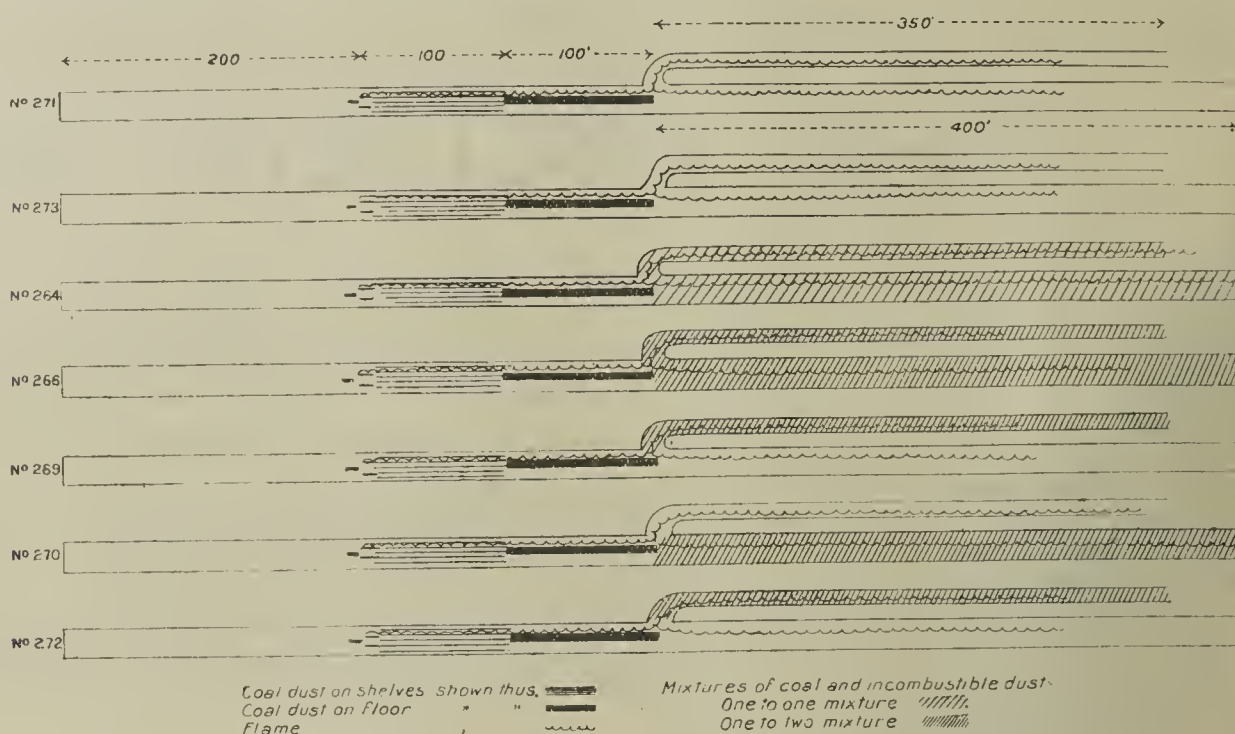


FIG. 4.

inflammability. It is difficult to start the general inflammation of a cloud of anthracite dust; but anthracite dust is quite capable of carrying on an explosion.

3. *Dryness of the Coal.*—It is not essential to an explosion that coaldust be quite dry; on the contrary, coal with a considerable quantity of moisture in it may form a cloud of dust and be inflamed. According to the experiments made by the United States Geological Survey,\* it would appear to be necessary for the coaldust to have a total moisture content approaching 30 per cent. to ensure that there will be no propagation of flame through it. This amount of moisture is alleged not to make fine coaldust seem very wet: with 40 per cent. of moisture the mixture becomes a mud, when, of course, it is impossible to ignite it.

#### FINENESS OF THE DUST AS AFFECTING ITS INFLAMMABILITY.

The Committee have not as yet made any experiments to determine absolutely to what extent fineness of the dust affects the ease of propagation of flame. The laboratory researches of Prof. Bedson have proved that the finer the dust the more sensitive it is to inflammation; on the other hand, experiments at the Pittsburg gallery of the United States Bureau of Mines have indicated that quite coarse dust is capable of propagating flame for a considerable distance. Thus, particles of coal that passed through a 20-mesh sieve and remained on a 40 mesh caused the flame of a charge of 2½ lb. of blasting powder fired from a cannon to extend for 40 or 50 feet. It is doubtful whether propagation would be continued with such coarse particles much beyond the distance affected by the concussion of the cannon, although one can understand that a coaldust explosion that had been developed by fine dust, and had travelled far enough to attain considerable violence, might raise and ignite even coarser particles than 20-mesh dust and propagate itself by means of them, though probably with diminishing intensity.

#### ON DIFFERENT MEANS OF CAUSING THE IGNITION OF COALDUST.

There are several different ways in which ignitions have been effected experimentally in large galleries, and the resulting phenomena appear to depend largely on the method adopted.

\* Bulletin 425, pages 50-54.

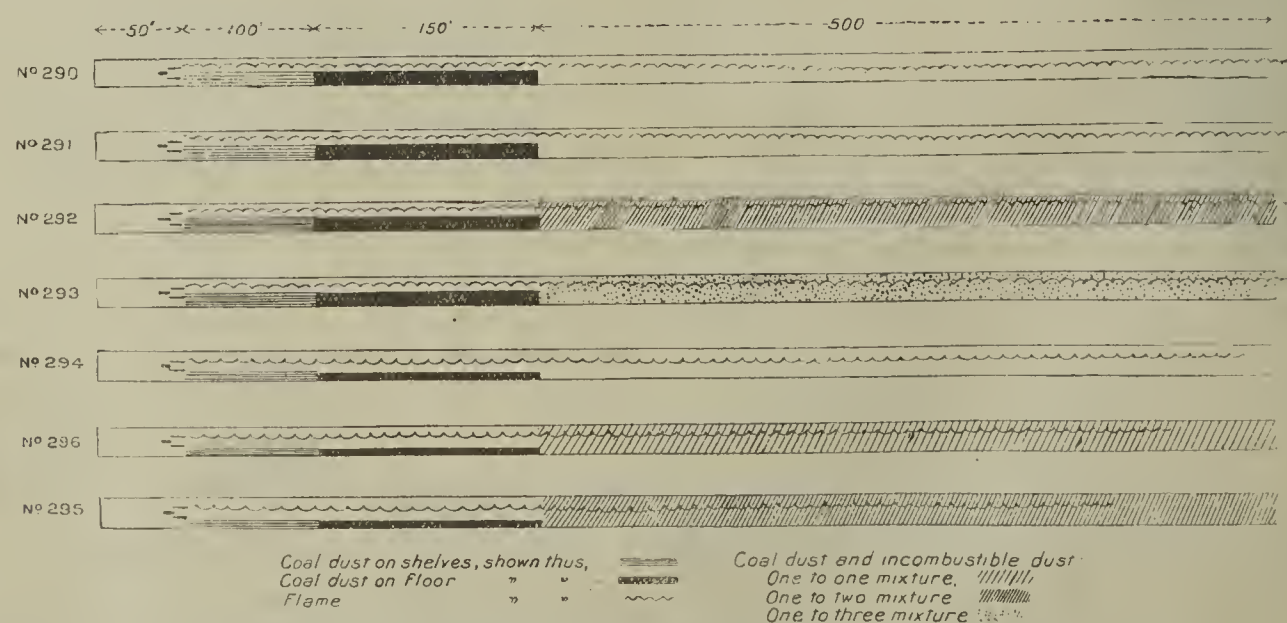
ash, moisture and occluded gases, which form no part of the coal substance proper. This was the procedure adopted in measuring the relative inflammabilities of coaldusts described in the Second Report, the dusts used (from pulverised nut coal) being all dried at 107 degs. Cent. before being tested.

So far as the experiments have as yet gone, such differences have not been found in the inflammabilities of bituminous coals as exist by reason of differences in the chemical composition of their coal substance to be very great. In the propagation of flame along a large dust-strewn gallery, the dust from one bituminous coal can be regarded as of nearly equal sensitiveness with the dust from other bituminous coals. The dusts from anthracite coals are, as is well known, of a low degree of

\* By "coal substance" is meant the coal apart from impurities that it may contain, such as ash, moisture, and

† As determined by Burgess and Wheeler "paraffin-yielding" tests, probably constituting the resinous portion of the coal or bituminous matter. (Vide Appendix I. to the Second

FIG. 5.



(Note: In experiments N°s 294, 296 and 295 the coal dust in the pure coal dust zone was present at the rate of ½ lb. per linear foot instead of 1 lb. as in the former experiments)

Fig. 6.



The method employed in the large gallery has been to use one cannon only, and to place in front of its muzzle a tube about 3 ft. in diameter and 10 ft. long, with a layer of coaldust strewn evenly along it. On the cannon being discharged into this tube a dense cloud of ignited dust is driven forward, and this displaces and ignites coaldust placed on shelves round the gallery. No air current is used.

That this means of ignition produces an inflammation capable of developing into an explosion of great violence under suitable conditions is evident from an experiment (No. 263) in which an explosion in the large gallery was communicated, through a funnel-shaped junction, to the 3 ft. gallery strewn with coaldust ( $\frac{1}{2}$  lb. to the linear foot). In this case the violence of the explosion set up in the small gallery was such as to rip it open at four separate places after the flame had travelled 200 ft. down the small gallery. This experiment shows that there is at command a method of ignition of coaldust by which explosions both of a moderate and of a violent character can be developed in the experimental galleries. The arrangement of the experiment (No. 263) is shown in fig. 1.

#### On the Effect of Incombustible Dusts.

The work done by the Mining Association at their experimental station at Altofts had shown that, under certain special conditions, shale or other incombustible dust could be employed to prevent either the initiation of a coaldust "inflammation" or the continued propagation of a coaldust explosion after explosive combustion had been developed.

On continuing this work, with the object of determining how incombustible gas could be applied in practice, it became apparent that it would be necessary to determine its efficacy in dealing, on the one hand,

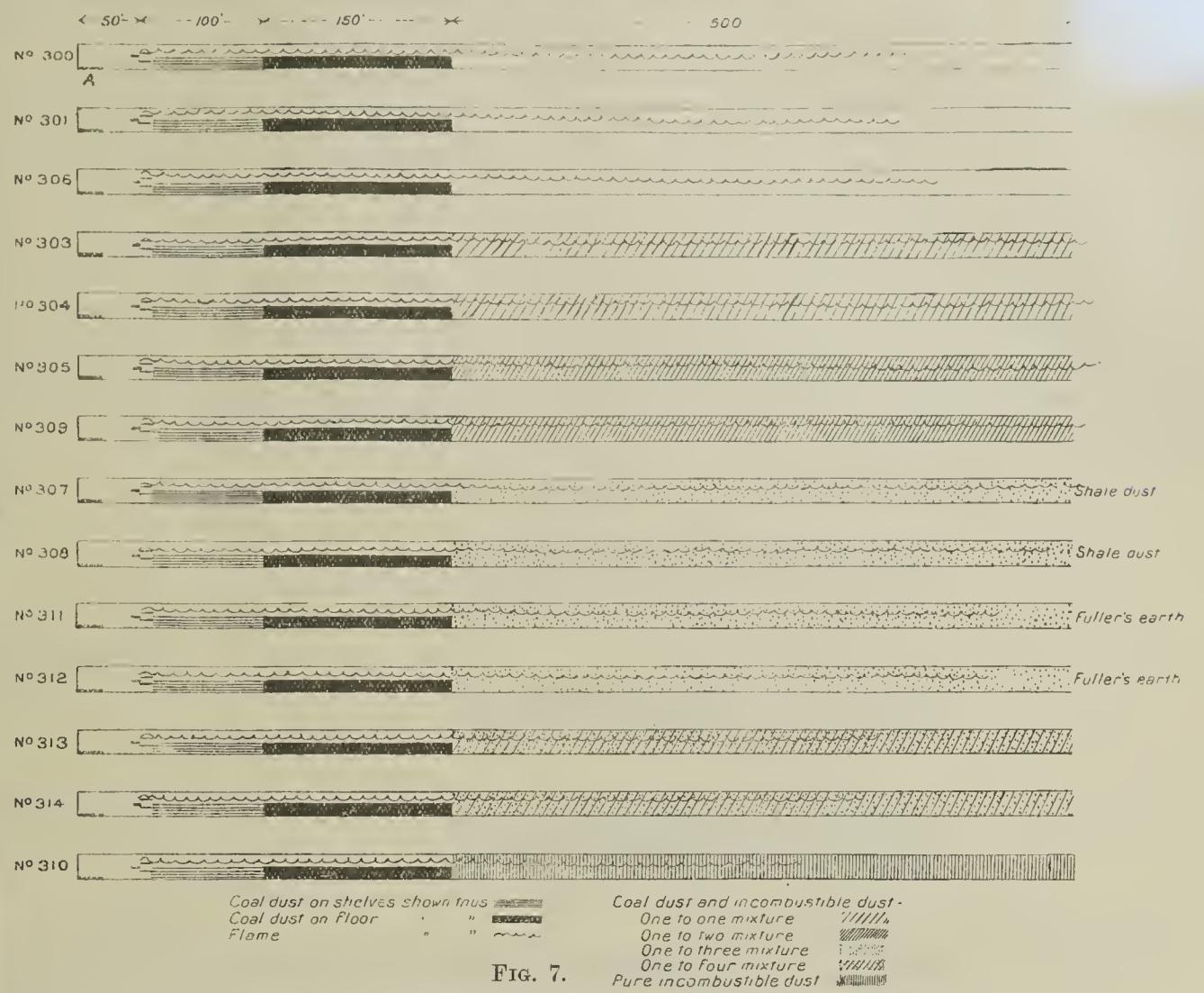
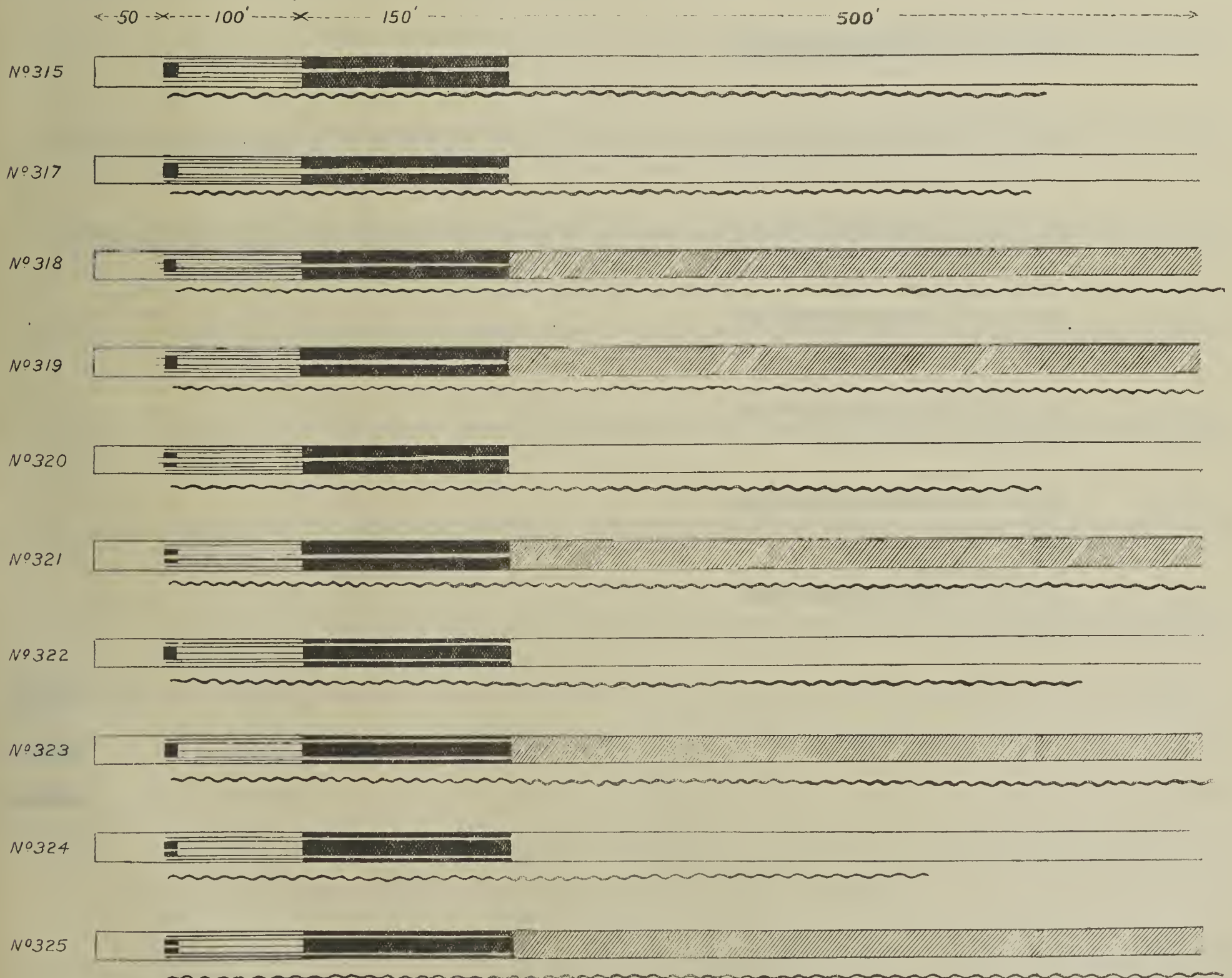


FIG. 7.

NOTE.—In this series of experiments the iron door at A, leading to the fan, was permanently fastened.



Mixture of fuller's earth and coal dust containing 10 per cent of fuller's earth: on shelves , on the floor   
 Mixture of fuller's earth and coal dust containing 20 per cent of fullers earth. on shelves ; on the floor   
 Cannon-tube containing pure coal dust Cannon tube containing mixture as in inflammation zone   
 Mixture of fuller's earth and coaldust, 2.1   
 Flame

FIG. 8.



ably propagating inflammations, and, on the other hand, with violent explosions. For if, as seems most likely, the incombustible dusts act mainly by virtue of their cooling action on the flame of the burning coaldust, it would seem to be essential that the raising of the coaldust in suspension in the air (whereby the inflammable mixture capable of propagating flame is produced) should be accompanied by the raising in suspension of the incombustible dust also. A violent explosion could perform this function more effectively than a mild inflammation. On the other hand, a violent explosion, by reason of the more active combustion taking place therein, might, presumably, continue to be propagated by mixtures containing more incombustible

showed that when using such a flame as the means of ignition it was essential that a dust cloud should pre-exist over at least 150 ft. of roadway. After the flame had travelled that distance in a previously formed cloud, sufficient movement of the air took place to enable dust deposited on the floor to be raised in suspension and continue the propagation. The inflammations thus produced, whilst capable of continuing to travel over any distance so long as fine coaldust was present, were, at any rate in the earlier stages, incapable of producing dynamic effects of any magnitude. This method of experiment seemed, therefore, a suitable one to adopt for the purpose of deciding whether coaldust deposited upon the surface of incom-

main gallery 6 ft. from the first right-angle bend. The leading pipe ended in a 2 in. nozzle fixed centrally in the gallery and directed, at a slight upward angle, towards its open end. Co-axially with this pipe a tube, 1 ft. in diameter and 10 ft. long, open at both ends, was arranged. This tube contained coaldust distributed evenly along it, so that the flame of the gas jet passing through was fed by the coaldust and greatly enlarged. The flame thus produced, which was unaccompanied by any concussion, was found capable of igniting a ready-formed cloud of coaldust, produced by allowing boards laden with the dust to fall a short distance and then be jerked sideways in the manner described in the Fourth Report.

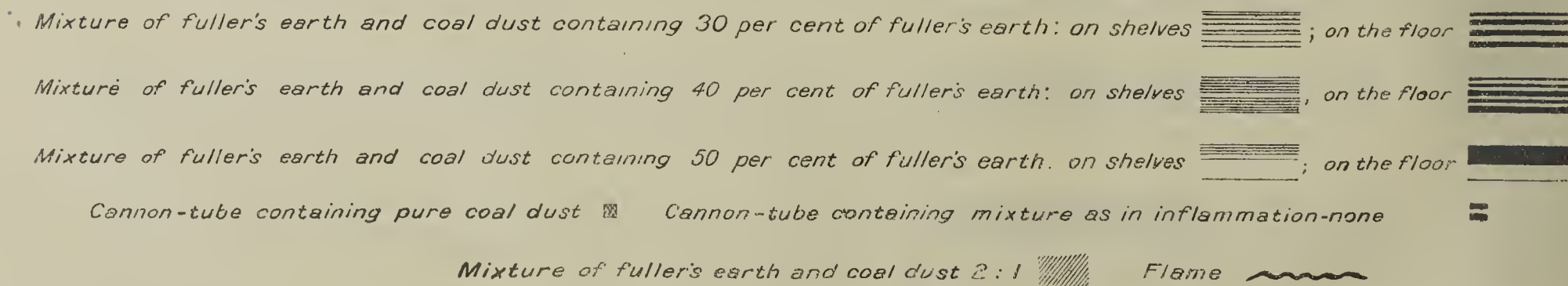
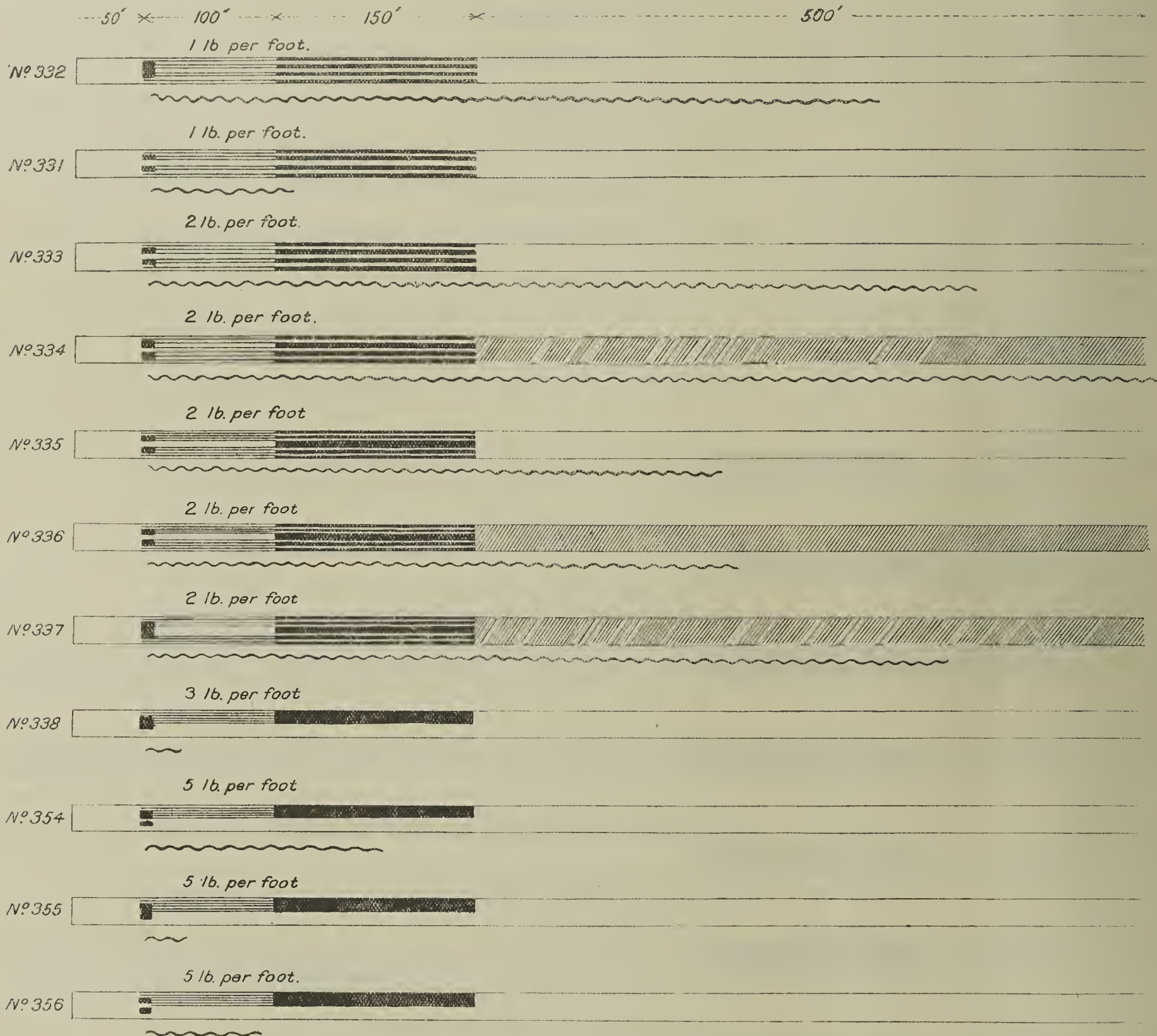


Fig. 9.

dust than would be effective in preventing or arresting a mild inflammation.

The task, therefore, is to determine the proportion of incombustible dust requisite to deal adequately with these two extremes, taking into account such matters as the manner of distribution of the incombustible dust and its fineness and buoyancy.

I.—THE EFFECT OF INCOMBUSTIBLE DUSTS ON FEEBLE INFLAMMATIONS.

In the Fourth Report (page 6) the Committee described a method of obtaining a propagating inflammation, using as the means of ignition a flame of gas jet, unaccompanied by concussion, and they

bustible dust could be raised in suspension apart from the incombustible dust beneath, and thus extend the distance travelled by the inflammation, despite the treatment of the roadways with incombustible dust.

A few minor alterations were made in the method of experiment described in the Fourth Report, the general arrangement being as follows:—

The large gallery (7 ft. 6 in. internal diameter) was employed. This gallery is 800 ft. long, and is connected by short lengths of tube (6 ft. internal diameter), forming right-angle bends to a fan, as shown in fig. 2. The gas jet igniter, figured in the Fourth Report, was fixed with its leading pipe entering at a point in the

Preliminary trials showed that the limiting conditions (with dust of the particular fineness and composition employed) necessary to ensure the propagation of flame throughout the previously formed dust cloud were:—

(1.) That the coaldust should be placed in quantity equivalent to about ½ oz. per cubic foot of air space of the gallery. This was obtained by loading the suspended boards with dust at the rate of 1½ lb. per linear foot. It will be understood that when the suspended boards were allowed to fall, the dust with which they were laden did not form a homogeneous cloud in the gallery. Some dust, no doubt, simply fell to the floor of the gallery and took little, if any, part in the subsequent



propagation of flame. It is not to be supposed, therefore, that the density of cloud required for propagation of flame, if that cloud were homogeneous, would correspond to  $\frac{1}{2}$  oz. of dust per cubic foot of air. It is probable that less is required. The Committee have, in fact, obtained propagation of flame on many occasions when the suspended boards have been laden with 1 lb. of dust per linear foot (0.35 oz. per cubic foot of air space); but on other occasions that quantity was found to be insufficient. With  $1\frac{1}{2}$  lb. of coaldust on the boards propagation took place invariably.

(2) That an air current of a velocity of at least 500 ft. per minute should be travelling in the same direction as the flame. The function of this air current is, probably, to produce a better dissemination of the dust than would obtain in a still atmosphere. An air current of less velocity served on several occasions, but on other occasions it failed; with a velocity of air current of

*Coaldust used.*—Pulverised Altofts Silkstone nuts. *Fineness.*—Fifty per cent. passed a 240-mesh sieve. *Air-current velocity.*—Five hundred feet per minute (blowing towards the open end of the gallery). *Length of suspended boards to give "previously formed dust cloud."*—One hundred feet.

*Quantity of dust to form this dust cloud.*—One and a-half pounds per linear foot.

*Length of fixed shelves (placed beyond the suspended boards).*—Two hundred feet.

*Quantity of dust on these shelves.*—One pound per linear foot.

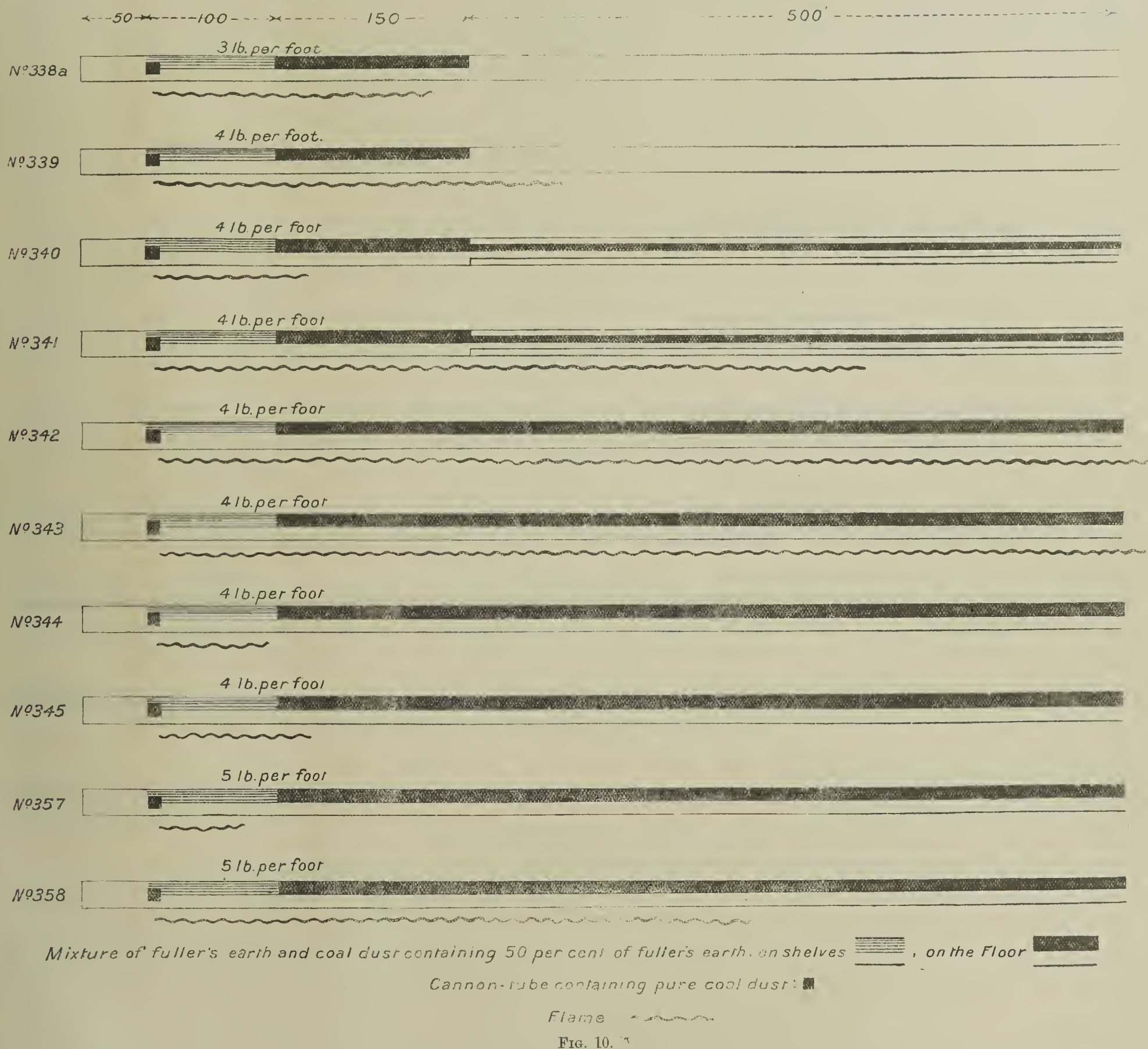
RESULTS. *Experiment No. 215.*—Flame travelled 250 ft. beyond the end of the fixed shelves; i.e., total length of flame 550 ft.

*Experiment No. 219.*—Flame travelled 210 ft. beyond the end of the fixed shelves; i.e., total length of flame 510 ft.

on the fixed shelves, at the rate of 5 lb. per linear foot forming a zone that extended from the end of the suspended boards (laden with coaldust) for a distance of 200 ft. On top of the incombustible dust pure coaldust was strewn, sometimes at the rate of 1 lb. per linear foot and sometimes at the rate of 2 lb.

The diagram (fig. 3) shows some of the typical experiments made; the quantity of coaldust on the suspended boards was, in every case,  $1\frac{1}{2}$  lb. per linear foot, and the velocity of air-current in every case was 500 ft. per minute. In general, the experiments of this nature that have been made (80 in number) show that under exceptional conditions the flame of a feebly propagating inflammation is capable of licking up coaldust from the surface of incombustible dust upon which it may be deposited, unless that incombustible dust is of such a character that it can be raised into a cloud with facility.

This points to the desirability of avoiding the accumu-



500 ft. per minute propagation of flame took place invariably.

The dust used in these experiments was pulverised nut coal from the Altofts Silkstone seam (as used in the experiments of the Mining Association), and its fineness was such that between 50 and 60 per cent. passed through a sieve with 240 meshes to the linear inch.

Under the conditions given above, which, it will be observed, differed in several respects from those described for similar experiments in the Fourth Report, it was found that, given a previously formed dust cloud extending over a distance of 100 ft. from the point of ignition, the inflammation produced was capable of raising in suspension dust deposited upon fixed shelves along the remainder of the gallery and thus propagating itself. If the previously-formed dust cloud extended for less than 100 ft. the flame died out.

As examples two experiments (Nos. 215 and 219) may be quoted, the details of which were :—

These experiments, which are typical of many similar, show that a comparatively slowly moving inflammation is just capable, after it has progressed a certain distance, of propagating itself by means of dust which it picks up from shelves fixed along the gallery. It was apparent that the flame was, so to speak, struggling along; it was unaccompanied by any marked dynamic effects, and but a slight alteration in the experimental conditions was sufficient to check the propagation. The inflammation of this character seemed, therefore, very suitable for the purpose of testing whether incombustible dusts would be effective in checking the flame when they were covered with a layer of coaldust. The question to decide was whether an inflammation of this feeble character, which was just capable of raising in suspension coaldust deposited upon shelves, could raise in suspension coaldust deposited upon a layer of incombustible dust, without disturbing the latter.

The incombustible dust to be tested was distributed

lation of much coaldust on the top of the incombustible dust, though we imagine that, once the treatment of the roadways with incombustible dust has been effected, the chances of such a combination of circumstances arising as would reproduce in practice the kind of inflammation obtained in the experimental gallery would be small, and any more violent means of ignition such as might be more likely to occur in practice would effectually raise in suspension both the coaldust and the incombustible dust beneath.

## II.—THE EFFECT OF INCOMBUSTIBLE DUSTS ON INFLAMMATIONS OF COALDUST AND AIR ATTENDED BY VIOLENCE.

As a result of the experiments just described, the Committee entertain no doubt that an easily raised incombustible dust, if properly placed, is capable of dealing effectively with a feeble inflammation, even under the most adverse conditions. It remained to be seen whether an inflammation accompanied by consider-



...ce could be extinguished in a similar manner, ... the proportion that incombustible dust ... bear to coaldust in order to effect this satisfactorily could be ascertained. After a certain amount of experiment it was found that a coaldust inflammation capable of developing into an explosion could be produced invariably by the following means:—

A cannon with a 2-in. bore, 2 ft. 9 in. deep, was charged with 24 oz. of blasting powder tamped with 8 in. of shaledust. This cannon was placed on the floor with its muzzle towards the open end of the gallery, pointing slightly upwards. Within 2 ft. of the muzzle a tube 3 ft. in diameter and 10 ft. long, open at both ends, was placed so that the gun pointed into it. No air current was employed, but the end of the large gallery behind the cannon was closed by an iron plate. This iron door resisted the outward pressure at the time of firing, but opened inwards under the suction produced in the rear of the inflammation, and allowed air to enter and flow along the gallery after the advancing flame. Coaldust was distributed within the 3 ft. tube into which the gun pointed and upon shelves along the gallery for 100 ft.,

200 ft.—i.e., to the junction between the 3 ft. (which was 350 ft. long) and the 7 ft. 6 in. gallery. It was distributed on shelves over the first 100 ft. from the point of ignition; for the remaining distance (100 ft.) it was strewn on the floor. Throughout the 200 ft. the coaldust was present at the rate of 1 lb. per linear foot of gallery. The coal used was Altofts Silkstone, and the dust was such that between 50 and 60 per cent. passed a 240-mesh sieve.

The results of this series of experiments are shown in diagram form in fig. 4.

*Experiments with an Inflammation of Pure Coaldust of 250 ft. Travel.*

The point of ignition was 150 ft. from the closed end of the gallery. Coaldust was laid for a distance of 250 ft. at the rate of 1 lb. per linear foot, on shelves for the first 100 ft. and for the following 150 ft. on the floor.

The results of this series of experiments are shown in diagram form in fig. 5.

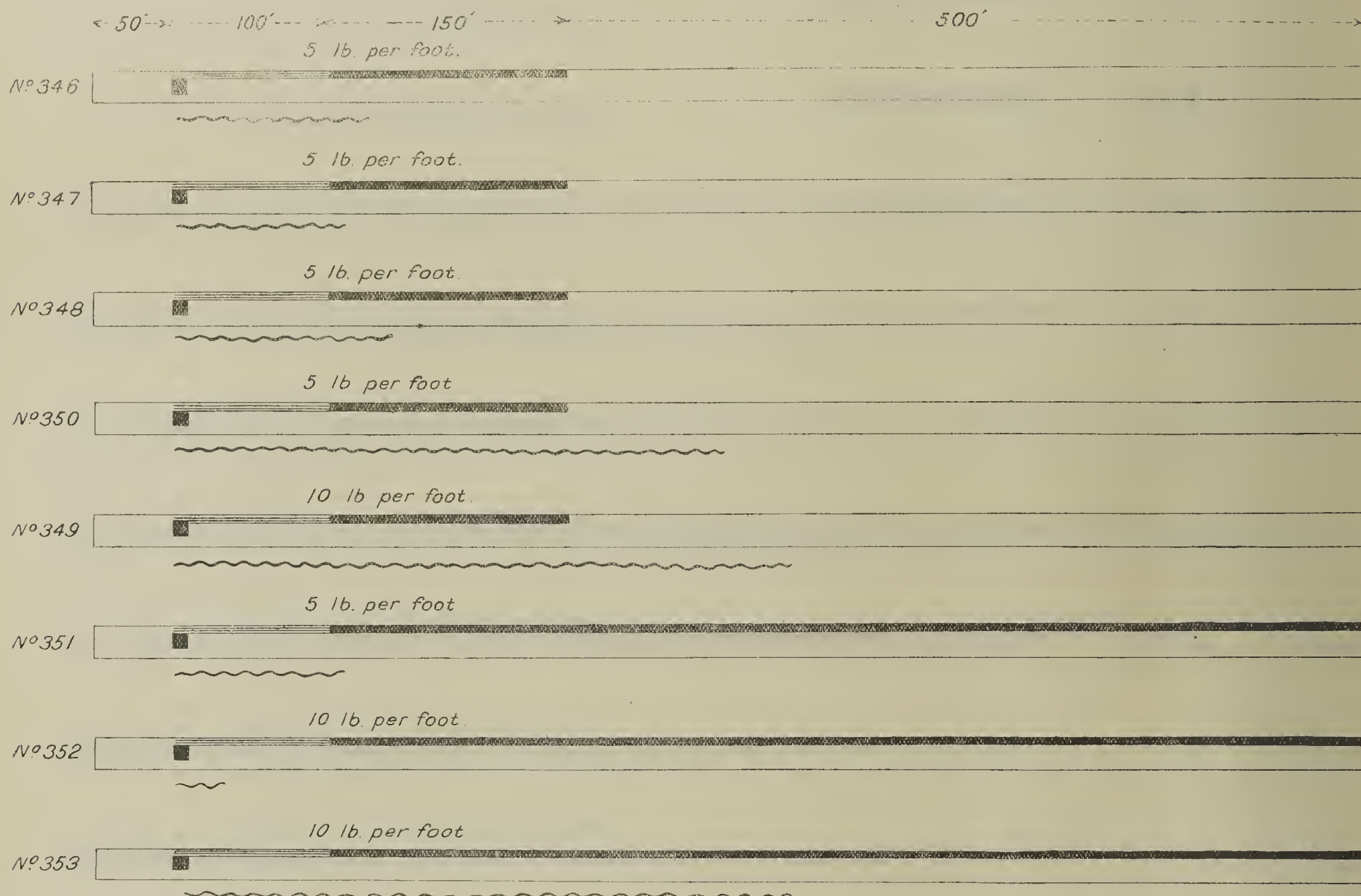
*Experiments in Large Gallery with Entrance to 3-ft. Gallery Closed.*

In the next series of experiments the opening into the

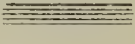

prevent any air entering the gallery behind the cannon. The quantity of coaldust in the coaldust zone was increased to 1 lb. per linear foot, the other conditions being the same.


The results of this series of experiments are shown in diagram form in fig. 7.

When the gallery is strewn with a mixture of coal and incombustible dust and a zone of pure coaldust is ignited at one end of the gallery, a cloud of pure coaldust is projected into this mixture and becomes more and more contaminated by incombustible matter the further it is driven forward. Consequently, as the flame travels forward it is fed by a less and less combustible mixture. For example, a cloud of 3 or 4 parts of shale or fuller's earth to 1 of coaldust when raised in air does not propagate flame *per se*, but when a pure coaldust cloud is borne by the air-blast that raises the mixture, some of the latter, by mingling with this pure coal, may become inflammable and feed the flame. On the other hand, the incombustible mixture may so contaminate the front portion of the pure coaldust cloud that it can no longer burn.



Mixture of fuller's earth and coal dust containing 60 per cent of fuller's earth:

on shelves , on the floor 

Cannon-tube containing pure coal dust 


Flame 

FIG. 11.

at the rate of 1 lb. per linear foot of gallery; beyond this 100 ft. the coaldust was simply strewn on the floor.

The flame arising from the blasting powder, which in dust-free air is about 12 ft. long, is greatly increased in length and volume by the coaldust in the tube, and, if the dust for some distance beyond is distributed round the circumference of the gallery, propagation of the flame takes place. It is to be noted that, even with such a violent means of ignition as is given by the firing of a stemmed charge of blasting powder, the dust must be so disposed in the region of the shot that the flame following the concussion shall have every chance of igniting a considerable volume of dust cloud.

Using this means of ignition to obtain a coaldust inflammation of moderate violence, the following experiments have been made.

*Inflammation of Coaldust of 200 ft. Travel.*

Point of ignition was 200 ft. from the closed end of the gallery. Coaldust was laid for a distance of

3-ft. gallery was blocked off, and the igniting cannon was moved 100 ft. towards the closed end of the large gallery. The iron door which closed the end of the gallery at the time of firing, opened inwards as before, under the suction produced in the rear of the inflammation. The point of ignition was 50 ft. from the closed end of gallery. Coaldust was laid for a distance of 250 ft., on shelves for the first 100 ft., and on the floor for the remaining 150 ft. at the rate of 1 lb. per linear foot. (Experiments 290-3.)

Since these four experiments were inconclusive as to the action of the incombustible dust on the flame, which in every case reached the open end of the gallery, the charge in the coaldust zone was reduced from 1 lb. to  $\frac{1}{2}$  lb. of coaldust per linear foot in the next experiments, the other conditions being the same. (Nos. 294-6.)

The results of this series of experiments are shown in diagram form in fig. 6.

In the next series of experiments the iron door at the closed end of the gallery was bolted in position so as to

The experiments have shown that a mixture of 1 part of incombustible dust and 1 part of coaldust is capable of burning *per se* once it is ignited, and can then propagate the flame as far as the mixture extends. It requires a large and intense source of ignition to inflame it, such as the fierce flame set up in pure coaldust placed in front of the cannon. Without such priming of pure coaldust the 1:1 mixture has always failed to propagate inflammation when a gunpowder charge of 28 oz. has been fired in the 3-ft. gallery strewn with quantities of the mixture varying from  $\frac{1}{2}$  lb. to 5 lb. per foot run.

A mixture of 2 parts of incombustible dust to 1 part of coaldust in the 3 ft. gallery has been found incapable of prolonging the flame, but when strewn on the floor of the large gallery it has been shown to prolong the flame for a considerable distance in several of the experiments—i.e., it feeds and keeps the flame alive for a longer distance than if no mixture at all were present.

It might be presumed, therefore, that the addition of incombustible dust both to the inflammation zone (or "firing" zone), as well as to the mixture in the rest of the gallery, would shorten this prolonging action by increasing the proportion of incombustible matter in the cloud that feeds the flame. If this view be correct, an inflammation begun, not in a pure coaldust zone, but in one containing a certain proportion of incombustible matter, should be extinguished sooner than a pure coal-



dust inflammation when it travels into a zone that has previously contained a 3 : 1 or a 2 : 1 mixture of incombustible dust and coaldust. Moreover, the distance travelled into the "incombustible dust zone" should be shorter the higher the proportion of incombustible dust in the "inflammation zone."

A number of experiments have been made to see whether this is the case—varying the proportions of coal and incombustible dust in the inflammation zone, and testing the effect of incombustible dust zones on the inflammations obtained—and the Committee's anticipations have been fulfilled. These experiments also serve the purpose of showing what proportion of incombustible dust must be present to prevent the initial ignition of coaldust.

*Experiments with Inflammations of Mixtures of Coaldust and Incombustible Dust.*

The general arrangement of the gallery was the same as for the previous series of experiments, the point of ignition being 50 ft. from the closed end.

The results of this series of experiments are shown in diagram form in figs. 8, 9, 10 and 11. They show that whereas the inflammation zone of coaldust may be mixed with 10 per cent., 20 per cent. or 30 per cent. of incombustible dust without preventing its flame from penetrating a 2 : 1 mixture to the end of the gallery (500 ft.); nevertheless, when the inflammation zone is further diluted until it contains 40 per cent. of incombustible dust, its flame does not pass through the 2 : 1 mixture.

These experiments also confirm the results of the previous series in showing that:—

(i.) Mixtures in equal proportions of coal and incombustible dust are difficult to ignite, but when ignited may propagate flame throughout the large gallery.

(ii.) Mixtures containing from 33 to 40 per cent. of coal to 67 to 60 per cent. of incombustible dust prolong the flames of less diluted mixtures traversing the large gallery, but do not propagate flame *per se*.

In all the above experiments the pressures produced in the gallery were recorded. It is not necessary, the Committee think, to set these out in detail. However, in the region where incombustible dusts were mixed with the coaldust, the pressures produced by the inflammation of these mixtures decreased progressively with the increase of the proportion of incombustible dust, and were barely measurable with a 50 per cent. mixture. In no case was a pressure produced one-tenth as high as that produced by pure coaldust fired under the same conditions.

From the results of these experiments in the large gallery, it was apparent that the 50 : 50 mixture of coaldust and incombustible dust was exceedingly difficult to ignite, and that it was important to make further and stricter tests with this mixture. To this end a series of trials was made in the 3-ft. diameter gallery in which the ignition of pure coaldust is readily accomplished—more readily than in the larger gallery, and without the aid of a "dust-raising" cannon as used at Altofts, or the 10 ft. tube employed at Eskmeals. The 3 ft. diameter gallery was 400 ft. long. It was closed at one end and the igniting cannon placed on the floor 50 ft. from that end with its muzzle pointing towards the open end. The cannon was charged with 28 oz. of blasting powder stemmed with 8 in. of dry clay. The mixture was strewn on the floor throughout the gallery from the point of ignition to the open end. Pure coaldust, and even a 60 : 40 mixture of coaldust and fuller's earth, at the rate of  $\frac{1}{2}$  lb. per linear foot, ignited readily, the flame being propagated throughout the gallery and issuing at the open end. The following experiments were then made with the 50 : 50 mixture:—

No. 375. The mixture present at the rate of  $\frac{1}{2}$  lb. per linear foot.

RESULT.—Flame travelled 15 ft. from the point of ignition and then died out.

No. 376. The mixture present at the rate of 1 lb. per linear foot.

RESULT.—Flame travelled 35 ft. from the point of ignition and then died out.

No. 377. The mixture present at the rate of 2 lb. per linear foot.

RESULT.—Flame travelled 50 ft. from the point of ignition and then died out.

No. 378. The mixture present at the rate of 5 lb. per linear foot.

RESULT.—The flame travelled 50 ft. from the point of ignition and then died out.

The quantity of dust present in the last experiment (No. 378) corresponded to about 8 oz. per cubic foot—that is, to a quantity of about 20 lb. per linear foot in the 7 ft. 6 in. gallery.

*On the Suitability of Different Incombustible Dusts for Checking Inflammations of Coaldust.*

It is a matter of the first importance to determine what are suitable dusts to employ. The Committee have

as yet only tried a limited number of dusts in the large gallery—viz., Altofts shale, fuller's earth, fluedust, and sand.

The specific gravity of Altofts shale is 2.6, that of fuller's earth 1.6, and that of the fluedust used 2.5, as compared with 1.2, which is the average specific gravity of coal. The specific gravity is not, however, the most important factor in the behaviour of the dust, for dusts of a thin flaky form are more easily stirred up than those of a rounded shape of grain. It is, of course, essential that the dust should not easily cake. The shale used was that usually employed for treating the roads at the Altofts Colliery. This shale is a "grey bind" occurring above the Diamond coalseam. It contains a small amount of carbonaceous matter and absorbs moisture from damp air. About 10 per cent. of the weight of the ground dust consisted of coarse-grained particles measuring  $\frac{1}{2}$  mm. or more in diameter: these larger particles have, probably, but small effect in checking ignitions of coaldust directly, but are said to dislodge coaldust when the shale is flung upon high timbers. There is no reason to doubt that the finer particles, when raised in the air, are effective in quenching flame; but on account of the coarser particles present it would require a greater weight of this Altofts shale to produce the same flame-quenching effect as a more uniformly fine incombustible dust. An analysis of a sample of Altofts shale by Dr. J. W. Mellor is given in an appendix to the Report.

Fuller's earth consists mainly of silicate of alumina, and contains about 58 per cent. of silica, free and combined. The mineral is easy to grind, the powder showing no tendency to "ball." It does not absorb moisture, nor does it cake. When received it had already been ground, and was in a fine white powder of specific gravity 1.6. For experimental purposes fuller's earth possesses the great advantage of being obtainable of very uniform quality and fineness.

Fluedust consists of the ash swept out of the flues of boilers. It has, of course, a varied composition, dependent on the sorts of coal used. It is flocculent and much more buoyant than Altofts shale, in the sense that it is far more easily blown up into the air by a puff of wind. Fuller's earth is also more easily raised than Altofts shale. These three materials represent three sorts of incombustible dust differing in their lightness and buoyancy. This capability of being easily raised into a cloud has, as has been shown, an important bearing on the effect of the incombustible dust.

In the Committee's previous reports they adduced reasons for the belief the shaledust employed was not of a character likely to conduce to phthisis. Experiments are being conducted into the character of fuller's earth and fluedust in this respect, upon which the Committee will report as soon as they are concluded.

A large number of compounds, such as gypsum and the carbonates of soda, of lime and of magnesia have been suggested for use, but the Committee have preferred as yet (in the initial stages of the enquiry) to keep to a limited number of such dusts as they know can be practically used.

## SCOTTISH COALMASTERS AND MINING LEGISLATION.

### Criticism of the Home Office.

Upwards of 150 coalmasters and colliery managers were present on Saturday evening at the annual dinner of the Scottish Branch of the National Association of Colliery Managers, which was held in Messrs. Ferguson and Forrester's, Edinburgh. Mr. C. C. REID, Cowdenbeath (Fife Coal Company) presided.

Mr. J. T. FORGIE, Bothwell (Messrs. Wm. Baird and Co.) who proposed the toast of the evening, said the position of a colliery manager was nowadays very difficult, onerous and responsible; but, nevertheless, it was a very honourable one. Personally, he did not think it was at all advisable or in the interests of safety that the actions and the work of colliery managers should be controlled, limited and dictated by Act of Parliament as they were at present. He made the statement now in the full knowledge that an inspector of mines was present listening to what he said, that the time occupied in reading over and signing reports at prescribed periods did not give the colliery manager an opportunity of looking after the interests of safety. Mr. W. C. Blackett, a friend of his, made a very emphatic and clear statement at the enquiry which was held by Lord Mersey into the regulations. He stated openly and without hesitation then that what the colliery manager was afraid of now was not the danger of the mine, but the danger of the law. Now he (Mr. Forgie) held that that was a dangerous and a false position to put managers in; indeed, he could not help thinking that the whole attitude of the Home Office with regard to the mines was entirely wrong. There was a panicky feeling in the Home Office—a pandering to public sentiment and opinion.

After all, what was that sort of public opinion worth? What did the grocer, the shoemaker, the lawyer, or any of these men know about mining? And yet they found public opinion drawn from such sources as these controlling the whole action of the Home Office. For example, let them take the present position of the Home Office with regard to rescue apparatus. Of course, they all know the position which the coalmasters in Lanarkshire had taken up. They had held conscientiously—and they had strong reasons and good grounds for so holding—that self-contained breathing apparatus was a dangerous equipment to put into the hands of any man. The Home Office, and those with them who had advocated the use of this apparatus, had placed it on too high a plane and had expected too much from it. That particular type of apparatus did very little at Cadder—in fact, it did nothing at all there. In this connection he might digress somewhat to say that Mr. Mowat and himself had previously strongly opposed the reversal of the air, but, after the experience at Cadder, he was now convinced that, under certain circumstances, the proper thing to do was to reverse the air. Even if the rescue brigade and apparatus had reached Cadder earlier in the evening he, personally, would not have been surprised to have heard of three or four additional deaths. In the recent huge disaster in South Wales two men with the rescue apparatus would have been dead had they not been saved by other two men who were not so equipped at all. So far they had little evidences of a single life having been saved by rescue apparatus, while they knew that at least 12 men had been killed through the use of self-contained breathing apparatus. Up to the present the Home Office had not prosecuted the Lanarkshire coalowners. He did not know whether that was due to a spirit of charity or a spirit of helplessness. The Lanarkshire coalowners believed the position they had taken up on this question was perfectly sound and justifiable, and that being so they held that the Home Office should have hesitated before they proceeded to take further action. On August 3 it was brought before the House of Commons that Dr. Haldane had reported on the use of rescue apparatus for sewerage work to the London County Council, and had reported unfavourably. The outcome was that the Home Office agreed to appoint an expert committee of enquiry. So far as he knew the committee had not yet been formed, nor had any enquiry been made or report formulated. In the circumstances, then, would it not have been much better for the Home Office to have awaited the findings of that committee before making the amended regulations they had done with regard to rescue apparatus. By their amended legislation the Home Office intended to force the coalowners of Lanarkshire to put rescue apparatus into the mines, and he (Mr. Forgie) honestly believed that 99 per cent. of the gentlemen present that evening agreed with him that such apparatus was an absolute danger.

The CHAIRMAN, in acknowledging the toast, asked what was the burden of the colliery manager's complaint with regard to all this legislation? Was it not just this: that he had so many trifling things to do—details which did not make for safety or the betterment of the pits—that he had no time whatever to devote to the ordinary work of the mine? No doubt, they would be told they had their reports, but he thought they would agree with him that their mines in Scotland could no more be managed by reports than the whole mines of the country could be conducted and controlled by correspondence. The colliery managers of the country had a message to give to the miners' leaders of Scotland. It was this: "If safety is your chief object—and surely, when you say so, you mean it—then come and help us." Instead of vilifying the colliery manager and using all their influence to destroy discipline, let the leaders make a point of telling the public and the men themselves that the manager was anxious for safety. There was no royal road to safety, and it could not be got by fresh legislation. The only way in which safety could be achieved was by the earnest and sincere co-operation of all men engaged in the industry. Nothing could be done by harassing, but much could be accomplished by mutual co-operation.

Mr. CHARLES CARLOW, chairman of the Fife Coal Company, in replying to the toast of "The Coal Trade," made passing allusion to the seriousness of German competition. If they saw the freight lists for Emden and Rotterdam, and took into consideration the quantity of coals which the Germans now shipped to their markets in France, the Mediterranean, Sweden and Pittsburg, they would begin to wonder what was to become of the east of Scotland coal trade. While they, as coalowners and colliery managers, would not allow words of a slanderous nature to be used against them in their desire for the safety of the men under their charge, they at the same time felt that the industry could not go on unless there was a careful looking into the economic side of the question. Everything required to be done by science, commonsense, energy and ability to bring the coals to the surface as cheaply as possible. There was no use of their doing everything they could to encourage safety in the mines if anything was to be done by way of legislation to take away the mines themselves.

Other toasts proposed and acknowledged were "The Mining Institute of Scotland" and "The Mining Colleges."



## THE COAL AND IRON TRADES.

THURSDAY, NOVEMBER 27.

## Scotland.—Western District.

## COAL.

An increasingly active business is being done in the west of Scotland coal trade. There is a strong all round demand, all departments, including smalls, being in a healthy condition. The position of ell coal is well maintained, both first and second qualities being in good demand. No falling-off is apparent in the demand for splint coal, either for home use or shipping. A steady business continues to be done in navigations and steams, and prices remain unaltered. Trebles, though a trifle more plentiful, are still firm, while doubles and singles are in greater demand. Shipments amounted to 82,195 tons, compared with 98,362 in the preceding week, and 108,920 tons in the corresponding week of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/3 to 13/6	13/ to 13/6
Splint .....	13/3 to 16/6	13/3 to 16/3
Treble nuts .....	13/3 to 13/6	13/3 to 13/6
Double do. ....	12/ to 12/6	12/3 to 12/6
Single do. ....	10/6 to 11/	10/6 to 11/

## IRON.

A moderate business was done in the Glasgow pig iron warrant market during the week, the turnover amounting to 15,000 tons. In the middle of the week there was a slight buying movement which led to a recovery, but owing to discouraging reports from abroad, principally America, weakness again set in and prices suffered a further reduction of 10½d. per ton. Cleveland iron closed at 48s. 6d. per ton cash and Cumberland hematite was quoted at 61s. 3d. per ton cash and 61s. 6d. per ton three months. Another furnace was closed down, and the number in blast in Scotland at present is 78, compared with 79 in the preceding week and 88 in the corresponding week of last year. The imports of pig iron into Grangemouth from Middlesbrough and district amounted to 10,710 tons. The prices of Scotch makers' iron, with the exception of Glegarnock and Carron, have been reduced 6d. per ton. Monkland is quoted f.a.s. at Glasgow, No. 1, 64s. 6d., No. 3, 63s.; Govan, No. 1, 63s., No. 3, 61s. 6d.; Carnbroe, No. 1, 69s. 6d., No. 3, 65s. 6d.; Clyde, No. 1, 71s., No. 3, 66s.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 71s. 6d., Nos. 3, 66s. 6d.; Glegarnock, at Ardrossan, No. 1, 72s., No. 3, 67s.; Eglinton, at Ardrossan or Troon, No. 1, 65s. 6d., No. 3, 64s. 6d.; Dalmellington, at Ayr, No. 1, 67s., No. 3, 65s.; Shotts at Leith, No. 1, 71s. 6d., No. 3, 66s. 6d.; Carron at Grangemouth, No. 1, 73s., No. 3, 68s. per ton. Scotch hematite is quoted 64s. per ton for west of Scotland delivery. The Carron Works are still closed, owing to the strike. The manufacturing branches of the trade continue in an unsatisfactory position. Several of the departments have reduced their prices. Black sheets are reduced 5s. per ton and galvanised sheets a similar amount. Malleable iron prices are again lowered, making the total reduction in this trade since June 32s. 6d. per ton, and prices are now based on £6 17s. 6d. per ton, less 5 per cent. for Crown bars for Glasgow delivery.

## Scotland.—Eastern District.

## COAL.

The coal trade in the Lothians is in a sound condition. All large coal is eagerly sought after and, among smalls, treble and double nuts are in heavy demand, while singles are more satisfactory. There is a large amount of tonnage at the ports and the pressure on the collieries is very heavy and difficulty is being experienced in getting ships away with regularity. Shipments are comparatively good and amount to 103,471 tons, compared with 126,850 in the previous week and 116,727 tons in the same period last year. At Grangemouth 44,335 tons were cleared, Granton 9,970, Leith 40,402, and Bo'ness 8,764 tons.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/6 to 13/9	13/6 to 13/9
Secondary qualities .....	12/ to 12/6	12/ to 12/6
Treble nuts .....	13/9 to 14/	13/9 to 14/
Double do. ....	12/3 to 12/9	12/3 to 12/9
Single do. ....	10/6 to 11/	10/9 to 11/3

Business in the Fifeshire district has been interfered with on account of the late arrival of steamers owing to the heavy weather. Under normal conditions there would have been no lack of tonnage and the demand for all classes of coal is very satisfactory. Shipments are over 18,000 tons below last week and total 94,456 tons against 122,696 and 120,185 tons in the corresponding week of last year. Prices remain steady.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/9	16/9
Unscreened do. ....	14/9	14/9
First-class steam coal .....	12/9 to 13/3	13/3 to 13/6
Third-class do. ....	10/9 to 11/3	11/ to 11/3
Treble nuts .....	13/ to 13/6	13/3 to 13/9
Double do. ....	12/	12/ to 12/3
Single do. ....	10/ to 10/6	10/ to 10/3

## Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

## COAL.

During last week 147,271 tons of coal and 874 tons of coke were despatched from Tyne Dock, an increase of 775 tons of coal and a decrease of 449 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 58,202 tons of coal and 3,065 tons of coke, a decrease of 9,753 tons of coal and an increase of 1,966 tons of coke. The Blyth shipments aggregated 89,419 tons of coal and coke, a decrease of 6,666 tons. The North-Eastern Railway Company is enquiring for 500,000 tons of locomotive fuel for each of the divisions—northern and southern. Negotiations with respect to the supplies for the northern division are stated to have resulted, already, in a considerable quantity of coal being arranged for with a north-west Durham colliery at about 12s. per ton delivered into trucks at the colliery. The coal is for delivery over next year and it is stated that the railway company hopes to secure the bulk of its supplies at 12s. per ton at the pit mouth, a reduction of about 2s. per ton on the rates for the expiring contracts. Second-hand holders are stated to have sold 12,000 tons of best Blyth steams for delivery in regular monthly quantities over next year at 12s. 9d. per ton, f.o.b. A large quantity of coking coal is stated to have been sold for November-June delivery at 11s. 6d., f.o.b. Twelve thousand tons of foundry coke are stated to have been sold for delivery over next year at 20s. 6d., f.o.b. Best Blyth steams are said to have been disposed of by the collieries for December-January shipment at 14s. and for January loading at 13s. 6d., f.o.b. Some excitement was imparted to the local coal market during the week by the news of the strike of French miners for an eight-hour day and, had the stoppage proved of long duration, local merchants looked forward to being able to help themselves to a considerable amount of French colliery business. Here, however, the French stevedores stepped in and vetoed the discharging of cargoes of English coals at French ports during the duration of the strike. Under these circumstances, therefore, it is just as well that the dispute only lasted a few days and work has been resumed, for, if discharging at French ports were stopped, it would have meant that, not only would there not have been any augmentation of business on account of the strike, but that ordinary business with the Republic would have been seriously impeded. The prompt market has been quiet during the week, but the tone is fairly well maintained. Supplies for spot shipment are very limited and loading turns for bests are long. Those of steam smalls are easy. F.o.b. quotations for prompt shipment have varied as follows on the week:—Best steams, Blyths, are stronger; Tynes, 3d. advanced; unscreened, 6d. reduced; special smalls, 3d. lower; smithies, 6d. down; gas bests, 3d. to 6d. cheaper; seconds, 6d. increased; unscreened bunkers, Durhams, 3d. more; Northumbrians, 1s. reduced; coking coal, weaker; smalls, 9d. to 1s. fallen; coke, foundry, 1s. less; blastfurnace, 1s. higher; and gas coke, 3d. weaker. An effort is being made to "bear" the coke market on the ground that ironmasters are unable to produce pig iron profitably at the present market rates, and that therefore coke should be reduced in order to cheapen the cost of production of iron.

Later.—News is just to hand with reference to the allotment of the supplementary contract to supply the Swedish State Railways with 100,000 tons of steam coals for delivery over the first three months of next year. Swedish firms have appeared to have secured the order for the following quantities:—20,000 tons Lambtons at 17s. 11½d. per ton, c.i.f., Stockholm, with option of D.C.B.'s at proportionate prices; 18,000 tons Lambtons at 18s. 2½d. per ton, c.i.f., Norrköping, with option of D.C.B.'s; and 30,000 tons Lambtons at 17s. 11d. per ton, c.i.f., Gothenburg. The balance of the order appears to have gone to Westphalia, but full details are not yet to hand. Several sales of New Pelton-Holmside coals are stated to have been effected at 14s. 4½d. per ton, f.o.b., March shipment. Several large quantities of best Blyth steams have been arranged for shipment over next year at 13s., f.o.b. A further quantity of 50,000 tons of superior West Tyne bunkers has been sold for shipment to coaling stations over next year at, it is stated, a somewhat better price than was secured in respect of the half-million tons of this class of coal the sale of which was recently reported. Contracts aggregating 150,000 tons of superior South Durham bunkers have been fixed up for shipment over next year at from 12s. 6d. to 13s. per ton f.o.b.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	14/9	14/6 to 14/9
Do. Tynes (Bowers, &c.) .....	14/9 to 15/	14/6 to 14/9
Secondary, Blyths .....	12/6	12/6
Do. Tynes (Hastings or West Hartleys) .....	12/6 to 13/	12/6 to 13/
Unscreened .....	11/ to 12/	11/6 to 12/6
Small, Blyths .....	7/6	7/6
Do. Tynes .....	6/6	6/6
Do. specials .....	8/6 to 8/9	8/6 to 9/
Other sorts:—		
Smithies .....	13/6	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	15/3 to 15/6	15/6 to 16/
Secondary gas coals (Pelaw Main or similar)	13/6 to 14/	13/6
Special gas coals .....	15/6 to 16/	15/6 to 16/
Unscreened bunkers, Durhams	12/9 to 14/	13/ to 13/9
Do. do. Northumbrians	10/6 to 11/6	11/6 to 12/6
Coking coals .....	13/3 to 13/9	13/6 to 13/9
Do. smalls .....	12/ to 12/6	13/ to 13/3
House coals .....	15/6	15/6
Coke, foundry .....	21/ to 22/	21/ to 23/
Do. blast-furnace .....	19/ to 20/	18/ to 19/
Do. gas .....	16/ to 17/3	16/3 to 17/6

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 94,230 tons of coal and 185 tons of coke, as compared with 108,535 tons of coal and 1,580 tons of coke for the corresponding period of 1912, being an decrease of 14,255 tons of

coal and 1,395 tons of coke. The coal market shows no fresh features: loading turns are still congested, for prompt shipment prices are fully steady, but for December and later sellers are more numerous, and the tendency for all grades is easier, holders being more disposed to come to terms; first and second gas qualities command recent figures, and bunkers are also in good request at previous value. Good ordinary bunker coal is reported to be offering at about 11s. f.o.b. over next year. There is a little better demand for house coal, foundry coke is scarce, and price is firmer. A quantity of good coking smalls is reported sold November to June at 11s. 6d., and a similar class of coal may be bought from January to December at 11s. A contract for 10,000 tons of best Durham foundry coke is reported at 20s. 6d. f.o.b. over next year. It is said that the North Eastern Railway is enquiring for their annual requirements for locomotive coal of about 500,000 tons. The outward freight market is a little firmer. Mediterranean is represented by Genoa at 8s. 3d., Malta 7s., Algiers 6s. 7½d., Naples 8s. 1½d., Savona 8s., Palermo 9s., Venice 10s., Port Said 8s. 6d., Alexandria 8s. 9d., and Constantinople 9s. 6d. Baltic has been busier with fixtures for Reval at 5s. 9d., Kiel 5s., Libau 5s. 6d., Veile 5s., Kolding 5s. 4½d., Helsingfors 5s. 10½d., Stockholm 5s. 6d. Bay is quiet on the basis of St. Nazaire 5s. 3d., Bayonne 7s., Oporto 9s. 6d. Coasting is steadier. London 3s. 4½d., Hamburg 3s. 9d., Rotterdam 3s. 9d., and Boulogne 4s. 9d.

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/9
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	17/	16/6
Ordinary do. ....	16/6	15/6
Other sorts:—		
Lambton screened .....	15/6	15/6
South Hetton do. ....	15/3	15/3
Lambton unscreened .....	13/9	13/6
South Hetton do. ....	13/9	13/6
Do. treble nuts	16/6	16/3
Coking coals unscreened ..	13/	13/9
Do. smalls .....	12/6	12/6
Smithies .....	15/9	15/
Peas and nuts .....	16/6	16/
Best bunkers .....	14/	13/6
Ordinary bunkers ..	13/6	12/6
Coke:—		
Foundry coke .....	21/	19/9
Blast-furnace coke (divrd. Teesside furnaces) .....	19/6 to 20/	18/6
Gas coke .....	17/	16/6

## Middlesbrough-on-Tees.

## COAL.

In the fuel market there is a steady feeling and prices all round are maintained. Activity continues in the gas coal branch, demand being good, and deliveries heavy, especially so far as the better qualities are concerned. Best Durham gas coal is 15s. 3d. to 15s. 6d., seconds 14s., and specials 16s. Bunker coal is in rather heavy demand, but an ample supply fully meets needs. Ordinary Durham bunkers run from 12s. 9d. to 14s., f.o.b. superior sorts 13s. 6d. to 14s., and special kinds 14s. 6d. to 15s. A report is current that the North Eastern Railway Company is about to enter the market for their annual requirements of locomotive coal, which amount to half a million tons of varying grades. Coking coal is fairly well taken up at prices ranging from 13s. to 14s. A contract for good coking smalls delivered up to June is understood to have been made at 11s. 6d. Household coal is 15s. 6d. to 15s. 9d. Coke is still very scarce and prices are firm. Best foundry coke for shipment is in the neighbourhood of 22s. 6d. f.o.b., gashouse coke is put at 17s. 9d. Local requirements are by no means easily satisfied. Nothing below 18s. 6d. is named for average blastfurnace coke delivered at Teesside works, and up to 19s. has been paid.

## IRON.

There is some improvement in pig iron so far as Cleveland kinds are concerned, values of which have taken an upward turn, but the hematite branch of the staple industry continues weak and neglected. Producers of pig iron generally complain that current prices are unremunerative and threaten to put more furnaces out of blast. At the Linthorpe Ironworks a hematite furnace is being put out of operation. Sheffield consumers of hematite have this week attended the Middlesbrough market, but so far as can be ascertained, have not been buying. No. 3 g.m.b. Cleveland pig has realised 49s. 9d. f.o.b., and that may be given as the general market quotation; whilst No. 1 is 52s. 3d., No. 4 foundry 49s. 3d., No. 4 forge 49s. and mottled and white iron each 48s. 9d., all for early delivery. The foregoing are merchants' quotations. Makers ask higher rates, many of them naming 51s. for spring delivery of No. 3. Though a sale of mixed numbers east coast hematite pig at 62s. has this week been recorded, the conditions were exceptional. There are sellers at 61s. for either early or forward delivery, and some customers consider that the price should be in the neighbourhood of 60s. Foreign ore merchants continue to take a firm stand, and they still quote on the basis of 19s. ex-ship Tees for rubio of 50 per cent. quality. Producers of most descriptions of manufactured iron and steel are busily employed, but orders are coming in only slowly. There are no changes in quotations to record, but reductions are anticipated, and consequently consumers are holding off.

## South-West Lancashire.

## COAL.

In the inland household coal trade during the last week, there seemed a dawn of a better demand and, at the moment, the production seems to be going away as made. Screened coal for forge and manufacturing purposes is rather a disappointing feature, the takings being considerably below the maximum. With regard to shipping, there is really very little change. Requirements of bunker coals are not up to the average and what is doing is mainly on contract account, there being unusually little open sale enquiry. Quotations for screened Lancashire steam coals remain about as last reported—viz., 13s. to 13s. 3d. f.o.b. for ordinary grades, and up to 13s. 9d. f.o.b. or thereabouts for

from Scottish ports during the week of 106 tons over the previous week and compared with the same week last year, 22,179 tons against 347,908 tons last week and the corresponding week of last year.



the best, but for fairly prompt shipment reductions might, in some cases, be obtained. Except as regards Dublin, the coastwise and cross-Channel trade is in a very healthy condition. In slacks, the consumption weekly approaches nearer to the supply, and there is no great amount in the siding awaiting orders.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/	17/
Do. (f.o.b. Garston, net) .....	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/ to 13/9	13/ to 14/
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

South Lancashire and Cheshire.

COAL.

The Manchester Coal Exchange was well attended on Tuesday. There is some slight improvement visible in the demand for house coal as compared with the last few weeks. Prices are unchanged. Furnace coal is going backward, but prices remain steady, while there is a moderate call for shipping coal. Slack is moving away in good quantities, with ample supplies offering. Prices are shaded in places to clear wagons. Prices generally are as follows:—

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 14/	13/3 to 14/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

IRON.

There is nothing new to report and trade generally remains in a depressed condition. No. 3 can be bought at 56s. 6d. delivered at Manchester. Foundries are not busy. Short time is being worked at most of the forges and it is expected that a reduction in the associated prices will take place very shortly; in the meantime, prices remain as last reported, viz., Crown bars £7 15s., second quality £7 5s., hoops £8 7s. 6d., sheets £9 2s. 6d. Steelworks are keeping working but foreign competition is handicapping most of them very much. Wagons keep fairly well up in price, but the various works are not too busy and it is expected that a reduction will take place here shortly.

Yorkshire and Derbyshire.

Leeds.

COAL.

There was a full and representative gathering on the Yorkshire Coal Exchange on Tuesday, and business in prompt parcels of steam coal and gas coal was fairly good. A good many of the Hull exporters were present, and were buyers of Hartleys. Apart from these things, however, the market was quiet, very few of the spot lots of manufacturing fuel changing hands. The pits have worked something less than five days on the average, and although stocks of house coal have not been increased these are still considerable. Empty wagons have been scarce, and there are again complaints of traffic difficulties.

House Coal.—Reports from the distant markets show that the retail trade is very quiet, and merchants are sending very few orders to this district. Supplies of private wagons, however, are fairly good, but are taking little beyond contract tonnage. The best qualities are weak, although officially no alterations have been made in quotations. Coastwise shipments are about the average for the time of the year, but the qualities selling principally for the south coast are the medium sorts of Silkstone house coal. Freights are about the same as last week. West Riding merchants are not by any means fully employed. There

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	14/6 to 15/	14/6 to 15/
Wallsend & London best	14/ to 14/6	14/ to 14/6
Silkstone best .....	14/ to 14/6	14/ to 14/6
Do. house .....	12/ to 12/6	12/ to 12/6
House nuts .....	11/6 to 12/	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best.....	17/ to 18/	17/ to 18/
Silkstone best .....	16/ to 17/	16/ to 17/
Do. house .....	14/6 to 15/6	14/6 to 15/6
Other qualities.....	14/ to 14/6	14/ to 14/6
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 11/6	11/ to 11/6
Unscreened gas coal ...	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	10/3 to 11/	10/3 to 11/
Large double-screened engine nuts .....	9/9 to 10/6	9/9 to 10/6
Small nuts .....	9/ to 9/6	9/ to 9/6
Rough unscreened engine coal .....	9/3 to 9/9	9/3 to 9/9
Best rough slacks .....	7/ to 7/6	7/ to 7/6
Small do. ....	6/ to 6/6	6/ to 6/6
Coking smalls .....	6/ to 6/6	6/ to 6/6
Coke:—		
Price at ovens:		
Furnace coke .....	12/ to 12/6	12/ to 12/6

has been a slight improvement in the local retail trade, but this applies mainly to washed house nuts and secondary qualities suitable for bagging. Current quotations:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other qualities, 14s. to 15s. 6d.

Gas Coal.—There is very little new to report in this branch of the trade. Forward business is quiet, but the output of the pits is readily cleared in satisfaction of current contracts. Extra pressure is being brought to bear on the collieries in view of the approaching holidays. One or two export orders have been placed within the last few days at prices which average about 6d. per ton below the season's contract figures.

Manufacturing Fuel.—Slacks are very freely offered, and special prices are continually met with. Stocks are heavy, as the consumption in the Bradford and Huddersfield districts is very much below the average. Washed fuel, especially washed nuts, are firmly maintained.

Washed Furnace Coke.—A few sales of washed patent oven coke are reported for delivery to the Middlesbrough district at 13s. per ton at the ovens. Apart from this, however, prices are still in the neighbourhood of 12s. to 12s. 6d. per ton, and buyers are only covering to the end of the year, in the expectation of lower prices. Most of the ranges of patent ovens are on short blast, and the output of coke is probably about 75 per cent. of the capacity.

Barnsley.

COAL.

The activity of the demand for Russia continues to be still pronounced, and although the higher ports are about to be closed, the volume of business shows very little decline. However, the output continues to be a little in excess of the demand and buyers are operating with more success, especially with regard to secondary descriptions of large steams. The surplus of best Barnsley hards is being almost entirely taken on home account, exporters refusing to pay the prices demanded by the coalowners. Values have suffered a little, owing to the realisation of coal in second hands, but this weakness is expected to soon pass away and already prices are stronger for this class of coal on current account, values being from 12s. 3d. to 12s. 6d. per ton. Secondary descriptions of large steams are still more competitive and are about 11s. per ton. With regard to next year's business, some little movement is being made, but on the whole little is being done. Railway companies have not yet allotted their contracts, but there seems to be every belief that, so far as the best hards are concerned, the advance of 1s. (making the price 12s. 6d. per ton) will be conceded, as the companies are showing perhaps a greater disposition this year to obtaining a full tonnage of the best fuel which they can meet with. The position hardly appears to be so promising, from the coalowners' point of view, with regard to secondary grade steams, which are now largely produced in the district, and it appears doubtful whether the advance will be obtained. It is reported that on shipment account, South Yorkshire Association hards have been bought at 13s. 10½d. per ton f.o.b. Hull, for delivery over next year—about 1s. per ton less than what collieries have been asking. The demand for small manufacturing fuel shows very little change and greater activity has been known within recent periods. The general enquiry continues to be good for washed nuts and best sorts maintain their values, but secondary descriptions are a shade easier. The accumulation of slacks continues and less prices have to be taken to stimulate business, but the output is still rather heavy, in spite of the lesser consumption in the cotton districts. With regard to house coal, the demand has improved considerably and best qualities are moving off rather better, but the bulk of the trade is still being done for cheaper qualities, and, where stocks have accumulated, any rush of orders has been speedily dealt with.

Prices at pit.

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	15/6 to 16/	15/6 to 16/
Best Barnsley softs.....	15/ to 15/3	15/ to 15/3
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	13/ to 13/6	13/ to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/ to 12/3	12/ to 12/3
Secondary do. ....	11/	11/ to 11/3
Best washed nuts .....	11/ to 11/3	11/3 to 11/6
Secondary do. ....	10/ to 10/3	10/3 to 10/6
Best slack.....	7/	7/3 to 7/6
Rough do.....	6/	6/ to 6/6
Gas coals:—		
Screened gas coals .....	12/6	12/6 to 13/
Unscreened do. ....	11/ to 11/3	11/ to 12/
Gas nuts .....	12/	12/ to 12/3
Furnace coke .....	12/	12/

Hull.

COAL.

The Humber coal market is moderately active. What buying there is going on is of the hand-to-mouth description to meet immediate requirements in the completion of contracts. The opinion gains ground that the tendency of prices is downward rather than upward; hence the cautious buying and the refusal of exporters to commit themselves far ahead. Nevertheless, the export demand is very good for the time of year, and this helps materially to keep best kinds of South Yorkshire steams firm. On the week their value is unchanged, but secondary sorts are marked down 3d. to 6d. per ton, the depression being accentuated by the fact that South Yorkshire has been unable to obtain a share of the Swedish State Railways extra contract. Gas coals are somewhat easier, but with colder weather house coals are steady, with a slightly improved demand, though this is not by any means so great as could be desired. Shipments at the docks keep up, and the November returns should show a substantial advance. The freight market is quiet, and only few fixtures are being made. Those for the Baltic ports are on the basis of Riga 6s. and Swedish Sound 5s. 6d. Mediterranean rates are round about 8s. Genoa and 8s. 2d. Alexandria. Big tonnage is in good request for Black Sea loading, and is being taken up at 9s., which has been paid to-day for three steamers for Odessa or Nicolaieff. The following are the approximate prices for prompt shipment f.o.b. Hull:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards.....	15/	15/
Washed double-screened nuts .....	13/ to 13/3	13/6 to 13/9
Unwashed double-screened nuts .....	12/6 to 12/9	12/9 to 13/
Washed single-screened nuts .....	12/6 to 12/9	13/ to 13/3
Unwashed single-screened nuts .....	12/ to 12/6	12/ to 12/6
Washed smalls.....	10/ to 10/3	10/ to 10/3
Unwashed smalls.....	9/ to 9/3	9/ to 9/3
West Yorkshire:—		
Hartleys .....	13/6	13/6
Rough slack .....	9/ to 9/3	9/ to 9/3
Pea slack .....	8/3 to 8/6	8/3 to 8/6
Best Silkstone screened gas coal .....	14/3	14/3 to 14/6
Best Silkstone unscreened gas coal .....	12/	12/
Derbyshire:—		
Best eteam hards (Hull) .....	15/3	15/3
Do. (Grimsby) .....	15/	15/
Derbyshire nuts (doubles) .....	13/	13/
Derbyshire nuts (doubles) (Grimsby).....	12/9	12/9
Derbyshire large nuts ...	14/ to 14/6	14/ to 14/6
Do. do. (Grimsby) .....	14/	14/
Nottinghamshire hards ...	15/3	15/3
Do. do. (Grimsby) .....	15/	15/

Chesterfield.

COAL.

The demand for house coal has fallen off considerably and is much below the normal autumn requirements of the country generally. The position is causing collieries some anxiety and it is feared that, unless there is an early improvement, a reduction of the number of working days will become inevitable. A spell of cold weather would quickly alter the situation. There is a steady call for fuel for manufacturing purposes and prices are well maintained. Prospects for the next few months are distinctly good owing to the satisfactory condition of the heavy steel trades of Sheffield and district, which will, it is anticipated, require as much coal as they have done during the present exceptionally busy year. Cobbles and nuts for gas-producers continue to move freely, and prices remain firm. There is no change in the condition of the market for fuel for steam-raising purposes. The demand for slack is at the moment fully met by the supply, which is pretty plentiful. Prices for current delivery are easier, but for next year's requirements values are firmly held. Steam coal for locomotive use is in steady demand, while prices for delivery over next year show an advance of 1s. per ton upon expiring contracts. There is greater activity in the export trade than is usual at this time of the year. Prices of best Derbyshire top hards are firm at 15s. per ton free alongside steamer at Immingham or Grimsby. Few, if any, contracts for steam coal over next year have been arranged up to the present. Buyers are still adopting a waiting policy which has not, up till now, derived any advantage, as collieries are in a strong position and can afford to await the course of events. Orders already on their books are almost sufficient to ensure the regular working of the pits until the opening of the next shipping season. Shipments are now proceeding vigorously. Gas coal is in brisk demand and stocks are low. There is a good business passing in cobbles and large nuts for near Continental ports, and no difficulty is experienced in disposing of the whole production of this class of coal. Washed fuel continues in steady request without any change in prices. Coke for blastfurnaces and for steel making is in slightly better demand with a slight appreciation in values.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	8/3	8/6

IRON.

The iron trade continues in the same depressed condition which has characterised it during the last few months. The demand is poor and prices of pig iron are slightly weaker. There is no prospect of any improvement at present.

Nottingham.

COAL.

Taking the coal trade of Nottinghamshire as a whole, there are indications of an early improvement, the colder weather which has prevailed during the past week having a tendency to stimulate business in one or two directions. It is already giving some assistance to the domestic fuel section, householders in many instances commencing to replenish their stocks in view of the approach of Christmas. The business done by local merchants and at the landsale depots is on the increase, but the improvement so far has not been sufficient to materially affect the position at the collieries, most of which can comfortably cope with the orders. Secondary qualities continue in good request, but best sorts are going out of hand steadily. Owners generally are maintaining recent quotations. In the steam coal branch there is less activity consequent on the decline in

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	14/ to 14/6	14/ to 14/6
Good house coals.....	13/ to 13/6	13/ to 14/
Secondary do. ....	11/ to 12/	11/ to 12/
Best hard coals .....	11/3 to 11/9	11/3 to 11/9
Secondary do. ....	10/ to 10/6	10/ to 10/9
Slacks (best hards).....	7/9 to 8/3	8/ to 8/6
Do. (seconds) .....	6/9 to 7/6	7/ to 7/6
Do. (soft).....	6/9 to 7/6	7/ to 7/6



ports, but there is a good demand in the home market for industrials. Values are inclined to fall slightly, more particularly in regard to secondary qualities. For best hards the market is more favourable to owners. There is no marked change in the position of slacks, which are not selling so well as a few weeks ago. While the demand for bests and peas is good, other qualities are not in active request, and cheap lots are obtainable in cases where there are abnormal stocks. The trade in gas coal is satisfactory, but coke is having a slow sale.

### Lelcestershire.

#### COAL.

The condition of business in this district is much as it was when last writing. There is a steady business doing, but there is no pressure. The household coal market is as quiet as for some weeks past. The best qualities are in very small demand, but there is rather a better enquiry for the middle qualities, and for small coals, cobbles and nuts. The business in steam coals is well maintained, all sorts of this coal are wanted, not only cobbles and coal, but nut slacks and ordinary engine slacks. There is no increase in the amount of the output, and stocks are in some quarters much heavier. The bulk of the stock is of household coal. Local merchants are still quiet, and until there is colder weather the consumption of household coal is not likely to increase. There is a fair amount of business locally in steam coal and engine slacks. The quotations are but little altered as a rule. Those current for some time are held, but there is some easiness reported to clear stocks when they have accumulated.

### South Staffordshire, North Worcestershire and Warwickshire.

#### Hednesford.

#### COAL.

There is very little change to report this week in connection with the coal trade of the Cannock Chase district. Generally speaking a fairly satisfactory business is being done. The collieries are well employed, most of them working full time, and they appear likely to be kept busy. Prices are about the same as when last reported. The demand for house coal is maintained, and there is an improving tendency. The enquiry for coal for manufacturing purposes continues satisfactory. There is still room for improvement in the demand for slack. There is no material change in the condition of business at the landsale depots.

#### Birmingham.

#### COAL.

The continuance of open weather is retarding sales of house fuel, but manufacturing qualities are in fairly steady demand. Slacks are particularly enquired for, and here and there 3d. a ton has been put on for the purpose of checking demand. Prices are unchanged as follow:—

#### Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/6
Do. seconds deep.....	16/	16/
Do. best shallow.....	14/9	14/9
Do. seconds do.....	14/	14/
Best hard.....	15/	15/
Forge coal.....	11/	11/
Slack.....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand - picked cobs .....	14/	14/
Best hard spires .....	15/	15/
Forge (steam) .....	11/	11/
D.S. nuts (steam) .....	10/	10/
Small (do.) .....	8/3	8/3

#### IRON.

The position of affairs in the steel industry was an interesting topic of discussion at Thursday's market. In Scotland the rebate system has been dropped, and the association itself is in a parlous state, inasmuch as it is understood that sections are "free" in all districts. As a set-off to the rebate, Scotch makers retain the liberty to give an extra discount of 5s. a ton to rebate customers, which is pretty much the same thing as a rebate, only it is not compulsory. English makers, on the other hand, will retain the rebate system intact, and they have not dropped prices, which now, they say, do not yield a working profit. The situation is rather complicated, and the primary cause of the movement in the north is the stress of German and Belgian competition. Finished German steel is quoted £4 10s. f.o.b. Antwerp, or about £5 7s. 6d. delivered here, and in face of these prices British makers must find difficulty in getting orders. Their prices are £6 10s., and in some cases £6 5s. The market did not show much, if any, move towards recovery of demand. Pig iron is sold in lots of 25 to 50 tons only, consumers exercising much caution in their dealings. Makers of the best quality of Northamptonshire forge stick to their prices, as having blown out furnaces they are in a more independent position. The commoner qualities, however, are bought as low as 49s. a ton, Derbyshire is 52s. to 53s., and Staffordshire 50s. to 52s. 6d., the latter being the quotation for part-mine. The bar-iron trade is irregular. The standard houses are the best occupied, but they are getting no forward business. Merchant qualities average £7 a ton delivered Birmingham, and business is not very satisfactory. Some of the mills are not working more than three turns a week. Nut and bolt stuff still suffers severely from the glut of Belgian material coming in at practically 15s. a ton below local rates. North Staffordshire bars are quoted £7 15s. a ton, and it is understood Lancashire bars are being delivered in this district at that figure. Galvanised sheets retain the same position they occupied a week ago. The chief orders are declining under £10 15s.; some have as much as £10 15s. can do up to the end of January, and are booking for the first of February. Black sheets, on the other hand, are in a better position, and makers will sell at £7 10s. to £7 15s. for

doubles; the best of them are not asking more than the latter figure. The gas strip trade is quiet, with prices unchanged. Copper sheets have been reduced £3 a ton since last week.

### Forest of Dean.

#### Lydney.

#### COAL.

Generally speaking there is very little change to report in the condition of the coal trade of this neighbourhood. In the steam coal branch of the trade buyers are scarce, and the pits are not working full time. Prices, too, show a weakness, and to avoid heavy stocks cheap sales have to be resorted to, in order to effect a clearance. The house coal producing pits are only averaging four or five days' work each week, and stocks, even with this restricted output, are excessive for the period of the year. Slacks are now meeting with a better demand.

#### Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	17/6
Forest .....	16/6	16/6
Rubble .....	16/9	16/9
Nuts .....	15/	15/
Rough slack .....	6/6	6/6
Steam coal:—		
Large .....	12/ to 13/	12/ to 13/
Small .....	8/ to 9/	8/ to 9/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

### THE WELSH COAL AND IRON TRADES.

THURSDAY, NOVEMBER 27.

#### North Wales.

#### Wrexham.

#### COAL.

Labour disputes at Liverpool still prevail. This time it is the motor carmen who have tabulated a grievance, and have demanded higher wages, together with a reduction in the hours to be worked. The carters' union have taken up their cause, and a resolution has been carried to the effect that no member of this union will handle traffic of any description for any of the firms who have not acceded to the men's demands. The result is that about 400 men are affected. In addition to this there is continual shortage of labour at the Liverpool docks. Business in the coal market here is still of a satisfactory character, and there is no diminution in the amount of trade done. As far as can be ascertained, practically all the pits are working at full stretch. In the house coal trade, the demand is practically identical with that which prevailed last week, and rail-borne and landsale business is well maintained. With reference to gas coal, this is pretty much as usual, it is being freely disposed of against contracts for the greater part. In some cases the gasworks are taking a little more than their average weekly contract quantity. The demand for steam coal is quite good. Owing to the continued open weather all the brickworks and other manufacturing works are enabled to work full time, and are taking a goodly tonnage of coal for their requirements; then the railway companies are responsible for a goodly portion of the output which is taken against locomotive coal contracts. The shipping trade at Birkenhead, Garston and Ellesmere Port is fairly good also, and the prices obtained for this trade are quite up to the average. With reference to small coal, nuts are practically unobtainable in the open market to any extent, and slack sold freely at prices very much on a par with what were obtained during the week previous. Gas coke has a fair market, but from what I can gather, there has been no alteration in the average price obtained.

#### Prices at pit.

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal .....	15/6 to 16/6	15/6 to 16/6
Secondary do. ....	14/6 to 15/6	14/6 to 15/6
Steam coal .....	12/6 to 13/6	12/9 to 13/6
Gas coal .....	13/ to 13/9	13/ to 14/
Bunkers.....	12/3 to 12/6	12/3 to 12/9
Nuts .....	11/3 to 11/9	11/6 to 12/
Slack .....	6/6 to 8/	6/6 to 8/
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 18/9	17/6 to 18/9
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

### Monmouthshire, South Wales, &c.

#### Newport.

#### COAL.

The improvement lately recorded in the steam coal trade has been fully held this week, and even developed. Chartering is more active, expanding rapidly the last day or two, while tonnage is fairly plentiful and shipments heavy.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	17/6 to 18/	17/6 to 18/
Western-valleys, ordinary	16/3 to 16/9	16/3 to 16/9
Best Eastern-valleys .....	15/6 to 16/3	15/9 to 16/3
Secondary do. ....	15/3 to 15/6	15/3 to 15/9
Best small coals .....	8/3 to 8/9	8/3 to 8/9
Secondary do. ....	7/9 to 8/	7/9 to 8/
Inferior do. ....	7/ to 7/6	7/ to 7/6
Screenings .....	8/6 to 8/9	8/6 to 8/9
Through coals .....	12/3 to 12/9	12/3 to 12/9
Best washed nuts .....	13/6 to 14/	13/6 to 14/
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/ to 20/	19/ to 20/
Furnace coke .....	19/ to 20/	19/ to 20/
Foundry coke .....	23/ to 25/	23/ to 25/

Colliery stems have filled up well for the next fortnight many collieries being now well booked right up to the end of the year, and rather independent in consequence of accepting further business. Best grade coals, Black Veins, and western-valleys, are relatively the strongest, while eastern-valleys scarcely show as much improvement. Smalls meet with a fair enquiry, values remaining about steady. Throughs, nuts, &c., maintain their position without change. The house coal trade continues to show no great signs of expansion, the comparative mildness of the season helping to keep down the consumption. Pitwood remains rather scarcer than buyers like, although values have fallen away a little to 22s. 6d. for good wood ex-ship.

#### IRON.

Local conditions in the iron and steel trades remain very much as a week ago, there being hardly any fresh business passing and not a great deal of enquiry received. Bar mills show work fairly good and output normal. Imports of foreign bars are exceedingly heavy, last week's total being 12,000 tons, with quotations from the Continent relaxed. Rail mills continue fairly well engaged, with a fair amount of fresh booking at last quoted rates. The pig iron market shows little change, official quotations for Welsh hematite being unaltered, while the influx of new orders is hardly equal to expectations. Iron ore values are unchanged. A better enquiry has been showing for tin-plates than for some months past, but forward business remains slow as yet with quotations nominally unaltered. Steel rails: heavy sections, £6 10s. to £6 15s.; light sections, £6 15s. to £7. Tin-plate bars: Bessemer steel, £4 15s., Siemens steel £4 16s. 3d. to £4 17s. 6d. Tin-plates: Bessemer primes, 20 x 14, 13s.; Siemens primes, 20 x 14, 13s. to 13s. 1½d. Pig iron: Welsh hematite, 69s. delivered locally. Finished black-plate, £9 10s. ton. Iron ore: Best Rubio, 18s. 6d. to 19s. c.i.f. Newport.

#### Cardiff.

#### COAL.

The principal event this week has been the placing of contracts by the Admiralty for their requirements over next year. As usual there is no information obtainable as to the precise quantity purchased, inasmuch as each colliery approached had simply to state what quantity of coal they were prepared to place at the disposal of the Admiralty, and at what price, but judging from past experience, it is probable that the contracts aggregated something like 1,500,000 tons. Neither the Admiralty agents nor the collieries were in a position to state what was the range of prices, as they were all pledged to secrecy, but as it has long been a foregone conclusion that for the best coals an advance of at least 9d. to 1s. per ton would have to be paid on the prices accepted last year, some idea may be gathered as to the amount of the tenders sent in. For best steams it is probable that the prices are from 18s. 3d. to 18s. 6d. net, whilst for secondary qualities they are about 17s. net. For the coals required for the naval manœuvres it is customary to pay 6d. per ton more. In addition to coals on the Admiralty list, it is customary to purchase certain quantities of semi-bituminous coals for mixing purposes, and these would probably be obtained at from 16s. 3d. to 16s. 6d. per ton. As all the prices had for the most part been discounted previously, the fixing up of the contracts had no effect on the market, current prices for best Admiralties being still 20s. 6d. to 21s., whilst superior seconds are 19s. 9d. to 20s. 3d., and ordinary seconds 18s. 9d. to 19s. It has been usual for some buyers to withhold their contracts until they could glean what the Admiralty had agreed to pay, but on the present occasion it was very generally conceded that no advantage was to be gained by the adoption of such a course. Several of the largest exporters, as well as the more important steamship companies, had previously come into the market for their supplies, and it was very wise that they did, for if they had delayed their purchases and had to come on to the market altogether, they would certainly have had to pay a higher price for their coals. The French Transatlantique Steamship Company, who, as stated last week, had arranged for a portion of their supplies on the basis of 17s. 6d. to 17s. 9d. for superior second-class Admiralty coals, have since arranged for the remainder of their requirements. Altogether it is estimated that they have bought something like 300,000 tons, but a large portion of this was of the ordinary second Admiralties, which they were able to obtain at about 17s. net. A similar price has been paid by the Peninsular and Oriental Steamship Company, who have contracted for a considerable part, if not the whole of their requirements, from South Wales. This company usually take from 300,000 to 400,000 tons, and rumours that they had purchased ordinary second Admiralties had a very firming effect on these coals. The placing of these contracts has naturally given an impetus to trade over next year and, amongst other enquiries which have come forward since last week, is that of the North of Spain Railways, who ask for tenders for the supply of 50,000 tons of ordinary Cardiff large steams for delivery into trucks at the usual ports from January to October. It is also reported that the Società Romana Carboni are in the market for 45,000 tons over next year—viz., six bi-monthly cargoes of 5,000 tons each for delivery at Palermo, and six of 2,500 tons each for delivery at Syracuse, best Cardiff large steams being required. Prices have to be in at the end of November for reply on December 10. With regard to current business, there is very little doing. As a matter of fact, very few collieries are in a position to quote, so heavily booked are they to the end of December, to say nothing of the arrears which they have to make up before the commencement of another year. They are being pressed on all sides and the shipments from Cardiff alone last week amounted to 428,000 tons. Tonnage is plentiful and the charterings last week represented something like 315,000 tons. Freight rates are still on the easy side, boats for Genoa being obtainable at about 7s. 9d., and it is possible that, for the next two or three weeks, the shipments will continue to go up. These will, no doubt, be helped by the increased outputs which are expected to take place. The dispute at the Llanhilleth Colliery, which has kept idle some 2,000 men, was settled on Monday, and work was expected to be fully resumed in a day or two. Work has also been commenced in some parts of the Senghenydd Colliery. Some buyers had hoped that as the outputs once more assumed normal proportions, they would be able to purchase on easier terms, but there is no prospect of this. Though the strike of 70,000 miners in France was never expected to be very prolonged, especially as the Chamber of Deputies in Paris on Monday passed a law fixing an eight hours' working day with optional overtime



Prices f.o.b. Cardiff (except where otherwise stated).		
	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	20/6 to 21/	20/6 to 21/
Superior seconds .....	19/9 to 20/3	19/9 to 20/3
Ordinary do. ....	18/6 to 19/	19/ to 19/3
Best bunker smalls.....	10/9 to 11/	10/9 to 11/
Best ordinaries.....	10/6	10/6
Cargo qualities .....	7/6	7/6 to 7/9
Inferior smalls.....	6/6 to 7/	6/6 to 7/
Best dry coals .....	19/ to 19/6	19/ to 19/6
Ordinary drys .....	17/ to 17/6	17/ to 17/6
Best washed nuts .....	16/ to 16/6	16/ to 16/6
Seconds .....	15/ to 15/6	15/ to 15/6
Best washed peas .....	14/6	14/3 to 14/6
Seconds .....	13/9 to 14/	13/ to 13/3
Dock screenings .....	12/9 to 13/	12/6 to 13/
Monmouthshire—		
Black Veins .....	18/ to 18/3	18/ to 18/3
Western-valleys .....	17/ to 17/3	17/ to 17/3
Eastern-valleys .....	16/3 to 16/6	16/ to 16/3
Inferior do. ....	14/9 to 15/3	15/3 to 15/6
Bituminous coals:—		
Best house coals (at pit) .....	20/6	20/6
Second qualities (at pit) .....	17/6 to 18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/	17/3 to 17/6
Through-and-through... ..	15/	14/6 to 15/
Small .....	12/ to 12/3	12/ to 12/6
No. 2 Rhondda—		
Large .....	13/9	13/6 to 13/9
Through-and-through... ..	11/6	11/6
Small .....	8/	8/ to 8/6
Best patent fuel .....	22/6	22/6
Seconds .....	20/ to 21/6	20/ to 21/6
Special foundry coke .....	27/ to 28/	27/ to 28/
Ordinary do. ....	22/ to 25/	23/ to 25/
Furnace coke .....	20/	19/ to 21/
Pitwood (ex-ship) .....	22/6 to 24/	24/ to 24/6

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

not to exceed 60 hours in one year, which was really what the men were fighting for, the strike could not but have a disturbing effect on the markets in that country, and some increased demand for Welsh steam coals may be looked forward to. But this will chiefly affect the Monmouthshire coals, which have decidedly become firmer. Black Veins are selling at 18s. to 18s. 3d., western valleys 17s. to 17s. 3d., and best eastern valleys 16s. to 16s. 6d. f.o.b. Cardiff. The small coal market continues very depressed. No further orders have been received from the Belgian State Railways, who appear to have bought 150,000 tons from home collieries. Welsh bunkerings are still offering at 10s. 9d. to 11s., and cargo qualities at round about 7s. 6d., but an improvement is looked forward to next month. There has been a very strong demand for dock screenings, and until a few days ago 13s. was obtainable, but the market at the time of writing had a slight downward tendency. The shipments of coal to foreign countries for the 10 months ending October 31 amounted to 24,965,486 tons as against 21,024,968 tons in the corresponding period of last year, being an increase of 3,940,518 tons. The following table shows the exports to the chief countries as well as the increase or decrease as compared with the 10 months of last year:—

	Total Ten months. 1913.	Increase.	Decrease.
	Tons.	Tons.	Tons.
Russia .....	536,046	91,912	—
Sweden .....	196,361	12,357	—
Norway .....	89,294	—	10,627
Denmark .....	31,565	534	—
Germany .....	261,405	61,873	—
Netherlands .....	102,294	—	16,910
Java .....	20,411	—	7,820
Dutch possessions in			
Indian Seas .....	12,448	2,538	—
Belgium .....	411,580	156,351	—
France .....	6,085,676	1,479,878	—
Algeria .....	628,584	193,979	—
French Somaliland... ..	49,557	30,795	—
Madagascar .....	13,044	—	2,307
Bourbon (Reunion) .....	7,407	3,099	—
Portugal .....	669,332	154,402	—
Azores .....	14,935	—	12,030
Madeira .....	105,336	—	9,297
Spain .....	1,111,499	256,231	—
Canary Islands .....	573,810	1,213	—
Italy .....	4,650,653	370,729	—
Italian East Africa .....	5,301	—	20,811
Austria-Hungary .....	277,117	155,288	—
Greece .....	313,026	92,988	—
Bulgaria .....	9,073	—	10,672
Romania .....	153,609	512	—
Turkey (European) .....	95,113	—	7,458
„ (Asiatic) .....	90,648	—	10,281
Egypt .....	1,605,212	202,081	—
Tripoli .....	3,010	—	9,207
Tunis .....	139,720	44,734	—
China (exclusive of			
Hong Kong) .....	25,579	6,995	—
Japan .....	314	—	15,207
Cuba .....	10,337	4,020	—
Mexico .....	19,517	—	610
Peru .....	8,697	—	12,337
Chile .....	376,861	—	37,296
Brazil .....	1,375,107	283,470	—
Uruguay .....	517,330	—	90,545
Argentine Republic .....	2,616,564	349,274	—
Channel Islands.....	51,987	—	12,609
Gibraltar .....	183,434	—	6,134
Malta .....	449,075	195,329	—
Cape of Good Hope .....	36,396	22,729	—
Mauritius .....	29,079	11,598	—
Aden .....	148,559	—	16,433
British India .....	94,864	28,587	—
Straits Settlements .....	18,292	5,155	—
Ceylon .....	191,769	—	1,669

	Total ten months Tons.	Increase. Tons.	Decrease. Tons.
Wei-hai-Wei .....	6,909	909	—
Hong Kong .....	51,303	28,090	—
Canada .....	14,548	2,834	—
Bermudas .....	7,749	1,494	—
British West Indies .....	7,299	273	—
Falkland Islands .....	12,363	9,821	—
West Africa: French .....	135,224	55,314	—
„ Portuguese .....	188,499	—	61,815
„ British .....	83,490	9,428	—

Bituminous coals keep very steady, No. 3 Rhondda large being 17s., and No. 2 ditto 13s. 9d. There is no change in patent fuel. Shipments for the week amounted to about 17,000 tons, of which the Crown Company despatched 4,968 tons and other local makers 2,600 tons, Swansea 6,092 tons, and Newport 3,300 tons. There are large enquiries in the market from Spain, Paragana and Algeria. The coke market is without material change, special foundry being 27s. to 28s., ordinary foundry 22s. to 25s., and furnace coke 20s. per ton. Pitwood seems to have reached top figures; whilst 24s. is still quoted for spot delivery, not more than 22s. 6d. is obtainable for wood to arrive.

IRON.

There is rather more business doing in tinplates, and the shipments for the week amounted to 171,938 boxes, or 58,149 boxes more than were received from works. Stocks are now down to 204,641 boxes as compared with 189,446 boxes at the corresponding date of last year. Some good orders have been received for oil plates, and there is also a steady demand from the Eastern markets. Prices are slightly stiffer, and 12s. 9d. is now the lowest quotation for 14 by 20 cokes. Some makers ask 13s. for option contracts. Over 5,000 tons of steel bars and plates have come to hand from Belgium and Germany, but these shipments were counterbalanced by the despatch of 2,500 tons of plates and bars from Cardiff to Marmagoa. The Association price of tinplate bars still remains at £4 16s. 3d., but business has been done in a few cases at £4 12s. 6d. There is no material change in galvanised sheets. Business is anything but brisk, and 24 gauge corrugateds are still quoted at from £10 10s. to £10 15s. The Mannesmann Tube Company are still considering the question of erecting their works at Newport. Welsh pig iron is fairly steady at 65s. to 66s. f.o.t. There is nothing new to report as regards scrap metals.

Swansea.

COAL.

A considerable reduction was shown in the returns of the trade of the port last week, due to the very severe weather which prevailed. Both the coal and patent fuel trades were quiet. The shipments amounted to 88,932 tons. There was a good attendance on 'Change this morning, and the undertone of the anthracite coal market displayed a strong tone. There were heavy arrivals of tonnage over the weekend, consequently there was a brisk demand for Swansea Valley large. Red Vein large was steady. Machine-made nuts and cobbles, however, were rather slow. Rubbly culm and duff were in poor request, and sellers were prepared to accept very low prices for prompt shipment. In the steam coal market large continued to be strongly quoted, and bunkers maintained their improved position.

Prices f.o.b. Swansea (oash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/6 to 21/6	19/6 to 21/6
Big Vein large (less 2½ per cent.) .....	17/6 to 18/6	17/6 to 18/6
Red Vein large do. ....	14/6 to 16/	14/6 to 16/
Machine-made cobbles (net) .....	21/6 to 24/6	21/6 to 24/6
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 26/	23/6 to 26/
German do. do. ....	23/ to 25/6	23/6 to 26/
Beans (net) .....	16/6 to 18/6	16/6 to 18/6
Machine-made large peas (net) .....	13/3 to 13/9	13/ to 13/9
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	4/6 to 5/6	5/ to 5/6
Duff (net) .....	3/ to 4/	3/ to 4/
Steam coals:—		
Best large (less 2½ p.c.) ..	19/ to 20/	19/ to 20/
Seconds do. ....	14/6 to 15/6	14/6 to 15/6
Bunkers do. ....	10/9 to 12/	10/6 to 11/6
Small do. ....	7/ to 7/6	7/ to 7/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) ..	10/ to 11/	10/ to 11/
Patent fuel do. ....	17/ to 17/6	17/6 to 18/

IRON.

The iron and steel trades were brisk during the past week. There was a good yield of pig iron from the blast-furnaces, and there was a decided improvement at the steel-producing establishments, outputs having increased considerably. Practically all the tin-plate works in the district were experiencing the usual briskness. The shipments of tin-plates last week were 171,938 boxes, receipts from works 113,789 boxes, and stocks in the dock warehouses and vans 204,641 boxes.

Llanelly.

COAL.

Delayed tonnage is responsible for the easy condition of the coal market of this district, and until the present large amount of stock is cleared, there is no hope for prices to get firmer. The gales have now subsided and boats should come along within the next few days. There is no firmness in the market for any particular kind, and buyers are able to pick up spot lots at a substantial reduction in price to have wagons released. So much depends on the weather, and only a cold snap is required to make things go. Anthracite of all classes is rather quiet. Collieries would be glad of orders for large, especially for horticultural qualities. There is no improvement in the demand for

machine made kinds, and very low prices are being quoted for beans. Steam and bituminous qualities have not been so bad for a long time, and works are crowded with loaded wagons. No improvement can be expected for months to come. Prices this week are:—

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	21/ to 22/6	21/ to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large.....	18/ to 19/	18/ to 19/
Red Vein do. ....	14/ to 15/	13/6 to 14/6
Machine-made cobbles ...	20/ to 21/	20/ to 21/
German nuts .....	23/ to 25/	23/ to 25/
French do. ....	23/ to 25/	23/ to 25/
Paris do. ....	23/ to 25/	24/ to 25/
Machine-made beans .....	18/ to 20/	18/ to 20/
Do peas.....	12/6 to 13/6	12/ to 13/
Rubbly culm .....	4/ to 5/3	4/9 to 5/3
Duff .....	4/ to 5/3	4/ to 5/
Other sorts:—		
Large steam coal.....	17/6 to 18/	16/ to 17/
Through-and-through ...	11/ to 11/6	11/ to 11/6
Small .....	9/ to 9/6	9/ to 10/
Bituminous small coal ...	10/ to 11/	10/ to 11/

THE IRISH COAL TRADE.

THURSDAY, NOVEMBER 27.

Dublin.

The Coal Merchants' Association is now adequately provided with free labourers, and the discharge of the coal vessels has been proceeding without interruption during the past week. Merchants are simply overwhelmed with orders awaiting fulfilment owing to the difficulty of effecting deliveries, and police protection is still required. The pressure for supplies at the Custom House docks is such that many of the factors are unable to get their carts loaded, and have to convey the coal for the retail trade from outlying seaside districts, the price per sack of 10 stone now being 3s. 6d. in the city and suburbs. Quotations are about as follow:—Best Orrell, 30s. per ton; best Abram, 29s.; best Wigan, 28s.; best Orrell slack, 24s.; best coke, 26s. per ton, all less the usual 1s. per ton discount for cash. Coal is being supplied by a local firm for the bunkers of the Federation housing and transport ships at present in the port. The few coaling vessels arriving during the week were from Garston, Maryport, Workington, Ayr, Cardiff, Liverpool and Manchester, the total quantity of coal discharged upon the quays being 10,646 tons. An important contract is open in connection with the Port and Docks Board for a 12 months' supply, and a few are issuing from the inland districts. Pit mouth prices at the Arigna Collieries (county Leitrim) are from 15s. 10d. to 18s. 4d. per ton for best coals; culm or slack from 9s. 2d. to 10s. per ton.

Belfast.

There is a fairly good demand generally for most qualities, and colder weather has given a slight stimulus to the household trade, both locally and inland, since last week, prices still remaining unchanged. There is a plentiful supply in the port, and the freight market has been a little firmer, owing to stormy weather at sea. Quotations in the city are as follow:—Best Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Prices of steam coals ex-quay are:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton delivered. From November 2 to 15 the total number of coal vessels entering the harbour was 115. Cargoes arriving during the week were chiefly from Maryport, Glasgow, Ayr, Garston, Workington, Ardrossan, Newport, Cardiff, Sharpness, Irvine, Partington, Girvan, Troon, Neath Abbey and Preston.

THE TIN-PLATE TRADE.

Liverpool.

Quite a fair amount of business has been booked during the week for shipment over the next couple of months or so, but prices reported were exceedingly low. Forward buying continues very slow. Quotations for coke tins may be called:—I C 14 × 20 (112 sh. 108 lb.), 12s. 9d. to 12s. 10½d. per box; I C 28 × 20 (112 sh. 216 lb.), 25s. 9d. to 26s. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 3d. to 13s. 4½d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 3d. to 13s. 4½d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 3d. to 13s. 4½d. per box; I C 20 × 10 (225 sh. 156 lb.), 18s. 10½d. to 19s. per box; I C squares and odd sizes, 13s. to 13s. 1½d. basis. Ternes are easy at 22s. 3d. for I C 28 × 20. Charcoal tins are being quietly but steadily bought at 15s. basis and upwards. Coke wasters meet with a very fair demand, and are quoted:—C W 14 × 20, 12s. to 12s. 1½d. per box; C W 28 × 20, 24s. 10½d. to 25s. per box; C W 14 × 18½, 10s. 10½d. to 11s. per box; C W 20 × 10, 15s. per box—all f.o.b. Wales, less 4 per cent.

Dead Buffer Wagons.—It would appear that there will be no extension of time allowed for the running of dead-buffered wagons on the railways, and after December 31 of this year these wagons must be taken out of traffic or converted to spring buffers in accordance with the Railway Clearing House requirements. At a recent meeting, which the Private Wagon Owners' Associations had with the carriage and wagon superintendents, it was agreed that no loaded dead-buffer wagons would be accepted after December 30, but those wagons in traffic at that date would be allowed to take their load and run home empty, or to some works for conversion or breaking up. The railway companies are, however, prepared to register dead-buffer wagons converted to spring buffers until December 31, 1914, so that owners have another year in which they may carry out the necessary alterations. It is roughly estimated that there are at present 50,000 dead-buffer wagons running on the railways in England and Wales, so that a shortage of wagons would appear to be likely unless trade slacks off considerably.



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(A Classified List appears on page 1130.)

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\*\*\* For other Miscellaneous Advertisements see Last White Page.

## The Colliery Guardian

AND

Journal of the Coal and Iron Trades.

Joint Editors—

J. V. ELSDEN, D.Sc. (Lond.), F.G.S.

HUBERT GREENWELL.

LONDON, FRIDAY, NOVEMBER 28, 1913.

The executive committee of the Miners' Federation, meeting in London on Wednesday, considered the question of securing the continuation of the Minimum Wage Act of last year in an amended form. It was decided to press the Government to include in an amended Act the extension of the Act to all surface workers employed in the mining industry; the inclusion of the 5s. for men and 2s. minima for boys, with a minimum of not less than 7s. per day for all miners employed at the coalface; the rules in the district awards not to be applicable to day-wage men.

Work has been resumed throughout the Pas-de-Calais coalfield. The French Chamber, on Monday, unanimously passed a Law fixing an eight hours working day for miners, with optional overtime not to exceed 60 hours for one year.

The Employers' Defence Committee announces that a cargo of 15,000 tons of Transvaal coal has left Lorenzo Marques for New Zealand and is due to arrive at Christmas. The strikers' trump card—to bring about a coal famine—has therefore been rendered useless.

A general meeting of the Midland Institute of Mining, Civil and Mechanical Engineers will be held at Leeds on Tuesday, December 9. The presidential address of Mr. Walter Hargreaves will be given, and papers on "The Zeiss Level," by Mr. J. Husband, and "The Effect of Increased Atmospheric Pressure on the Height of the Gas Cap," by Mr. G. A. Lodge, will be read.

At a meeting of the South Wales Institute of Engineers last week it was announced that Mr. H. T. Wales had been elected president for 1914.

During the past week several large contracts were reported on the Cardiff Coal Exchange, but some expected orders of an extensive nature have gone to Germany, owing to the high price of the Welsh product.

Work was resumed at the ill-fated Universal Colliery, Senghenydd, on Wednesday. Up to date 410 bodies have been recovered.

The executive committee of the Miners' Federation of Great Britain are persisting in their demand for a special commission to enquire into the Senghenydd disaster. Though they failed to carry their point in two interviews with the Home Secretary, they have decided to inform the latter that the Federation will not be satisfied unless a court of three be appointed.



Severe criticism of recent mining legislation was levied at the annual dinner of the Scottish branch of the National Association of Colliery Managers, on Saturday.

On Wednesday, her Majesty Queen Mary paid a visit to the aged miners' homes at Ushaw Moor, Middlestone Moor, and Shincliffe, Durham.

Rumours lacking official confirmation have been afloat in South Wales during the past week that the Powell Duffryn Coal Company intend amalgamating with the Bedwas Navigation Colliery Company Limited. Yet another rumour is that the same company are negotiating for the purchase of the Cardiff Collieries Limited.

The ballot of the Northumberland Miners' Association upon the question of tendering 14 days' notice, and, if necessary, of striking to secure the abolition of the three-shift system, will take place on Tuesday next.

With a view to saving the expense involved in costly litigation regarding workmen's compensation claims, representatives of the Nottinghamshire and Erewash Valley Colliery Owners' Association and the Nottinghamshire Miners' Association have decided in favour of the principle of establishing a joint board for settling disputes.

A joint conference of owners and men, to consider the question of surfacemen's wages, will be held in Manchester on Monday next.

Mr. Thomas Ashton, secretary of the Miners' Federation of Great Britain, has issued a statement condemning Mr. Larkin's manifesto to trade unionists.

### The Railway Commission.

At the opening sitting of the Royal Commission on Railways, the chairman, Lord LOREBURN, made a statement defining the scope of the enquiry. At first sight this appears to be severely limited, the question being the relationship between the railway companies and the State in respect to matters other than safety of working and conditions of employment; but since a variety of matters, such as the provision of facilities or accommodation, the regulation of rates, the machinery and powers of the Railway and Canal Commission Court, &c., to say nothing of amalgamations, steamship and canal monopolies, and the law of railways generally, may be said to have a bearing upon the issue, the line of demarcation is imaginary rather than real.

The obvious moral is one that we have never ceased to point—namely, that, at bottom, the interests of the railway companies and their customers are identical—but it is too much to hope that the antagonism which has been engendered by a perverted competition will be assuaged by a Royal Commission. A more competent and a more promising enquiry was that conducted a few years ago by the Railway Conference, which succeeded in formulating some really valuable suggestions; practically nothing has been done, however, to remedy even the transparent inadequacies of the Railway and Canal Commission Court, and practically the only new legislation that has been passed was prompted by an awkward labour situation, leaving untouched the vast body of grievances that have made traders the enemies instead of the friends of the railway companies.

So far as we can see, the Commission are ready to hear evidence upon every conceivable subject that has the slightest relation to railways, and we may expect, in consequence, a further series of valuable, but useless, volumes such as represented the results—and apparently the only results—of the Canal Commission's labours. Anyone hearing Mr. MARWOOD's able

summary of the chain of events leading up to the appointment of the Commission must have trembled for its fate.

Yet the faults of the present system can be clearly defined. Traders, on the one hand, object to an increase in rates or a reduction of facilities without due and proper justification, and to an expensive judicial control that has signally failed to give a fair and prompt decision upon questions in dispute; on the other hand, the railway companies, through the very nature of the system that has grown up in the course of years, are unable to meet the increasing burden of expenditure, without prejudice to certain sections of their *clientèle*. Mr. MARWOOD made it clear that the object of the Board of Trade in appointing the Commission was to encourage the tentative suggestion that if its powers to deal with the questions between the railways and the traders were increased, possibly by the creation of some financial interest or responsibility, the department might be able to do something to remedy existing grievances. The fear, in that case, is that the enquiry will resolve itself into an interminable discussion on the merits and demerits of nationalisation, in which case it will probably result, to adopt Lord LOREBURN's observation in regard to the present judicial methods, "in a conclusion of opinion," and nothing more. If the Commission is to be more than a *succès d'estime*, it will be necessary to keep constantly in view the real irritants of expense and delay.

### The Stonedust Report.

The Fifth Report of the Explosions in Mines Committee embodies results of far-reaching and practical importance. It is emphatically the most valuable portion of the laborious investigation now proceeding at Eskmeals that has yet been achieved, and the Executive Committee, who have organised the experiments, are to be congratulated upon the progress that has been made in the elucidation of the complex problem they have set themselves to solve.

A careful study of the conditions under which the experiments were conducted will, we think, be enough to convince the most sceptical that the conclusions at which the Executive Committee have arrived are justified; and, notwithstanding the careful and guarded language employed, these conclusions are really of a very definite character. We do not see in this report any evidence of indecision so far as concerns logical deductions and legitimate generalisations from the experimental results themselves. Within the reasonable reservations claimed by the Committee, the conclusion is undoubtedly warranted that, as an alternative to watering, the treatment of coaldust by an incombustible dust—so as to maintain an excess of incombustible matter in the mixed dust—might well be provisionally adopted as fulfilling the requirements of the Coal Mines Act, 1911, section 62 (3) and (4).

The only point about which the Report is indecisive is as to the advisability or otherwise of fixing a definite minimum proportion of stonedust—whether 50 per cent. or higher. This question has been placed before the Consultative Committee, but the latter body has not yet sufficiently considered the different aspects of the matter, upon which they quite properly desire to obtain further advice before coming to a conclusion upon so important a point as a fixed stonedust standard. This, then, we take it, is the main point of interest in this Report, and it is upon this aspect of the question that practical men will now mainly concentrate their atten-

tion. For it is one thing by experiment, observation and inference to establish a generalisation, and it is another thing to recommend this as the possible basis of legislative enactment.

We do not propose to discuss the details of the numerous experiments described in this Report, especially as we have nothing but praise for the method and procedure adopted, and we shall for the present confine our remarks mainly to the practical consequences of fixing any stonedust standard at all under the provisions of the Coal Mines Act. One of the most important considerations in this respect is the practicability of maintaining any such standard as 50 per cent. The difficulties which would be experienced in doing so would vary greatly in different collieries, and it seems as if it would not always be a simple matter to ensure adequate stonedust treatment by this means within practicable economic limits. For the experiments amply prove that stonedust may at any time be rendered ineffective if covered by a new layer of coaldust. Such a superficial covering might be "licked up" by a flame without appreciably disturbing the stonedust below it. And such a flame might thus be continually fed and propagated along a stone-dusted roadway, as, in fact, was the case in some of the experiments in the Eskmeals gallery. And yet such a dust might be freely sampled and found to lie well within the 50 per cent. limit.

In short, in the Eskmeals experiments the coaldust and stonedust were intimately mixed previous to firing the shot. Could it be ensured that the dust in a mine would always mix itself in such intimate proportions as to ensure efficiency? In practice the dust would, in fact, consist of stratified layers of stonedust and coaldust. In this respect stonedusting appears to differ from watering. Water, by its mobility, spreads itself out more or less uniformly. Stonedust has no such tendency, and the maintenance of a definite standard might be difficult under certain conditions. It must not be forgotten, however, that the method of stonedusting is in actual operation at Altofts Colliery, and it would be interesting to know whether the procedure in that pit is such as would always ensure a 50 per cent. minimum of stonedust tested in such a manner as might be defined by law.

As to the efficacy of such treatment, the Committee clearly state that the procedure must be such that at no time should it be possible for dust to be raised in suspension from the exposed surfaces of the roads containing less than 50 per cent. of ash after incineration—a condition which, as we have shown, might be difficult to maintain in certain pits. The very existence of a legal standard, without intelligent application, is in itself a source of danger, since it may bring about a relaxation of management.

It is abundantly clear, from an examination of these experiments, that no kind of zone treatment would be of any avail. Stonedust appears to be far more valuable in preventing initial ignition than in retarding the propagation of a flame once started, and this fact alone lends increased importance to what has been said above with regard to the necessity of intimate admixture. For ignition might perhaps follow from the presence of what we may perhaps comparatively call mere films of coaldust locally distributed, and, once inflammation had been started, the retarding powers of even a 50 per cent. mixture of stonedust might prove to be small. In reply to this objection, however, we have the experiments of M. TAFFANEL at Liévin, and also those at Eskmeals, pointing to the fact that at least 1 lb. of coaldust per 100 cubic feet of air must be present to render inflammation



although enough is not yet known as to variations in this respect in different quantities of dust, or as to the influence of small quantities of gas. Indeed, of the influence of firedamp we know nothing as yet, for this is one of the many questions which still remain to be investigated at Eskmeals.

Other points which the Committee desire still further to investigate, are the behaviour of various kinds of mineral dust other than those already used. These latter were Altofts shale, fuller's earth, flue dust and sand. Other kinds of shale, as well as mineral carbonates, gypsum, and other incombustible materials, also claim attention, and as the efficacy of these materials depends largely upon such factors as heat conductivity, specific gravity and other physical properties, it may be assumed that there is still a wide field for experiment in this direction. In fact, we are inclined to think that the Consultative Committee have acted wisely in postponing a definite pronouncement, for not only is it a question of percentage, but also of the sort of stonedust that is employed. We may look with confidence to the ultimate success of the great investigation which, through the initiative of the coalowners, the Government is carrying out at Eskmeals. Some may feel impatient to arrive at a practical solution. But there is no known short cut to success in such circumstances. Epoch-making discoveries have, it is true, been made by what look like lucky accidents, but the coalmining industry cannot afford to wait for the wheels of chance. The Government has, very properly, set out to find a remedy against colliery explosions, and the investigation must go on until a definite result has been reached. The stonedust remedy has already gained considerably by these researches, because we now know more of its limitations, and that is surely the only path to success. What we think to be indicated at the present juncture is not so much the establishment of a legal stonedust standard as a tentative voluntary adoption of this method, following the excellent example at Altofts, wherever circumstances are favourable to such a course. Colliery owners, who contributed so handsomely to the earlier experiments should certainly not be found wanting in the desire to co-operate further by giving it a trial in the pit, and, as experience is thus accumulated, it may ultimately be found possible to arrive at a definite formula to suit the requirements of individual collieries.

A good deal of valuable information upon the points referred to above would have been available to-day, had the Home Office followed the example of the French Government and persuaded—not coerced—a number of collieries to adopt the system in a tentative spirit.

#### Trade Summary.

The London coal trade during the past week has changed but very little. The demand is slow and the prices weak, but the tonnage seems to be fairly maintained. The depot trade has slightly improved, but the stocks are still heavy, and merchants are shrinking from buying whilst the present mild weather lasts. Factory fuels and steam coals are moving slowly, but Welsh steam coals are improving in price. Cokes are unusually quiet. Bakers' nuts and kitcheners cobbles are steady. The shipping trade is falling off.

The market at Newcastle has been quiet, but the tone is fairly well maintained. Small coals are rather easier. Coke prices are variable, foundry sorts being lower, but blast furnace sorts are higher.

The Durham coal trade is steady as regards prompt business, but on forward account rather easier terms are offering. Bunkers are in good request, and house coals are in better demand.

Improvement in Lancashire house coals. House coals are below par, and the same is true of the shipping demand. The consumption of house coals is falling.

Business in West Yorkshire has been fairly strong, a considerable amount of coal having been sold for export. The market for manufacturing coals is dull, and stocks of house coal are still considerable.

In South Yorkshire, hard coals are in consistently strong demand, the home consumption being well sustained. Small coals are rather slow, the demand being restricted to nuts and washed sorts. House coals are rather better.

Derbyshire house coal is in poor request, and stocks tend to increase. There is a steady call for fuel for manufacturing purposes, and prices are well maintained. The export branch is active.

Business at Cardiff is slack, but this is principally through the collieries' order books being practically filled. Monmouthshire coals are decidedly firmer. Small coals are still depressed. Bituminous coals are steady.

The Scottish coal trade is more active, especially as regards the sale of manufacturing coals. The export branch is also satisfactory.

#### OBITUARY.

The death took place on Sunday, at South Kensington, of Mr. Robert Trefusis Mallet, C.E., a former Chief Engineer in the Indian Railway Service.

Sir William Henry Bailey, the well-known engineer and one of the fathers of the Manchester Ship Canal, died on Saturday last, aged 75. His father in early life was the founder of the Salford Ironworks, which Sir William afterwards greatly developed. Sir William attained considerable fame as an inventor. He was also president of the Manchester Association of Engineers, and a member of the Iron and Steel Institute and the Society of Mechanical Engineers. Some years ago he was presented with the Freedom of the City of London.

#### LABOUR AND WAGES.

##### North of England.

The concluding session of the council of the Northumberland Miners' Association at the Burt Hall, Newcastle, took place on Friday last, and was mainly devoted to a consideration of the finances of the association.

The Eccles Lodge, Backworth, moved that the contributions be 9d. per fortnight for full members and 4½d. for half-members, except in regard to surfacemen, whose contributions shall remain as at present. The delegate explained that he did not include banksmen among surface workers, as they were in receipt of higher wages, and were also, for county percentage purposes, treated the same as underground workmen. The resolution was carried by 43 votes to 19. If the lodges confirm the proposed increase, it is estimated that the income of the association will be augmented by over £10,000 per year.

On Saturday a circular was issued by the Northumberland Miners' Association respecting the forthcoming strike ballot on the three-shift question, which was decided upon at the recent council meeting. The circular states that the committee have exhausted every means of a conciliatory character to induce the colliery owners either to abolish or modify the system. The committee have no intention of again postponing the matter, and have decided that the vote be taken on Tuesday, December 2, 1913. If the result is in favour of necessary of striking, the representatives will lay the whole position before the Federation conference, which will be held on December 10 and 11. The question on the ballot paper is: "Are you in favour of tendering 14 days' notice, and if necessary of striking, to secure the abolition of the three-shift system?"

The Nos. 1, 2, and 3 pits at Chopwell, and the Whittonstall drift, belonging to the Conssett Iron Company, Limited, have been laid idle since Friday, about 2,500 men and youths having struck work. The crux of the dispute is that twelve conveyor men were "cavilled" to a conveyor, and the men drawn in the cavil claim that place for three months in preference to any other set of men.

The strike notices against non-unionists at the Ashington, Woodhorn, Linton, and Ellington collieries have been withdrawn, the number of non-unionists having been materially reduced.

Sir Wm. Collins, chairman of the Cumberland Joint District Board, sat at Workington on Tuesday to adjudicate upon the Whitehaven Colliery Company's demand for the lowering of the minimum wage operating at Whitehaven to the standard fixed by the other Cumberland collieries. When the general minimum for Cumberland was fixed, an exemption was made in respect to the Whitehaven collieries on account of the special circumstances proved by the obtaining there, as provided for by the Act, and a special minimum, 3d. higher than for the rest of the county, was granted. This was to hold good for 12 months, after which the Act entitles the employers to re-raise the question, and they gave three months' notice, as they have done in this case.

The North Seaton miners, who tendered notices to strike against the employment of non-unionist labour, have asked the colliery owners to agree to the suspension of their notices for a fortnight seeing that only 30 non-unionists remain outside now. This request the employers have refused to grant. At a further meeting of the men on Tuesday it was unanimously decided to withdraw the notices.

Under the auspices of the Durham Miners' Forward Movement Association, a public meeting was held on Saturday at Stanley to protest against the recent wages award of Sir R. Romer. A resolution was unanimously

carried to request the executive committee of the Durham Miners' Association to call a special council meeting immediately, in order to discuss the present situation, and to make an individual ballot on the question of tendering notices to enforce better conditions than the award gives.

##### Federated Area.

At a meeting of the executive of the Black Country Miners' Association, at Tipton, a resolution was adopted urging the officials to approach the coalowners on the non-union question, and, failing their co-operation, to convene a special meeting to consider the advisability of forcing the non-union men into the organisation. It is expected that a conference with the employers on the question will be held at an early date.

At a meeting of the executive of the South Staffordshire and East Worcestershire Miners' Association, at Dudley, on Saturday, it was resolved to approach the coalowners on the non-union question, and, failing to secure their co-operation, a special meeting be convened to consider the advisability of taking drastic steps with a view of forcing the men into the union.

A settlement of a permanent price list has been arrived at in connection with the Yorkshire Main Colliery at Edlington, after several months' efforts from the Yorkshire Miners' Association. The most important point was with regard to the tonnage rate. It is understood a settlement of 1s. 4½d. per ton (shovel filled) has been agreed upon. The list requires ratifying by the Yorkshire Miners' Association.

Proceedings of considerable interest to miners were adjudicated upon by the Mansfield Petty Sessional Bench on the 20th inst. The prosecutors were the Butterley Colliery Company, who summoned George Turner, stallman, and 44 other workmen employed at the Summit Colliery, Kirkby-in-Ashfield, for absenting themselves from the service of the company without giving proper notice, and in respect of this the company claimed the sum of 5s. each from the defendants by way of damages. The loss sustained by the company was stated to have been £279. The charge against Turner, who was alleged to have caused the other men to remain absent, was dismissed, and the other defendants were each fined 5s.

A dispute has arisen at the Hucknall Colliery owing to the manager having dismissed two men for an offence which the miners declare should have been met by the infliction of a fine.

The four trade unions in the North Staffordshire coalfield have issued a manifesto concerning their agreement with the employers on the non-union question. Both the coalowners and the unions have agreed that lists of non-union men are to be submitted and "dealt with" at a conference to be held before Christmas. A show-card will be held on Friday, December 12, and stringent conditions have been drawn up, each man being required to write his name, occupation, colliery employed at, number of his union card, and number of his lamp at the back of the card. Workmen over a month in arrears in subscription will not be entitled to a show-card, and their names will be enlisted with non-union men.

The coalowners and miners of Lancashire are about to make a further effort to settle the question of the wages of surfacemen. A recent joint meeting for the purpose of making an agreement for the whole of the collieries in the county failed, and it was reported that negotiations were broken off. It has now been arranged that a further joint conference will be held in Manchester on Monday next. The Federation asks for a 15 per cent. advance in the wages of surfacemen—the amount conceded in the English Federated area to miners—and the preparation of a schedule of wages to the various grades of surfacemen, with future alterations of wages on the same percentage as the underground workers.

A conference between representatives of the Leen Valley colliery owners and the Notts Miners' Association took place at the Victoria Station Hotel, Nottingham, on Monday, November 24, to take into consideration the wages of surface workers other than those who manipulate coal. After the question had been fully discussed, it was agreed to adjourn the matter to enable the owners' representatives to consult with their members. The meeting also considered the question of an increase of the present scale of rates and the formation of a joint board for the settlement of disputed workmen's compensation cases. The principle of the latter was approved and a small joint committee appointed to draw up a scheme.

##### Scotland.

The dispute at the Wilsons and Clyde Coal Company's Douglas Park and Parkhead Collieries, Belshill, whereby fully 800 men have been on strike for three weeks, has been settled. The basis of settlement is on a compromise by both parties in dispute. On Saturday, at a meeting of Lanarkshire Coalmasters' Association, the employers agreed that the increase in wages given to the pithead runners and table boys at the conclusion of the last stoppage on September 18 would henceforth apply to all the surface workers at these collieries. The employers, however, declined to concede the men's demand for a reduction of the hours of working for these workers from nine and a quarter to eight. Eventually the men's representatives agreed to waive their demand on this point.

##### Trade Dispute Act.

The Employers' Parliamentary Council has issued a statement of its views with regard to the Trade Dispute Act. It is understood, they state, that the Government have completed their enquiry with respect thereto, and that legislation will shortly be proposed dealing with the questions involved. The council submits that legislative action should follow the lines that would bring the law relating to picketing and labour combination into conformity with the wishes with the whole body of employers and traders, and with the opinion of the great



majority of the working classes and the general public of the United Kingdom. The council urges that the Act of 1906 is the charter of labour union terrorism, violence, and outrage. The long reign of outrage and violence in South Wales; the period of unprecedented terrorism through which the whole country passed during the "national strike" (1911); the examples of "peaceful persuasion" in connection with the Irish railway strike, and the present labour disturbances in Dublin bear witness to the widespread iniquity that has resulted from the passing of this Act. The whole system of labour unionism is, in the opinion of the council, nothing short of a huge conspiracy against private freedom, industrial peace, and national well-being. These labour unions are no longer distinct and separate bodies, each limited to its own legitimate sphere of activity. They are federated in one gigantic machine, with the sole object of paralysing the country by throwing all its industries and communications into disorder by means of a general strike. The council has drafted, and proposes to have presented, an amending Bill during next session, the purpose of which will be to limit the number of pickets to two, who must wear a badge, to confine picketing to the place at which a person works or carries on business, and to restore the responsibility of labour unions for the consequences of their acts.

The Miners' Federation of Great Britain and the Senghenydd Disaster.

Mr. Robert Smillie, president, Mr. W. E. Harvey, M.P., vice-president, and Mr. Thomas Ashton, secretary of the Miners' Federation, with Mr. W. Brace, M.P., president of the South Wales Miners' Federation, held a further interview with the Home Secretary (Mr. R. McKenna) at the Home Office this week, to repeat the request for the holding of a special enquiry under the new Mines Act into the cause of the Senghenydd colliery disaster. Some weeks ago the executive of the Federation decided to ask the Home Secretary to avail himself of the powers given by the new Mines Act to appoint two assessors, representing respectively the coalowners and the miners to sit with the representatives appointed by the Home Office to conduct the enquiry into the disaster. It is stated that the coalowners intimated that they were unwilling to appoint an assessor, preferring to leave the conduct of the enquiry entirely in the hands of the Mining Department of the Home Office. After consultation with the Attorney-General, Mr. McKenna replied to the request of the Miners' Federation in a manner which, while not a blank refusal, was unfavourable to the proposal for the appointment of assessors. The reply of the Home Secretary was considered at a special executive meeting held at Southport, when it was agreed that a further appeal should be made to the Home Secretary. The request for a special enquiry was again put. Our correspondent states that Mr. McKenna gave a most sympathetic hearing to the request made by the deputation, but he told them that there were great difficulties in the way of granting the request, and really adhered to his previous decision. The result of the deputation was reported by Mr. Smillie and his colleagues to a meeting of the executive of the Federation, held at the Westminster Palace Hotel the same evening. At the close of the Federation meeting, Mr. Thos. Ashton reported that the following resolution had been unanimously passed: "That this Executive, after full consideration of the report of the officials on their interview with the Home Secretary, hereby decide that this Federation will not be satisfied unless a court of three be appointed to enquire into the cause of the explosion at Senghenydd, and we instruct our secretary to send this resolution to the Home Secretary."

The Minimum Wage Act.

A meeting of the executive committee of the Miners' Federation of Great Britain was held at the Westminster Palace Hotel, London, on Wednesday. The most important business before the meeting was the question of securing the continuation of the Minimum Wage Act of last year in an amended form. The amendments which the Federation has decided to press the Government to give in any amended Minimum Wage Act include:—

The extension of the Act to all surface workers employed in the mining industry.

The inclusion of 5s. for men and 2s. for boys, with a minimum of not less than 7s. per day for all miners employed at the coal face.

The rules in the district awards not to be applicable to day wagemen.

It was agreed to ask the Prime Minister to receive a deputation at an early date on the subject of the continuation of the Act in an amended form.

The executive also considered the decision of the Scarborough conference on the question of the amendment of the Workmen's Compensation Act by increasing the compensation payable from one half to the full wages earned by the injured workman, with a minimum compensation of 15s. per week for adults and 10s. for young persons, and also asking for immediate legislation upon the report and recommendations of the Royal Commissions on Canals. It was decided that the secretary (Mr. Ashton) should write to the Home Secretary and the President of the Board of Trade asking them to receive deputations on these subjects.

A letter was read from Mr. W. Straker, secretary to the Northumberland Miners' Association, informing the executive of the decision of the association to take a ballot of the men employed in the coalfield on the question of a general strike in the county in order to secure the abolition of the three-shift system. It was agreed that the position in the Northumberland coalfield should be considered at the special conference to be held in London on December 10 and 11.

The question of the political fund to be raised in accordance with the ballot recently taken of the members of the Federation was under consideration, and the secretary was instructed to call for the first quarterly levy of 3d. per member. Of this 2d. per member will go to the Federation central fund for party purposes, and the remaining penny will be retained in the districts for the expenses of local, municipal and other elections.

THE BY-PRODUCTS TRADE.

*Tar Products.*—The market is steady. Pitch is rather easier. There is no change in naphthas or carbolics and benzols of all kinds keep firm. Nearest values are:—

Benzols, 90's .....	1/2
Do. 50's .....	1/
Do. 90's North .....	1/0½
Do. 50's North .....	1/11
Toluol .....	1/10½
Carbolic acid, crude (60 per cent.) .....	1/1 to 1/1½
Do. crystals (40 per cent.) .....	3½
Solvent naphtha (as in quality and package) ...	9¾
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3½
Pitch (f.o.b. east coast) .....	41/
Do. (f.a.s. west coast) .....	41/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

*Sulphate of Ammonia.*—Nearest prompt prices are as follow:—

London (ordinary makes).....	£12/7/6
Beckton (certain terms) .....	—
Liverpool .....	£13/2/6
Hull .....	£13 to £13/1/3
Middlesbrough .....	£12/18/9 to £13
Scotch ports.....	£13/2/6
Nitrate of soda (ordinary) per cwt. ...	10/7½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 2½ per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

*Grimsby Coal Exports.*—The exports of coal from Grimsby during the week ended Friday, 21st inst., were shown by the official returns as follow:—Foreign: To Antwerp, 285; Christiania, 911; Dieppe, 1,012; Eshjerg, 318; Gefle, 2,024; Gothenburg, 2,539; Halmstad, 1,001; Hamburg, 962; Hargshamn, 273; Libau, 4,234; Malmo, 792; Rotterdam, 962 tons; total, 15,313 tons. Coastwise: To Lowestoft, 597 tons. The respective totals for the corresponding week of last year were:—Foreign, 28,292, and coastwise, 111 tons.

*Partnerships Dissolved.*—The *London Gazette* announces the dissolution of the following partnerships:—W. T. Thorne and W. E. Welch, carrying on business at The Butts, Worcester, as motor engineers, under the style of Thorne and Welch; J. C. Jenkins and T. Evans, carrying on business as coal merchants, at Tredegar, under the style of Jenkins and Evans; H. Lock, J. W. Blair and T. Walker, carrying on business as haulage contractors, at Newburn, Northumberland, under the style of the Newburn Haulage Company; J. Garside and E. Garside, carrying on business as plumbers, millwrights, and gas and water engineers, at Prince Arthur's Buildings, Ripponden, near Halifax, under the style of C. Garside and Sons; D. R. Batty and F. Bott, carrying on business as wire-workers, at William Edward-street, Birmingham, under the style of Frank Bott and Co.; C. W. Matthews and M. K. Matthews, carrying on business as surveyors, valuers, rating assessors and estate agents, at Tottenham Court-road, under the style of Matthews and Son; R. Lund and F. C. Holden, who carried on business as electrical and mechanical engineers, at Queen Victoria-street, under the style of Lund, Bros. and Co.

*Employers' Parliamentary Association.*—The secretary of the Employers' Parliamentary Association, which has its headquarters in Manchester, and of which Sir Charles W. Macara is the president, writes stating that the association has no connection whatever with the body known as the Employers' Parliamentary Council, London, which has issued a statement on the case for the amendment of the Trade Disputes Act of 1906, and against "labour union conspiracy." The Employers' Parliamentary Association was inaugurated two years ago to deal with National Insurance in the first instance. It is entirely non-political, and is organised on a thoroughly representative basis, its main object being to ensure that the men controlling the industries of the country shall be consulted with regard to all legislation affecting industry. The association has no antagonistic feeling towards trade unionism; indeed, it recognises that the workers have quite as much right as the employers to combine for the defence of their interests. The statutes do not permit of the association taking any part in disputes between capital and labour. The Employers' Parliamentary Association has already assumed large dimensions, including in its membership many great firms in special industries and 30 federations and associations of employers, and it hopes to co-operate in the future, as it has done in the past, with the Parliamentary committees of the Employers' Federations controlling the staple industries, in dealing with legislative measures affecting industry generally.

Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

SMOKELESS FUEL.

SIR,—Under the above heading in your last issue appears an advertisement of the British Coalite Company Limited, warning intending purchasers of plants for the production of this fuel against infringing their Patent No. 14356 of 1906. The British Coalite Company Limited claim this patent covers the principle of low-temperature carbonisation.

I have before me a recently issued pamphlet, "Coalite: Its Commercial Possibilities, &c." On the first page I read, "The production of a smokeless fuel, from the carbonisation of coal, at a low temperature, has been carried on spasmodically over the past 100 years."

In the face of the statements published in the pamphlet mentioned, and to the use of low-temperature carbonisation by gas companies for the last 100 years, I would like the British Coalite Company Limited to tell me how or by what means they have any claim to the exclusive use of low-temperature carbonisation of coal for any purpose, and what is the difference between coalite and ordinary gas coke made from the same coal carbonised at the same temperature.

Nottingham, GEORGE C. BOND.  
November 26, 1913.

CONTINENTAL MINING NOTES

Belgium.

The Coke Syndicate have announced a reduction of 2½ fr. from January 1, 1914, in the price of coke, leaving blast-furnace coke at 21½ fr., half-washed coke at 25 fr., and washed foundry coke at 30½ fr.

The production of pig iron in Belgium during October last comprised 2,130 tons of forge pig, 8,200 tons of foundry pig, and 210,600 tons of steel pig—a total of 220,930 tons, as compared with only 205,780 tons in the corresponding month of 1912.

Exports and imports during the first 10 months of the present year were as follow:—

	Imports.		Exports.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	6,686,965 ...	7,419,248 ...	4,228,091 ...	4,126,999
Coke .....	773,550 ...	943,179 ...	836,534 ...	921,431
Briquettes ...	365,604 ...	394,453 ...	532,082 ...	526,602

From Germany there were imported 4,311,742 tons of coal, 837,492 tons of coke and 386,800 tons of briquettes, increases of 486,668 tons, 145,795 tons and 43,511 tons respectively, Germany thus contributing 72.62 per cent. of the total increase. Imports of British coal rose from 1,426,198 tons to 1,938,184 tons, but those of French coal fell from 1,028,804 tons to 723,140 tons.

France.

German competition in France has been accentuated of late, and offers are being made of washed smalls delivered Paris at 25 fr., or Lille 21 fr.

Some interesting figures are given in the official report on the coalmining in the Pas-de-Calais coalfield in 1912, from which we select the following:—

	1911.	1912.	1902.
Average production per person employed above and below ground .....	215 ...	223 ...	224
Ditto below ground .....	295 ...	306 ...	295
Average daily wages above and below ground .....	5.43 ...	5.54 ...	4.83
Ditto below ground .....	5.89 ...	6.01 ...	5.21
Ditto above ground .....	4.00 ...	4.05 ...	3.66
Average yearly wages above and below ground .....	1,531 ...	1,581 ...	1,246
Ditto below ground .....	1,625 ...	1,688 ...	1,294
Ditto above ground .....	1,211 ...	1,220 ...	1,069
Average wages per ton of coal raised .....	70.9 ...	7.07 ...	6.04

Notwithstanding the fact that legislation affecting mines has been prominent in recent years, further measures, to a considerable number, are promised in the immediate future. Reports have already been made on the following subjects:—(1) The completion of the Law of 1911 relating to miners' pensions; (2) a modification of the same Law; (3) the restriction of the hours of engine-winders at collieries. Other measures under consideration are the following:—(1) Modifications of the Law of 1889 in regard to the work of women and children; (2) the institution of arbitration boards in labour conflicts and the intervention of third parties in strikes and collective references; (3) assurance against sickness, premature invalidity and old age (Government measure); (4) modification of the Law of 1905 relating to Sunday labour in industrial and commercial undertakings; (5) the collective contract of labour; (6) workmen's compensation.



ded.—The strike of miners in the northern France came to an unexpected end on Sunday as a result of negotiations between the officials of the National Federation and the mineowners. The owners have agreed, in order to put an end to the strike, to suppress all long shifts until the promulgation of the Eight Hours Law, the Senate amendments to which, increasing the amount of optional overtime from 30 to 150 hours a year, led to the declaration of a general strike. On Monday, the Chamber of Deputies adopted amendments whereby an hour's overtime cannot be demanded on more than 60 occasions each year, and even these occasions are purely optional. M. Cheron, the Minister of Labour, stated that the Government accepted the new text of the committee: "60 hours' overtime per year (as against the 30 hours originally proposed by the Chamber and altered to 150 by the Senate); and a quarter-of-an-hour's overtime for coming to the surface (as against half-an-hour). Under the new Law the question of actual overtime is left to agreement between masters and men. Even these concessions did assuage the more revolutionary Federation of Underground Workers, who, however, are in a minority compared with the more moderate trade unionists. They did not resume work on Monday. Work was resumed at Lens, Bethune, Ferfay, Nœux, and Bruay. At Dourges, Drocourt, Courrières, Harnes, Fouquières-les-Lens, Montigny, Billy-Montigny, Mericour, and Noyelles-Godault work was partially restarted. There was still a complete stoppage at Carvin and Ostricourt. In addition to the eight-hour day the Federation of Underground Workers ask for a minimum wage. They also demand pensions for miners at the age of 50 who have completed 25 years' service in the mines. A further strike is threatened at some later date.

#### Germany.

The "participation" during December will be lowered from 87½ to 85 per cent. for coal and from 65 to 55 per cent. for coke, that for briquettes being maintained at 85 per cent. The basis prices have been reduced in the following proportions:—Blastfurnace coke, 1½ marks; coking coal, 1 mark; other classes of coke, ¾ to 2 marks; coals, ½ to 1 mark; briquettes, ½ to ¾ mark. The new prices will take effect from January 1, 1914, to September 30, 1914, for coking coal and blastfurnace coke, and for the whole of 1914-15 in the case of other combustibles.

*Coal Market in Upper Silesia.*—There is no falling-off in the demand, and the volume of deliveries could be increased if the pits were only able to raise coal enough to satisfy the needs of consumers. This they are prevented from doing, on the one hand by the scarcity of skilled labour, and on the other by the limitations of their equipment, so that the accumulation of stocks is impracticable. Nearly all kinds of fuel are in equal request. In house coal, the traffic has suffered to some extent in consequence of the weather, in spite of which, however, it is difficult to satisfy the demands of the market. Coking and industrial coals are selling well, and the demand for gas coal is advancing. The export trade remains favourable, and it is necessary to restrict consignments both to Austria and Russian Poland, whilst in the home market the outlying districts continue to take large delivery. Up to the present, the supply of railway wagons is fairly good.

*Coal Syndicate Report for October.*—Total coal raised, 8,662,818 tons (8,486,265 tons in October 1912), or 320,845 tons (314,034 tons) per working day. Calculating distribution, 6,658,494 tons (6,530,054 tons), being 246,611 tons (241,854 tons) per working day, or 89·73 per cent. (92·07 per cent.) of the participation. Total distribution of the syndicated pits, 8,389,656 tons (8,150,628 tons), or 310,728 tons (301,875 tons) per working day. Deliveries, including local sales, miners' house coal and supplies to pits' own iron-works: coal, 5,402,337 tons (5,084,179 tons), or 200,087 tons (188,303 tons) per working day; coke, 1,696,512 tons (1,798,843 tons), or 54,726 tons (58,027 tons) per working day; briquettes, 394,961 tons (368,986 tons), or 14,628 tons (13,666 tons) per working day.

*Official Coal Prices, Düsseldorf Exchange.*—Gas and open-burning coals: Open-burning gas coal through-and-through 12·25 to 13·25 marks per ton. Bituminous coals: Through-and-through 12 to 12·75 marks, best mixed 12 to 13·50 marks, coking coal 13·25 to 14 marks. Lean coals: Through-and-through 11·25 to 12·75 marks, best mixed 13·25 to 14·75 marks, anthracite nuts II. 22 to 26 marks. Coke: Foundry coke 19 to 21 marks, blast-furnace coke 16·50 to 18·50 marks, broken coke I. and II. 21 to 24 marks. Briquettes 11·50 to 15 marks.

*Ruhr Coal Market.*—The situation remains unchanged, the deliveries, though large, being considerably below the output. It is doubtful whether the restriction put on the latter for November will prove sufficient, since the requirements of the iron industry are not increasing, and other industries are taking less fuel. The condition of the coking coal trade and of the coke trade is very unsatisfactory, for, while by-products find a ready sale at remunerative prices, the coke remains largely on hand. The demand is comparatively limited, though the season advances. Exports are at a low level, except that Belgium is taking a large quantity of coke for her iron industry, and

prices generally are low on account of competition. In some markets, English coal is too dear to prove a serious competitor. In consequence of the low state of the Rhine, shipments to South Germany have been curtailed, but the local demand has not improved so far that oncoming consignments can be taken over at once, both house coal and industrial grades being depressed.

#### Russia.

The Cabinet has approved the importation, free of duty, of foreign coal, for the needs of the South-East Railway Company.

### THE LONDON COAL TRADE.

THURSDAY, NOVEMBER 27.

The London coal trade for the past week has been very quiet. The tonnage has been fairly maintained, but the sales have been somewhat difficult and prices have kept low. Nothing like the usual tonnage for the season of the year has been coming forward into the London district, and merchants who are already fairly well stocked are holding back from buying whilst the present open weather continues. The stocks at the various depots and metropolitan sidings have become very heavy by the gradual accumulation of contract coal, and although the open market purchases have been small, the heaps on the ground have gradually become larger. There has been very little difficulty over this as the merchant is buoyed up with the hope that more seasonable wintry weather cannot well be delayed much longer, but it has been a keen disappointment hitherto. The mild weather also has enabled the ordinary householder to use the gas stoves more freely. The seaborne market has shown very little change, and none of the vessels coming forward have been on offer; 34 cargoes were entered in the Thames for Monday's market, and 11 for Wednesday's, but all sold under contract. Prices remain as before, viz.:—Best Wallsend, 21s. 6d.; seconds, 20s. 6d.; Charlston Wallsend, 21s.; and Charlston Main, 19s. 6d. The household market has been overloaded, and the special offers are plentiful whilst the buyers are few. Manufacturing coals are also getting more abundant now that the iron market is not so brisk. The factories along the Thames-side however, continue fairly busy, and Welsh steam coals are still active. The shipping trade is falling off, and the reports from the Continent show that prices have fallen considerably abroad. The suggestion that the French labour troubles would throw the collieries idle gave a slight impetus to the buying at the beginning of the week, but the news of a partial settlement soon brought the market to its normal condition. Some of the London merchants have been at variance with each other over the trolley prices, and it is reported that in the South of London some of the trollies are going out at 1s. per cwt., or a reduction of about 6d. per cwt., or 10s. per ton, on account of the conflict. The Gas Exhibition has given rise to a good deal of discussion as to the improvements that may be brought about in the ordinary open grate coal fires. Already a new appliance for removing the fire from the sitting-room to the bedroom has been brought forward, and there are many other suggestions which are likely to be brought forward in the near future. At the present it is felt that a good deal of the heat is wasted by going up the chimney, and the trade is looking in this direction for a remedy. The enquiry for small nuts has slightly increased lately, but the prices are still weak. Slacks are exceedingly quiet. Bakers' nuts and kitcheners cobbles are steady, but moving very slowly, and all prices are irregular.

#### Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<i>Yorkshire.</i>		
Wath Main best coal .....	13/	13/
Do. nuts .....	12/	12/
Birley cube Silstone .....	12/6	12/6
Do. branch coal .....	16/	16/
Do. seconds .....	11/	11/
Barnsley Bed Silstone .....	13/6	13/6
West Riding Silstone .....	13/	13/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	12/	12/
New Charlston Wallsend .....	15/	15/
Wharfedale Silstone branch .....	16/	16/
Do. Flockton Main .....	15/6	15/6
Do. Atherley house coal .....	12/	12/
Newton Chambers best Silstone .....	17/	17/
Do. Grange best Silstone .....	15/6	15/6
Do. Hesley Silstone .....	14/	14/
Do. Rockingham selected .....	14/	14/
Do. Rockingham Silstone .....	13/6	13/6
<i>Derbyshire.</i>		
Wingfield Manor best .....	12/6	12/6
Do. large nuts .....	12/3	12/3
Do. small nuts .....	10/	10/
Do. kitchen coal .....	10/6	10/6
West Hallam Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/3	12/3
Do. London brights .....	11/	11/
Do. bright nuts .....	11/	11/
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Shipley do. brights .....	13/	13/
Do. do. nuts .....	12/6	12/6
Mapperley brights .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Cossall Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Trowell Moor brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Grassmoor Main coal .....	13/	13/
Do. Tupton .....	11/6	11/6
Do. do. nute .....	11/6	11/6

	Current prices.	Last week's prices.
<i>Derbyshire—(cont.)</i>		
Clay Cross Main coal .....	13/	13/
Do. do. cubes .....	13/	13/
Do. special Derbys .....	12/	12/
Do. house coal .....	11/6	11/6
Pilsley best blackshale .....	13/	13/
Do. deep house coal .....	11/6	11/6
Do. hard screened cobbles .....	11/	11/
Hardwick best Silstone .....	13/	13/
Do. Cavendish brights .....	12/6	12/6
Do. cubes .....	12/6	12/6
<i>Nottinghamshire.</i>		
Clifton picked hards .....	12/6	12/6
Do. small hards .....	12/6	12/6
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	13/
Do. cobbles .....	13/	13/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/6	14/6
Bestwood hard steam coal .....	13/	13/
Do. bright cobbles .....	11/9	11/9
Hucknall Torkard main hards .....	12/9	12/9
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. ...	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/3
<i>Warwickshire.</i>		
Griff large steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. bakers' nuts .....	11/3	11/3
Do. loco Two Yard hards .....	14/6	14/6
Do. Ryder nuts .....	11/9	11/9
Do. do. cobbles .....	13/	13/
Nuneaton steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Haunchwood steam .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Wyken steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Exhall Ell coalspires .....	14/3	14/3
Do. brights .....	12/6	12/6
Do. large steam coal .....	12/	12/
Do. best screened cobbles .....	12/3	12/3
Do. large nuts .....	12/3	12/3
<i>Leicestershire.</i>		
Stribston steam .....	10/	10/
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/
Do. roasters .....	10/6	10/6
Do. cobblee .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	18/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	9/9	9/9
Do. large nuts .....	9/6	9/6
Do. bakers' nuts .....	9/	9/
Do. Main nuts .....	9/6	9/6
Do. hards .....	9/3	9/3
Granville New Pit cobbles .....	11/	11/
Do. Old Pit cobbles .....	11/	11/
<i>North Staffordshire.</i>		
Talk-o'-th'-Hill best .....	13/	13/
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	14/	14/
Do. cobbles .....	13/	13/
Apedale best .....	13/	13/
Do. seconds .....	12/9	12/9
Podmore Hall best .....	13/	13/
Do. seconds .....	12/6	12/6
<i>South Staffordshire (Cannock District).</i>		
Walsall Wood steam coal, London		
Do. brights .....	11/	11/
Do. shallow one way .....	11/	11/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	10/9	10/9
Coppice deep coal .....	14/6	14/6
Do. cobbles .....	14/	14/
Do. one way .....	12/	12/
Do. shallow coal .....	13/6	13/6
Cannock Chase deep main .....	16/	16/
Do. Deep kitchen cobbles .....	11/6	11/6
Do. best shallow main .....	13/	13/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/9	11/9

#### From Messrs. Dinham, Sawons and Co.'s Reports.

Friday, November 21.—The seaborne house coal market continued quiet to-day, no sales reported. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Charlston W.E. (Yorks) 21s., Charlston Main 19s. 6d. Cargoes 14.

Monday, November 24.—There was no alteration in the seaborne house coal market to-day, which remained quiet. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Charlston W.E. (Yorks) 21s., Charlston Main 19s. 6d. Cargoes 34.

Wednesday, November 26.—The seaborne house coal market was very quiet to-day, no Durham or Yorkshire cargoes being on offer. Best (Durham) 21s. 6d., seconds 20s. 6d., Charlston W.E. (York) 21s., Charlston Main 19s. 6d. Cargoes 11.



## IMPROVEMENTS IN OXYGEN APPARATUS.\*

BY BERGASSESSOR GRAHN.

With a view to removing all possible objection to the use of injectors in rescue apparatus on the score of penetration by poisonous gases in consequence of the negative pressure in such apparatus, the German makers have adopted means for ensuring the prevalence of positive pressure in same. Fig. 1 is a diagrammatic representation of the 1913 pattern of the Draeger apparatus, showing the course traversed by the contained air. The exhaled air is drawn out of the bag *a* by the injector, and passes the suction nozzle *d*<sub>1</sub> and the delivery nozzle *d*<sub>2</sub> into the regenerator or cartridges *p* from below, issuing from the top of same, then flowing through the cooler *k* into the breathing bag *e*, and thence into the helmet *h* or mouth-piece. In contrast to the earlier patterns, therefore, the air is forced through the cartridges instead of being drawn through them.

The idea on which the modified arrangement was based was that the lowest pressure must necessarily obtain on the suction side of the injector, and that consequently, to prevent negative pressure, the air to be breathed ought to be drawn from a large receptacle instead of the narrow cartridge with its relatively high resistance.

For similar reasons the makers of the Westfalia apparatus included in their latest, or 1912, pattern

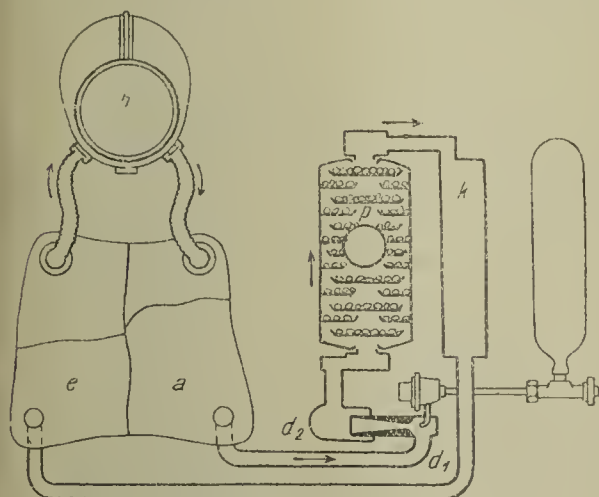


FIG. 1.—DIAGRAM OF DRAEGER APPARATUS, 1913 MODEL, WITH POSITIVE PRESSURE.

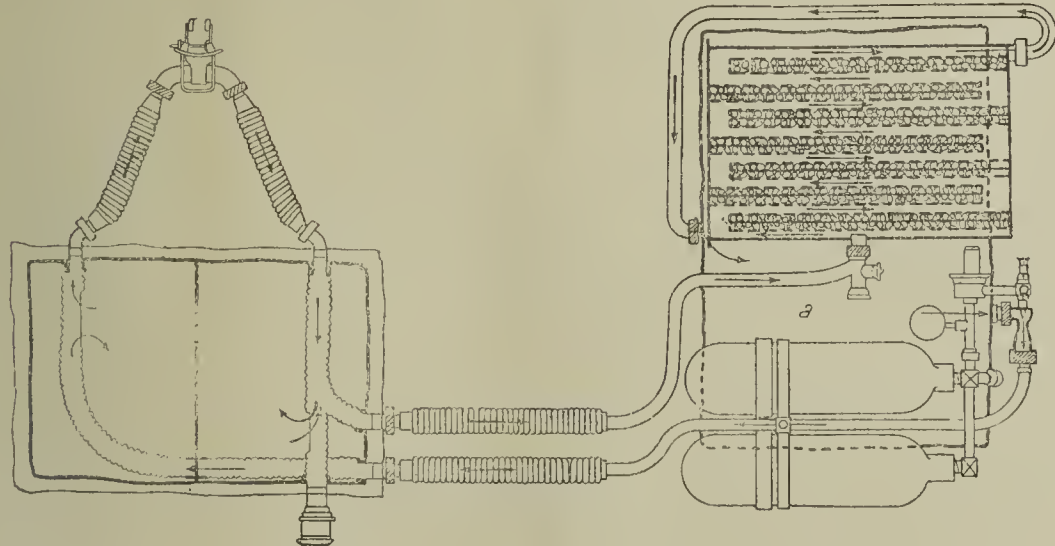


FIG. 2.—DIAGRAM OF WESTFALIA APPARATUS, 1913 MODEL, WITH INJECTOR.

(fig. 2), an injector bag *a*, situated between the regenerator and the injector, so that the latter can draw the air as directly from the bag as possible. The new bag is provided with a number of weak internal rubber bands, which tend to contract the bag as soon as the positive pressure sinks, as the result of an increased need of breathing. Both forms of apparatus must be filled with air before use, either by the wearer inhaling the outer air for several breaths and exhaling into the apparatus, or else by starting the injector for a few minutes beforehand. The loading of the blow-off valves is increased to 80 to 90 millimetres water-gauge in the Draeger apparatus and to 140 to 150 millimetres in the Westfalia apparatus.

A number of experiments were carried out to determine the amount of positive pressure obtaining in these new patterns while in use, with the result that in place of the negative pressure of 2 to 3 centimetres (Draeger) and 4 to 5 centimetres (Westfalia), there was found a positive pressure of 0 to 6 centimetre (Draeger), and 0 to 12 centimetres (Westfalia), thus demonstrating the possibility of constructing injector apparatus free from negative pressure.

From the results of the measurements taken during

the performance of manual labour while wearing the apparatus, it seems advisable not to begin heavy work too soon at the start, or the regenerators may become prematurely exhausted. The better plan is to work moderately and breathe quietly at first, in order that the regenerative material may warm up gradually, since it works better and remains active longer under these conditions. With both the old and new patterns of apparatus work may be performed to the extent of 50,000 kilogrammetres in two hours. For such large amounts of work, however, it would be desirable to increase the size of the regenerators in the Westfalia apparatus, the present size being nearly exhausted at 40,000 kilogrammetres.

Similar experience was obtained in working with the Fleuss apparatus (fig. 3), which is of the non-injecting type recommended by Prof. Cadman. The air is drawn

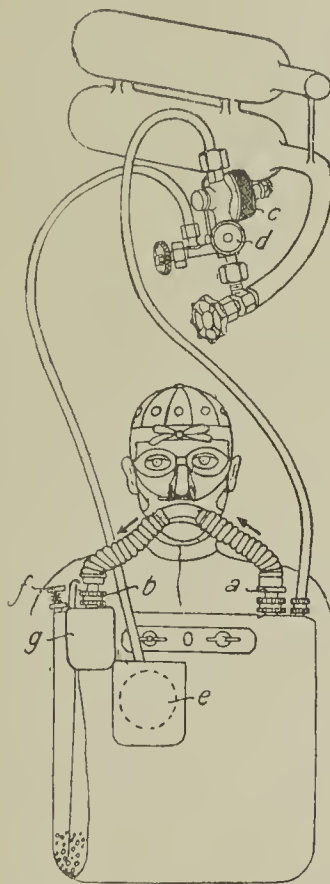


FIG. 3.—FLEUSS APPARATUS, NON-INJECTING TYPE.

through the caustic soda in the regenerator by the power of the lungs, through flexible tubes attached to the two halves of the bag, and provided with inhaling and exhaling valves *a* and *b*. The oxygen from the two bottles on the back escapes through a reducing valve *c*, at the rate of about 90 cubic inches per minute, into the inhaling half of the bag. In case of need, the wearer can increase the oxygen supply by opening a by-pass valve *d*. Should the bag become overfilled with air or oxygen, the pressure can be relieved by pressing on the valve *l*.

Whereas, in the Draeger and Westfalia apparatus, the air is compelled to pass through the various layers of absorbent material in succession, it follows its own devices in traversing the regenerative material of the Fleuss apparatus; and it is, therefore, not surprising that the purification of the air should be more uniform and complete in the former. This was demonstrated in a working experiment with skilled operators doing work to the extent of 25,000 kilogrammetres in an hour. Whilst in the two former apparatus the air at the end of that period contained only 0.04 per cent. of CO<sub>2</sub>, the percentage in the Fleuss apparatus was already 1.86 per cent. Moreover, since the frictional resistance of the air in the apparatus has to be overcome by the lungs alone, the wearer has to be well trained in its use before any large amount of work can be performed.

## SOUTH WALES INSTITUTE OF ENGINEERS.

The ordinary general meeting of the South Wales Institute of Engineers took place at Cardiff on Thursday, November 20, 1913.

Mr. HUGH BRAMWELL, presiding, announced that the council had elected Mr. T. H. Wales, Swansea, president for the coming year.

The following were declared elected by ballot to the institute:—James Henry Gilroy, mining engineer, Aberaman, Aberdare (proposed by Messrs. E. M. Hann, Geo. Hann, and G. D. Bridge); Reginald Osterstock, surveyor, Llandaff North (proposed by Mr. J. W. Hutchinson, C. M. Roberts, and Ben. Thomas); Joseph Rees, county mining lecturer, Ogmore Vale (proposed by Messrs. David Williams, J. Dyer Lewis, and Evan Williams); John Standridge, colliery agent and manager, Ystalyfera (proposed by Messrs. J. Dyer Lewis, J. W. Fidoe, and Wm. D. Wight); Frederick John Taylor, engineer, Briton Ferry (proposed by Messrs. H. Spence Thomas, Henry T. Wales, and Thomas Sugden); Harold Ernest Trubshaw, tin-plate manufacturer, Llanelly (proposed by Messrs. H. Spence Thomas, Henry T. Wales, and David E. Roberts); Hezekiah Williams, colliery manager, Begelly, Pembrokeshire (proposed by Messrs. David Thomas, Geo. Roblings, and W. O'Connor); and John Williams, tin-plate manufacturer, Swansea (proposed by Messrs. H. Spence Thomas, Henry T. Wales, and Thomas Arnold).

## Mechanical Puddling.

Discussion was declared closed on Mr. DAVID E. ROBERTS' paper describing the latest developments of mechanical puddling, the CHAIRMAN commenting upon the important character of the paper, especially in view of the fact that for many purposes people were changing back from steel to iron.

## Recording Instruments for Iron, Steel and Tin-plate Works.

The paper of Mr. SIDNEY B. HASLAM, describing a variety of recording instruments for the scientific control of iron, steel and tin-plate works, as well as for automatically recording colliery ventilation and steam in its passage through pipes, was further considered.

The CHAIRMAN referred to the desirability of an instrument for registering the water-gauge of the same type as the aneroid barometer—a simple instrument, easy to deal with.

Mr. HASLAM said there was an instrument of that type on the market, and there was no reason why it should not be thoroughly satisfactory. There was nothing to go wrong, and there should be very little variation.

Replying to Mr. T. SUGDEN, Mr. HASLAM added that the bulk of the variation was due to the moisture of the steam. If they could be always sure of getting dry steam, the variation would be under 1 per cent.; but the makers guaranteed accuracy subject to 3 per cent. variation under any conditions.

Prof. FREDERIC BACON, recalling that the author said in the paper that there were no other possible means of regulating the temperature in the furnaces, &c., but thermo-electric pyrometers, asked why the electrical resistance type of pyrometer had been excluded.

Mr. HASLAM said perhaps he should have included the type referred to, but he did not think the electrical-resistance type had given the same satisfaction as the thermo-electric pyrometer had done. In the preparation of the paper he had tried to avoid matter that might produce "competitive" discussions.

Mr. T. SUGDEN said he should like to see the inventors of these highly ingenious and useful instruments go a step further and devise appliances that would not merely record but correct some of the things they revealed. Take the CO<sub>2</sub> recorder, for example, how valuable that instrument would be if, besides reporting an excess of air in the furnace, it automatically regulated it.

The discussion closed with a vote of thanks to Mr. Haslam.

## Machine Mining in the South Wales Coalfield.

The joint paper by G. D. BRIDGE and W. E. JAYNE on machine mining in the South Wales coalfield was next taken.

Mr. BRIDGE replied to previous discussion. Mr. Morgan Rees had dealt with the heavy cost of repairs to coal-cutters, and had attributed this to want of skill on the part of the machinemen. There was no doubt that when coal-cutters are first introduced into a colliery many breakdowns occur that are unavoidable, but this was only a matter of time. According to the authors' experience in South Wales and other districts, the repair cost compared favourably in South Wales with most districts, although it could not be brought to as low a figure as in the Midlands, and was certainly much less than the figure mentioned

\* From a paper read at the International Life-saving Congress, Vienna, 1913.



Mr. Morgan Rees. Electrically-driven machines working under wet conditions were more expensive in upkeep; but a fair cost for upkeep of compressed-air machines should not exceed 2d. per ton. He could not agree with Mr. Mavor that the coal described was not hard to cut. A set of cutters at times would only cut 10 yards of face, and the average yardage for a set of cutters did not exceed 15 yards in coal. Only last week a machine required three sets of cutters to get through 8 yards; and there was no pyrites in this piece of coal. It was interesting to note that the cutters stood better when cutting in hard clod than when cutting in coal. Thirty yards might be taken as the maximum for a set of cutters in either coal or stone. With reference to the relation of line of face to structure of coal and its effect on the cutting, it was admitted that, as far as cutting was concerned, the most effective work would be done if the face was on the slip; but it was impossible to hold the roof under these conditions. In a face on half course it was necessary to avoid cutting through the inner end of a slip before the outer end was free. If the outer end was cut first, the machine was clear of that particular slip before the inner end was cut and before the piece of coal could collapse.

Mr. JOHN M. MARTIN, Glasgow, wrote dealing with a few points in the paper. In the course of his communication the writer traversed the view expressed by the authors that former hand-working methods should be adhered to as closely as possible in machine-mined sections. The advantages gained by conforming to old-established customs and conditions could only apply in a very limited way to the human element. The increased output from the smaller area necessitated the introduction and adoption of methods much more exacting for machine than for hand mining. In those mining districts where the outputs per person employed were highest, it was found that the coal getting and loading, ripping and packing, and setting timber was done by separate units who were specialists at their work. It might be difficult and costly in the first instance, but, once adopted, the advantages were all in favour of this system. Dealing with the roof problem, Mr. Martin said seams with roofs that were worse than many of those in South Wales had been successfully worked by a retreating method of longwall. This method, modified to meet the circumstances, was much safer in every way than the present system, and might with much advantage be adopted in the South Wales coalfield. There was not so much difference between the coals of South Wales and elsewhere that a special cutter was required. The coals generally were only of a medium hardness. His experience in South Wales showed him that in many cases the machines did not run up to the load they were designed for. He had seen cases where the pipe lines had absorbed so much of the pressure that the machines could not be run light up to the designed speed. As the cutting speed varied as the revolutions of the machine, but not in the same proportion, it was evident that when a machine was not running up to speed and advancing in proportion, the cutters, instead of chipping out pieces of coal, were reduced to grinding it out, with the result that the cutting points were worn away quickly. It was a matter of everyday experience to find that cutters in a low-powered machine did not cut the same area before requiring to be changed as a higher powered machine in the same cutting material.

Mr. W. D. WIGHT was disappointed that the authors had given no explanation of the working shifts, of the time occupied by the various sections of men in connection with the coal cutters. This was a matter—proper organisation and control—which meant success or failure. The speaker expressed surprise at the paragraph in the paper which apparently referred to a reduced speed of advance of the face as an advantage. It seemed contrary to all experience in coalworking. Another statement that did not accord with his own experience was that in most of the South Wales seams it was unsafe to cut with the trailing bar, disc, or chain. Then he challenged the author's assertion that a machine man who regularly cut 150 yards per shift in the Midlands would not average more than 50 yards per shift in a South Wales seam of the same thickness, owing to the nature of the coal. He (Mr. Wight) had known 80 yards per shift regularly done in South Wales seams, month after month; and if the men could be induced to work on piecework a great deal more than 80 yards could be done.

Mr. O'CONNOR also dealt with certain points in the paper, the discussion of which was adjourned.

#### The Sinking of the Bedwas Colliery.

On consideration of the paper by Mr. E. L. HANN dealing with the sinking and equipment of this colliery, Mr. K. JORDAN, F.G.S., said the Bedwas pits were the most interesting of all the shafts that had been sunk to the present time, because they had been sunk in the coalfield to intersect all the

measures from the Mynyddislwyn seam down to the lowest workable seam in the sequence. The vertical section which accompanied the paper showed the Mynyddislwyn seam (which went by the name of "Bedwas seam" in the Bedwas district, and was the No. 3 Llantwit seam of the Taff Valley and westward), to have been intersected 22 yards from the surface, and the lowest seam, which probably was the Hard vein of Rudry and other places, and also the Lower Four-feet of Aberdare, was shown to be at a depth of 838 yards 1 ft. 11 in. Thus the pit depth from the Bedwas seam to the bottom coal was 816 yards; but this distance had to be corrected for the 14 in. of dip of the measures in the pit, which amounted to 24 yards; and this made the true thickness 792 yards. The entire thickness of the coal measures at the syncline,  $\frac{3}{4}$  mile to the south-west, might be ascertained as follows:—Rhos Llantwit pit at that position reached the Bedwas, or No. 3 Llantwit vein, at a depth of 155 yards; but a little distance to the west of the pit a fault threw the measures down to the west, and the seam there was 47 yards deeper, consequently there were 202 yards of coal measures above the Bedwas seam; and adding this to the above 792, they got 994 yards as the exact measurement of the total thickness of the coal measures above the Hard vein in the Caerphilly basin. It was the sinking of the Bedwas Colliery pits that had enabled this exact information to be obtained. It was quite probable that beneath the Hard vein another thin seam of coal existed, and some 30 yards or so of strata also, before the top of the millstone grit was reached. It might be remembered that nearly 11 years ago he contributed a paper to the institute upon the south trough of the coalfield, which dealt with the question of the thickness of the coal measures in the Caerphilly basin; and in that paper he gave two distances, the mean of which was 1,000 yards; and this differed by 6 yards from the above-stated exact distance, 994 yards. The depth of the shafts in the undertaking of Mr. Tom Taylor at Nantgarw Colliery pointed to the probability of the coal measures there being somewhat thicker than at Caerphilly; and in the important pits being sunk by the Great Western Colliery Company, near Llantwit Fardre, would doubtless afford further interesting information in regard to the structure of the coalfield.

The discussion was further adjourned. The consideration of a paper by Mr. JAMES ASHWORTH (member), British Columbia, on the Fourth Report of the Explosions in Mines Committee, was likewise deferred.

The proceedings closed with a vote of thanks to the chairman.

#### INJECTORS IN OXYGEN APPARATUS.\*

By BERGASSESSOR FORSTMANN, D.ENG.

The use of injectors in oxygen-breathing apparatus was introduced by Giersberg in 1901, with the object of maintaining the circulation of air in the apparatus without burdening the lungs, and at the same time of enabling regenerator cartridges to be employed for purifying the exhaled air, thus increasing the working capacity of the wearer. Against injectors has been urged the objection—more recently voiced by Prof. Cadman—that they induce sub-normal pressure in the apparatus, and thus allow the external air to enter through any leaky places; but, on the other hand, it may be mentioned that thousands of sets of apparatus fitted with injectors have been made and used without this objection having been confirmed in practice. The question, however, has been reinvestigated by the author, to ascertain whether this drawback is as serious as represented.

The first point to be investigated was what volume of air entering from the outside in the manner described would be needed to endanger the wearer of the apparatus. According to a number of authorities, the inhalation of about 67 cubic inches of carbon monoxide is sufficient to saturate the blood to the extent of producing a fatal result, whilst half that quantity will cause unconsciousness. Now, experiments conducted at Bochum have shown the maximum amount of carbon monoxide in the fumes from pit fires to be 0.6 per cent., and in Upper Silesia the average is found to be 0.1 to 1 per cent., higher percentages (up to 3 per cent.) being found only in the fumes from sealed-up fires. It may therefore be assumed that, in practice, not more than 1 per cent. of carbon monoxide will ever be met with in pit air during rescue work and fire fighting. With this percentage of CO and an apparatus allowing about 30 cubic inches of external air to leak in per minute, sufficient CO would enter in 2 hours to render the wearer of the apparatus unconscious.

\* From a paper read at the International Life-saving Congress, Vienna, 1913.

Prof. Cadman does not state how his experiments were conducted; but he seems to have calculated the volume of entering air from the depression existing in the apparatus. Now, measurements show that the pressure in the apparatus, while in use, is continuously fluctuating, according as the wearer inhales or exhales, and also according to the strength of his breathing; so that all readings are inaccurate, and it is impossible to determine in this way exactly how much air really enters the apparatus. For the purpose of making accurate determinations, the measuring device shown in fig. 1 has been constructed, its internal capacity being about 300 cubic inches. To diminish frictional resistance, the pulley wheel over the bell is made large and mounted on ball bearings, so that the bell can be counterbalanced in such a way that it sinks under a minimum suction effort. The exact weight required to balance the bell at different heights was determined by experiment, and a number of small leaden weights, 10 grammes each, were provided, which could be removed in turn in proportion as the bell descended. The various forms of breathing apparatus tested—one of which, the 1912 pattern of Westfalia apparatus, is shown in fig. 2—were provided with connections at different points for taking samples,

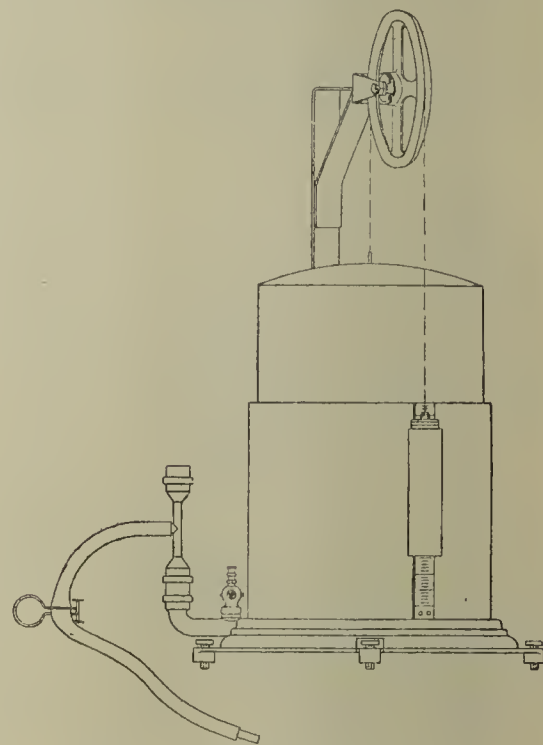


FIG. 1.—PRESSURE RECORDER.

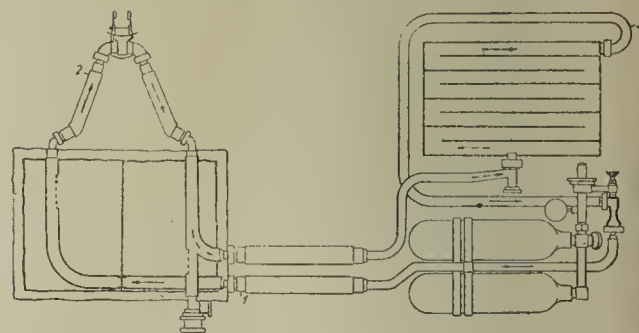


FIG. 2.—WESTFALIA APPARATUS, 1912 MODEL.

one being situated between the injector and the mouth-piece (*i.e.*, where a positive pressure exists), and another (marked 3 in fig. 2) at a point where the pressure is negative. Short intermediate pieces, with orifices of different dimensions (5.2 and 1 mm. diameter), were provided, and measurements were taken during the performance of work and at periods of repose, the latter measurements usually extending over four minutes in order to obtain a reliable average, the others for one and a-half minutes.

The experiments—the results of which are set out in a number of tables—show, in the first place, that the amount of air penetrating the apparatus is greater when the blow-off valve is set to act under a low pressure than it is when the valve load is increased. Again, with an admission orifice (leak) of 1 mm. diameter, the amount of air entering the apparatus is far below 30 cubic inches per minute, even when heavy work is being done; and the value does not exceed the above limit with a 2 mm. orifice unless the wearer is performing heavy tasks; though with a 5 mm. orifice a larger amount than the critical volume may be drawn in, even without any work being done. It must, however, be borne in mind that in practice it would be impossible to do such heavy work continuously, frequent rests being essential, so that the volume of indrawn air would sink to a point intermediate between the figures obtained for work and rest respectively. This mean, with a 2 mm. leak, is, however, below 30 cubic inches per minute, and therefore such a leak would not be dangerous in presence of carbon monoxide, since unconsciousness could not supervene unless more than 30 cubic inches



of external air (containing 1 per cent. of CO) entered per minute during a period of two hours. Even the presence of a high percentage of carbon dioxide in the fumes could not be dangerous, the regenerators of the Westfalia and Draeger apparatus being so largely dimensioned that they could absorb any dioxide entering in this way, without impairing their working efficiency.

Danger might arise if the leak exceeded 2 mm. in diameter; but such a contingency is unlikely to arise in practice, since a leak of these dimensions could not escape detection if the apparatus were properly examined before use, its presence being revealed by the altered reading of the depression meter, or by blowing through the apparatus.

On the ground of these experiments, it is considered justifiable to assume that Prof. Cadman has considerably over-estimated the possible risk, and that the tests just mentioned are sufficient to prevent any danger arising from leaks. Of course, danger to the life of the wearer may be incurred when the apparatus is not kept in good order and properly examined before use; but in such circumstances there are other possibilities of danger quite as great as that from leakage. Cadman's conclusion that the injector should be discarded is therefore ill-founded; and, in addition, he has overlooked the fact that leakage of external air can also occur in apparatus unprovided with injectors, the Fleuss apparatus, for instance, being liable to admit a larger quantity of air, when leaky at one point near the mouthpiece, than could occur, under similar conditions, at any point in injector apparatus.

### MINING AND OTHER NOTES.

An enquiry was held at Harthill, Lanarkshire, on Thursday last, by the Lanark County Council, with a view to eliciting information as to the need for additional housing accommodation in the district. Mr. D. M. Mowat, for the Summerlee Iron Company, stated that his firm were starting a pit in the district, and hoped to be getting coal next winter. With one shaft winding they would employ from 400 to 500 men. If it turned out all right they would fit the other shaft for winding, and altogether they would then employ possibly from 800 to 900 men. They had not considered the question of housing, but they were likely to do so when the necessity arose. On the life of the coalfield, Mr. Mowat said they had a lease for 31 years from May of last year, and there was coal in this area, to a little under 1,000 acres, to keep them going most of that time. Then the carboniferous limestone series would probably come in. As the Hamilton and other fields became exhausted, he thought the Harthill district would grow in importance and prosperity. Other coalmasters who were examined gave it as their opinion that there was coal in the district to last for 50 or 60 years.

The Baker Oil Separator Company Limited, of Union Works, Sayner Road, Hunslet, Leeds, inform us that the title of the company has been altered to Bakers (Leeds) Limited. This change has been considered necessary on account of the firm having recently taken over the boiler works of the Executors of Barker Oxley, and now being engaged in the manufacture of all classes of riveted and welded steelwork, repairs and constructional work in addition to their speciality, the manufacture of the Baker patent oil separator for exhaust steam.

The Mirrlees Watson Company Limited inform us that they have recently received orders for condensing plant for the City and Guilds (Engineering) College, Messrs. the Carron Company, Falkirk, De Beers Consolidated Mines Limited (Kimberley), the New Jagersfontein Mining and Exploration Company Limited, the Fife Power Company, the Londonderry Collieries Limited, Holytown Colliery (per Messrs. Greenwood and Batley Limited), the Wath Main Colliery Company, Rotherham, Maltby Main Colliery, Harland and Wolff, and the Fife Coal Company.

Speaking at the Pontefract municipal banquet, Col. J. R. Shaw, mayor of the borough, stated 1,000 more men were wanted at the Hemsworth collieries if they could be got, and he would be glad if houses could be built at Pontefract for them to live in. They could travel to and from Hemsworth with cheap contract tickets on the new railway to be opened next April between Hemsworth Collieries and Baghill Station. One hundred workmen's dwellings would shortly be ready for occupation. He had been charged with pushing this scheme for his own benefit, but he pointed out if he could employ more men at his collieries, Pontefract would be the gainer if they lived in the town.

It is stated that yet another pit is likely to be added to the circle around Doncaster, a company being in course of formation to work the coal beneath the Wallingwells estate of Sir Archibald White, and the adjoining Firbeck estate of Mr. S. G. Jebb. The new colliery will be between Maltby and Dinnington, and constructed for an output of 4,000 tons daily.

Good progress is being made with the development of the Maltby Main Colliery. One day last week the tonnage for the two shifts of 16 hours' work reached 2,000 tons. This amount, from the upcast shaft alone, is said to be a record for the whole country where the working conditions are similar to those at Maltby.

In the colliery offices of the Wath Main Collieries, last week, Mr. T. Morgan, was presented with a silver-mounted dark oak stationery cabinet and inkstand, bearing the inscription: "Presented to Mr. T. Morgan by the afternoon officials at the Wath Main Collieries, November 14, 1913." The recipient is leaving the colliery to take up an important appointment at the Cadeby Collieries.

Mr. T. H. Byrom, chief analytical chemist to the Wigan Coal and Iron Company, has received a handsome sterling silver flower stand, consisting of a large centre vase and three side vases, in plain modern style and artistic design, engraved on the base as follows: "Presented to T. H. Byrom, F.I.C., by the managers and officials of Messrs. the Wigan Coal and Company, as a token of esteem and regard, on his severing his connection with the company, November 29, 1913." Accompanying this was a purse of gold. For presentation to Mrs. Byrom there was a fine Brazilian diamond three-stone cross over 18-carat gold ring. Mr. Byrom has just left the district to take up an important position in London.

At the annual meeting of the Broomhill Collieries Limited, Sir Stephen W. Furness remarked that the company had been beset with extraordinary difficulties. First there was the serious fire at Newburgh, and shortly afterwards a prolonged strike during which expenditure went on without any revenue. In common with other colliery companies, they viewed with some alarm the increased cost of working, and they feared that, when there was a reduction in the price of coal, the charges in many cases would still continue.

The continual rapid development of the coalmining areas in South Yorkshire is being attended with housing and transit problems that are occasioning the local authorities no little anxiety. At Featherstone the Council are obtaining a loan of £25,950 from the Public Works Loan Commissioners to enable them to carry out a comprehensive scheme for the erection of working-class dwellings. With the object of linking up the many colliery villages and towns in the Mexborough and Barnsley area a number of the councils are combining for the purpose of promoting a joint scheme of light railways on an extensive scale. Barnsley, Thurnscoe, Wath, and Wombwell have already given the project favourable consideration, and application for powers to construct and work a light railway will shortly be made.

A serious accident occurred last week in New Orbiston Colliery, Bellshill, owned by the Summerlee Iron and Coal Company. Two hutches of coal were being wound to the surface, when the detaching hook gave way, and the cage with its contents was precipitated to the pit bottom. The shaft was wrecked by the cage in its descent. Another shaft mishap occurred at the Hattonrigg Colliery, Bellshill, belonging to the same company. One of the slides of the shaft was smashed by the cage.

At the Hotel Cecil last week Mr. Howard Houlder delivered the inaugural lecture of the Institute of Ship-brokers. Referring to the opening of the Panama Canal he thought the question was largely one of population on the other side of the canal. They were not going to have any great increase in the volume of trade until the Pacific coast both north and south was much more inhabited than it is at present. Nevertheless the opening of the canal was an important event, and would greatly accelerate an enormous shifting of trade towards the Pacific basin.

A presentation was made at Newcastle on Saturday to Mr. G. E. Young, manager of Benwell Colliery, in recognition of his brave attempt to save Capt. Ramsay, the chief of the Northumberland and Durham Colliery Rescue Brigade, in June last. The Coroner, Mr. Appleby, made the presentation of the Humane Society's silver medal, and recalled the circumstances of Mr. Young's bravery in going into the impure air which had overcome Capt. Ramsay without himself waiting to put on any protective apparatus.

Presiding at the annual meeting of the Millom and Askham Hamatite Company, at Preston, on Monday, the chairman, Mr. G. Mure Ritchie, referred to the find of ore at Ullbank, and said they anticipated that it would be the heaviest discovery in Cumberland in the history of the company. Of course ore could not be gained for another two or three years. In addition to the ore discovered by five bores in previous years, ore has since been discovered in five additional bores. The tonnage proved to date formed one of the largest bodies hitherto discovered in Cumberland. Arrangements were now made for sinking a shaft, fully equipped with modern plant, capable of handling a large annual tonnage on economical lines. It was probable that a second shaft would be required, and, if so, the outlay originally contemplated would be practically doubled.

The Clifton and Kersley Coal Company Limited, New Colliery, Astley, near Manchester, have placed a repeat order with Edward Bennis and Co. Limited, of Little Hulton, Bolton, for two hand-fired furnaces.

The senate of the University of Wales has recommended that the degree of Doctor of Science be conferred upon Mr. William Galloway, F.G.S., formerly inspector of mines and professor in mining in the University College of South Wales and Monmouthshire, Cardiff, on the ground of the services to the community rendered by him through his researches into the part played by coaldust in colliery explosions.

The annual dinner of the West of Scotland Iron and Steel Institute took place at Glasgow, on Friday. The institute this year attains its majority and the event was fittingly celebrated at the dinner. Reference was made to the growth of the industry and to the extensive developments in the uses to which the products are devoted.

Mr. George Clarence Allsebrook, fifth son of the late Mr. W. P. J. Allsebrook, of Wollaton, near Nottingham, who was called to the Bar on Monday, was engaged in the coalmining industry for some time, being manager of the Manners Colliery, Ilkeston, for a period of five years. He was president of the Russell and Palmerston Club, Oxford, last term.

In connection with a water supply for Woodlands, Adwick-le-Street, Carcroft, and Highfields colliery districts, boring operations have recently been pushed forward near to the Adwick Station, on behalf of the Brodsworth Main Colliery Company. At a depth of 245 ft. a supply has been struck which is producing no less than 24,000 gallons per hour. It is estimated that there is sufficient not only for the present population, which totals some 15,000, but for at least an increase on those figures of 10,000.

After a conference lasting two days the West Coast of Scotland Steelmakers' Association and the North-east of England Steelmakers' Association, sitting in London, have decided that no change is to be made in the prices of steel plates in England, and that while the rebate system is to remain in force in England it is to be abandoned in Scotland. In angles and other sectional materials all limitations as regards price are removed. The associations will not be dissolved.

At Tanfield Lea, on Saturday, six cottages which have been erected by Mrs. W. J. Joicey, of Sunningdale Park, in memory of her late husband, Major Joicey, were formally opened by their son, Mr. J. J. Joicey, in the presence of a large company. Dr. Wilson, M.P., who presided, said that the men who had started the Aged Miners' Homes movement had never dreamed it would reach the dimensions it had. They owed much to the generosity of the late Lord Joicey.

Mr. J. Duncan Millar, M.P. for North-East Lanark, has received a letter from the Home Secretary referring to the new draft regulation which he has issued under the Coal Mines Act in regard to the use of breathing apparatus. The letter states that the object of the new regulation is to meet the Lanarkshire difficulty in the use of smoke helmets. The alternative method would have been to take proceedings against a Scottish owner, but this would have meant considerable delay, and, if the case had been decided in favour of the Home Office, there would probably have been an appeal to a higher court, involving still further delay. Mr. McKenna decided that, as the matter was urgent, it would be better to proceed by the method of amending the regulations.

The National Health Insurance Joint Commissioners have appointed a committee to advise as to the securities which should be approved under section 56 (2) of the Act of 1911, for the investment of funds paid over by approved societies.

The annual dinner of the British Electrical and Allied Manufacturers' Association will take place on Wednesday, January 21, 1914. Lord Amptill will preside.

Messrs. Maxted and Knott Limited have placed an order on behalf of the British Portland Cement Manufacturers, Magheramorne Limeworks, near Larne, with Edward Bennis and Co. Limited, Little Hulton, Bolton, for a coal-conveying plant for their works. It consists of a series of three "Bennis" standard band conveyors and accessories. These conveyors will receive the coal from the boats and transport it into the overhead coal storage bunkers. The main conveyor is so arranged that it is carried up an incline for the greater portion of its length. The capacity of the plant is 80 tons of small coal per hour.

A social gathering of the Coal Trade Benevolent Association (Leeds, Bradford, and District branch) was held last week at the Hotel Metropole, Leeds, Mr. James Hargreaves presiding. Mr. E. T. Wilks, of London, in a brief address, explained that the society was not a charitable organisation, but a "bond of sympathy" between the members, nearly all the applications for relief coming from the provinces. Speaking of the suggestion that a central board should be formed in the immediate vicinity, he urged that this would not be beneficial, because as a national society they received certain bequests which would not otherwise be given. The total sum received in subscriptions from the branches last year was £2,114, and other donations amounted to £1,920. In 1912, relief was extended in 86 cases, at a cost of £2,297, and this was a substantial increase upon the previous year.

Midland Institute of Mining, Civil and Mechanical Engineers.—A general meeting of the members of the institute will be held at the Great Northern Hotel, Leeds, on Tuesday, December 9, 1913, at 3.30 p.m. There will be a council meeting at 2.45 p.m. The annual dinner will be held in the evening at the Great Northern Hotel at 6.45 for 7 o'clock. Tickets, 5s. each. The president, Walter Hargreaves, Esq., in the chair. At the meeting in the afternoon the president will deliver his presidential address, and papers on "The Zeiss Level," by Mr. J. Husband (University of Sheffield), and "The Effect of Increased Atmospheric Pressure on the Height of the Gas Cap," by Mr. George A. Lodge will be read.



## SPONTANEOUS COMBUSTION IN COALMINES.

A Digest of Evidence before the Committee.

(Continued from page 1065.)

Mr. A. M. HENSHAW (continued).

CHARACTER OF N. STAFFORDSHIRE SEAMS.

Witness completed his evidence by putting in a statement describing the various coals described in his notes, their chemical composition and sulphur contents particularly, coals that are subject to gob fire and that are not subject to gob fire. This showed, he said, that although the sulphur content in the coals was the same, the sulphur content in the "hussle" at the Birchenwood Colliery was 1.82 to 2.10 per cent. against 9 in the "hussle" at the Jammage Colliery. He said he was not sure even now that that was an explanation of the occurrence of gob fires at one colliery and not at another. But over many years past he had had this opinion—that at the Jammage and at the Talk Colliery, where gob fires were very frequent, it was due to the soft character of the coal, its broken faulted condition, its thickness, the number of beds of associated shale, the difficulty in working the seam with small loss—those conditions compared with the Birchenwood Colliery, where no fires have occurred and the coal is harder and not quite so thick, in practically one or two beds, instead of a number, and having a roof of hard shale and very little hussle, as compared with the soft shales and greater thickness. Then he took the Bullhurst seam from the Chatterley-Whitfield Colliery on the east side, where no fires had ever occurred. Very strangely, the shales there contain less sulphur and the coal more; the sulphur in the shale was from 0.38 up to 1.96. Some of the shales there are practically cannel. One contains 41.90 of volatile matter and 40.26 per cent. of carbon. At the same time it has 17.84 per cent. of ash.

Witness gave some further notes on the effect of pyrites on oxidation. Of the four seams at the Talk-o'-th'-Hill Colliery above the Bullhurst, where heating has not been known to occur except on very rare occasions, in May 1912 a number of selected samples of pyritic coal were put aside, exposed to the atmosphere in a warm room at ordinary temperatures. When examined in February 1913, nine months afterwards, it was found that certain changes had taken place as follows: No. 1, shale, with carbonaceous matter in thin layers; these layers had developed at the edges greenish white crystals of ferrous sulphate. So far as the investigation went, added witness, it bears out the view that pyrites enters largely into the question of spontaneous combustion. It certainly induces some primary heat; but it disintegrates the coal so rapidly that the oxidation of the coal itself is considerably assisted.

The statement referred to by Mr. Henshaw in his evidence appears below:—

## ANALYSES.

BULLHURST COAL AND SHALE from the JAMMAGE COLLIERY. Subject to Gob Fires.

Coal.—"Big tops."

Moisture, 0.94 per cent.; volatile matter, 31.60 per cent.; carbon, 55.64 per cent.; ash, 12.76 per cent.; sulphur, 1.92 per cent.

Analyses of ash:—Silica, 21.40 per cent.;  $\text{Fe}_2\text{O}_3$ , 47.21 per cent.; alumina, 25.10 per cent.; calcium oxide, 2.40 per cent.; sulphates, 3.13 per cent.

Coal.—"Little tops."

Moisture, trace; volatile matter, 31.70 per cent.; carbon, 55.64 per cent.; ash, 12.66 per cent.; sulphur, 2.14 per cent.

Analysis of ash:—Silica, 23.20 per cent.;  $\text{Fe}_2\text{O}_3$ , 56.75 per cent.;  $\text{Al}_2\text{O}_3$ , 9.21 per cent.; CaO, 3.75 per cent.; sulphates, 7.21 per cent.

Coal.—"Middle coal."

Moisture, 1.43 per cent.; volatile matter, 36.60 per cent.; carbon, 59.17 per cent.; ash, 4.23 per cent.; sulphur, 3.41 per cent.

Analysis of ash:—Silica, 30.25 per cent.;  $\text{Fe}_2\text{O}_3$ , 22.05 per cent.;  $\text{Al}_2\text{O}_3$ , 37.81 per cent.; CaO, 1.05 per cent.; sulphates, 6.32 per cent.

Coal.—"Wall or bottom coal."

Moisture, 0.85 per cent.; volatile matter, 36.70 per cent.; carbon, 59.42 per cent.; ash, 3.88; sulphur, 3.61 per cent.

Analysis of ash:—Silica, 29.15 per cent.;  $\text{Fe}_2\text{O}_3$ , 32.16 per cent.;  $\text{Al}_2\text{O}_3$ , 27.05 per cent.; CaO, 4.40 per cent.; sulphates, 6.91 per cent.

Shale.—Between the little tops and middles.

Moisture, 1.03 per cent.; volatile matter, 17.00 per cent.; carbon, 13.19 per cent.; ash, 69.81 per cent.; sulphur, 4.43 per cent.

Shale.—"Hussle," "Browns."

Moisture, 1.20 per cent.; volatile matter, 16.00 per cent.; carbon, 9.41 per cent.; ash, 74.59 per cent.; sulphur, 9.69 per cent.

Shale.—Between middle and bottom coals.

Moisture, 0.70 per cent.; volatile matter, 26.80 per cent.; carbon, 32.43 per cent.; ash, 40.77 per cent.; sulphur, 5.09 per cent.

Analysis of ash:—Silica, 48.8 per cent.;  $\text{Fe}_2\text{O}_3$ , 10.16 per cent.;  $\text{Al}_2\text{O}_3$ , 22.42 per cent.; CaO, 1.63 per cent.; sulphates, 15.16 per cent.

BULLHURST COAL AND SHALE from the BIRCHENWOOD COLLIERY. Not subject to gob fires.

Coal.—"Rider coal."

Moisture, 0.82 per cent.; volatile matter, 31.00 per cent.; carbon, 57.72 per cent.; ash, 11.28 per cent.; sulphur, 2.10 per cent.

Coal.—"Tops."

Moisture, 0.98 per cent.; volatile matter, 33.50 per cent.; carbon, 60.09 per cent.; ash, 6.41 per cent.; sulphur, 2.63 per cent.

Coal.—Main coal where speckled with pyrites.

Moisture, 1.23 per cent.; volatile matter, 29.60 per cent.; carbon, 54.94 per cent.; ash, 15.46 per cent.; sulphur, 2.97 per cent.

Coal.—Main coal.

Moisture, 1.29 per cent.; volatile matter, 35.00 per cent.; carbon, 62.56 per cent.; ash, 2.44 per cent.; sulphur, 1.92 per cent.

Analysis of main coal ash:—Silica, 27.27 per cent.;  $\text{Fe}_2\text{O}_3$ , 28.97 per cent.;  $\text{Al}_2\text{O}_3$ , 1.92 per cent.; CaO, 5.73 per cent.; sulphates, 6.05 per cent.

Shale.—"Binds" between rider coal and top coal.

Moisture, 1.21 per cent.; volatile matter, 21.20 per cent.; carbon, 31.45 per cent.; ash, 47.35 per cent.; sulphur, 1.82 per cent.

Shale.—"Hussle" between tops and main coal.

Moisture, 1.32 per cent.; volatile matter, 20.20 per cent.; carbon, 29.37 per cent.; ash, 50.43 per cent.; sulphur, 2.10 per cent.

BULLHURST COAL AND SHALE from the CHATTERLEY-WHITEFIELD COLLIERY. Not subject to gob fires.

Cannel.

Moisture, 1.07 per cent.; volatile matter, 41.90 per cent.; carbon, 40.26 per cent.; ash, 17.84 per cent.; sulphur, 2.64 per cent.

Shale and Cannel.

Moisture, 1.24 per cent.; volatile matter, 27.00 per cent.; carbon, 34.99 per cent.; ash, 38.01 per cent.; sulphur, 1.96 per cent.

Black Shale.

Moisture, 1.31 per cent.; volatile matter, 12.60 per cent.; carbon, 0.17 per cent.; ash, 88.23 per cent.; sulphur, 0.38 per cent.

Fine-grained Cannel.

Moisture, 0.78 per cent.; volatile matter, 38.30 per cent.; carbon, 41.70 per cent.; ash, 20.00 per cent.; sulphur, 1.55 per cent.

"Cat" or Bastard Cannel.

Moisture, 0.93 per cent.; volatile matter, 35.10 per cent.; carbon, 34.23 per cent.; ash, 30.67 per cent.; sulphur, 1.77.

Bullhurst Coal.

Moisture, 1.08 per cent.; volatile matter, 33.60 per cent.; carbon, 57.56 per cent.; ash, 8.84 per cent.; sulphur, 5.64 per cent.

Analysis of Bullhurst ash:—Silica, 32.50 per cent.;  $\text{Fe}_2\text{O}_3$ , 36.34 per cent.;  $\text{Al}_2\text{O}_3$ , 20.31 per cent.; CaO, 1.46 per cent.; sulphates, 8.21 per cent.

NOTE.—This coal contains thin flakes of a white deposit vertically in the coal consisting mainly of calcium carbonate as shown in the following analysis:—Silica, 16.35 per cent.;  $\text{Fe}_2\text{O}_3$ , 12.18;  $\text{Al}_2\text{O}_3$ , 1.32; calcium carbonate, 64.79; sulphates, 2.35.

The following is a section of the Chatterley-Whitfield Bullhurst seam:—Black shale, 1 ft. 4 in.; "cat" or bastard cannel, 3 in.; cannel, fine grained, 1 ft.; cannel, coarse, 9 in.; shale and cannel, 5 in.; coal, 3 ft. 3 in.

Following is a comparison of the volatile matter and sulphur contents of the whole coals and shales in the three seams.

Jammage, gob fires.

	Sulphur. Per cent.
Big tops .....	1.92
Little tops .....	2.14
Middle coal .....	3.41
Bottom coal .....	3.61
Shale .....	4.43
Browns .....	9.69
Shale .....	5.09

Chatterley-Whitfield, no gob fires.

	Sulphur. Per cent.
Cannel .....	2.64
Shale and cannel .....	1.96
Black shale .....	0.38
Fine cannel .....	1.55
Cat .....	1.77
Coal .....	5.64

Birchenwood, no gob fires.

	Sulphur. Per cent.
Rider .....	2.62
Tops .....	2.63
Coal (pyrites) .....	2.97
Coal .....	1.92
Binds .....	1.82
Hussle .....	2.10

Jammage Bullhurst, 7 samples.—Volatile matter, 28.05 per cent.; sulphur, 4.33 per cent.

Chatterley-Whitfield, 6 samples.—Volatile matter, 31.41 per cent.; sulphur, 2.32 per cent.

Birchenwood, 6 samples.—Volatile matter, 28.41 per cent.; sulphur, 2.34 per cent.

Similar averages of four seams at Talk-o'-th'-Hill not subject to spontaneous combustion:—Volatile matter, 32.27 per cent.; sulphur, 3.76 per cent.

Oxidation the Effect of Pyrites.—Four seams of coal above the Bullhurst at Talk-o'-th'-Hill, not subject to gob fires, but in three of which heating has occurred on very rare occasions where the coal was thick and soft near faults.

In May 1912, a number of selected samples of pyritic coal were put aside, exposed to the atmosphere in a

room at ordinary temperatures. When examined in February 1913 it was found that certain changes had taken place as follows:—

No. 1. Shale with carbonaceous matter in thin layers. These layers had developed at the edges greenish white crystals of ferrous sulphate.

Analysis of the whole piece of shale gave the following results:—Volatile matter, 19.90 per cent.; carbon, 20.33 per cent.; ash, 59.77 per cent.

No. 2. Coal with pyrites in laminated form. The sample had partially separated at the laminations. Fairly active oxidation had apparently taken place. Ferrous sulphate was formed. The ferrous sulphate had to some extent undergone further decomposition, with formation of ferric sulphate and a small percentage of free sulphur.

Analysis gave the following figures:—Volatile matter, 30.90 per cent.; carbon, 50.53 per cent.; ash, 18.57 per cent.

No. 3. Coal strongly pyritic. The pyrites was finely disseminated in veins, streaks and speckled form. Oxidation had completely disintegrated the mass with considerable formation of ferrous sulphate crystals and free sulphur. A further oxidation seems to have produced brownish yellow ferric sulphate on the outer surfaces arresting still further oxidation.

Analysis gave the following figures:—Volatile matter, 28.30 per cent.; carbon, 40.27 per cent.; ash, 31.43 per cent.

The constituents soluble in hydrochloric and nitric acids of these three samples gave the following analyses:—

	No. 1. Per cent.	No. 2. Per cent.	No. 3. Per cent.
Moisture .....	Nil	2.03	2.56
Iron oxide, $\text{Fe}_2\text{O}_3$ ..	35.42	13.65	17.06
Iron, Fe .....	—	9.55	11.94
Alumina .....	3.05	1.05	1.70
Sulphates .....	4.16	12.14	11.37
Calcium oxide .....	Trace	0.92	2.75
Free sulphur .....	0.25	0.72	1.06
Total sulphur .....	18.67	4.87	6.86

So far as the investigation goes it bears out the view that pyrites enters largely into the question of spontaneous combustion.

Pyrites occurs in practically three conditions in the coal and shales. 1st. The common "brazil" variety as heavy masses of crystalline pyrites—agglomerations, lumps and layers horizontally in the seam. These large solid masses do not appear to oxidise except slightly on the surfaces. 2nd. As thin "brassy" laminae horizontally and vertically. These oxidise sufficiently to break up the mass into separate pieces. 3rd. As finely and thickly disseminated veins, streaks, and specks of "brassy" pyrites throughout the mass of portions of the coal. This oxidises very readily, so that the coal quickly weathers and falls to a heap of small coal of the consistency of coarse sand. The black colour of the coal is almost hidden by the grey and yellow crystals of ferrous and ferric sulphates. The physical conditions thus brought about, accompanied as it is by efflorescence and absorption of moisture, is to my mind the initial stage of the development of heat, at any rate the conditions are favourable.

The form of pyrites known as marcasite—i.e., white iron pyrites in rhombic crystals—is not, I think, found to any great extent in the coals now considered. This form of pyrites is very easily oxidised on exposure to the atmosphere. The contention that pyrites has an important bearing on the liability of a seam of coal to spontaneous combustion is, I think, supported by the figures given above. The sulphate contents of the whole section of the Jammage Bullhurst seam, where gob fires occur, is 4.33 per cent. The Chatterley-Whitfield whole section, where gob fires are unknown, gives 2.32 per cent. The Birchenwood section, free from gob fires, gives 2.34 per cent. On the other hand, the Chatterley-Whitfield coal itself shows 5.64 per cent. sulphur.

These conclusions must be received with caution, and considerably more scientific research requires to be made in this direction, particularly with regard to the comparison of the chemical constituents of the various coals and their relation to the physical conditions under which they exist, not only in the seams but in the goaves. For instance, the soft coal near faults, where I have shown gob fires most frequently occur, generally contains, at the same time, more visible pyrites, such pyrites being in the dangerous form described above—fine laminae, veins, speckles and streaks.

Mr. J. COLCLOUGH.

Mr. JOHN COLCLOUGH, overman at Talk-o'-th'-Hill Colliery, gave evidence on February 12, 1913. Witness said that, in his experience, there had been many conditions that have caused gob fires. The most likely conditions were leaving small coals from which oxidation sets in. The precautions were to exclude air from the goaf by charging it with gas. The other two precautions were to draw the timber and extract the coal to the greatest possible extent. In the Bullhurst seam there are falls that occur in the waste, but there are precautions to stop these great falls. These are sufficient packing that will carry the roof with safety and let down the tubs with small spaces, and, if necessary, a middle pack run up in the waste that will extract the largest percentage of coal possible.

Witness said he had known fires take place in the packs, but not over the packs. He had never heard of a fire in a goaf that was not so large that he could get to the tops. As to the symptoms of heating, witness said it was very important to a fireman that he should be able to detect a smell by the first indications. He put his own success down to that particular sensation of detecting. Witness added that he had not known any case of fires where they had had the goaves filled with gas. He could not definitely say whether timber had been a contributory cause or not.

Witness said he would try to keep control of the



ventilation; where the coal is very friable it is subject more to fires and spontaneous combustion. Witness here pointed out that the Mines Act has no statutory provisions for the controlling of this packing material the same as in the case of the timbering of the mine. For example, he did not approve of packing with hussle—it was as bad as slack. Only clean dirt should be used for the packs. If they had water on their floor it would assist spontaneous combustion. Moisture, in his experience, contributed to the process of generating heat, and especially if it commenced getting a bit drier, and there is rapid evaporation.

Witness said that, in his opinion, the best method of working coal in these spontaneous combustion mines was retreating longwall, because they could leave their enemy behind them. Witness, in conclusion, repeated that he did not favour sweeping ventilation in a fiery mine—just sufficient to lead off the gas was plenty.

(To be continued).

## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Firemen as State Officials or as Employees of the Men—Desired Amendment of the Minimum Wage Act—Resumption of Work at Senghenydd—Mining Instruction Conference—Criticism of the Coal-owners' Mining School—Llanhilleth Strike Settlement—Important Powell Duffryn Developments—Great Railway and other Improvements in the Coalfield.**

"Firemen as State employees" continues to be a subject of keen discussion, chiefly through newspaper correspondence, but incidentally also at miners' meetings. The suggestion of those who advocate this change appears to centre in an idea that the Government inspectors should appoint the colliery examiners, thus setting them free from direct control either of colliery proprietors or workmen.

On the other side are those who desire that firemen should be the employees of the workmen, so that they shall be free from dependence upon the masters, and therefore (as is claimed) more rigorous in demanding such requisites as make for safety.

It is enough here to indicate the trend of discussion. A more interesting point is the repudiation and criticism of control by workmen. Mr. Frowen, an official of the Examiners' Association, is in utter disagreement with Mr. Hartshorn on this, for he asserts that the numberless instances where workmen fail to co-operate with the management and firemen in matters relating to safety can be remedied only by placing the latter in a position to exercise without fear or favour a complete and effective control in that respect. Accidents and death are brought about, he states, "by determination to finish filling the tram before putting up the stick or post that the fireman has ordered, or by holing out this or that bunch before putting up the sprags also ordered by the fireman, and still again, the persistent disuse of the barhook demanded by law, provided by the management and ordered by the examiner."

The subject is of more than passing importance, because it must be regarded as forming part of the new demands to come forward in "fateful 1915;" and it is interesting to note this and other comments upon workmen's doings as employers. One critic asks, "What hope have we, if colliery examiners became directly employed, that they could escape spite, prejudice, scorn, and petty jealousy if they dared to give opinions contrary to the crowd."

The conditions at Senghenydd have so far improved that on Friday the men held a meeting to consider the advisability of resuming work in the eastern portion—that which was unaffected by the explosion. It was decided to appoint representatives who should make a complete examination, and report to an adjourned meeting on Monday. The examiners went through those workings and reported favourably; and on Monday the men passed a resolution to return on Wednesday, they having been idle for six weeks, and many of them feeling keenly the pinch of unemployment. Work was resumed on Wednesday.

A conference is to be held in the City Hall, Cardiff, upon the subject of mining instruction. What is aimed at is that all the authorities dealing with this particular branch of education should unite and correlate their work, operating together so that there should be a common course of technical work, directed to increasing the safety of mining as well as the efficiency of officials and workmen. One central body, representative of public authorities, University College, and the coalowners, is desired.

Mr. T. Mardy Jones, following up the criticism of the South Wales School of Mines which has been established by the coalowners, states that in his opinion it is desirable to make investigation into the relation of that mining school with University College, because this might lead to re-arrangement, making it more democratic, and of easier access to miners who cannot afford high fees. Mr. Mardy Jones has been a student of Ruskin College, and since his return has acted as registration agent for the Miners' Federation; and he can be regarded as expressing the mind of a large section of colliers.

In regard to the new institution, one of his criticisms is that no provision is made in the mining school for any training in the relations of capital and labour in

the industry, whereas, in his judgment, economics as a science should occupy an important place in the curriculum, either at the mining school or during the college course. Unless the mining students in the school or at the college are properly instructed in economics, with special reference to the coal industry and such questions as charges and conditions, then, in his opinion, they will probably be far less efficient in wage and labour dispute negotiations than is the present type of colliery manager. The latter have, in a large proportion, risen from the ranks, and, having worked as miners, taken a more or less active part before they became officials, they have valuable experience in dealing with men from a wage point of view.

In Mr. Jones's opinion there is a danger that the new type of manager prepared by the mining school will not be in sufficiently close touch with the men, but will be appointed to important positions with very little previous experience in matters relating to wages and bargaining with the workmen. He considers that there is a danger of the school developing the same type of manager as exists in France, where (he states) almost invariably the mining engineers are drawn from the well-to-do members of the middle class, and undergo a college training, with the result that while they are well equipped from the engineering point of view, they are unable to cope with wages difficulties half as easily as the corresponding class is in South Wales.

Monmouthshire Education Committee is being criticised for its dilatoriness in giving full effect to a resolution of two years ago concerning the establishment of a school of mines. The Council, as a whole, favoured the idea; but the committee is charged with slackness in carrying out the Council's decision.

The strike at Llanhilleth Colliery, which has lasted over six weeks and involved nearly 2,000 men, has ended, the men having resolved, at a meeting held on Monday, to resume work. Originating through a belief that gas had made the mine dangerous, it was persisted in by demand for removal of several officials; and last week there was some disorder through assault made upon the local secretary of the Colliery Examiners' Association. The council of that association met in Cardiff on Saturday, and after three hours' discussion and the consideration of representations made by a deputation from Llanhilleth, it was decided that the whole of the staff (in sympathy with those to whom the workmen objected) should be allowed to resign. Guarantee for employment of equal financial value was understood.

During Saturday the workings were examined by Mr. Stewart (Powell's Tillery), Mr. Falcon (Ebbw Vale), Mr. Tallis (Tredegar), and Mr. Jeffreys (Lancaster's), and found free from any accumulation of gas. Following this, Monday's meeting of the men decided to return to work, repairers and timbermen to go down the same evening. The workmen undertake that, in the event of any similar complaint in future, the question at issue shall be put before the Examiners' Association, and thus a stoppage of work be prevented.

The Joint Minimum Wage Committee met in Cardiff, on Tuesday, and dealt with several questions submitted; but they were unable to agree upon the classification of 10 grades of men which had not been provided for in the original award. This matter will therefore come before Lord St. Aldwyn in a few days' time.

The joint committee had also a question upon the method of averaging wages, brought up from the Blaengarw Colliery, of the Ocean Company. A man having failed to earn the minimum rate of wage, the earnings of the preceding week had been taken into account for the purpose of averaging for the fortnight; and the employers (not being free to take a week more than once) proposed for the third week to use the fourth or subsequent one. The committee decided, after a long discussion, that the subsequent week could not be taken; but that it must be the third week.

Two matters of considerable interest, relating to the Powell-Duffryn Company, have attracted notice this week; first, the rumour (which lacks confirmation) that the company seek extension by uniting their present undertaking with the Badwas collieries, or with the Cardiff collieries at Llanbradach. Already there is personal connection in the directorate between Powell-Duffryn and Badwas. The other item of interest is that the sinkings at Pengam have reached the Polka and Ras Las seams, after work extending over two years, wherein considerable difficulties were encountered; for at about 500 yards the sinkers tapped an enormous flow of water. Within three or four months, it is anticipated, this new colliery, which is in the Rhymney Valley, will be in operation; and it will ultimately provide work for 3,000 men. With the garden village now in course of construction close by, and other heavy building enterprises, a total of at least 800 new houses are to be erected.

The notices which have been issued of Parliamentary Bills for next session give conclusive demonstration of the continued industrial progress of South Wales, particularly in the coal trade, for it is in respect of colliery traffic that the greater part of the railway extension developments are required. The Great Western Railway Company will construct a new line in the Neath Valley; also additional accommodation in and around the Port Talbot Docks. They will extend their undertaking in the direction of Pontardulais; and between Cardiff and Port Talbot they are, overlarge sections,

laying two additional lines of railway. Quite a number of bridges are being enlarged; and at Cardiff fresh acquisitions of land are notified.

In Monmouthshire, the Brecon and Merthyr Company, and also the Alexandra Dock Company, give notice of railway extensions; and the Rhymney Railway Company intend applying to Parliament for power to construct a new line from their Penallta branch eastward to a junction with the Great Western between Hengoed and Nelson. All through the busy district lying on the coalfield from Llanelli eastward, there is evidence of considerable additional railway development.

Part of the new proposals creates much disquiet in Llanelli, where harbour improvements have secured a great depth of water, high hopes being entertained that, by the facility thus afforded for larger ships, Llanelli would secure a greater proportion of the anthracite-coal shipments. At present these shipments are made chiefly at Swansea; but just at this time, when the improved harbour access gave Llanelli a prospect of better trade, the Great Western Railway purpose making their new fast route to Fishguard by a shorter cut which leaves Llanelli to the south; and along their new line there will be an even better access for anthracite traffic to Swansea—much to the advantage of the collieries in the Gwendraeth Valley, but to the disappointment of Llanelli.

In the report of the Merthyr Union for the half-year ended September 30, 1912, there is a striking item as to the increase in outdoor paupers. The abstract of accounts has only just been issued and published, and it states that outdoor paupers totalled 27,222, as compared with 15,471 in the corresponding period of the previous year, and that the great increase of 12,251 was attributable to the strike in the coal trade during the earlier part of 1912. This is a fact worth placing on record, although the information is so belated.

Steps have been taken to attain the desired two wages boards in the Forest of Dean, the steam-coal men, working under the conditions of deeper development, not being content to have their interests combined with those of the house-coal men; but although notices terminating the existing agreement were duly given, no definite re-arrangement has yet been made.

**Alcohol as Fuel.**—A paper read before the Institution of Automobile Engineers by Dr. W. R. Ormandy urged the necessity of further research regarding the use of alcohol as fuel for motor-car engines, and reviewed a number of experiments undertaken with mixtures of benzol and alcohol. Among the conclusions drawn by the author were that the modern high-speed petrol engine would run on a half-and-half mixture of benzol and alcohol with as much power, flexibility, ease of starting, silence and economy in consumption as with its ordinary petrol fuel, and with merely slight modifications to existing types of carburettors.

**Crown Enterprise in Dean Forest.**—There has just been brought into actual working a factory for the manufacture, out of the waste woods of the Forest of Dean, of various products for which there is a substantial demand; and with respect to some of these manufactures they are of great value, and are indispensable in regard to the Government requirements for the supply of War Office explosives. The factory is situate near the Speech House-road railway station, and is built according to the plan of Mr. F. H. Meyer, of Hanover. The primary importance of the concern is the manufacture of acetone, from the acetate of lime, which under the process is extracted from the wood, and which is used in the manufacture of the smokeless powder for which the War Office is the best customer. Other valuable residuals are naphtha or methyl alcohol, used in the production of methylated spirits, wood tar, and charcoal. Although distillation of wood has been carried on in the Forest of Dean for many years, the processes have not been modernised, and have now almost entirely ceased to exist. The undertaking under notice is stated to be the first of its kind in this country. The plant is of a most expensive kind, and the buildings, which are of a most substantial character, have been erected with great care. The exact nature of the process is guarded with jealous privacy, and only those who are in actual employ upon the work thoroughly understand it. A 30-horse power engine has been laid down by Messrs. Marshall, of Gainsborough, whilst the boiler (of 120 lb. pressure) is supplied by Messrs. Edwin Danks, of Oldbury. Having regard to the fact that the Forest of Dean has an area of 22,000 acres of woodland, and that there is a considerable "fall" every year, it follows that a great many tons of timber—chiefly oak—are available for utilisation, but it is probable that as time goes on, if the factory is to be kept going full speed, an even larger quantity of wood than the Royal forest is capable of producing will be requisitioned. The outstanding feature in the enterprise consists in the fact that, whilst much of the raw material has hitherto possessed only a nominal value, the products which under this process will be obtained from it are of a most valuable kind. Mr. Thos. Newcomen, of Coleford, who has had valuable experience in local distilleries, is the manager, and the undertaking is under the direct supervision of Mr. V. F. Leese, deputy-surveyor of Dean Forest.



## CONTRACTS OPEN FOR COAL AND COKE.

Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

**TEDDINGTON, DECEMBER 8.**—The Teddington Urban District Council are desirous of receiving tenders for the supply of rough slack, about 1,500 tons for the period ending December 31, 1914, delivered in quantities as required at the sewage works, situated at Broom-road, Teddington. Sealed tenders endorsed "Tender for Rough Slack," together with samples, must be sent to the undersigned at the Council Offices not later than noon on Monday, December 8, 1913. The Council do not bind themselves to accept the lowest or any tender. By order, G. H. Salmons, town clerk, Council Offices, Teddington.

### Abstracts of Contracts Open.

**ALEXANDRIA (EGYPT), DECEMBER 12.**—For the Ports and Lighthouses Administration, supply of coal for H.H.S. "Aida," at Port Said, and Port Said lighthouse. Conditions of tender from the Stores Department of the Administration at the Arsenal, Alexandria.

**CARDIFF, DECEMBER 10.**—About 2,870 tons of large screened house, 890 tons of large screened smokeless steam, 596 tons of through-and-through smokeless steam, 3,140 tons of washed steam nuts, 550 tons of washed steam beans, 247 tons of washed anthracite nuts, 80 tons of smith's coal, and 40 tons of small coal; also 495 tons of gas coke, for the Corporation. Forms from Mr. J. L. Wheatley, town clerk, City Hall, Cardiff.

**DOWNHAM, DECEMBER 2.**—About 60 tons of best Cresswell large nuts coal. Tenders to Mr. Walter Hutson, Stow Bridge, Downham.

**DUNDEE, DECEMBER 10.**—Coal for the Tay ferries' steamers, for the Dundee Harbour Trustees. Specifications from Mr. J. H. Thompson, general manager and engineer, Dundee.

**GAYTON, DECEMBER 17.**—About 35 tons of good house coal, for the Gayton Fuel Allotment. Tenders to Mr. Robt. J. Cullum, of Gayton.

**KILLARNEY, DECEMBER 6.**—About 400 tons of best house coal, for the Guardians. Tenders, chairman, Mr. P. Carey, clerk of Union, Boardroom, Workhouse, Killarney.

**KINGSTON-UPON-THAMES, DECEMBER 1.**—Coal and coke, for the Surrey Standing Joint Committee. Forms from the County Hall.

**LONDON, DECEMBER 8.**—Best gas coke, for the St. Pancras Borough Council. Forms from Mr. C. H. F. Barrett, town clerk, Town Hall, Pancras-road, N.W.

**PENTRE (RHONDDA), DECEMBER 5.**—About 12,000 tons of through-and-through gas coal, for the Rhondda Urban District Council. Forms from the manager, Mr. Octavius Thomas, Gas and Water Offices, Pentre, Rhondda.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

**ABERDEEN, DECEMBER 9.**—Steel Engine House.—Erection of steel engine house, lime store and other contingent works, for the Corporation (Water Department). Specification at the Water Engineer's Office, 41½, Union-street, Aberdeen.

**ANTWERP, JANUARY 26.**—Cranes.—Tenders are invited by the Municipal authorities of the above city for six electric cranes for the Bassin-Canal extension.\*

**CHIPPENHAM (WILTS), DECEMBER 10.**—Well Boring.—For making a boring at Langley Burrell, near Chippenham, Wilts, for the Rural District Council. Specification, &c., from Mr. T. J. Moss-Flower, C.E., 28, Victoria-street, Westminster, S.W., on deposit of 3 guineas (returnable).

**CHRISTIANIA (NORWAY), DECEMBER 15.**—Coal Discharging Machinery.—Tenders are invited by the Norwegian Main Railway for the supply of two coal-discharging machines, each capable of discharging at least 50 tons per hour.\*

**DURBAN (SOUTH AFRICA), JANUARY 7.**—Gas Electric Plant.—Gas electric plant for that town. Specification obtained at the office of the borough electrical engineer, Municipal-buildings, Durban, on deposit of £1 ls. (returnable).

**GOSPORT, DECEMBER 2.**—Steel Main.—A new steel steam main, including necessary valves, &c., at the air-compressing station, Westfield, Gosport, for the Gosport and Alverstoke Urban District Council. Specification on receipt of a cheque for £1 ls. (returnable), from Mr. H. Frost, engineer and surveyor to the Council, Gosport.

**GLEN (ORANGE FREE STATE, SOUTH AFRICA), JANUARY 7.**—Pumping Plant.—Complete pumping plant required in connection with the irrigation scheme at Glen, Orange Free State.\*

**GREAT BADDOW, DECEMBER 4.**—Mechanical Filters.—Erecting at Great Baddow Waterworks, in the county of Essex, mechanical filters, capable of filtering 10,000 gallons of water per hour, for the Chelmsford Rural District Council. Specification from Mr. James Dewhurst, A.M.I.M.E., the Council's engineer, Waterloo-lane, Chelmsford.

**HASTINGS, DECEMBER 9.**—Cast Iron Pipes.—About 1,250 yards of 6 in., 925 yards of 4 in., and 1,640 yards of 3 in. cast iron socket pipes, and about 4 tons of irregulars, for the Corporation. Specification from Mr. P. H. Palmer, M.I.C.E., Town Hall, Hastings.

**HASTINGS (NEW ZEALAND), DECEMBER 18.**—Turbo Pumps, &c.—Tenders are invited by the Hastings Borough Council for the supply and erection of two sets of high-lift turbo pumps and electro motors, together with suction and delivery piping, &c. Specification, &c., may be obtained on payment of £2 2s. (returnable), from the Town Clerk, Hastings, New Zealand.\*

**HYDE, DECEMBER 2.**—Iron Pipes, &c.—Iron pipes and specials, for the Corporation. Forms on application to the borough surveyor, Town Hall, Hyde.

**LEEDS, DECEMBER 6.**—Cast Iron Pipes, &c.—Cast iron pipes, from 2 in. to 36 in. in diameter, for

particulars, &c., may be seen at the Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

the Corporation. Specification from Mr. Hubert Pooley, Assoc. M. Inst. C.E., engineer and manager, Gas Offices, Millstone-lane, Leicester.

**JOHANNESBURG (SOUTH AFRICA), DECEMBER 16.**—Steel Rails, &c.—Tenders are invited by the South African Railways Administration for the supply of (1) 8,600 tons of 60 lb. steel rails and 531 tons of fishplates for same, and 31,700 tons of 80 lb. steel rails and 1,810 tons of fishplates for same; and (2) 400 tons of 60 lb. chairplates and 5,183 tons of 80 lb. chairplates.\*

**LIEGE (BELGIUM), DECEMBER 3.**—Boilers.—Two boilers, for the Municipality (Electricity Department). Specification, &c., 10d., obtainable at Hotel de Ville, Bureau des Adjudications.

**LONDON, DECEMBER 16.**—Steel Rails.—The Government of Nigeria invite tenders for the supply of acid steel rails, British standard section. All particulars obtainable on application at the office of the Crown Agents for the Colonies, Whitehall-gardens, London, S.W.

**MELBOURNE (AUSTRALIA), JANUARY 7.**—Steel Bars, &c.—Tenders are invited by the Victorian Railways Commissioners for the supply of the following:—(1) 150 steel channel bars for engines; (2) 45 copper plates for engines; (3) seamless copper tubes for engines; (4) 10,000 porous pots for batteries; (5) 180 steel boiler plates for engines; (6) 60 Yorkshire iron angles for engine boilers; (7) 17 tons of copper rod for engines; (8) 3,960 brass locomotive boiler tubes; and (9) 237 cast steel wheel centres for engines and tenders. Specifications from the secretary, Victorian Railways Offices, Spencer-street, Melbourne.\*

**PRETORIA (SOUTH AFRICA), JANUARY 7.**—Pumping Plant.—Tenders are invited by the Union Tender Board for the supply and erection of a pumping plant at Glen, Orange Free State. Specifications obtainable from the Director of Irrigation, P.O. Box 399, Pretoria, on deposit of the sum of £2 (returnable).

**RICHMOND AND TWICKENHAM, DECEMBER 5.**—Tunnel and Water Mains.—For the construction of a tunnel under the Thames, together with the necessary shafts and other auxiliary works, and the supplying, laying and fixing of mains at Richmond and Twickenham, for the Metropolitan Water Board. Specification, &c., can be inspected at the offices of the Board (Chief Engineer's Department), Savoy Court, Strand, W.C.

**ROTHERHAM, DECEMBER 1.**—Motor Pumps.—Two automatically controlled electrically driven motor and pump sets, each set capable of delivering 1,800 gallons per minute against a head of 25 ft., for the Corporation. Further particulars from Mr. Ernest B. Martin, M. Inst. C.E., borough engineer, Rotherham.

**SHEFFIELD, DECEMBER 2.**—Retort Fittings, &c.—Hydraulic mains, ascension pipes, cast iron floor plates, &c.; also 250 mouthpieces, 24 in. by 16 in., □ shape, both for the Grimesthorpe Works, for the Sheffield United Gaslight Company. Specifications upon application to the engineer, Mr. J. W. Morrison, M.I.C.E., Commercial-street, Sheffield.

**SYDNEY (AUSTRALIA), DECEMBER 15.**—Pumping Machinery.—Tenders are invited by the Sydney Water Supply and Sewerage Board for the manufacture, supply, and delivery of a complete set of turbine-driven centrifugal pumping machinery. Specifications from the President, Metropolitan Board of Water Supply and Sewerage, 341, Pitt-street, Sydney, N.S.W.\*

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

## COAL, IRON AND ENGINEERING COMPANIES.

**Blaenavon Company Limited.**—The report for the year ended September 30 last states that, including £15,993 brought forward, and after providing £11,003 for the year's debenture interest, £10,454 for renewals and reserve funds, £25,000 for depreciation, and also after paying preference dividend to June 30 and interim ordinary dividend, there is a balance at the credit of profit and loss account of £40,623. From this the directors recommend payment on January 1 next of £8,625, being 2½ per cent. dividend on the ordinary shares, 5 per cent. for the year, carrying forward £31,998. New by-product coke ovens and modern coal-screening arrangements, extension of iron ore depots and electric power plant, new aerial ropeways, hot blast stoves, wagon shop, and other works have been installed to augment and economise the outputs of coal, coke, iron and steel. Plants for the recovery of refined benzol and tar distillation are now in an advanced state of construction.

**Bolton (Roger) and Son Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire the business now carried on by Robert Rimner under the style of Roger Bolton and Son at 58, Standishgate, Wigan, and to carry on the business of iron and brass founders, tin-plate workers, brass, iron and steel converters and engineers, &c.; also to enter into agreements (1) with William H. Smith and Ada L. Smith, and (2) with Robert Rimner, who are included in the first directors. Qualification, £500. Registered office, King-street West, Wigan.

**Broadbent and Hey Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire the business now carried on by Joseph Broadbent and Robert Hey at Flowery Field Ironworks, Hyde, Chester, under the style of Broadbent and Hey, and to carry on the business of ironfounders, &c.; also to enter into an agreement with the two above-named gentlemen, who are the first directors. Registered office, the Flowery Field Ironworks, Flowery Field, Hyde, Chester.

**Brown (John) and Co. Limited.**—An interim dividend at the rate of 5 per cent. per annum on the ordinary shares, less tax, payable December 20.

**Cardiff Collieries Company Limited.**—An extraordinary meeting of the shareholders, held at the Great Western Hotel, Paddington, have agreed to confirm the division of the ordinary and preference capital into £1 shares, increasing the capital to £300,000 by the creation of 100,000 new ordinary shares of £1 each and capitalising £97,650, the undivided profits of the company, for distribution as bonus among the ordinary and preference shareholders.

**Carlton Main Colliery Company Limited.**—The directors have declared an interim dividend at the rate of 15 per cent. per annum on the ordinary shares for the half-year

ended September 30. A circular has been sent to the debenture holders of the company, informing them that it is not the directors' intention to renew the £50,600 of first mortgage debentures which fall due for repayment on March 31 next.

**Dartmoor Forest Mining and Exploration Syndicate Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to search for and prepare for market tin, copper, iron and other metals, and to carry on the business of dealers in same. Signatories: Henry H. Walton, 55, Chapter-road, Kennington, S.E.; and A. C. Drowsing, 4, Larden-road, The Vale, Acton, W.

**Douglas (B.) and Co. Limited.**—This private company has been registered, with a capital of £10,000 in £10 shares, to acquire the business now carried on in Vicar-lane, Chesterfield, Derby, under the style of "B. Douglas and Co.," and to carry on the business of iron and steel merchants, dealers in colliery stores and tools of all kinds, ironmongers, &c.; also to enter into an agreement with John Bishop, who is one of the signatories, residing at Red Neuk, Newbold, Chesterfield.

**Falcon Ironworks (1913) Limited.**—This private company has been registered, with a capital of £6,000 in £1 shares (5,500 6 per cent. cum. pref.), to acquire the business now carried on by Hugh Bayley at Booth-street, Manchester, and to carry on the business of mechanical engineers, iron and brass founders, colliery owners, metal workers and tool makers, &c. First directors: John N. Kay and William Entwistle. Registered office, Falcon-street, Oldham.

**Gwaun-cae-Gurwen Colliery Company Limited.**—The report for the year ended September 30 last states that the profit is £30,480 13s. 8d., which, with the amount brought forward from the previous year of £5,910 2s. 3d., makes a total of £36,390 15s. 11d. Out of this was paid in June interim dividends of £4,311 on the ordinary and £219 7s. 5d. on the preference, leaving £31,860 8s. 6d. The directors recommend this should be disposed of as follows:—Payment of a final dividend of 1s. 6d. per share, free of income-tax, on the ordinary shares of £1 each, £8,633; 9d. per share, free of income-tax, on the ordinary shares of £1 each 10s. paid, £4,299 15s.; 7 per cent. preference dividend for the half-year to September 30, less income tax, £219 7s. 5d.; depreciation account, £4,000; reserve fund, £8,000; carrying forward £6,708 1s. 1d.

**Hornsby (R.) and Sons Limited.**—The directors recommend, out of the profits of the company for the year ended September 30 last, the following appropriation of the disposable balance of £41,328:—A further dividend on the preference stock for the half-year, making 6 per cent. per annum, less income-tax; dividends at the rate of 6½ per cent. on new shares and ordinary shares, less income-tax; placing £15,000 to the reserve fund, and carrying forward £4,570.

**Hyderabad (Deccan) Company Limited.**—Interim dividend of 1s. 6d. per share, free of tax.

**Light Steel Tubular Wheels Limited.**—This private company has been registered, with a capital of £9,000 in £1 shares, to acquire the business of the L.A.S.T. Wheels Limited, and to carry on the business indicated by the title and that of founders, smiths, and engineers, &c.; also to enter into an agreement with Ernest H. Jones and L.A.S.T. Wheels Limited. First directors, Ernest Henry Jones and M. Gregory. Qualification, one share. Registered office, 33, Amberley House, Norfolk-st., Strand, W.C.

**Martin (Charles) and Co. Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares (3,000 preference), to purchase the business now carried on by Charles Martin at Kelvin Works, Gateshead, and to carry on the business of engineers, ironfounders, &c.; also to enter into an agreement with Charles Martin, who is one of the first directors, residing at Kelvin Works, Gateshead.

**Metropolitan Wagon, Carriage, and Finance Company Limited.**—Interim dividend at the rate 7½ per cent. per annum.

**Midland Foundries Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to carry on the business of ironfounders, &c. Secretary, George H. Tyler. Registered office, Newton-chambers, 43, Cannon-street, Birmingham.

**Newport-Abercarn Black Vein Steam Coal Company Limited.**—Interim dividends have been declared at the rate of 7½ per cent. on the pre-preference shares, 7 per cent. on the preference shares, and 7 per cent. on the ordinary shares of the company, less income-tax, for the half-year to September 30 last.

**New Reynolton Anthracite Colliery Company Limited.**—This company has been registered, with a capital of £60,000 in £1 shares, to acquire the Reynolton Colliery, Belgelly, Pembroke, and to carry on the business of colliery and mine owners, smelters, iron and steel founders and masters, and engineers, &c.; also to enter into an agreement with T.M.H. Limited. Minimum cash subscription, seven shares. Signatories include: J. Eric Ladner, 147, Church-lane, Old Charlton, S.E., and Alec Edward Jennings, 52, Albert-road, Mitcham, Surrey. Qualification of directors (not yet appointed), £100. Remuneration, £5 5s. for each meeting attended.

**North Lonsdale Iron and Steel Company Limited.**—A dividend of 10 per cent. for the year ended October 31.

**Oldham Boilerworks Limited.**—The accounts, after allowing £450 for depreciation, show a loss for the past half-year of £1,592.

**Pease and Partners Limited.**—The directors announce interim dividends of 8s. per share (8 per cent. per annum) on the ordinary and deferred shares.

**Pettors Limited.**—The directors have declared a dividend for the half-year to September 30 on the preference, less tax, and an interim dividend at the rate of 5 per cent. on the ordinary, free of tax.

**Plates Limited.**—This private company has been registered, with a capital of £6,000 in £1 shares (3,000 A and 3,000 B shares), to acquire certain inventions relating to processes and apparatus for the coating of plates and sheets such as are used in the tin-plate industry, and to carry on the business of dealers in minerals, ores and mineral substances of every description; also to enter into an agreement with Metal Plates Limited, S. O. Cowper-Coles and Peak, Frean and Co. Limited. First directors, A. Carr, George Roberts, S. O. Cowper-Coles and J. G. Gordon. Registered office, 158, Drummond-road, Bermondsey, S.E.



**Ruston, Proctor and Co. Limited.**—Interim dividend at the rate of 5 per cent. per annum on the ordinary shares.

**Vulcan Motor and Engineering Company (1906) Limited.**—The directors report for the year ended September 30 last that the net profit amounts to £15,824, which, with the balance brought forward, gives a total of £23,828. Deducting the interim dividends paid for the six months ended March 31, 1913, there is a balance available of £20,758. Out of this the directors recommend that the expenses for increasing the capital be written off, £196 10s., the payment of dividends on the cumulative preference shares for the last six months at the rate of 6 per cent. per annum, less tax, and on the ordinary shares for the last six months at the rate of 10 per cent. per annum, free of tax, being 10 per cent. for the year, and that £10,000 be carried to a reserve fund, leaving to carry to the next account £7,407.

**Western Dominion Land and Investment Company Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to acquire mineral and other properties, and to carry on the business of coal and iron masters, steelmakers and converters, colliery proprietors and ironfounders, &c.; also to enter into an agreement with A. S. Walter, A. L. Rye and H. E. Holding, who are the first directors. Registered office: 13, Golden-square, W.

**Wylie (A. B.) Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire the business now carried on by Alexander Brown Wylie at 64-6, Corn-market, Warwick, and to carry on the business of manufacturers of and dealers in agricultural and other implements, iron merchants and brassfounders, &c.; also to enter into an agreement with A. B. Wylie, who is one of the signatories, residing at 64-6, Market-place, Warwick.

## THE FREIGHT MARKET.

Outward chartering has been moderately active during the past week. On the north-east coast there was a sharp rise in coal freights to French ports during the few days that the French miners' strike lasted. This influence has now departed, however, and rates are down to normal. Generally speaking, rates are rather firmer this week, the one exception being in the case of the Mediterranean, to which 8s. for Genoa continues to be the basic rate. At South Wales chartering is fairly active, at firm figures. There is more enquiry for Mediterranean tonnage. The River Plate market is stronger. Coasting rates are improving. At the Humber the market is quiet. Orders are difficult to secure, and suitable tonnage is rather scarce. Rates are well maintained. There is very little doing at the Clyde. Homewards, the amount of chartering done has been fully up to the average. The Black Sea has been fairly busy, at steady figures; the same is true of the Azof and Danube. There is an improving enquiry from India. Australia is firm, but dull. The River Plate is steady, with more tendency to do business for new crop loadings. The Mediterranean and ore trades are steady. The Baltic is unchanged.

Tyne to Algiers, 3,100, 6s. 7½d., 600; Alexandria, 6,000, 8s. 9d.; Amsterdam, 1,700, 3s. 9d.; Barcelona, 3,000, 8s. 3d., river loading; Boulogne, 1,500, 4s. 9d.; Bona, 2,000, 8s. 6d.; Calais, 1,650, 4s. 9d.; Chantenay, 1,500, 5s. 10½d.; Constantinople, 4,800, 9s. 6d.; Genoa, 4,500, 8s. 3d.; 3,200, 8s.; 5,000, 8s.; 3,700, 8s.; 2,600, 8s.; Gibraltar, 1,400, 7s.; Gandia, 1,500, 9s. 6d. coal, 12s. coke; Hamburg, 930, 3s. 9d.; 2,500, 3s. 9d., river loading; 1,500, 4s.; 1,600, 4s. 1½d., from Dunston; Kiel, 2,600, 5s.; Kolding, 1,600, 5s. 4½d.; Las Palmas, 2,200, 8s.; Leghorn, 4,500, 8s. 3d.; Genoa terms; 2,600, 8s.; Libau, 1,500, 5s. 6d.; London, 720, 4s. 3d.; 1,500, 3s. 4½d.; Marseilles, 4,100, 7s. 9d., from Dunston; Malta, 4,800, 6s. 9d.; Naples, 3,700, 8s. 1½d.; 3,800, 8s. 3d., 700; Oporto, 1,300, 9s. 6d., 250; 1,750, 9s. 6d.; Port Said, 5,500, 8s. 3d.; 4,500, 8s. 3d.; 5,000, 8s. 6d.; Palermo, 1,900, 9s. 3d.; 1,900, 9s., 400; Porto Ferrajo, 5,000, 8s. 3d.; Rendsburg, 1,800, 5s. 3d.; Reval, 2,300, 5s. 6d.; Rotterdam, 1,700, 3s. 9d.; Stockholm, 2,400, 5s. 6d.; Smyrna, 2,600, 10s., 400; 3,000, 9s. 6d.; St. Nazaire, 3,000, 5s. 3d., 600; Savona, 6,000, 7s. 9d., 500, 7s. 6d., 750; 4,200, 8s., 500, 7s. 9d., 750; 2,60, 8s.; Trieste, 4,200, 8s. 6d.; Tonnage, 1,200, 5s. 3d.; Venice, 4,900, 10s.

Cardiff to Ancona, 8s. 6d., 500, December; 3,500, 9s. 9d., 400; Alexandria, 3,800, 8s. 9d., December 1-15; 4,700, 9s.; 5,300, 8s. 3d., December 11; Algiers, 4,000, 8½ fr.; Bombay, 5,000, 12s.; Barriero, 1,600, 6s. 9d., 400; Bermuda, 2,500, 8s. 3d. and 9s.; Bordeaux, 3,300, 6½ fr., end November; 1,800, 6½ fr.; Bastia, 2,800, 8s. 6d.; Bayonne, 1,400, 7 fr.; Barcelona, 2,400, 7s. 3d.; 2,400, 8s. 3d.; 2,700, 8s.; Colombo, 5,000, 11s. 3d., early December; 5,000, 11s., December; 11s., December 20-January 20; Cherbourg, 450, 6s.; Cadiz, 1,500, 7s. 6d.; Civita Vecchia, 2,800, 9s.; Constantinople, 4,000, 9s., December 5; 5,000, 9s. 3d.; Campana, 15s. 6d., December 1-15; 10s. 6d.; Caen, 1,500, 5s. 6d.; Devonport, 2,200, 2s. 4½d., usual options, Admiralty; 2,800, 2s. 6d., Admiralty; Dieppe, 2,300, 4s. 10½d.; Djibouti, 10s. 9d., end December-early January; Genoa, 6,200, 7s. 9d., early December; 5,000, 7s. 7½d.; 4,700, 7s. 9d.; 5,200, 7s. 9d.; Gibraltar, 2,600, 4s.; 3,800, 4s., December 4; 2,600, 4s. coal, 4s. 9d. fuel, December 1, Admiralty; Havre Canal, 1,900, 5s. 1½d.; Havre, 1,750, 5s.; Huelva, 1,800, 6s. 6d.; Islands, 3,000, 7s. 9d., December; Las Palmas, 5,000, 7s. 7d.; 2,600, 7s. 9d.; 1,400, 7s. 9d.; 3,000, 7s. 9d., December 7; Lisbon, 2,900, 6s., 500; 2,000, 6s. 3d., 350, early December; 1,650, 6s. 6d.; 3,400, 5s. 10½d.; 1,600, 6s. 9d.; 2,300, 6s.; Loanda, 3,000, 15s. 6d., 250; Leghorn, 5,500, 8s. 6d., 500; 5,500, 8s.; La Pallice, 3,300, 5½ fr., December 1, with option; Marseilles, 4,800, 9½ fr.; 4,000, 9½ fr., December 1; 5,300, 9½ fr.; early December; Monte Video, 5,300, 14s. 6d., December 5; Naples, 5,500, 8s. 6d., 500; 5,500, 8s.; Oran, 6,500, 8½ fr.; Oporto, 850, 8s. 1½d.; Pernambuco, 4,000, 14s. 6d., early December; Port Said, 4,600, 9s.; 6,500, 8s. 6d.; 5,500, 8s. 6d.; 5,000, 8s. 6d.; 4,000, 9s.; 7,000, 8s. 6d., December 2; 6,000, 8s. 6d.; Palermo, 5,500, 8s. 6d., 500; Port Sudan, 6,000, 11s.; Portsmouth, 2,800, 2s. 7½d., Admiralty; Rio de Janeiro, 4,000, 14s. 6d., early December; 6,500, 15s. 3d.; about 15s. 3d., fuel; River Plate, 5,500, 15s., early December; 6,000, 14s. 9d., mid-December; 5,000, 15s., early December; 5,200, 15s., option up river 16s., December 1-15; Rouen, 1,100, 5s. 6d.; Rosario, 5,000, 16s., first half December; 5,200, 16s. 6d., December 1-15; St. Malo, 2,400, 5s.; St. Servan, 2,400, 5s.; St. Nazaire, 3,300, 5½ fr., December 1; Tarragona, 2,800, 8s. coal, 8s. 9d. fuel; Tenerife, 3,000, 7s. 9d., December 7; Torre Annunziata, 2,800, 9s.; Venice,

8s. 6d., 500, December; 3,500, 9s. 9d., 400; 3,500, 9s. 6d.; Vera Cruz, 4,500, 11s. 6d., fuel, December 10; Villa Constitucion, 5,000, first half December, 15s. 6d.; 16s. 6d.

Newport to Genoa, 3,700, 7s. 9d.; Corcubion, 1,450, 6s. 6d.; Marseilles, 3,700, 7s. 9d.; 2,000, 9½ fr.; 5,600, 9½ fr., early December; Oran, 6,500, 8½ fr., 600, December 1; Bahia Blanca, 14s. 7½d., December; Bastia, 2,850, 8s. 6d.; Rouen, 1,100, 5s. 9d.; River Plate, 6,500, 15s.; Gibraltar, 3,200, 6s. 10½d.; Seville, 1,100, 7s. 10½d.; Lisbon, 1,600, 6s. 6d., 300, December 10; Bordeaux, 1,800, 6½ fr.; Cadiz, 1,500, 7s. 6d.; Torre Annunziata, 2,900, 9s.; Civita Vecchia, 2,900, 9s.; Smyrna, 4,000, 9s. 1½d.

Cardiff and Newport to Bombay, 18s., rails, sleepers, &c., December.

Swansea to Rouen, 850, 6s. 3d.; 900, 6s.; 1,450, 5s. 9d.; 730, 6s.; London, 1,100, 4s. 6d.; Corcubion, 1,450, 6s. 6d., 250; Barletta, 2,400, 9s. 6d. coal, 10s. 3d. fuel; Marseilles, 1,300, 9-62½ fr.; Oran, 1,900, 9½ fr. coal, 10½ fr. fuel; Caen, 900, 5s. 6d.; Calais, 1,200, 4s. 6d.; Rotterdam, 550, 5s.; Alexandria, 8s. 9d.; Genoa, 1,700, 9s. 6d.; Savona, 1,700, 9s. 6d.; Palma, 950, 9s. 9d., free tax; Bordeaux, 790, 7½ fr.; Nantes, 1,700, 6½ fr.; Antwerp, 1,600, 4s. 6d.; Ghent, 1,600, 4s. 6d.; Gandia, 1,250, 8s. 6d., 1896 tax; La Pallice, 1,950, 6½ fr.; La Rochelle, 1,950, 6½ fr., end December; Diapre, 1,180, 5s. 6d.; Cagliari, 2,400, 8s. 6d. coal, 9s. 3d. fuel; December 4; St. Servan, 1,280, 5s. 6d.; Civita Vecchia, 4,000, 8s. 9d. coal, 9s. 6d. fuel; Havre, 680, 5s. 6d.; Alexandria, 3,200, 9s. coal, 9s. 9d. fuel, December 2.

Wear to Boulogne, 1,000, 4s. 9d.; Veile, 2,000, 5s.; Kolding, 1,600, 5s. 4½d.; Nice, 3,000, 8s.; Helsingfors, 1,900, 5s. 10½d.; Stockholm, 2,400, 5s. 6d.

Port Talbot to Calais, 2,600, 4s. 9d.

Seabam Harbour to Bayonne, 1,400, 7s.

Llanelli to Dieppe, 950, 5s. 4½d.; 850, 5s. 6d.

Rotterdam to Callao, sail, 1,714 n.r., 25s. 6d.; Porto Ferrajo, 6,500, 6s. 9d., mid-December; Piræus, 3,600, 9s.; St. Nazaire, 3,400, 4s. 9d., 480, 4s. 7½d., 580, Trignac terms; 3,400, 4s. 6d.; Marseilles, 5,100, 9 fr.

Leith to Norrköping, 1,200, 5s. 6d.; Odessa, 2,900, 11s.

Newport River to Tarragona, 2,600, 8s. coal, 8s. 9d. fuel.

Antwerp or London to Rio de Janeiro, Santos and Bahia Blanca, 17s. net, December 3.

Liverpool to New York or Philadelphia, 1,950, about 7s., full cargo of Cuban sugar.

Dunkirk to New York, sail, 6s. 6d.

Goole to Boulogne, 1,200, 4s. 6d.

Blyth to Delfzyl, 3,000, 3s. 7½d.; Libau, 1,500, 5s. 6d.; Calais, 1,700, 4s. 9d.; Boulogne, 1,700, 4s. 9d.; Hamburg, 2,500, 3s. 9d.; Rendsburg, 1,700, 5s. 3d.

Glasgow to Barcelona, 2,400, 8s. 3d.; 8s. 10½d.; Genoa, 2,600, 8s.; Savona, 2,600, 8s.; Leghorn, 2,600, 8s.

Wales to Taltal and nitrate port and home to United Kingdom-Continent, sail, 40s. in and out one port, 40s. 6d. if stiffened.

Runcorn to United States, salt, November; Savannah, 7s. 3d., salt; Pensacola, 7s. 3d., salt.

West Hartlepool to Hamburg, 2,400, 3s. 6d., 2,000, 3s. 7½d.; 2,500, 3s. 7½d.; Nice, 3,000, 8s.; Zeebrugge, 1,700, 3s. 6½d.; Bordeaux, 3,300, 5s. 3d.

Methil to Piræus, 3,500, 8s. 9d.; Syra, 3,500, 8s. 9d.; Zea, 3,500, 8s. 9d.; Venice, 3,500, 10s. 6d.; Alexandria, 5,000, 8s. 6d., 700.

Hull to Pernau, 1,400, 6s.; 1,800, 6s. 7½d., 48 hours; Bilbao, 1,500, 6s. 9d.; Novorossisk, 4,200, 9s. 6d.; Odessa, 2,900, 11s.; 4,200, 9s. 6d.; Reval, 5s. 7½d.; Riga, 3,000, 6s.

Wales to Mexillones, sail, 17s., December.

Fife port to Lubeck, 1,800, 5s. 6d.; Messina, 2,400, 7s., f.d.

Hamburg to Honolulu, sail, 18s.

Grangemouth to Kurrabeksmide, 1,600, 5s. 4½d.

Humber to Riga, 1,650, 6s. 3d.; Theodosia, 5,200, 9s. 1½d.

Tyne, Wear or Blyth to Genoa, contract, 100,000 tons coal, 7s. 6d. per ton, delivery over 1914; 30,000 tons, contract, 7s. 3d., delivery over 1914.

Forth to Kiel, 2,300, 5s. 1½d.

Homeward charters:—Savannah, 2,327 net, Liverpool or Bremen 27s. 6d., Havre 30s., cotton, December; Port Arthur, 950 stds., Delfzyl and Tyne, 88s. 9d., December; San Lorenzo, net above, 550, 10 per cent., United Kingdom-Continent, 14s. o.c., less 6d., less a further 6d. if London or Rotterdam, option full cargo below bar 1s. 6d. less, January 25-February 25; 4,500, 10 per cent., 14s. 6d. o.c., less 6d., seed 6d. extra, January 25-February 25; Santa Fé, 3,800, 10 per cent., Continent, H. to H., 20s. 4½d., less 6d., quebracho, January 20-February 20; Australia, 8,600, United Kingdom-Continent p.p., 29s., no reduction direct, January; 11,000 max., 29s., less 6d., with options, January-February; Calcutta, 2,966 net, United Kingdom-Continent, p.p., 18s. one port, 18s. 9d. two ports, d.w. basis, net terms, December-January; 2,222 net, Bombay or Kurrachee Rs. 5-6, option Colombo Rs. 4-6, voyages over 1914; Sulina, 5,600, Glasgow, 9s. 3d., 800 tons oats 1s. 9d. extra, ppt.; 6,200, Rotterdam 8s. 6d., Antwerp 8s. 9d., with 3d. less barley up to half cargo, cancelling December 10; 3,400, Antwerp or Rotterdam, 8s. 6d. spot; Hornillo Bay, 5,200, Rotterdam, 5s., November; Villaricos, 6,800, Rotterdam, 6s., ppt.; Algiers, 4,000, Cardiff, 4s. 9d., December; Barreiro, 1,450, Garston, 8s. 3d., spot; Bilbao, 4,100, Rotterdam, 4s. 6d., December 10-25; 2,200, Middlesbrough, 4s. 9d., ppt.; Porman, 5,000, Oslebshausen, 6s. 6d., 1,000-1,000, December; Azof, 6,300, Rotterdam 9s. 9d., Antwerp, Emden or Weser 10s., Hamburg 10s. 3d., with 3d. less barley, in case of ice to complete at Novorossisk 2s. less, November-December; Kherson, Nicolaieff or Odessa, 6,300, London, 8s. 6d., with 3d. less barley, 800 tons oats 1s. 6d. extra, ppt.; 5,100, London or Rotterdam 8s. 7½d., Weser 8s. 10½d., Hamburg 9s. 1½d., with 3d. extra barley, ppt.; Nicolaieff, 4,800, Rotterdam 8s., Weser 8s. 6d., Hamburg 8s. 9d., with 3d. less barley, days, November 25; Odessa, 2,862 net, Rotterdam, 7s. 10½d., spot; Novorossisk, Theodosia, Sulina or Kustendje, 3,500, 9s. 6d. n.c. or any, 10s. Hamburg, 3d. extra two ports loading, January 15-February 15; Novorossisk or Theodosia, 5,000, Rotterdam 8s. 6d., Antwerp, Emden or Weser 8s., early December; 4,700, Rotterdam, 8s., no reduction, ppt.; Kherson, Nicolaieff, Odessa, Novorossisk or Theodosia, 6,000 max., Rotterdam 8s. 6d., Antwerp 8s. 9d., cancelling December 10; Galveston, 3,186 net, 146 ft., Antwerp, Rotterdam, Bremen or Hamburg, basis 25s., December 15-30; La Goulette, 3,200, East Coast United Kingdom, 8s. 3d., December; Odessa, Novorossisk or Theodosia, 6,400, Rotterdam 8s., Antwerp, Emden or Weser 8s. 3d., Hamburg 8s. 6d., with 3d. less barley, January 10-31; time charter, Transatlantic trade, reported at 5s. 9d. one trip, delivery Baltimore, re-delivery West Italy; 5,800, 6s.,

one trip; time charter, Brazil trade, 2s. 9d., one trip, delivery Santos, re-delivery United Kingdom Continent; Concepcion Bay, about 24s., United Kingdom-Continent, Newcastle, N.S.W., sail, 20s. 6d. if arriving April 30, 19s. if end May, direct nitrate port; Port Larath, 3,500, Middlesbrough or Stockton, 8s. 9d., f.d., ppt.; Tonnay Charente, 2,000, West Hartlepool, 4s. 6d., ppt.; Gulf, 2,265 net, Buenos Ayres or Rosario, 120s., January; 1,250 stds., River Plate, 115s., December-January; Rosario, 5,300, 10 per cent., New York, 10s. 6d., ppt.; Poti, 7,000, Rotterdam, 8s. 6d., Antwerp, 8s. 9d., ppt.; Taganrog, 5,100, Marseilles, 13 25 fr., ppt.; South Russia or Siberia, 3,500, 10 per cent., 9s. 6d. n.c. or any, 10s. Hamburg, 3d. extra two loadings, early December; Novorossisk, 4,600, Denmark, 13s. one port, 13s. 3d. two ports, 13s. 6d. three ports, oil-cake, ppt.; Danube, 3,500, Antwerp or Rotterdam, 9s. 9d., spot; 5,700, Rotterdam, 10s., option 1,000 tons oats 2s. extra, December 1-15; Adelaide, sail, 29s., United Kingdom-Continent, option outport, February; North Pacific, sail, 48s. 9d., direct port West Coast South America; Portland, Or., sail, 32s. 6d., United Kingdom-Continent, wheat basis, December; San Francisco, sail, 57s. 6d., United Kingdom-Continent, option North Pacific, hatchway lumber; Sydney, N.S.W., 29s. 3d., United Kingdom-Continent, option Melbourne and Geelong loading, 29s. 6d., or South Australia 29s. 9d., with options, January 1-25; New York, 2,183 net, River Plate, basis about 19c. one port, two voyages commencing March, 1914; Sapelo, 800 stds., 10 per cent., United Kingdom-Continent, 80s. one port, 82s. 6d. two ports, option Continent and one port United Kingdom, 82s. 6d., Passages 82s. 6d., Passages and one port United Kingdom, 85s., December-January; Pensacola, 600 stds., two ports between Lisbon and Passages, 130s., end December; Kustendje, 6,300, London, 10s., oats, late December; Batoum, 5,100, Garston, 11s. 3d., ppt.; Kustendje, 6,200, Hamburg, 8s. 6d., ppt.; Algiers, 7,200, Rotterdam, 4s. 6d., ppt.; Huelva, 3,000, Philadelphia, 9s. 9d., f.d., ppt.; Santander, 2,200, Rotterdam, 5s. 6d., ppt.

## GOVERNMENT PUBLICATIONS.

Any of the following publications may be obtained on application to this office at the price named post free.

Workmen's Compensation: Form Nos. 4, 1½d.

Union of South Africa Handbook, 2½d.

Foreign Trade Returns for October, 6d.

EXPLOSIONS IN MINES: Fifth Report of Committee, 2s. 1d.

Consular Reports, 1912: Paraguay, 4d.; France, New Caledonia, 3½d.; Tunis, 4½d.; Austria-Hungary Finances, 1911-13, 2d.; Russia, Poland and Grodno, 6d.; Portuguese Guinea, 1½d.; Turkey, Salonica, 2d.

Statistical Tables Relating to British Self-governing Dominions, Crown Colonies, Possessions and Protectorates, Part 36, 1911, 7s. 6d.

Pauperism Statement for October, 1½d.

Railway Accidents for Quarter Ending June 1913, 1s. 2d.

Southern Nigeria Mineral Survey for 1912, 1½d.

## PUBLICATIONS RECEIVED.

THE COLLIERY MANAGERS' POCKET BOOK, 1914. Edited by Hubert Greenwell. London: The Colliery Guardian Company Limited. Cloth, 2s.; roan, 3s.; calf, 4s. 6d.

OFFICIAL YEAR BOOK OF THE SCIENTIFIC AND LEARNED SOCIETIES OF GREAT BRITAIN AND IRELAND, 1913. London: Charles Griffin and Co. Limited. Price 7s. 6d.

COAL TAR DISTILLATION. By Arthur R. Warnes. London: John Allan and Co. Price 7s. 6d. net.

BUSINESS PROSPECTS YEAR BOOK, 1914. Edited by Joseph Davies and C. P. Hailey. London and Cardiff: The Business Statistics Company Limited. Price 10s.

FIRST SERIES OF COALDUST EXPLOSION TESTS IN THE EXPERIMENTAL MINE (Bull. 56 Department of the Interior, U. S. Bureau of Mines). By George S. Rice, L. M. Jones, J. K. Clement and W. L. Egy. Washington: Government Printing Office.

A LABORATORY STUDY OF THE INFLAMMABILITY OF COAL-DUST (Bull. 50, Department of the Interior U. S. Bureau of Mines. By J. C. W. Fraser, E. J. Hoffmann and L. A. Scholl, jun.

INVESTIGATIONS OF DETONATORS: ELECTRIC DETONATORS (Bull. 59 Department of Interior, U.S. Bureau of Mines). By Clarence Hall and Spencer P. Howell.

FIRST AID INSTRUCTIONS FOR MINERS (Miners' Circular 8, U.S. Bureau of Mines). By M. W. Glasgow, W. A. Kandenbush and C. O. Roberts.

"Annual Statistical Report of the Bureau of Statistics of the American Iron and Steel Institute, 1912"; "New Zealand Mines, Statement for 1912," by the Hon. W. Frazer, Minister of Mines; "Mining and Treatment of Lead and Zinc Ores in the Joplin District, Missouri" (Tech. Paper 41, U.S. Bureau of Mines); "Monthly Statement of Coalmine Fatalities in the U.S.A. for August 1913," compiled by A. H. Fay; "Journal of the Franklin Institute" (Vol. 176, No. 5), November, price 50 cents; "The International Review" (Vol. 1, No. 1), December, price 2s. net.

A correspondent learns that, following the example of Messrs. Fletcher, Burrows and Co., who have provided well equipped baths for the miners and other workers at the Gibfield pit, Howe Bridge, Atherton, Lancs., other colliery proprietors in Leigh and Tyldesley are obtaining estimates for the provision of similar conveniences at certain of their pits.



# THE COLLIERY GUARDIAN

## MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below:—

Am. Gas Light JI. = American Gas Light Journal.  
Berg- Hüttenmänn. Rdsch. = Berg- und Hüttenmännische Rundschau.  
Bull. Am. Inst. Min. Eng. = Bulletin of the American Institute of Mining Engineers  
Bull. Soc. Amicale Douai = Bulletin de la Société Amicale Douai.  
Canad. Min. JI. = Canadian Mining Journal.  
Coal and Coke Op. = Coal and Coke Operator.  
Coal Tr. Bull. = Coal Trade Bulletin.  
Colliery Eng. = Colliery Engineer.  
Colliery Guard. = Colliery Guardian.  
Eng. Mag. (N.Y.) = Engineering Magazine (New York).  
Eng. Rec. = Engineering Record.  
Iron Tr. Rev. = Iron Trade Review.

Jl. Am. Soc. Mech. Engin. = Journal of the American Society of Mechanical Engineers.  
Jl. Soc. Chem. Ind. (Lond.) = Journal of the Society of Chemical Industry (London).  
Jl. Soc. Dyers Col. = Journal of the Society of Dyers and Colourists.  
Mex. Min. JI. = Mexican Mining Journal  
Min. Engin. (Lond.) = Mining Engineering (London).  
Min. Eng. World = Mining Engineering World.  
Min. Mag. = Mining Magazine.  
Oesterr. Z. Berg- Hüttenwes. = Oesterreichische Zeitschrift für Berg- und Hüttenwesen.  
Rev. Univ. Min. Met. = Revue Universelle des Mines et de la Métallurgie.  
Scient. Am. = Scientific American.  
Stahl Eisen = Stahl und Eisen.

Technik Wirtsch. = Technik und Wirtschaft.  
U.S. Bur. of Mines = United States Bureau of Mines.  
U.S. Geol. Surv. = United States Geological Survey.  
Z. Bayr. Rev.-Ver. = Zeitschrift des Bayerischen Revisions-Vereins.  
Z. Oesterr. Ing. Ver. = Zeitschrift des Oesterreichischen Ingenieur- und Architekten-Vereins.  
Z. Ver. D. Ing. = Zeitschrift des Vereins Deutscher Ingenieure.  
Z. Zentr. Berg. Betrbsl. Oest. = Zeitschrift des Zentralblattes des Bergbau-Betriebsleiter Oesterreichs.

\*\*\* We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

### I.—General.

- State and Private Working of Mines (Staats- und Privatbetrieb im Bergbau.) Herbig. "Technik Wirtsch.," vol. 6, 9, p. 589-607. 2s. 6d.  
The Development of the Silesian Mining and Metallurgical Industries. (Uebersicht ueber die Entwicklung des Schlesienschen Berg- und Hüttenwesens.) Duenkelberg. "Glückauf," vol. 49, 35, p. 1358-62. 2s. 6d.  
On Payment of Wages in Silesian Coalmines. (Ueber Lohnzahlung im Schlesienschen Steinkohlenbergbau.) W. Nimptsch. "Glückauf," vol. 49, 35, p. 1418-9. 2s. 6d.  
Fifty Years Statistic of Upper Silesian Iron Industry. (50 Jahre oberschlesischer Eisenindustrie in statistischer Darstellung.) E. Jüngst. "Glückauf," vol. 49, 35, p. 1426-64. 5s.  
The Concentration of German Industry, More Especially of Coalmining. (Die Konzentration im deutschen Wirtschaftsleben, im besonderen im Steinkohlenbergbau.) E. Jüngst. "Glückauf," vol. 49-35, p. 1464-77. 2s. 6d.  
The Elsterau District. (Das Elsteraueengebiet.) Soehle. "Braunkohle," vol. 12, 28, p. 480-6. (Traffic conditions.) 2s. 6d.  
Monthly Statement of Coalmine Fatalities in the United States, May 1913, with Revised Figures for Preceding Months. A. H. Fay. Washington, D. C.: U.S. Bur. of Mines, 16 pp.  
An Accounting System for Coal Companies. J. C. McNeil. "Coal Age," vol. 4, 12, p. 414-7. A brief description of a simple system of bookkeeping applicable to any coal company, in which reliance is placed upon vouchers and loose-leaf forms, so that the amount of work to be done is reduced to a minimum.) 1s. 3d.  
The Mineral Production of India, 1912. H. H. Hayden and G. F. Adams. "Colliery Guard.," vol. 106, 2759, p. 1012. 6d.  
Strikes and Lock-outs in the Mining and Quarrying Industries in 1912. "Colliery Guard.," vol. 106, 2758, p. 940. 6d.  
Industrial Agreements in the Coal Trade: South Wales. "Colliery Guard.," vol. 106, 2758, p. 955. 6d.  
Miners' Relief. "Colliery Guard.," vol. 106, 2760, p. 1063. (Report of deputation to Home Secretary.) 6d.  
A Review of Coalmining. R. T. Moore. "Colliery Guard.," vol. 106, 2760, p. 1051; 3 fig. (Pres. address Inst. Engin. Shipbldr. Scotland.) 6d.

### II.—Education.

- The Mining High-School Education in Austria. (Der monatliche Hochschulunterricht in Oesterreich.) F. Lorber. "Z. Oesterr. Ing. Ver.," vol. 65, 26, p. 401-7; 27, p. 417-23; 28, p. 433-8. 4s. 6d.

### III.—Geology.

- Progress made in the Geology of Upper Silesia during the last 20 Years. (Die Fortschritte der Geologie Oberschlesiens in den letzten 20 Jahren.) Prof. Michael. "Glückauf," vol. 49, 35, p. 1362-6. 2s. 6d.  
The Marine Character of the Upper Silesian Coal Measures. (Der paralische Charakter des oberschlesischen Steinkohlengebirges.) Dr. Quitzow. "Glückauf," vol. 49, 35, p. 1377-80. 2s. 6d.  
Comparison between the Coal Basin of Upper Silesia with others in Central Europe. (Das oberschlesische Steinkohlenbecken im Vergleich mit anderen Becken Mitteleuropas auf Grund der Steinkohlenfloren.) W. J. Glückauf. "Glückauf," vol. 49, 35, p. 1366-77. 2s. 6d.  
The Coalfields of the Pass. W. W. Leach. "Canad. Min. JI.," vol. 34, 19, p. 605-8; ill. 1s. 6d.  
The Commercial Value of Coal. "Colliery Guard.," vol. 106, 2760, p. 685. 6d.

Relative Positions of Carboniferous and Eruptive Rocks in the Eastern Portion of the Waldenburg Basin. (Die Lagerungsverhältnisse des Karbons und der Eruptivgesteine im östlichen Teile des Waldenburger Beckens.) G. Berg. "Glückauf," vol. 49, 35, p. 1380-4. 2s. 6d.

Bibliography of Washington Geology and Geography. G. O'Donnell. Olympia, Washington: Washington Geol. Surv. Bull., 12, 64 pp.

The Coalfields of Montana. E. Stebinger. "Bull. Am. Inst. Min. Eng.," vol. 1913, 81, p. 2330-59. 3s. 6d.

### VI.—Working of Minerals.

Mechanical Equipment at the Anna Colliery, Lana, Bohemia. (Die maschinellen Einrichtungen des Annaschachtes der englisch-boehmischen Steinkohlengewerkschaft in Lana.) H. Hrada. "Oesterr. Z. Berg-Hüttenwes.," vol. 61, 41, p. 577-80; 42, p. 593-6; pl. 2s. 6d.

Rotary Pneumatic Hand Drills for Coal-getting in Upper Silesia. (Die Verwendung von Freihand-drehbohrmaschine mit Pressluftantrieb bei der Kohलगewinnung in Oberschlesien.) G. Richter. "Glückauf," vol. 49, 35, p. 1396-9. 2s. 6d.

Does Bituminous Mining Pay? A. E. Rickards. "Coal Age," vol. 4, 12, p. 418-22; ill. 1s. 3d.

Working Thick, Highly-inclined Seams. J. E. Ambrose. "Coal Age," vol. 4, 13, p. 442-3; ill. (Description of the general methods employed for working thick seams of coal on steep pitches, in Colorado and British Columbia.) 1s. 3d.

Submarine Coalmining. J. E. Spicer. "Coal Age," vol. 4, 13, p. 444-5; ill. (The necessary thickness of cover an important factor. The nature and thickness of the strata overlying the seam are determined by soundings and test holes put up in the roof of the mine. Faults and washouts a menace. Submarine mining in Nova Scotia, British Columbia, and Great Britain.) 1s. 3d.

The Rossitz - Zbeschau - Oslawan Coalfield. (Das Rossitz-Zbeschau-Oslawaner Steinkohlenrevier.) L. Zelnicek. "Oest. Z. Berg-Hüttenwes.," vol. 61, 41, p. 585-7. (Ventilation, lighting, danger and prevention of fires, blasting, rescue work.) 2s. 6d.

Mine-safety Precautions in Utah. A. C. Watts. "Coal Age," vol. 4, 14, p. 484. 1s. 3d.

### VII.—Boring, Shaft Sinking, and Tunnelling.

The Shaft III/IV of the Pit Victor, near Rauxel. (Die Schachanlage III/IV des Steinkohlenbergwerks Victor bei Rauxel.) H. Meyer. "Glückauf," vol. 49, 37, p. 1505-15; ill. 2s. 6d.

An Automatic Water Spray for Hammer Drills. "Min. Engin.," vol. 17, 232, p. 206-7; ill. 9d.

Modern Mining Pneumatic Drills. F. C. Perkins. "Coal and Coke Op.," 1913, p. 405; ill. 1s. 6d.

### VIII.—Explosives, Blasting.

Thirty-seventh Annual Report of his Majesty's Inspectors of Explosives. London, 1913; p. 149.

Explosive Efficiency. A. E. Anderson. "Mex. Min. JI.," vol. 17, p. 344-6. 1s. 6d.

Investigation of Detonators and Electric Detonators. C. Hall and C. P. Howell. 8vo, 73 pp. U.S. Bur. of Mines Bull. No. 59.

The Manufacture of Caps, Fuses and Igniters. (Die Herstellung von Zündhütchen, Zündschnüren und Zündern.) W. Kummer. "Z. Zentr. Berg. Betrbsl. Oest.," 1913, p. 453. 2s. 6d.

The Analysis of Black Powder and Dynamite Explosives. W. O. Snelling and C. G. Storm. 8vo, 80 pp. U.S. Bur. of Mines, Bull. 51.

### IX.—Timbering, Packing, &c.

Hydraulic Stowage Plant at the Bahn Shaft, Fürstenstein Colliery. (Die Spuelsatzanlage und die Klaierung des Spelwassers auf dem Bahnschacht der k. k. Fürstensteiner Gruben.) K. Mayer. "Glückauf," vol. 49, 31, p. 1391-5; 8 ill. 2s. 6d.

The Theory of Subsidence in Coal Areas, with Special Consideration of Railway Subsidence in the Ostrau-Karwin Coal District. (Die Theorie der Bodensenkungen in Kohlengebieten mit besonderer Berücksichtigung der Eisenbahnsenkungen des Ostrau-Karwiner Steinkohlenreviers.) A. Goldreich. Berlin: J. Springer, 1913. 15s.

Hydraulic Goaf Packing at the St. Nicolas Colliery, Montegnée (Belgium). (Le Remblayage Hydraulique au Siège St. Nicolas, à Montegnée.) A. France. "Rev. Univ. Min. Met.," vol. 57, 3, p. 277-304; 7 ill.

### X.—Surface Arrangements

Economy in the Mine Machine Shop. W. J. Crocker. "Min. Eng. World," vol. 39, 14, p. 589-590. 1s. 3d.

### XI.—Winding and Haulage.

Haulage Plant at the Friedensgrube Colliery, Upper Silesia. (Fördereinrichtungen der Friedensgrube in Friedenshütte O.S.) O. Pütz. "Glückauf," vol. 49, 35, p. 1384-91, 10; ill. 2s. 6d.

Gasoline Motors in Coalmines. A. J. King. "Colliery Eng.," vol. 34, 3, p. 164-5; 2 fig. (Extent to which they vitiate the air. Additional quantity of air to be supplied.) 2s. 6d.

Electrically-driven Main-shaft Hauling Engine with Steam Turbine and Starting Dynamo. (Elektrisch betriebene Hauptschacht-fördermaschinen mit Dampfturbinenantrieb der Anlassdynamo.) E. Blau. "El. Maschbau," vol. 31, 37, p. 779-82; ill. 2s. 6d.

Notes on M. Dessard's Paper on Preventing Overwinding by Means of Converging Cage Guides. (Quelques Observations au Sujet d'un Travail de M. l'Ingénieur N. Dessard intitulé Etude Critique des Guides rapprochés Places comme Evite-Nolettes.) A. R. Henry. "Rev. Univ. Min. Met.," vol. 57, 3, p. 315-21; 4 ill.

German Regulations for Underground Haulage with Liquid Fuel Locomotives. (Bedingungen fuer den Lokomotivbetrieb mit flüssigen Brennstoffen unter Tage.) "Braunkohle," vol. 12, 28, p. 486-8. (Halle District.) 2s. 6d.

Rope Haulage at Vesta No. 4 Mine. W. Z. Price. "Colliery Eng.," vol. 34, 3, p. 135-7; 7 fig. (Description of what is probably the greatest system of mechanical haulage in the coalmining world.) 2s. 6d.

Hauling Ropes for Great Depths. (Die Foerderseile fuer grosse Schachteufen.) D. F. Baumann. "Glückauf," vol. 49, 40, p. 1646-52; ill. 2s. 6d.

Gasoline Mine Locomotives. C. Scholz. "Colliery Eng.," vol. 34, 3, p. 153-4. 2s. 6d.

The Storage Battery Locomotive. A. R. Anderson. "Colliery Eng.," vol. 34, 3, p. 146-50; 5 fig. (Its application to gathering coal in mines; methods of calculating size of locomotives and battery needed.) 2s. 6d.

New Cascade Motors, Type Sandycroft-Hunt. (Neue Kaskaden-Motoren, Bauart Sandycroft-Hunt.) A. Ricker. "Z. Ver. D. Ing.," vol. 57, 38, p. 1503-7; ill. (Application for a hauling plant at an Indian coalmine.) 2s. 6d.

Notes on Rail Bonding. V. Rhea. "Coal Age," vol. 4, 13, p. 457-8; ill. (The comparative costs in power expended with two types of rail bonds are here discussed and the results compared upon the basis of a 1 mile track of 40 lb. rails per year.) 1s. 3d.



### XIII.—Lighting.

The Use and Care of Miners' Safety Lamps. J. W. Paul. Washington, D. C.: U.S. Bur. of Min. Miners' Circ., 12, p. 16; ill.

Portable Electric Mine Lamps. H. H. Clark. "Colliery Guard." vol. 106, 2758, p. 958. (From Technical Paper 17. U.S. Bur. Mines.) 6d.

A Defence of the Flame Safety Mine Lamp. E. A. Hailwood. "Colliery Guard." vol. 106, 2759, p. 1011. (Abst. paper read before American Min. Congress.) 6d.

Approved Safety Lamps for Mines. "Colliery Guard." vol. 106, 2757, p. 905, 17 figs.; 2758, p. 957. (Safety lamp order (continuation): Johnson, Clapham and Morris Nos. 3 and 6, Laidler No. 2a, Mills and Son Nos. 2 and 3, Bifold burner Marsaut lamp for officials, Marsaut A1 and B2 lamps for officials, Marsaut E, Patterson A2, A4, B2 and D1, Prestwich patent Protector A. Teale and Co.'s standard bonneted Marsaut No. 4a, Cambrian No. 1a, Fireman's No. 21; "Ceag," Gray-Sussmann, Oldham, Wolf and Float electric lamps; approved safety lamp glasses.) 1s.

### XIV.—Ventilation.

Experiments with Compressed-air Apparatus and Fans for Ventilation Purposes. (Versuche mit Druckluftstrahlapparaten und Ventilatoren zur Sonderbewitterung.) O. Döbelstein. "Glückauf," vol. 49, 39, p. 1593-1600; ill. 2s. 6d.

Ventilation of Mines and Removal of Gas. J. J. Rutledge. "Coal Tr. Bull." 1913, p. 55 and p. 50. 4s.

### XV.—Mine Gases, Testing.

The Influence of Inert Gases on Inflammable Gaseous Mixtures. J. K. Clement. Washington, D. C.: U.S. Bur. of Min. Techn. Paper 43, 24 p.; ill.

A Novel Firedamp Indicator. "Colliery Guard." vol. 106, 2758, p. 939; 1 fig. (The Haber Whistle.) 6d.

Firedamp in Mines and the Prevention of Explosions. J. Harger. "Colliery Guard." vol. 106, 2759, p. 997. (Abst. paper read before Manchester Geol. Min. Soc.) 6d.

### XVI.—Coaldust.

The Liévin Testing Station, France. (Station d'essais de Liévin.) J. Taffanel. "Bull. Soc. Amicale Douai," 1913, p. 564.

The Influence of Moisture on the Explosibility of Coaldust. (Das Verhalten von Kohlenstaub mit verschiedenem Feuchtigkeitsgehalt gegen Schuss- von Schwarzpulver und Gurdynamit.) Woltersdorf. "Glückauf," vol. 49, 35, p. 1401-6. 2s. 6d.

Austrian State Experimental Station for Firedamp, Coaldust, &c., Bruex. (Die staatliche Versuchsanstalt fuer Schlagwetter, Koehlenstaub, Brandgase, usw. in Bruex.) K. Stauch. "Oest. Z. Berg-Huttenwes," vol. 61, 41, p. 582-4; ill. 2s. 6d.

French Coaldust Experiments at Commentry. J. Taffanel. "Colliery Guard." vol. 106, 2757, p. 889; 2 figs. 6d.

Influence of Moisture Content on the Inflammability of Coaldust. Woltersdorf. "Colliery Guard." vol. 106, 2758, p. 956. 6d.

Explosions in Mines Committee: Fifth Report. "Colliery Guard." vol. 106, 2760, p. 1061. (Conclusions.) 6d.

The Dragon Stone Mill. "Colliery Guard." vol. 106, 2760, p. 1053; 1 fig. 6d.

### XVII.—Explosions.

Some of the Conditions Affecting Explosions of Coal Gas and Air. Sellers and Campbell. "Jl. Soc. Chem. Ind.," vol. 32, 14, p. 730-6. 4s.

### XVIII.—Mine Fires.

The Detection of Gob Fires. J. Harger. "Colliery Guard." vol. 106, 2759, p. 998. (Abst. paper read before Manchester Geol. Min. Soc.) 6d.

Experiments on the Oxidation of Coal. M. P. Mahler. "Colliery Guard." vol. 106, 2757, p. 891. 6d.

Spontaneous Combustion in Coalmines. "Colliery Guard." vol. 106, 2759, p. 1009; 2760, p. 1064. (Digest of Evidence before Departmental Committee: C. Johnson, A. M. Henshaw.) 6d.

The Fire at the Cadder Colliery. "Colliery Guard." vol. 106, 2760, p. 1048; 2 fig. (Sir H. Cunynghame's report.) 6d.

### XIX.—Rescue and Ambulance.

American Mine Safety Meeting at Pittsburgh. "Min. Eng. World," vol. 39, 14, p. 597-8. 1s. 3d.

Second Congress for Life Saving and Prevention of Accidents. (II. Internationaler Kongress fuer Rettungswesen und Unfallverhuetung.) "Glückauf," vol. 49, 39, p. 1617-21. (Report of Proceedings.) 2s. 6d.

Organisation of Rescue Work in Bohemian Mines, and Central Rescue Station at the State Colliery Julius III. (Die Organisation des Grubenrettungsdienstes bei der k.k. Bergdirektion Bruex in Nordwestboehmen und die Zentral-Rettungsstation am k.k. Schachte Julius III.) G. Ryba. "Oest. Z. Berg-Huttenwes," vol. 61, 40, p. 565-7; 2 ill. 2s. 6d.

Breathing Apparatus in Rescue Work in Austrian Mines. (Die Atmungsapparate im Rettungswesen beim oesterreichischen Bergbau.) W. Pokorny. "Oest. Z. Berg-Huttenwes," vol. 61, 41, p. 580-2; 42, p. 596-9. 5s.

A New Resuscitation Apparatus. "Coal Age," vol. 4, 14, p. 502; ill. (Resuscitation device called the "Lungmotor," which does not depend upon the action of any compressed gas for operation.) 1s. 3d.

Experiments with Recent Oxygen Breathing Apparatus. (Neuerungen auf dem Gebiet der Sauerstoff-Atmungsgeraete und damit angestellte Versuche.) Grahn. "Glückauf," vol. 49, 39, p. 1605-10; ill. 2s. 6d.

Oxygen Breathing Apparatus with and without Injectors. (Ueber Sauerstoff-Atmungsgeraete mit und ohne Injektoren.) Forstmann. "Glückauf," vol. 49, 39, p. 1600-5; ill. 2s. 6d.

The Development and Working of the Life Saving Organisation in Clausthal in 1912. (Die Entwicklung und Handhabung des Grubenrettungswesens im Bezirk der Sektion 3 der Knappschafts-Berufsgenossenschaft zu Clausthal im Jahre 1912.) Breyhan. "Glückauf," vol. 49, 38, p. 1549-58; ill. 2s. 6d.

The Use of Rescue Apparatus at Lodge Mill Colliery, Huddersfield. W. D. Lloyd. "Colliery Guard." vol. 106, 2758, p. 957. (Read before Midland Inst. Min. Engin.) 6d.

Rescue Appliances. "Colliery Guard." vol. 106, 2759, p. 997. (New General Regulations.) 6d.

Simplified Witkowitz Rescue Apparatus. J. Popper. "Colliery Guard." vol. 106, 2759, p. 999; 1 fig. 6d.

### XX.—Drainage, Pumping, &c.

A New Centrifugal Pump with Helicoidal Impeller. C. V. Kerr. "Jl. Am. Soc. Mech. Engin.," vol. 35, 10, p. 1493-1524. 2s. 6d.

### XXI.—Preparation.

Experiments in the Classification of Fine Coal. (Untersuchungen ueber die Aufbereitung der Feinkohlen.) F. Juengst. "Glückauf," vol. 49, 34, p. 1321-8; 10 ill. 2s. 6d.

The Drying of Lignite and its Economy. (Das Trocknen der Braunkohle und seine Wirtschaftlichkeit.) Dr. Echardt. "Z. Zentr. Berg. Betrbsl. Oest.," 1913, p. 505. 2s. 6d.

Drying Brown Coal with Steam in Plate Stoves. (Versuche ueber die Trocknung der Braunkohle im Dampftellerofen.) W. Boettcher. "Braunkohle," vol. 12, 27, p. 463-9. 2s. 6d.

### XXII.—Briquettes

Naphthaline as a Binder for Anthracite Briquettes. "Scient. Am.," vol. 108, p. 503. 1s. 6d.

Drying and Briquetting of Fuel. Jordan. "Feuerungstechnik," vol. 1, p. 126-9. 2s. 6d.

Machinery Plant for Manufacturing Egg-shaped Briquettes. (Maschinenanlage zur Herstellung von eiförmigen Briquets.) "Unland," vol. 46, 36, p. 66; ill. 2s. 6d.

### XXIII.—Coke Ovens

The Manufacture of Coke in 1912. E. W. Parker. Washington, D. C.: U.S. Geol. Surv. Adv. chapt. from Min. Resources. of the U.S., cal. year 1912 64 pp.

Calculation of Prime Cost of a Coke-Oven Plant. (Selbstkostenberechnung eines Kokereibetriebes.) F. Korten. "Glückauf," vol. 49, 35, p. 1413-18. 2s. 6d.

Recovery of By-products in a Modern Coke-Oven Plant. "Am. Gas Light Jl.," vol. 99, 13, p. 199-203. 1s. 6d.

Laboratory Work on By-product Coke-Oven Plants. "Gas World," vol. 59, 1524, p. 10-11; ill. (The correlation of theory and practice.) 1s.

Types of Coke-Oven Plants as Seen in Operation. "Gas World," vol. 59, 1524, p. 12-15; ill. (Simon Carves ovens and direct recovery process at Dinnington Main.) 1s.

Power from Coke-Oven Gas at Grassmoor Colliery. "Gas World," vol. 59, 1524, p. 17-8; ill. (Third generating set to be installed.) 1s.

Coking Coal at Low Temperatures. (Die Verkokung der Steinkohle bei niedriger Temperatur.) O. Simmersbach. "Berg-Huttenmaenn. Rdsch.," vol. 10, 1, p. 1-10; 18 ill.

Peat Coking. (Ueber Torfverkokung.) A. Wihl. "Feuerungstechnik," vol. 1, 23, p. 409-12; ill. 2s. 6d.

Coking of Coal at Low Temperatures. S. W. Parr and H. L. Olin. "Jl. Soc. Chem. Ind. (Lond.)," vol. 32, p. 539. 4s.

An Analysis of the Coaltar Situation. A. T. Shurick. "Coal Age," vol. 4, 13, p. 452-5. 1s. 3d.

Coal Washing, Coke and By-product Plant at Barugh. "Colliery Guard." vol. 106, 2759, p. 993; 9 fig. and supplement plates. 6d.

Modern By-product Coking. G. S. Cooper. "Colliery Guard." vol. 106, 2757, p. 903; 6 fig. (Paper read before Jun. Inst. Engin.) 6d.

Electric Winding Engines. "Colliery Guard." vol. 106, 2760, p. 1047; 4 fig. 6d.

### XXIV.—Fuels, Testing, &c

The Technical Analysis of Coal. D. Brownlie. "Jl. Soc. Dyers Col.," vol. 29, 10, p. 292-7. 2s.

Heating Values of Fuels. (Heizwerte von Brennstoffen.) "Z. Bayr. Rev. Ver.," vol. 17, 18, p. 175-8 (Heating values of fuels which have been tested in the chemical laboratory of the Association in 1912.) 1s. 6d.

The Constitution of Coal. O. Dimroth and B. Kerkovius. "Ann.," vol. 399, p. 120-3.

Experiments on the Oxidation of Coal. (Experiences sur l'Oxydation de la Houille.) P. Mahler. "Ann. Fr. Ser.," vol. 4, 9, p. 163-98; 9 tab.

The Microscopic Examination of Coal under Direct Light. (Die mikroskopische Untersuchung der Kohle im auffallenden Licht.) H. Winter. "Glückauf," vol. 49, 35, p. 1406-13. 2s. 6d.

The Specific Properties and the Differences Between Liquid and Solid Fuels and their Technical Importance. Aufhauser. "Stahl Eisen," vol. 33, 30, p. 1226-32. 3s.

Economical Limits of the Gasification of Low-grade Fuels. Bartel. "Feuerungst.," vol. 1, 20, p. 363-4. 2s. 6d.

The Gasification of Solid Fuels. (Die Vergasung fester Brennstoffe.) W. Heym. "Feuerungst.," vol. 1, 20, p. 353-9, 21, p. 377-83. 5s.

### XXV.—Steam Engines and Boilers.

Coal Products Company's Power Plant. S. G. Artingstall. "Power," vol. 38, 12, p. 384-7; ill. (The main features of this plant are found in the type of engines installed and the method of piping the units. Two live-steam headers run parallel with the boiler room. The size of the headers and branch pipes from the boilers are such as to prevent loss of pressure due to high steam velocity.) 1s.

A Water-tube Boiler for Pulverised Coal. "Iron Age," vol. 92, 14, p. 710-11; ill. (A promising development in using atomised fuel for steam generation.) 2s.

Bibliography of Smoke and Smoke Prevention. H. McClelland. 8vo, 164 p. University of Pittsburgh. 3s.

Progress in Furnaces for Solid Fuels. (Fortschritte auf dem Gebiete der Feuerungen fuer feste Brennstoffe.) Pradel. "Feuerungst.," vol. 2, 1, p. 9-13; ill. 2s. 6d.

Power on Mines. "Min. Mag.," vol. 9, 4, p. 287-9. (Production of gas from wood. Items of cost.) 2s.

### XXVI.—Compressed Air.

A Rotary Hydro-pneumatic Compressor. "Iron Age," vol. 92, 14, p. 712; ill. (Single-stage machine and vacuum pump for moderate pressures.) 2s.

The Auxiliary Apparatus in the Use of Compressed Air in Mining. (Die Hilfsapparate des bergbaulichen Pressluftbetriebes.) A. E. Liwehr. "Z. Zentr. Berg Betrbsl. Oest.," 1913, p. 479; ill. 2s. 6d.

Air-compressors and Compressed Air Machinery. R. L. Streeter. "Eng. Mag., N. Y.," vol. 46, 1, p. 19-36; 35 fig. (Small steam, electric, gas and belt-driven compressors.) 1s. 8d.

### XXVII.—Electricity.

Puntledge Hydro-electric Power Plant. "Eng. Rec.," vol. 68, 13, p. 349-51; ill. (An ultimate development of 19,000-horse power which will supersede separate steam plants used for the operation of coalmines at Vancouver Island.) 2s.

Use of Electricity in Mining in the Butte District. J. Gillie. "Bull. Am. Inst. Min. Eng.," vol. 1913, 81, p. 2305-7. 3s. 6d.

Safety Electric Switches for Mines. H. H. Clark. Washington, D. C.: Technical Paper 44, U. S. Bur. of Mines, 8 p.

Safety Electric Switches for Mines. H. H. Clark. "Colliery Guard." vol. 106, 2758, p. 957. (From Technical Paper 44, U.S. Bur. Mines.) 6d.

Specifying and Buying Mining Electrical Plant. J. P. C. Kivlen. "Colliery Guard." vol. 106, 2760, p. 1068. (Abst. paper read before Assoc. Min. El. Engin. (W. Scotland.) 6d.

### XXVIII.—Surface Transport.

Pacific Mills Coal- and Ash-handling Equipment. "Power," vol. 38, 13, p. 425; ill. (A coal- and ash-handling system, consisting of three distinct parts. The first is a pivoted bucket conveyor to transfer the coal from the cars to the coal bunkers. The second part consists of charging cars for conveying coal from the bunkers to the boiler room, and the third part is an industrial railway system for removing ashes.) 1s.

Modernisation of Conveying Plants. "Coal Age," vol. 4, 12, p. 413; ill. (A description of a telfer system that transports coke from the oven bench direct to the mouth of the blast furnace without removal from its original bucket. Breakage is thus reduced to a minimum.) 1s. 3d.

Coal Shipping on the Great Lakes. "Coal Age," vol. 4, 13, p. 449-51; ill. (A description of the harbours at Toledo and Milwaukee.) 1s. 3d.

Coal-unloading Machines at Fort William, Ont. R. D. Williams. "Iron Tr. Rev.," vol. 53, 14, p. 578-80. (First application of the Hulett unloader to the problem of discharging coal cargoes from vessels.) 2s.

Coal-conveying Plants Combined with Bunkers and Mechanical Stoking. (Kohlenfoerderanlagen in Verbindung mit Hochbunkern und mechanischer Rostbeschickung.) A. Eichholtz. "Feuerungst.," vol. 1, 24, p. 430-3; ill. 2s. 6d.

Recent Experiences in the Construction of Conveyor Plants for Ashes and Coals. (Neuere Erfahrungen im Bau von Transportanlagen fuer Asche und Kohlen.) W. Heym. "Glaser," vol. 73, 6, p. 108-11. (Various conveying systems are described.) 2s. 6d.

### XXIX.—Sanitation, Diseases, &c.

Nystagmus in French Mines. (Note sur une Enquête sur le Nystagmus dans les Mines Françaises.) Aubrun. "Ann. Fr. Ser.," ser. 11, vol. 4, 9, p. 199-208. (The result of the enquiry is that the malady is not very widespread and that no special regulations are necessary.)

### XXX.—Mining Laws, Royalties.

A Dissertation on U.S. Mining Law. R. L. Dunn. "Min. Eng. World," vol. 39, 12, p. 503-8. 1s. 3d.

Royalties as Percentages of Market Price. W. Griffith. "Coal Age," vol. 4, 12, p. 412-3. 1s. 3d.

Collieries and Income Tax. "Colliery Guard." vol. 106, 2757, p. 899. 6d.

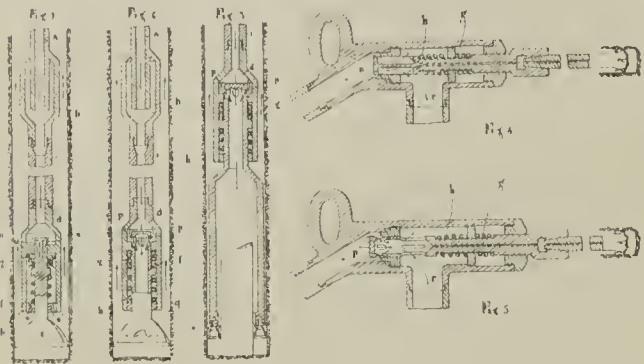
The Limited Day in France and Belgium. "Colliery Guard." vol. 106, 2760, p. 1059. 6d.

Miners' Neglect of Work.—Forty-five miners, all employed by the Cannock and Rugeley Colliery Company at Hednesford, were charged at Cannock Petty Sessions, on Monday, with neglecting their work. On behalf of the colliery company, counsel stated that the proceedings were not taken by the colliery company in anything like a vindictive spirit, but with the sole view of putting an end to an intolerable state of affairs which had been brought about by numbers of men absenting themselves from work when the colliery was open. That morning there were 300 men absent from their work. It was not merely the loss of profit on the sale of coal which the company had to sustain. The expense involved in starting these pits was something like £70 a day. Another point that these men seemed to forget was that now that they had a Minimum Wage Act in operation, and if men did not earn or receive the amount specified under the Act, then the company had to make it up. The colliery company were therefore determined to compel these men to perform their contracts. The Bench imposed penalties in the various cases ranging from 3s. to 12s.



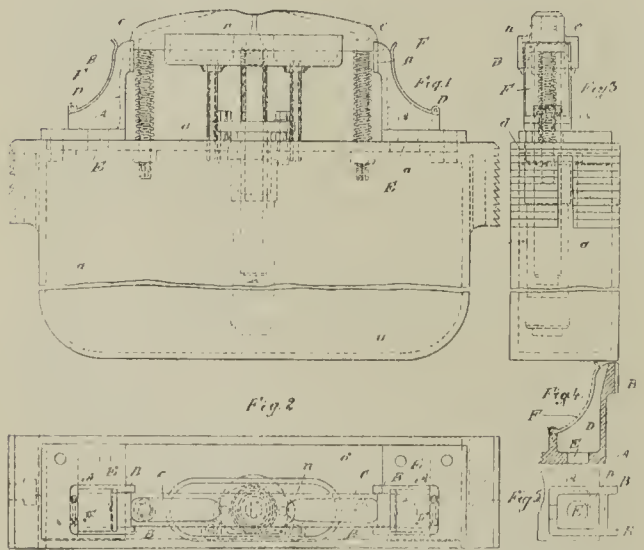
# ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

2776 (1913). *Improvements in Hydraulic Percussion Drilling Machines.* L. J. C. van Es, jun., Batavia, Dutch East Indies.—Has for its object to provide an improved percussive drilling machine driven by water under pressure, wherein the exhaust water serves at the same time for flushing out the borehole. According to this invention, the hitherto usual valve which is independent in its closing movement from the movement of the piston is dispensed with, and instead thereof the piston itself is constructed as a distributing device. By this means the motion of the valve and the motion of the piston are synchronous—that is to say, these motions take place exactly at the same time. At the instant that the water-flow is cut off the piston has some velocity, and therefore the percussive power will be greater, because the water that has flowed through the machine has partly delivered its energy to the piston. Further, the cut-off of the water



can only occur during the working stroke of the piston, and never retards the piston. Retarding of the piston can be effected by a spring, which causes a quick returning of the piston and thus a quick cut-off of the water. The time during which water flows through the machine is thus reduced to a minimum, as is also the loss of energy caused by this waterflow. Therefore a greater striking force is produced with a higher efficiency. Since the cutting-off of the water only occurs during the working stroke of the piston, it is impossible that at any time there can arise a higher pressure than necessary for a useful blow. The influence of leakage is therefore much less than in those machines where the cut-off of the water occurs during the return of the piston. Figs. 1, 2, 3 show three modifications of the improved drilling machine designed for deep bore drilling; and figs. 4 and 5 show two modifications of the machine designed for rock-drilling. (Four claims.)

4331 (1913). *An Improved Oiling Apparatus for the Axles of Hutches and the like.* G. M. Menzies, of Ardbeg, Bathgate, and J. Wardlaw, of 5, Violet Bank, Bathgate.—Relates to the oiling apparatus for supplying oil to the axles of hutches or other like vehicles described in prior Patent No. 289, dated January 4, 1912. The present improvements especially relate to guide means for the movable crosspiece, and to additional means in connection with said guide means for returning any superfluous oil to the oil tank. With the improvements the wear and tear on the apparatus caused by the passage of the hutches and the like is greatly reduced, whilst, owing to the additional means for returning the superfluous oil to the oil tank, waste of lubricant is also reduced. Fig. 1 is a side view of an oiling apparatus; fig. 2 is a plan view, and fig. 3 an end view of same; figs. 4 and 5

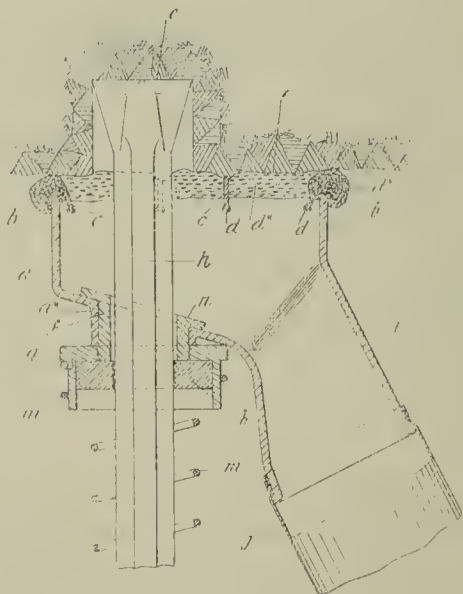


are detail views of one of the guide blocks A. To expedite the return of superfluous oil to the tank or receptacle a, longitudinal grooves or their equivalent C are made in the crosspiece n, and at the extremities of said crosspiece these grooves C communicate with the guide blocks A, which are recessed or so shaped on their exterior, as indicated at D, that the superfluous oil is caused to flow downwards to the base of the blocks A, where, by means of suitably-shaped holes or openings E in the blocks and the cover plate d, the oil is returned to the tank or receptacle a. Hinged covers or the like F are or may be provided, for covering or partially covering the recesses in the guide blocks A, which conduct the superfluous oil to oil holes or openings E in the guide blocks. (Two claims.)

5810 (1913). *Improvements in and Relating to the Manufacture of Briquettes.* A. G. Bloxam, of Bank Chambers, Southampton Buildings, London. (Communicated from abroad by Firma Hoesch and Co., Pirna a/Elbe, and Max Platsch, of 3, Bettinastrasse, Frankfurt a/Main, Germany.)—Many attempts have been made to introduce a concentrated sulphite cellulose liquor into the briquette industry as a binding material; the application of the liquor in this direction, however, has not been extensive, because the binding material always remains soluble in water. A briquette thoroughly unattacked by water has only been obtained hitherto by carbonising the binding material. The present invention, however, has necessitated a high temperature of about 100 degs. Cent. and upwards, which, apart from the fact that combustion often ensues, produces in many materials, such as coal, changes which are disadvantageous.

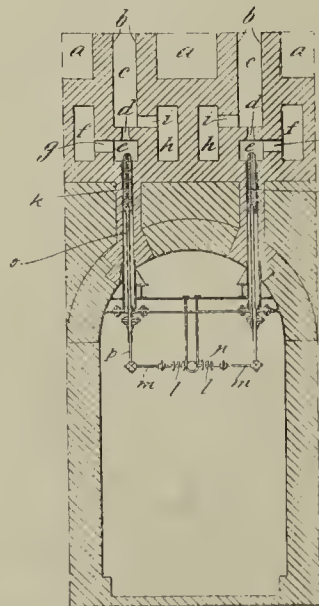
By the present invention cellulose sulphite liquor and therefore coal briquettes, ore briquettes or the like made therewith can be rendered resistant to water at a temperature of about 100 degs. Cent. The invention consists in precipitating as calcium sulphate the lime in the concentrated liquor by means of sulphuric acid in slight excess and removing the calcium sulphate, and in such a manner that heating is avoided, or, if necessary, accompanying the precipitation by cooling. It is proposed to dry the briquette made up with the liquor at a temperature in the neighbourhood of 100 degs. Cent. with or without the aid of a vacuum, whereby the sulphuric acid is evolved and recovered as sulphurous acid, and the volatile organic acids are evolved and recovered in concentrated form, while the binding agent remains in a form insoluble in water. (Three claims.)

5914 (1913). *Dust Arrestor or Collector for use with Rock and like Drilling and Boring Machines.* M. T. Taylor, M.A.I.M.E., of Paces Mines, Liskeard, Cornwall.—Relates particularly to that type of dust arrester and collector comprising a cup or receptacle adapted to be slipped over the boring tool, and having a soft-edged mouth which accommodates itself to the rock surface when the receptacle is pressed thereagainst by spring means. The invention consists in a construction of device as in the foregoing type,



introducing improved features, amongst which are chiefly: The construction and shape of receptacle with especial regard to the disposition of the tool-opening therein and dust exit; the formation of a sloping base tending to divert dust past the tool-opening to the dust exit, and preventing dust accumulation in the receptacle; a construction of gland at the tool-opening through which the tool extends in a dust-tight manner; and a new mode and arrangement of sponge edging. (Two claims.)

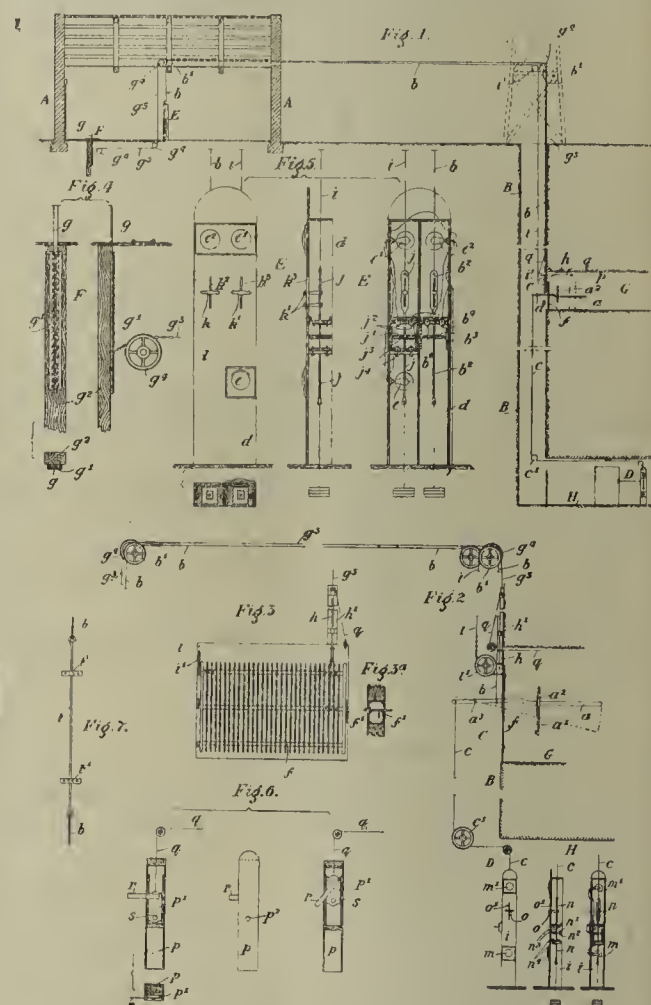
10684 (1913). *Improvements in Coke Ovens.* Dr. C. Otto and Co., G.m.b.H., of Dahlhausen a.d. Ruhr, Germany.—Relates to the known type of coke ovens so constructed that it can be heated at choice, with poor gas of low calorific value, such as producer gas or blastfurnace gas, or with rich gas of high calorific value, generally coke-oven gas, or with a mixture of the two kinds of gas. It is known that when regenerative coke ovens are heated with gas of low calorific value it is necessary to pre-heat both the gas and the air for its combustion in order that the necessary temperature may be attained in the oven, while when the oven is heated with coke-oven gas it suffices to pre-heat the air. The present invention consists in a coke oven in which each heating flue of the heating wall of the oven or each group of such



flues can be supplied at choice with either poor gas or rich gas or with both in exactly adjusted proportion. This object is attained by supplying the coke-oven gas, which is not pre-heated, through hollow refractory bodies which are capable of being raised or lowered in the channels which supply the pre-heated poor gas to the nozzles situated beneath the several heating flues or groups of flues; by raising or lowering any one of these bodies the passage through the corresponding nozzle can be exactly adjusted. An example of the construction according to the invention is shown in the accompanying drawing, which represents a vertical transverse section through a coking chamber and its heating walls. (One claim.)

11166 (1913). *Improvements in Safety Signalling Apparatus for use in mines.* E. Nelson, 6, Caledonian-road, Glenarnock, Ayrshire.—Relates to signalling apparatus for use in mines, and its object is to provide simple and reliable apparatus which will obviate or greatly minimise the dangers at present existing in mine shafts when the cage is being used at various levels. There is provided separately from the usual signalling apparatus in general use, means for intimating to the engineman on duty in the engine-house at the pithead, preferably by visible signals, the level

to which it is desired to lower the cage and simultaneously for intimating at the foot of the shaft or bottom level and, should there be more than one intermediate level, at the other levels also, that the cage is about to be used. Provision is also made whereby the sender of a signal can lock said means so that anyone else wishing the cage at the same level will know that it is already signalled for, whilst, in cases where there are more levels than one, it will be impossible for the cage to be signalled for from other levels until the sender of the first signal has unlocked or released the apparatus. Means are also provided whereby after lowering the cage to the desired level the engineman can, from the engine-house, unlock or unbolt a gate or the like, situated at the junction of the level and the pit shaft, which gate can then be opened by the miner to give access to the cage, means being also provided in connection with said gate or the like whereby, when it is opened, such opening is automatically indicated in the engine-house. The visible signals used may be either a combination of semaphore signals and electric or other lamps of suitable colours, or one or other of these can be used as may be found suitable or desirable. Fig. 1 is a general view to a small scale, showing one arrangement of the apparatus both above and below ground applicable to a shaft having an intermediate level only in addition to the bottom level. Figs. 2, 3 and 3<sup>a</sup> are views to a larger scale showing the apparatus used in the intermediate level and also showing the apparatus used in the bottom level at the foot of the shaft. Fig. 4 shows three views of the means fitted in the engine-house for unlocking or unbolting the gate f. Fig. 5 shows four views of the signalling mechanism fitted in the engine-house, the mechanism in this arrangement being electrically actuated. Fig. 6 shows four views of a simple form of signalling mechanism for use in connection with the locking mechanism for the gate f. Fig. 7 is a view showing one method of connecting together the lengths of material constituting the flexible connections. When it is desired to signal to the engine-house A from the intermediate level G that the cage is to be sent to that level, the miner or other worker depresses the lever a, indicated at figs. 1 and 2, and retains it in the depressed



position by means of a pin or the like inserted in one of the holes a<sup>1</sup> in the guide frame a<sup>2</sup>. The lever a is pivoted at a<sup>3</sup> preferably to the side of the shaft B, and when depressed the flexible connections b, c are pulled in opposite directions. The flexible connection b is carried up the side of the shaft B over guide pulleys or the like b<sup>1</sup> to the signalling apparatus E in the engine-house A whilst the flexible connection c is carried down the shaft B to the bottom thereof and over the guide pulleys or the like c<sup>1</sup> to the signalling apparatus D situated in the bottom level H, thereby indicating to the engineman that the cage is desired at level G, and simultaneously operating the signalling apparatus D in such manner as to indicate to workers in the bottom level H that the cage is in use above. The apparatus E comprises a suitable box or casing d having therein three electric lamps, e which may be a white lamp, e<sup>1</sup> which may be a red lamp, and e<sup>2</sup> which may be a green lamp, suitably wired and so arranged that the various lamps can be lighted at the proper times. During working hours and when the cage is not in use the white lamp e is lighted until such time as a signal is given from below that the cage is required—say, for example, at level G. When the lever a is depressed, the flexible connection b, the upper end of which is connected to the sliding-guide piece b<sup>2</sup> in the box casing d, causes said guide piece b<sup>2</sup> to move upwards, and in so moving bring the metallic plate b<sup>3</sup> into contact with the contact-pieces b<sup>4</sup>, thereby completing an electric circuit through the wires shown and lighting the green lamp e<sup>2</sup>. In fig. 5 the metallic plate b<sup>3</sup> is shown in mid-position. When the green lamp lights, the engineman knows that the cage is required at level G and thereupon lowers the cage to said level, but before the cage can be entered the gate f must be unlocked. To do this the engineman depresses the foot lever g of the apparatus F fitted in the engine-house floor, which lever works in a slide or casing g<sup>1</sup> secured to the post g<sup>2</sup> and has connected thereto one end of a flexible connection g<sup>3</sup>, which passes over pulleys or the like g<sup>4</sup>, its other end being secured to a sliding bolt h working in a casing h<sup>1</sup> fitted in the shaft B at level G. The depressing of the foot lever g raises the bolt h whereupon the miner or other workman at the level G



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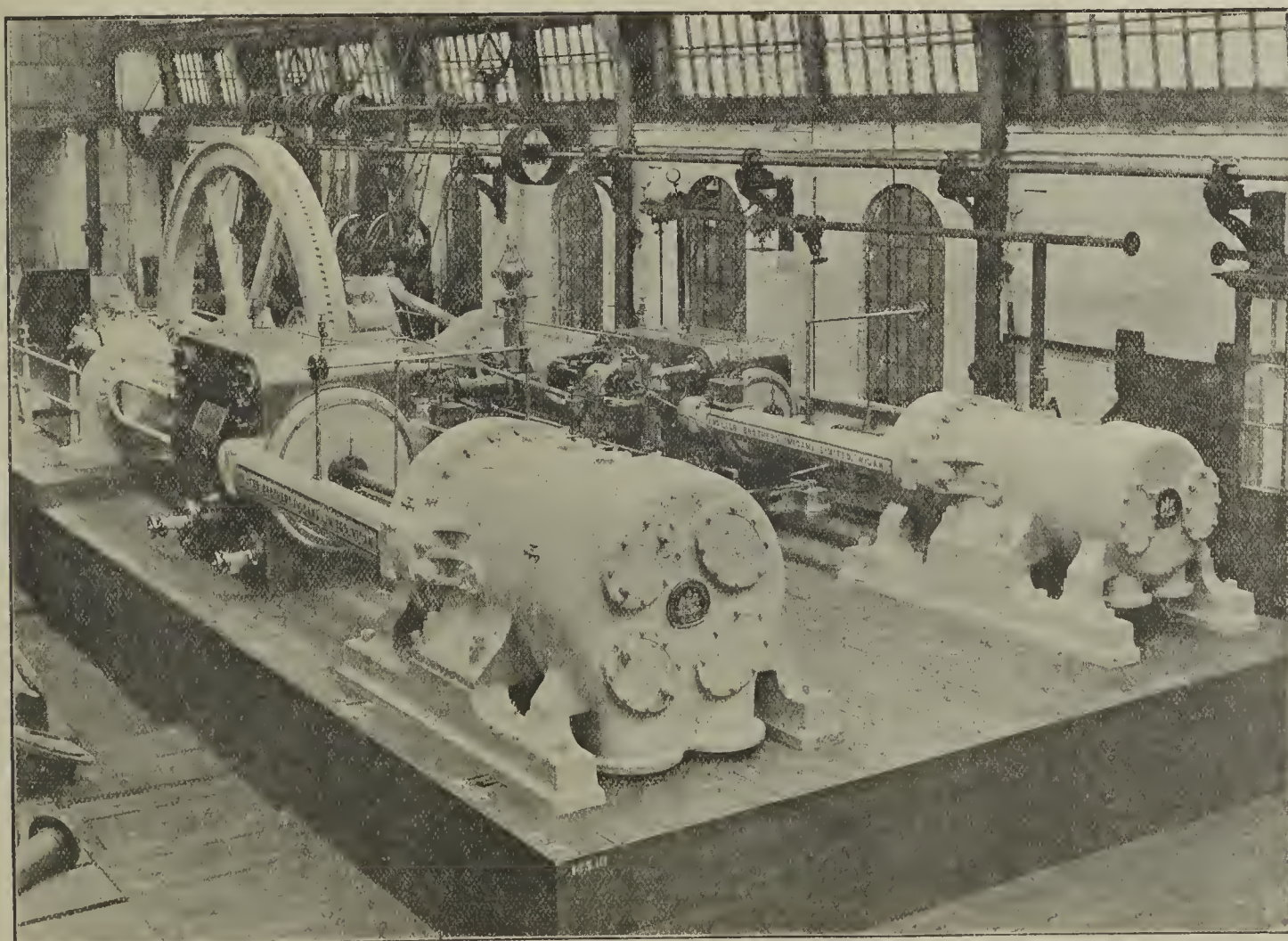
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now fitted to all our Air Compressing and Blowing Engines have the minimum of inertia and there is an ample port opening with an exceptionally low lift. Special grinding and tempering of the valves ensure fluid tightness, and they endure for a prolonged period of active life when working in conjunction with our Patent Valve Guard of resilient form.

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which regulates the supply of air in accordance with the demand.

**I**T provides that gradual variation of load which is especially essential where electricity is the motive power. The device is applicable to both single and two-stage compressing engines.

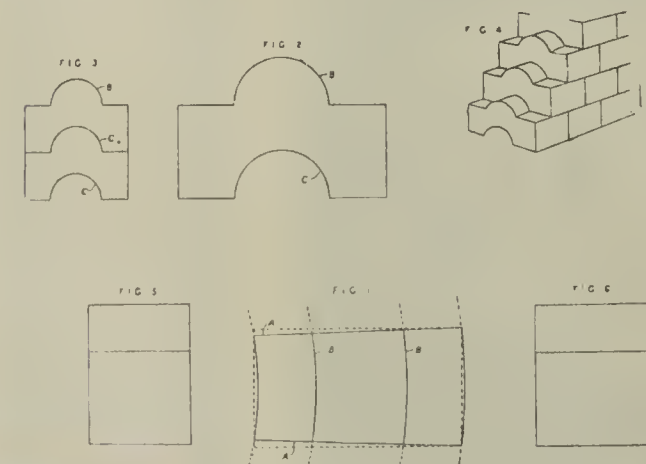


Pair Compound Corliss Steam Two-Stage Air Compressing Engines with Patent Disc Valves.



When the gate *f* is opened the latch *f*<sup>1</sup>. A flexible connection *i* is connected at one end to the gate *f* and passing over guide pulleys *i*<sup>1</sup> is carried to the engine-house *A*, its other end being connected to the sliding guide-piece *j*, working in the box or casing *d*. When the gate *f* is opened the flexible connection *i* is operated, actuating the sliding guide-piece *j* and bringing the metallic contact plate *j*<sup>1</sup> into contact with the contact pieces *j*<sup>2</sup>, thereby completing an electric circuit through the red lamp *e*<sup>1</sup> and lighting same indicating to the engineman that the cage has been entered. A second contact plate *j*<sup>3</sup> is fitted on the sliding guide-piece *j* and normally contacts with the contact pieces *j*<sup>4</sup>, thereby completing an electric circuit through the white lamp *e*, which lamp remains lighted until such times as the gate *f* is opened, when the moving upwards of the guide-piece *j* breaks the circuit through the lamp *e*, extinguishing same and completing the circuit through the red lamp *e*<sup>1</sup>. In this way, by the extinguishing of the white lamp and the lighting of the red one, the engineman is kept informed as to what is taking place at level *G*. In addition to the visible signals given to the engineman through medium of the lamps *e*, *e*<sup>1</sup> and *e*<sup>2</sup>, pointer mechanism *k* and *k*<sup>1</sup> may be fitted in connection with the guide-pieces *b*<sup>2</sup> and *j*. The pointer *k* works in slot *k*<sup>2</sup> formed in the front of the box or casing *d*, whilst the pointer *k*<sup>1</sup> works in a similar slot *k*<sup>3</sup>. In this manner, should, by any unforeseen occurrence, the signal lamps fail to act, the position of the pointers at once informs the engineman as to the position of affairs. The signalling apparatus *D*, which is illustrated to a larger scale at fig. 2, consists of an arrangement of mechanism somewhat similar to the apparatus *E* fitted in the engine-house *A*. It consists of a suitable box or casing *i* having fitted therein two electric lamps *m*, *m*<sup>1</sup>, suitably wired, showing a white light and red light respectively. A sliding guide-piece *n* works in the box or casing *i*, and has connected to its upper end the lower extremity of the flexible connection *c*, whose upper extremity is connected to the lever *a* situated at level *G*. Contact plates *n*<sup>1</sup>, *n*<sup>2</sup> are fitted on the guide-piece *n* and contact respectively with contact pieces *n*<sup>3</sup>, *n*<sup>4</sup>. A pointer *o* is also fitted on the guide-piece *n* and works through a slot *o*<sup>1</sup> in the box or casing *i* for supplementing the signals given by the lamps *m*, *m*<sup>1</sup>. When the shaft *B* is clear—that is to say, when the cage is at the top of the shaft or is not in use at any of the other levels—the lamp *m* remains lighted, but should the cage be signalled for, from say level *G*, the operation of the lever *a*, as already explained, actuates the flexible connection *c*, raising the guide-piece *n*, breaking the circuit through the white lamp *m* and completing the circuit through the red lamp *m*<sup>1</sup>, thereby indicating to the miner or other workman at the bottom level *H* that the cage is in use. As in the case of the signalling apparatus *E* in the engine-house *A*, already described, the pointer *o* will give the necessary indications should the lamps *m*, *m*<sup>1</sup> fail to act. For use in conjunction with the gate *f* a simple form of indicating apparatus may be used, and one arrangement of such is illustrated at figs. 1, 2 and 6. In this apparatus electric energy may be dispensed with and the necessary signals given by means of a semaphore arm and a safety or other lamp. A box or casing *p* is provided in which is fitted a sliding shutter or its equivalent *p*<sup>1</sup> having an opening *s* glazed with red glass or such like, whilst one end of the semaphore arm *r* is pivotally secured to the shutter *p*<sup>1</sup>. A flexible connection *q* is also provided and connected at one end to the shutter *p*<sup>1</sup> and at the other to the sliding bolt *h*. The arrangement is such that when the bolt *h* is down and the gate *f* locked the semaphore arm *r* remains in a horizontal position, whilst the glazed opening *s* is in line with the lamp fitted in the box or casing *p* so that a red light is shown, thereby indicating that the bolt *h* is down and the gate *f* cannot be opened. When the bolt *h* is raised the simultaneous upward movement of the shutter *p*<sup>1</sup> lowers the semaphore arm *r* and raises the glazed opening *s* clear of the lamp in the box or casing *p*, the white light of the lamp being rendered visible through the opening *p*<sup>2</sup> therein. In cases where more than one level, in addition to the bottom level, opens on the shaft *B*, when the cage is signalled for, to the engine-house, from one level, it is necessary that intimation be also given to the other levels in addition to the bottom level, and in order to provide for this a slightly modified arrangement of apparatus may be used. (Eight claims.)

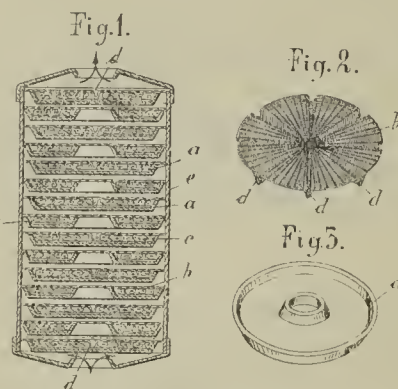
24764 (1912) *Improvements in the Construction of Shafts for Coalmines and the like*. T. E. Harris, 20, Pengam-street, Pengam, South Wales.—The idea of this invention is to construct a mine shaft lining of bricks which will become locked without the aid of mortar or the like. The brick is designed in a manner so that when a wall is built each course of bricks will lock the course below, by means of a groove and ridge, as described in the following form:—The brick is made with a groove in the bottom cut out in the form of a half-circle and extending from one side to the other, the groove being cut out in the centre of the brick, the diameter of the groove being about one-third of the



length of the brick. On the top of the brick there is a ridge in the form of a half-circle extending from one side to the other, the ridge being made in the same direction as the groove. At the bottom, the diameter of the ridge being about one-third of the length of the brick, therefore by placing the brick on another brick the groove in the top brick will fit over the ridge in the brick below, by which means the bricks become locked. The sides of the brick are plain,

and are tapered at each side from the front towards the back, the brick being designed for circular walling for pit shafts only. A block formed in accordance with the invention is illustrated in the drawings annexed. (One claim.)

29162 (1912). *Improvements in and relating to Respiration Apparatus*. A. B. Dräger, of Moislingerallee 53, Luheek, Germany.—The caustic potash batteries or cartridges for use in connection with respiration apparatus, in which the carbonic acid of the exhaled air is absorbed, consist of a number of dishes, trays or the like carrying layers of chemicals. Usually these dishes or carriers are made of sheet iron or the like and are provided with a wire gauze cover. In order to prevent the chemicals spread over the dish from accumulating all on one side, when the cartridge is tilted or tipped whereby the effective surface of the layers of chemicals is reduced in an undesirable manner, it has been proposed to divide up the spaces in the dishes by means of partition walls (ribs, ledges or the like) into a number of chambers. According to the present invention, the same object is arrived at by forming ribs on the wire gauze cover instead of forming ribs in the dish itself or



attaching partition walls to the bottom thereof. The ribs in the wire gauze cover are formed by making impressions thereon which project into the space in the dish. This improvement has evident advantages which will not only be found to produce a new effect, but also in manufacturing the structure. When pressing ribs on to the dishes themselves it has been frequently found that the material tears and the rents then allow the caustic liquid which is formed in regenerating the exhaled air within the cartridge to run out. When the ribs are formed of wire gauze there is, moreover, the advantage that the air can freely circulate through the meshes and thus come into contact with the chemicals in a more intimate manner. Fig. 1 is a longitudinal section of a cartridge provided with carriers, fig. 2 shows a wire gauze cover having ribs formed by pressure, and fig. 3 is a dish without partition walls and having a central opening. (Two claims.)

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

- 26296. Sheet-metal culverts. F. G. Brettell. (American Rolling Mill Company, United States.)
- 26324. Condensers employed at gasworks. G. F. H. Beard, J. W. Scott, and R. J. Dempster Limited.
- 26327. Apparatus for automatically recording and indicating the output and operation of machines and the operation of workmen. H. W. Shardlow and J. H. Kelly.
- 26328. Appliances used for transporting goods. C. S.-Snell and A. Goodwin.
- 26360. Machines for separating tin-plates which adhere together. W. P. Williams.
- 26395. Checking device preferably for use in coalmines, for checking the number of corves or tubs of coal delivered by the miner or for other analogous purposes. E. Nach's Nachfolger.
- 26397. Tipping vehicles. H. Constable.
- 26411. Furnaces provided with regenerative chambers. H. Poetter and Poetter G.m.b.H.
- 26415. Alternating current dynamo-electric machines. L. J. Hunt and Sandycroft Limited.
- 26418. Method of and means for separating different kinds of minerals or other substances such as coal, ores and the like. J. W. Blackhurst, known as J. Blackhurst, and I. C. Blackhurst.
- 26442. Rolling-mill and similar installations. W. R. Webster.
- 26443. Automatic roll adjustments for rolling-mills. W. R. Clark.
- 26444. Speed-controlling mechanism for rolling-mills and the like. W. R. Clark.
- 26450. Stop valves or cocks. R. Kilburn and J. Hopkinson and Co. Limited.
- 26468. Boiler furnaces. R. H. Anderson.
- 26510. Reversible turbine. W. J. Bilham and P. H. Bilham.
- 26560. Arrangement for automatically stopping and releasing ropes. W. P. Creed.
- 26574. Grab. G. Bull.
- 26578. Gradient and acceleration indicating devices. H. T. Logan.
- 26583. Apparatus for regulating and controlling temperatures in the melting of metal. I. Hall.
- 26599. Grinding mills. W. F. Carr-Hill.
- 26627. Improvements in or connected with mechanical chain grate stokers for varying the fuel surface thereof. L. and C. Steinmüller.
- 26647. Coal dust damper. W. Hurst.
- 26652. Chain conveyors. O. Schmidt.
- 26673. Trucks or wagons. Heenan and Froude Limited and A. Herszlikiewicz.
- 26684. Insulated electric conductors. Western Electric Company Limited. (F. T. Woodward, Belgium.)
- 26697. Apparatus for distributing and laying stonedust and the like in the roads and workings of coalmines. W. Forster Brown and D. A. E. Evans.
- 26712. Impregnation of iron, steel, and cast iron with nickel. A. C. Hyde.

- 26748. Device for supporting the spindles of rollers and pulleys in mines and other works and the like. J. Morris.
- 26756. Process of desulphurising sulphur-bearing shale oils. W. A. Hall.
- 26790. Percussive hammers, drills, and the like. W. H. Wakfer and S. Peck.
- 26791. Percussive hammers, drills, and the like. W. H. Wakfer and S. Peck.
- 26808. Devices for loading and unloading coal and other substances in measured quantities. F. J. Schraeder, jun.
- 26837. Flexible lock joints for car bodies and trucks. J. M. Coleman.
- 26843. Anti-friction bearings for trolley or truck wheels, pulleys, and the like. F. E. Midgley and F. Midgley, trading as Midgley Brothers.
- 26871. Rope grips and the like for haulage and similar purposes. M. E. Aspinall, trading as Joseph Aspinall and Co.
- 26883. Conveying devices. T. R. Murray and Spencer and Co. Limited.
- 26907. Apparatus for accumulating heat. E. Timm.
- 26910. Means and method for the manufacture of sand, lime, brick and stone. J. Stretch.
- 26938. Chains. F. W. Schroeder.

### Complete Specifications Accepted.

To be published on December 11, 1913.

1912.

- 18137. Smoke-helmets and like protective head coverings. Bauscher and Bauscher.
- 26350. Treatment of ores. Bensusan.
- 26752. Methods of and apparatus for charging storage batteries. Wilson.
- 26922. Turbines. Van Reede.
- 27006. Centrifugal fans. Allen and Allen.
- 27137. Steam boilers. Scott.
- 27920. Calorimeters. Simmance and Ahady.
- 28306. Weighing and force-measuring machine. Hele-Shaw.
- 28791. Manufacture of coke. Moeller and Wolterreck.
- 28868. Hygrometers or instruments for ascertaining the degree of moisture contained in the air. Hellige.
- 29314. Stop-valves for gas- or air-compressors. Enock.
- 165. Breathing apparatus. Jenkins.
- 2316. Linings for tunnels, conduits, and the like. O'Rourke.
- 2577. Electric furnace with electrodes passing through charging receptacles. Helfenstein.
- 3433. Manufacture of undulated bars or tubes. Barge.
- 3673. Process and apparatus for the gasification of fragmentary gritty or powdery fuels. Timm.
- 6700. Miners' electric safety lamps. Wolf.
- 6909. Construction of wire rope. Batchelor.
- 9233. Fluid-actuated percussive coal cutters and the like. Mauss.
- 9590. Enclosed electric furnace with upper charging chutes. Helfenstein. (Elektro-Ofen-Ges.)
- 11509. Weighing machines for weighing, checking, and sorting. Popow.
- 12349. Elastic-fluid turbines. Bentley.
- 14589. Rolling apparatus of armoured turrets, turntables, swing-bridges, and similar structures. Soc. Anon. John Cockerrill, et Ternstrom.
- 15096. Machines for forging nails and the like. Brougham. (O. Mustad & Son.)
- 17885. Adjustable mine props. Treinies.
- 17925. Electrodes for electric furnaces. Fried Krupp Akt.-Ges.

### Complete Specifications open to Public Inspection before Acceptance.

1913.

- 23345. Respiratory apparatus. Drägerwerk Heinr. and Bernh. Dräger.
- 23552. Pressure-equalising devices, particularly for use in connection with submerged receptacles. Drägerwerk Heinr. and Bernh. Dräger.
- 23660. Devices for controlling the discharge of compressed fluids from their containers, particularly adapted for use with respiratory apparatus. Drägerwerk Heinr. and Bernh. Dräger.

**The Reporting of Colliery Accidents.**—The question of whether or not an under-manager at a colliery should report all accidents which come to his knowledge was decisively answered in the affirmative by his Honour Judge Ruegg, K.C., at the Newcastle-under-Lyme County Court last week. His Honour replied to an application by Mr. J. H. Knight on behalf of the Silverdale Colliery Company, who said that at the last court the judge reprimanded the under-manager, Mr. Thomas Lockett, while he was in the witness-box, for not having reported an accident which had been attended with serious consequences. As a result of his Honour's remarks Lockett had been subject to a good deal of criticism, and correspondence had taken place in the local paper. Mr. Knight contended that according to the Coal Mines Regulation Act there was no obligation on the under-manager to report on accident such as the one that had occurred, and the colliery company felt that Lockett was under a "cloud," which they wished to be removed, as the result of the judge's remarks. His Honour said he did not want to cast any aspersions on Lockett or on the colliery company, but he held it would be fatal to any company—and especially a colliery company—to allow any servant to decide whether an accident should be reported or not. He had only wished to impress upon the man the fact that such a course would be attended by the utmost danger, for, in his opinion, it was of first importance that all alleged accidents should be brought to the notice of the heads of the firm without any delay, and such people as Lockett must not take it upon themselves to exercise their own discretion in such cases.



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## COALDUST EXPERIMENTS IN THE UNITED STATES.

Bulletin 56 of the United States Bureau of Mines contains a record of the first series of coaldust explosion tests in the experimental mine at Bruceton, Pa., by George S. Rice, L. M. Jones, J. K. Clement and W. L. Egy.

The number of experiments embraced in the first series was comparatively small. The tests chiefly served to try out the mine and apparatus; apart from this end, there was valuable educational service accomplished by certain tests before large audiences of mining men. The fact that coaldust in air containing no inflammable gas may explode is now almost universally conceded in the United States. This was not the case prior to the first public test of October 30, 1911, when many still doubted even after having witnessed explosion tests in the Pittsburg surface testing gallery. This explosion test seriously damaged the mine equipment, necessitating considerable delay before repairs could be completed. Then followed further experiments, which were limited in number by lack of funds.

Drift openings were started at Bruceton in December 1910, and entries were driven into the coalbed. Drifting proceeded intermittently up to October 1911, when the first series of coaldust tests was begun. The underground passages then consisted of two main parallel entries a little more than 700 ft. long, each 9 ft. wide, with a 41-ft. pillar of coal between them. There are crosscuts or "cut-throughs" between the entries every 200 ft. A diagonal heading 198 ft. long connects the aircourse with a third opening (fig. 2); it enters the aircourse at an angle of 55 degs. at a point 117 ft. from the mouth of the aircourse. Fifty-five feet from the mouth of the aircourse there is a fourth opening, an air shaft that is offset 6 ft. from the entry. This shaft is intended for ventilating purposes only, while the mine is being developed, or as an auxiliary opening in case an experimental explosion should wreck the other openings. The diagonal heading was made in order to provide an opening for ventilation purposes; it was turned off from the main aircourse, with the expectation that the chief force of an explosion wave would pass directly out of the aircourse.

The main entries were driven in the coalbed "on the faces"—that is, at right angles to the principal vertical cleavage. These entries are of the usual width employed in working the Pittsburg bed, nominally 9 ft., but ranging between 9 ft. and 9½ ft. It was first intended to place the cut-throughs 100 ft. apart, but owing to the expense of constructing tight stoppings strong enough to resist explosions, the distance was changed to 200 ft. In driving the entries, line brattices are carried from the last cut-through up to the face of each entry. Fortunately the natural roof inbye the concrete lining is sufficiently strong so that only a few cross timbers have as yet been necessary. Side posts have been put in, not to support the roof, but for attachment of the side shelves on which to lay coaldust.

The main entry is provided with an arched portal of heavily reinforced concrete (figs. 3 and 4) with retaining wall, wing walls, and buttresses built *en masse*; the walls are carried down to the solid formation, and the buttresses to a limestone 3½ ft. below the coal. The reinforcement consists of ½ in., ¾ in., and 1 in. round rods of mild steel placed vertically, diagonally, and horizontally. The vertical rods are set in drill holes in the limestone. The stresses considered were (1) those due to forces directed outward from the mine, and (2) a bursting pressure acting at right angles to the axis of the entry or tunnel. The wing walls were also designed as retaining walls for the roof shale and dirt cover over the arching of the tunnel. The arrangement at the entrance provides for the future addition of a counterweighted door, sliding vertically in grooves, for use in special experiments requiring a perfectly quiet atmosphere.

It was intended that a similar entrance should be placed at the mouth of the aircourse. Owing to the lack of funds this was not completed for the tests of

the first series, but has since been erected. The aircourse entrance was not intended to be used for explosion tests during the first series. A reinforced concrete portal is provided for the diagonal heading similar to that of the main entrance, except that the walls are not so heavy, the heading being smaller in cross-section.

It was necessary to line the outer parts of the entries on account of the poor roof; indeed, this had to be supported by heavy timber while the entries were being

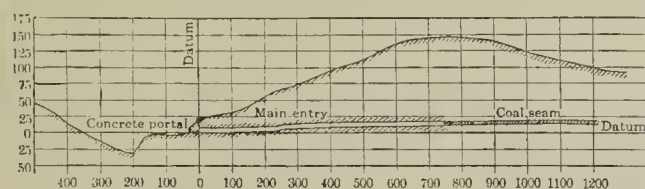


FIG. 1.—PROFILE OF MAIN ENTRY OF EXPERIMENTAL MINE.

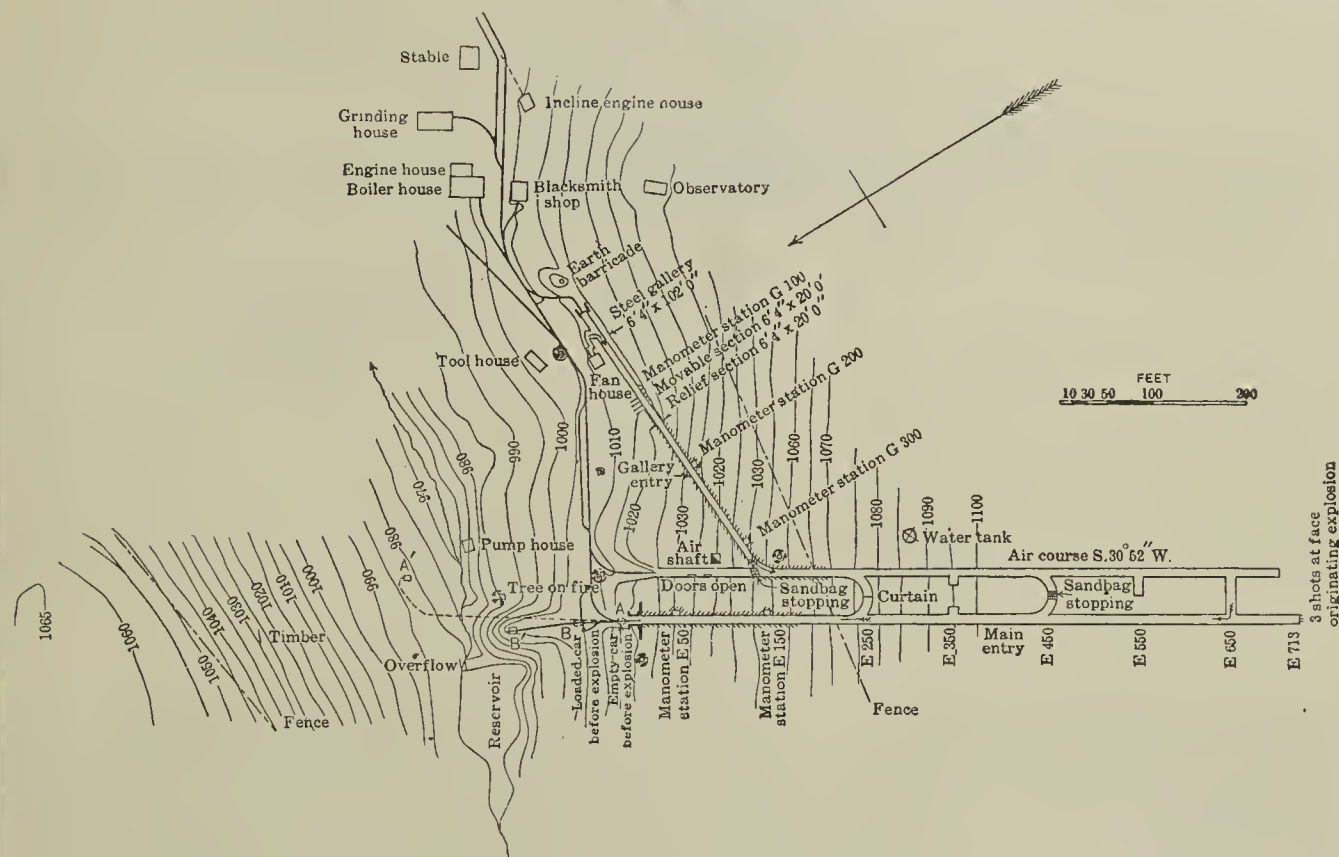


FIG. 2.—PLAN OF EXPERIMENTAL MINE, ALSO SURFACE CONTOURS, AT TIME OF EXPLOSION OF OCTOBER 30, 1911, SHOWING PATH OF MINE CAR THROWN BY EXPLOSION.

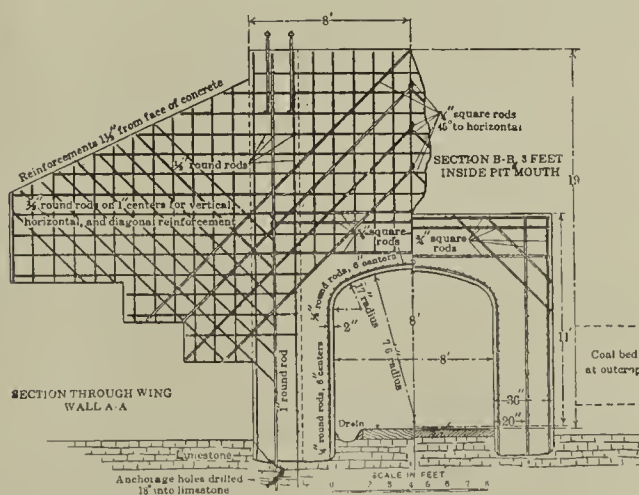


FIG. 3.—CROSS-SECTION OF REINFORCED PORTAL.

driven. A type of lining was adopted similar to that so extensively used in the Béthune mines, Pas-de-Calais district, France, as designed by J. Lombois, principal engineer. The concrete on the side walls is 7 to 9 inches thick, and thicker in places where irregularities in the natural walls required the filling. The arch is made 7 in. or more thick. As it was necessary to have the lining strong, the concrete mixture was made relatively rich, being 1 part Portland cement to 2 parts sand and 4 parts gravel. The reinforcing bars of the arch are ¾ in. square steel rods, placed 6 in. apart in that part of the entry close to the mouth and 32 in. apart farther

in. The arches were made in two halves, each half extending from the foundation to the centre of the crown, where they were joined together by a bolt passing through a loop in the end of each half arch. The horizontal reinforcement consists of ¼ in. rods placed 12 in. apart (see fig. 5) and wired to the arch rods at the intersections. The concrete lining was put in place over forms of collapsible type which could be moved from point to point as the work advanced. These forms were similar to those designed by Lombois.

While the concreting material of the lining was being placed, bolts were inserted for the support of five shelves on each side to be used in coaldust explosion experiments. There was also laid behind the wall a 4 in. steel pipe, in which were placed electrical cables, a 2 in. pipe for a compressed-air line, and a 2 in. water main with hydrant boxes every 100 ft. The arched lining, which is finished smooth, is 8 ft. wide in the clear, and 7 ft. 6 in. high from the top of the track ties to the arch; near the entrance the roof has a slight rise and the floor descends, so that the arch is 8 ft. high at

the portal. The diagonal heading or gallery is smaller, being 6 ft. 4 in. wide and 6 ft. 4 in. high.

During the first series of experiments the concreting was extended into the main entry, making its total length 169 ft.; the entire diagonal heading, 198 ft. long, was lined, and in the air course there was a lining from a point 20 ft. outbye the connection with the diagonal heading or gallery to a point 65 ft. inbye the junction. At the wide space at the junction the roof had been supported with railroad rails, which were left in to supplement the strength of the reinforced lining.

The surface equipment of the experimental mine consists of an external explosion gallery, ventilating fans, a power plant, a coaldust and rockdust crushing and grinding plant, an observatory and control station in which recording instruments are placed, an incline, a coal tippie and shoot for loading railroad cars, a reservoir, pump house, blacksmith shop, barn, tool-house and a water tank and hydrant system for fire protection.

The explosion gallery consists of a steel tube 6 ft. 4 in. in internal diameter and 122 ft. long, set in line with the diagonal heading, or "gallery slant," and 20 ft. from its mouth. Between the tube and the mine portal there is a U-shaped passage of heavily reinforced concrete; it has the same diameter (6 ft. 4 in.) as the steel tube and the diagonal heading. The roof of this passage is closed by flat plates resting loosely on 2½ in. round tie rods (connecting the tops of the concrete walls) and when necessary is weighted down with sandbags. This



These covering is 20 ft. long by 6 ft. 4 in. wide, and serves as a great relief valve for the protection of the fan and ventilating fan in case of a very violent explosion in the mine.

In order to make the external steel gallery available for small explosion experiments outside the mine itself, the inner 20 ft. section, adjacent to the U-shaped passage, can be rolled to one side; then, after the mouth of the diagonal heading has been closed, the steel gallery is isolated from the mine and tests can be conducted in it without interfering with work in the mine. During such periods mine ventilation is carried on by means of a fan set at the top of the air shaft. The steel gallery when thus isolated is 102 ft. long and has practically the same dimensions as the gallery for testing explosives at the Pittsburg station. There is, however, one difference. The outer end of the steel gallery at the mine is left open except for a board or plank stopping which can be slid into place in the concrete framework. Twenty-five feet from the outer end of the gallery there is a branch 6 ft. 4 in. in diameter, set at an angle of 60 degs. This branch is for connection to a fan for use in producing a ventilating current either at the time of an explosion or in the ordinary mine operations.

For testing explosives or for coaldust ignition a special cannon similar to those used at Pittsburg station

of 1 in. and  $\frac{1}{2}$  in. water-gauge, and is run by a gas engine.

The power plant consists of one 60-horse power boiler of locomotive type, placed in a galvanised iron boiler-house sufficiently large to permit the erection of a duplicate boiler.

The shelving is made heavy, of 3 by 4 inch hard-pine material, in order to lessen breakage. It was thought that if the shelves were set close to the ribs and were continuous and smooth, like the rifling of a gun, they would not be seriously damaged. This generally has proved to be the case, except that shelving in front of an opening is liable to be broken down. The shelving is placed with the 3-in. side horizontal. In the lined sections bolts were set in the concrete wall during construction, so that each 16-ft. length of shelving is supported by three  $\frac{3}{4}$ -in. bolts, which pass through the timber; the bolts are drawn up, pressing the shelving tightly against the concrete. (See fig. 5.)

It was intended before the first series of tests was started to have all the various kinds of instruments used in the foreign testing galleries, and, if possible, to design and make new instruments better adapted for the particular conditions at the experimental mine, but circumstances prevented getting any but the British coaldust instruments, like those used at Altofts. In

locked box. This switch is closed by the engineer in charge of the experiment after he has thrown in the switch at the mouth of the mine; that is, he carries the keys to both boxes, so that he may make sure that everyone has left the mine before he throws in the switches. When the switches are both in, the firing circuit is completed by pressing a button that causes the shot in the mine to be discharged. A diagram of the wiring is shown in fig. 8.

The B. C. D. automatic sampler used in the first series of tests at the experimental mine was opened by circuit maker operated by pressure. On account of the difficulty in predetermining accurately the relative velocities of the pressure wave and the flame, the attempts during the first series to obtain gas samples during the passage of the flame were not successful. Also, in some tests the projecting pipe connections were

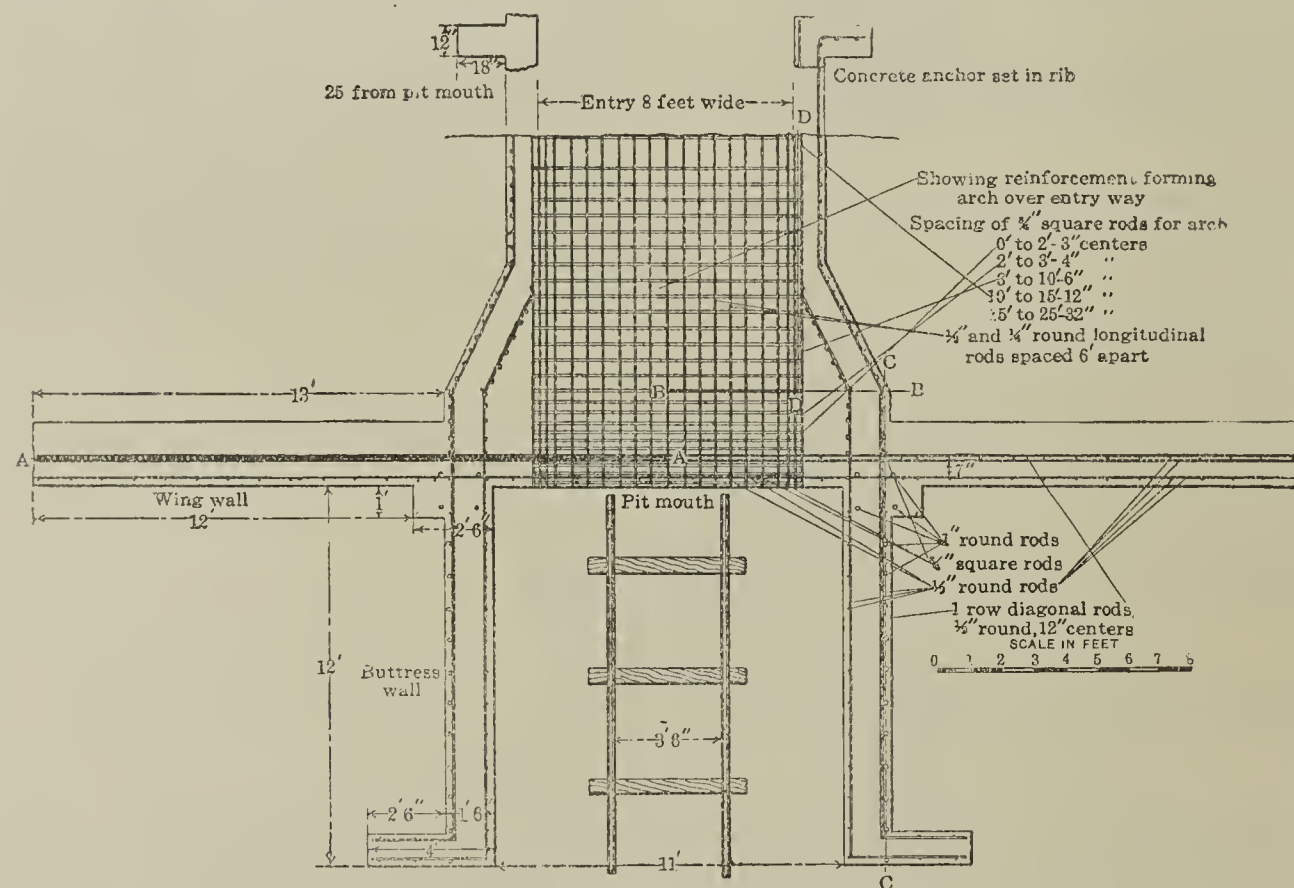


FIG. 4.—PLAN OF REINFORCED CONCRETE PORTAL.

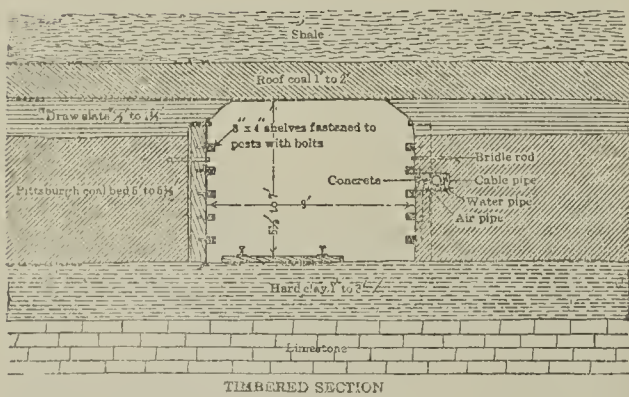


FIG. 5.—CROSS-SECTIONAL VIEW OF GALLERY.

is employed. The cannon has a borehole  $2\frac{1}{4}$  in. in diameter and 18 in. deep; it is mounted on a truck which can be wheeled to the outer end of the steel tube, so that the cannon can point into it through a hole in a heavy plank stopping.

The fan is a centrifugal fan of standard make. It is designed for a capacity of 80,000 cubic feet of air per minute at a pressure of 2 in. water-gauge, or 15,000 cubic feet of air per minute at a pressure of 6 in. water-gauge. The fan is reversible, and will be mounted at the end of the branch of the external steel gallery. There will be several relief doors, in addition to the protection afforded the fan by its being set to one side of the gallery. Unlike the practice at foreign testing galleries, at which the fan is cut out by valve arrangements a few moments before an explosion is started, it is proposed to run this fan during an explosion in order to parallel conditions that occur in mine disasters. Unfortunately, sufficient funds were not available for erecting the large fan before the first series of explosion tests, so that a small fan was temporarily set up in the mine. The small fan has a capacity of 10,000 cubic feet of air per minute, at pressures

using instruments in the experimental mine it is necessary to protect them from the action of the pressure and the flame from an explosion by placing them in special chambers (fig. 7) as nearly gastight as possible, lined with reinforced concrete, and located in the side of the entry. For recording the pressures three B. C. D. manometers similar to those designed for the experiments at Altofts were purchased. Two of these were used for high pressures and one for pressures below atmospheric pressure. In the latter tests of the series the recording manometers were supplemented by maximum-pressure gauges. They are similar to those used by Taffanel at Liévin. Two different types of flame circuit breakers were used—the detonator type and the tin-foil type.

The cable carrying the wires to the various electrical instruments runs through an iron pipe set in a deep groove in the coal. The groove is faced with concrete to provide protection for the pipe and support for the coal rib. The cable is cut at each instrument chamber, and the wires are connected to binding posts on the switchboard at the back of the chamber.

Among the other wires of the cables are a pair of firing wires that can be connected to form a circuit in the observatory and thus discharge the igniting shot. In the first two official experiments this wiring was temporary, but subsequently when the flame and pressure circuit wires were installed the shot-firing wires formed a part of one of the cables passing through the pipe in the rib. The shot-firing wires are separated from the other wires at the mouth of the mine and enter a locked switch box.\* This box contains switches, which are always open until everyone has left the mine. At the observatory there is another switch, also in a

\* After the first series of explosions had been completed, with a view to greater safety the installation was changed. Now all the wires enter the locked box, and are arranged so that all the circuits are cut by switches when men are in the mine.

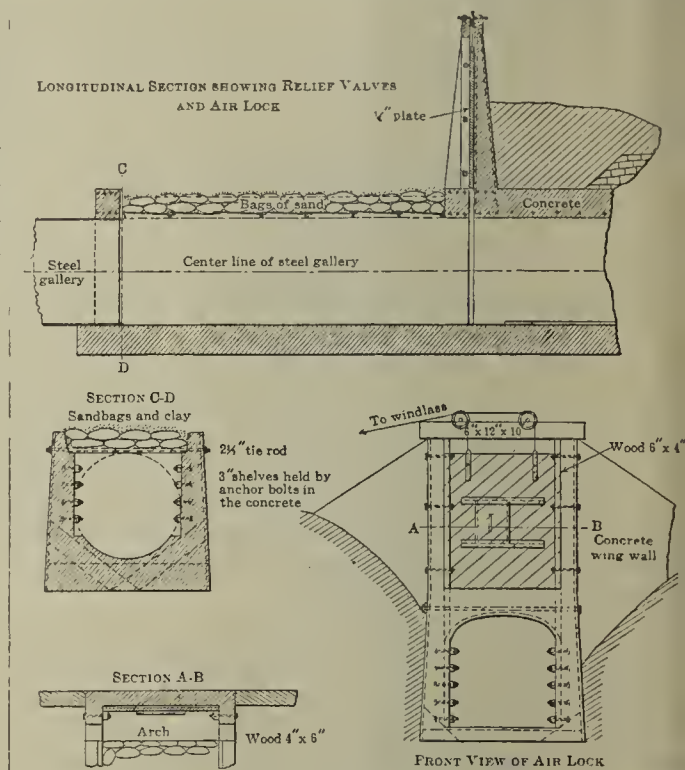


FIG. 6.—SECTIONS OF PASSAGE BETWEEN STEEL GALLERY AND DIAGONAL ENTRY.

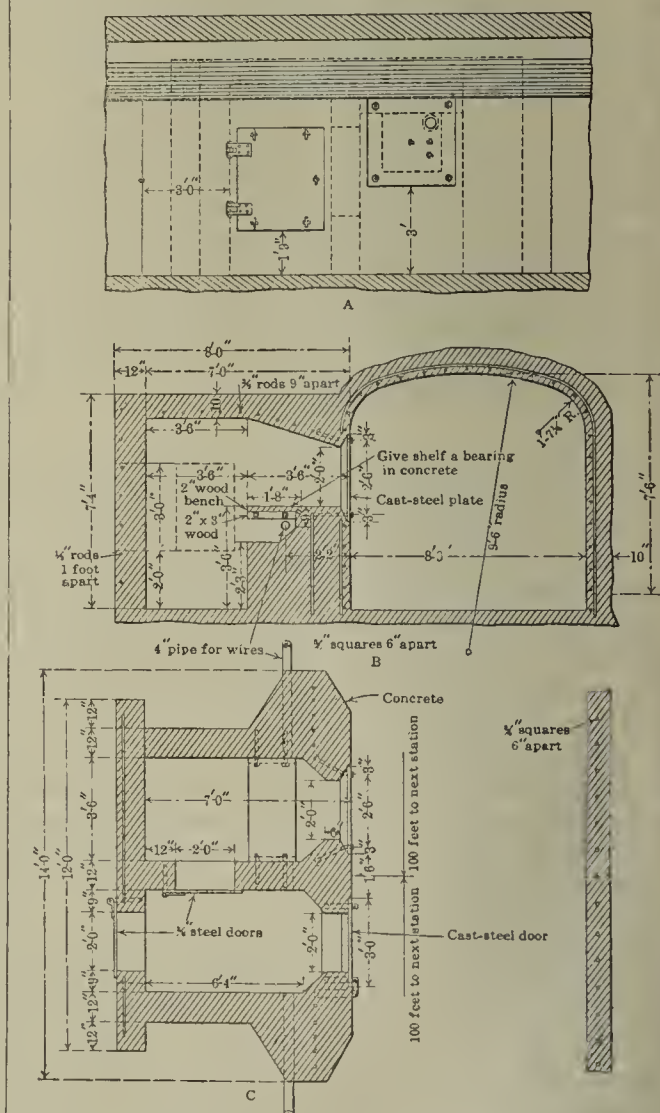


FIG. 7.—CONSTRUCTION OF INSTRUMENT CHAMBER. A, front elevator; B, vertical section; C, plan.

carried away by the force of the explosion. It is planned in future experiments to have gas samplers operated by means of the flame circuit makers, to have no projecting parts, and to use devices for quickly closing the sampling bottles after the sample has been admitted. A new type of automatic gas sampler is being developed at the Pittsburg station for taking a set of three successive samples during or following the passage of the flame. The sampler is set in operation by a flame circuit breaker. The first sample is taken instantaneously; the others are taken at predetermined intervals by means of clockwork mechanism.



## Comments on the Data Obtained.

Although the tests were too few, and the data obtained too meagre, to admit of final conclusions being formed concerning the phenomena of coaldust explosions, the results are of value, in an educational way, in demonstrating to the mining public the explosibility of coaldust when firedamp is not present, and the violence and destruction that accompany extensive coaldust explosions, even when firedamp was not present.

In the course of the experimental tests there were obtained records of five pressure waves in three experiments that were clearly "shock" waves started by the igniting shot. Two of these were registered when coaldust was not used, so that there is no question as to the

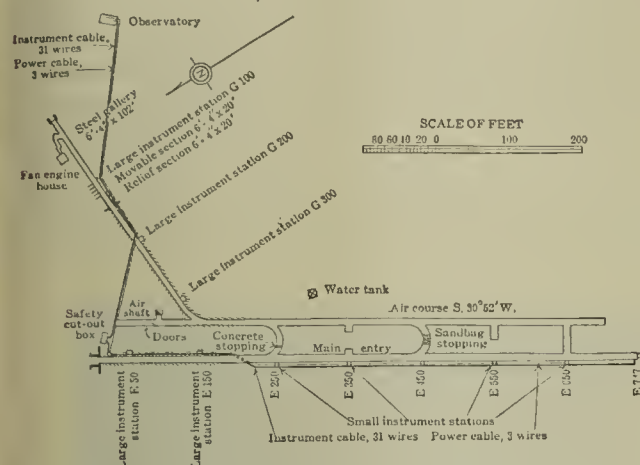


FIG. 8.—ELECTRIC WIRING OF MINE.

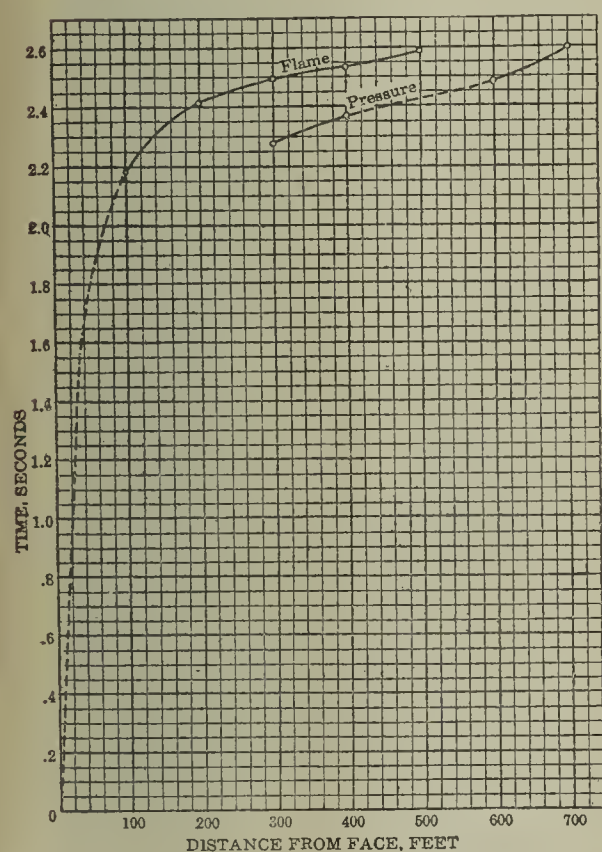


FIG. 9.—RELATIVE POSITIONS OF FLAME AND PRESSURE WAVE, TEST 15.

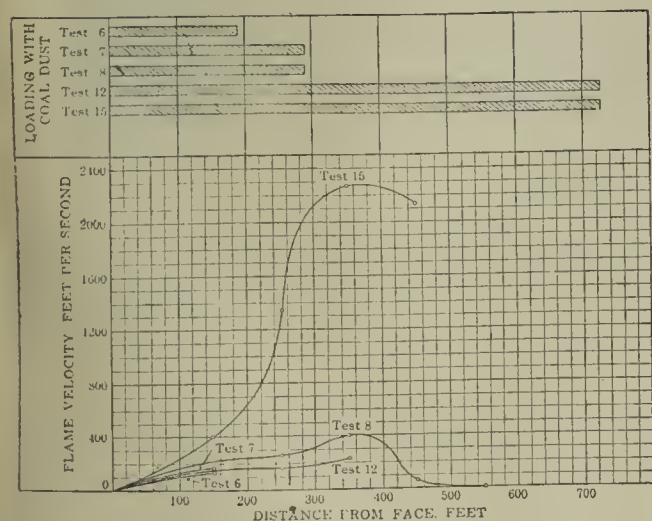


FIG. 10.—FLAME VELOCITY CURVES.

correctness of the interpretation of their being waves started by the shot, and not by the explosion of coaldust. The velocities recorded were:—Test 8, 1,136 and 1,116 feet per second; test 9, 1,111 and 1,099 feet per second; test 15, 1,139 ft. per second; average, 1,120 ft. per second. The ventilating current at the time of the passage of the shock wave had in each case a velocity of about 2 ft. per second in the same direction; deducting this, the net average velocity of the shock wave was therefore 1,118 ft. per second, as shown by the combination of circuit breakers, automatic commutator, and chronograph. It has been decided that in future tests there is to be a chronograph with as many recording pens as there are circuit breakers, so that each may be independent in registration although marking on the

same drum; the registration will then be referable to the same time intervals.

In test 15 (fig. 8) the period of developing pressure, including time of traversing the first 300 ft., occupied two and a-quarter seconds from the time of ignition. When the pressure wave reached the 300-ft. point it was far behind the shock wave caused by the blown-out shot. The pressure velocity curve obtained from the records

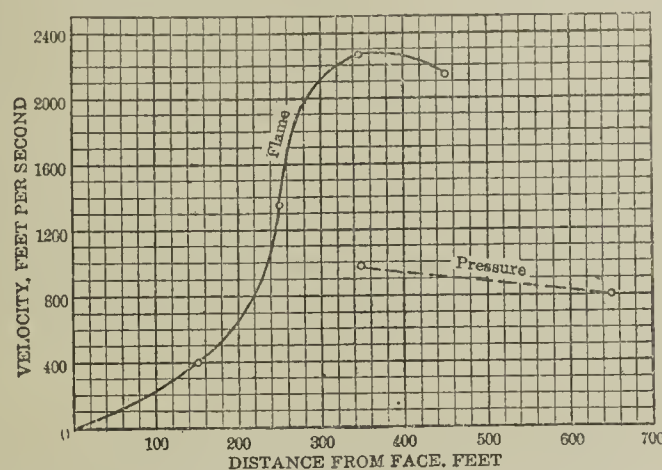
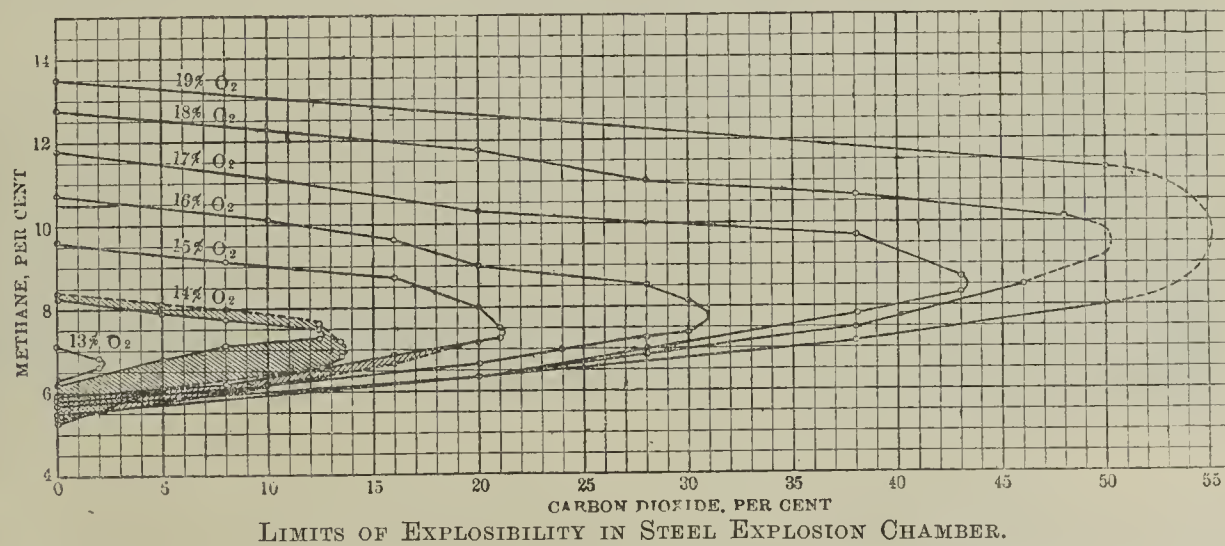


FIG. 11.—PRESSURE VELOCITY AND FLAME VELOCITY CURVES OBTAINED IN TEST 15.

of test 15 is shown in fig. 9. Although the data are incomplete, sufficient details were obtained to make apparent the slow development of pressure and velocity to the 300-ft. point, where the pressure wave started off at a higher rate, but less than the velocity of a sound wave. At the 600-ft. point the manometers indicated a slowing up between the stations at 600 ft. and 700 ft. from the origin. It is possible that the indicated decrease in velocity is due to the lag of the manometer at the 700-ft. point. Much additional information from further experiments must be obtained before conclusions can be drawn as to the normal pressure-velocity curve resulting from uniform dust loading in a given size and shape of passageway, and other known controlling factors.

The data of indicated flame velocities in the first series of tests are more satisfactory than those of the pressure velocities. There are fewer difficulties with the flame circuit breakers than with the pressure circuit breakers, since there is only one flame record to be made; but there was difficulty with the automatic commutator and single-point chronograph, since failure of any breaker meant loss of all subsequent records. Fig. 10 shows the curve plotted from the flame-velocity records from tests 6, 7, 8, 12, and 15. These curves indicate that for the first 200 ft. the velocity is relatively



low, averaging less than 200 ft. per second. In the case of explosions showing the least violence, the velocities did not materially increase with distance, though in test 8 the velocity reached 400 ft. per second. This velocity was attained about 60 ft. beyond the end of the coaldust zone; but, as a large amount of coaldust would be carried forward by the wave itself, there would be no lack of fuel for considerable distance.

Test 15 was most complete and satisfactory, although unfortunately the velocity records were not obtained as far as the mouth of the mine. A feature of great interest in the flame-velocity curve (fig. 11) plotted from the record is the seeming attainment and passing of a maximum velocity between the points 350 ft. and 400 ft. from the origin. However, as there was only one registration beyond this apex, it would not be safe to assume that a normal flame-velocity curve drops after a maximum has been reached.

The members of the Yorkshire branch of the Association of Mining Electrical Engineers paid a visit on Saturday to the New Monckton Collieries, Royston, near Barnsley. A lecture on "Electricity in Mines" was given by Mr. John Benthams, of Sharlston Collieries.

## THE INFLUENCE OF INERT GASES ON INFLAMMABLE GASEOUS MIXTURES.\*

By J. K. CLEMENT.

The object of the experiments described in this report was to determine the range of explosibility of mixtures of methane or natural gas with oxygen, carbon dioxide, and nitrogen. The results are given in the form of tables and curves, by means of which one may readily determine whether any mixture of these gases, provided it contains not over 19 per cent. oxygen and its composition is known, is explosive. In future experiments it is planned to extend the investigation to mixtures containing carbon monoxide.

Two types of explosion chambers were used in the experiments—a glass Hempel explosion pipette with an electric-spark igniter, and a steel vessel in which ignition was effected by the arc from a 220-volt circuit.

As a matter of convenience, in part of the work natural gas from the Pittsburgh city mains was used instead of methane. Nitrogen was prepared from aqueous ammonium chloride and sodium nitrite, and was passed through a solution containing five volumes of concentrated potassium dichromate to one volume of concentrated sulphuric acid, in order to remove oxides of nitrogen. Carbon dioxide was taken from a tank of liquid carbon dioxide, allowance being made for the air present in the gas; and oxygen was taken from a tank of compressed oxygen prepared by the Linde method. Methane was prepared from sodium acetate and soda-lime, the gas being passed through wash bottles containing fuming sulphuric acid and potassium hydroxide.

The limits of explosibility in mixtures of methane, oxygen, carbon dioxide, and nitrogen determined in the steel explosion chamber are given in the accompanying figure. The limits of burning are represented by broken lines, and the regions in which burning without explosion takes place are indicated by shading.

The results show that the addition of carbon dioxide to mixtures of methane and air, or of natural gas and air, reduces the range of explosibility. This action of carbon dioxide cannot be attributed solely to the resulting dilution of the explosive mixture, for the limits of explosibility are reduced when carbon dioxide is used to replace the nitrogen of the air. The effect of carbon dioxide on the explosibility of gases must, therefore, be due to a specific chemical or physical property. The reduction in the limits of explosibility observed in the experiments with carbon dioxide cannot be due to a difference in thermal conductivity, for the conductivity of carbon dioxide is less than that of nitrogen.† The mean molecular heats of carbon dioxide

and nitrogen between 0 deg. and 650 degs. Cent. are, respectively, 10.6 and 7.2.‡ A given volume of carbon dioxide will absorb, therefore,  $\frac{10.6}{7.2}$  or 1.47 times as much heat—practically 50 per cent. more—as the same volume of nitrogen while being heated to 650 degs. Cent., the ignition temperature of methane. The action of carbon dioxide in reducing the explosibility of methane and natural gas can be accounted for by the high specific heat of this gas, and in the opinion of the author it is due to this property.

## Application of Results.

The data found for the limits of explosibility in mixtures of methane, oxygen, nitrogen and carbon dioxide may be used either to determine (a) whether any mixture of these gases, whose analysis is known, is explosive; (b) whether a non-explosive mixture of methane, oxygen, nitrogen and carbon dioxide will form

\* From Technical Paper 43, U.S. Bureau of Mines.

† Landolt and Börnstein, *Phys.-chem. Tabellen*, third edition, 1905, p. 511; G. W. Todd, "Thermal Conductivity of Air and other Gases," *Proc. Royal Soc., ser. A*, vol. 83, 1909, p. 1939; *Science Abstracts*, vol. 13, 1910, p. 83.‡ Holborn and Austin, *Sitzungsber. Kgl. Preuss. Acad.*, 1905, p. 175.



an explosive mixture when air is added to it; and (c) that quantity of an inert gas, as nitrogen or carbon dioxide, must be added to a given explosive mixture of methane, oxygen and nitrogen, or of methane, oxygen, nitrogen and carbon dioxide, to render it non-explosive. The results apply to mixtures of these four gases only, and not to mixtures containing appreciable quantities of carbon monoxide. As somewhat wider limits of explosibility were found in the steel explosion chamber with the arc igniter than in the Hempel explosion pipette, the results obtained in the former apparatus should be used in determining the explosibility of gas mixtures.

The spaces enclosed by the curves for different percentages of oxygen in the figure represents the regions of explosibility. If the methane and carbon dioxide co-ordinates for a given gas mixture intersect inside of the curve corresponding to the oxygen content of the mixture, the mixture is explosive. If the point of intersection lies outside of the curve, the mixture will not explode when subjected to the action of the electric arc. Thus, a gas containing 16 per cent. oxygen, 7 per cent. methane and 15 per cent. carbon dioxide is explosive.

## THE RECOVERY OF BENZOL FROM COKE OVEN GAS.

### The Koppers Process.

During the past few years the demand for benzol has grown very rapidly indeed, and it is more than likely that this demand will continue to increase. In view of this fact it is important to remember that on all by-product coke oven plants in this country the benzol can be recovered from the gas without in any way affecting the operation of the ovens, and with only slightly affecting the amount of energy obtainable from the gas when used for boiler-firing purposes or for consumption in gas engines, &c. The capital outlay required to erect a benzol plant is comparatively small, as also are the maintenance and working costs, whilst there is always a ready sale of the products at prices which leave a very satisfactory margin of profit for the manufacturer. The recovery of benzol from coke oven gas is now universally effected by washing the benzol out of the gas with creosote oil, and then submitting the oil to distillation.

The difference between the various systems of benzol

counter-stream to the gas, and by the time the gas has passed through all the scrubbers the benzol is completely extracted from it. The enriched oil containing the benzol passes to the storage tank *b*, whence it is pumped into a preliminary heater, where its temperature is raised to about 60 degs. Cent. It then goes to the superheater *f*, where it is heated to a temperature of about 135 degs. Cent., after which it runs over into the still *g*. By means of live steam, the whole of the benzol is driven off, the debenzolised oil then flowing out at the bottom of the still. This weak oil is cooled and used again for scrubbing purposes.

The benzol vapours, together with some water vapour, leave the still and enter a heat exchanger *e*. In this apparatus, the heat contained in the vapours is transmitted to rich oil, and the vapours are thereby cooled down considerably, led into a final cooler *k*, and condensed to the liquid form. The benzol and water thus obtained pass to a separator, where, by reason of the difference in specific gravity, the two are entirely separated. The benzol so obtained is known as crude spirit, and is usually of about 65 per cent. strength. When a refining plant is available, the crude benzol is

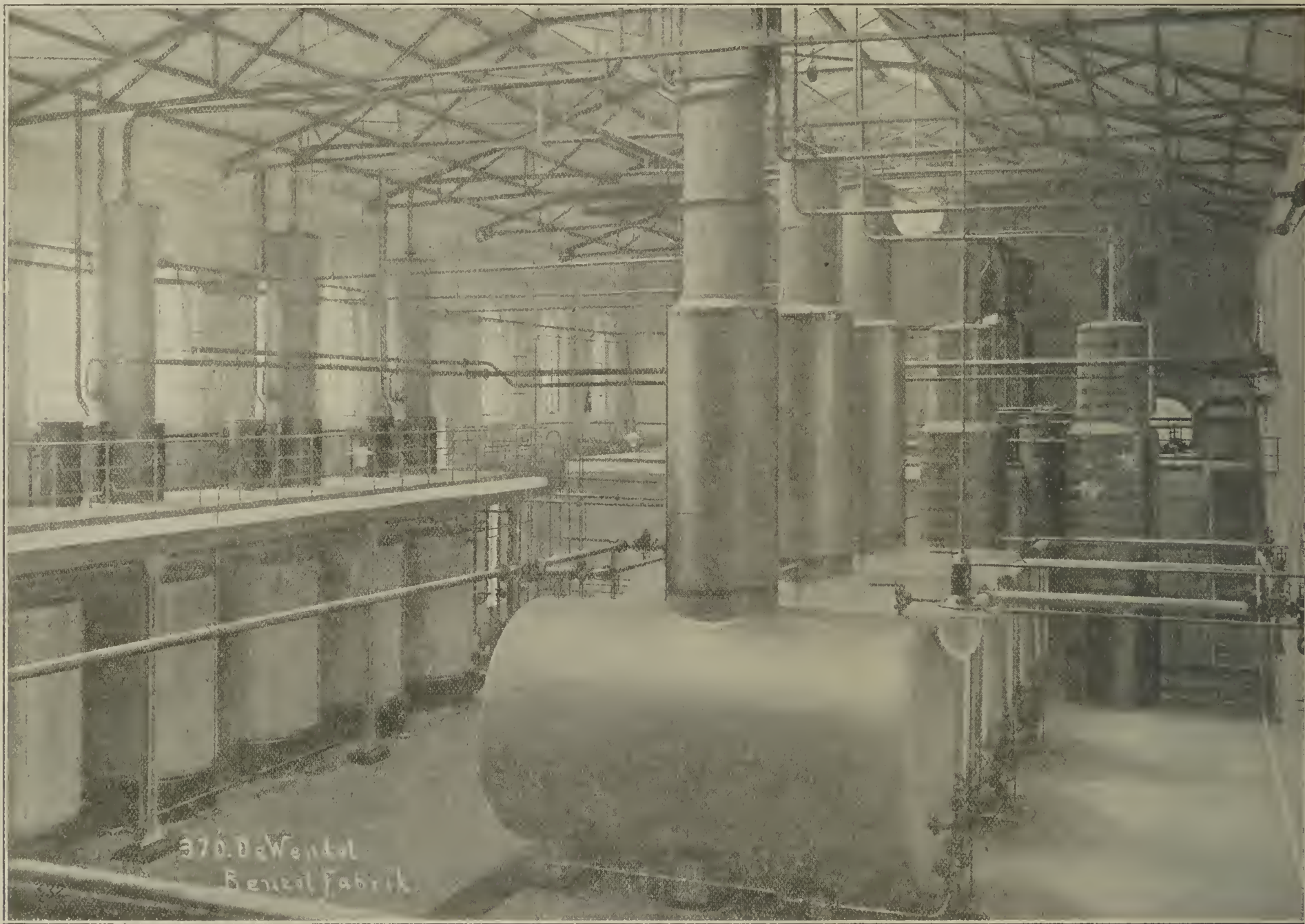


FIG. 1.—INTERIOR OF BENZOL REFINING PLANT, DE WENDEL COLLIERY, GERMANY.

while a gas containing the same percentages of oxygen and carbon dioxide and 11 per cent. methane is not explosive. The latter gas will form an explosive mixture, however, when mixed with air in certain proportions. For example, if 25 cubic feet of air be added to 100 cubic feet of this gas, the resulting 125 cubic feet of gas will contain:

15	cubic feet, or	12	per cent., carbon dioxide.
11	cubic feet, or	8.8	per cent., methane.
21.25	cubic feet, or	17.0	per cent., oxygen.
77.75	cubic feet, or	62.2	per cent., nitrogen.
125		100	

The point of intersection of the co-ordinates for 12 per cent. carbon dioxide and 8.8 per cent. methane lies well within the curve for 17 per cent. oxygen, and the gas mixture is therefore explosive. Similar calculations will show that if more than 15 and less than 80 volumes of air be mixed with 100 volumes of a gas mixture of the composition given above, the resultant mixture will fall within the limits of explosibility represented by the curves.

recovery now on the market lies principally in the internal arrangements of the apparatus employed and the temperature and pressure at which the various parts are worked. The Koppers' Coke Oven and By-product Company, of Sheffield, one of the leading firms of coke oven erectors, have built plants to recover the benzol from the gas evolved from over 3,600 coke ovens, and the experience so obtained enables them to put into operation the simplest, most efficient and most economical type of plant.

In the recovery of the by-products from coke-oven gas, the tar and ammonia are first removed. In order to extract the benzol satisfactorily, it is necessary to cool down the benzol to as near as possible atmospheric temperature. It is only at this temperature that the absorption of the benzol by the scrubbing oil can be efficiently carried on. To effect this cooling, the gas is run through coolers either of the direct or indirect type.

The cooled gas then enters a series of tower scrubbers *a*, inside of which is a number of boards, in order to ensure an even distribution of the scrubbing oil, and hence complete extraction of the benzol. The oil is circulated by means of pumps *c*, and is fed into the scrubbers at the top through sprays. The oil flows in

not produced higher than 50 to 60 per cent. Up to this point the process is continuous, and can proceed without interruption for any length of time, a little fresh scrubbing oil being added occasionally and some of the old oil removed.

If it is desired to produce a refined spirit, it is necessary to submit the crude benzol to further processes of redistillation and purification. The crude spirit runs from the separator into a storage tank, and from there is pumped into a still *m* of large capacity. This is heated by means of steam coils. The benzol vapours pass into a dephlegmator *n*, in which separation of the various constituents take place owing to the different temperatures at which they boil. In order to produce the higher-boiling homologues of benzol, further distillation under a partial vacuum by means of live steam is resorted to. The vapours leaving the dephlegmator are condensed and run into the various storage tanks. The products so obtained are—benzol, toluol, xylol, &c., and each of these is now treated separately in order to produce a refined spirit. A pump delivers the spirit to an agitator *a*, where it is washed with sulphuric acid. After allowing an interval for separation, the acid is run off and the spirit is treated with caustic soda and finally with water. By finer dephlegmation and slower

The Town Council at a meeting last week adopted by a large majority a resolution affirming the principle of the nationalisation of coalmines.



distillation in another still *m*, the washed spirit is fractionated and the products known as 90 per cent. benzol, 90 per cent. toluol, solvent naphtha, &c., are obtained. In order to produce pure benzol, toluol, &c., for chemical purposes further fractional distillation is necessary, but these products are seldom, if ever, manufactured on coke oven plants.

In the stills from which the crude benzol is first re-distilled, a certain quantity of hydrocarbons, consisting mainly of naphthalene, is always left, and this is run off after each distillation into open pans. The naphthalene settles out, is brought to a centrifugal machine and dried. The oily matter remaining is run back into the scrubbing oil and used for scrubbing purposes.

The sulphuric acid used for washing the crude spirit after a time can no longer be used for that purpose. It is run into lead-lined pots and heated by live steam, thereby being freed from hydrocarbons. The cleaned acid is then used in the saturator for the manufacture of sulphate of ammonia.

The products obtainable from the crude benzol on rectification vary somewhat according to the nature of the coal carbonised. The following may be taken as an average yield from 1,000 gallons on redistillation:—

500 gallons, 90 per cent. benzol.

120 gallons, 90 per cent. toluol.

60 gallons, 90 per cent. xylol.

70 gallons, 90 per cent. solvent naphtha.

The remaining 250 gallons is returned to be used again for scrubbing purposes.

#### THE SAFETY OF WINDING ROPES.\*

##### Preliminary Report of the Prussian Winding-Rope Commission.

The Prussian Winding-Rope Commission was appointed in 1905, for the purpose of devising uniform regulations with regard to the winding of men in the various mining districts, and also to investigate the general conditions for securing safety in winding. Each

and men respectively—both being based on the maximum load to be supported by the rope. In the former case a factor of 6 is recommended. For winding men, the Dortmund and Bonn committees specify a minimum safety factor of 8; the Clausthal committee considers that the load when men are being wound should not exceed 50 per cent. of the load in winding materials; whilst the Halle committee proposes that, for a new rope, the safety factor in winding materials should be 8, if safety catches are provided, and 9 without these appliances, the corresponding figures for winding men being 10 and 12 respectively, and that the rope should be replaced when its safety factor for winding materials has decreased to 6 (7). For flat steel ropes these values should be increased by 1.25. The Bonn committee recommends for new ropes a safety factor of  $9\frac{1}{2}$  for winding men, and that the total load for this work should not exceed 90 per cent. of that in winding materials. Finally, the Breslau committee would reduce the factor to  $7\frac{1}{2}$  in deep mines, where it would be difficult to allow

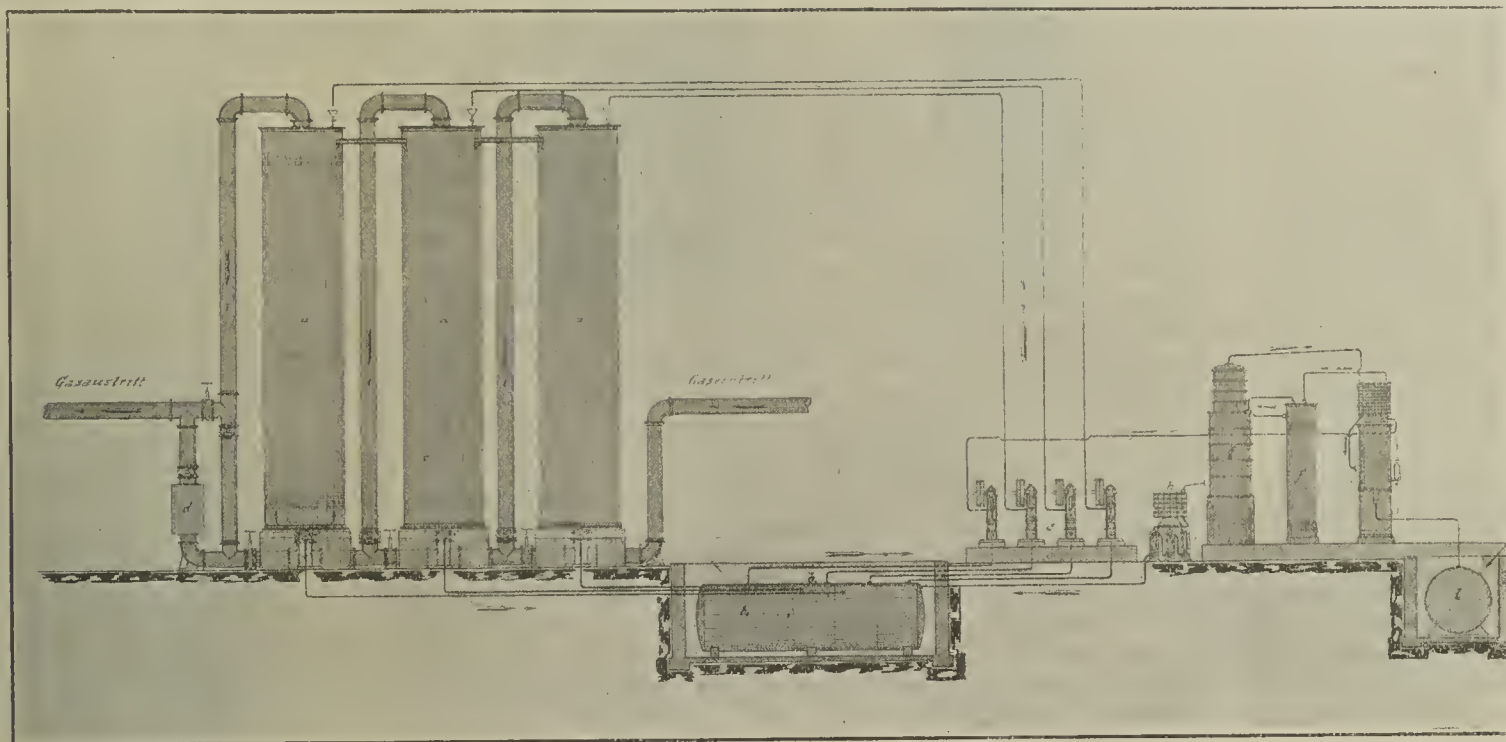


FIG. 2.—DIAGRAM ILLUSTRATING THE PRODUCTION OF CRUDE BENZOL

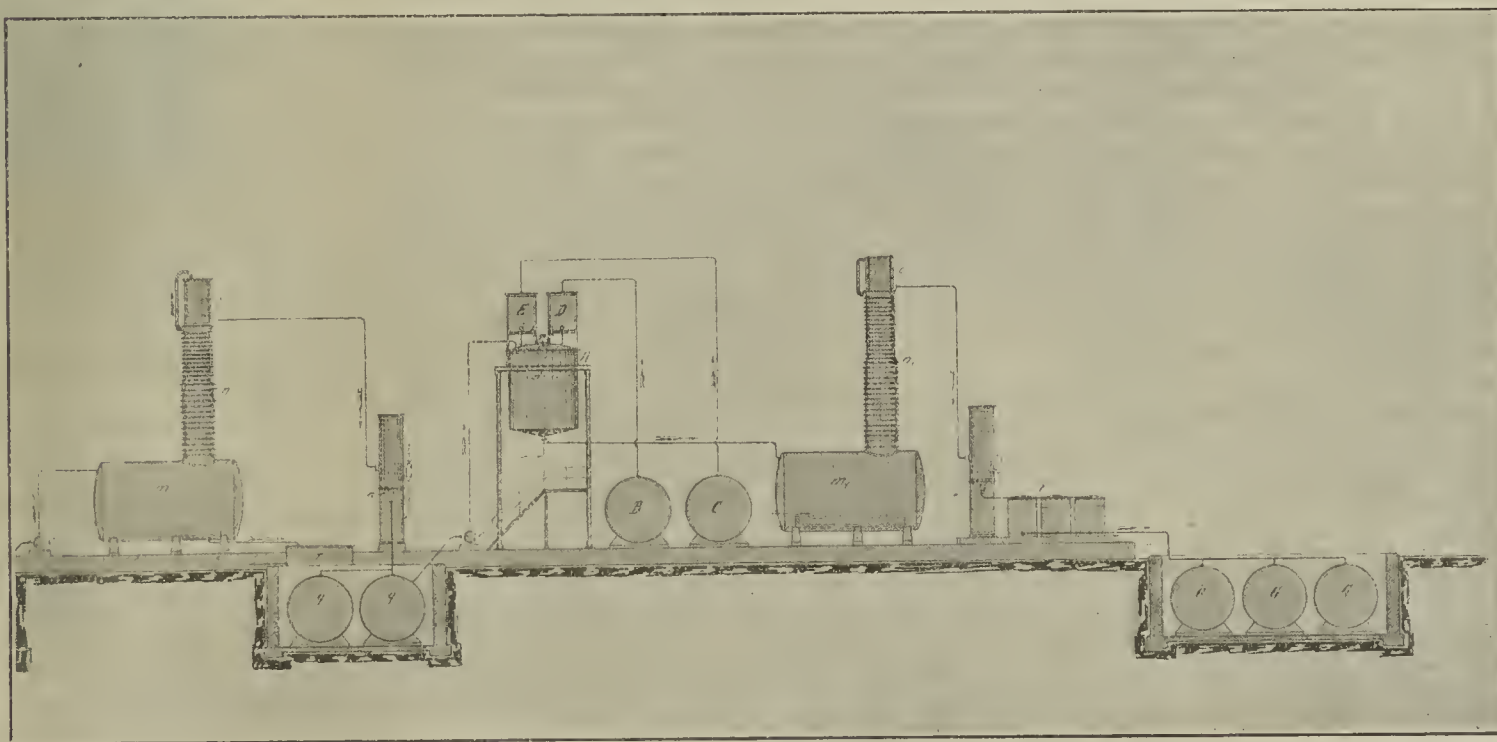


FIG. 3.—DIAGRAM ILLUSTRATING THE PRODUCTION OF REFINED BENZOL, &C.

It will be seen, therefore, that the whole plant is arranged so that only a minimum of loss takes place. The heat exchangers are arranged so as to effect the greatest possible heat economy, and the efficiency of the whole of the apparatus is such that the maximum amounts of the various products are obtained, and all of a superior quality.

The oil generally used for scrubbing purposes on benzol plants is the creosote obtained in the distillation of tar. Several specifications of this oil are used, there being no such thing as a standard agreed to by all producers. The following is characteristic:—

Distillate to 390 degs. Fahr., not more than 5 per cent.

Distillate 390—572 degs. Fahr., 90 per cent.

Naphthalene content, not more than 7 per cent.

Water content, not more than 1 per cent.

The oil should contain only traces of anthracene.

Blast furnace creosote is used in some cases, and this has the advantage of containing no naphthalene.

district was dealt with by a sub-committee of investigation, and special travelling committees were appointed to study the question in neighbouring countries. It is with the results of these enquiries that the present report deals.

One of the principal points examined was the safety of winding ropes, especially round-section ropes of steel wire, which form the chief type used in German mining; and the question to be settled in this connection comprised: fixing the data on which the safety factor should be determined; ascertaining the maximum working life of Koepe ropes; the behaviour in practice of ropes made of high-tensile steel; suitable tests for the quality and condition of steel ropes; and how the condition of a rope can reveal that its limit of service has been reached.

**Safety Factor of Winding Ropes.**—The committees are in general agreement that two safety factors must be taken into consideration—namely, for winding materials

the factor to become so low as 6 for winding material and still retain 8 as the minimum for men.

In general, the committees do not think it necessary to increase the safety factor for new ropes, except for those used on Koepe pulleys, for which initial factors of  $9\frac{1}{2}$  and 8 are advised in view of the impossibility of shortening the ropes in order to ease the portions subjected to the greatest wear. It was also agreed that no increase in the factor should be required where tail ropes are used, since these prevent jolting and ensure more even running. To prevent overstrain due to the tail rope jamming or looping at the pit bottom, this rope could be made of weaker material than the main rope, so as to break first.

**Life of Koepe Ropes.**—As these ropes cannot be examined periodically by cutting off their ends, it is recommended that a limit should be placed on their period of service, two years being mentioned as the maximum (the Breslau regulations fix one year for flat Koepe ropes). The Bonn committee advises that the

\* Zeitschrift für Berg-, Hütten- und Salinenwesen.



ropes should be taken off for examination every three months, whilst the Halle committee considers that the diameter of the Koepe and head pulleys should not be less than 120 times that of the rope, and that the angle of convergence of the rope between the head pulleys and the Koepe pulley should not exceed 1 deg.; further, that the cast steel wires in the rope should not have a higher breaking strength than 150 kilogs. per square millimetre. Statistics placed before the Commission showed that, out of 492 Koepe ropes discarded between the years 1905 and 1909 44 per cent. had been in use less than one year, 36 per cent. less than two years, and 20 per cent. more than two years, this unfavourable result being ascribed to the double strain on the rope as compared with those used in drum winding. The galvanising of Koepe ropes, to save greasing, lowers the breaking strength by about 9 per cent., the flexibility by 13 per cent., and the "give" under torsion by 50 per cent. Moreover, the breakage of a Koepe rope not only precipitates both cages to the pit bottom, but also results in serious damage caused by the loose, rising end of the rope itself; and in view of all these circumstances, the Commission decided to recommend two years as the limit of service, with a possibility of authorised extension in special cases.

**Wires of High Tensile Strength for Winding Ropes.**—This point was gone into on account of a regulation specifying that in determining the safety factor of a winding rope the calculations should be based on a breaking strength not exceeding 150 kilogs. per square millimetre (213,340 lb. per square inch) of the wire of which the rope is composed. Since this limit would entail the use of very thick and heavy ropes, to comply with the high safety factors prescribed by the regulations, the opinion of ropemakers was consulted, and it was found that they consider the limit might safely be increased to 200 kilogs. per square millimetre (284,450 lb. per square inch). According to particulars furnished by Messrs. Gessmann, of Herne, from tests made at the Graf Moltke II. shaft, ropes with a breaking strength of 145 kilogs. per square millimetre lasted 301 days and performed work equal to 101,520 ton-kilometres, whilst others, with a breaking strength of 175 kilogs. per square millimetre, ran for 1,107 days and raised 576,000 tons, the cost of the former per ton-kilometre being 34 marks, and of the latter 7.65 marks. Further tests have shown that the useful work done by the rope increases with its breaking strength. The local committee, however, does not regard steel of high tensile strength as the best material to use in all cases, one with greater ductility being preferable where the working conditions are unfavourable. In Breslau, however, wires with a breaking strength of 170 to 270 kilogrammes per square millimetre are more favourably regarded, owing to the increasing depth of the shafts and the necessity for reaching the prescribed factors of safety without making the ropes unwieldy. It is considered that with metal of good quality the increased fragility of the wires is only slight, whilst the diameter of the rope can be reduced, with advantage to the fatigue due to flexion. The Bonn committee considers it inadvisable, for the time being, to raise the limit above 180 kilogs., but the Halle committee is decidedly against any increase over 150 kilogs., owing to unfavourable experience with wires of higher breaking strength.

Evidence was laid before the Commission to the effect that, whilst the flexibility of high-tensile steel wires is low when bent through a very small radius, it increases with the tensile strength when the radius of curvature exceeds 1 in., and that while such wire is difficult to work, it is very suitable for ropes to be used in winding from great depths at high speeds and raising heavy loads. It was also stated that the rope pulleys should have a diameter not less than 100 times that of the rope. With regard to high-tensile steel for deep winding, it was pointed out that ropes with a breaking strength of 130 kilogs. cannot be used for depths beyond about 1,300 m., and that, although with a breaking strength of 150 kilogs., a depth of 1,500 m. can be attained, the weight of the rope is then 10 times as great as that of the load raised: whereas with a breaking strength of 180 kilogs. the weight is only three times that of the load, and on increasing the breaking strength to 200 kilogs. the weight falls to double that of the load. With regard to cost, for an equal weight of metal a rope made of wires having a breaking strength of 200 kilogs. is 50 per cent. dearer than one having a breaking strength of 150 kilogs.; but as the relative weight of the two ropes is only 1:5, the actual cost of the stronger rope is only three-fourths that of the other. The conclusion arrived at by the Commission was that there is no reason for reducing the breaking strength of rope wire to 150 kilogs. per square millimetre in calculating the

safety factor, nor to impose any upper limit, in order not to retard progress.

**Tests for Rope Wires.**—The main question before the Commission was to settle the number of successive bendings that a wire should be expected to stand, for the purpose of calculating the safety factor. In view of the conditions of practice, the Dortmund committee recommended traction, flexion, and torsion tests, more especially the last-named, as affording the best means of ascertaining the quality and homogeneity of the metal. Such torsion tests would, however, have to be restricted to new rope, because even a slight amount of wear, traces of rust or mechanical injury (nicking), may reduce the resistance to torsion to a single twisting, whereas these factors do not affect the breaking strength or flexibility. The breaking test should be applied to the whole section of the rope, and also to the separate strands, 10 per cent. of the wires being subjected to tensile strain, and, in the case of round wires, to flexion and torsion as well. As an alternative tensile test, all the wires, except those of the neutral zone, should be tested. The carrying strength of a wire should be determined by its breaking load. The flexion tests should be made with jaws 10 mm. in diameter, the wire being fixed at right-angles to the jaws and bent, to the right and left alternately, through 180 degs. The number of bendings that naked wire, having a maximum breaking strength of 175 kilogs. per square millimetre (248,900 lb. per square inch), should stand without rupture is as follows, for the various sizes of wire specified, the corresponding values for wires of higher breaking strength, or galvanised, being given in parentheses:—Below 1.5 mm. diameter, 12 (11); 1.5 to 1.8 millimetres, 10 (9); 1.8 to 2.0 millimetres, 8 (7); 2.0 to 2.2 millimetres, 7 (6); 2.2 to 2.5 millimetres, 6 (5); 2.5 to 2.8 millimetres, 5 (4); over 2.8 mm., 4 (3). These data are the result of tests on 1,650 new wires, and are 30 per cent. below the mean values actually obtained. The torsion test should be performed by twisting a test piece, 200 m. long, of each wire around its own axis until it breaks. For the same breaking strengths as mentioned in the bending test, the wires should bear twisting the following number of times:—Wire less than 1.5 mm. in diameter, 32 (23) times; 1.5 to 1.8 millimetres, 30 (21) times; 1.8 to 2.0 millimetres, 26 (19); 2.0 to 2.2 millimetres, 24 (17); 2.2 to 2.5 millimetres, 22 (13); 2.5 to 2.8 millimetres, 16 (11); over 2.8 mm., 12 (9) times. These values are 30 per cent. less than the mean obtained with 1,650 wires. The carrying power of the rope is found by the sum of the breaking strengths of the individual wires, when the whole of these are tested; but in arriving at the total, all wires which have a breaking strength that is more than 20 per cent. below the mean result of the whole number of tests, and all those failing to pass the flexion and torsion tests must be eliminated. Ropes made of triangular or locked wires, in addition to having a hemp core, must be tested over the whole section, or, at least, by strands.

(To be concluded).

**Coke Oven Gas at Middlesbrough.**—Some few months ago an arrangement was entered into between the Middlesbrough Corporation and Sir B. Samuelson and Co. Limited, of the Newport Ironworks, Middlesbrough, whereby the iron company undertook to supply the gas required for consumption in the municipal area of Middlesbrough of a quality suitable for all the purposes for which town gas is usually employed. To meet this demand Messrs. Samuelson placed an order for a battery of 46 Otto regenerative coke ovens, with complete by-product recovery plant working on the Otto "direct recovery" system. They have already in operation 200 Otto waste-heat ovens, from which a certain amount of gas will be available in case of emergency, so that there is no likelihood of the continuity of the supply not being maintained. With the regenerative type of oven, such as is now being installed at the Newport Ironworks approximately 5,500 cubic feet of gas per ton are available for outside use, the remainder being required for heating the ovens; and as the gas consumption at Middlesbrough is about 600,000,000 cubic feet per annum, the plant will have to carbonise about 110,000 tons of coal yearly. It is understood that the quality of the gas can be readily maintained at the required standard of 14 to 16-candle power, and a calorific value of 500 to 600 B.Th.U. per cubic foot. Messrs. Samuelson utilise all of their coke for blast-furnace purposes, and, in addition to drawing supplies of coal from their colliery at Hedley Hope, county Durham, they regularly purchase from outside sources to maintain their coking plant. We understand that in order to insure a constant supply of high quality coking coal, Messrs. Samuelson and Co. Limited have during the past few days concluded arrangements for the taking over, as from January 1 next, of the Sherburn group of collieries in county Durham, now worked by the Lambton and Hetton Collieries Limited, of Newcastle-on-Tyne. There are four pits in this group (Littleton, Sherburn Hill, Sherburn House, and Sherburn), worked as two collieries; and it is understood that the new owners will work the Busty and main seams, which are rich in undeveloped coking coal of good quality.

## THE LESKOLE SPEED AND VOLUME RECORDERS.

The Leskole meter described below is intended primarily for the measurement of large quantities of gas or air under conditions for which more orthodox methods are either unsuitable or too costly. The adaptability of the method arises from the use which is made of one of three systems of determining speed (and thence volume) inferentially. These are:—

1. *The Pitot Tube.*—This has been slightly modified for use as a modern gas meter by substituting for the straight pipe one with a bend facing with the stream of the medium, as indicated in fig. 2. This has the advantage that larger pressure differences are obtained for given speeds. In place of the simple glass U-gauge, a highly sensitive Leskole differential pressure recorder is employed, but the charts are directly calibrated to show either speed in feet, or volume in cubic feet, per second, per minute or per hour. Only two small holes are drilled in the pipe in question, two 1 in. gas pipes connect to the meter, which may be any reasonable distance away. One instrument can be used for measurements in pipes or conduits of any size and meter

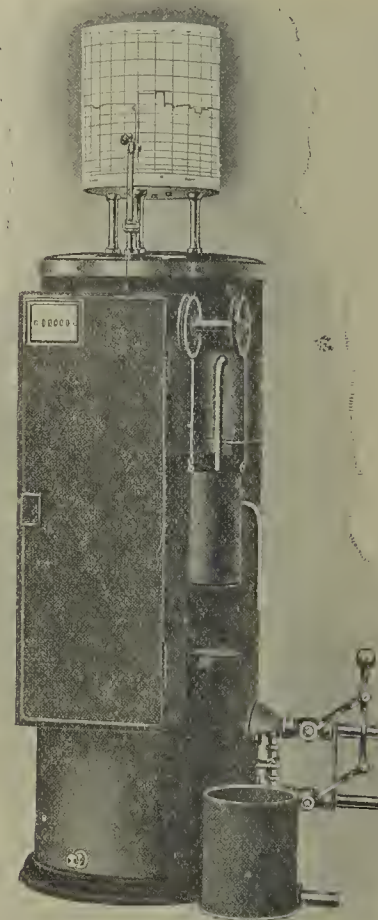


FIG. 1.—VOLUME METER COMBINING CHART RECORD AND AUTOMATIC TOTALISER.

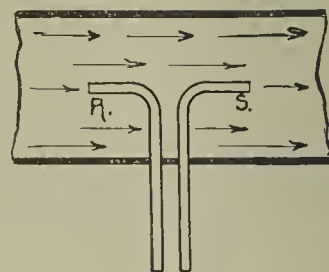


FIG. 2.—"PITOT" TUBES.

accurately any quantity, from the smallest to the largest, even where rapid fluctuations within wide limits occur. As nothing passes through the meter, it can deal with hot and dirty gas without difficulty, and is not subject to wear on this account. The chart record does not only furnish the total volume passed, but also the rate of flow during any part of the 24 hours, thus serving as a check on the men and recording for future reference any irregularity, together with the time when it took place.

2. *The Throttle Disc.*—In cases of closed pipes, where the speed of the gas or air is not sufficient to create the necessary difference in pressure for a satisfactory record (all speeds below 20 ft. per second) by means of the Pitot tube, a thin disc (fig. 4) is inserted between two flanges of the pipe line. This disc has a bore smaller than that of the pipe, and the difference in pressure on the two sides is the means of determining the speed or volume of gas flowing, on the same form of recorder. This method is also preferable in some cases where measurements are desired in short lines of piping in the vicinity of bends or branches.

3. *The Venturi Tube.*—This well-known form of throttle (fig. 5) is more expensive than either of the foregoing, and the Leskole people use it only in rare



cases where straight runs of piping are not available, or where it is desired to avoid the slight loss of pressure occasioned by the disc. It has the further advantage of offering very little opportunity for sediment or impurities to collect.

The differential pressure recorder or meter proper is made in various forms, some of which are illustrated in figs. 1, 3, 6 and 7. The construction may be gathered from fig. 3. A float A is balanced in the non-evaporative liquid in the container B. The dynamic pressure due to velocity reaches the space under the bell through tube C, whereas the static pressure acts upon the space above the float through the tube D. Attached to A is the pen rod E carrying pen F, which traces a record of the motions of the float upon the 24-hour chart G. An annular chamber H, partly filled with paraffin, provides a seal for the pen against atmosphere and renders the airtight closing-in of the clock drum unnecessary. The illustration shows the special float with central supporting body of curved cross-section, which is employed when charts having equally-spaced divisions are

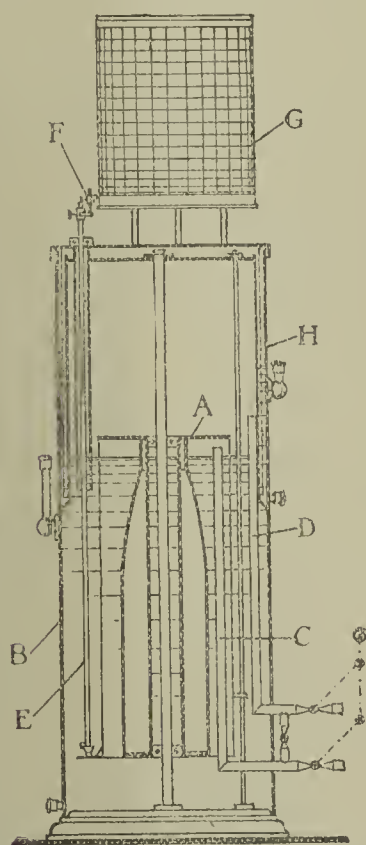


FIG. 3.—SECTION SHOWING CONSTRUCTION.

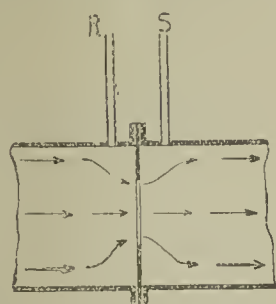


FIG. 4.—THROTTLE DISC.

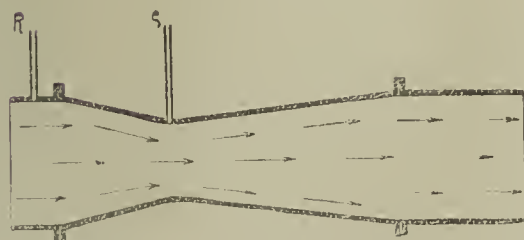


FIG. 5.—"VENTURI" TUBE.

desired, which can be averaged out with an ordinary planimeter. The construction of the float allows of registering the pressure differences on the chart on a greatly magnified scale. This magnification (up to fifty-fold) is secured simply by varying the proportion between the area of the bell and its central body, and without levers of any kind.

In fig. 1 is shown the latest type of meter combining with the usual 24-hour record a counter or integrator, operated by a small flow of water. This is controlled by the oscillations of the pen rod and automatically totalises the volume of gas or air which has passed the point of measurement during any period, thus rendering working-out of the diagrams unnecessary. Fig. 6 illustrates the standard type of recorder used for gas or air up to a static pressure of 30 in. water-gauge. Above this, up to 25 lb. per square inch, another pattern is used. Instruments for greater pressures can be supplied to order. The illustrations show the dustproof covers fitted over the chart drums. The apparatus shown in fig. 7 records pressure and volume simultaneously on the same chart, and is particularly useful for keeping a record of the working of ventilating fans in mines. An

increase of volume without a corresponding increase of suction would indicate that "false" air is being drawn by the fan. A movement on the two charts in opposite directions would point to a change in the area of the airways, and so on. The charts are usually made 8 in. high and 25 in. long, and printed specially to each

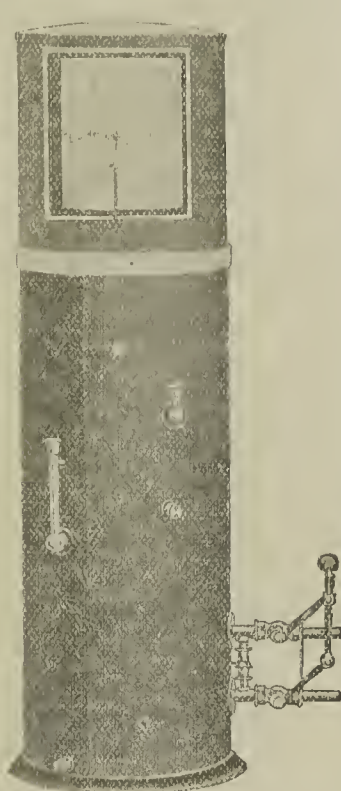


FIG. 6.—VOLUME METER WITH 24-HOUR CHART FOR ORDINARY PRESSURES.



FIG. 7.—COMBINED VOLUME AND PRESSURE METER.

client's specification. The standard clocks give 1 revolution to the charts in 24 hours, and are wound once in 48 hours. Special clocks for seven-day charts can be fitted on request.

The appliances are made by the Leskole Company Limited, Palace Works, Enfield.

**Power Supply in the North of England.**—In order to cope with the increased demand for power and the steadily increasing load, the Newcastle-upon-Tyne Electric Supply Company Limited have decided to extend the power station at Dunston-on-Tyne, which was started some three years ago on a site directly opposite the western end of the Elswick Works, and which has a frontage to the river of about 900 ft. The Dunston station generates three-phase current at a periodicity of 40 complete cycles, and a normal voltage of 6,000 volts. The steam pressure is 200 lb. per square inch, and the steam is superheated, the total temperature being practically 570 degs. Fahr. The main generating units at present consist of two A.E.G. sets, each of 10,500-horse power, and a Brown-Boveri set of 9,000-horse power, all three running at 1,200 revolutions per minute. The station was originally laid out to eventually accommodate six generating units, each of 10,000-horse power continuous capacity and 13,000 maximum capacity, or a total capacity of about 70,000-horse power. In connection with the present extension scheme, an agreement has been entered into with the Teams By-product Coke Company Limited, who are now engaged upon the installation of a large battery of Otto-Hilgenstock coke ovens on a site about 1½ miles distant from the Dunston power station, to purchase their available coke-oven gas. This gas will be led along the North-Eastern Railway Company's Dunston branch in a 16-in. welded steel pipe, which will be supplied by Messrs. Stewarts and Lloyds Limited. The joints will be welded *in situ* by the acetylene process. The boiler-house extensions comprise a steel frame building, sheeted in with corrugated iron, 114 ft. long by 75 ft. wide, and two steel chimneys. There will be two coal-fired water-tube boilers, each capable of producing continuously 30,000 lb. of steam per hour, with the necessary furnace and flue fixtures, also stokers and superheaters. In addition, there will be four gas-fired water-tube boilers, each capable of dealing continuously with 57,000 cubic feet of gas per hour, to be built in two batteries, with the necessary flue fixtures of same, inclusive of gas burner and superheaters. The fuel economisers, one for each boiler, will have automatic tube scrapers and flues and dampers, also soot-cleaning gear. Induced draught fans, direct-coupled to electric motors, will be capable of dealing with the products of combustion from two gas-fired boilers and one coal-fired boiler. There will be two feed pumps, each capable of dealing with 200,000 lb. of water per hour at 190 lb. to the square inch boiler pressure. The coal-handling plant will be of the gravity bucket conveyor type and capable of feeding the coal into the overhead bunkers at the rate of 40 tons per hour. The plant will be suitable for receiving coal from two hoppers of 25 tons capacity, each traversed by a railway truck. The overhead bunkers will have a capacity of 950 tons. All the boiler house plant and buildings have been contracted for by Messrs. Babcock and Wilcox Limited, and the whole of these buildings will be placed on a 6 ft. 6 in. reinforced raft supported on 376 ft. pitch pine piles, which work has been executed by Messrs. Robt. McAlpine and Sons Limited, of Glasgow. The engine room plant extensions consist of a 12,000 kw. turbo-alternator with direct-coupled exciter, the turbine being of Messrs. Richardsons, Westgarth and Co. Limited, manufacture, and the alternator by Messrs. Brown, Boveri and Co. Limited, of Baden, Switzerland. The surface condensing plant consists of a Contraflo surface condenser capable of dealing with 141,600 lb. of steam per hour.

#### ANALYSIS OF ALTOFTS SHALE.

An appendix to the Fifth Report of the Explosions in Mines Committee contains a description of Altofts shale, communicated by Dr. Mellor, Director of the Pottery School, Stoke-on-Trent.

The shale, as used in the mine, was submitted in the form of a powder, consisting of grains of very varied size, a few as large as rape seed. The great mass of the dust, however, consisted of a fine powder.

The result of elutriation was as follows:—

Size of grain.	Percentage of grains.
Below 0.002 mm.	18.96
Between 0.002 and 0.010	17.40
Between 0.010 and 0.063	13.84
Between 0.063 and 0.107	1.75
Between 0.107 and 0.421	35.24
Above 0.421	12.17
Total	99.39

The composition of the clay may be considered from two points of view—viz., the chemical elements present and the minerals. An analysis for the chemical elements gave the following results. The methods of analysis adopted will be found in "A Treatise on Quantitative Inorganic Analysis, with Special Reference to Clays and Silicates," Part II., p. 155, published by C. Griffin and Co., 1912.

	Clay dried at 109 to 110 degs. Cent. Per cent.
Silica (SiO <sub>2</sub> )	51.92
Titanic oxide (TiO <sub>2</sub> )	0.87
Alumina (Al <sub>2</sub> O <sub>3</sub> )	20.08
Ferric oxide (Fe <sub>2</sub> O <sub>3</sub> )*	6.40
Manganese oxide (MnO)	0.05
Magnesia (MgO)	1.58
Lime (CaO)	0.57
Potash (K <sub>2</sub> O)	2.72
Soda (Na <sub>2</sub> O)	0.86
Water†	7.75
Phosphoric oxide (P <sub>2</sub> O <sub>5</sub> )	0.15
Sulphur trioxide (SO <sub>3</sub> )	0.32
Carbon dioxide (CO <sub>2</sub> )	2.44
Carbonaceous matters (C)	4.42

\* A determination of ferrous oxide furnished 5.76 per cent., but no reliance can be placed upon determinations of ferrous oxide in the presence of organic or carbonaceous matters, because the organic matter reduces ferric to ferrous during the progress of analysis.

† The water combined with the clay will not be so much as this. The carbonaceous matter contains hydrogen, and this interferes with the direct determination of the water.

A rational analysis also was made. The methods here employed and a general criticism of the process of rational analysis will be found in the last-mentioned work. So far as it goes, Mr. Mellor believes the following rational analysis to be reliable, but the margin of experimental error is relatively large:—

	Clay dried at 109 to 110 degs. Cent. Per cent.
Carbonaceous matters	4.4
Ferrous carbonate	6.4
Argillaceous matter	48.6
Felspathic matter	5.4
Quartz	35.2

It will be thus seen that (with a probability of error of not more than 2 per cent.) the amount of free silica in Altofts shale is about 35 per cent. out of a total silica of 52 per cent. Of that 35, 1.48 is probably in a colloidal form and the rest is either crystalline, or a form of silica which, when tested chemically, behaves like crystalline quartz.

It is possible, and highly probable, that whatever free silica or crystals there may be are covered over with colloidal silica and colloidal hydroxides of alumina and iron.

There is this to be remembered. It is a fallacy to argue that the analysis of the material in bulk furnishes a real criterion of the composition of the finest dust which remains suspended in the air an appreciable time. The analysis of the finest fractions have not yet been made, and consequently nothing definite can be said on this, although up to the present it has been found that the finer the fraction separated from a given clay, the more nearly does its composition approach the limiting value for clay:—

	Per cent.
Silica	45.5
Alumina	39.5
Water	14.0

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—J. I. Evans, O. Evans and C. Johnson, carrying on business as ships engineers and ship repairers, at York-street, Swansea, under the style of the South Dock Engineering Works; F. Fairweather, H. P. Ranger, and G. F. Lyon, carrying on business as constructional engineers, at Victoria-street, West London, under the style of Fairweather and Ranger; G. A. Boshier and A. H. Richards, carrying on business as traction engine proprietors, general carriers and hauliers, at Wellington, Salop, under the style of Boshier and Richards.



## Letters to the Editor.

It is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### SMOKELESS FUEL.

SIR,—In the prospectus issued by the British Coalite Company Limited, in June 1907, the patent referred to is T. Parker, No. 14365, and not 14356, of 1906, as stated by Mr. Bond.\*

This specification states the invention is for the production of fuel, by the partial destructive distillation of coal, at a low temperature, not exceeding about 800 degs. Fahr. with the object of producing charred or partially distilled coal, &c. The complete specification states:—"I am aware that it has before been proposed to produce, by a process of partial destructive distillation, fuel resembling coke, and to secure thereby a considerable yield of tar, &c.; but it has not been practical to produce by a simple process of destructive distillation, without some preliminary or after treatment, such a fuel, of substantially constant and uniform character, of sufficient hardness to stand handling, stacking and carriage."

The claim is for a process for the preparation of hard smokeless fuel from bituminous coal, consisting in subjecting the coal to a partially destructive distillation, so that the whole mass of coal is maintained at a temperature of about 800 degs. Fahr., until the illuminating gases cease to be evolved, and then stopping the distillation and quenching the fuel.

A previous specification, L. Zechmeister, No. 22381, of 1902, relates to a process for the distillation of coal, peat, and the like, the object being to obtain valuable products and residues of distillation, as for instance a substance which burns almost without producing smoke. In carrying out this process, when applied to coal, the material is heated in a retort and the temperature raised to a fixed point, approximately 300 degs. Cent., and maintained at this temperature until the tar vapours are generated, when the process is finished—the claim being for a process for distilling mineral coal, peat, or the like, consisting in distilling the material, in a single retort, at temperatures raising up to approximately 300 degs. Cent., and maintaining it until the tar vapours are separated, for the purpose of obtaining a solid product forming a valuable heating material with practically smokeless combustion.

It will thus be seen that Patent 14365 of 1906 is not a patent controlling low-temperature carbonisation of coal, but a patent limited to the carbonisation of coal, in a closed retort, at a temperature of approximately 800 degs. Fahr., for the production of a hard coke, which is constant in its composition and will stand handling, stacking and carriage.

V. B. Lewes ("The Carbonisation of Coal," pp. 239-40) found, however, that material produced under such conditions was exceedingly friable, and contained 18 per cent. of breeze and from 8 to 14 per cent. of volatile matter.

If the process does not come up to the claims in the patent, any material alteration in the process of carbonisation by raising or lowering the temperatures or otherwise to produce a hard, firm fuel, would be entirely outside the scope of this patent.

ANDREW W. TAYLOR, F.C.S.

### THE QUALIFICATIONS OF SURVEYORS.

SIR,—I have recently read the inaugural address of the president of the Chemical, Metallurgical, and Mining Society of South Africa, which deals with the qualifications of a mine surveyor. In the paper, the requirements and duties are set forth at some length.

As in this country, the mine surveyor has to be certificated, but he is *not*, as is the case here, debarred from ever becoming a mine manager; the paper concluding as follows:—

"He (the surveyor) will, if ambitious, keep the mine manager's certificate, and the mine manager's position in view, and endeavour, by taking an active interest in and, if possible, participation in every phase of underground work, with a studious regard for the surface departments, qualify himself for taking control of a mine should it ever be his privilege to do so."

Comparing the prospects of a South African surveyor with those in the country, it would appear

that in this letter, also called attention to the fact that the patent.—Eps. C.G.

that his prospects are distinctly more rosy. As well as the higher salary he probably commands, he has the opportunity of qualifying himself to become a mine manager if he desires it. Although the requirements vary from those required for surveyors in this country, taking all things into account, the standard is not higher than that required here. The Home Office requires that the plans shall be accurate, and certified as such by the surveyor, and, without labouring the point, this requires a knowledge of the higher branches of surveying, *i.e.*, the use of instruments of precision, and also the ability to make the necessary computations for plotting surveys made with such instruments. It is the writer's opinion that the Home Office will not obtain men willing to undertake the necessary training to fulfil these requirements while the present disability of the surveyor to aspire to be a colliery manager remains in force.

Probably the highest salary a colliery surveyor can command is £4 a week, and it appears extremely unlikely that the man with the ability to become a good surveyor would be satisfied with this, when, by having pit experience as a "collier," "deputy," &c., he can aspire to a manager's position. It is also necessary, and I think every one will admit it, that the surveyor should have a good knowledge of the "principles of mining," and there is no doubt as to his interest in the management of the mine. Under these considerations, which are by no means all, I do not think the surveyor should be debarred from obtaining a manager's certificate, and eventually taking up such a position should he desire to do so.

SURVEYOR.

Sheffield, November 27, 1913.

**The Kent Coalfield.**—Within the last two or three weeks several new companies have made their appearance in the Kent coalfield. The latest is a private company known as the Valley Boring Syndicate, with a capital of £25,125. The signatories to the memorandum of association are Messrs. H. A. Saunders, T. B. Springett and T. Greaves, all of Chesterfield. The first-named gentleman is the solicitor to the Stonehall and Adisham colliery companies, who recently acquired areas from the Kent Coal Concessions Company. The following undertakings are now engaged in winning coal in Kent: The Kent Coal Concessions, South-eastern Coalfield Extension, Extended Extension, Deal and Walmer Coalfield, East Kent Colliery Company, Snowdown Colliery, Guilford Syndicate, Wingham and Stour Valley Colliery Company, Anglo-Westphalian Kent Coalfield, Anglo-Westphalian (Chislet) Colliery, Betteshanger Syndicate, Ebbsfleet Syndicate, Whitstable and Canterbury Coalfields, Kent Collieries, Stonehall Colliery Company, Adisham Colliery Company, Channel Collieries Trust, Canterbury Coal Company and the new company mentioned above. The Kent Coal Concessions have sold two areas to the Stonehall and Adisham colliery companies, while negotiations are in progress for selling an area at Eythorne to a Continental iron and steel-making company. The Anglo-Westphalian Company are putting down borings at Chislet, Rushbourne, Surry and Reculver; the Betteshanger Syndicate propose to sink two collieries on the Betteshanger estate, near Deal; the Ebbsfleet Syndicate propose to start a colliery in the Lydden Valley, North Deal; and the Whitstable and Canterbury Coalfield have not yet put down their borings. Within a few weeks of the publication of particulars of the Anglo-Westphalian (Chislet) Colliery comes the announcement that Messrs. Dorman, Long and Co., of Middlesbrough, have taken a considerable interest in the Channel Collieries Trust, and it is stated that a boring to prove the iron ore is already being sunk to the east of Dover. The Anglo-Westphalian Company have already selected the site for their colliery, this being upon land belonging to the Ecclesiastical Commissioners, near Chislet Park. Satisfactory progress is being made at the Tilmanstone and Snowdown collieries, where the output of coal continues on the increase as the faces are opened out. These collieries are each winding over 1,500 tons of coal per week, which finds a very ready sale. At Snowdown, No. 2 pit has been carried down below 1,635 ft., while No. 3 has gone beyond 1,818 ft. An 18 in. seam which was passed through a fortnight or so ago, has been tested and found to be superior to the Beresford seam, being much harder and of higher quality. It is anticipated that a good seam of 3 to 4 feet in thickness will be met before the sinking reaches 1,900 ft.; in fact, according to the boring, it is considered that this will be met with between 1866 and 1,876 feet. The surface equipment at Stonehall Colliery, near Dover, is in an advanced state, and sinking has recently commenced. Work is being carried out by the East Kent Light Railways, which lines are connecting up all the collieries and proposed collieries, as well as the villages in the district. At a meeting last week it was pointed out that practically four-fifths of the coal from the Kent coalfield must be carried over this line. The shareholders of the Medway Coal Exploration Syndicate will meet in London on January 6, 1914, for the purpose of having an account laid before them showing the manner in which the winding up has been conducted and the property of the company disposed of.

### THE UTILISATION OF FUEL.

Mr. JOHN W. COBB, B.Sc., F.I.C., Livesey Professor of Coal-Gas and Fuel Industries in the University of Leeds has delivered four of his series of lectures at the Armstrong College, Newcastle, on "The Utilisation of Fuel." These lectures, which have been arranged by the Newcastle section of the Society of Chemical Industry and the Armstrong College, continue to attract large audiences, drawn from all parts of Northumberland and Durham.

In his third lecture Prof. Cobb dealt with the making and distribution of gaseous fuels, the choice of coal, gas-producer construction and working, Mond gas and distribution. He reminded his hearers that, in gas-producer practice, they were not dealing with pure carbon, and that the first action that the coal underwent was distillation. The amount of clinker permissible would depend upon the sort of service to which the producer was to be put. The nature and quantity of ash were both of importance in determining how much steam it was necessary to use in order to prevent clinking. There were some cases—but they were very rare—in which the fusibility of the ash was a positive advantage. For ordinary producer work, however, they might take it as a general rule that what was wanted was to prevent clinking. The tendency to clinker depended a great deal upon the fusibility of the ash. One of the most prominent constituents in the ash in producing fusibility was lime. The amount of ash in coal from the same colliery, from the same sort of coal, was greater when the small coal, particularly dust passing a  $\frac{1}{2}$  in. sieve, was considerable. The extent of that difference was often overlooked. It was a difference, according to some experiments he had conducted, of as much as from 3.8 to 22.5 per cent., with coal passing a 1 in. sieve and dust passing a  $\frac{1}{2}$  in. sieve respectively. A nut coal was much less likely to give clinker trouble in a producer than was slack. It had also the advantage of having a suitable physical structure. Larger coal did not offer a suitable surface, and the channels between the lumps of coal were too large. Coal with a very large proportion of dust in it was also disadvantageous. When it lay together in a producer, it was likely to form a sort of impenetrable mass, particularly when it was a little bit coked. The distribution of the current of gas in the producers, under such circumstances, was not likely to be regular. What did happen was, that the blast began to rise and the small stuff to channel, and that entailed the same sort of burning on the top of the producer as was the case when the coal was too large. That explained why the output of gas from a slag was lower than when nuts or round coals were used. A high rate of working also tended to increase clinking. One result of an accumulation of gas was to raise the combustion zone. It was for that reason that a fairly deep bed of fuel was easier to keep in good working order than a shallow one. The trouble in producer practice was with the stage when the ash fused to some extent, but did not oblige the gas manager by running liquid on the bars and clearing itself away. With a careful choice of fuel, clinking troubles could be minimised, but he laid it down as an axiom that it was impossible to establish a rigid rule as to what steam was permissible in producer practice without consideration of all the conditions. Mechanical arrangements for the removal of the ash were particularly necessary when dealing with low grades of fuel which were used sometimes primarily for the ammonia which could be recovered from them. It was to be remembered that a average bituminous coal contained between 1.3 and 1.4 per cent. of nitrogen. If all that could be recovered as ammonia in the form of ammonium sulphate at about £12 per ton, that would be worth a great deal. That fascinating possibility had never been realised, but a great step towards it was taken many years ago by Dr. Mond in the construction and working of the Mond gas plant, the principle of working which was mainly the use of a large quantity of steam. The result was low temperatures in the producer and the descending coal was practically distilled at low temperatures in a current of steam and in nitrogen. It could be proved that if a coal were so distilled in a current of steam and nitrogen a large proportion of the nitrogen could be recovered, as ammonia, and that distillation process did take place in the Mond producer.

Prof. Cobb's fourth lecture dealt with radiation, conduction and convection and their significance for furnace construction and use, and with steam-raising by coal, waste heat and gas. In the course of the lecture, he exhibited the instructive results of a test of a boiler—that of Messrs. Babcock and Wilcox—which gave a great total of efficiency. He also described the Bettington boiler. Whatever should be the ultimate fate of that boiler, it was an exceedingly interesting way of utilising coal in a very efficient manner, and very high efficiency was claimed for it.

The fifth and final lecture, fixed for December 15, will deal with the principles of the construction and use of regenerative and recuperative furnaces, surface combustion, the use of high-grade gas at normal and high pressures, and electrical heating.

At a meeting of the Horwich (Lancs) District Council, held recently it was reported that an agreement had been made with Mr. Mason, of the Montcliffe Colliery, that the council should take the whole of the water from Montcliffe Colliery, the price to be paid being at the rate of 5d. per 1,000 gallons.



## MINE MANAGERS' EXAMINATIONS.

We have received from the Secretary to the Board of Examinations copies of the questions set at the examination for certificates of competency as managers and under-managers of mines and for certificates of qualification as surveyors of mines, which was held by the Board on November 25 and 26 at Edinburgh, Newcastle, Sheffield, Wigan, Cardiff and Birmingham.

The text of the papers is given below:—

(The figures in brackets against each question indicate the maximum number of marks obtainable.)

## For First-class (Managers') Certificate.

## SUBJECT No. 1.—Winning and Working.

(Six questions only to be answered: No. 5 is compulsory.)

1. Describe how coalseams have been formed.

How do you account for the great variation in the inclination of the seams, and why do some seams crop out on the surface? (40)

2. An upcast shaft at which no winding is done is 13 ft. diameter, and it is decided to widen it to 20 ft. diameter. Explain fully how you would do this, the ventilation to be carried on as usual. (40)

3. Describe the different methods with which you are acquainted of putting down a borehole from the surface, starting at 10 in. diameter and going down to a depth of 300 yards. (40)

4. A new coalfield is to be developed. State the various circumstances which have to be considered, both above and below ground, before determining the most suitable part of the estate in which to sink the shafts. (40)

5. In a coalfield 2,000 yards square the seams dip 1 in 5 to the south; two shafts are sunk in the centre of the northerly part of the coalfield. The seam to be worked is 4 ft. thick. Coal is wound at the downcast shaft only, from a mouthing or landing 40 yards below the seam. Lay out the workings with the object of getting 1,000 tons of coal per shift of eight hours, showing all the main roads, and state approximately how many men would be employed in each district. (50)

6. Draw a sketch showing how you would lay out the pit bottom in order to deal with the output mentioned in the preceding question. (40)

7. Sketch:—(a) A longwall face showing methods of timbering, the packing (stowing or building) and the necessary drawing roads. Give full details. (b) A small district of pillar-and-stall working. Under what conditions would you adopt the latter system? Describe the section of each seam, including roof and floor. (40)

## SUBJECT No. 2.—Theory and Practice of Ventilation.

(Six questions only to be answered: No. 7 is compulsory.)

1. Given two adjoining shafts 600 yards deep, the average temperature in one being 60 degs. Fahr., that in the other 70 degs. Fahr., and the average weight of a cubic foot of air in the former 0.078 lb.; calculate the average weight of a cubic foot of air in the warmer shaft and the height of water-gauge corresponding to the difference in pressure. (30)

2. Describe and sketch an apparatus for testing safety lamps in an explosive current of gas and air. (30)

3. Ascertain, by means of the following formula, the equivalent orifice of a mine in which a volume of 250,000 cubic feet of air is passing per minute with a water-gauge of 4 in., viz:—

$$a = \frac{q}{0.65 \sqrt{2gh}}$$

in which  $a$  is the equivalent orifice in square feet;  $q$ , the volume of air per second in cubic feet;  $h$ , the height of a column of air (weighing, say, 0.079 lb. per cubic foot), which corresponds to the height of the water-gauge; 0.65, the coefficient of the vena contracta; and  $g$ , 32.2. (30)

4. (a) Sketch, in plan and elevation, and describe the construction of, a single-inlet Capell fan, showing the position of the vanes by means of a sectional side elevation at right angles to the axis of the shaft. (b) If a ventilator of this description produces a water-gauge of 3 in. when making 100 revolutions per minute, what will be the water-gauge at 150 revolutions per minute? (30)

5. Under what various circumstances is a cavity in the roof of a mine, in which the strata above the seam give off firedamp, likely to contain explosive gas, although free from it under normal conditions? (30)

6. If a fan engine is developing 60 indicated horse power in drawing 130,000 cubic feet of air per minute through a mine with a water-gauge of 2 in., what is the combined efficiency of the engine and fan? (30)

7. Sketch a plan showing an upcast and downcast shaft; levels extending in opposite directions to about the same distance on each side of the shafts; an area of longwall workings like a semi-circle on the rise side of the levels, with the shafts as its centre; the intake and return airways necessary to ventilate the working places with two separate splits of air; two air-crossings; and as few doors as possible. (50)

## SUBJECT No. 3.—Explosions in Mines, Underground Fires, and Inundations.

(Five questions only to be answered: No. 1 is compulsory.)

1. Which, in your opinion, is the best method of rendering coal dust harmless? Give your reasons. How would you conclude that the necessary degree of safety had been reached, and how would you maintain it? (30)

2. In the event of an explosion, what appliances and stores should be immediately available for rescue work and re-opening? What outside assistance would you call for, and how would you organise the operations? (25)

3. A large underground fire gets beyond control in a pit yielding firedamp. Describe a quick and efficient method of closing the pit shafts at the surface. Also what means you would afterwards adopt to obtain evidence as to the progress or the extinction of the fire, and what conditions would indicate the possibility of safely re-opening? (25)

4. During rescue work after an explosion, men have been found alive but unconscious some distance in the workings, by a rescue team wearing breathing apparatus. What should the team do for the further safety and removal of the men? (25)

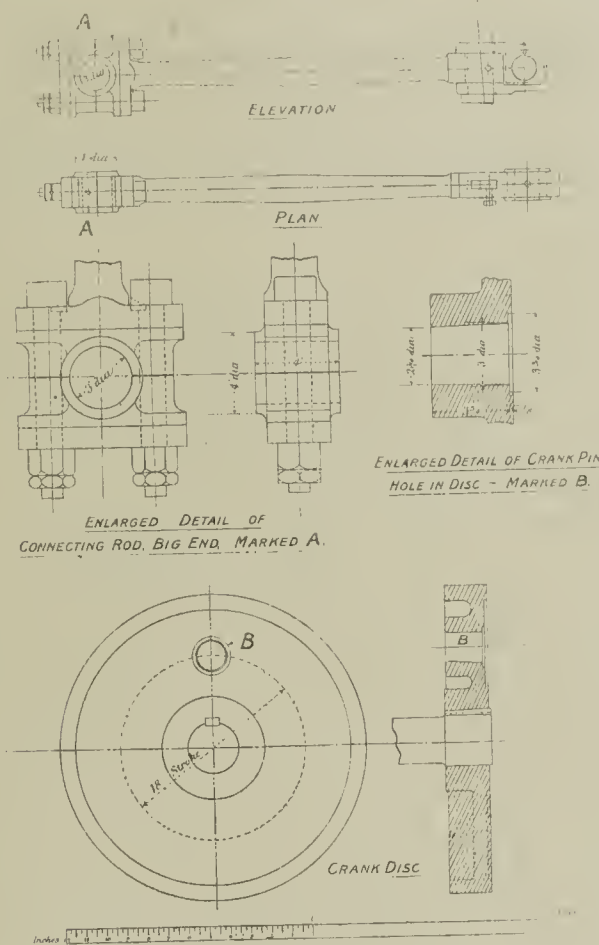
5. In cases of gob fire under various conditions, which you may assume and state for the purpose of your answer, what circumstances would affect your decision as to whether or not to withdraw the workmen? (25)

6. In sinking a pit from the surface which is to pass through the old workings of a seam which had formerly been abandoned, and partially flooded on account of fire, what dangers would you anticipate, and what precautions would you take? (25)

## SUBJECT No. 4.—Machinery.

(Five questions only to be answered: No. 5 is compulsory.)

1. The drawings herewith show the big end of a connecting rod and an engine-disc crank. Make in your answer book a drawing (side elevation) of a crank-pin



SKETCH ACCOMPANYING QUESTION No. 1.  
(Scale reduced.)

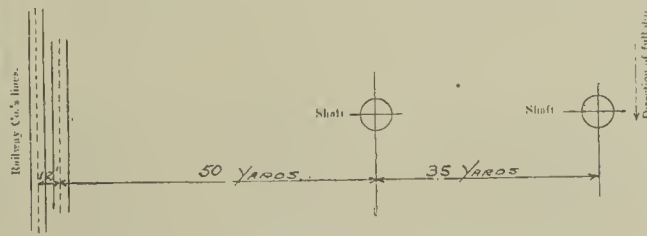
suitable for the connecting rod and crank, filling in all necessary dimensions. The drawing need not be to scale. How would the crank-pin be placed in, and secured to, the crank? (28)

2. What kind of cages would you instal and what onsetting and banking arrangements (at bottom and top respectively) would you make to raise 1,000 tons of coal per shift of seven and a-half hours through a shaft 14 ft. diameter in the clear, 500 yards deep, using trams carrying about 10 cwt. of coal? Candidates accustomed to rectangular shafts may assume a shaft 14 ft. x 10 ft. in the clear. (28)

3. State what kind of pump you would instal for performing the following services, describing very briefly the features of each type, and giving, also briefly, your reasons for choosing the type:—(a) For extracting air and water from a surface condenser. (b) For feeding a range of 10 Lancashire boilers. (c) For keeping a shaft bottom dry for the sinkers with an income of water of 400 gallons per minute at a depth of 300 yards. (28)

4. Describe the processes of welding and of hardening or tempering. Name one metal that can be hardened but not welded, one metal that can be welded but not hardened, and one metal that can neither be welded nor hardened. (28)

5. Two shafts are sunk, as shown in sketch below, in relation to the dip of the seam and the railway. It is intended to wind 1,600 tons per day from one shaft, and to use the other for the men to ride in. The shafts are 300 yards deep. Repeat the sketch in your answer book,



PLAN ACCOMPANYING QUESTION No. 5.  
(Scale reduced.)

and show by sketching where you would place your winding engines, boilers, screening, picking, and loading plant, sidings, fan plant, power-house, and workshops.

6. Set out, but do not enlarge upon, the differences that you know of between three-phase alternating electric current and continuous electric current. If you are generating electric power at one colliery and have to take it to another colliery some 12 miles away, which type of electric power would you instal? At what pressure would you transmit the current? Give reasons for your answers. (28)

## SUBJECT No. 5.—Surveying, Levelling and Drawing.

(Five questions only to be answered. Candidates for surveyors' certificates must answer question 6.)

1. How is the terrestrial meridian, or line of true north, marked on the Ordnance Survey maps? How would you lay down the magnetic meridian of your mining compass on one of these maps; and what sources of error are involved in doing so? (25)

Distance.	Back sight.	Inter-mediate.	Fore-sight.	Remarks.
0	5'40	...	...	Floor of road at A.
50	...	3'30	...	" "
100	...	...	1'40	" "
150	2'20	2'20	...	" "
200	...	4'20	...	" "
250	...	...	6'20	" at B.

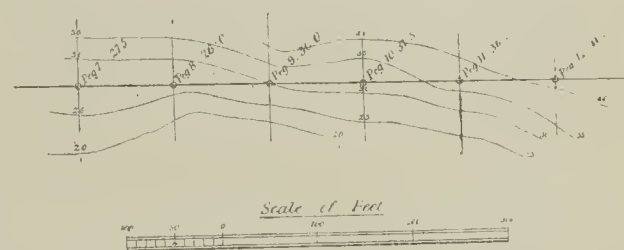
Transfer the above notes of levelling in an unused notebook to your answer book. Reduce the level to a datum 10 ft. under the floor of the roadway at A. Plot a section from A to B on a scale of 1 in. to 100 ft. for horizontals, and 1 in. to 10 ft. for verticals of section. Calculate the quantity of ripping necessary to make the roadway of one grade from A to B if the ripping be 6 ft. in width. What will then be the gradient, if any, from A to B? (25)

3. Calculate the length of a cross measures drift, or cross-cut mine, between two seams, 50 yards apart vertically from the floor of the upper seam to the roof of the lower and dipping at 1 in 5: (a) If the drift, or mine, be level; (b) if it rise 1 in 10 towards the dip of the seams; (c) if it dip 1 in 3 in the same direction as the seams. Check your results by measurement from an outline section drawn to a scale of 1 in. to 100 ft. (25)

4. What is a vernier? Construct a barometer scale to read tenths of an inch (show 1 in. in length only), and a vernier scale to measure hundredths of an inch. Draw these scales on the opposite sides of a single line with the vernier scale in such a position that the reading is 29.55 in. (25)

5. How would you measure a line accurately over steep and rough ground? A survey line crosses a deep ravine; how would you check the measurement across the ravine, (a) using surveying instruments, (b) by the method of similar triangles? Illustrate your answer by sketches. (25)

6. The accompanying plan, scale 1 in. to 100 ft., shows the centre line of a colliery railway from peg 7 to peg 12, the level of the surface of the ground at each peg, and the contours of the ground adjoining. The formation level of the railway at peg 7 is 20.00, and the gradient is a rise of 1 in 100 towards peg 12. Plot a longitudinal section from peg 7 to peg 12 on a scale of 1 in. to 100 ft. for horizontals,



PLAN ACCOMPANYING QUESTION No. 6.  
(Scale reduced.)

and 1 in. to 10 ft. for verticals of section. Show the formation level and mark the depth of cutting at each peg. Plot cross-sections to a scale of 1 in. to 10 ft. at pegs 9, 10 and 11, and calculate from these cross-sections the cutting in cubic yards between pegs 9 and 11, taking the width on formation level at 14 ft. and the slopes at 1 vertical to 1½ horizontal. (40)

## SUBJECT No. 6.—General Management and Mining Legislation.

(Five questions only to be answered: No. 1 is compulsory.)

1. Describe, in general terms, any mine with which you are acquainted, stating the thickness and inclination of the seams worked; their depths from the surface, and the nature of the roof or overlying stone, the system or systems of working; the presence of gas or water; and how is the official underground staff organised. (30)

2. What are the regulations under the Coal Mines Act, 1911, as to the raising and lowering of workmen day by day or in emergency? (25)

3. What are the regulations as to preparing and keeping colliery plans of underground workings? (25)

4. State the general stipulations concerning the storing and treatment of explosives at and in the mine. (25)

5. What methods are to be adopted for the prevention of the deposit of coal dust? (25)

6. What are the regulations concerning winding ropes and the recapping thereof, and the margin of safety required? (25)

**Hudson and Kearns' Blotting Pad Diaries.**—Once again Messrs. Hudson and Kearns Limited (Hatfield-street Works, Stamford-street, E.C.) have favoured us with specimens of their admirable register date indicating blotting pads. There are diaries for all purses, but special attention may be drawn to Nos. 8 and 8a; the former, which costs 6s., comprises blotting pad, tablet for standing memos, tear-off memorandum slip, tear-off date slip and interleaved diary; the latter, which costs 7s., is rather larger. An *édition de luxe* is the "bankers' edition," the price of which is 8s. Two useful specimens of rather smaller pattern are No. 6 (3s.) and No. 4 (4s. 6d.). We know of nothing of their kind to equal these diaries.

**Contravention of the Eight Hours' Act.**—At Hamilton, on the 13th inst., before Sheriff Shennan, seven miners employed at Greenfield Colliery, belonging to Archibald Russell Limited, were charged with having been below ground on October 6 for the purposes of their work, and of going to and from their work for more than eight hours. Separate complaints had been served on the accused, who all pleaded not guilty, and the first case was taken as a test one. The Fiscal remarked that this was the first of the kind in the district, although similar cases had been heard elsewhere. The defence pleaded section 1 (subsection 2) of the Act, where a contravention was not deemed to have taken place if workmen were below ground dealing with any emergency or work not completed through unforeseen circumstances which required to be dealt with without interruption in order to avoid serious interference with the ordinary work of the pit, and on this occasion a stoppage had occurred owing to a breakdown of the machinery attached to the haulage engine. The sheriff, in a judgment, held that "serious interference to the ordinary work of the pit" had not been proved. In the circumstances, he imposed the nominal fine of 1s. Other five of the accused were also fined 1s., and the sixth (a boy under 16 years of age) was dismissed with an admonition.



## THE COAL AND IRON TRADES.

THURSDAY, DECEMBER 4.

Scotland.—Western District.  
COAL.

The coal trade of the west of Scotland continues in a satisfactory position. All classes of coal are in good demand notwithstanding an upward tendency in prices. Ell coals are particularly active, and the demand for splint is undiminished. Navigations are full up for some weeks ahead, and prices are very firm. Smalls are somewhat easier, and a shade lower than last week, while doubles and singles are in better demand. The total shipments amount to 119,194 tons against 82,195 in the preceding week, and 87,212 tons in the corresponding week of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/3 to 13/9	13/3 to 13/6
Splint .....	13/ to 16/6	13/3 to 16/6
Treble nuts .....	13/ to 13/3	13/3 to 13/6
Double do. ....	12/3 to 12/6	12/ to 12/6
Single do. ....	10/9 to 11/	10/6 to 11/

## IRON.

Although there has not been any increase in business in the Glasgow pig iron warrant market, prices are 10½d. per ton in advance of last week. Cleveland iron closed at 49s. 6d. per ton cash. There are now 75 furnaces in blast in Scotland compared with 78 in the preceding week, and 89 in the corresponding week of last year. Monkland is quoted f.a.s. at Glasgow, No. 1, 64s., No. 3, 62s. 6d.; Govan, No. 1, 63s., No. 3, 61s. 6d.; Cambroë, No. 1, 69s., No. 3, 65s.; Clyde, No. 1, 70s. 6d., No. 3, 65s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 71s., Nos. 3, 66s.; Glengarnock, at Ardrossan, No. 1, 72s., No. 3, 67s.; Eglinton, at Ardrossan or Troon, No. 1, 65s., No. 3, 64s.; Dalmellington, at Ayr, No. 1, 66s. 6d., No. 3, 64s. 6d.; Shotts at Leith, No. 1, 71s., No. 3, 66s.; Carron at Grangemouth, No. 1, 73s., No. 3, 68s. per ton. Scotch hematite is quoted 64s. per ton for west of Scotland delivery. The furnaces at the Cambroë ironworks belonging to Messrs. Merry and Cunningham have been closed down, and the fact that they have been blown off makes the outlook in the Coatbridge district very gloomy, as it will be at least three months before work can be restarted.

## Scotland.—Eastern District.

## COAL.

The coal trade in the Lothians shows considerable improvement. All large coals are being well taken up and prices are well maintained. In smalls, trebles and doubles are in much the same position, but singles are commanding more attention and prices have firmed up. At Grangemouth 44,370 tons were shipped, Granton 9,503, Leith 33,900, and Bo'ness 12,453 tons—total 100,074 tons, compared with 103,471 in the previous week and 90,129 tons in the corresponding week of last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal .....	13/ to 13/9	13/6 to 13/9
Secondary qualities .....	12/ to 12/6	12/ to 12/6
Treble nuts .....	13/6 to 13/9	13/9 to 14/
Double do. ....	12/3 to 12/9	12/3 to 12/9
Single do. ....	10/9 to 11/	10/6 to 11/

The Fife coal trade, which was somewhat depressed last week on account of the delay of steamers, owing to heavy weather, is now (on the arrival of a considerable number of steamers) in its normal state of activity. All classes of round coal are in heavy demand and the position of trebles, doubles and singles is considerably better. Shipments are comparatively heavy and amount to 116,499 tons, compared with 94,456 in the preceding week and 89,459 tons in the corresponding week of last year. Prices generally are firmly maintained.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	16/9	16/9
Unscreened do. ....	14/9	14/9
First-class steam coal .....	12/6 to 13/3	12/9 to 13/3
Third-class do. ....	10/9 to 11/3	10/9 to 11/3
Treble nuts .....	13/ to 13/6	13/ to 13/6
Double do. ....	11/9 to 12/	12/
Single do. ....	10/3 to 10/9	10/ to 10/6

The aggregate shipments from Scottish ports amounted to 335,767 tons, compared with 280,122 in the previous week and 266,800 tons in the corresponding week of last year.

## Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

## COAL.

During last week 136,452 tons of coal and 492 tons of coke were despatched from Tyne Dock, a decrease of 9,967 tons of coal and 822 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearance amounted to 48,482 tons of coal and 2,377 tons of coke, a decrease of 1,591 tons of coal and 590 tons of coke. Shipments aggregated 90,426 tons of coal and 3,049 tons of coke, a decrease of 7,987 tons. Fuller details of the Swedish State Railways' contracts for shipment from January to March

indicate that the whole order, with the exception of 10,000 tons, has come to this district. The local allotments are as follow:—Stockholm 20,000 tons, 17s. 11½d. per ton c.i.f., Lambton basis; Norrköping 18,000 tons, 18s. 2½d. c.i.f., Lambton basis; Malmö 14,000 tons, 17s. 7½d., Lambton basis; Gothenburg 30,000 tons, 17s. 7d., Lambton basis; Halmstadt 4,000 tons, 18s., Lambton basis; and Helsingborg 9,000 tons, 17s. 4½d., D.C.B. basis. Options of D.C.B.'s are given in respect of several of the Lambton lots. The business has been largely secured by Swedish merchants, only one or two of the orders having come direct to Newcastle. The prices have been the subject of a good deal of adverse criticism—being regarded as based evidently on very low notions as to selling values and freights. In view of the wonderfully and persistently firm condition of the market it is remarkable that such low prices, clearly of a very speculative character, should have been tendered. It is stated that the North-Eastern Railway Company has now renewed contracts with Northumbrian and Durham collieries for the supply of over 350,000 tons of steam coals to the northern division over next year. The contract prices are stated to be from 1s. to 1s. 9d. per ton, according to quality, below those for similar business for the expiring year. There still remain 150,000 tons to be contracted for for the northern division. A large quantity of best Blyth steams is stated to have been sold at 18s. per ton f.o.b. for delivery over next year. A small cargo—2,000 tons—of D.C.B. smalls for January shipment is said to have realised 6s. 6d. f.o.b. A considerable quantity of Tyne gas primes for March delivery has been sold at 14s. 4½d. per ton f.o.b. Some 12,000 tons of good Durham ordinary unscreened bunkers have been sold for January delivery at 12s. 7½d. f.o.b., whilst 12,000 tons of superior sorts for delivery over all 1914 have realised 12s. 6d. f.o.b. Parcels of Tyne gas primes on passage to Genoa have been sold at 2½s. 6d. per ton c.i.f., and several cargoes for December delivery at 23s. 4½d., with one of 3,000 tons at 23s. 6d. Three cargoes have also been sold for January-March shipment to Genoa at 14s. 1½d. f.o.b. The Portuguese Railways have received tenders of their required supplies of coking coal for delivery over a portion of next year. The local coal market is in a very healthy condition at present. At the moment strong and long-continued westerly winds are delaying tonnage to some extent, and rendering the supply of spot coals rather more ample. Apart from this, however, there is rather a squeeze for supplies, and other positions are very well maintained. There has been some little perturbation as to the possible result of the ballot which the Northumberland miners took this week on the question of tendering 14 days' notice, and, if necessary, striking to secure the abolition of the three-shift system, which operates at 16 collieries in the county. The result of the ballot is not yet known, but returns from a large number of collieries have been published, and indicate that the requisite two-thirds majority in favour of a stoppage will not be forthcoming. It is, indeed, doubtful whether there will be even a simple majority in favour of tendering notices. F.o.b. quotations for prompt shipment have varied as follow on the week:—Best steams, Blyths, are 3d. dearer; Blyth smalls, similarly advanced; special smalls, 3d. to 6d. reduced; gas bests, firmer; unscreened bunkers, Durhams, 3d. to 6d. improved; coking smalls, 3d. reduced; households, 6d. increased; and foundry coke, 1s. higher. Other descriptions of fuel are unaltered.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	14/9 to 15/	14/9
Do. Tyne (Bowers, &c.) .....	14/9 to 15/	14/9 to 15/
Secondary, Blyths .....	12/6	12/6
Do. Tyne (Hastings or West Hartleys) .....	12/6 to 13/	12/6 to 13/
Unscreened .....	11/ to 12/	11/ to 12/
Small, Blyths .....	7/6 to 7/9	7/6
Do. Tyne .....	6/6	6/6
Do. specials .....	8/ to 8/6	8/6 to 8/9
Other sorts:—		
Smithies .....	13/6	13/6
Best gas coals (New Pelton or Holmside) ...	15/6	15/3 to 15/6
Secondary gas coals (Pelaw Main or similar) .....	13/6 to 14/	13/6 to 14/
Special gas coals .....	15/6 to 16/	15/6 to 16/
Unscreened bunkers, Durhams .....	13/3 to 14/3	12/9 to 14/
Do. do. Northumbrians .....	10/6 to 11/6	10/6 to 11/6
Coking coals .....	13/3 to 13/9	13/3 to 13/9
Do. smalls .....	12/ to 12/3	12/ to 12/6
House coals .....	15/6 to 16/	15/6
Coke, foundry .....	21/ to 23/	21/ to 22/
Do. blast-furnace .....	19/ to 20/	19/ to 20/
Do. gas .....	16/ to 17/3	16/ to 17/3

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 110,305 tons of coal and 845 tons of coke, as compared with 108,195 tons of coal and 500 tons of coke for the corresponding period of 1912, being an increase of 2,110 tons of coal and 345 tons of coke. The coal market during the past few days has displayed a firmer tone, and with more pressure for December shipment together with loading turns difficult to arrange, holders are asking higher prices for practically all descriptions of coal. The enquiry is extending into January; thus, while the outlook for forward delivery is brighter the trend of the market is towards an advance in prices. Gas coals are very steady. Coking qualities continue strong. Bunkers are a strong feature on the market, commanding higher prices. Households are without change, coke is firm. The Swedish State Railways have now accepted tenders for the following shipments:—January to March, Stockholm, 20,000 tons Lambton at 17s. 11½d. option D.C.B. 18s. c.i.f.; Norrköping, 18,000 tons Lambton, 18s. 2½d. c.i.f.; Gothenburg, 30,000 tons Lambton, 17s. 11d. c.i.f.; Malmö, 14,000 tons Lambton, Hetton or Horden basis, 17s. 7½d. c.i.f. option D.C.B. at 17s. 3d.; Halmstadt, 4,000 tons Lambton or Horden option D.C.B. 17s. 8d. c.i.f.; and for Helsingborg, 9,000 tons of Lambton at 17s. 8d. option D.C.B. 17s. 4½d. c.i.f. It is reported a contract has been effected for 150,000 tons of South Durham bunkers at 12s. 6d. to 13s. f.o.b. Tyne Dock delivery over 1914. Current quotations are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/6
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	17/6	17/
Ordinary do. ....	16/6	16/6
Other sorts:—		
Lambton screened .....	15/6	15/6
South Hetton do. ....	15/3	15/3
Lambton unscreened .....	13/9	13/9
South Hetton do. ....	13/6	13/9
Do. treble nuts .....	16/9	16/6
Coking coals unscreened ..	13/3	13/
Do. smalls .....	13/	12/6
Smithies .....	16/	15/9
Peas and nuts .....	16/6	16/6
Best bunkers .....	14/6	14/
Ordinary bunkers ..	13/9	13/6
Coke:—		
Foundry coke .....	22/	21/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	20/	19/6 to 20/
Gas coke .....	17/6	17/

The outward freight market has been fairly active but rates are on the easy side. Recent fixtures include:—Coasting: London 3s. 3d., Rotterdam 3s. 9d., Rouen 4s. 9d., Fecamp 5s. 6d., Hamburg 3s. 9d., Calais 4s. 6d., Antwerp 4s. 7½d. Bay: Bordeaux 5s. 6½d., St. Nazaire 5s. 6d., Nantes 5s. 7d., Lisbon 6s. 4½d. Baltic: Kiel 5s. 3d., Lubeck 4s. 10½d., Königsberg 4s. 9d., Elsinore 5s. 3d., Christiania 5s. 3d. Mediterranean: Marseilles 8s., Leghorn 8s., Genoa 7s. 9d., Naples 8s. 3d., Palermo 9s., Malta 6s. 9d., Venice 9s., Port Said 8s. 1½d., Alexandria 8s. 9d., Las Palmas 8s. 3d., Constantinople 9s. 3d., Odessa 9s., Nicolaieff 10s. 6d.

## Middlesbrough-on-Teesside.

## COAL.

The fuel market continues very strong. With the position for this month well assured, traders are now discussing next year's business, but up to the present negotiations on forward account do not appear to have got beyond the enquiry stage. Deliveries of gas coal are now at their heaviest. Best Durham gas coal is 15s. 3d. to 15s. 6d., seconds 13s. 4½d. to 14s., and specials up to 16s. Bunker coal keeps firm. The rather heavy demand is met by an ample supply. Ordinary Durham bunkers are 12s. 10½d. to 13s. f.o.b., superior kinds 13s. 6d. to 14s., and specials 14s. 6d. to 15s. Household coal is steady and firm at 15s. 6d. to 15s. 9d. Coking coal is in good request and prices vary from 13s. to 14s. There is continued scarcity of coke and those who are necessitated to purchase for local consumption are having to pay high prices. Average blastfurnace qualities are fully 18s. 6d. delivered at Teesside works, and as much as 19s. has been realised. Foundry coke for shipment is round about 22s. 6d. f.o.b.; gashouse coke is put at 17s. 9d.

## IRON.

Shipments of pig iron from the Tees last month totalled 93,413 tons, as compared with 125,190 tons for the previous month and 90,196 tons for November last year. Of last month's despatches, 84,332 tons went from Middlesbrough and 9,081 tons from Skinningrove, all but 540 tons of the latter, which went to Holland, going to Scotland. Of the pig sent from Middlesbrough during November, 51,717 tons went to foreign ports and 32,615 tons to coastwise customers. As usual, Scotland was the largest receiver, taking 19,140 tons, whilst Germany received 10,771 tons, Wales 7,730 tons, Sweden 6,955 tons, Belgium 6,565 tons, Italy 5,602 tons, France 5,058 tons, Japan 4,665 tons, Norway 2,943 tons and Canada 2,191 tons. Of the 16,346 tons of manufactured iron shipped from the Tees in November, 9,988 tons went abroad and 6,358 tons coastwise, and of the 41,250 tons of steel cleared, 37,053 tons went foreign, and 4,197 tons coastwise. Once more India was the largest purchaser of both manufactured iron and steel, importing 7,512 tons of the former and 16,811 tons of the latter. Other principal receivers of steel were Argentina 6,237 tons, West Australia 5,386 tons, Canada 1,276 tons, the Straits 1,208 tons, and Cape Colony 1,001 tons. Quietness prevails in the pig iron market. Buyers are backward and prices are easy. With current rates unremunerative, producers talk of blowing out more furnaces, and, in fact, Messrs. Bell Brothers are reducing the output by next week putting a blastfurnace out of operation at their Clarence Ironworks. Producers of Cleveland pig iron report a few sales of No. 3 at prices varying from 50s. to 51s. for spring delivery, but merchants are prepared to do early business at a lower figure. Second hands quote No. 3 g.m.b. 49s. 6d. f.o.b., No. 1 52s., No. 4 foundry 49s., No. 4 forge 48s. 9d., and mottled and white iron each 48s. 6d., all for early delivery. East coast hematite pig is easy. The recent sales to Sheffield users have been at varying prices. One of the largest transactions, it is understood, was at equal to 60s. 3d. for mixed numbers at Middlesbrough. The general market quotation now for Nos. 1, 2 and 3 is 60s. for either early or forward delivery. So far as can be ascertained, there is nothing passing in foreign ore and, in the absence of transactions, sellers still base quotations nominally on 19s. ex-ship Tees for best rubio. In the manufactured iron and steel trades, orders come in slowly. Steel ship plates are down to £6 10s. and steel ship angles to £6 2s. 6d.

## South-West Lancashire.

## COAL.

Notwithstanding the mild weather the demand for household coals appears to be sufficient to clear the sidings daily, although there is no pressure except for one or two particular grades. Only moderate quantities of screened coal go into consumption for forge and manufacturing purposes. Bunker fuel is only in quiet request. The quantity being taken on contract account is not heavy, while there is not much outside enquiry. For the few orders on the market there is keen competition, and in some cases prices are being cut. Nominally prices of Lancashire steam coal remain about the same as last week, viz., 13s. to 13s. 3d. for ordinary qualities, up to 13s. 9d. f.o.b. for the very best descriptions, although as indicated less prices are being taken for spot lots. There is a very satisfactory quantity of fuel moving



for the coastwise and cross channel trade except as regards Dublin. In slacks a little here and there is going into stock, but it is a trifling percentage on the output, which is now at its maximum.

Prices at pit (except where otherwise stated).

Houise coal:—	Current prices.	Last week's prices.
Best .....	17/	17/
Do. (f.o.b. Garston, net)	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net)	15/ to 15/6	15/ to 15/6
Kitchen.....	13/	13/
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal.....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/ to 13/9	13/ to 13/9
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

South Lancashire and Cheshire.  
COAL.

The Manchester Coal Exchange was well attended on Tuesday. Business generally is on the dull side, but there is a slightly better demand for house coal and prices are steady at list rates. Furnace coal, on the other hand, is poor, but there is a little improvement in shipping coal. Slack continues to move away in good quantities, but prices are not very steady and in cases cuts are made to clear loaded wagons. Below is the present list.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 14/	13/3 to 14/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington)	14/	14/
Best slack.....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

IRON.

One cannot say there is any trade to report about, and there is nothing to test the market. In the meantime, makers have reduced their prices in the hope they may induce customers to place orders. Good No. 3 pig can be bought at about 55s. The majority of the founders are none too busy, the only people who seem to be well off for orders are those who have specialities. The majority of the forges are working short time, and they have had to reduce the price of their commodities—the prices quoted being £7 5s. for Crown bars, £6 15s. for second quality and £7 17s. 6d. for hoops. Steelworks are suffering from foreign competition, the prices were reduced yesterday on various products by 10s., large bars are now quoted at £7, small sizes £6 15s., plates £6 10s., boiler plates £7 15s. The market at the moment appears to be bottomless.

Yorkshire and Derbyshire:

Leeds.

COAL.

The coal trade in the West Riding is on the whole quiet. There is some little improvement in the demand for house coal, and the pits have been able to work five days this week without materially adding to stocks. Steam coal is in good demand, but there is an over-production of manufacturing fuel, and slacks especially are very weak. Empty wagons have been scarce during the past few days, and there is also considerable delay to loaded traffic.

House Coal.—There is no improvement to report in the demand from London and the southern and eastern counties. Merchants appear to find contract deliveries quite as much as they can deal with, although concessions in price have been frequently offered. The very best qualities are relatively the strongest. There is a large quantity of cheap Silkstone house coal on offer for the distant markets. The coastwise trade is quite up to the average for the time of the year, but prices here again are slightly in buyers' favour. Freights are pretty much the same as last week, but there is a great scarcity of sailing vessels. In the local markets there is a slight improvement in the demand for the cheaper grades, but best sorts are neglected. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.;

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	14/6 to 15/	14/6 to 15/
Wallsend & London best	13/9 to 14/3	14/ to 14/6
Silkstone house .....	13/9 to 14/6	14/ to 14/6
Do. house .....	12/ to 12/6	12/ to 12/6
House nuts .....	11/6 to 12/3	11/6 to 12/
Prices f.o.b. Hull:		
Haigh Moor best.....	17/ to 18/	17/ to 18/
Silkstone best .....	16/ to 17/	16/ to 17/
Do. house .....	14/6 to 15/6	14/6 to 15/6
Other qualities.....	14/ to 14/6	14/ to 14/6
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 11/3	11/ to 11/6
Unscreened gas coal ...	10/ to 10/6	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	10/3 to 11/	10/3 to 11/
Large double-screened engine nuts .....	9/9 to 10/6	9/9 to 10/6
Small nuts .....	9/ to 9/3	9/ to 9/6
Rough unscreened engine coal .....	9/3 to 9/9	9/3 to 9/9
Best rough slacks .....	6/9 to 7/3	7/ to 7/6
Small do. ....	6/ to 6/6	6/ to 6/6
Coking slacks .....	6/ to 6/6	6/ to 6/6
Coke:—		
Price at ovens:		
Furnace coke .....	12/ to 12/6	12/ to 12/6

Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other qualities, 14s. to 15s. 6d.

Gas Coal.—The whole of the output is needed to satisfy contract demands. Open market business is consequently scarce. A few enquiries are circulating for quotations for next year, and these, so far as can be ascertained, are from 6d. to 1s. per ton below recent contract figures.

Manufacturing Fuel.—Washed fuel is generally fairly strong, but slacks, both rough and fine, are exceedingly plentiful. Stocks show no diminution on the week, while the consumption in the manufacturing districts is much below the average.

Washed Furnace Coke.—Prompt sales of washed patent oven coke are made at 12s. to 12s. 6d. per ton at the ovens, with forward business over the first three months of next year up to 13s. There is, however, no life in the demand as the iron and steel trades are feeling the effects of a serious depression. The putting-out of one or two additional furnaces has not improved the position of sellers of coke, and stocks are beginning to accumulate here and there.

Hull.

COAL.

There is some extra activity in the Humber coal trade, in view of the approach of Christmas. Exporters are anxious to get contracts cleared off in the next week or two and, with the best classes of steam coal scarce, second holders are able to command a good price for spot lots for immediate shipment. As much as 15s. 9d. was paid to-day for a lot of best South Yorkshire steam hards, besides which secondary sorts are all firmer on the week. Derbyshire and Nottingham steams are quietly steady at about 15s. for shipment at Grimsby or Immingham and slightly more at Hull. House and gas coal are in stronger demand. The forward market remains inactive under the strong "bear" influence, and something akin to a shock was experienced to-day when it was reported that the North-Eastern Railway Company had placed 350,000 tons of the half million required for the northern half of their system with Tyne firms, all prices showing a reduction of 1s. to 1s. 6d. and more per ton on the present contract prices. The company require also 500,000 tons for the southern half of their railway, but the outcome of negotiations in South Yorkshire has not yet been made known. The shipments at all the Humber ports to foreign countries continue large and on a very satisfactory scale. There has been very little doing in the freight market. Rates are easier all round, Baltic destinations being on the basis of 5s. 9d. to 6s. Riga-Mediterranean, 8s. Genoa and Black Sea ports, 9s. Odessa. The following are the approximate prices for prompt shipment f.o.b. Hull, &c.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards.....	15/9	15/
Washed double-screened nuts .....	13/6 to 13/9	13/ to 13/3
Unwashed double-screened nuts .....	12/9 to 13/	12/6 to 12/9
Washed single-screened nuts .....	12/9 to 13/	12/6 to 12/9
Unwashed single-screened nuts .....	12/6 to 13/	12/ to 12/6
Washed smalls.....	9/6 to 10/	10/ to 10/3
Unwashed smalls.....	9/ to 9/3	9/ to 9/3
West Yorkshire:—		
Hartleys .....	13/6	13/6
Rough slack .....	9/ to 9/3	9/ to 9/3
Pea slack .....	8/3 to 8/6	8/3 to 8/6
Best Silkstone screened gas coal .....	14/3	14/3
Best Silkstone unscreened gas coal .....	12/	12/
Derbyshire:—		
Best steam hards (Hull)	15/3	15/3
Do. (Grimsby) .....	15/	15/
Derbyshire nuts (doubles)	13/	13/
Derbyshire nuts (doubles) (Grimsby).....	12/9	12/9
Derbyshire large nuts ...	14/6	14/ to 14/6
Do. do. (Grimsby) .....	14/ to 14/3	14/
Nottinghamshire hards ...	15/3	15/3
Do. do. (Grimsby) .....	15/	15/

Barnsley.

COAL.

Generally speaking the position of the coal trade during the week has been of an inactive character, although the extent of business continues to be substantial considering the period of the year. Buyers are showing a decided belief that the market is of a weakening description, and their operations are being directed in anticipation of lower prices. The outlook is also suggestive of lower rates, and forward business continues to hang fire and more negotiations are being made than usual. The railway companies are evidently not going to be rushed in renewing their contracts, for which they have been asked to pay 1s. per ton advance, and it is already reported that fixtures have been completed for Derbyshire hards at 11s. 6d. per ton. The position in regard to the best Barnsley hards is rather different, inasmuch as the quantity of this class of fuel available is comparatively limited, and after the arrangement already reported with some of the trawler companies offering an advance of 1s. per ton it is expected that this will be also paid by the railway companies. On current account there continues to be a good deal of buying for Russia, but the representatives are only placing orders when they find prices approach their ideas, and no doubt arrangements have been made for a considerable tonnage of secondary classes of large steams at considerably less than scheduled quotations. Although the output is below the maximum there is no difficulty in obtaining ready supplies, and, if anything, prices of secondary qualities are slightly weaker. The business which has been done in manufacturing fuel is comparatively speaking of a quieter description, although buyers still take nuts very freely, and prices of this class of coal are about maintained, but slacks are still accumulating, and reduction in prices does not lead to their material reduction. On the whole, the enquiry for all classes of house coal is below expectation, and the public are still making more use of gas for heating purposes, and are showing economy to such an effect that the collieries are unable to clear their output, and stocks are

becoming considerable. The best class of coal is still rather neglected, and prices are hardly maintained. In respect to coke there is practically no change, and offers for forward supplies are receiving but little consideration.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone .....	15/6 to 16/	15/6 to 16/
Best Barnsley softs.....	15/ to 15/3	15/ to 15/3
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	13/ to 13/6	13/ to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/ to 12/3	12/ to 12/3
Secondary do. ....	11/	11/
Best washed nuts .....	11/ to 11/3	11/ to 11/3
Secondary do. ....	10/ to 10/6	10/ to 10/3
Best slack.....	7/	7/
Rough do.....	6/	6/
Gas coals:—		
Screened gas coals .....	12/6	12/6
Unscreened do. ....	11/ to 11/3	11/ to 11/3
Gas nuts .....	12/	12/
Furnace coke .....	12/	12/

Chesterfield.

COAL.

The demand for house coal is still of a poor kind, which is due entirely to the mildness of the weather. Prices however, do not show any corresponding weakness, and stocks are not by any means large; indeed, a few days of cold weather would clear off any surplus wagons that may now be under load in colliery sidings. There is no falling off in the demand for fuel for manufacturing needs and prices of the various classes are fully maintained. Cobbles and nuts are in particularly brisk request, and they are almost certain to move freely in view of the continued activity of the heavy steel and armament trades of the country. Slack for boiler firing is in poor request, and the supply is at present greater than the needs of the market. Prices for current deliveries are weak but it is confidently expected that these will improve early in the new year. Locomotive coal is going off in very satisfactory quantities, and gas coal is in strong demand. There is a much stronger demand for steam coal for export, and prices have advanced fully 9d. per ton on the week. Supplies are scarce and it is not improbable that prices may experience a further rise within the next few days. Foreign buyers are still keeping off the market, hoping that values of coal for next year's shipment will depreciate. So far as steam coal is concerned there is little or no prospect of such hopes being realised. There is a full demand for cobbles and nuts for near Continental ports. Washed nuts are in active request. Coke is in better demand and prices are rather firmer.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	8/	8/3

IRON.

There is no improvement in respect of pig iron or manufactured bars, and the works of the district are not working much more than half time. Fresh orders are badly wanted.

Nottingham.

COAL.

The improvement in the coal trade of Nottinghamshire, which was anticipated a week ago, has not been fully realised mainly owing to the weather having taken a milder turn. As a result business is not as active as it should be at this time of the year. The mild weather has considerably affected the demand in the house fuel section, and but for the orders which local merchants are receiving in view of the approach of Christmas the tone in this branch would be far from healthy. As it is, the stocks at some collieries are increasing. Owners are not finding it an easy matter to maintain prices, but generally, recent quotations are being adhered to. Special lots, however, are obtainable at slightly lower rates in a few cases. A fairly satisfactory tone characterises the steam coal section, for while the demand on shipment account is falling off, as is usually the case at the opening of December, there is a good trade being done in industrials in the home market. Stocks at collieries are on a moderate scale. Second hards are not in very active request and spot lots are on offer at some pits. The slack market does not show much change, and with stocks being considerable cheaper rates are ruling on certain qualities. Gas coal is continuing to have a good sale, but coke is in slow demand.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	13/6 to 14/6	14/ to 14/6
Good house coals.....	13/ to 13/6	13/ to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Best hard coals .....	11/3 to 11/6	11/3 to 11/9
Secondary do. ....	10/ to 10/6	10/ to 10/6
Slacks (best hards).....	7/9 to 8/	7/9 to 8/3
Do. (seconds) .....	6/9 to 7/3	6/9 to 7/6
Do. (soft).....	6/9 to 7/3	6/9 to 7/6

Leicestershire.

COAL.

There has been a little more movement in business in this district during the last week, but there is not any particular urgency in the demand. There has been some little improvement in household coals, it being mostly in the lower qualities. The best qualities are still slow in demand. The most active business is in steam coals. They are in good request for all descriptions. The output has been somewhat heavier and stocks have not increased. In some



they are very light; the bulk of the stock is household. Local merchants are not busy in household coal, but they are having a fairly busy time in steam fuels. There is no noticeable alteration in quotations; as a rule, they are steady at the level they have been for some time past. There may possibly be a small concession obtained to clear any heavy stock, but this disposition is not general.

### South Staffordshire, North Worcestershire and Warwickshire.

#### Hednesford.

##### COAL.

The coal trade of the Cannock Chase district is in much the same condition as when last reported; a fair business is being done, but there is no particular rush. Most of the collieries are fully employed and there is not much coal in stock. Owing to the continued mildness of the weather, there is very little improvement in the house coal trade. There is a good demand for coal for manufacturing purposes and slack is selling fairly well. Railway sales are about the same and there is not much improvement in business at the landsale depots.

#### Birmingham.

##### COAL.

A brisker demand is being experienced for house fuel, which is welcome after the long spell of comparative quietude. Between now and Christmas a period of activity is looked for. In manufacturing fuel the tendency is towards slackening. No change has occurred in quotations, which stand as follow:—

##### Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/6
Do. seconds deep.....	16/	16/
Do. best shallow.....	14/9	14/9
Do. seconds do.....	14/	14/
Best hard.....	15/	15/
Forge coal.....	11/	11/
Slack.....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked		
cobs.....	14/	14/
Best hard spires.....	15/	15/
Forge (steam).....	11/	11/
D.S. nuts (steam).....	10/	10/
Small (do.).....	8/3	8/3

##### IRON.

The market was well attended but did not disclose any material change from the conditions recently prevailing, and all indications point to a quiet steady trade at low prices during the winter. Foreign competition is felt in the cheaper branches of both iron and steel. Recently, however, Continental prices for sheet bars and billets have been advanced to £4 12s. 6d. to £4 15s. a ton, and with the lowest English price at about £4 17s. 6d. the disparity is not so great. The figures of the Wages Board issued at the beginning of the week disclose a drop in selling prices of 6s. 11d. a ton compared with the preceding two months. This was expected, and while customers may press for easier terms in consequence of the 5 per cent. drop in wages which follows under the sliding scale, manufacturers may be expected to resist on the plea that the reduction has long since been discounted, and that they are entitled to this relief. The output of 35,810 tons for the 17 selected firms is an increase of 6,445 tons over the holiday months of July and August, and a drop of 8,598 tons from the corresponding months of 1912, representing the difference between the output working full capacity and working about four days a week as is now the rule. The position of the steel trade was also the subject of discussion. During the week English makers have reduced prices by 5s. a ton. The basis price of angles now becomes £6 5s. a ton, or 25s. below what it was at the end of 1912. The alteration was expected after the reduction in Scotland a fortnight ago, because any disparity between the two countries makes for a displacement of trade in the north-eastern district, where makers come into rivalry with Scottish competitors, and this has to be guarded against. Only a moderate amount of business is passing. Ferro-manganese has dropped 10s. a ton to £10. A year ago the price was £12. The galvanised sheet branch continues to gather strength, and there is some talk of an effort being made to resuscitate the association. The weakness of previous combinations has been their inability to stand the test of periods of depression, and makers will therefore be chary about allying themselves to another, which may break up when its help is most needed. Leading houses are this week quoting £11 a ton f.o.b. Liverpool, and £11 2s. 6d. for the home trade. India is for the time being one of the best markets, but substantial orders are also under execution for South America and South Africa. Makers of best bars are fairly well supplied with work. Prices are £9 a ton, and the disparity between that figure and the £7 paid for merchant bars delivered at Birmingham is out of proportion, and warrants the belief that there will be a further reduction in marked bars about quarter day. Trade in common bars is irregular. North Staffordshire bars are quoted £7 15s., compared with £8 for Yorkshire and Lancashire bars. Pig iron has not improved either in respect of sales or prices. Foundry iron is in chief sale.

### Forest of Dean.

#### Lydney.

##### COAL.

Generally only a moderate business is passing in the house coal trade here and the collieries are still only five days' work each week. The mildness all against the sale of fuel suitable for domestic use. Most descriptions are stocking, but heavy slacks are meeting with a better sale. Slacks are still hanging, and none of the heavy descriptions are busy. Prices show rather a weakness.

##### Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block.....	17/6	17/6
Forest.....	16/6	16/6
Rubble.....	16/9	16/9
Nuts.....	15/	15/
Rough slack.....	6/6	6/6
Steam coal:—		
Large.....	12/ to 13/	12/ to 13/
Small.....	8/6 to 9/	8/ to 9/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

### Devon, Cornwall, and South Coast.

#### Plymouth.

##### COAL.

Messrs. W. Wade and Son report that the coal trade of Devon and Cornwall is still very dull as far as household qualities are concerned, in consequence of the continuance of mild weather. Considerable competition is complained of by local merchants in prices of coal and coke. Steam freights are quoted rather lower from most of the coal ports.

### THE WELSH COAL AND IRON TRADES.

THURSDAY, DECEMBER 4.

### North Wales.

#### Wrexham.

##### COAL.

It has been arranged that there will be no general strike of carters at Liverpool, as was feared would be the case. During the past week the coal trade here has been quite good, both as regards output, sales and prices. There has been a slight advance in the current prices for present deliveries for most classes of fuel available for sale in the open market. The demand has been to the full extent of the supplies, and all the collieries hereabouts have been working well, and will now probably continue to do so right up to the end of the year. There are now a number of contract enquiries on the market for next year's supplies; sellers are seeking an advance on current figures, which buyers are disinclined to give, as the latter anticipate an easier market; therefore the settlement of these contracts is for the present held over. With reference to household coal, the demand is all that can be desired, both as regards price and supplies of best and seconds quality. Although the weather has been somewhat against this class of trade, householders are now getting in their supplies in readiness for the Christmas holidays, therefore all the landsale depots are busy, as well as merchants' railborne business. The steam coal market is pretty similar to what existed last week. The tonnage supplied for locomotive purposes to the railway companies has been the average contract quantity, and coal for manufacturing purposes and the shipment trade has been in fairly good demand, at slightly rising figures. The output of gas coal has been easily disposed of, both large and small varieties, and gas companies are pressing for their full contract quantity, and a little extra to enable them to augment their stock in view of the approach of the holidays. There does not appear to be any stocks of slack in the colliery sidings, and the prices obtained for the tonnage sold during the past week have been of a satisfactory character. The current market prices at the time of writing are as below:—

##### Prices at pit.

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal.....	15/3 to 16/9	15/6 to 16/6
Secondary do.....	14/3 to 15/3	14/6 to 15/6
Steam coal.....	12/6 to 13/6	12/6 to 13/6
Gas coal.....	13/3 to 14/	13/ to 13/9
Bunkers.....	12/4 to 12/6	12/3 to 12/6
Nuts.....	11/6 to 12/	11/3 to 11/9
Slack.....	6/9 to 8/6	6/6 to 8/
Gas coke (at works).....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal.....	17/6 to 19/2	17/6 to 18/9
Seconds.....	16/8 to 17/6	16/8 to 17/6
Slack.....	10/ to 12/6	10/ to 12/6

### Monmouthshire, South Wales, &c.

#### Newport.

##### COAL.

The steam coal trade again shows steady improvement during the week, a good demand being evinced, while chartering is active, more especially for tonnage to load before the holidays. All large coals are firmer, while smalls share in a lesser extent. So much for the ordinary trend of events, but the one outstanding feature to-day is the desire to know how the strike fever on the Great Western system will develop. So far there have been no stoppages and little friction in this neighbourhood, but it is useless to ignore the fact that a very large number of the younger railwaymen are feeling very mischievous and may at any

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	17/9 to 18/6	17/6 to 18/
Western-valleys, ordinary	16/6 to 17/	16/3 to 16/9
Best Eastern-valleys.....	16/ to 16/6	15/9 to 16/3
Secondary do.....	15/6 to 15/9	15/3 to 15/9
Best small coals.....	8/6 to 8/9	8/3 to 8/9
Secondary do.....	8/3 to 8/6	7/9 to 8/
Inferior do.....	7/6 to 8/	7/ to 7/6
Screenings.....	8/6 to 8/9	8/6 to 8/9
Through coals.....	12/3 to 12/9	12/3 to 12/9
Best washed nuts.....	13/6 to 14/	13/6 to 14/
Other sorts:—		
Best house coal.....	18/ to 19/	18/ to 19/
Secondary do.....	17/ to 18/	17/ to 18/
Patent fuel.....	19/ to 20/	19/ to 20/
Furnace coke.....	19/ to 20/	19/ to 20/
Foundry coke.....	23/ to 25/	23/ to 25/

time cause a serious dislocation, if not total stoppage, of all local traffic. The air is thick with rumours, and it takes very little at such a time to precipitate matters—one cry of "blackleg" being enough to deter a hundred men from continuing at work, although the majority would rather be left alone. At Newport Docks, the only effect so far has been a slight choke back of empty wagons for Rhondda collieries.

##### IRON.

There is hardly any change to report in the general condition of the local iron and steel trades, but there has been somewhat more enquiry coming along, but in most cases only on matters of a small nature. Work is moderately good at bar mills and output normal. During the past week prices have been reduced by the Siemens Association to £4 11s. 3d., and more business in the department is now hoped for. Imports of foreign bars for the week total about 10,000 tons, with quotations for these unaltered. Rail mills continue fairly well placed with values at last quoted figures. At blastfurnaces conditions remain unaltered, not much enquiry is coming to hand, and hardly any forward business is taking place. Welsh hæmatite is easier on the week, so also is iron ore. The tin-plate department remains rather quiet, although a fair number of orders have recently been placed, but these only of a small description.

#### Cardiff.

##### COAL.

As the year draws to a close the market assumes a still stronger tone. Rarely has the pressure for coals been so great as at present, and there seems to be every prospect of its continuance until the end of December and even into the beginning of the new year. This is reflected in the charterings which have taken place, the number of vessels engaged during the week representing a capacity of 415,630 tons, being an increase of fully 100,000 tons as compared with the previous six days. On one day alone, the fixtures reported amounted to no less than 145,230 tons, which is a record for both this year and last. The nearest approach to it was on January 8 last, when vessels with a carrying capacity of over 140,000 tons were taken up. When the present week opened there were 117 vessels in the Cardiff Docks, 82 at Barry and 20 at Penarth—making a total of 219. As usual, whenever there is a rush of tonnage in port, there is the utmost difficulty in finding the necessary loading berths, and on Tuesday morning there were in Barry alone no less than 16 steamers waiting for tips. Needless to say, this means the payment of a good deal of demurrage. But for this circumstance, there is no doubt that prices, firm as they are, would still be in the ascendant, especially as the men never work as hard as they do when wages are comparatively low. It is true that outputs are somewhat better than they have been, but they are still considerably less than the normal for the time of year, and it is no unusual thing to hear the expression given utterance to, that the reason why more coal is not brought up is because the miners are earning too much money. Prices all round are exceedingly firm and there is very little coal to be had from the collieries at any price, but where cargoes are obtainable for shipment this month, the best collieries quote from 21s. 6d. to 22s., whilst for next month they refuse to accept less than 21s. Within the last few days a cargo of coals, which are not considered of the very best quality, changed hands at 21s., and from what our correspondent can learn, the buyer was very pleased to get on even at that figure. Generally, second Admiralties fetch from 20s. 3d. to 20s. 6d., whilst ordinary seconds have sold up to as high as 19s. 6d. per ton. Notwithstanding the heavy amount of chartering that has recently taken place, it is believed that there are still large orders to be placed for next year. For the very best steam coals buyers are rather loth to pay the price asked by colliery people, but from the negotiations that are proceeding, there is every indication that important contracts will be entered into within the next few days at about 19s. or even more. As a matter of fact, 19s. has already been paid for considerable quantities over next year. The Commissioners of his Majesty's Works, etc., are in the market for tenders for Welsh smokeless steam coal for delivery over the whole of 1914. Tenders are to be in not later than Tuesday, the 9th inst. Messrs. Elder, Dempster and Co., who usually take about 200,000 tons of Admiralty qualities in the course of a year, are reported to have bought a considerable portion of their requirements at 17s. 9d. net for superior seconds, and a shade under 17s. for ordinary kinds. Whether the trouble in France will have any effect on the market it is impossible to say, but it is significant that the Miners' Federation of that country is dissatisfied with the agreement come to at Douai between the delegates of the trades unionists and the coal masters, and threaten that unless satisfaction be given respecting not only the eight-hours day, but the question of a minimum wage, with a pension of 2 francs a day to every miner on attaining the age of 50 years, a general strike will be proclaimed. The small coal market, which is very sensitive to foreign influence, is distinctly better, bunkerings selling at from 11s. to 11s. 3d., and cargo qualities at 8s. to 8s. 3d. per ton. The only weakness observable is in dock screenings. A week ago these commanded 13s., and that figure was obtainable not only at Cardiff, but even at Port Talbot, buyers paying the cost of transferring the coal from that port to Cardiff, Penarth or Barry at a cost which amounted to about 1s. 6d. per ton. But since then there has been a decided slump, and it is doubtful whether a seller could get more than 11s. 6d. to 12s. at present. Monmouthshire coals, in sympathy with the rise in best Admiralty steams, have a distinctly firmer tone, Black Veins commanding 18s. 6d., western valleys 17s. 9d. to 18s., and best eastern valleys 17s. 3d. to 18s. per ton, in each case f.o.b. Cardiff. In the better class of the Rhondda bituminous coals there is no material change, No. 3 large being still quoted at 17s., but owing to the active demand for No. 2 qualities prices are much stronger, large coals being quoted at from 14s. 3d. to 14s. 6d. Shipments coastwise for October show a decline, the total being 316,849 tons, as against 327,326 tons in the corresponding month of last year. From Cardiff there were shipped 170,358 tons, of which Southampton took 50,080 tons, London 37,657 tons, Liverpool 29,500 tons, and Bristol 23,753 tons. From Newport the shipments amounted to 57,841 tons, Swansea 27,921 tons, and Port Talbot and Briton Ferry 21,550 tons. There was a full average export of patent fuel during the week. Of the total quantity of 36,701 tons, the Crown Company are credited with 8,880 tons, and other local makers 5,730 tons, Swansea 19,591 tons, and Newport 2,500 tons. There is no change in prices. The coke market



is very quiet, special foundry being round about 27s., ordinary foundry 22s. to 25s., and furnace coke about 20s. per ton. Pitwood has come forward much more freely, and is now selling at 22s. per ton.

Prices f.o.b. Cardiff (except where otherwise stated).

Steam coals:—	Current prices.	Last week's prices.
Best Admiralty steam coals .....	21/6 to 22/	20/6 to 21/
Superior seconds .....	20/3 to 20/6	19/9 to 20/3
Ordinary do. ....	18/6 to 19/6	18/6 to 19/
Best bunker smalls .....	11/ to 11/3	10/9 to 11/
Best ordinaries .....	10/9	10/6
Cargo qualities .....	8/ to 8/3	7/6
Inferior smalls .....	7/ to 7/6	6/6 to 7/
Best dry coals .....	19/6 to 20/	19/ to 19/6
Ordinary dries .....	17/6 to 18/	17/ to 17/6
Best washed nuts .....	16/ to 16/6	16/ to 16/6
Seconds .....	15/ to 15/6	15/ to 15/6
Best washed peas .....	14/6 to 14/9	14/6
Seconds .....	13/6	13/9 to 14/
Dock screenings .....	11/6 to 12/	12/9 to 13/
Monmouthshire—		
Black Veins .....	18/6	18/ to 18/3
Western-valleys .....	17/9 to 18/	17/ to 17/3
Eastern-valleys .....	17/3	16/3 to 16/6
Inferior do. ....	15/9 to 16/	14/9 to 15/3
Bituminous coals:—		
Best house coals (at pit) .....	20/6	20/6
Second qualities (at pit) .....	17/6 to 18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/	17/
Through-and-through .....	14/6 to 15/	15/
Small .....	12/	12/ to 12/3
No. 2 Rhondda—		
Large .....	14/3 to 14/6	13/9
Through-and-through .....	11/6 to 12/	11/6
Small .....	8/ to 8/6	8/
Best patent fuel .....	22/6	22/6
Seconds .....	20/ to 21/6	20/ to 21/6
Special foundry coke .....	27/	27/ to 28/
Ordinary do. ....	22/ to 25/	22/ to 25/
Furnace coke .....	20/	20/
Pitwood (ex-ship) .....	22/	22/6 to 24/

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

#### IRON.

There appears to be little doubt that the new works of the Mannesmann Tube Company will be erected at Newport. Though it is admitted that the foundations are not so good as they might be, still there are no insuperable difficulties in the way. The land on which the company have secured an option is 107 acres in extent, and will cost roughly about £40,000. It does not abut on the Usk, as in the case of Messrs. Lysaghts' works, but there is direct railway access. The Corporation have met the company very generously as to water supply, having agreed to supply what they require, which will probably amount to about 500,000 gallons per day, at 3d. per 1,000 gallons. At present a footpath runs through the site, but it is not thought there will be any difficulty about its diversion. Perhaps the question which has had the most influence on the company so far is that of freight. It is known that Messrs. Lysaghts, by the removal of their works from Wolverhampton, have saved something like 12s. per ton on the carriage of the material they use, and, of course, the Mannesmann Tube Company are also looking forward to effecting a very considerable saving in the event of their deciding to erect their new works at Newport. The tin-plate trade shows distinct signs of improvement. Orders for some 10,000 tons of plates have lately been received from the United States and Canada, and though at present prices have not been materially affected, makers look forward hopefully to some improvement in the future. Bessemer standard coles are still selling at 12s. 9d., and oil sizes at 13s. 3d. per box, but as these prices leave practically no margin of profit there is talk by some of the leading makers of a stiffening of their quotations. The Welsh Siemens Tin Bar Association at their last meeting decided to reduce the price of bars 5s. per ton, so that Siemens bars are now obtainable at £4 11s. 3d. Bessemer bars in sympathy therewith are offered at £4 10s. Some of the galvanised sheet works are fairly well placed for orders for some time ahead, and are therefore asking up £10 17s. 6d. for 24-gauge corrugateds, but the general quotation is still £10 15s. The Ebbw Vale Works have secured an order for some 10,000 tons of rails from the London and South-Western Railway. Welsh pig iron is still on the downward grade, offering now at 6s. 4s. to 6s. 6s. f.o.t. New steel crop ends are also selling at 56s. 6d. to 57s. 6d. per ton.

#### Swansea.

#### COAL.

Trade last week showed considerable improvement; more than ordinary activity was experienced in the coal trade, and there was a fair export of patent fuel. The shipments of coal and patent fuel amounted to 136,788 tons. There was a capital attendance on 'Change this morning, and the undertone of the anthracite coal market was very strong. There was a large demand for Swansea Valley large, especially the Genoa option brands, and this commodity was difficult to obtain for prompt delivery. Red Vein large was also very firm. Machine-made nuts were without movement, but peas were very scarce, and cobbles were firmer. Rubbly culm was in slightly better request, and values were advanced a little; duff, however, is quiet. There was a slightly better feeling in the steam coal market, both large and bunkers showed improvement.

#### IRON.

There was a satisfactory yield of pig iron at the blast furnaces last week, and the output of steel ingots compared favourably with that of the previous week. There was nothing new to report about the tin-plate trade; all the works are now in fairly full operation, but prices remain low, and there is little, if any, improvement in the demand. Employment at the Mannesmann Tube Works was exceptionally brisk, overtime being resorted to. The engineering works and foundries were not as busy as usual. The shipments of tin-plates last week were 112,581 boxes, receipts from works 97,576 boxes, and stocks in the dock warehouses and vans 189,936 boxes.

#### Prices of coal f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/6 to 21/6	19/6 to 21/6
Big Vein large (less 2½ per cent.) .....	18/ to 19/	17/6 to 18/6
Red Vein large do. ....	14/6 to 16/	14/6 to 16/
Machine-made cobbles (net) .....	22/ to 24/6	21/6 to 24/6
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 26/	23/6 to 26/
Gorman do. do. ....	23/ to 25/6	23/6 to 25/6
Beans (net) .....	16/ to 18/6	16/6 to 18/6
Machine-made large peas (net) .....	13/3 to 13/9	13/3 to 13/9
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	5/3 to 5/6	4/6 to 5/6
Duff (net) .....	3/ to 4/	3/ to 4/
Steam coals:—		
Best large (less 2½ p.c.) ..	19/ to 20/	19/ to 20/
Seconds do. ....	14/6 to 15/6	14/6 to 15/6
Bunkers do. ....	11/6 to 12/6	10/9 to 12/
Small do. ....	7/ to 7/6	7/ to 7/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/6 to 18/6	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) ..	10/ to 11/	10/ to 11/
Patent fuel do. ....	17/ to 17/6	17/ to 17/6

#### Llanelli.

#### COAL.

The market at the moment is not at all satisfactory, and though some coals have a good enquiry, the majority are somewhat difficult to place. It is expected there will be a better demand between now and the end of the year, owing to the approaching holidays, and works should shortly be buying extra coal for stocking purposes. The action of a number of the local railwaymen in refusing to work will also probably cause a better demand, but the market generally speaking is dull, and prices are not at all satisfactory. For many of the qualities they are quite 2s. per ton lower than they should be for the time of the year. Some anthracite qualities especially are very difficult to place almost at any price. This is more due to the mildness of the weather here and on the Continent than to any other reason. Some of the large sorts, chiefly Big Vein qualities, are moving well, but for other kinds there is little enquiry. Stove and suction gas qualities are in poor demand. Prices this week are:—

#### Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	21/ to 22/6	21/ to 22/6
Secondary do. ....	19/ to 20/	19/ to 20/
Big Vein large .....	18/ to 19/	18/ to 19/
Red Vein do. ....	14/ to 15/	14/ to 15/
Machine-made cobbles ..	20/ to 21/6	20/ to 21/
German nuts .....	23/ to 24/	23/ to 25/
French do. ....	23/ to 24/	23/ to 25/
Paris do. ....	23/ to 24/	24/ to 25/
Machine-made beans .....	18/ to 20/	18/ to 20/
Do peas .....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	4/9 to 5/6	4/ to 5/3
Duff .....	4/ to 5/3	4/ to 5/3
Other sorts:—		
Large steam coal .....	17/ to 18/	17/6 to 18/
Through-and-through ..	11/ to 11/6	11/ to 11/6
Small .....	9/ to 10/	9/ to 9/6
Bituminous small coal ..	10/ to 11/	10/ to 11/

#### THE IRISH COAL TRADE.

THURSDAY, DECEMBER 4.

#### Dublin.

Unloading operations are proceeding briskly with the colliers already in port, and in many instances deliveries are being made direct from the ship's sides. Free labourers continue to be actively engaged in the work of discharging and also in the delivery of consignments. Motor lorries are still plying busily in the city and suburbs. Business with the country districts is greatly hampered owing to the congestion on the railways, and at many of the inland towns coal is almost prohibitive in price. The unusually high prices ruling in the city have been brought about by the difficulty in obtaining supplies, and the increased freights by routes other than the direct delivery in Dublin. There is no further advance since last week, quotations being about as follow:—Best Orrell, 30s. per ton; best Abram, 29s.; best Wigan, 28s.; best Orrell slack, 24s.; best coke, 26s. per ton, all less 1s. per ton discount for cash; house coal, retail, 3s. 6d. per sack of 10 stone; steam coals, 30s. per ton. Irish coals at Arigna (county Leitrim) from 15s. 10d. to 18s. 4d. per ton for best coals, culm or slack from 9s. 2d. to 10s. per ton—all at the pit mouth. There has been an unusually large demand for turf since coal advanced in price, and briquettes have been selling extensively at nearly double the usual price, although some of the local works recently had to close for the want of slack for their manufacture. The coaling vessels arriving during the week amounted to 36, chiefly from Ayr, Troon, Liverpool, Garston, Preston, Irvine, Partington, West Bank Dock, Newport, Workington, Whitehaven, Glasgow and Point of Aire. The total quantity of coal discharged upon the quays was 13,202 tons. The Electricity Supply Committee in their report to the Municipal Council state that the coal from the Wolfhill Collieries (Queen's County) has been tested at their principal station with satisfactory results, and it is thought advisable that this coal should be used in future, together with Scotch coal.

#### Belfast.

Although the season is so far advanced the house coal trade continues to be rather quiet, owing to the absence of any severe wintry weather, but for other classes there is a fairly good demand, the supply in the port being plentiful,

and freights remaining high. Quotations for 1000 lbs. are unchanged. City prices are:—Best Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 22s. 6d. Current rates for steam coals ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s. per ton; Welsh steam coal, 18s. 6d. to 20s. per ton delivered. Cargoes arriving during the week were chiefly from Troon, Maryport, Ayr, Glasgow, Garston, Preston, Ellesmere Port, Manchester, Whitehaven, Partington, Workington, Girvan, West Bank, Neath Abbey, Ardrossan, and Burryport.

#### THE BY-PRODUCTS TRADE.

**Tar Products.**—The market is fairly steady, but distinctly quiet. This is more particularly the case with pitch. There is no change in naphthas. Benzols and toluol continue firm, the former being in good request. Carbolics generally are quiet and fractionally easier. Nearest values are:—

Benzols, 90's .....	1/1½
Do. 50's .....	1/
Do. 90's North .....	1/
Do. 50's North .....	1/11
Toluol .....	1/11
Carbolic acid, crude (60 per cent.) .....	1/0½
Do. crystals (40 per cent.) .....	1/3½
Solvent naphtha (as in quality and package) ..	1/9½
Crude ditto (in bulk) .....	1/5½
Creosote (for ordinary qualities) .....	1/3
Pitch (f.o.b. east coast) .....	40/ to 40/6
Do. (f.a.s. west coast) .....	40/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—The market is very quiet, a not unusual feature about this time of the year, especially with an open season. As regards forward business there is nothing to report, and the enquiry even has slackened. Prompt business also is restricted, though the attempts to circulate lower quotations are virtually without influence save on paper. Closing prompt prices are:—

London (ordinary makes) .....	£12/5
Beckton (certain terms) .....	£12/15
Liverpool .....	£12/18/9
Hull .....	£12/17/6
Middlesbrough .....	£12/16/3
Scotch ports .....	£13 to £13/2/6
Nitrate of soda (ordinary) per cwt. ...	9/4½

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

#### OBITUARY.

The death took place on Wednesday, November 19, at his residence, Egerton-terrace, Walkden, Manchester, of Mr. Thomas Rushton, one of the oldest and best-known colliery managers in South-east Lancashire. Commencing at the early age of nine years in one of Lord Ellesmere's collieries in the Walkden district, Mr. Rushton worked himself up to the position of one of the head managers of the Earl of Ellesmere, having for many years had charge of the extensive Bridgewater Collieries, Worsley, also the Linnyslaw Colliery, Walkden. The deceased gentleman, who was in his 73rd year, retired on pension rather over two years ago. The funeral, which recently took place at the Walkden Parish Church, was of a public character, representatives from various public bodies attending. Mr. Jesse Wallwork, mining agent to the Earl of Ellesmere, and managers from all his lordship's collieries were also present. There were a great number of floral tributes.

The death took place on 21st ult. of Mr. James Howden, chairman of the firm of James Howden and Co. Limited, engineers and boiler-makers, of Glasgow. Deceased was the last survivor of the original membership of the Institution of Engineers and Shipbuilders in Scotland.

The death has occurred at Folkestone of Mr. Vincent Hill, who was for ten years general manager of the South-Eastern and Chatham Railway. He resigned in 1911, being succeeded by Mr. F. H. Dent. Mr. Hill became connected with the superintendent's department of the London, Chatham and Dover Railway in 1862, and was appointed manager of the Hull and Barnsley Railway and Docks Company in 1884.

The death occurred on Tuesday, at Harrington-gardens, of Mr. Septimus Vaughan Morgan, who was in his 82nd year. Mr. Morgan was one of a family of six brothers, partners in the firm of Morgan Brothers, owners of the two papers, the *Ironmonger* and the *Chemist and Druggist*. Mr. Morgan was responsible for founding the Morgan Crucible Works at Battersea.

The death recently took place of Mr. Hugh Jones, Laeswood, Mold, at the age of 86 years. He was the last survivor of those who were rescued from the Argoed Colliery, Mold, when that mine was flooded on May 20, 1837. On that occasion a sudden inrush of water occurred imprisoning 31 miners; of these all but 10 perished in the flood, and Mr. Jones, who was a boy 10 years of age, was among those who escaped a watery grave. Throughout his long life he has always been an active church and worker.

The death has occurred at Canterbury of Mr. Henry Moss Biggleston, senior partner in the firm of Messrs. Biggleston and Drury, iron and brass founders.



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(A Classified List appears on page 1186.)

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## The Colliery Guardian

AND

Journal of the Coal and Iron Trades.

Joint Editors—

J. V. ELSDEN, D.Sc. (Lond.), F.G.S.

HUBERT GREENWELL.

LONDON, FRIDAY, DECEMBER 5, 1913.

A meeting of the Manchester Geological and Mining Society will be held on Tuesday, December 9, 1913, at 4 p.m. Dr. Harger's papers on firedamp and the detection of gob fires will be further discussed.

The Home Secretary gives notice that on November 25, 1913, he made an Explosives Order. The effect of the Order is to add the following explosives, viz., "Expedite," "Negro Powder No. 2," "New Fortex," "Permon Powder," "Pitsea Powder No. 2," "Sheppey Powder," and "Sunderite" to the permitted explosives named and defined in the First Schedule to the Explosives in Coal Mines Order of September 1, 1913, and to change the name of the permitted explosive "Stanford Powder" in that Schedule to "Ammonite No. 3."



On Wednesday and Thursday, a conference of the Miners' Federation of Great Britain will meet to consider the whole question of colliery surface workers.

The joint committee appointed by the South Wales Coal Conciliation Board to deal with the banksmen's claims have agreed that the men shall work nine hours a day. The consideration of an increase of wages claim was deferred.

Lord Balfour of Burleigh has agreed to act as arbiter in the claim by 90,000 Scottish miners for 9d. per day advance in wages. Friday, December 19, has been fixed as the date of the meeting.

The Northumberland coalowners have refused to grant the application of the men for an advance in wages, and the latter will remain at 52½ per cent. above the 1879 basis.

A conference of the owners and men of the Derbyshire coalfield on Tuesday failed to come to an agreement respecting an application for an increase in the wages of surfacemen. It is understood that the owners' reply took the form of a distinct negative.

The meeting of the Lancashire coalowners and miners' representatives, at Manchester, on Monday, to consider the wages of colliery surfacemen, proved abortive. Both parties presented their own schedule of wages, but no agreement was reached.

A strike of Great Western railway workers, originating at Llanelli, has spread to a number of other places in Wales, and the goods traffic has in consequence become more or less dislocated. Several collieries, and also the ports from where the coal is shipped, have been affected by the strike.

In order to bring their employees in closer touch with the management, Messrs. William Cory and Son have adopted a scheme of copartnership for the purpose of which an issue will shortly be made of £250,000 employees' shares of £1, to rank *pari passu* with the ordinary shares.

Much interesting information is given in the "Abstract of Labour Statistics of the United Kingdom for 1912," which has just been issued. The general percentage returned as unemployed in 1912 (excluding persons on strike, lock-outs, sick, or superannuated) was 3.2, against 3.0 in 1911. The mean annual percentage returned for the engineering and metal trades was 3.7, as against 4.2. Of the insured unemployed, 62 per cent. were on benefit. Calculations are also given as to the increase of retail prices of food in the year.

A party of mining experts composed of Government inspectors, company officials and men's representatives are making a series of inspections at the Universal Colliery, Sengenhenydd in an endeavour to ascertain the origin of the recent explosion.

Although the ballot of the Northumberland Miners' Association on the question of the three-shift system has resulted in favour of the handing in of notices, there is not the two-thirds majority which is necessary before a strike can take place.

rules were last settled by the district boards, on an application made (with three months' notice given after the expiration of the year) by considerable sections of the workmen or employers, the existing rate or rules may be varied. It thus falls that in several districts such applications have been made, a year having now passed since the original awards were issued.

It may be remembered with what promptitude the chairmen of the Northumberland and Durham boards issued their awards in the first instance; one of the consequences is that in the case of these Boards the first essays at revision have been made. The new awards, the terms of which have already appeared in the *Colliery Guardian*, have been very disappointing from the point of view of the miners. Lord MERSEY and Sir ROBERT ROMER have both declined to interfere with the previous rates, except in the case of the boys, refusing to assent to the plausible suggestion that, with a rise in the general rate of wages, the minima should also be capable of revision in an upward direction. The plausibility of this proposal arises from the existence in the two northern coalfields of the "county average," which has always provided, as we pointed out many months ago, a perfectly equitable method of adjusting difficulties that arise from abnormal working conditions. During the past year the county average for hewers in Durham has risen from 6s. 1¼d. to 7s. 2d. The miners claimed that the minimum of 5s. 6d. should also be increased in proportion, but from this view the learned chairmen have dissented, and Sir ROBERT ROMER, in making his original award, specifically pointed out that it was not to be regarded as a general settlement of wages, but as a settlement, in the terms of the Act, of the minimum below which the wages of the different classes of workmen affected should not fall. The matter is rather complicated, however, by the procedure adopted in some of the other districts; in these instances—*i.e.*, North Staffordshire, the Black Country and the Forest of Dean—rates were fixed which definitely include the percentages upon standard rates, and in South Wales Lord ST. ALDWYN actually fixed new standard rates in a large number of instances, thus tending to identify the minimum with the general wage rate. The Durham miners immediately signalled their intention of approaching the Board of Trade on the subject, but so clearly does the attitude of the Northern chairmen conform to the letter and spirit of the Act that Mr. BUXTON felt, no doubt, that he might experience considerable difficulty in giving that satisfactory reply to the deputation which is so familiar a tag to the reports of meetings between the Government officials and the accredited representatives of organised labour. Indeed, the PRESIDENT OF THE BOARD has preferred not to face a deputation, having intimated to the Northumberland Miners' Association that he has no power under the Act to take action to declare the awards null and void.

One of the influences that have undoubtedly smoothed the course of this Act has been the prevailing high rate of wages, which has reduced materially the number of cases in which recourse may be had to the minimum rates. In order to avail themselves of the benefits of the Act at such times, it is necessary for the men to curtail their labour—a familiar concomitant of high prices and wages. In the North of England, however, the rules form an insuperable obstacle to such limitation of effort, for, whereas the other chairmen appointed a certain maximum of attendance, Lord MERSEY and Sir ROBERT ROMER prescribed that a workman who on any

day during any pay had been absent from work without leave or without reasonable excuse should forfeit his right to wages at the minimum rate; and this rule they have refused to relax, having in view the short week which is normally worked in these coalfields. As far as the men are concerned, Lord MERSEY appreciably eased the situation in some cases by altering the definition of the word "day" to mean "a day on which it is customary for the workmen of any particular class to work," instead of the colliery "working day"; but some workmen are worse off than before.

Whether the miners will succeed in approaching the PRIME MINISTER, and what action the Miners' Federation of Great Britain may determine upon, we cannot say; the trouble over this makeshift Act has come rather earlier than we expected. The miners are only now learning a fact that was not obscure at the outset—namely, that the tendency of a legal *minimum* is to bring the wage rate to that *minimum*. Otherwise, if the minimum is to be the subject of perpetual negotiation, we must either revert to the *status ante quo* or introduce the abhorrent principle of compulsory arbitration.

These incidents form a striking commentary upon Sir GEORGE ASKWITH's declaration the other day that, "where terms might bear two interpretations, a means of impartial interpretation should be found." Lord MERSEY, whom Mr. STRAKER, the Northumberland miners' secretary, now speaks of as the "so-called" chairman, was accepted by the men when the Board was formed; it is only in the light of his subsequent awards that his impartiality has been impeached. We think that it will be found that "impartial interpretations" satisfactory to the rank and file are only obtainable from those who, like some of the high court judges in Australia and New Zealand, take a complacent and generous view of the labour standpoint. In every case, we believe, the workmen will find that agreements arrived at by methods of conciliation are more lasting and beneficial than awards secured by the intervention of third parties. In this respect the Court of Appeal last week showed commendable sense in referring certain disputes on the South Wales rules to the Conciliation Board. The points were chiefly as to the period over which the wages of pieceworkers should be averaged for ascertaining whether or not they are entitled to the minimum wage (Rule 7), and the requirement that a workman should give notice to the officials of the occurrence of abnormal conditions in his working place (Rule 5). How far the element of compulsion prevented the Board from coming to a decision we are unable to say; as a matter of fact, the Board very nearly arrived at a compromise, but the existence of a court of reference seriously limits the chances of agreement by negotiation. The Court of Appeal decided yesterday that Rule 7 was *ultra vires*, but that Rule 5 was *intra vires* so far as the point raised was concerned.

There are other questions that hinge upon the Minimum Wage Act, such for example, as the question of surfacemen's wages, into which we cannot enter on this occasion. It will be remembered that last year, as a result of the Minimum Wage Act, the surfacemen started an agitation for treatment similar to that extended to the underground workmen. Their case was afterwards taken up by the Miners' Federation, and subsequently the wages of men employed on the surface have been advanced materially, amounting in some cases to 15 per cent. The Miners' Federation, however, failed to secure all they want, and a conference is to be held next week. The situation is not

#### THE Coal Mines (Minimum Wage) Act, which was passed under notorious circumstances

in 1912, contains a provision, distinguishing it from other industrial enactments, that it shall continue in force for three years and no longer, unless Parliament shall otherwise determine. This means that on March 29, 1915, the Act automatically comes to an end. There is a further provision, however, that after one year has elapsed since the rate or



fully strained, but it is a reasonable view that all these matters could have been more satisfactorily adjusted had the Minimum Wage Act of 1912 never been passed.

THE issue by *The Times*, on Monday last, of a monster Fuel Question. Fuel Supplement, marks somewhat of an innovation in daily journalism so far as coal is concerned, for although the *Cambrian Daily Leader* has also recently issued a bulky supplement, dealing mainly with the South Wales anthracite industry, there has not, so far as we are aware, been any previous effort in a daily paper to deal so comprehensively with the whole question of fuel as that of *The Times*.

A critical review of this publication we do not propose to attempt on this occasion; but there are in it certain features which deserve more than passing notice, and others which may be liable to misconstruction on the part of the lay public to whom, it is to be presumed, this supplement will largely appeal. In the first place, most people will probably approve of the opinions expressed in the leading article dealing with the economy of fuel. It is certain that enormous progress has been made in the perfection of heat engines, and in the discovery of methods for increasing the power-yield from coal; but even now the realised energy value of coal is far below its potentialities, and much mineral wealth in fuel is still squandered in every civilised country in the world. We would point out in this connection that while invention and discovery are doing much to promote rational methods of power production, there is also a marked tendency in modern times to an increase in the cost of fuel, due mainly to legislative action. We are, therefore, approaching the time when industries must either economise in their fuel bills or cease to exist, and it appears as if this point is much closer to us than the period of exhaustion of our coal supplies. It is also a matter which equally concerns both consumer and producer. The upward curves of prices and cost of production must soon reach a limit at which no further elasticity in output will be possible, and the big divisor will no longer suffice as a regulator of tonnage costs.

This is perhaps mere platitude, but it is induced by the prominence given in *The Times* Fuel Supplement to such matters as conservation and duration of coal supplies, and to statistics of coal resources in the countries of the world—questions which are vital enough from the point of view of posterity, but make little appeal to the colliery shareholder of to-day.

A view, with which we cordially agree, is expressed upon the difficult question of legislation in the interests of safety of mining. Everything certainly does point to the conclusion that we have gone far enough with general rules of universal application, and that the time has come to replace many of these by local regulations drawn up by specialists at each mine. We do not grudge the credit that has been freely claimed for the progressive diminution in accidents since the passing of the first Coal Mines Regulation Act; but we look for further improvement mainly to the general growth of knowledge and to progress in scientific research.

The articles in the Fuel Number are evidently the work of many persons, and they are consequently of unequal merit. This was perhaps pardonable under the circumstances, but we cannot but be pardoned for calling attention to the fact that some of the articles which seem to require amend-

ment. In the important article on "The Application of Fuel," excellent as it is in the main, the section headed "Calorific Intensity" should certainly be revised. The very meaning of the term is misleading, and the statement that "when pure carbon burns completely (when it forms carbon dioxide) with just the right quantity of air, a temperature of 3,700 degs. Fahr. is theoretically obtainable" is meaningless in practice and apparently wrong in theory, if the figure has been obtained by dividing the calorific power per pound of coal by the specific heat of carbon dioxide.

A more serious criticism may be offered upon the section dealing with the "Origin of Mineral Fuel," in which the author indulges in some truly remarkable statements respecting the probable conditions under which coal seams were produced. It is not so much the adherence to the antiquated notion of an atmosphere of carbon dioxide gas in carboniferous times that calls for remark, as the statement that the primary rocks consist entirely of silicates and are wanting in limestones and other carbonates, because all the carbon dioxide was still in the atmosphere until the coal measure period. As a matter of fact, limestone rocks and dolomites occur not only in the palæozoic formations preceding the coal measures, but also in the earlier archæan rocks. What is still more damaging to this theory is the fact, disclosed later on by other writers in the Supplement, that enormous areas of coal have been formed in post-carboniferous times, ranging up to the tertiary period; while the thick graphite deposits in the laurentian rocks of Canada contradict the statement as to the geological distribution of carbon. This section should certainly be re-written and brought up to the level of modern knowledge. We have already commented upon the relative utility of statistical information respecting the sizes and resources of the coalfields of the world, and we can see little use in reproducing old statements of the superficial areas of coalfields made so early as 1860, when but little information was available respecting those concealed coalfields which in England are probably far greater in extent than those exposed at the surface, and in Holland and Belgium promise to be of far-reaching economic importance—in fact, since the publication of the comprehensive volume on *The Coal Resources of the World* by the International Geological Congress at Toronto this year, many of the older compilations are better relegated to the limbo of oblivion, than served up as copy for up-to-date journalism. There are other things, also, which could be improved. The subject of anthracite is only superficially treated, and no distinction is drawn between true and pseudo anthracites.

Notwithstanding such criticisms as the above, which do not pretend to be exhaustive, *The Times* Fuel Supplement is well done in the main, and the information upon "The Mining of Coal," "Equipment of Collieries," and "Dangers of Coalmining" is especially sound and fresh. Extremely useful also is the account given of the phenomena accompanying the carbonisation of coal at high and low temperatures, to which considerable space is devoted.

Although fuel in general is the subject treated, it is significant that three-quarters of the space is occupied by coal, and necessarily so, considering the preponderating importance of coal in comparison with oil and other sources of energy. Coal gas also claims a full share of attention, and even natural gas is treated at some length. Readers may be surprised to find that in the United States there are 25,000 miles of pipe lines for natural gas, four separate companies in

Pittsburg alone supplying each about 30,000 million cubic feet per annum.

With regard to the future, it is difficult to see how coal is going to be dethroned from its premier position. It is only 132 years since WATT produced his steam engine, and there is as yet no indication that the decline of the Coal Age is in sight. The internal combustion engine has gone far to revolutionise the world of mechanical motion—it has made flying possible, it has gone far to bring about the abolition of horse traction, and it has revolutionised many things; but it has made not the smallest impression upon the ever-growing demand for coal.

#### Trade Summary.

The London coal trade during the past week has continued improving in point of tonnage. Prices are unchanged, but the volume of trade doing is increasing. Since the turn of the month, orders have been more plentiful and the reports from the wharves and depots are encouraging. Coke continues very quiet and supplies are over-abundant. Small nuts and slacks are very irregular. Some qualities are offering much below the standard quotations. Hard steam coals are in better demand, and also bakers, nuts and kitcheners cobbles. All prices, however, continue low for the season of the year. The shipping trade is reported weaker, but Welsh smokeless coals are firm.

The market at Newcastle is firm, although some low prices have been tendered on forward account. Stormy weather has for the time being delayed tonnage and "spot" supplies are rather heavy.

The Durham coal trade shows a firmer tendency, and gas coals are very steady.

In Lancashire there is a fair demand for house coals of special grades. Screened coals and bunkers are in moderate request. The output of slack is at its maximum, and a small quantity is going into stock.

There is some improvement in the call for West Yorkshire house coal, but the market as a whole is quiet.

Conditions in South Yorkshire are decidedly easier in all branches, although the best grades of hard coal are still firm.

Derbyshire house coal is still below par, although prices are well upheld. Manufacturing coal continues to find a ready outlet.

The market at Cardiff shows increasing firmness and charterings are heavy. Small coal has improved with the threat of renewed trouble in the north of France. Monmouthshire coals are more active. Rhondda No. 2 coals are stronger. Coke is quiet.

The Scottish coal trade continues very active in all departments.

#### MODERN BY-PRODUCT COKING.

A joint meeting of the Midland section of the Junior Institution of Engineers and the Birmingham Scientific Institute was held last month at the Midland Institute, Birmingham. Mr. G. S. COOPER delivered a lecture on "Modern By-product Coking" and made special reference to the installation of Koppers chamber ovens now being erected at the Saltley Gas Works, Birmingham.

In the discussion which followed, Mr. JEAVONS said that he did not quite see the object of employing a divided regenerator in the gas oven, whereas an undivided generator was used in the coke oven.

Mr. PINNOCK remarked that the lecturer had said that the regenerative system was the only satisfactory method of heating the air prior to combustion. He would like to know what was the objection to the ordinary recuperative system where hot waste gas and air went in counter current. Further with regard to the recovery of the by-products, in the Koppers' process the gas was first cooled to extract the tar and then the ammonia was recovered, the gas being first reheated. In the Mond recovery system the ammonia was first recovered from the hot gas and then the tar was removed. Could not this method be followed out more economically than with the same result as the Koppers' process?

Mr. E. W. SMITH, chief chemist to the Birmingham Gas Works, said he had taken great interest in recent experiments by Dr. Wheeler with regard to the action of various coals on photographic plates. The resinous constituents of the coal had a very marked effect on the plate. In the case of a non-coking coal, the image obtained seemed to suggest that these constituents were thoroughly disseminated throughout the whole mass. With a coking coal, however, a number of bands appeared in the image, thus indicating a different kind of distribution.

Mr. WHITEHOUSE asked in what way the composition of coke oven gas differed from that of ordinary town gas.

Mr. ALLCUT, speaking with reference to the use of surplus gas in gas engines, suggested that the large gas engines in Germany were operated on blastfurnace gas and not on



coke oven gas. If the latter was used much trouble was experienced, and the running of the engine was not satisfactory.

In his reply to the discussion, Mr. COOPER said that the divided regenerator of the gas oven served for several purposes. Principally it secured an even distribution of air or gas into each of the two sets of vertical flues fed from it. In the recuperative system of heating the air waste gas and air are on opposite sides of a wall, and the heat has to be transmitted through the wall. If the wall was thin there was good conduction of the heat from the gas to the air, but there was also great liability to leakage and consequent contamination of the air with foul gas. If, on the other hand, the wall was thick, there would be no leakage, but conductivity would suffer. In the regenerative system the air came into direct contact with the hot brick-work. With regard to the extraction of the by-products, treating Mond gas was quite a different proposition to treating coal gas. The latter contained much more tar, and this would be precipitated were any attempt made to recover the ammonia prior to the extraction of the tar.

With reference to Dr. Wheeler's photographic experiments, Mr. Cooper explained how these were performed. He had repeated Dr. Wheeler's experiments in a slightly modified way, and he had formed the same conclusion as expressed by Mr. Smith. He had, however, come across an apparent contradiction, as with anthracite, which is a non-coking coal, he had obtained an image more similar to those of coking coals than to those of other non-coking coals. He was, however, repeating these experiments.

The composition of coke oven gas was practically identical with that of town gas. It usually contained rather more nitrogen, as the quality of the gas was of little account to most coke oven operators, and rigid precautions to exclude air were not taken. It was not correct to say that large gas engines were only operated on blast furnace gas. Many were in operation in Germany using coke oven gas, and were highly successful. Several of 800 to 1,200 horse-power were also successfully working in this country.

## THE USE OF SULPHATE AS A FERTILISER.

### Interesting Experiments at Barnsley.

Mr. F. MIDDLETON, of the Old Silkstone Collieries Limited, Dodworth, was the principal speaker at the dinner which succeeded annual ploughing contests at Worsbro' recently, and directed his observations to the subject of artificial fertilisation which is of great interest to the agricultural community. Mr. Middleton said it was probably known to a good many of his hearers that within the last few years rapid strides had been made in connection with the production of one of the premier artificial fertilisers—sulphate of ammonia. The increase in the production of this particular fertiliser had come about owing to the large increase in the number of patent by-product coke ovens which had been put down in this country, and he specially mentioned that in the Barnsley district the increase had been very pronounced. The colliery people who owned by-product coke ovens and were producers of sulphate were practically all members of what was known as the Sulphate of Ammonia Committee. The purpose and work of this committee had nothing to do with fixing prices for sulphate, it being constituted entirely for the purpose of propaganda work, and to extend the use and make known the utility of sulphate amongst the agricultural community. It was a well-known fact that artificial fertilisers were not used in this country to anything like the same extent as they were used in foreign countries. As an instance in point he cited Germany, where the annual production at the present time of sulphate of ammonia was 440,000 tons, and over 90 per cent. of this quantity was used in Germany. The production in the United Kingdom was 400,000 tons, and there was only 20 per cent. of this quantity used in England, the balance being exported to foreign countries. So far as colliery people were concerned in that district, their position was that they could readily dispose of the whole of their make of sulphate for export at as good, or better, prices than they obtained if they disposed of their sulphate locally. This position might not, however, always obtain, and they were prepared to do all in their power to assist and foster the distribution of sulphate of ammonia amongst the agricultural community in this district if by so doing they could render some service to that community, and at the same time not prejudice their position as regarded the price of the commodity they had to dispose of. The producers of sulphate were at present subscribing to the sulphate committee 9d. per ton on the sulphate produced for the purpose of propaganda work, and he had suggested to the committee—and they had accepted his suggestion—that they should put down in that district ten or twelve experimental plots, so that a practical demonstration may be given of the value and utility of sulphate. These plots would be put down on farms to be selected; the fertilisers would be supplied free of charge, and the only obligation of the farmer working the experimental plots would be to see that the sulphate was properly applied. The committee were prepared to go still further and give prizes of substantial amount to the three farmers showing the best results, taking into consideration the nature of the soil on which the experimental plots were worked.—Mr. TAYLEUR,

agricultural expert to the Sulphate of Ammonia Committee, remarked that he did not think there could be a better argument for the use of sulphate ammonia in the district than the fact that the first and second prizes in all the root classes that day had been obtained by two colliery companies, both of whom were large makers of sulphate of ammonia. The experiment of the Sulphate of Ammonia Committee during the last three years proved that 15s. per acre spent on sulphate meant a return of 30s. when applied to cereals. As there were some six millions worth of sulphate of ammonia being made in the country at the present time, this meant that if all that was made was used in the country the crops would be worth another six millions, surely a sum that would appeal to all practical men. Mr. Middleton had suggested that the Worsbro' district should establish a series of plots, and the speaker was glad to know that this had been taken up, Mr. Swift, president of the Barnsley section of the National Farmers' Union, having undertaken the supervision of the work.

## THE TIN-PLATE TRADE.

### Liverpool.

There has been quite a fair amount of business placed during the past week or so, but prices show little or no improvement and must be unremunerative for the manufacturer; 14 x 20 cokes are offering freely at 12s. 9d. and odd sizes were done in unassorted at 12s. 10½d. basis. Makers' present quotations may be called:—Coke tins: I C 14 x 20 (112 sh. 108 lb.), 12s. 9d. to 13s. per box; I C 28 x 20 (112 sh. 216 lb.), 25s. 9d. to 26s. per box; I C 28 x 20 (56 sh. 108 lb.), 13s. 3d. to 13s. 4½d. per box; I C 14 x 18½ (124 sh. 110 lb.), 13s. 3d. to 13s. 6d. per box; I C 14 x 19½ (120 sh. 110 lb.), 13s. 3d. to 13s. 6d. per box; I C 20 x 10 (225 sh. 156 lb.), 18s. 10½d. to 19s. 3d. per box; I C squares and odd sizes, 13s. 1½d. to 13s. 3d. basis for approved specifications. Charcoal tins are in quiet demand. Quotations for I C 14 x 20 run 15s. per box and upwards, according to tinning. Terneplates stand easy at round 22s. 6d. per box for unassorted 28 x 20. Coke wasters meet with a steady enquiry. Quotations:—C W 14 x 20, 12s. to 12s. 1½d. per box; C W 28 x 20, 24s. 10½d. to 25s. per box; C W 14 x 18½, 10s. 10½d. to 11s. per box; C W 20 x 10, 15s. to 15s. 3d. per box—all f.o.b. Wales, less 4 per cent.

## LABOUR AND WAGES.

### North of England.

The Wages Board of the Northumberland Miners' Association met the coalowners of the county at Newcastle, on Saturday, in respect to an application for a general increase of wages, and to further consider the proposed revival of the system for ascertaining the selling price of coal. Since the Conciliation Board went out of existence there has been no method of arriving at quarterly ascertainties, and men's representatives have had to base their case, when making wages applications, largely on Press reports of the state of the coal trade. Both sides were agreed that it would be more satisfactory if the actual prices of coal realised could be authoritatively made known when the parties came together at the end of each three months. It was officially announced that wages would remain unchanged for three months. The present wages are 52½ per cent. above the 1879 basis. The question of quarterly ascertainties of the selling price of coal, and the proposal by the men's side to raise the minimum percentage basis in respect to the regulation of wages, were adjourned.

The dispute which has been pending in Cumberland for the last three months between the Cumberland Winding Enginemen and Boiler Firemen's Association and the Steel Smelters' Association, as to which union the enginemen at the Cumberland coke ovens should belong to, has been amicably settled. It has been decided that the power-houses at Clifton shall be worked by members of the Cumberland Winding Enginemen's Association, the position at present held by a member of the Steel Smelters' Association, on becoming vacant, to be filled by a member of the Winding Enginemen's Association. That the power-house, exhaust-house, and crusher plant at Siddick be worked by members of the Steel Smelters' Association, the positions filled on these plants by members of the Cumberland Winding Enginemen's Association, on becoming vacant, to be filled by members of the Steel Smelters' Association; and that the lines of demarcation already fixed by this Board be adhered to in future. All situations in either department, except colliery winding, are to be open in accordance with seniority to members of the Winding Enginemen's Association, the Steel Smelters' Association, or the Cumberland Coalminers' Association, provided that applicants are competent to fill such positions and are willing to transfer to the society regulating wages in the department where such position is vacant.

The representatives of the Cleveland Ironstone Mine-

owners and the Cleveland miners' representatives met at the mineowners' offices, Middlesbrough, on Saturday, under the chairmanship of the Right Hon. Sir Robert Romer, G.C.B., for the purpose of revising the minimum rates of pay and the conditions laid down by Sir Robert Romer in May of last year under the provisions of the Minimum Wage Act. The men claimed an advance in the minima for almost every class of labour in the Cleveland mines, whereas the mineowners sought to effect a reduction. Revision of the conditions was also asked for, and Sir Robert Romer attended to hear both sides. The proceedings were private, but it is expected that the decision will be issued shortly.

### Federated Area.

A conference between Derbyshire colliery managers and representatives of the Derbyshire Miners' Association took place at Nottingham on Monday, with a view to arriving at an agreement respecting an increase in wages asked for by the surfacemen. Strong repudiation was made of a report that the Derbyshire banksmen are paid better than the surfacemen in any other country. The Nottinghamshire banksmen, it was claimed, are receiving, under many of the same owners as employ the Derbyshire topworkers, from 9d. to 10d. per day more than is paid in Derbyshire under the agreement of April 1912. After a discussion occupying about two hours, the proceedings closed without any settlement being arrived at. The owners' reply, it is understood, was in the form of a distinct negative. The Derbyshire Miners' Association will now report to the executive of the Miners' Federation, who are meeting in London on Wednesday to deal with the returns from the various counties.

A special meeting of the council of the Yorkshire Miners' Association was held at Barnsley, on Monday, Mr. H. Smith presiding. The question of political activities was considered, with a view to securing further Labour representation. The question of the non-unionists was discussed, and it was reported that the returns showed the association had made splendid headway, with the exception of a few collieries. Permission had been given to the men at the Newlands Branch, Normanton, to take a ballot on the question of giving notice to obtain the reinstatement of alleged victims.

Mr. J. G. Hancock, M.P., the agent, gave a report at the meeting of the Notts Miners' Association on Saturday on the conference which had taken place between representatives of the Association and the Erewash and Leen Valley coalowners with regard to the establishment of a county board to deal with cases of compensation which could not be disposed of locally. The report was accepted, and a small committee, consisting of the agent, president, assistant secretary, Mr. D. Davis and Mr. J. Lack, was chosen to act, with a similar number of owners' representatives, to thoroughly consider the whole question. It was announced that the lodges had voted by a large majority in favour of making a further grant of £200 to the Dublin strikers. The agent reported on the interviews which had taken place during the month with the owners on the question of surfacemen's wages and hours. No settlement, he said, had been arrived at, but other meetings had been arranged, and it was hoped a satisfactory decision would be come to.

An important meeting of Lancashire coalowners and miners' representatives was held at the Queen's Hotel, Manchester, on Monday, to consider the wages of colliery surface workers. A good deal of interest was felt in the result of the meeting for its influence on the national conference of miners, which is to be held in London next week to determine the Federation policy. Both parties held separate meetings previous to the joint meeting, and prepared their own schedules of wages. Mr. Charles Pilkington presided, with Mr. Jesse Butler in the vice-chair. Mr. Pilkington presented the proposals of the coalowners, and Mr. Jesse Butler those of the men, and the parties separately considered them, but failed to come to any agreement. The difference between the two sets of wage proposals amounts to 3d. per day in the case of boys of from 13 years of age to 6d. per day in the case of adult workers.

The proposals submitted by the men were as follow:—

Age.	Wage rate per day.	Age.	Wage rate per day.
	s. d.		s. d.
13 to 14.....	1 6	17½ to 18.....	2 8
14 to 14½.....	1 7	18 to 18½.....	2 10
14½ to 15.....	1 8	18½ to 19.....	3 0
15 to 15½.....	1 10	19 to 19½.....	3 2
15½ to 16.....	2 0	19½ to 20.....	3 5
16 to 16½.....	2 2	20 to 21½.....	3 8
16½ to 17.....	2 4	20½ to 21.....	3 11
17 to 17½.....	2 6	21 and over.....	4 3

The above rates to be paid when wages are at 50 per cent. above the 1888 standard. Each advance or reduction of 5 per cent. in the rate of wages to mean an advance or reduction of 1d. per day for those of the age of 16½ years and under, and 2d. per day for those over 16½ years. At any ordinary winding pit overtime to be paid for after a nine hour shift. Exemption from the above clause in respect of hours to be made in the case of sinking pits; also when any tunnelling is immediately required for opening out purposes to reach the seams of coal intended to be worked. Cases of aged and infirm workmen and workmen partially disabled by illness or accident to be considered by the pit set committee in the same manner as similar cases coming under the Minimum Wage Act 1912. It was stated that arrangements on these terms had already been made and agreed at 40 per cent. of the collieries in the county. The coalowners offered the following schedule of wages for workmen engaged on the pit banks and screens manipulating the coal:—



	Wage rate per day. s. d.	Years of age.	Wage rate per day. s. d.
14	1 6	18	3 3
15	1 8	19	3 7
16	1 10	20	3 11
17	2 3	21	4 3
17	2 9		

The above rates to be paid when wages are, as at present, 65 per cent. above the standard of 1888. The above rates not to apply to aged or infirm workmen, or workmen partially disabled by illness or accident, or in receipt of compensation. Each advance or reduction of 5 per cent. in the rate of wages to mean an advance or reduction of 1d. per day for those of the age of 17 years and under, and 2d. per day for those above that age, and proportionately for other percentages. Present conditions of employment to remain unaltered. At any places where the wages may be less per shift than the proposed minima, but where the hours worked per shift are shorter than the working shifts which generally prevail, special consideration to be given.

At the Longton Stipendiary Court, on Wednesday, 140 men employed by the Florence Coal and Iron Company Limited, Longton, were summoned for absenting themselves from work without notice, damages amounting to 6s. per man per day being claimed. Prosecuting counsel said the prosecutions were taken owing to the growing practice of men extending the week-end holiday over the Monday. This had become so bad that on September 22 so few workers went down that the colliery could not be worked at all. A warning was posted, and on Monday, September 29, there was a better turn-up. On October 6, however, there were again so many absentees that No. 1 pit worked only a quarter of a day. The attendance was even worse on October 13. Consequently, a slip was handed to each miner as he came for his lamp, stating that he had been absent on certain days, and requesting an explanation. Those who had given no explanation, or unsatisfactory explanations, had been summoned. It was further stated that, after consultation with the defending solicitor, it had been agreed to withdraw the summonses against 30 of the defendants. With regard to the remaining 110, pleas of guilty had been entered, damages at 5s. per man per day being consented to, and costs also to be paid.

#### Scotland.

Nineteen colliery districts of Mid and East Lothian were represented at a meeting of miners' delegates held at Dalkeith on Saturday. Reports from the collieries showed that fully two-thirds of the miners were in favour of increasing the contributions to the Miners' Union, so as to provide increased strike allowance and out-of-work payments and also to allow a larger proportion of expenses for local propaganda. It was resolved, after consideration, that a ballot of the whole of the miners of Mid and East Lothian be taken before the increased contributions were begun.

A meeting of the executive of the Scottish Miners' Federation was held on Friday, Mr. Robert Smillie presiding.—Bailie Mc'Kerrell, on behalf of the Ayrshire miners, reported that an amicable settlement had been arrived at in their dispute at the Kilwinning collieries in regard to the wages of oncost lads. A discussion took place on the proposal which has been before the miners for several months that any new wages agreement which may be entered into must guarantee a minimum of 7s. per day to Scottish miners. It was agreed that the executive should hold a special meeting to consider the matter fully with a view to having the question raised before the Miners' Federation of Great Britain.—Mr. Brown, secretary, read a statement which he had drafted with regard to the question of Sunday labour in mines.—It was agreed to forward the statement to the coalmasters with a view to having a joint conference on the matter, the colliery owners having already intimated their desire to limit Sunday labour as far as possible.

The adjourned meeting of the Scottish Coal Conciliation Board was held, on Friday, in Glasgow, to consider the application on behalf of the miners for an increase of wages of 18½ per cent. on the 1888 basis. Mr. Adam Nimmo presided. Parties failing to agree as to the demand, it was decided, according to rules, to refer the matter to Lord Balfour of Burleigh as neutral chairman. It was suggested that the meeting be held on December 15 or 16, either in Edinburgh or Glasgow, as might suit his lordship.

The monthly meeting of the executive board of the Fife and Kinross Miners' Association was held at Dunfermline on the 27th ult. The result of the ballot vote of the general body of the members on the proposal to raise the weekly contributions from 3½d. to 6d. was declared as follows:—In favour, 9,523; against, 6,757; majority in favour, 2,766. The executive agreed that the first increased payment be made on Friday and Saturday, December 12 and 13.

#### Iron, Steel, and Engineering Trades.

The return of the accountants to the Midland Iron and Steel Wages Board for September and October shows a reduction of 6d. per ton in the rate of iron-workers' wages. Under the sliding scale arrangement, which governs wages in North and South Staffordshire, Shropshire, Lancashire, Yorkshire and South Wales, the wages for puddling during the next two months will be 10s. per ton, and all other mill and forge wages will be reduced 5 per cent. from December 8 until February 7 next. With the addition of 6d. per ton given to the puddlers by resolution of the Wages Board in 1912, the puddling rate now becomes 10s. 6d. per ton.

Wages of 5 per cent. has been decided by the Conciliation Board having reached this decision after examination of the employers' books. Messrs. J. R. Winpenny and J. Cox, of the Board of Conciliation and Arbitration

for the Manufactured Iron and Steel Trade of the North of England, issued the accountant's report for the two months ending October 31 last, which shows that, in accordance with the sliding scale arrangement, there will be a reduction of 6d. per ton on puddling and 5 per cent. on all other forge and mill wages, taking effect from the 1st inst. The average net selling price of manufactured iron is certified at £7 6s. 7-77d. per ton, as compared with £7 12s. 7-16d. per ton for the previous two months.

#### Trade Unions and the Insurance Act.

Mr. Buxton received at the Board of Trade, on Friday, a deputation from the Engineering and Shipbuilding Trades Federation, who sought a statutory remedy for the conflicting interpretations put by umpires on section 87 of the unemployment part of the Insurance Act. The proceedings were private. In some cases the umpires award unemployed benefit to men displaced by strikes, and in other cases withhold it. Mr. Buxton thought it would take some time for the anomalies to mature sufficiently to justify the introduction of an amending Bill.

#### THE LONDON COAL TRADE.

THURSDAY, DECEMBER 4.

The London coal trade for the past week has maintained its firmer tone and the volume of trade doing is on the increase. Prices, however, remain stationary and in many cases much below the actual current quotations and below also the winter contract price. The turn of the month brought in a good number of orders for house coals, and it was evident that many of the merchants had refrained from buying during the last few days of November and somewhat eagerly sought to put a fair quantity on order during the early days of December, and particularly whilst the prices remained low. The continued mild weather is still the great topic of conversation on the market, and the slow consumption prevents any great increase in the wholesale buying from week to week. The London market has not experienced a severe winter since the days of the siding rent charges, which were instituted by the combined railway companies, and it is well known that the stocks on hand in the Metropolis could only partially cope with any great pressure arising from any long-continued frost, so that very few merchants are prepared to hold out for any length of time should very severe weather ensue. Here and there a merchant will be found who talks of picking up stock previous to Christmas, seeing the weather continues so open and mild, but only in very rare cases is this done until the new year has actually commenced. Usually the colder weather is experienced after Christmas rather than before. The heavy incoming of so many loaded wagons into London and the slow delivery trade has had another effect upon the market generally by causing a great scarcity of empties at the colliery end, and many of the Midland collieries have lost time in consequence. The delay in unloading has caused an unusual amount of shunting, besides the loss in wagon-hire. The seaborne market offers no variation. The official returns quote the same prices that have been in existence so long, viz., 21s. 6d. for best Wallsend and 20s. 6d. for seconds. Nineteen vessels were reported as arriving in the Thames for Monday's market, and six for Wednesday's, all sold. The recent news from the labour world is very disquieting. Not only are the railways affected, but business is seriously curtailed. It is reported on the Cardiff Coal Exchange that business is almost at a standstill in connection with the various conflicts in the South Wales district.

#### Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal	13/	13/
Do. nuts	12/	12/
Birley cube Silkstone	12/6	12/6
Do. branch coal	16/	16/
Do. seconds	11/	11/
Barnsley Bed Silkstone	13/6	13/6
West Riding Silkstone	13/	13/
Kiveton Park Hazel	13/	13/
Do. cobbles	13/	13/
Do. nuts	12/	12/
Do. hard steam	12/	12/
New Charlton Wallsend	15/	15/
Wharfedale Silkstone branch	16/	16/
Do. Flockton Main	15/6	15/6
Do. Athersley house coal	12/	12/
Newton Chambers best Silkstone	17/	17/
Do. Grange best Silkstone	15/6	15/6
Do. Hesley Silkstone	14/	14/
Do. Rockingham selected	14/	14/
Do. Rockingham Silkstone	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best	12/6	12/6
Do. large nuts	12/3	12/3
Do. small nuts	10/	10/
Do. kitchen coal	10/6	10/6
West Hallam Kilburn brights	12/6	12/6
Do. do. nuts	12/3	12/3
Do. London brights	11/	11/
Do. bright nuts	11/	11/
Do. small nuts	10/	10/
Manners Kilburn brights	12/6	12/6
Do. do. nuts	12/	12/
Shipley do. brights	13/	13/
Do. do. nuts	12/6	12/6
Mapperley brights	12/6	12/6
Do. hard steam	11/6	11/6
Cossall Kilburn brights	12/6	12/6
Do. do. nuts	12/	12/
Trowell Moor brights	12/6	12/6
Do. do. nuts	12/	12/
Grassmoor Main coal	13/	13/
Do. Tupton	11/6	11/6
Do. do. nuts	11/6	11/6

	Current prices.	Last week's prices.
<b>Derbyshire—(cont).</b>		
Clay Cross Main coal	13/	13/
Do. do. cubes	13/	13/
Do. special Dsrby	12/	12/
Do. house coal	11/6	11/6
Pilsley best blackshale	13/	13/
Do. deep house coal	11/6	11/6
Do. hard screened cobbles	11/	11/
Hardwick best Silkstone	13/	13/
Do. Cavendish brights	12/6	12/6
Do. cubes	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards	12/6	12/6
Do. small hards	12/6	12/6
Do. deep large steam	12/	12/
Annesley best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Linby best hards	12/6	12/6
Do. bright cobbles	11/9	11/9
Digby London brights	13/	13/
Do. cobbles	13/	13/
Do. top hards	13/	13/
Do. High Hazel coal	14/6	14/6
Bestwood hard steam coal	13/	13/
Do. bright cobbles	11/9	11/9
Hucknall Torkard main hards	12/9	12/9
Do. do. cobbles	11/3	11/3
Do. do. nuts	11/	11/
Do. do. High Hazel H.P.	14/9	14/9
Do. do. London brights	12/3	12/3
Do. do. large nuts	12/3	12/3
Do. do. bright nuts	11/3	11/3
Sherwood H.P. hards	12/6	12/6
Do. hard steam	11/6	11/6
Do. brights	11/3	11/3
Do. cobbles	11/3	11/3
Do. large nuts	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal	11/	11/
Do. screened cobbles	11/6	11/6
Do. bakers' nuts	11/3	11/3
Do. loco Two Yard hards	14/6	14/6
Do. Ryder nuts	11/9	11/9
Do. do. cobbles	13/	13/
Nuneaton steam coal	11/	11/
Do. screened cobbles	11/6	11/6
Do. nuts	11/3	11/3
Haunchwood steam	11/	11/
Do. screened cobbles	11/6	11/6
Do. nuts	11/3	11/3
Wyken steam coal	11/	11/
Do. screened cobbles	11/6	11/6
Do. nuts	11/3	11/3
Exhall Hill coal spires	14/3	14/3
Do. brights	12/6	12/6
Do. large steam coal	12/	12/
Do. best screened cobbles	12/3	12/3
Do. large nuts	12/3	12/3
<b>Leicestershire.</b>		
Snibston steam	10/	10/
Do. cobbles	10/6	10/6
Do. nuts	10/6	10/6
South Leicester steam	10/	10/
Do. cobbles or small hards	10/6	10/6
Do. nuts	10/6	10/6
Whitwick steam	10/	10/
Do. roasters	10/6	10/6
Do. cobbles	10/6	10/6
Do. nuts	10/6	10/6
Netherseal hards	18/	18/
Do. Eureka	12/6	12/6
Do. kitchen	10/6	10/6
Ibstock kibbles	9/9	9/9
Do. large nuts	9/6	9/6
Do. bakers' nuts	9/	9/
Do. Main nuts	9/6	9/6
Do. hards	9/3	9/3
Granville New Pit cobbles	11/	11/
Do. Old Pit cobbles	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best	13/	13/
Sneyd best, selected	14/6	14/6
Do. deeps	14/	14/
Silverdale best	14/	14/
Do. cobbles	13/	13/
Apedale best	13/	13/
Do. seconds	12/9	12/9
Podmore Hall best	13/	13/
Do. seconds	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London		
Do. brights	11/	11/
Do. shallow one way	11/	11/
Do. deep nuts	11/6	11/6
Cannock steam	10/9	10/9
Coppice deep coal	14/6	14/6
Do. cobbles	14/	14/
Do. one way	12/	12/
Do. shallow coal	13/6	13/6
Cannock Chase deep main	16/	16/
Do. Deep kitchen cobbles	11/6	11/6
Do. best shallow main	13/	13/
Do. shallow kibbles	13/6	13/6
Do. best brights	13/	13/
Do. yard cobbles	13/6	13/6
Do. yard nuts	12/6	12/6
Do. bakers' nuts	10/3	10/3
Do. screened hards	11/9	11/9
<b>From Messrs. Dinham, Fawcett and Co.'s Report.</b>		
Friday, November 28.—The seaborne house coal market was dull to-day, no enquiry, and no cargoes on offer. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Charlton W.E. (Yorks) 21s., Charlton Main 19s. 6d. Cargoes 20.		
Monday, December 1.—There was no alteration in the seaborne house coal market to-day, which continued dull with no sales reported. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Charlton W.E. (Yorks) 21s., Charlton Main 19s. 6d. Cargoes 19.		
Wednesday, December 3.—The seaborne house coal market was again very quiet to-day, no cargoes being on offer. Best (Durham) 21s. 6d., seconds 20s. 6d., Charlton W.E. (Yorks) 21s. 6d., Charlton Main 19s. 6d. Cargoes 6.		



CONTINENTAL MINING NOTES.

Belgium.

At a National Congress of Belgian miners held last month it was decided to oppose, by a general strike if necessary, the Bill instituting strike commissions. It was also resolved to continue the agitation for a minimum wage.

The output of pig iron from Belgian blast furnaces during the ten months ending with October last comprised 78,480 tons of foundry pig, 23,400 tons of forge pig, and 1,986,520 tons of steel pig—a total of 2,088,400 tons, which contrasts with only 1,932,380 tons in the corresponding period of 1912.

France.

The death has occurred of M. Gosselet, a well-known authority on the geology of the Ardennes.

The Liévin Company states in its report that in 1912-13 the output was raised to 1,948,566 tons, or 21,052 tons in excess of 1911-12. Labour has been scarce, and the cost of production has risen. During the year 8,797 workmen were employed, with an average wage of 2,365 fr. for hewers and 1,876 fr. for all underground labour. No less a sum than 1,882,954 fr., or 0.96 fr. per ton and 214 fr. per workman, was allocated in payment for housing, free house coal, pensions, and other social charges. In taxation, 765,958 fr., or 0.39 fr. per ton, were paid, and 415,814 fr. in general expenses. The dividend is 146 fr. 50 c. per tenth of share, free of tax.

*French Coal Contracts Tax.*—In their monthly circular some little time ago, the British Chamber of Commerce in Paris gave details of representations made with regard to the imposition of the *patente* tax upon contracts passed by British colliery companies with French State Administrations, including the State Railways. This matter has been the subject of appeal to the Conseil de Préfecture de la Seine, but in one case at least the result has been unfavourable. The Chamber now states: "We have again asked his Majesty's Government to represent to the French authorities the fairness of excluding from the operation of this tax coal contracts passed between October 1911 and the end of June 1912, no notice whatever having been given of this tax, which had never been previously applied to this class of contract."

Germany.

*Hamburg Coal Trade.*—Mr. H. W. Heidmann, of Hamburg, writes the import of coal into Hamburg has been in November:—

From	1913. Tons.	1912. Tons.
Northumberland and Durham...	169,806	215,885
Yorkshire, Derbyshire, &c. ....	62,135	70,462
Scotland .....	104,989	116,865
Wales .....	7,136	12,444
Coke .....	311	50
Total.....	344,377	415,706

*Revised Export Bounties in the Iron Trades.*—The following information has been received at the Board of Trade from a reliable source:—Although the industrial boom in Germany shows signs of weakening, yet the various leading syndicates in the coal and iron industries are making a determined stand to maintain steady prices at home. In modern iron-works the various branches are so closely interdependent that it is no longer possible to close down a blastfurnace without affecting the working of other parts of the concern, or even of neighbouring concerns, by cutting off the supply of top gas which is needed as power. As a result, the iron-works are forced to produce an over-supply of their base products, for which new markets must be found at any possible price provided they are outside Germany. These foreign sales are facilitated by export bounties, of which the following are at present in operation:—(1) The Coal Syndicate allows 1.50 marks per metric ton upon fuel purchased from the Syndicate, and proved to have been used for the production of iron goods actually exported. This bounty came into operation on October 1. (2) The Raw Iron Syndicate grants a bounty on raw iron purchased from it and used to manufacture articles for export. This bounty, together with the Coal Syndicate's bounty, amounts to 4.50 marks per metric ton. (3.) The Steelworks Union used to allow a bounty of 10 marks per metric ton on half-finished goods exported, but from June 1, 1913, this bounty was increased to 15 marks. The purchase price of the half-finished material to be used for the manufacture of articles for export is at the same time reduced by a further 5 marks per metric ton. (4.) The Rolled Wire Syndicate has increased its export bounties, so that they now amount to 11.50 marks per metric ton of raw material used in the case of iron wire, and of wire goods made from rolled wire, and to 16.50 marks for material used for wire tacks. The purchase price of the raw material used for making goods for export is also reduced by 5 marks per metric ton. All these bounties are paid out by the central bureau in Düsseldorf, known as the "Abrechnungstelle für die Ausfuhrvergütung."

*Ruhr Coal Market.*—The Syndicate has decided to reduce the settling prices. For blast-furnace and foundry coke the reductions will be 1½ and 1 mark per ton respectively, from January 1 to September 15 next, whilst for coals a reduction of ½ to 1 mark, and for briquettes one of ½ to ¾ mark, will come into force on April 1. The recent restriction of

the output of coke to 55 per cent. of the participation figures is highly significant of the situation, even in view of the fact that the nominal participation is about 1 million tons higher than it was last year. The published figures of the distribution of coal show a considerable decline, notwithstanding which the Syndicate has much difficulty in disposing of all its supplies, chiefly on account of the unfavourable state of the iron industry, and the absence of a compensating outlet in other quarters. It is true that the export trade is large, but prices have to be lowered to meet competition. Belgium is a fairly large customer, though the depression in the iron industry has affected the demand in that market; but, on the other hand, France and Holland continue to be good buyers. In South Germany the supply exceeds the demand, although the shipments have again been restricted.

*Coal Market in South Germany.*—The renewal of contracts for next year's supplies of Saar coal is now almost completed, and business has, in general, proceeded smoothly, buyers having mostly given their orders to the same sellers as before, though for smaller quantities in view of the less favourable situation. The campaign in Ruhr coals will commence very shortly, and English sellers are beginning to pay greater attention to this market. The conditions of distribution are still very unfavourable, and no improvement can be expected in industrial coals for the present, whilst house coal will not be in any greater request so long as the mild weather continues. The trade in anthracite nuts is still satisfactory, and business is good in large bituminous nuts; but very little is being done in large broken coke. The recent rains have improved the state of the river, so that craft can get up as far as the Upper Rhine without lightening cargo.

*Coal Market in Upper Silesia.*—The traffic returns for the first half of November show an increase of nearly 20,000 wagons over the same period of last year, from which it is evident that the course of business is not taking any other than a favourable turn. Customers' requirements continue large, and there is little falling off in the demand by the iron industry in spite of the not altogether favourable condition of this latter. The reason is to be sought in the fact that no one has been able to lay in large stocks. The weather of late has not been favourable to the house coal trade, notwithstanding which there is no difficulty in disposing of the output. Gas coals are in better request, and the demand for coking coal is by no means easy to satisfy. The requirements of the export trade are increasing, and it is impossible to deliver as much as Russian and Austrian consumers would like. The satisfactory tone of the coke market is retained, and the old complaint of insufficiently prompt delivery of coking coals still mot with. Even the small grades of coke find a ready sale; and the decline in the pig iron output has not reacted on the demand for metallurgical coke. Makers of briquettes are fully occupied with orders.

*Fuel Traffic in Ruhr Harbours, October.*—Total railway consignments of coal, coke and briquettes to Ruhrort 1,102,937 tons, Duisburg 357,463 tons, Hochfeld 42,382 tons—total 1,502,782 tons. Shipments outward to Coblenz and places higher up river 738,660 tons, to places below Coblenz 19,026 tons, Holland 637,454 tons, Belgium 335,113 tons, France 32,734 tons, other destinations, 39,973 tons. Total shipments from Ruhrort 1,109,656 tons, Duisburg 376,628 tons, Hochfeld 39,537 tons, Rheinpreussen 96,492 tons, Schwelgern 97,500 tons, Walsum 83,147 tons—total 1,802,960 tons.

*Output of Fuel.*—The following shows the production of various classes of fuel during October and the ten months ended therewith:—

	October.		January-October.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	16,102,206	16,941,570	147,404,184	160,615,852
Lignite .....	7,947,179	8,191,740	67,659,847	72,323,966
Coke .....	2,651,076	2,765,242	23,838,693	26,861,798
Coal briquettes.....	475,687	512,256	4,422,625	4,918,594
Lignite do....	1,777,613	1,961,354	15,748,884	179,550,076

*Exports and Imports of Fuel.*—The following shows the exports and imports of fuel during September:—

	Imports (October).		Exports (October).	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	1,006,862	884,762	2,308,513	3,042,219
Lignite.....	631,689	620,376	4,978	4,655
Coke .....	54,691	83,157	637,027	552,126
Coal briquettes...	4,478	2,854	176,143	196,377
Lignite do. ....	15,030	11,330	59,805	81,522

Imports during the 10 months ended with October were as follow.—Coal, 8,839,340 tons (+ 360,613 tons); lignite 5,949,343 tons (−79,529 tons); coke, 514,148 tons (+ 19,974 tons); coal briquettes, 22,466 tons (−18,805 tons); lignite briquettes, 98,641 tons (−6,354 tons). Exports in the same period were as follow:—Coal, 28,671,267 tons (+ 2,947,484 tons); lignite, 49,528 tons (+ 4,762 tons); coke, 5,543,546 tons (+ 727,403 tons); coal briquettes, 1,939,273 tons (+ 178,137 tons); lignite briquettes, 697,593 tons (+ 222,057 tons) The imports of British coal during October amounted to 770,152 tons, as compared with 892,540 tons in October 1912; the total for the nine months is 7,724,033 tons, an increase of 411,493 tons. Exports of coal in October

increased to Belgium, France, Italy, Netherlands, Austria-Hungary, European Russia, Sweden and Switzerland.

Netherlands.

In the first nine months of the current year, 10,184,781 tons of coal were imported into the Netherlands, of which 8,427,831 tons came from Germany, 1,550,576 tons from the United Kingdom, and 204,066 tons from Belgium. The exports amounted to 3,732,379 tons, the destination being:—Belgium, 783,959 tons; France, 630,968 tons; Germany, 899,655 tons.

Sweden.

*Electricity Supply from Collieries in Sweden.*—A new pit has recently been completed at the collieries of the Höganas-Billesholm Aktiebolag, at Ormestop, Sweden. As part of the coal produced is of a poor quality, which only brings a relatively low price, it has been decided to utilise it in the generation of electricity direct at the colliery. To this end, a generating plant, of a capacity of 7,000 kw, is to be installed. About a third of this will be utilised by the colliery company itself; a third will be taken by the South Swedish Power Company, while the remainder will be disposed of for lighting and power purposes to the towns and villages in the district.

Switzerland.

During the first half of 1913, 940,958 tons of coal, 213,514 tons of coke and 485,227 tons of briquettes were imported into Switzerland; in the first half of 1912, the corresponding totals were 941,158 tons, 181,623 tons and 399,333 tons. From Germany came 763,871 tons of coal (741,674 tons), 179,563 tons of coke (151,205 tons) and 446,572 tons of briquettes (361,159 tons). Considerable quantities were also imported from France and Belgium, but only 14,156 tons of coal (11,783 tons), 1,056 tons of coke (408 tons) and 141 tons of briquettes (*nil*) were imported from the United Kingdom.

ELECTRICAL WINDING EQUIPMENT FOR THE RAND.

The order for the electrical equipment of a large winding engine has been placed direct by Messrs. the East Rand Proprietary Mines Company Limited with Messrs. the British Westinghouse Electric and Manufacturing Company Limited, Trafford Park, Manchester.

The winder is capable of raising 8 tons of ore from a vertical depth of 4,500 ft. at a speed of from 2,200 to 2,500 feet per minute.

The electrical equipment comprises two 1,500-B.H.P. 550 volts 33.4 revolutions per minute direct-current motors direct coupled to the winding drum one on either side. These are supplied with current from a motor generator set operating on the Ward-Leonard system, and comprising a 4,200-B.H.P. three-phase, 25-periods 3,000-volts alternating-current motor direct coupled to two 1,375 kw. 550 volts direct current generators with a direct-coupled exciter for the generators and the winding motors. All the necessary control gear and switchgear are also being provided by the electrical contractors.

Thirty-five other similar installations, comparable in size with the above, have been supplied by the British Westinghouse Electric and Manufacturing Company Limited, of which the following are a few examples:—Six equipments for the Village Deep and City Deep of the Rand Mines Limited, the winding motor for each equipment being of 3,400 maximum B.H.P.; three equipments for the Brakpan Mines of the Consolidated Mines Selection Company Limited, the winding motor for each equipment being rated at 3,000 maximum B.H.P.; one equipment for the Great Western Colliery Company Limited, South Wales, England, with two winding motors capable of a maximum of over 1,800 B.H.P. each.

The winding drum in the East Rand installation which runs at the speed of the driving motors 33.4 revolutions per minute, is 12 to 21 feet in diameter, and 9 ft. 3¾ in. long between the cheeks, and winds a rope 2 in. in diameter.

The capacity of the winder is 160 tons per hour. The capacity of each winding motor has been increased to 1,900-horse power, and that of the motor driving the motor generator set, which runs at 490 revolutions per minute, to 5,000-horse power. The winding motors are shunt wound, connected in series with one another, and direct coupled to the drum shafts. The minimum output of the motor generator set is 1,375 kw.

It will be noticed that the speed of the winder is very low; the tendency on winders at the present time is to increase the load per wind and reduce the speed; this is also the case with the Great Western winder mentioned previously, whose speed is 28.6 revolutions per minute. The brake and clutch engines are driven by compressed air supplied from a Westinghouse slip-ring motor-driven air-compressor.



## NATIONALISATION OF MINES.

Discussed at Newcastle.

Mr. JOHN CHAPMAN, a member of the Newcastle City Council and prominently associated with the Northumberland Miners' Association, addressed the Newcastle Economic Society on Wednesday evening last on "The Case for Mines Nationalisation."

He stated that the miners' national strike of 1912 demonstrated to the public the greater need for State interference. The Minimum Wage Act, which resulted, was not sufficient alone to remove the many evils under which the workers labour. The community also had grievances likely to remain as long as the mines and minerals were private property. Under our individual ownership system, large quantities of valuable coal, aggregating many millions of tons, were lost to the nation for ever. Under collective control, barriers would be reduced to a minimum and, in many instances, removed altogether.

The present system did not lend itself to economy of production. Many pits to-day were working the same seams as their neighbours, but on different levels. It would often have been more economical and safer to have had the seam all worked from one level. Many additional pits or shafts were put down unnecessarily to obtain coal belonging to small landholders who also owned the mineral rights. State ownership would obviate much of that unnecessary expense. The welfare of the workers and of the public, Mr. Chapman insisted, was not the prime motive of the coalowners, or, for that matter, of the other private owners of capital, the question of profit being their first consideration. Collective control, by eliminating the factor of private profits and competition between mines, would go a long way towards minimising the risk of accidents. Of course, so long as other industries remained private property, the State mine would have to make profit—in other words, would have to pay—but the profit need not be so large, as the luxurious existence of the shareholders depending upon their profits would be eliminated. State ownership would reduce the price of coal to the consumer. The average selling prices were much higher than were necessary to cover the extra costs due to recent legislation and higher wages.

Referring to the returns of the income-tax, they found that profits had increased in four years by about 28 per cent. Whilst admitting that the cost of production was greater in consequence of the National Insurance Act, Minimum Wage Act and new Mines Act of 1911, he argued that the increase to the consumer was out of all proportion to that increase in cost, and that 6d. per ton would be sufficiently high to cover all costs due to recent legislation. Wages having gone up in Northumberland about 22½ per cent. on the basis, would represent an increased cost of not more than 1s. per ton. Whilst 3s. 6d. would represent the average increase in the price of coal during the past two years, only 1s. 6d. of that was due to wage and extra legislation. In reply to the possible argument that private ownership made for competition and therefore for the keeping down of prices, he stated that most of the valuable coal deposits in this country belonged to large coalowners or were already leased to large colliery proprietors, and mining tended to become almost a partial monopoly, with partial monopoly prices as a consequence. An important item in British mining was the problem of mining royalties. A case was reported to the Miners' Federation of a pit in the Bristol coalfield where the royalty paid by a mine drawing 300 tons per day was 8d. per ton, whilst the hewer was paid 7½d. for getting the coal. The royalty owner was requested to forego 1d. per ton, but refused, and the pit was closed in. Mr. Chapman ventured to say that now the average amount paid per ton for royalties only would equal 7d. and for wayleaves 1d. That meant, on last year's output, the sum of 8½ millions sterling levied upon the mining industry for the benefit of people who took no risk whatever. The abolition of royalties would lead to many mines, at present struggling for existence, being kept going. State ownership of royalties, whilst not abolishing the amount above the minimum paid, would give some elasticity, as the minimum, or part of it, could be abolished to enable the worst mines to be worked to advantage during trade depression. As to management, if the mines were State-owned, there need be no change so far as the officials and management were concerned. It would not matter to them to whom they gave their services so long as they were adequately paid. Regarding control under State ownership, the mines could be divided into areas somewhat similar to the present inspection districts, and a board or council, composed of responsible individuals, could be set up in each district, with mining experts and advisers under its control. The manager of each mine would consult with the experts, the experts would advise the district board, and the district boards would be responsible to the Minister of Mines and the National Commissioners. It was not to be assumed that under State control the workers' grievances would be at an end. The right to combine and the right to strike would still exist, but the right to work would prevail. If the right spirit were exercised, there was no reason why public employment should

not be as near the ideal as possible. Under State ownership the home consumer would have first consideration, and a necessary corollary would be a system of municipal depôts, eliminating the middleman, and an organised distribution of coal as thorough as the distribution of letters. There were about 420 coal merchants supplying house coal in London alone at present, and it was estimated by Mr. Hylton Dale that it was necessary to add 5s. per ton to the price of coal for general expenses only before any profit was seen by the merchant. Much of that 5s. could be cut down by a properly organised system of distribution. Foreign business would be done through State coal exchanges. Taking an average annual output for the United Kingdom at 260,000,000 tons at a capital value of 11s. per ton, they arrived at a total value of the mines of £143,000,000 sterling. According to the Labour Party's Bill, the mines would be purchased by the creation of "guaranteed 3 per cent. coal mines stock," yielding dividends at the rate of 3 per cent. per annum upon the nominal amount of capital held. It would be lawful for the Minister of Mines at any time to redeem any portion of the stock at par. Could the mines be profitably worked by the State? The average profit on coalmines during normal times was about 10½ millions sterling. The royalty owners received at least 8½ millions. These two sums made an annual income of 19 millions, which might be disposed of as follows:—Interest on the coalmines stock, 4½ millions sterling; to be set aside annually for about 25 years for the redemption of capital or coalmines stock, 5 millions sterling; cost of recent legislation, 4 millions sterling; leaving a surplus of 5½ millions sterling for other purposes. As the royalty rights were to be confiscated, the only people to be compensated were the colliery proprietors. Of the surplus, he proposed to appropriate 2 millions in raising the wages of the lower paid men, leaving 3½ millions to be utilised for administration, additional safety, development, and reserve.

The CHAIRMAN (Col. Henry A. Erskine) said he regretted exceedingly that a reply to Mr. Chapman's paper could not be given by Prof. Louis on December 10 as advertised, but it would be given instead in January owing to the absence from home of the professor on the former date.

In opening the discussion, Mr. H. S. MULDAHL asserted that the argument of State service and the elimination of the waste of competition in the matter of Post-office work had not strikingly appealed to him. He gathered that the coalmines were very profitable. He almost wondered whether Mr. Chapman was not booming the value of the mines of the nation with a view of unloading shares on them. He did not think the coalowners would jump at Mr. Chapman's price. The feeling of security, Mr. Muldahl contended, was more important to the community at large than the rectification of alleged wrong of long ago. A great objection to nationalisation would be that wages and conditions at the pits would be test questions at elections. He regretted he was not convinced by Mr. Chapman's arguments.

Mr. RUTHERFORD expressed the opinion that the land, railways and royalties should be nationalised before the mines. Mine-owning was a precarious business.

Support of Mr. Chapman was given by Mr. WM. STRAKER the corresponding secretary of the Northumberland Miners' Association, and Councillor CHAPMAN briefly replied to a few of the points raised by Mr. Muldahl and others.

## SECOND NORTHERN COLLIERY AND MINING EXHIBITION.

We give below a preliminary list of exhibitors at the Colliery and Mining Exhibition, promoted by the Northern Mining Industries Exhibitors' Committee, to be held in the City Exhibition Hall, Manchester, from Friday, June 12, to Saturday, June 27, 1914:—Messrs. Ackroyd and Beet Limited; Appleton and Howard; Sir W. H. Bailey and Co. Limited; Bleichert's Aerial Transporters Limited; Herbert Frood Company Limited; A. Hirst and Son Limited; Austin Hopkinson; Jandus Arc Lamp Company Limited; Lancaster and Tonge; Matthews and Yatee Limited; Miners' Safety Explosive Company Limited; Mather and Platt Limited; Méguin and Co. A.G.; W. T. Nicholson and Clipper Company Limited; Protector Lamp and Lighting Company Limited, Eccles; Patent Safety Mining Gear Company; Steinle and Hartung; Siebe, Gorman and Co. Limited; John Stringer and Son; Tilghman's Patent Sandblast Company Limited; Trefor Société Anonyme; Thomas and Bishop; Wolf Safety Lamp Company; Wilson and Stockall; Walsh and Dick.

**Acetylene Lamps in Mines.**—The entries in the competition for acetylene miners' lamps were considered by an expert jury at Basle in October. There were 20 entrants from eight different countries, who exhibited 102 lamps. These were reduced to 12, which will be submitted to elaborate tests in the laboratories of the various associations. These will be carried out by the Office Central de l'Acétylène, at Paris; Deutscher Acetylen Verein, at Berlin; Association Italienne, at Rome; and the Société Suisse de l'Acétylène, at Basle.

## MINING AND OTHER NOTES.

Mr. William Arnold, late certificated manager at the St. Helens Collieries Company Limited, St. Helens, Lancs. has been the recipient of a silver tea and coffee service, a illuminated address, and a purse of gold, presented by the officials and workmen of the collieries. Mr. Arnold has record of 57 years' underground work and has been with the St. Helene Collieries for 25 years as certificated manager.

The first annual general meeting of the Lothians Miners' Ambulance League was held in Edinburgh on Saturday last, the 29th ult. Mr. W. Walker, H.M. divisional inspector of mines for Scotland, presided over the large and influential gathering. The objects of the League are to promote and encourage the study and practice of ambulance work. The report submitted by Mr. H. J. Humphrys, H.M. inspector of mines, hon. secretary and treasurer, showed that the League had made good progress during the year and that the financial position was satisfactory. The Lord Murray of Elibank was elected hon. president, Mr. W. Walker, president and chairman of committees, and Mr. R. Ramsay, Niddrie Collieries, Portobello, vice-president. Various alterations to rules were discussed and agreed on.

The Delegacy of King's College have appointed, in succession to Dr. T. F. Sibly, appointed Professor of Geology at the University of South Wales, Cardiff, Mr. W. T. Gordon M.A., D.Sc., F.R.S.E., as lecturer and head of the Geological Department. Mr. Gordon has been lecturer in palaeontology and assistant in geology at the University of Edinburgh since 1910, and has made extensive researches in palaeobotany and some investigations in stratigraphical geology.

The late William Weir, chief partner of William Baird and Company, ironmaster, left a gross estate of £2,451,393, of which there is in Scotland £1,665,188, in England £554,519, and abroad £238,561.

Presiding at the fourteenth general meeting of the Weardale Steel, Coal and Coke Company, Sir John S. Barwick, Bart., reported that extraordinary expenditure had been incurred in the past year. There was an additional total of £24,000 made up of £6,232 due to the Minimum Wage Act, £4,866 to the National Insurance Act, and £7,866 to the Coal Mines Act of 1912. There was also a loss of £5,000 entailed by the shaft accident at Wheatley Hill last February.

Sir Hugh Bell, Bart., chairman of the Tees Conservancy Commissioners, gave an interesting review of the year's working of that body, at Middlesbrough on Monday. Speaking of the future, Sir Hugh said the question of additional coaling accommodation on the north side of the river would occupy some attention. They had entered into a draft agreement for the sale of 83 acres of land at Seaton on Tees for the erection of a shipbuilding yard. New roads were to be commenced that day connecting Port Clarence with Seaton Carew. They were exceedingly well adapted for the erection of iron and steel works because the north bank was in close proximity to the coalfields of South and Central Durham. Sir Hugh afterwards cut the first sod of the above mentioned railway.

Application was made in the Lancashire Chancery Court at Liverpool on Monday to sanction a grant of 1,000 guinees from the Hulton Colliery Explosion (1910) Relief Fund for the relief of the sufferers by the recent colliery explosion in South Wales. Mr. John Rutherford said that £140,000 was subscribed for the relief of sufferers by the disaster at the Pretoria pit, Little Hulton, three years ago. When all the claims of the sufferers had been met a considerable surplus remained, and a trust deed was prepared under which the Committee were at liberty, subject to the approval of the court, to make grants in connection with similar occurrences in the United Kingdom. The present surplus was £30,720. Mr. Courthope Wilson, appearing for the Attorney General of the County Palatine, said his clients were of the opinion that the surplus of the fund ought not to be limited to disasters arising in the county, having regard to the way in which the money had been subscribed. He considered the present application was a proper one, but reserved to himself complete liberty of action as regarded any further application. His Honour approved the application.

Mr. W. H. B. Lockerbie, surveyor for the past nine years at Hylton Colliery, has been appointed under-manager of Murton Colliery in succession to Mr. A. E. Holliday, who has removed to Ashington to take up a similar position.

The annual meeting of the Yorkshire Collieries Ambulance League was held on Saturday afternoon, at the Hotel Metropole, Leeds. The Hon. E. Wood was re-elected president. The report of the secretary (Mr. A. L. Barnard) for the past year showed that the number of teams which had entered for the Wood Shield Competition was 106, as compared with 97 the previous year, being the largest number since 1909, when the number was 12. Hickleton Main Colliery were the winning team. The first year competitions were held on September 6, 30 teams entering, as compared with 21 in 1912, and competition being held at six different centres. Five life-saving certificates and one certificate for meritorious ambulance work were granted during the year. The balance sheet showed a balance in hand of £118, as compared with £2 the previous year. The report and balance sheet were adopted.



The Bolsover Colliery Company having completed recently sinking operations at Rufford, coal being reached there a few weeks ago, are now turning their attention to the new pit at Clipstone. For this purpose, the company leased some 6,000 acres of coal lying under the Clipstone estate from the Duke of Portland. Boring commenced last week, and it is stated that a depth of about 100 ft. has now been reached. Water was found at a short distance from the top, but this was not unexpected, as the site of the colliery is almost in the valley. It is understood that 700 houses are to be erected at Forest Town for the workmen employed at this new colliery between the present village and the wood nearer Clipstone. This wood, by the way, the Duke of Portland has presented to the colliery company to be used as a recreation and pleasure ground, and will be artistically laid out.

The Ollersett Colliery Company have opened a new pit at New Mills in place of the old Pingot pit, set down.

A Local Government Board enquiry was held at Wrexham recently concerning an application by the Wrexham Rural District Council for authority to prepare a town planning scheme. The area proposed to be embraced is partly within the parishes of Stansty, Gresford, Acton and Gwersyllt. Three colliery companies within the proposed area raised objection to the scheme. It was explained that the council felt that now a new colliery had been opened at Acton, it was desirable to prevent haphazard building such as had occurred elsewhere. He referred especially to Rhos, where houses and streets had been laid out in any fashion.

An unusual prosecution was heard at Doncaster on Saturday, when George Cook, under-manager of the Cadeby Colliery, was summoned by the management for a breach of the Mines Act, on October 15. He pleaded guilty. Defendant was charged with having contravened No. 41 of the General Regulations in the Coal Mines Act, 1911, by allowing an uncertified person to act as deputy. It was stated that the person whom defendant appointed to do the work on one particular shift only, and under peculiar circumstances, was a person who until the Act came into force could have been fully qualified to act as deputy. On the date in question there was trouble with a gob fire, and defendant sent one of the deputies from another district to superintend the fire, and to fill his place temporarily he allowed a man named Gregory to act. The chairman said the company had no option but to prosecute, and they thought the justice of the case would be met by the payment of the costs, 7s. 6d.

The Lambton and Hetton Collieries Limited, propose to erect a colliery garden village at New Penshaw, one of the populous parishes of Houghton-le-Spring Rural District, the plans of which were passed by the Rural Council last Thursday. There are to be 79 houses, each with a separate garden in front, with a length of at least 40 ft. The back streets are to be 18 ft. wide, and the front streets 9 ft., both being asphalted. Attached to each house there will be a clothes-drying green, with posts erected. The houses will be erected in six rows, or terraces, and will form three sides of a square, one end of which will be open, a recreation ground forming the centre of the garden city.

Under the auspices of the Glasgow and West of Scotland Branch of the Smoke Abatement League of Great Britain a lecture on "Smokeless Fuel and the Relation of the Gas Companies to Smoke Abatement" was delivered in the Berkeley Hall, Glasgow, on the 27th ult., by Prof. Vivian B. Lewes.

The first meeting of the reconstituted Advisory Committee to the Board of Trade on Commercial Intelligence was held at 7, Whitehall-gardens on the 26th ult. Among the matters considered by the Committee were the collection by his Majesty's Trade Commissioners of samples of foreign goods competing with British products in the self-governing Dominions; proposals for a new commercial mission; and the proposal for a revision of the classification of goods under the Trade Marks Act.

The Cannock and Rugeley Colliery Company has decided to erect 100 miners' houses at Rawnsley, near Hednesford. It is proposed to build houses with three bedrooms and a living kitchen, and a large garden. Two or three other colliery firms are considering the question of erecting large numbers of workmen's houses, and 60 are now in the course of erection by the Littleton Colliery Company, Cannock.

At the monthly meeting of the Rotherham Rural District Council, the business was chiefly in connection with schemes rendered necessary by the colliery developments in South Yorkshire. Since the last meeting consideration had been given to applications from the Rothervale Collieries Limited, Maltby Main Colliery Company Limited, and the Dalton Main Collieries Limited, for water to be supplied at their respective collieries at Thurcroft, Maltby, and Silverwood, and it was decided that the lowest possible price at which the Council could supply water in bulk by meter to large consumers was at the rate of 1s. 3d. per 1,000 gallons.

It is rumoured that the East Tanfield pit, in North-West Durham, one of the oldest mines owned by Messrs. J. Joicey and Co. Limited, is to be closed at the end of the present year. The working of the coal has, it is stated, been greatly hindered by the pressure of water, and only a few months ago the workmen were temporarily idle owing to a sudden flooding of the pit. There is plenty of coal in the mine if it could be wrought without difficulty.

The Higher Education Sub-Committee of the London County Council have recommended the Somerset House site as the most favourable for the housing of the University of London. In their opinion its accessibility from all parts of London, its prominence, and its architectural merit renders the site most suitable for the purpose in question.

The opening gathering of the winter session of the Notts and Derbyshire branch of the Association of Mining Electrical Engineers was held at Eastwood, on Wednesday, October 29. By the permission of Messrs. Barber, Walker and Company through Mr. J. W. Fryar, the general manager, the members were given an opportunity of inspecting the electrical power station at Moorgreen which supplies six of the company's collieries in the district. Additional interest was added to the visit by Mr. L. G. F. Routledge, chief electrician, and his staff, who had arranged an exhibition consisting of samples of switches, gate end boxes, and other parts of electrical apparatus. Following the inspection the members were entertained to tea by the company at the Sun Inn, where subsequently the annual meeting of the branch was held. The election of officers resulted as follows:—President, Mr. L. G. F. Routledge, Eastwood; vice-president, Mr. E. E. Beadsmoore, Tibshelf; secretary, Mr. F. Cusworth, East Kirkby; auditors, Mr. F. Smith, Pinxton, and Mr. T. H. Williams, Kirkby; council, Mr. E. R. Hudson, Ilkeston, Mr. C. A. Newton, Derby, Mr. J. W. Watson, Ilkeston, Mr. J. T. Taylor, Swanwick, Mr. J. Highton, and Mr. A. R. Davies. On the proposition of Mr. Beadsmoore, seconded by Mr. Cusworth, a hearty vote of thanks was passed to Messrs. Barber, Walker and Co., and Mr. J. W. Fryar, the general manager, for giving permission to visit the power station and entertaining the members, and also to Mr. Routledge and his staff for their assistance.

A meeting of the members of the Notts and Derbyshire branch of the Association of Mining Electrical Engineers was held at the Hotel Portland, Chesterfield, on Saturday evening, Mr. E. E. Beadsmoore (vice president), of Tibshelf, being in the chair in the unavoidable absence of the president (Mr. L. G. F. Routledge, of Eastwood). The chairman announced that Mr. T. H. Williams, of East Kirkby, and Mr. E. Barks, two members of the branch, had passed the recent examination, and certificates had been forwarded to them. An instructive discussion took place on the paper on "Large Prime Movers and Boilers for Power Houses," which was read a few days ago by Mr. E. Kilburn Scott, of London, at a joint meeting of that branch and the Midland branch of the National Association of Colliery Managers at the University College, Nottingham. The members who contributed to the discussion were the chairman, Mr. F. Cusworth, East Kirkby (branch secretary), Mr. A. R. Davies, Bolsover, Mr. F. Smith, Pinxton, Mr. C. Bakewell, Creswell, Mr. J. Kirkby, Pilsley, Mr. A. Abell, Langwith, Mr. Jos. Watson, Sheepbridge, and Mr. J. T. Taylor, Swanwick. The secretary stated to a joint meeting of that branch and the Midland branch of the National Association of Colliery Managers had been arranged to be held at the Nottingham University College to discuss the section relating to electricity in the general mine regulations.

The recent disaster at the Universal Colliery of the Lewis Merthyr Consolidated Colliery Company, at Senghenydd, resulting in the highest death roll ever experienced in the South Wales coalfield, has impelled some of the leading coalowners to go more fully into the question of insurance, so as to cover themselves against the heavy losses that must inevitably be entailed underground in the event of an explosion, quite apart from insuring against loss in so far as the Workmen's Compensation Act is concerned. As the result of enquiry and negotiation, colliery owners, says the *Engineer*, find that they can insure against loss in the way of damage to underground workings and machinery—a matter of great importance, not only to South Wales, but to the coalfields of the United Kingdom. They are also able to cover themselves to the extent of having their collieries put into working order again should a disaster occur. The whole question has been gone into very closely and exhaustively, and an approximate idea as to what the premium would be has been obtained. The insurance will be effected by individual colliery concerns and not collectively. Underwriters have gone very fully into statistics and it is believed that the risk taken over a series of years is not a very serious one.

The Richmond Ironworks, Stockton, were offered for sale at Middlesbrough on Tuesday. There was only one bid of £3,000 made, and the property was withdrawn.

Steady progress is being made with the experimental search for coal on the Croxteth estate at West Derby. Preparatory to actual boring, a steam pumping plant has been erected in Mab-lane, and is being worked to free the proposed trial shaft of the water which is generally super-abundant in the red sandstone strata above the coal measures.

Sir T. Edward Thorpe, C.B., F.R.S. (chairman), Mr. Robert Nelson, of the Home Office, Mr. W. Slingo, of the General Post Office, Mr. James Swinburne, F.R.S., and Mr. Alexander P. Trotter, of the Board of Trade, have been appointed by the Board of Trade to be a committee to consider the causes of explosions which have occurred in connection with the use of bitumen in laying electric cables.

## SPONTANEOUS COMBUSTION IN COALMINES.

A Digest of Evidence before the Committee.

(Continued from page 1121.)

Mr. G. P. HYSLOP.

Mr. G. P. HYSLOP, colliery manager to the Shelton Iron and Steel Company, was called on March 5, 1913. Witness commenced by describing the seams liable to spontaneous combustion in the collieries managed by him. These are the Great Row, the Cannel Row, the Winghay and the Rowhurst seams. They had ceased to work the Winghay and Rowhurst seams within the last four years.

### METHODS OF WORKING.

His experience of spontaneous combustion had been gained at the Madeley Collieries in the Ragman Rough 7 ft. and Hans seam, 7 ft. Banbury seam, and Bullhurst seam; at the Mossfield Collieries in the Cockshead seam; and as subordinate official at Florence Colliery in the Great Row seam. The seams at Shelton are worked entirely by longwall now. In the Great Row seam the main roads are driven narrow in the solid coal, from 2 ft. to 3 ft. being left up for a roof and panels of longwall of from 200 to 300 yards in the width are worked to the rise. Longwall working has only been adopted during the past 9 years. Formerly, on account of the difficulty in obtaining suitable packing material, a method known locally as "post and thirl" was followed. The roof coal is, however, got down in the wastes and the packing material is obtained almost solely from the roof marl broken down between the packs. The roof coal in the roadways is allowed to stand as long as possible, and the roads are not ripped into the overlying marl for some time after the face has advanced; the *débris* from the ripping is not invariably stowed in the face, but is sometimes sent out of the pit. In the Cannel Row seam the main roads are driven narrow in the solid coal and the longwall faces worked to the rise of any convenient width. In the Winghay all the coal is extracted and the main levels are packed in the gob, from which longwall faces advance to the rise. In the Rowhurst all the coal is extracted and all roads beyond the shaft pillar are packed roads in the goaf. The two latter seams have now ceased to be worked.

The method of work at the Madeley collieries in the seams liable to spontaneous combustion is entirely pillar and stall. The goaf was charged with gas as the coal was extracted. The method of work at the Mossfield Colliery in the Cockshead seam was similar to that described in the Great Row seam. Owing to the tender nature of the roof a portion of the seam is left up in the longwall face, and as much of the roof coal as is possible is extracted in the wastes. In those instances in the Great Row longwall working where spontaneous combustion has taken place, the seat of the fire has nearly always been at some point where there has been irregular subsidence of the roof coal and the superincumbent strata, permitting leakage of air into a waste. This is more likely to occur in the first pack which is put against the solid rib of coal upon starting a longwall drift. When these fires have occurred, the first symptom has been noted about 9 or 12 months after the drift commenced and when it has advanced 70 to 80 yards from the rib side. Actual fire has not been observed until, in some cases, three months later. Fires in the Cannel Row have occurred in the packs. In one section the fires were entirely absent, and in the other case they were pretty frequent. The fine holing dirt heated within the pack, and when the heat reached the cannell which was used for "builders" on the outside of the pack, the latter burst into flame. The dirt was almost a bussle. That itself never caught on fire; it was the large stuff outside the packs that caught on fire.

Spontaneous combustion in the Winghay or Rowhurst in nearly all cases has taken place at a point where there was irregular subsidence of the roof on the packs, generally arising from a stoppage of the working face for a period and a consequent fracture of the roof at the point where stopped. Leakage of air into the waste, unsuspected and unnoticed, has taken place, and in time spontaneous combustion followed. Only one case of spontaneous combustion occurred at the Madeley collieries in those districts where the system of charging the gob with gas could be properly carried out during the 4½ years witness was in charge. In this instance a small pillar of coal had been left at a fault, and faint symptoms of gob fire appeared before the firedamp covered the pillar. Other cases occurred at these collieries during that period, but they were revivals of old fires due to ineffectual stopping off. The gob fire referred to in the Cockshead seam at Mossfield occurred in some old workings into which air was admitted by the removal of pillars.

### INDICATIONS OF HEATING.

In the Great Row seam, in longwall workings, the smell, very faint, but perceptible to an experienced examiner, generally appears for a considerable period before any of the more serious symptoms are noticeable. On some occasions the actual gob stink is preceded by a strong smell, often called by the men a "sour" smell, which suggests fermentation of some matter in the goaf. Frequently the sour smell comes and goes without further trouble. On other occasions this is followed by a faint smell of distillation, but sharp and suggestive of freshly mixed mustard. Occasionally moisture appears at the mouth of the waste and "sweating" is noticed. Sweating, however, is quite common without any subsequent symptom of gob fire. No rise in temperature is noticeable, and no smoke appears in the waste. This gob stink is only to be observed out of the current of ventilation and in the wastes, and becomes more accentuated as time goes on.

In some cases where the stink is observed in its early stages, packs from 3 to 5 yards in width are drawn across the waste and by roof pressure, as the face







## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Colliery Insurance Proposals—The Question of Mutual Action, or Self-Insurance for Large Undertakings—Its Effect on Share Values—Great Triple Strike Foreshadowed—The 9d. Increase in the Minimum—Greater Taxation and Heavier Rating—Re-assessment of Collieries—Conciliation Board Deals with Important Reference from the High Court—Satisfactory Examination at Senghenydd—Colliery Traffic Interrupted by Sudden Railway Strike.**

The question of colliery insurance is, at the present time, under careful consideration in South Wales, having been brought to the front by the Senghenydd explosion. Just as insurance is made in respect of the Compensation Act, so it is desired to make insurance against the risk of losing profits—not only on account of exceptional incidents, such as an explosion, but also against loss of profits which may be entailed by other mining risks. It is stated that, as the result of enquiries, those who have the matter in hand are given to understand that underwriters are prepared to take the risks occasioned by accident, both in regard to surface plant and underground workings.

Obviously, any such scheme of insurance would have to be taken up generally, or else the underwriters could not spread the risk; and this consideration involves the further one that if there is to be such a widespread practice of insurance as will make it profitable for underwriters to take up the business, it necessarily follows that the coalowners, in combination, could themselves carry the risk at a lower cost. Their position would be just that of the larger steamship lines, or of other large undertakings which practise self-insurance. Just as the owner of a large number of steam vessels can, by setting aside the ordinary amounts of premium, cover himself in respect of insurance without going to any outside underwriters, so the associated coalowners can carry their own burdens in respect of colliery risks without entering into any agreement outside. Moreover, the position of the coalowners, as bearers of the risk would be stronger than that of underwriters, provided all the collieries came into the arrangement.

One incidental advantage of a system of insurance would be the stability of value that would be given to colliery investments. Such an occurrence as that at Senghenydd invariably has the result of discouraging investment in colliery shares. Probably it is not too much to say that there was an absolute cessation of local business of this character for the first two or three weeks after the catastrophe. But if the cost of an accident were, through mutual insurance, distributed over the whole coalfield, the special risk in this respect which attaches to investments in individual collieries would be extinguished; and colliery shares would come into greater favour, and would consequently bear a higher price.

The threatened amalgamation of railwaymen with the miners and transport workers—it really amounts to a threat—is occasioning discussion, for the idea is that early in 1915, by means of a combination of these three classes of wage-earners, great changes in the conditions of their employment can be procured.

The general secretary of the Miners' Federation of Great Britain, it appears, has been instructed to write to the general secretary of the railwaymen and transport workers with a view of a general conference of the three executives being called.

Speaking upon the subject of Parliamentary representation in West Monmouthshire—from which Mr. T. Richards, M.P., secretary of the South Wales Federation, will retire at the end of the present Parliament—Mr. G. Barker urged the Abertillery miners to support a Labour candidate, and he brought forward the suggestion that wages could be increased by legislative action. Landowners and capitalists, he said, were always anxious to secure the reins of government. Had Labour been properly represented in the past, they, as miners, would have been able to get an Act under which there would be a reasonable wage to all employed in and about the collieries. There was going to be an effort to increase the minimum rate by 9d. per day, and there ought not to be any difficulty in bringing that about if the workers exercised their powers.

The most serious feature of the question is in the "local administrative authorities" idea. Given any large measure of Labour representation on such authorities, it follows that the application of local rates to social purposes will increase largely: education, libraries and reading-rooms, baths and washhouses, parks and playgrounds, bands in the parks, municipal ownership of tramways with special service and low fares for workmen—these, and other developments, all entailing heavy expenditure, all strictly legal and within the closest limits of municipal service, come into sight. It is in the local rating no less than in the legislative minimum that increased costs of production are indicated. What, for example, would there be to hinder heavy outlay upon cottages, through application of the existing Housing Act, whereby the local authority discharges the function of a building society in making occupants the owners of their dwellings?

Concerning re-assessment of collieries, the Merthyr Union Committee had before it, on Saturday, a letter from the secretary to the Coalowners' Association,

replying to a suggestion that representatives should be sent to a joint meeting. The letter intimated that the Association was unable to be represented at such a meeting, the question being one which, in their opinion, should be dealt with by the respective unions and the parties affected. Upon the reading of this, the chairman of the Assessment Committee remarked that the hope of combination was at an end. A conference would be waste of time and money. Each union must act separately. It was therefore decided to consider the appointment of an expert valuer to re-value the whole of the collieries in the union. The advisability of instructing overseers to introduce the imperial instead of the long ton will also be considered; overseers to reduce the rate per ton in proportion to the difference effected by the change.

Further rumours have been current as to the extension of the Powell Duffryn undertaking by acquisition or amalgamation, the Bedwas or the Cardiff Collieries (Llanbradach) being again mentioned. There is, however, no reliable basis for the rumours.

To Ebbw Vale students, Mr. D. A. Thomas, head of the Cambrian Combine, said that coal in South Wales was not nearing the point of exhaustion, nor would it within the next 400 years; but it would become dearer and dearer, the thinner seams having to be worked. As far as possible, they should conserve their resources. Was it right for this generation to work out from the ground that which the centuries had put there, and leave their successors to face a national debt, with no coal? Statesmen should carefully consider the question; but there were not a dozen in the House of Commons who understood coal.

The colliery "handyman" figured in a case at Bridgend County Court, a local company being sued by him for £4 6s. 7d. on account of wrongful dismissal. Plaintiff stated that his employment was that of a repairer; and that upon refusal to do work as a collier he was dismissed. The defence was that plaintiff took his tools to the working place, but declined to work because he found the place wet. It was stated by the manager that defendant was a "handyman," and had to do whatever he was told. The judge said the grade of handyman did not appear in the list; and that even if a man did work, without objecting, in a different grade, it did not follow that he was bound to do so.

Two rules, framed by the independent chairman (Lord St. Aldwyn) under the Minimum Wage Act, were challenged by the workmen as *ultra vires*. The chief issue was as to the period for averaging earnings to arrive at a daily rate representing the minimum wage. Lord St. Aldwyn fixed a fortnight as the period, but the judge in court put it at a week. Upon appeal, the higher court ruled that there was no power under the Act to fix any period at all; yet it was recognised that no average could be got from one day. In the outcome, on Thursday of last week, it was arranged in the Appeal Court that the whole matter should go to the South Wales Conciliation Board, the further hearing being adjourned till after that Board had endeavoured to reach agreement.

At the emergency meeting of the Conciliation Board, on Saturday—continued by adjournment on Monday—the subject was exhaustively dealt with. The two rules were Nos. 5 and 7. One required the workmen to give notice when his place became abnormal; failure in this respect entailing forfeiture of his right to have the wage made up to the minimum rate. The other fixed a fortnight as the period for averaging the daily earnings. The men objected to that part of the rule which compelled them to give notice; and they objected to the fortnight as the period for averaging, but were willing to agree to a week. It was accepted that Rule 5 was *ultra vires*, although it was held that some notification of the workman's inability to earn the minimum wage rate must be given the employers.

The chief difficulty, however, arose on a peculiar point, it being alleged that in certain instances a man might be paid twice over for the work that he had done. For example, a man engaged in deadwork non-productive of tonnage remuneration, might in one week, because of this deadwork, earn less than the minimum, and therefore come upon the owners to make up his wages to the minimum rate. Then a few days later, in actually cutting the coal, he would get the full tonnage rate, reaping therein the benefit of the necessary deadwork of the preceding period. In such circumstances the owners, who had been called upon to make up the wage rate at the time the deadwork was in operation would be paying twice—first in the make-up money, and then in the full tonnage rate, which was earned only because the deadwork had been done. The higher earnings of the later period would be the outcome of the preliminary work of the earlier time as to which special remuneration in making up the wages had been obtained from the employers. Upon this point agreement proved to be impracticable, and the matter had to go back to the court. On Thursday the Court of Appeal decided that the board had no power to determine the period of computation, Rule 7 therefore, being *ultra vires*, and that the disputed portion of Rule 5 was *intra vires*.

Senghenydd workings were examined on Tuesday by a party of experts, in pursuance of the arrangement made last week. Government inspectors, colliery managers and workmen's representatives forming the party. Prof. Redmayne, Dr. Atkinson, Col. Pearson and Mr. Dyer Lewis formed the inspectors' party; Messrs. T. Griffiths (Porth), D. Hannah (Ferndale) and L. C. Jacobs represented the company; and from the

Federation came Mr. J. Winstone (vice-president), with Mr. D. Watts Morgan and Mr. Hubert Jenkins. A further inspection is to be made on December 16. As to precautionary measures in respect of the bushings, &c., it is stated that the party found that the utmost possible had been done; everything is cooling down, and the temperature is normal.

Glamorgan Education Committee discussed, at Tuesday's meeting, the salary of Mr. H. Davies, director of mining instruction. General agreement was expressed, in very eulogistic terms, with a proposal to increase Mr. Davies' salary; and strong testimony was borne to his energy and resourcefulness, particularly his faculty of initiative. It was stated by Ald. Williams that the high position occupied in mining education by Glamorgan—where far more is done than in any other county—is due to Mr. Davies, whose work was "splendidly done."

The joint committee of the Conciliation Board, appointed to consider the question as to banksmen's employment, met in Cardiff on Tuesday, and an agreement as to hours, fixing these at nine per day, was followed by discussion upon the wage-rate. The sum of 5s. per day plus percentages is asked for, the general question of duties to be performed having been disposed of. After a prolonged sitting, the committee adjourned till December 13.

The steam coal workmen in Forest of Dean submitted a request that the Minimum Wage Board should be divided, making separate sections for them and for the house-coal men. Mr. Russell Kerr, the independent chairman, has, however, given a decision contrary to their wish. He states that, having well considered the provisions of the Act, he failed to discover any means whereby a second board could be established in the same coalfield.

The sudden strike of railwaymen, originating in Llanelly on Tuesday, and spreading to other centres during Wednesday, occasioned much uneasiness on the Coal Exchange at Cardiff, for there was immediate interference with shipments, this having as its consequence a shortage of trucks at the collieries. Empties could not be moved, and the colliery traffic generally was hampered, each succeeding hour making matters worse. The men of one colliery refused to travel by the workmen's train because they believed (erroneously) that the engine was to be driven by a "blackleg"; and the result was that hundreds of miners were absent from work.

## COAL, IRON AND ENGINEERING COMPANIES.

**Argentine Iron and Steel Company (Pedro Vasena E Hijos) Limited.**—Subscriptions have been invited for 150,000 preference shares of £1 each at par. Each allottee of preference shares of the issue will, after payment in full for his shares, receive an option certificate, to bearer, entitling the holder to claim an allotment, at par, at any time or times up to and including July 31, 1915, of one ordinary share of £1 in respect of every three preference shares of £1 each allotted under the present issue. The present issue of shares will rank for dividend in respect of the profits of the current financial year ending February 28, 1914, proportionately from the due dates of the instalments, but not before allotment. The authorised share capital of the company is £1,200,000, divided into 500,000 preference shares of £1 each, entitled to (1) a fixed cumulative preferential dividend of 6 per cent. per annum, and 20 per cent. of the surplus profits available for dividend, and (2) upon a distribution of assets, priority in respect of capital and arrears of the fixed dividend, if any, and 20 per cent. of the surplus assets, after repayment of the whole of the paid-up capital; and 700,000 ordinary shares of £1 each, entitled to (1) the remaining 80 per cent. of the surplus profits available for dividend, and (2) upon a distribution of assets, repayment of the capital paid up thereon, and the remaining 80 per cent. of the surplus assets; 350,000 preference and 600,000 ordinary shares have been issued to date. The authorised debenture issue consists of 6 per cent. first mortgage debentures of £350,000, redeemable by March 1, 1932. Debentures of the nominal value of £13,000 have been drawn for redemption at par, under the terms of the trust deed, leaving now outstanding £237,000.

**Bradford Coal Merchants and Consumers' Association Limited.**—The directors announce an interim dividend at the rate of 4 per cent. per annum, less income tax, on the ordinary shares, for the past half-year.

**Gairntable Gas Coal Company Limited.**—The report for the 12 months ended September 30 last states that the accounts show a profit of £1,056, which, with £162 brought forward, makes the balance of £1,218 at the credit of profit and loss account. The directors do not feel warranted in recommending the payment of a dividend, and they propose that £500 be written off for depreciation of colliery and lease, and that the balance of £718 be carried forward. An arrangement has been come to with the proprietor of the minerals, by which the company has obtained a considerable concession in the rate of lordship and a reduction of the fixed rent to one-half of the amount provided for in the lease. As a part of this arrangement the company renounces that portion of the mineral field which lies to the south of the large fault, and which they were bound to develop or give up by Mart., 1916. The directors saw no prospect of the company being able to work this portion of the field, as it involved the sinking of new pits and a large capital expenditure.

**Chinese Engineering and Mining Company Limited.**—The report to June 30 last states that the gross profits of the Kailan Mining Administration, which administers the mines of this company and those of the Lanchow Mining Company Limited as a joint undertaking under an agreement dated June 1, 1912, amounted to 2,934,736 dol. After making provision, in accordance with the terms of the agreement, for one year's interest on the 6 per cent. Kulan bonds, £72,000; redemption of bonds for the half-year to June 30, 1913, £12,000; reserve for depreciation,



ls.; and the proportion of profit to which the Provincial Government is entitled, 11,124 dols., there is a net profit of 1,655,743 dols., which is divisible as follows:—60 per cent. to this company and 40 per cent. to the Lanchow Mining Company Limited. The amount brought to credit of the company's profit and loss account is £101,155, which is reduced by certain expenses not chargeable to the Kailan Mining Administration to £99,977. Interest and other items bring up the total receipts to £109,735. After deducting administration and other expenses in Europe, income-tax and the sum of £5,957, being one-third of the preliminary expenses, there remains a net profit of £85,854. The board propose that a further dividend of 4½ per cent. be declared, free of income-tax (making a total of 8 per cent.), and that the balance, £5,854, be carried forward. The total sales of coal for the year amounted to 1,728,296 tons.

**Dinnington Main Coal Company Limited.**—The directors have decided to pay an interim dividend of 1s. per share, less income-tax.

**Electrical Works (Miller) Limited.**—This company has been registered, with a capital of £25,000 (5,000 shares of £5 each and 5,000 shares of £1 each), to carry on the business of electricity suppliers, &c. Minimum cash subscription, £2,000. Registered office, 16, John-street, Bedford-row, W.C.

**Engineering and Mercantile Company Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of exporters of and dealers in tools and engineering plant of every description, and also of machinery dealers. Signatories: A. M. Marney, 34, Hanley-road, High-street North, Manor Park, E., and D. E. Beal, 213, Kingsland-road, N.

**Fassifern Coal Company Limited.**—The report for the year ended June 30 last states that the tonnage of coal won by the tributor during the year was 19,959 tons, as compared with 11,840 tons last year. Notwithstanding this increase, only the minimum royalty of £500 per annum became payable. The result of the year's working is a net profit of £373, which, with £546 brought forward, gives a total of £919 standing to credit of profit and loss account. Negotiations are proceeding which, if successful, will enlarge the sphere of the company's operations and necessitate an increase of the capital, in which event the shareholders will be called together for that purpose.

**Graig Giffrew Colliery Company Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares (200 deferred), to acquire certain minerals known as the Gellia or Wenallt Vein and the vein immediately underlying it, known as the Glynwylm Vein situated in Blaenrhondda, Glamorgan, and to carry on the business of colliery owners, miners, coalmasters, coal merchants, ironfounders, and patent fuel manufacturers, &c. First directors: William Phillips, Blaenywaun, Onllwyn; D. J. Thomas, 4, Woodland-road, Neath; James Thomas, Redcliff, Porthcawl; William John, Ty-Nant, Neath Abbey-road, Neath; T. Thomas, The Railway Inn, Aberdulais; and G. Jones, Maesycod, Cadoxton, Neath. Qualification, 100 shares.

**Harvey (Matthew) and Co. Limited.**—This private company has been registered, with a capital of £25,145 in £5 shares, to acquire the business of brass and nickel casters and ironfounders, &c., formerly carried on by Matthew Harvey and Co. Limited, and to carry on the business of iron and steel founders and general ironmongers; also to enter into an agreement with Matthew Harvey and Co. Limited (the old company) and Frank Harvey. First directors: M. Harvey, Shoal-hill, Cannock, Staffs., and Frank Harvey and L. Kate Harvey, both of Brackenwood, Birmingham-road, Walsall.

**Hornsby (Richard) and Sons Limited.**—The report for the year to September 30 last states that there is a profit on the year's working of £51,579, after writing off depreciation and paying directors' remuneration. Deducting £11,127 for interest on debenture stocks and on payment in advance of calls, £3,000 interim dividend on preference stock, paid June 15, 1913, and adding £3,877 balance from last account, gives a disposable balance of £41,328. The directors recommend the following appropriation: Further dividend on £100,000 preference stock for the half-year ended September 30, making 6 per cent. per annum, less income-tax, £3,000; dividend on 5,545 new shares of £10 each, fully paid, to September 30 at the rate of 6½ per cent. per annum, less income-tax, £3,465; dividend on 30,000 ordinary shares of £10 each, £8 paid, to September 30 at the rate of 6½ per cent. per annum, less income-tax, £15,000; dividend on £1 per ordinary share (making £9 paid) from August 5, 1913, to September 30, 1913, at the rate of 6½ per cent. per annum, less income-tax, £2,937; placing to reserve fund, £15,000; balance to carry forward, £4,570.

**Kent Collieries Limited.**—The report for the period to September 30 last states that, in order to avoid the inconvenience of holding the general meeting during the holiday months, it was decided to make up the company's accounts to September 30, instead of June 30, as indicated in the last report. At the date of the last general meeting the depth of the No. 3 pit was 1,080 ft. The shareholders were informed by circular on September 17 last that the first seam of coal was cut in this shaft at about 1,275 ft., and that, the sand and water having been successfully passed through and tubbed off, the colliery could then be worked on a commercial scale. The managing engineer, however, reported that he found the conditions of sinking so much better than had hitherto been the case, and such rapid progress could be made that it would be more advantageous and economical to proceed without intermission to the 1,625 ft. level, and not to commence the working of coal until that depth is reached. Below the seam at 1,275 ft. there are two seams—one at 1,500 ft. and the other at 1,625 ft.—and it is anticipated that sufficient coal can be raised from these seams, first, to supply fuel for the colliery boilers, and ultimately to give an output up to 500 tons per day. Whilst developing this coal, it is intended to continue sinking the shafts to the 2 ft. 9 in. seam at 1,810 ft. to open it up, and afterwards proceed to the 4 ft. seam at 2,225 ft. No. 2 shaft will be fitted with winding gear already been provided, for winding the shaft. The sinking will be continued in No. 3 pit, which is connected with No. 3 as various levels are reached. The shareholders will meet at the last annual general meeting

that a group of the largest shareholders were providing, by way of advances, the funds required for the purposes of the company. This has been continued, and the advances at September 30 last amounted to £81,900 exclusive of interest. An agreement has been entered into with the Channel Collieries Trust Limited, under the date July 31, 1913, under which the Trust is granted an option during the next five years to commence the working, on royalty, of ironstone and chalk on lands belonging to or leased by the company, and also to acquire the right, on terms, to certain surface rights. A further agreement has been entered into with Channel Collieries Trust Limited, under the date of November 17, 1913, to secure further advances up to £50,000. The negotiations for the provision of the funds required necessitated the holding of a meeting of debenture holders, which took place, pursuant to notice, on February 25, 1913, when a resolution was passed approving of a supplemental trust deed providing for (a) an increase in the authorised issue to £250,000, and (b) the payment of the arrears of debenture interest and of the further interest becoming due up to and including that due on August 1, 1915, by the issue of further debentures at par. The interest up to August 1, 1913, has been satisfied in accordance with the terms of this arrangement.

**New Dunderland Company Limited.**—In pursuance of the scheme of arrangement between the Dunderland Iron Ore Company Limited and the various classes of its creditors and members, which was sanctioned by an order of the court on September 10, the New Dunderland Company Limited has been formed with the object of carrying the scheme into effect. The capital of the company is £350,000, in £1 shares, and the whole of the capital has now, as required by the scheme, been offered at par, as to 75,000 shares to the holders of the prior-lien bonds, as to 176,843 shares to the holders of the first and second charge debenture stocks, as to 43,234 shares to the holders of the funded interest certificates, and as to the balance of 54,923 shares to the holders of the capital stock in proportion to the amount of such securities held by them respectively. The new company or its nominees (who will hold the stock on its behalf) will be the holders of all the capital stock in the old company, and as such holders will be entitled to 75 per cent. of the net profits of that company available for distribution until the capital amount of the prior-lien bonds has been reduced to £125,000 and to 95 per cent. of such profits until the prior-lien bonds have been entirely paid off, when the whole of such profits will belong to the new company. In a circular the directors state that the new company has secured an option to acquire a controlling interest in the West Fjord Iron Ore Company Limited, and through it in the Aktiebolaget Ofotens Malmfält, a Swedish company owning large and developed iron ore properties at Bogen-i-Ofoten, near Narvik, Norway, which has a paid-up capital of 3,000,000 kr., with a debenture charge of 1,800,000 kr. The issued capital of the West Fjord Iron Ore Company is £220,000, and the proposal is that at least a controlling interest in that company be acquired—the price to this company to be a like number of fully paid shares of this company of an equivalent nominal value. It is proposed to increase the capacity of the concentration plant to deal with 2,000 tons of crude ore per day. It is also proposed to briquette 200,000 tons per annum of the concentrates so produced at the Dunderland briquetting plant, so as to utilise this large plant, which has been erected at a cost of over £118,000. The directors of the New Dunderland Company are:—Mr. T. J. Hoover, director of the Zinc Corporation, &c.; Mr. E. O. Forster Brown, mining engineer; and Mr. William Rhodes, Flore Fields, Weedon, director of the Wankie Colliery Company Limited, &c. Two or more of the directors of the West Fjord Company will join the board if the proposed arrangement is carried out.

**Power Gas Corporation Limited.**—The directors have recommended payment of a dividend of 5 per cent. per annum on the ordinary shares of the company, less income-tax.

**Richards and Co. (Wednesbury) Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire the business now carried on at Portway-road, Wednesbury, Staffs., under the style of Richards and Co., and to carry on the business of ironfounders, coach axle manufacturers, mechanical engineers, &c.

**Roman Ridge Colliery Limited.**—This private company has been registered, with a capital of £1,000 in £1 shares, to acquire the business of colliery proprietors, now carried on by Joseph Jarvis at Roman Ridge Colliery, near Wincobank, Sheffield, and to carry on the business of colliery proprietors and ironmasters, also to enter into an agreement with Joseph Jarvis. First directors: Stanley Denniff, B. de-ga-chambers, High-street, Sheffield, and Joseph Jarvis, 162, Hesley-lane, Thorpe, Rotherham. Qualification, £100.

**Tredegar Iron and Coal Company Limited.**—The directors announce an interim dividend of 5 per cent. (free of income-tax), being at the rate of 10 per cent. per annum on the A and B shares for the half-year ended September 30 last.

**Universal Electric Contracts Limited.**—This private company has been registered, with a capital of £1,000 (100 founders' shares of £1 each, and 1,800 ordinary shares of 10s. each) to carry on the business of electricians, mechanical engineers and suppliers of electricity for all purposes. First directors: John C. Akerman, Robert A. Chambers, E. V. Allen and Henry Pinder Brown. Registered office, 240, High Holborn, W.C.

**Warwickshire Coal Company Limited.**—The accounts for this year ended June 30 last show that the debit to revenue account of £7,858 brought forward was increased to £16,832.

**Wilton Engine Company Limited.**—This private company has been registered, with a capital of £2,500 in £1 shares, to acquire the business now carried on by William Bates, John P. Bates, and James Marland, at Thomas-street-East, Cheetham, Manchester, under the style of "The General Engineering Company," and to carry on the business of engineers, iron and brass founders, metal workers and tool dealers, &c.; also to enter into an agreement with William Bates, John P. Bates, and James Marland.

For some time past a geological expert has been taking samples of shale in the land at Scremerston, near Berwick, which is owned by Greenwich Hospital.

## THE FREIGHT MARKET.

There is a very substantial volume of business in the outward freight market this week. On the north-east coast, rates are fairly well maintained. Coasting business is being done at 3s. 3d. to London and 3s. 9d. to Hamburg, with Havre and Rouen at 4s. 9d. The Bay is worth 5s. 3d. to Bordeaux. The Baltic has been done at 5s. 3d. to Kiel. The Mediterranean varies from 7s. 9d. to 8s. 3d. to Genoa. At South Wales the market all round is easier, tonnage offering freely, and rates have a drooping tendency. The River Plate is extremely quiet, and the demand is very limited. The Bay is dull, and coasting business is unchanged. On the Clyde the market is quiet and business is dull, and the same is true of the Humber. There has been an average amount of homeward freights. Odessa advices give a decline of a full 6d. from previous prices. Grain is coming forward fairly freely, and tonnage is ample for the most urgent orders. For the Danube and Azof there is a limited enquiry. The Eastern market is quiet, and rates are barely maintained. The Baltic is firm. The Mediterranean and ore trades are fairly well maintained. America is inactive, the bulk of the enquiries being for timber-carriers from the Gulf. There is a little enquiry for grain from the north-east ports. The River Plate market is weak for early tonnage, but steady for new crop positions.

Tyne to Alexandria, 4,900, 8s. 9d.; 500; Bordeaux, 3,300, 5s. 3d.; 1,500, 5s. 6d.; from Dunston; 1,550, 5s. 3d.; Bari, 2,400, 8s. 9d. coal, 10s. 9d. coke; Barcelona, 4,400, 8s. coal, 10s. coke and goods, from Dunston; Catania, 2,600, 8s. 6d., 600, two loading places; Constantinople, 3,800, 9s. 3d., 400; 3,800, 9s. 9d.; Carthage, 2,000, 8s.; Calais, 2,400, 4s. 3d., 600; 1,750, 4s. 6d., 600; 2,500-3,000, 4s. 3d.; Cherbourg, 800, 6s.; Civita Vecchia, 5,000, 8s. 6d.; Elsinore, 1,600, 5s. 3d.; Fécamp, 1,200, 5s. 6d.; Genoa, 5,000, 8s. 3d.; 5,000, 8s.; 2,800, 8s.; 4,000, 8s. 3d.; 4,500, 8s. 3d.; 3,800, 7s. 9d.; Hamburg, 2,000, 3s. 9d.; Havre, 2,100, 4s. 9d.; Karabeksmine, 1,200, 5s. 3d.; Kiel, 1,700, 5s. 3d.; Las Palmas, 1,900, 8s. 3d.; 6,700, 8s. 6d.; 6,200, 8s. 6d.; Lubeck, 2,400, 4s. 10½d., 600, 10½d.; London, 2,500, 3s. 3d.; Lisbon, 4,000, 6s. 4½d.; Leghorn, 3,200, 8s. 1d., 800; 3,100, 8s., 500, Genoa terms; Marseilles, 2,900, 8s., from Dunston; 5,000, 7s. 8½d., 600; 5,200, 7s. 9d., 600, 1s.; 4,500, 7s. 7½d., 600, from Dunston; 4,500, 7s. 9d., ditto; Maesbomsund, 800, 6s.; Malta, 4,500, 6s. 9d.; Naples, 3,300, 8s. 3d., 800; 2,900, 8s. 3d., 800, free tax; 4,800, 8s. 1½d., from Dunston; Oran, 2,500, 7s.; 3,000, 6s. 10½d., 500; Port Said, 5,500, 8s. 6d.; 5,200, 8s. 9d.; 4,600, 8s. 6d., from Dunston; 6,500, 8s. 6d., from Dunston; 5,200, 8s. 1½d.; Palermo, 5,000, 9s.; Porto Ferrajo, 4,200, 8s., from Dunston; Rouen, 1,300, 6s.; 3,100, 4s. 9d.; 2,600, 4s. 9d.; Rotterdam, 2,100, 3s. 9d.; Savona, 2,800, 8s.; St. Innes, 1,600, 10s. 6d. coal, 13s. coke; Toulon, 2,000, 8s. 6d.; Teneriffe, 1,900, 8s. 3d.; Valencia, 2,100, 7s., free tax, 100; Venice, 4,900, 9s. coal, 11s. 6d. coke; 4,800, 9s. 1½d.; 6,000, 9s. 6d., with option 1,500 tons coke, reported; Villaricos, 1,600, 10s. 6d. coal, 13s. coke; Wisby, 1,100, 6s. 3d.; Zeebrugge, 1,500, 3s. 6d.

Cardiff to Alexandria, 4,200, 8s. 9d.; 5,400, 8s., December 8; 40,000, contract over 1914, option Swansea loading, 20,000 tons, 8s. coal, 8s. 9d. fuel; Aden, 10s. 6d., early January; Algiers, 4,000, 9 fr.; 2,200, 9 fr.; 1,200, 10½ fr. and 11½ fr.; 5,400, 8½ fr.; 1,300, 10½ fr. and 11½ fr.; 3,200, 8½ fr.; 3,200, 8½ fr.; Brest, 2,400, 4s. 10½d.; 1,200, 4s. 9d.; Bahia Blanca, 6,000, 15s.; Buenos Ayres, 5,000, 15s. 1½d.; 4,400, 15s.; Bermuda, 2,500, 8s. 3d. coal, 9s. fuel, Admiralty; Bourgas, 4,300, 12s. 9d., 400, December; Chantenay, 2,200, 6½ fr.; Calais, 2,400, 4s. 9d.; Civita Vecchia, 4,500, 9s., 400, December 10; 2,900, ditto, 4,600, 9s., ppt.; 4,600, 8s. 6d., December 10; Catania, 2,100, 8s. 6d., 600, 10d.; Campana, 15s. 6d., December 12-25; Cape Verds, 2,500, 8s. and 8s. 3d.; Constantinople, 4,000, 8s. 6d.; Devonport, 2,400, 2s. 6d., with options, Admiralty; Genoa, 6,000, 7s. 9d., December 7; 5,300, 7s. 9d.; 5,200, 7s. 9d., December; 3,800, 8s.; 3,000, 8s.; 8s. 3d., December; Gandia, 1,500, 7s. 9d., 300; 1,450, 8s. 9d.; Gibraltar, 2,000, 7s. 3d., December 15; Honfleur, 750, 5s. 9d.; 1,100, 5s. 6d.; Havre, 1,600, 4s. 9d.; Islands, 5,000, 7s. 9d., December 12; 3,000, 7s. 9d., December 13; 4,400, 7s. 9d., December; 2,800, 8s. 4½d.; 4,000, 7s. 9d., December 10; Lisbon, 2,500, 6s., 400; Las Palmas, 3,300, 7s. 9d.; 5,500, 7s. 9d.; 8s. 3d., December; 2,000, 8s. 3d.; La Rochelle, 2,000, 6 fr., with option; Leghorn, 5,000, 7s. 9d.; La Pallice, 2,800, 5½ fr.; Monte Video, 6,000, 14s., early December; 4,700, 14s., December 15; Madeira, 2,000, 8s. 3d.; Malta, 2,000, 7s.; 1,900, 7s. 6½d.; 3,500, 7s. 6d.; 4,000, 7s. 6d.; 2,700, 6s. 3d., Admiralty; 3,700, ditto, ditto, 6,100, ditto ditto; 3,400, 6s., f.d., December 15, Admiralty; Marseilles, 1,700, 9½ fr., December 10; 3,800, 9½ fr., December 8; 3,800, 9½ fr. and 10½ fr.; 4,600, 9½ fr., December 8; Naples, 4,400, 7s. 10½d., December 6; Oran, 2,000, 9½ fr.; Port Said, 3,300, 9s. 3d.; 4,000, 8s. 9d., December 10; 5,000, 8s. 6d.; 6,100, 8s. 3d., December 6; 6,000, 8s. 3d., December 10; 6,600, 8s. 3d., December 13; 6,500, 8s., December 9; Port Sudan, 5,000, 11s., 700, 1s. discharge; Piræus, 4,500, 8s.; 4,500, 8s. 6d.; Reggio, 2,200, 9s., 300; River Plate, 6,000, 15s. 1½d., December 6, lower ports; 5,000, 15s. 3d.; 4,400, 15s., up river 16s.; 18s. 3d., 5,600, 14s. 6d., end month; 6,000, 15s., December; 5,500, 15s.; 4,000, 14s. 6d., December 8; 5,300, 14s. 6d.; 5,800, 14s. 6d.; 4,800, 14s. 6d., mid-December; Rosario, 16s., December 12-25; 4,200, 15s. 9d., December 8; Rouen, 1,500, 5s. 10½d.; 1,000, 5s. 9d.; Rio de Janeiro, 4,600, 15s., December 8; 5,000, 15s.; 5,000, 14s. 6½d., December 8; St. Servan, 1,900, 5s. 3d.; Shanghai, 4,800, 14s., December 10, Admiralty; St. Vincent, 2,500, 8s. 3d.; Siobly, 2,900, 8s., December 15; St. Nazaire, 3,100, 5½ fr.; Seville, 1,450, 7s. 9d.; Salerno, 2,000, 8s. 6d., December 15; Sheerness, 1,600, 3s., Admiralty; Torre Annunziata, 4,500, 9s., 400, December 10; 2,900, ditto, ditto; 5,000, 8s. 6d.; Trieste, 5,000, 8s. 9d., 500; Taranto, 4,600, 8s. 6d., Dec. 10; 5,000, 8s. 6d.; Teneriffe, 7s. 9d., early Dec.; Villa Constitución, 15s. 6d., December 12-25; Valencia, 1,600, 7s. 9d.; 2,100, 7s.; 1,450, 8s. 9d.; Vera Cruz, 11s. 6d., fuel, early December; Valencina, 1,600, 7s. 9d., 300; Varna, 4,300, 12s. 9d., 400, December; Vigo, 1,700, 6s. 9d.; Zaraté, 4,200, 15s. 6d., 200, December 8; 5,000, 15s. 9d., December.

Newport to Bahia Blanca, 5,200, 15s., December 12; Bordeaux, 3,100, 6½ fr.; Smyrna, 4,000, 9s. 1½d., December; La Pallice, 2,600, 6 fr.; La Rochelle, 2,600, 6 fr.; Alexandria, 5,000, 8s., December 20; Oran, 1,800, 9½ fr., 400; Seville, 1,500, 7s. 9½d., December 10; Marseilles, 4,600, 9½ fr., early December; Nantes, 2,300, 6½ fr., December 9; Ibcuy, 5,000, 15s. 9d., December; Gibraltar, 2,700, 4s. 6d., 900, f.d.; 2,000, 7s. 3d.; Naples, 4,800, 8s., December 8; Torre Annunziata, 4,800, 8s., December 8; Salerno, 4,800, 8s., December 8; Oporto, 850, 8s. 3d.; 850, 7s. 6d.; Algiers, 3,200, 8½ fr.

Swansea to Genoa, 1,700, 8s. 6d.; Palermo, 1,700, 9s. 3d.;



Havre, 1,000, 5s. 9d.; 1,500, 5s. 3d.; Rouen, 2,300, 5s. 6d.; Alexandria, 3,200, 9s. coal, 9s. 9d. fuel; Valencia, 1,400, 8s. coal, 8s. 9d. fuel, 250; 1,200, 8s. 6d.; Rochefort, 2,000, 7 fr.; Huelva, 1,800, 6s. 6d.; Copenhagen, 620, 6s. 6d.; Valencia and Gandia, 2,000, 8s. 3d. coal, 8s. 9d. fuel, December 12; Tunis, 1,400, 13s. coal, 14s. fuel; Chantenay, 2,000, 6½ fr.; St. Nazaire, 2,700, 7½ fr.; Honfleur, 1,200, 5s. 6d.; Charente, 1,400, 7½ fr.; Bayonne, 1,500, 8 fr.; Algiers, 4,000, 8½ fr. and 9½ fr.; Alexandria, contract, 40,000 tons, over 1914, 8s. coal, 8s. 9d. fuel, option 20,000 tons loading at Cardiff, same rate; Cherbourg, 950, 6s.; Sicily, 2,800, 8s., 500, mid-December; San Felio, 1,100, 9s. 6d. and 10s. 6d.; La Rochelle, 2,200, 6½ fr.; Caen, 1,400, 5s. 6d.; Stettin, 1,700, 5s. 7½d.

Port Talbot to Alexandria, 3,300, 8s. 4½d., December 18; Chantenay, 2,200, 6½ fr.; Rouen, 1,300, 5s. 10½d., December 8; 2,400, 5s. 6d.; Algiers, 1,200, 10½ fr. and 11½ fr.; Lisbon, 2,500, 6s.; Chantenay, 3,100, 6½ fr., December 15; Bayonne, 2,000, 6½ fr. December 8; St. Nazaire, 3½ 0, 6 fr.

Blyth to Constantinople, 4,400, 9s. 6d.; Odessa, 3,800, 9s.; Antwerp, 1,700, 4s. 7½d.; Rouen, 1,300, 6s.; Karabekminde, 5s. 3d.; Kiel, 1,700, 5s. 3d.; Nakskov, 1,000, 5s. 9d.; Salobrena, 1,400, 10s. 3d., 250.

Humber to Theodosia, 5,200, 9s. 3d.  
Hamburg to Savannah and Wilmington, 4,700, 10s. 6d., kaint; Savannah, 4,000, 10s. 3d., kaint.

Seaham Harbour to Randers, 1,800, 5s. 1½d.; Konigsberg, 600, 7s.

Glasgow to South Africa, 22s. 6d.; Buenos Ayres, 15s. 3d., 250, December.

Britonferry to Fecamp, 850, 5s. 10½d.

Hartlepool to St. Nazaire, 3,500, 5s. 6d., Trignac terms; Leghorn, 4,000, 8s., Genoa terms; Hamburg, 2,100, 3s. 9d.

Bo'ness to Faaborg, 1,000, 5s. 9d.

Liverpool to Riga, 3,200, 5s. 3d.; Liban, 3,200, 5s. 3d.

Burntisland to Faaborg, 1,400, 5s. 3d.

Antwerp to River Plate, 4,500, 23s., general cargo, December; La Guayra, 11s. 4d. net, December.

Grangemouth to Riga, 6s. 3d.; Horsens, 1,250, 5s. 6d.; Monte Video, 15s.

Middlesbrough to Melbourne, 6,000, 17s., rails, &c., December.

Immingham to Nicolaieff or Odessa, 9s., December; Barcelona, 1,300, 8s. 6d.; Nicolaieff or Sebastopol, 6,650, 9s. 3d.

Fife port to Genoa, 3,500, 8s. 3d.; Savona, 3,500, 8s. 3d.; Leghorn, 3,500, 8s. 3d.; Nakskov, 1,200, 5s. 6d.; Elsinore, 750, 6s.

Hull to Riga, 1,900, 6s. 3d., early December; Barcelona, 1,300, 8s. 6d.; Port Said, 5,000, 8s. 3d.; Rouen, 5s.

Forth to Kiel, 2,300, 5s. 3d.; Randers, 1,200, 6s.; Konigsberg, 1,200, 6s. 3d.

Goole to London, 884, 4s.

Wales to Mexillon, sail, 17s., fuel; Luderitz Bay, sail, 20s., December-January.

Wear to Konigsberg, 1,500, 4s. 9d.; St. Nazaire, 2,000, 5s. 6d.; Nantes, 2,000, 5s. 9d.; 1,700, 5s. 7½d.; Lisbon, 2,700, 6s. 4½d.; Elsinore, 1,100, 5s. 3d.; 1,600, 5s. 3d.; Nicolaieff, 3,200, 10s. 3d.

Rotterdam to St. Nazaire, 3,400, 4s. 6d., 580, 4s. 7½d., 480, Trignac terms, December 7; 2,800, 4s. 4½d., 580, Trignac terms, December 15-31; 3,200, 4s. 7½d., 480, 4s. 6d., 580, Trignac terms, December 15-17; 3,700, 4s. 6d., 480, 4s. 4½d., 580, Trignac terms, December 15; Bordeaux, 3,000, 5s. 6d., December; Marseilles, 5,100, 9 fr.; 3,700, 9½ fr., 600, 9 fr., 900; Naples, 6,000, 7s. 6d., December 17; Port Said, 5,000, 8s. 6d.; La Rochelle, 3,200, 4s. 6d., December 6.

Homeward charters:—San Lorenzo, not above, 5,500,

2,708 net, 23s. 9d., kernels, January; Marmagoa and/or Bombay, 2,973 net, United Kingdom-Continent, 18s. 9d. one port, 19s. 3d. two ports, option both loading 6d. extra, on d.w., December; Adelaide, sail, 29s., United Kingdom-Continent, option South Australia loading 30s., spot; Fremantle, sail, 29s. 9d., United Kingdom-Continent, first-class insurance, January-February; time charter, Transatlantic trade, 5,500, £1,350, one trip, delivery Gulf, re-delivery United Kingdom-Continent; Danube, 4,500, French Mediterranean, two ports, 13½ fr., ppt.; 6,000, Rotterdam 10s. 3d., Antwerp 10s. 6d., in case of ice to load or complete at Sulina at 1s. 6d. less; Hornillo Bay, 3,600, St. Nazaire, 6s. 3d., ppt.; 3,900, Cardiff, 5s. 3d., ppt.; Algiers, 4,500, Antwerp, 5s. 6d., ppt.; Kotka, 450 stds., Barcelona, 68 fr., d.b., one-third bds.; South Australia, sail, 30s., United Kingdom-Continent, January; Sydney, N.S.W., sail, 30s., United Kingdom-Continent, January; 28s. 9d.; time charter, West African trade, about 3s. 9d., one round trip, delivery and re-delivery United Kingdom-Continent; Mauritius, 9½ annas, less 7½ per cent., Bombay, December; Huelva, Chrome Dock, 9s. 9d., f.d., ppt.; Vivero, 3,300, Rotterdam, 4s. 7½d., option Immingham 4s. 10½d., ppt.; Santander, Riga, 836 net, Birkenhead, 11s. 9d., sleepers, spot; Gulf timber port, 1,200 stds., 10 per cent., Sunderland, 80s., March; Nicolaieff, 4,400, 10s. n.c. or any, 10s. 6d. Hamburg, 8,000 qrs. or 10 per cent. oats 2s. extra, December 10; Novorossisk or Theodosia, 6,000, Rotterdam 8s. 6d., Antwerp, Emden, Weser, 8s. 9d., Hamburg 9s., with 3d. less barley up to half-cargo, ppt.; 5,400, Rotterdam, 8s. one port loading, 8s. 3d. both ports loading, ppt.; Kosichang, 6,000-7,000, United Kingdom-Continent, 24s. 9d., London 25s., December; Burmah, about 7,000, United Kingdom-Continent, o.c., 23s. 9d., February-March; Philadelphia or Baltimore, 2,300, Avonmouth or Rotterdam, 1s. 10½d., December; Norfolk, 5,500, Algiers, 12s. 3d., January; Sydney (N.S.W.), 5,400, United Kingdom-Continent, 31s. 3d., with options, January 15-February 15; South Australia, Melbourne, Geelong or Sydney (N.S.W.), 7,400, United Kingdom-Continent, 30s., option Hull 29s. 9d., January-February; West Australia, 7,000, United Kingdom-Continent, 28s. 3d. one port, 28s. 9d. two ports loading, France 1s. extra, January-February; Bombay, 2,444 net, United Kingdom-Continent, 18s. 9d. one port, 19s. 3d. two ports, France 6d. extra, on d.w., January; Odessa, 6,400, Rotterdam 8s. 3d., Weser 8s. 6d., Hamburg 8s. 9d., with 3d. less barley, ppt.; Sulina, Kustendje, Novorossisk or Theodosia, 3,500, 10 per cent.; 9s. n.c. or any, 9s. 6d. Hamburg, January 15-February 15; Novorossisk, 7,100, Weser, 8s. 6d., with 3d. less barley, ppt.; Vladivostok, 2,500, United Kingdom-Continent, Copenhagen or Stettin, 28s., spot; Carthage, 4,000, Rotterdam, 5s. 3d., ppt.; Bizerta, 4,000, Philadelphia, 8s., f.t., ppt.; Nantes, 1,700, Swansea, 3s. 6d., ppt.; Nicolaieff or Odessa, 7,000, Hamburg, 9s., December 10-25; Gulf Port and/or Port Arthur, 1,817 net, Rotterdam, 82s. 6d., December; Melbourne, sail, 30s., United Kingdom-Continent, February; nitrate ports, sail, 21s. 6d., United Kingdom-Continent; time charter, Transatlantic trade, reported at 4s. 1½d., one round trip, delivery and re-delivery United Kingdom-Continent, via Gulf.

### COASTWISE SHIPMENTS DURING OCTOBER.

According to the monthly coal tables, the quantities of coal shipped coastwise during the month of October were as follow:—

From	Total cargo.		Total bunker.	
	1912.	1913.	1912.	1913.
	Tons.	Tons.	Tons.	Tons.
Bristol Channel ports .....	327,326	316,849	22,027	21,959
North-western ports .....	301,755	259,973	66,771	64,151
North-eastern ports .....	703,450	715,753	19,889	27,133
Humber ports.....	230,652	219,116	11,771	12,875
Other ports on east coast.....	18,553	11,299	7,160	8,473
Other English ports .....	3,230	2,558	2,827	3,414
Total from England and Wales .....	1,584,966	1,525,548	130,445	138,005
Ports on east coast of Scotland.....	115,757	110,655	19,961	16,992
Ports on west coast of Scotland.....	140,117	117,934	34,175	30,975
Total from Scotland .....	255,874	228,589	54,136	47,967
Irish ports .....	—	—	4,142	3,130
Total from United Kingdom .....	1,840,840	1,754,137	188,723	189,102

10 per cent., United Kingdom-Continent, 13s. o.c., less 6d., seed 1s. extra, December 10-31; 4,400, 10 per cent., 15s. o.c., less 6d., Colastine 1s. extra, seed 6d. extra, February 1-28; 4,400, 10 per cent., 12s. o.c., less 6d., ppt.; 4,500, 10 per cent., 13s. o.c., less 6d., December 15-January 15; Calcutta, 2,408 net, Rs. 5-10, January 1-10, 2,447 net, Bombay, Rs. 5-8, December-January; Nicolaieff or Odessa, 5,500, Rotterdam 8s. 6d., Weser 8s. 9d., Hamburg 9s., 3d. less barley up to half-cargo, mid-December; Bilbao, 3,000, Middlesbrough, 4s. 9d., early December; 3,000, 4s. 10½d., ppt.; 3,400, Cardiff, 4s. 4½d., ppt.; 3,600, West Hartlepool, 4s. 10½d., ppt.; 3,000, Stockton, 5s., ppt.; Savannah, &c., 1,786 net, 133 ft., United Kingdom-Continent, p.p., 27s. 6d., December 1-15; Sulina, 4,200, Antwerp or Rotterdam, 9s. ppt.; 6,300, Rotterdam, 8s. 9d., with 3d. less barley up to 1,500 tons, option 1,000 tons oats 1s. 6d. extra, ppt.; 3,400, E.C. United Kingdom, 9s. 6d. one port, 10s. 3d. two ports, ppt.; 3,600-3,850, 9s. 6d. n.c. or any, 10s. Hamburg, December 10-20; 4,800, Rotterdam 8s. 9d., Hamburg 9s. 3d., with 3d. less barley up to half-cargo, cancelling December 10; Sulina or Kustendje, 20,000 qrs., 10 per cent., 400, 9s. 6d. n.c. or any, 10s. Hamburg, 3d. extra berth loadings, December 21-31; Kherson, 5,500, Rotterdam 9s. 3d., Hamburg no reduction, in case of ice to complete at Nicolaieff or Odessa 6d. less, ppt.; Algiers, 7,000, Rotterdam, 4s. 6d., December; Rivadesella, 1,550, Middlesbrough, 6s. 6d., ppt.; Villa Constitucion, not above, 5,000, 10 per cent.; United Kingdom-Continent, 12s. o.c., no reduction direct, ppt.; Madras Coast, 5,000, 10 per cent., Marseilles, 25s. 9d., kernels, January-February;

The following was the destination of cargo shipments:—

To ports in	Oct. 1912.	Oct. 1913.
	Tons.	Tons.
England and Wales .....	1,297,729	1,273,458
Scotland .....	97,977	100,092
Ireland .....	445,134	380,587

Shipments to London aggregated 779,008 tons.

The tests which have been carried out for the London Fire Brigade by Dr. J. S. Haldane have resulted in the adoption for the brigade work of a new type of smoke helmet. The design, which has been found to give satisfactory results in tests, has been evolved by Messrs. Siebe, Gorman and Co. from the helmet that has found large employment in colliery work, from which, however, it differs in certain important details. The apparatus is self-contained, the man using it carrying a reserve of oxygen in a steel cylinder at 1,800 lb. per sq. in. pressure. The supply is controlled by a reducing valve which admits the gas at the rate of 2 litres a minute into the breathing bag, which contains a supply of caustic soda. In the event of a breakdown of the reducing valve an emergency valve comes into operation and enables oxygen to be drawn direct from the cylinder.

### CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages.

TEDDINGTON, DECEMBER 8.—The Teddington Urban District Council are desirous of receiving tenders for the supply of rough slack, about 1,500 tons for the period ending December 31, 1914, delivered in quantities as required at the sewage works, situated at Broom-road, Teddington. Sealed tenders endorsed "Tender for Rough Slack," together with samples, must be sent to the undersigned at the Council Offices not later than noon on Monday, December 8, 1913. The Council do not bind themselves to accept the lowest or any tender. By order, G. H. Salmona, town clerk, Council Offices, Teddington.

#### Abstracts of Contracts Open.

ALEXANDRIA (EGYPT), DECEMBER 12.—For the Ports and Lighthouses Administration, supply of coal for H.H.S. "Aida," at Port Said, and Port Said lighthouse. Conditions of tender from the Stores Department of the Administration, at the Arsenal, Alexandria.

CARDIFF, DECEMBER 10.—About 2,870 tons of large screened house, 890 tons of large screened smokeless steam, 596 tons of through-and-through smokeless steam, 3,140 tons of washed steam nuts, 550 tons of washed steam beans, 247 tons of washed anthracite nuts, 80 tons of smith's coal, and 40 tons of small coal; also 495 tons of gas coke, for the Corporation. Forms from Mr. J. L. Wheatley, town clerk, City Hall, Cardiff.

DUNDEE, DECEMBER 10.—Coal for the Tay ferries' steamers, for the Dundee Harbour Trustees. Specifications from Mr. J. H. Thompson, general manager and engineer, Dundee.

FAREHAM, DECEMBER 8.—About 60 tons of unbroken coke, for the Guardians of Fareham Union. Sealed tenders to Mr. A. Laker, clerk, 97, West-street, Fareham, Hants.

HATFIELD (HERTS).—Good steam coal and coke, for the Hertfordshire County Council. Forms on application to county surveyor, Hatfield, Herts.

GAYTON, DECEMBER 17.—About 35 tons of good house coal, for the Gayton Fuel Allotment. Tenders to Mr. Robt. J. Cullum, of Gayton.

LONDON, DECEMBER 8.—Best gas coke, for the St. Pancras Borough Council. Forms from Mr. C. H. F. Barrett, town clerk, Town Hall, Pancras-road, N.W.

LONDON, DECEMBER 9.—Welsh smokeless steam coal, for the Commissioners of his Majesty's Works, &c. Forms on application to the Controller of Supplies, his Majesty's Office of Works, 18, Queen Anne's-gate, Westminster, S.W.

MERTHYR TYDFIL, DECEMBER 8.—Best large steam coal, for the Education Committee. Tenders to Mr. Rhys Elias, director of education, Town Hall, Merthyr Tydfil.

MORPETH, DECEMBER 11.—Coal, to the Visiting Committee of the Northumberland County Asylum, Morpeth. Forms from the clerk and steward at the Asylum.

WAKEFIELD.—Boiler coal, for the West Riding Standing Joint Committee. Form from Mr. P. O. Platts, county architect, Wakefield.

The date given is the latest upon which tenders can be received.

### CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

ABERDEEN, DECEMBER 9.—Steel Engine House.—Erection of steel engine house, lime store and other contingent works, for the Corporation (Water Department). Specification at the Water Engineer's Office, 41½, Union-street, Aberdeen.

ANTWERP, JANUARY 26.—Cranes.—Tenders are invited by the Municipal authorities of the above city for six electric cranes for the Bassin-Canal extension.\*

BIRKENHEAD, DECEMBER 22.—Dee Tunnel and Pipe Line.—Construction of a pipe line (consisting of about 10 miles of cast iron and steel pipes 25 in. in diameter, and about 3½ miles of cast iron and steel pipes 28 in. in diameter) extending from Connah's Quay, in the county of Flint, to Birkenhead, in the county of Chester, including a tunnel about 450 ft. long to be driven under compressed air beneath the estuary of the River Dee, for the Corporation (Alwen Supply). Specification of Sir Alexander Binnie, Son and Deacon, St. Stephen's House, Victoria Embankment, London, S.W., on payment of £5 (returnable).

BRIGHTON, DECEMBER 8.—Rails.—Supply of 240 tons of British Standard No. 4 rails, for the Corporation. Specification of Mr. Hugo Talbot, town clerk, Town Hall, Brighton.

CHIPPENHAM (WILTS.), DECEMBER 10.—Well Boring.—For making a boring at Langley Burrell, near Chippenham, Wilts, for the Rural District Council. Specification, &c., from Mr. T. J. Moss-Flower, C.E., 28, Victoria-street, Westminster, S.W., on deposit of 3 guineas (returnable).

CHRISTIANIA (NORWAY), DECEMBER 15.—Coal Discharging Machinery.—Tenders are invited by the Norwegian Main Railway for the supply of two coal-discharging machines, each capable of discharging at least 50 tons per hour.\*

DUBLIN, DECEMBER 9.—Coal Chute Renewal.—The overhaul and renewal of the boiler coal chutes at the Pigeon House Fort Works, for the Corporation. Full particulars from the city electrical engineer, Pigeon House Fort Electricity Works.

DURBAN (SOUTH AFRICA), JANUARY 7.—Gas Electric Plant.—Gas electric plant for that town. Specification obtained at the office of the borough electrical engineer, Municipal-buildings, Durban, on deposit of £1 ls. (returnable).

GLEN (ORANGE FREE STATE, SOUTH AFRICA), JANUARY 7.—Pumping Plant.—Complete pumping plant required in connection with the irrigation scheme at Glen, Orange Free State.\*

HASTINGS, DECEMBER 9.—Cast Iron Pipes.—About 1,250 yards of 6 in., 925 yards of 4 in., and 1,640 yards of 3 in. cast

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 7., Basinghall-street, E.C.



st pipes, and about 4 tons of irregulars, for the n. Specification from Mr. P. H. Palmer, M.I.C.E., Hastings.

**TINCS (NEW ZEALAND), DECEMBER 18.—Turbo Pumps, &c.**—Tenders are invited by the Hastings Borough Council for the supply and erection of two sets of high-lift turbo pumps and electro motors, together with suction and delivery piping, &c. Specification, &c., may be obtained on payment of £2 2s. (returnable), from the Town Clerk, Hastings, New Zealand.\*

**JOHANNESBURG (SOUTH AFRICA), DECEMBER 16.—Steel Rails, &c.**—Tenders are invited by the South African Railways Administration for the supply of (1) 8,600 tons of 60 lb. steel rails and 531 tons of fishplates for same, and 31,700 tons of 80 lb. steel rails and 1,810 tons of fishplates for same; and (2) 400 tons of 60 lb. chairplates and 5,183 tons of 80 lb. chairplates.\*

**LONDON, DECEMBER 9.—Steel Angles, &c.**—For the directors of the Madras and Southern Mahratta Railway Company Limited: Steel material (angles, flats, rounds, &c.), cast iron sleeper pots and fittings, steel rails, steel fishplates. Specifications can be seen at the offices of the company, 91, York-street, Westminster, S.W.

**LONDON, DECEMBER 16.—Steel Rails.**—The Government of Nigeria invite tenders for the supply of acid steel rails, British standard section. All particulars obtainable on application at the office of the Crown Agents for the Colonies, Whitehall-gardens, London, S.W.

**MALVERN, DECEMBER 23.—Cast Iron Pipes.**—About 1,750 yards of 4 in. cast iron pipes and specials, for the Gas and Electricity Committee of the Urban District Council. Specification from the engineer, Mr. W. H. Johns, Council Offices, Church-street, Malvern.

**MELBOURNE (AUSTRALIA), JANUARY 7.—Steel Bars, &c.**—Tenders are invited by the Victorian Railways Commissioners for the supply of the following:—(1) 150 steel channel bars for engines; (2) 45 copper plates for engines; (3) seamless copper tubes for engines; (4) 10,000 porous pots for batteries; (5) 180 steel boiler plates for engines; (6) 60 Yorkshire iron angles for engine boilers; (7) 17 tons of copper rod for engines; (8) 3,960 brass locomotive boiler tubes; and (9) 237 cast steel wheel centres for engines and tenders. Specifications from the secretary, Victorian Railways Offices, Spencer-street, Melbourne.\*

**PRETORIA (SOUTH AFRICA), JANUARY 7.—Pumping Plant**—Tenders are invited by the Union Tender Board for the supply and erection of a pumping plant at Glen, Orange Free State. Specifications obtainable from the Director of Irrigation, P.O. Box 399, Pretoria, on deposit of the sum of £2 (returnable).

**SOUTH SHIELDS (DURHAM), DECEMBER 13.—Boilers, &c.**—Two water-tube boilers, complete with mountings and fittings, &c., and one economiser, for the Corporation. Specification from Mr. Harry S. Ellis, borough electrical engineer, South Shields, on payment of £1 1s. (returnable).

**SYDNEY (AUSTRALIA), DECEMBER 15.—Pumping Machinery.**—Tenders are invited by the Sydney Water Supply and Sewerage Board for the manufacture, supply, and delivery of a complete set of turbine-driven centrifugal pumping machinery. Specifications from the President, Metropolitan Board of Water Supply and Sewerage, 341, Pitt-street, Sydney, N.S.W.\*

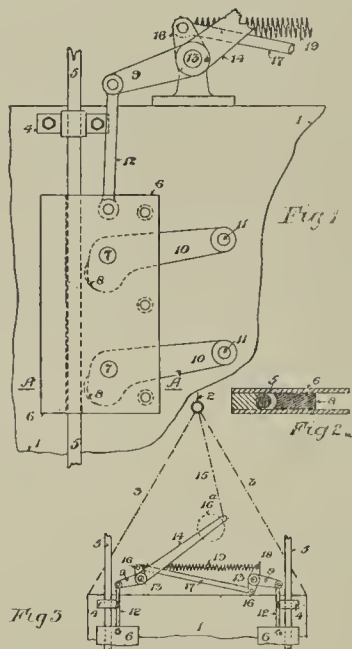
**UPWEY, DECEMBER 8.—Main Laying.**—Providing and laying about 720 yards of 3 in. cast iron main, for the Weymouth Rural District Council. Plans and specifications from Mr. H. A. Huxtable, clerk to the Council, Bank-chambers, Weymouth.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

**Home Office Prosecution at Airdrie.**—Charges were brought before Sheriff Lee at Airdrie, on Monday, against David Reid, colliery electrician, Armadale, and James Eadie, certificated manager, of No. 11, Blairmuckhill Colliery, Harthill, worked by A. and G. Anderson, of having, in the case of the electrician, failed to make a thorough examination of all the electrical apparatus in that mine, including the testing of earth conductors and metallic governors, and, in the case of the manager, with failing to have electric cables covered with insulating material, with the result that some of the cables specified in the complaint had been left bare and open to danger. A plea of guilty to a technical breach was tendered in each case. For the accused, it was stated that until quite recently it was recognised in practice that a qualified electrician was responsible, apart altogether from the responsibility on the part of the manager, and it was only in consequence of a recent decision of Mr. Sheriff Shennan, at Hamilton, that that view was disturbed. The Fiscal said the inspector of mines held the opinion strongly that electrical appliances in all the mines should be in such a condition as no accident to the workers could occur. The Sheriff said the fact that heavy penalties were imposed under this Act on ordinary workers contravening it made it quite necessary that when the management was at fault there should be considerable penalties imposed upon them. He thought he was justified in looking upon the charges here as being against the management of the colliery, and that the person primarily responsible was the electrician. If the manager put a qualified electrician in charge of his mine, it was difficult to see how he could do more, because he was not supposed to be a skilled person, an expert, in electricity himself, and interference on his part might not only be an impertinence, but a danger. He therefore seemed to his lordship to have practically done all he could possibly do if he satisfied himself as to the experience and capacity of the electrician. At the same time, he was technically responsible. His lordship fined the electrician £5, and proposed no penalty on the manager.

## ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

1001 (1913). *A Safety Suspending Grip for Mine Cages and the like.* P. H. Morris, of West Lea, Chestnut Grove, Gedling, Nottingham, G. B. Hulme, of Orlando Drive, Carlton, Nottingham, and J. Bufton, of 36, Redland Grove, Carlton, Nottingham.—According to the invention the guide rope passes through a grooved frame, which may be in one piece or be built up of plates and bars riveted or otherwise fastened together. This frame is connected by a link to one end of a lever which is pivotally mounted on the cage, while the other end of the lever is provided with a weight, and is connected to the hauling rope by which the weighted end of the lever is supported so long as the hauling rope is unbroken. The frame is provided with one or more gripping cams, which are pivotally mounted within the frame, and are provided with arms which are pivotally connected to the cage or to a bar attached to such cage. The inner face

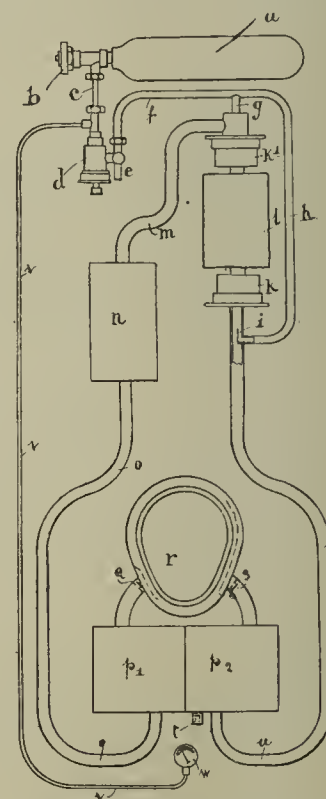


of the back of the frame, and the face of the gripping cams, between which the guide rope passes, may be grooved to fit the surface of the guide rope, and there may be a recess in the grooved portion of the frame opposite the gripping cams, so that when the gripping mechanism comes into action the pressure of the cam tends to bend the rope. There may be one or more gripping cams to each frame, and a safety suspending grip to each guide rope, and such grips may be brought into action by the same or independent levers and weights or their equivalent, also the weighted end of the lever is designed to fall a considerable distance before the grips come into action, so that the cage can be manipulated at the top and bottom of the shaft without the guide ropes being nipped. Fig. 1 is the elevation of part of a cage illustrating the application of the improved suspending grip to one guide rope; fig. 2 is a section of the grooved frame on the line A-A, fig. 1; and fig. 3 is a diagram illustrating the application of the suspending grip to all the guide ropes. (One claim.)

1928 (1913). *Improvements in Explosives and in their use for Blasting.* Société l'Air Liquide (Société Anonyme pour l'Etude et l'Exploitation des Procédés Georges Claude), 48, rue St. Lazare, Paris.—Has reference to blasting material of the kind in which an oxidisable substance is used in conjunction with liquid oxygen by impregnating the substance with the liquid oxygen. Explosives of this kind are disclosed in the prior Specification No. 18929 of 1897. The chief object is to provide an improved cartridge of the kind in which the oxidisable substance employed is powdered aluminium or a similarly-acting metallic substance presenting the same great advantage of yielding innocuous products of combustion, by rendering the cartridge capable on the one hand of absorbing a quantity of liquid oxygen sufficient for the complete combustion of the aluminium or equivalent metallic substance, and on the other hand capable of producing the best explosive effects owing to the proportions adopted for the constituents composing it, as hereinafter stated. The aluminium or similarly-acting metallic substance is mixed with a suitable inert material to act as a diluent, the proportion (varying in accordance with the effect to be produced by the explosion) being such that in the case of aluminium each litre of the composition contains from 100 to 600 grammes of the aluminium. The inert material used should be light, and may be silica, infusorial earth (kieselguhr), or one or more of the light metallic oxides, alumina for example. In place of powdered aluminium a chemically-equivalent amount of any other combustible metal or metallic substance having innocuous products of combustion may be employed—as for example, a metallic silicide or a hydride, calcium hydride for example. The composition is enclosed, for example, in canvas bags with an igniting device of any appropriate kind—for example a fusible wire, alone or associated with a detonating substance such as fulminate. When it is desired to use such a cartridge, it is immersed in liquid oxygen for some time and then taken out of the liquid and placed in position—for instance, in a hole in the rock to be blasted. When the operator has placed the cartridge in position and has reached a place of safety, the igniting device is rendered active so as to provoke the reaction, which, once started, proceeds automatically. In order to lengthen the permissible interval available between the time of placing the cartridge in position and the instant of its explosion, which interval is about five minutes in the case of cartridges weighing 200 grammes, an insulating sheath may be provided for each bag of the composition, as has been done for other liquid-air blasting cartridges. (Five claims.)

2314 (1913). *Improvements in Portable Breathing Apparatus.* D. C. H. Schümann and Hanseatische Apparatebau-Gesellschaft, vorm L. von Bremen and Co., mit beschränkter Haftung, both of Rödingsmarkt 35, Hamburg, 11, Germany.—Relates to self-contained portable breathing apparatus working on the regenerative principle. According to the present invention the pressure of the oxygen is utilised to overcome the frictional resistance in the regenerative device, by admitting the oxygen in front of the regenerating device

to the closed conduit in which the exhaled air flows to the said device without admixture of air drawn from the surrounding atmosphere. The pressure of the fresh oxygen serves to drive the exhaled air with which it is mixed through the regenerating device. One form of construction of apparatus designed according to the invention is shown in the accompanying drawing. The oxygen at a pressure below 150 atmospheres is carried in the flask *a*. The discharge orifice of the latter is controlled by means of a valve *b*, the oxygen flowing through the pipe *c* to the reducing valve *d*, which is associated with a safety valve *e*. A pipe *v* leads to a manometer *w*, which indicates the pressure of the oxygen, and consequently affords an index to the amount in the flask. After passing through the reducing valve the pressure of the oxygen is only approximately 7 atmospheres. At this pressure the oxygen passes through pipes *f* and *h* into the stream of circulating air and mixes at *i* with the exhaled impure air in the pipe *u*. At *i* there is no injector nozzle having a small orifice liable to be obstructed, the stream of oxygen being simply admitted to the pipe *u* while flowing substantially in the same direction as the exhaled air, so that the two streams unite, with sufficient pressure to carry them through the purifying device or regenerator *l* which is connected to the circulation



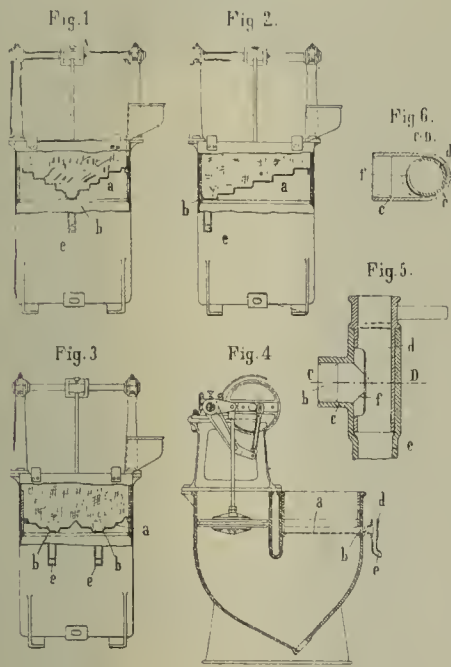
system by couplings *k*, *k'*. The carbon dioxide contained in the exhaled air is by this means well distributed throughout the purifier, so that the cleansing is very efficient. After being purified, the air, enriched with oxygen and freed of the whole of its carbon dioxide and most of its moisture, passes through the pipe *m*, cooler *n* and pipe *o* into the breathing bag *p*, and thence through a short connection and non-return valve *q* into the breathing mask or helmet *r*. The user of the apparatus inhales the air, and the exhaled air containing carbon dioxide and vapour passes through a non-return valve *s* into a bag *p*, whence it passes through pipe *u*, where it is again enriched at *i* with fresh oxygen, and is driven by the latter through the purifying device *l*. *t* is a relief valve on the breathing bag *p*, which opens when the pressure inside is too high, and allows the superfluous air to escape into the atmosphere. The branch pipe *g* from the pipe *f* to the coupling *k'* forms part of a special coupling system, which is described in a separate specification No. 21860, A.D. 1913, and which does not in any way affect the action of the apparatus as hereinbefore described. (Two claims.)

11228 (1913). *Method of Manufacturing Combustible Substances in an Agglomerated Form.* M. Rossi, of 2, rue Obispo, Barcelona, Spain.—Has for its object a method of manufacturing fuel in an agglomerated form or as combustible briquettes from coal with or without the addition of other combustible substances, and with or without the mixture of binding substances such as pitch, tar and the like. This method is based essentially on the fact that the mass constituting the body of the agglomerated substances or briquettes is treated with carbon di-sulphide preferably in molecular dissociation in the state of gas or vapour or in an atomised state produced by the aid of currents of vapour or of gas mixed or injected with the liquid carbon di-sulphide. One method of proceeding is, for example, to combine a machine such as is usually employed for the manufacture of agglomerated substances with a generator of carbon di-sulphide in such manner that the discharge tube or tubes by which the carbon di-sulphide passes from the condenser is put into communication with the receptacle where the mixture and the kneading of the substances to be agglomerated are effected; in this manner the action of the carbon di-sulphide on these materials penetrates through all the intermolecular spaces, thus dissolving or softening, in a more or less great quantity, the substances naturally carried by the coal and which are suitable for the agglomeration. The result of this is that the mass thus treated, after it has been submitted to pressure or moulding to give shape and consistency to the briquettes, possesses a very high mechanical resistance. It is advantageous to give to the mass under treatment a certain degree of moisture in order that the vapours of the di-sulphide diffuse more easily throughout the mass. This method permits of the manufacture of briquettes of canal coal without the necessity of adding any kind of agglomerant to the coal, by profiting purely and simply by the agglomerating power of the substances naturally carried by the coal in its mass. Also the briquettes of coal can be manufactured with the mixture or addition of agglomerating substances, but with this advantage that the percentage of the agglomerating substances added is very small, because the agglomeration is aided by the binding substances naturally carried by the coal. The treatment can be carried out according to requirements cold or with a more or less high temperature. By way of example, it may be stated that the proportions of



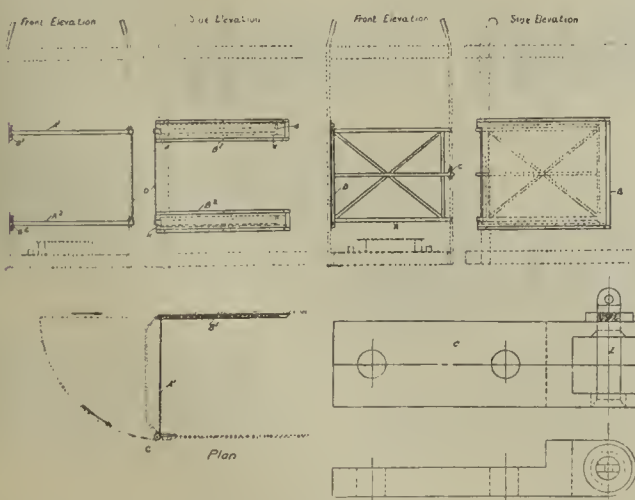
the several substances according to one instance of carrying out the method are as follow:—Coal, 1,000 kilogs.; pitch, 40 kilogs.; carbon di-sulphide, 1 kilog. (Two claims.)

12441 (1913). *Improvements in Jigging Machines*. K. Schuchard, of 2, Königshütter Chaussee, Beuthen O.S., Germany.—Is an improvement in or modification of the invention of British Patent No. 28745 of 1911, which relates to jigging machines in which the jigging action is accomplished by the passage of a stream of water through a stationary perforated carrier, the surface of which is formed corrugated for the purpose of enabling a stream of water of comparatively considerable thickness to pulsate backwards and forwards through the carrier at each stroke of the piston, and to separate the different materials on said carrier according to their specific gravities. The object of the present invention is to improve this type of jigging machine by reducing the number of corrugations or troughs through which the discharge takes place, whereby the consumption of water is diminished. Another object is to provide for a better and more efficient regulation of the discharge directly at the point of discharge from the carrier. In order to attain these objects, the corrugations or troughs which lead to the discharge openings are placed at a greater depth—that is, at a lower level than the other corrugations or troughs—this arrangement resulting in a form of the perforated carrier which is inclined towards the discharge opening or openings. This arrangement has the further important advantage that the separated materials which accumulate in the discharge corrugations or troughs are much purer. The separate discharge device provided for



each discharge corrugation or trough enables the discharge to be regulated directly at the point of the discharge—that is, at the opening through which the material passes out of the trough. The discharge device may in this case be made in the shape of an ordinary tube, which extends at right angles with regard to the discharge corrugation or trough, and may be connected directly to the discharge end thereof. In the upper portion of the vertical discharge tube a short tubular sleeve is arranged concentrically and rotatably, this sleeve being provided with an opening corresponding to or determined by the opening provided at the end of the discharge corrugation or trough. By turning this tubular sleeve or valve, the discharge of the material may be regulated, the opening of the valve being caused to register with the discharge opening, or to cover the latter more or less. In this manner, a very exact regulation of the discharge of the separated material may be obtained at a point where the material is still subjected to the direct action of the pulsating water stream. Figs. 1, 2 and 3 show three different constructions in side elevation; fig. 4 is a vertical section of fig. 1; fig. 5 is a vertical section through the delivery pipe drawn to a larger scale; and fig. 6 is a horizontal section on line C—D of fig. 5. (Six claims.)

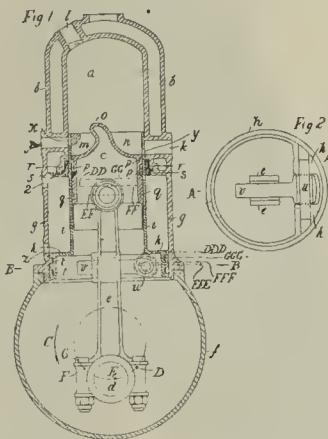
25081 (1912). *Improvements in and relating to Gates for Pit Cages*. W. Dando, 11, The Green, Abertyswg, Monmouthshire.—The drawings show simple and effective arrangements for the prevention of accidents, through falling from the pit cage during winding operations. The left-hand drawings show the arrangement of safety bar, and pocket, for receiving same. Letters A<sup>1</sup> and A<sup>2</sup> are the sliding safety bars. Letters B<sup>1</sup> and B<sup>2</sup> show pockets for containing bar, when not in use. Letter C shows the receiving jaw and pin for safety bar when in use. Letter D shows connecting



link only required when two safety bars are used. The safety bar A<sup>1</sup> is allowed to slide in pocket from E to F, and is prevented from coming out of pocket by the hinge G on bar coming against stopper at end of pocket; at this point the bar is turned on this hinge in direction shown by arrows to close cage. This safety bar A<sup>1</sup>, when not in use, is pushed back in pocket and is prevented from working out by the shoulder H, dropping inside of stopper end of pocket. The right-hand drawings show the arrangement of the

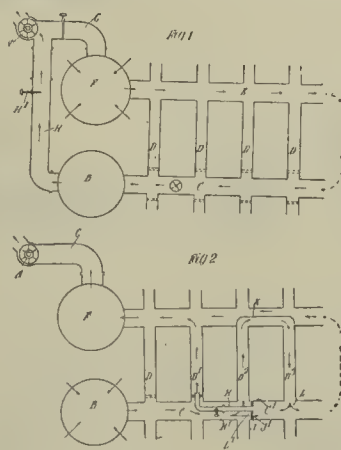
safety gate and pocket for receiving same. Letter A shows the sliding gate. Letter B shows pocket for containing gate when not in use. Letter C shows receiving jaw and pin for securing safety gate when in use. The dotted line, indicated by the arrow, shows how the bar is brought out from the pocket B and placed in position across the cage. C shows a full-sized plau of jaw for receiving safety bar when same is in action. This jaw is riveted to cage, on opposite side to pocket. I is the pin which is picked up when inserting safety bar and then dropped, thus preventing safety bar slipping open. Countersunk head to pin to prevent same being jerked or picked right out and getting astray. (Five claims.)

25417 (1912). *Improvements in Internal Combustion Engines*. C. Mather, junr., of 39A, Gordon-street, Lower Broughton, Lancashire, and A. E. L. Chorlton, of Granville House, Ellesmere Park, Eccles, Lancashire.—Relates to motor engines of the two-cycle type. According to this invention, a liner or sleeve-valve is employed, surrounding and lying in between the piston and the cylinder wall of the engine, and whilst in general having a reciprocating motion along with the piston, having also a separate and differential motion relatively to that member, such motion being obtained by the angular oscillation of the connecting rod about either side of the vertical centre-line of the engine. By this method the exhaust-port being suitably placed on one side of the cylinder and the inlet-port on the other, the exhaust may be opened first by the sleeve, the inlet next, and then the exhaust will close, followed by the inlet. Thus an extended period of changing is obtained and a fuller working charge put into the cylinder. In another form, in which a stepped or enlarged end of the working piston works in a similarly enlarged and lower-situated



cylinder, forming a charging pump for the supply of the working cylinder, thereby overcoming any difficulties otherwise arising from the preceding method—that is, crank-case charging, still further improvements are obtained by separating this enlarged piston from the working piston and connecting or making it in one with the liner or sleeve-valve hereinbefore described. Thus the same delayed action is obtained. By this means the exhaust of the engine is first allowed to go free, and charging from the pump afterwards takes place, but is concentrated through the delaying action of the link-work to the period just before and just after the exhaust-port closes. A fuller charge is thus inserted with less tendency to loss through the exhaust port, and the engine is enabled to run at lower speeds. Fig. 1 is a vertical section with certain parts shown in side elevation, and fig. 2 is a horizontal section through part of the apparatus shown in fig. 1. (Four claims.)

26888 (1912). *Improvements relating to the Control of Air in Mines when a Fire or an Explosion Occurs*. P. McCarrick, 11, Mary-terrace, Coronation, South Church, Bishop Auckland, county Durham.—Relates to the control of the ventilation in mines, when a fire or an explosion occurs, in such a way as to enable the smoke or afterdamp in the airways of the mine to be readily removed. In the event of an explosion occurring, a tube is associated with one of the airshafts and with the fan, or, in the event of a fire, is built into an airway down in the mine in such a manner that the direction of flow of the air is changed without causing any change in the action of the fan. Fig. 1 is a plan representing diagrammatically two mine shafts and two subterranean airways with cross-connecting galleries, and means for circulating air therethrough in accordance with the invention to clear the mine after an explosion. Fig. 2 represents the method of regulating the ventilation of a



mine on fire so as to enable the fire to be extinguished. In the case of an explosion occurring in a mine at a point such as X in fig. 1, near the downcast shaft, the conduit G connecting the mouth of the upcast shaft F with the suction fan S is stopped up, the shaft F is uncovered, and one end of the tube H is fitted over the mouth of the downcast shaft B, and the other end is connected to the suction side of the fan A. The fan is then driven in the same direction as before, and the direction of the air circulation in the upcast and downcast shafts, and in the airways and galleries of the mine, will be reversed; hence all gases resulting from the explosion are drawn away from what was formerly the upcast shaft, and will be drawn up what was formerly the downcast shaft but is now the upcast shaft, and a supply of pure air circulating in the reverse direction to that formerly taken will be obtained as shown by the arrows on fig. 1. The amount of air drawn through the mine or district during such

proceedings can be regulated by a regulator H in the tube. To enable the tube H to be fitted conveniently over the mouth of the shaft B, the corresponding end is turned down at right-angles to the main length of tube. In the case of a fire, the tube is used down in the mine as will now be explained with reference to fig. 2. Suppose that a fire has broken out in the intake airway C at the point C<sup>1</sup>. One method of procedure is as follows:—A brick wall or “stopping” J is built across the intake airway in front of the fire, and the straight end of the tube H is built into the stopping with its end projecting towards the fire as shown. The other or bent end of the tube is built into a wall or stopping in one of the galleries D<sup>1</sup>. If there are any other galleries in the intake airway between the downcast shaft B and the wall J they are stopped up, excepting the gallery D<sup>2</sup> immediately in front of the wall. A partition K is provided in the outgoing airway E to conduct air from the gallery D<sup>2</sup> immediately in front of the wall to a gallery D<sup>3</sup> immediately behind the wall—that is to say, to the gallery that extends from the outgoing airway to the intake airway at a point behind the fire. In this way the air drawn down the open shaft B and along the intake airway C passes through the unobstructed gallery D<sup>2</sup> that is in front of the wall and through the passage formed by the partition K in the outgoing airway E to the unobstructed gallery D<sup>3</sup> immediately beyond the fire, thereby reaching the intake airway at a point L beyond the fire. This air now divides, part of it passing along the intake airway C in the reverse direction, that is to say it travels towards the downcast shaft B and passes through the fire carrying with it the smoke, and upon meeting the brick wall or stopping J in the airway it enters the projecting end of the tube H through which it passes and thence reaches the gallery D<sup>1</sup>, finally passing along the outgoing airway and up the covered upcast shaft F to the surface and thence through the conduit G to the fan. (One claim.)

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

- 26970. Condensers used in gasworks. G. F. H. Beard, J. W. Scott, and R. and J. Dempster Limited.
- 26976. Drilling, boring, and analogous machines. A. A. Jones and Shipman Limited and F. Shipman.
- 26987. Method of operating centrifugal compressors. Akt.-Ges. Brown, Boveri et Cie.
- 26990. Tipping wagon. A. Poepel.
- 27008. Process and means for the conversion of carbon dioxide into carbon monoxide. P. B. W. Kershaw and J. Field.
- 27149. Concentrating tables for the treatment of ores and similar materials. E. W. Wetherell.
- 27151. Rope railways. T. Thunhart.
- 27162. Pulverisers. E. C. R. Marks. (Blake Crusher and Pulveriser Co., United States.)
- 27167. Compressed fuel and method of producing the same. Compagnie d'Agglomérés d'Anthracite Pur.
- 27201. Suction gas producers. H. Dormand.
- 27228. Manufacture of fuel. C. E. Swailes.
- 27230. Reversible rotary pumps. C. Monin.
- 27255. Centrifugal pumps. E. N. Mackley.
- 27266. Stretchers for use in hospitals, ambulances, and the like. J. A. Jackson and J. M. Jackson.
- 27310. Arrangement to enable lamps to be used to detect gas near roof and in cavities within the mine. D. Evans.
- 27322. Electric lamp holder combined with reflector for miners' electric safety lamps. G. Pearson and L. Fielder.
- 27323. Arrangement for positive electrode in round accumulators. G. Pearson and L. Fielder.
- 27333. Safety-pawl for self-acting inclined planes. F. Kasperczyk.
- 27338. Manufacture of machine-made bricks and the like. H. P. Youngman.
- 27339. Brick, tile, and the like making machines. H. P. Youngman.
- 27368. Clutches for winding engines. R. C. Gardner. (W. F. Smeeth, India.)
- 27371. Handling and vending combustible materials. W. M. Thacher.
- 27386. Methods for obtaining large quantities of hydrocarbons and sulphate of ammonia by distillation of coal, shale, or other carbonaceous materials. J. Moeller.
- 27405. Alloy for bearings and the like. A. Oxley and D. Davies.
- 27413. Pick-carrying devices. Hardy Patent Pick Company Limited and J. T. Foster.
- 27467. Machines for coating metal plates with tin, terne, and other metal. P. B. Taylor.
- 27469. Apparatus for coating metal plates with tin, terne, and other metals or alloys. P. B. Taylor.
- 27487. Machine for cutting off lengths from solid or hollow bars, applicable also for machining lengths of solid bars. C. Taylor (Birmingham) Limited and G. L. Taylor.
- 27490. Driving mechanism of steam or other fluid-pressure driven winches. W. E. Moss.
- 27518. Safety suspending apparatus for mine cages and the like. W. E. Matthews.
- 27525. Manufacture of chrome steel. J. M. Herschell. (J. Buchel, Germany.)
- 27536. Process for briquetting iron ore and the like. G. Crusius. (Convention date, November 30, 1912, Germany.)
- 27544. Process for producing castings in iron and similar metals. H. Pearce.
- 27553. Means for tipping or tilting trucks, wagons, or the like. Scammell and Nephew Limited and A. G. Scammell.
- 27558. Superheaters for water-tube boilers. H. E. Yarrow.
- 27559. Coke ovens and like ovens. Dr. C. Otto and Co. G.m.b.H. (Convention date, June 25, 1913, Germany.)

Continued on page 1184.



# **THE RECORD**

# **840**

**square feet in one shift with  
one "Siskol" Coal-Cutter.**

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**INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.**



The OFFICIAL figures recently published by H.M. Home Office show that in the Manchester District, for 1910, there were 152 Coal Cutters, of eleven different types, in use, of which 81, or more than half of the total number, were “SISKOL” machines.

Is any further proof needed as to which is the best Coal Cutter?

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INTERNATIONAL CHANNELLING MACHINES LD.,  
SHEFFIELD.



## Complete Specifications Accepted.

To be published on December 18, 1913.

1912.  
Explosives. Kolowratnik.  
Air compressors. Dinesen.  
Tunnel-drying apparatus. Yates and Matthews and Yates Limited.  
27379. Car-journal boxes. Berry.  
27626. Recovery of nickel from its ores. Sulman, Picard, and Roberts.  
28195. Pump valve structures. Boonzaier.  
29661. Reversing valves for oscillating cylinder compressed-air engines. Akroyd.  
1913.  
884. Respiratory apparatus particularly applicable as rescue apparatus for mines and other places. Huskisson and Jenkins.  
6422. Central buffers and couplings for railway and the like rolling stock. Edgar Allen and Co. and Gunstone.  
10743. Chucks or sockets for rock-boring drills and the like. Smith and Wood.  
11758. Method for removing or recovering certain substances from coal gas. Hultman.  
11783. High-pressure diaphragm pumps. Taylor.  
11809. Safety explosives. Herz.  
16477. Grabs. J. Pohlitz Akt.-Ges., and Volkenborn.  
17261. Electric conductor for explosive charges. Von Klaeden.  
18860. Couplings for railway and like vehicles. Boirault.  
26901. Construction of greaser for lubricating the axles of colliery tubs. Dodd.

## Complete Specifications open to Public Inspection before Acceptance.

1913.  
22763. Process of and apparatus for charging furnaces. Puschmann.  
23361. Devices for connecting flexible cables used for respiratory apparatus and similar purposes. Drägerwerke Heiner. and Bernh. Dräger.  
23719. Process of casting ingots of metals and alloys and apparatus therefor. Durville.  
23955. Toothed gearing. Graemiger.  
25719. Jig conveyers. Geh. Hinselmann.  
26395. Checking device preferably for use in coalmines for checking the number of corves or tubs of coal delivered by the miner, or for other analogous purposes. E. Nack's Nachfolger.

**A Kent Boring.**—A memorandum has been issued to the shareholders of the Betteshanger Boring Company Limited, describing the progress of the boring operations from June 21 to October 31, 1913. It is signed by Mr. Henry C. Embleton, mining engineer, Leeds, and Mr. Albert Farquhar, mining engineer, Darlington, and dated October 31. It is stated that in spite of a delay of nearly three months occasioned by the crown getting fast in the hole the Betteshanger borehole has now reached a depth of just over 2,700 ft. The following further seams of coal of over 2 ft. in thickness have been passed through:—

Depth from surface.	Thickness of seam.	Remarks.
	Ft. in.	
Seam G at 2,364 ft. ...	2 1 Coal 1 11 Parting 0 4 Coal 0 4 Parting 2 0 Coal	A foul seam.
Seam H at 2,403 ft. ...	3 0 Coal	A strong, clean coal. Should be a valuable steam or house coal.
Seam J at 2,513 ft. ...	2 7 Coal	Good quality.
Seam K at 2,562 ft. ...	1 4 Coal 0 2 Parting 3 2 Coal	Total coal 4 ft. 6 in. This coal is rather high in ash, but it might prove a valuable seam.
Seam L at 2,592 ft. ...	2 3 Coal	Analysis not yet received. A bright coal of strong physical quality. It appears to be a clean and valuable seam.
Seam Mat 2,632 ft. ...	7 9 Coal	

Analyses of the principal seams, as ascertained by Mr. C. F. H. Stock, of Darlington, county analyst, are as follows, after washing with a 1.40 specific gravity solution:—

Designation of seam.	Thickness of seam.	Fixed carbon.	Volatile hydro-carbons.	Ash.	Sulphur.
	Ft. in.				
G { Upper Section	2 1	80.92	10.76	7.17	1.15
G { Lower	2 4	72.84	15.16	10.85	1.15
H	3 0	79.75	15.88	3.62	0.75
J	2 7	80.03	14.03	4.97	0.97
K	4 6	76.94	14.67	7.60	0.79
M	7 9	Analysis not yet completed.			

Seams G, H, J, and K all give a good, strong sound coke suitable for foundry or blastfurnace purposes. The further coal proved in seams 2 ft. and over amounts to 24 ft. 6 in., which, with the 20 ft. 5 in. proved previously, makes 44 ft. 11 in., equivalent to over 52,000 tons per acre.

## GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.  
Annual Statement of Trade: Supplement to Vols. 1 and 2 for 1912, 3s. 6d.  
Merchant Shipping: Tables of Progress, 1881-1911, 1s.  
Trade Reports: Finances of the German Empire, 1913, 2d.  
Trade of French West Africa, 1911-12, 6d.; Trade of Valparaiso, 1911-12, 4d.  
Acts, 1913: Lancashire and Yorkshire Railway, 4s. 5d.; Great Eastern Railway, 1s. 9d.  
Abstract of Labour Statistics, Sixteenth Issue, 1s. 10d.  
Statutory Rules and Orders, 1913: Railway Rates and Charges, 28/10/13 (No. 1159), 1d.; Ditto (No. 1158), 1d.  
Boiler Explosion Report, No. 2263, 2d.

## PUBLICATIONS RECEIVED.

ANALYSES OF COALS IN THE UNITED STATES: Part I, Analyses; Part II., Description of Samples (Bull. 22, U.S. Bureau of Mines). By N. W. Lord.  
A HISTORY OF THE SALT UNION. By A. F. Calvert. London: Effingham Wilson. Price 5s. net.  
NOTES ON TEST CASES UNDER THE FINANCE ACT, 1910, AND AMENDING ACTS. Land Union. Price 6d.  
"Mining and Treatment of Feldspar and Kaolin in the Southern Appalachian Region," by A. S. Watts (Bull. 53, U.S. Bureau of Mines); "The Titaniferous Iron Ores in the United States: their Composition and Economic Value" (Bull. 64 of the U.S. Bur. of Mines); "Monthly Statement of Coalmine Fatalities in the United States, July 1913," compiled by A. H. Fay; "Sanitation at Mining Villages in the Birmingham District, Ala.," by D. E. Woodbridge (Tech. Paper 33 of the U.S. Bur. of Mines); "The Production and Use of Brown Coal in the Vicinity of Cologne, Germany," by C. A. Davis (Tech. Paper 55); "Rules for Mine Rescue and First Aid Field Contests," by G. W. Paul (Miners' Circular 15); "Journal of the Western Society of Engineers" (Vol. 18, Nos. 7 and 8), September, price 50 cents; "Transactions of the North-east Coast Institution of Engineers and Shipbuilders" (Vol. 30, Part 1), November, price 5s.; "Comité Central des Houillères de France et Chambre Syndicale Française des Mines Métalliques, 'Rapports des Ingénieurs des Mines aux Conseils Généraux sur la Situation des Mines et Usines en 1912'"; "Bull. Mensuel de la Société Industrielle du Nord de la France" (No. 197), October; "Bull. of the American Institute of Mining Engineers" (No. 83), November, price 5s.; "The I.C.S. Student," December, price 2d.; "Transactions of the Mining Institute of Scotland" (Vol. 36, Part 1).

**Grimsby Coal Exports.**—The exports of coal from Grimsby during the week ended Friday, 28th ult., were shown by the official returns to be as follow:—Foreign: To Ahus, 1,271 tons; Antwerp, 288; Dieppe, 679; Esbjerg, 133; Faeroe, 25; Gefle, 2,334; Gothenburg, 1,834; Hamburg, 376; Helsingborg, 1,108; Hoganae, 718; Riga, 329; Rotterdam, 414; and Sodertelje, 1,482; total, 10,991 tons. Coastal: To London, 109 tons; Lowestoft, 500; Rye, 290; and Yarmouth, 190; total, 1,089 tons. The figures for the corresponding week of last year were 27,766 tons to foreign ports and 606 tons coastal.

**South Staffordshire Mines Drainage.**—A Bill has been entered by the South Staffordshire Mines Drainage Commissioners seeking power to purchase the sites of certain of their pumping stations; and to sell to the Birmingham Canal Navigations of certain of the pumping stations. The sites which it is sought to purchase are the lands at present leased at Bradley, Bilston, and Stowheath, Wolverhampton. Powers are sought to sell to the Canal Company the Moat, Bradley, Stowheath, and Herberts Park pumping stations, Darlaston, and to constitute the same when so purchased as aforesaid part of the undertaking of the Canal Company. This will necessitate alterations in the financial provisions of the South Staffordshire Mines Drainage Acts, 1873, 1878, 1882, 1891, 1894 and 1904, and the Commissioners are to be enabled to borrow from the Public Works Loan Commissioners moneys upon mortgage of the mines drainage rate leviable by the Commissioners in the Tipton district of the drainage area subject to the jurisdiction of the Commissioners.

## CATALOGUES AND PRICE LISTS RECEIVED.

Bulletin No. 34D issued by the Chicago Pneumatic Tool Company describes the Chicago pneumatic steam-driven Corliss compressors.

The Wolf Safety Lamp Company (Bank-street, Sheffield) issue a leaflet relating to the Wolf alkaline lamp, and the Wolf alkaline battery and lead cell.

Messrs. Crosby Lockwood and Son have just issued a new illustrated catalogue of their scientific, technical and industrial books, which they will be pleased to send, post free, to anyone interested.

Messrs. Meldrums Limited (Timperley, Manchester) send literature dealing with some of their specialities including the "Sprinkler" and "Koker" stokers, for forced, induced, or natural draught working (the former having fixed grates, and the latter moving bars), and the "Meldrum" forced draught furnace. We may mention that the firm are always ready to test samples of fuel for prospective customers, and to advise as to its suitability.

Messrs. T. Whittaker and Co. Limited (Dowry-street Ironworks, Accrington), have produced a new catalogue of brickmaking machinery, which they send to us. The catalogue is illustrated by numerous photographs, and describes a wide variety of clayworking plant. The catalogue is divided into sections dealing respectively with perforated grinding and mixing mills; solid-bottom grinding mills and mortar mills; the semi-plastic brickmaking process; the "New Era" stiff-plastic process; pugmills and mixers, clayrollers, screens, &c. A second list relates to water coolers for gas and oil engines, &c. These coolers are made with capacities from 240 to 100,000 gallons per hour and for a wide variety of conditions.

We have received from Messrs. Fraser and Chalmers Limited (3, London Wall Buildings, E.C.) a comprehensive catalogue of machinery for the economical handling of material. The appliances described include belt conveyors of various designs, picking belts, bucket and tray conveyors, floating elevators and coal bunkering machines, and grab transporters. In connection with some of the conveyors supplied, an ingenious appliance is shown for use with articulated belting, enabling a considerable increase of speed to be obtained. This appliance, Barling's equalising gear, varies the angular velocity of the driving tumbler by the intervention of an epicyclic train operated by a cam, which is cut so as to compensate exactly for the shape of the tumbler. The catalogue is embellished by some interesting photographs of actual installations of varying type.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, November 25, 1913, is as follows:—Amsterdam, 788 tons; Antwerp, 607; Barcelona, 4,759; Bilbao, 1,246; Boulogne, 1,572; Bremen, 1,697; Christiania, 2,319; Copenhagen, 236; Dieppe, 2,568; Drontheim, 106; Gefle, 1,920; Genoa, 5,169; Gothenburg, 500; Ghent, 1,002; Hamburg, 10,926; Harlingen, 1,705; Leghorn, 296; Libau, 206; Marinopol, 5,106; Malmo, 1,708; Marseilles, 2,780; Novorossisk, 6,314; Odessa, 6,385; Oxelosund, 4,954; Rotterdam, 1,203; Rouen, 4,538; Riga, 5,644; Reval, 1,900; Smyrna, 1,929; Spezzia, 2,300; Sunderborg, 1,486; Stettin, 2,970; Stockholm, 1,290; Trieste, 608; Theodosia, 3,996; Wyk, 110; total, 92,843 tons. Corresponding period November 1912, total, 62,774 tons.

**The Institute of Metals.**—The annual general meeting of the Institute of Metals will be held at the Institution of Mechanical Engineers, Storey's-gate, Westminster, S.W., on Tuesday and Wednesday, March 17 and 18, 1914. The annual dinner will take place on March 17, 1914. The fourth early lecture is to be delivered by Prof. E. Heyn, of Berlin, early in the month of May. Prof. Heyn, who is one of the best-known Continental metallurgists, will deal with the subject of "Internal Strains in Cold-wrought Metals and Some Troubles Caused Thereby." The Institute of Metals has just published a volume entitled "The Second Report to the Corrosion Committee," which contains, in addition to the important report presented at the recent Ghent meeting of the Institute of Metals, a verbatim account of the discussion that took place at that meeting, together with many additional contributions to the discussion made subsequently by correspondence. Copies of the Second Report, price 5s. net, can be obtained at the offices of the Institute of Metals, Caxton House, Westminster, S.W.

Illustration of the apparatus fitted with telephone, the battery box and telephone wire in lifeline is shown.

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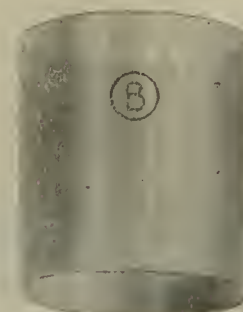
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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

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No. 2763.

## CENTRIFUGAL PUMPS.\*

By A. TEMPLE THORNE.

A writer on centrifugal pumps has said that they defy the mathematician and possess more tricks than a circus mule, and with this most engineers were until comparatively recently content to agree, but with the extraordinary development of turbine machinery generally during the last 10 years, centrifugal pumps have now come into very general use.

The centrifugal pump is a water turbine reversed, and while the water turbine was long ago brought to a high state of efficiency, in the reversal of its working process there is one great difficulty, which difficulty probably accounts for the slow development of the centrifugal pump. In the water turbine, the pressure energy of the water supply is converted into kinetic energy on entering the turbine, and this change can be performed in converging nozzles with very little loss. It was the efficient reversal of this process which was the stumbling block. In the centrifugal pump, the water is whirled round in the impeller, and finally is shot out of the impeller with a high velocity. The absolute velocity of water leaving the impeller may be 50 ft. per second, or even more, while that in the discharge will rarely be more than 10 ft. per second. Thus there is a very great amount of kinetic energy in the water as it leaves the impeller, and with the reduction of the velocity the excess of kinetic energy must be converted into pressure energy, the condition for a reduction without loss being that it must be performed without any abrupt change in either magnitude or direction.

In the early pumps the impeller was surrounded by a circular or spiral casing of such dimensions that the velocity of the water found the casing was approximately that of the discharge. The water was shot out of the impeller, and practically the whole of the surplus kinetic energy was dissipated in shock and eddies due to the impact of the slow-moving mass of water in the casing. The first method of preventing this loss was the introduction of a diffuser ring. This ring formed part of the casing, and had a gradually increasing cross-section (in which the action is approximately that of a fire vortex). This effects a fairly efficient reduction of the velocity, but there is still a considerable loss due to eddies. Guide vanes were next introduced; these are fixed vanes in the diffuser ring, which divert the water into the proper direction for the discharge and maintain a steady flow through the casing. It is the adoption of guide vanes which has rendered possible the high efficiencies now obtained with centrifugal pumps.

### Shape of Impellers and Impeller Blades.

The impeller blades must be such that the water enters and leaves them without shock. Thus the entrance and exit angles are determined by the direction of the entrance and exit water velocities under the particular conditions for which the pump is designed.

It is obvious that if from any cause the calculated velocity diagrams are not realised in practice, there will be losses due to shocks and eddies at the entrance and exit of the blades and vanes, with a corresponding fall in efficiency. The velocities were calculated from given conditions of head and quantity of water pumped at a given speed; and for this head and quantity the correct diagrams will be formed at the given speed, and that speed only. If the head is changed, however, the correct velocity diagrams may be reformed by altering the revolutions, and, approximately, the maximum efficiency maintained at the new head. If the matter is investigated mathematically it is found that to maintain a constant efficiency the variation in speed should be such that the ratio  $q^2/H$  is constant,  $q$  being the quantity pumped and  $H$  the head. In practice this cannot be absolutely followed; for instance, in the case of any pump, if the given head be increased, then the speed should be increased to raise the quantity pumped the required amount for  $q^2/H$  to be constant—this in all probability would cause too great an overload on the driving

engine or motor and would consequently be impossible. On the other hand, if the head be decreased the pump should be slowed up correspondingly; this will maintain a high efficiency, but will increase the total pumping time, and it is unlikely that the maintenance of the efficiency would be worth this. Thus the relation given above should be borne in mind, but should not by any means be considered a hard-and-fast rule.

How far the given conditions of head, &c., may be varied is best seen from the characteristic curves of the pump. For any pump the relations between head, capacity, speed and efficiency are fixed and definite, and may be plotted to give the characteristic curves.

A large number of centrifugal pumps are never called upon to work under any but a fixed set of conditions—when these considerations do not apply. In the case of a pump pumping against a constant head there is, however, the possibility of a break in the pump line, which may greatly reduce the discharge head and increase the capacity to such an extent that the motor is seriously overloaded. The overload which it is possible to put on a pump is determined by the impeller-blade design, and is rarely more than 25 per cent., whatever the possible overload is. Care must be taken that the motor or engine driving the pump is capable of standing this overload for at any rate a short time. Fig. 1 shows

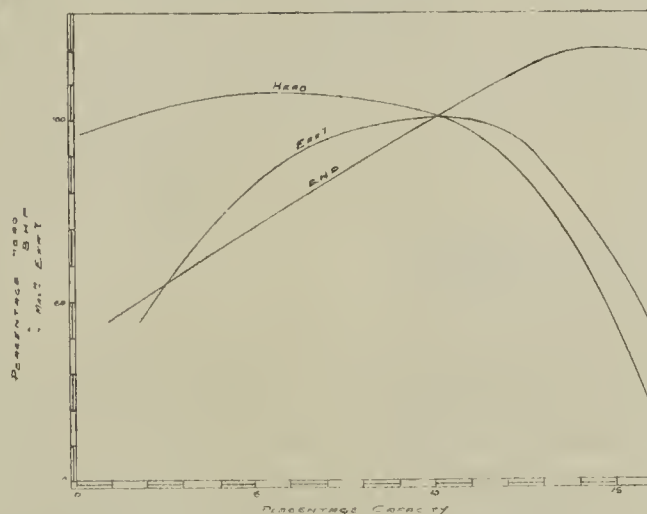


FIG. 1.—PUMP DESIGNED FOR LIMITED OVERLOAD.

the characteristic curves of a pump designed to give not more than 25 per cent. overload, as may be seen from the B.H.P. and capacity curve.

The nature of the service for which a pump is intended has some bearing on the shape of the impeller blades. A nearly radial blade will, for instance, be of advantage when a high efficiency is required over a considerable range of capacity against a constant head; but in most cases backward-turned blades are employed, these giving a high efficiency over a considerable range of capacity at constant speed. With regard to the actual outline of the blades, the method of determining the entrance and exit angles has already been mentioned. The form of the blades between these points must be such that the calculated exit velocity is actually obtained and that the velocities obtained are at right angles to the entrance and exit areas, which conditions are fulfilled by involutes drawn from either extremity of the blade and joined by a straight line at the centre. The greatest accuracy in the construction of the impeller blades is essential, in order that the channel cross-sections may be exactly the calculated area, for on these depend the velocities from which the whole pump was designed. The usual practice is to cast impellers in one piece; but for very high speeds the high stresses produced necessitate the use of forged impellers with blades riveted on.

### Pump Efficiency.

The various losses occurring in the pump may be divided into:—

- (1.) Friction and eddy losses.
- (2.) Short-circuited water losses.
- (3.) Mechanical losses.

The friction and eddy losses may be considerably reduced by careful design. Loss occurs first at the suction pipe mouth, which may be reduced by a bell-

mouth on the suction pipe. Then, again, all pumps having a suction head against which the water must be drawn up must be fitted with a non-return valve, except in special cases when it is not possible, and then more complicated arrangements must be made, in order that the pumps may be primed ready for starting. This valve is often a source of loss, and it must be carefully designed to offer the least resistance when the pump is running and the valve is open.

There is some further loss at the entrance to the impeller. Theoretically, the flow in the suction should be axial and the water enter the impeller in a direction perpendicular to it, and it is found that the efficiency is considerably increased by using guide vanes in the entrance to ensure the water entering the impeller in the correct direction.

There is in the impeller loss due to friction with the blade surfaces, for which reason these surfaces should be as highly polished as possible, and there should be as few blades as possible. Further, the blades should be thin and sharpened to a fine edge at both entrance and discharge to prevent any sudden change in the area of the passage through which the water is flowing. Similar remarks apply to the guide vanes.

Short circuit loss is due to leakage between the casing and impeller rim at the outer diameter of the impeller—the clearance between the impeller and casing is made as small as possible, but the loss from this cause is rarely less than 3 or 4 per cent., and often as high as 10 per cent. The actual amount of loss depends almost entirely on the quality of the workmanship.

The mechanical losses should be small in a centrifugal pump. The impeller and shafting are comparatively light, and the loss due to bearing friction small in consequence. The principal source of mechanical loss is the unbalanced axial thrust—which absorbs more or less power according as all or only a part of the thrust is taken by a thrust bearing. The question of actual thrust must be more fully considered.

### Thrust Balancing.

Unbalanced thrust in the direction of the axis is present in all centrifugal pumps, and two methods have been tried for its correction. The first was the elimination of the thrust in one part of the pump by that in another, *i.e.*, by placing two impellers back to back. The objections to this method (and it must be borne in mind that the two impellers are discharging at different pressures) are: Firstly, that it necessitates employing impellers in pairs, which lessens the adaptability of any type of pump for different heads; secondly, it adds largely to the cost that two different types of impellers, right and left handed, must be made, and the casing casting also becomes very complicated; and thirdly, it is found by experience that after some time the balance becomes imperfect owing to wear of the packing between the two impellers. This method was for long adopted by Messrs. Sulzer, who were the pioneers of high-speed centrifugal pumps, but they have recently discarded it in some of their pumps in favour of balancing by means of a balancing piston. This is shown in fig. 2. The piston P is keyed on to the shaft and is held tightly against the impeller by the nut N, and in the space A there is a high pressure depending on the final pressure of the pump. The water in space A can pass through the clearance space D to space B, being considerably throttled while doing so. From B the water flows through clearance space C and thence is drained away. If the pump pressure increases in A, this causes a movement of shaft and piston to the left, decreasing the clearance space C. This causes the pressure in B to increase sufficiently to balance the additional thrust. A reduction in the pump pressure moves the shaft and piston to the right, increasing the clearance space C and causing a decrease in pressure in space B. Numerous devices are employed by different makers to balance the axial thrust, but many obtain a partial hydraulic balance and take up the excess by means of a marine or ball thrust bearing capable of taking a thrust in either direction.

In the Alberger pump the pressure on both sides of

\* From a paper read before the Graduate Section of the North-east Coast Institution of Engineers and Shipbuilders, November 15, 1913.



ller is made approximately equal by means of a balancing piston in the impeller casing and the surplus water is absorbed by a marine type thrust bearing. In the Mather and Platt pump an hydraulic balancing disc is employed (fig. 3).

#### Motive Power.

The choice of motive power for any pumping installation largely depends on local conditions and whether the pump is to run continuously or intermittently only. For intermittent running steam power is not efficient, and electric motors or oil engines should be used—the latter being particularly useful when a self-contained plant is required and no steam or electric supply is available—as, for instance, on temporary works. The majority of permanent installations are electrically driven, this being the most efficient method when electricity is cheap and readily accessible. There was at

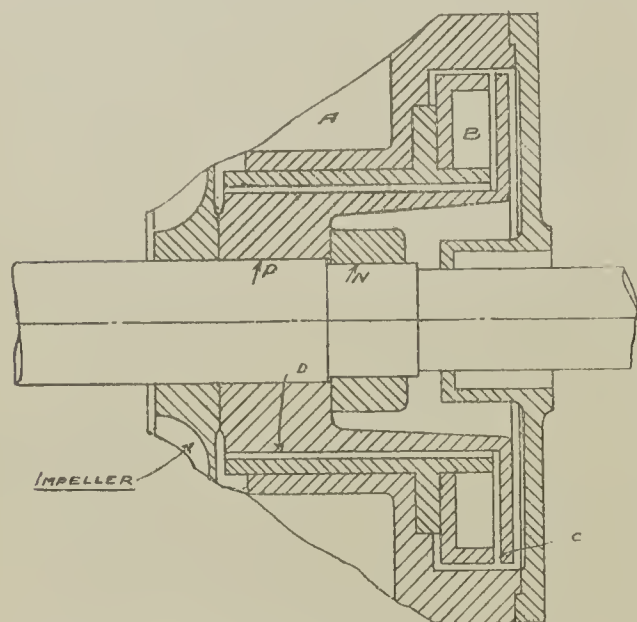


FIG. 2.—BALANCING PISTON, SULZER PUMP.

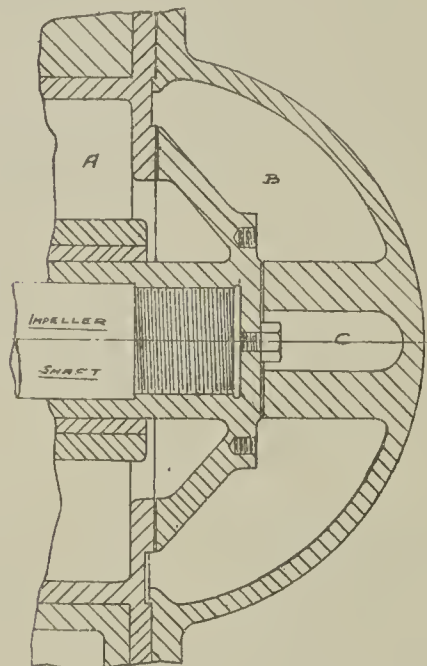


FIG. 3.—BALANCING DISC, MATHER AND PLATT PUMP.

Space A connected to discharge; Space C connected to suction.  
Balance effected by pressure in B.

one time a prejudice against using electric motors or pumps pumping at varying heads. It was mentioned above that if the head against which a pump is pumping be decreased the quantity of water is largely increased, and if the speed remains constant the power required becomes excessive—a steam engine is, of course, more easily able to cope with this overload, but this objection no longer holds if the pump impeller is designed so as to give a maximum overload of 25 per cent., and a motor capable of doing this is provided. Oil-engine-driven pumps are now being employed for permanent installations, notably at the Gladstone Dock, Liverpool. For boiler-feed pumps, circulating and air pumps working in conjunction with a steam plant, it is usually preferable to use steam turbines or high-speed steam reciprocating engines.

#### Applications.

The uses to which centrifugal pumps are now applied are very varied. They are particularly suitable for dealing with large quantities of water at low heads, and thus are extensively used for drainage and irrigation work. These pumps are usually single-stage horizontal pumps, and efficiencies of over 80 per cent. have been obtained with pumps of 60 in. diameter discharge pipes, relieving over 100,000 gallons per minute.

Another characteristic of the centrifugal pump is its ability to deal with a very considerable quantity of water suspended in the water pumped. Pumps of very heavy construction have

been made which are capable of dealing with stones up to 12 in. in diameter. This has led to a very efficient method of excavating and for dredging from rivers, &c. For excavating very powerful jets of water are played on the earth, the resulting mixture of earth, stones and water being collected in a sump from which it is pumped by the centrifugal pumps. This method was adopted with great success on the Panama Canal. Four pumps were in use, each capable of dealing with about 150 tons of solid matter per hour, this requiring 10,000 gallons of water per minute. An efficiency of 60 per cent. was attained with these pumps. The diameter of the discharge is 20 in., and each pump is driven by a 655-horse power motor.

A different class of work is the pumping of mines. Here large quantities of water have to be raised a very great height, the pumping head often being 1,500 to 2,000 feet. These pumps are, of course, multi-stage pumps, the allowable head per stage varying from 150 to 200 feet.

Steam turbine-driven pumps are now largely used for boiler-feed work and as circulating pumps, the great difficulty here being that the turbine speed is in general considerably above the pump speed. It has been found, however, that a compromise can be arrived at with very little loss of efficiency.

Another very large field for centrifugal pumps is that of fire-station service, the reliability of the installation being a great asset. The building of such pumps is somewhat specialised, the question having been taken up by insurance companies, and fire-station pumps are now built to the underwriters' specifications.

### NEW PERMITTED EXPLOSIVES.

The Home Secretary has made an Order, dated November 25, 1913, amending the Explosives in Coal Mines Order of September 1, 1913, by the addition of certain explosives to the First Schedule to that Order. The Order also repeals so much of the First Schedule to the said Order of September 1, 1913, as relates to the explosive "Stanford powder."

The composition of the new explosives is as follows:—

*Ammonite No. 3*, consisting of the following mixture:—

Ingredients.	Parts by weight.	
	Not more than	Not less than
Nitrate of ammonium .....	72	68
Nitrate of sodium .....	23	21
Tri-nitro-naphthalene .....	4	3
Chloride of ammonium .....	4.5	3.5
Moisture .....	1	—

The explosive is to be used only when contained in a case of lead and tin alloy thoroughly waterproofed with pure paraffin wax; with a detonator or electric detonator of not less strength than that known as No. 6; the greatest weight of the explosive which may be used in any one shothole shall not exceed 12 oz.; and the explosive shall have been made at the works of the Miners' Safety Explosive Company Limited, at Stanford-le-Hope, in the county of Essex.

*Expedite*, consisting of the following mixture:—

Ingredients.	Parts by weight.	
	Not more than	Not less than
Nitrate of ammonium .....	36	33
Nitrate of potassium .....	34	32
Chloride of ammonium .....	21	19
Tri-nitro-toluol .....	13	11
Moisture .....	1.5	—

The explosive is to be used only when contained in a case of paper thoroughly waterproofed with paraffin wax, with not less than a No. 7 detonator; the greatest weight of the explosive which may be used in any one shothole shall not exceed 32 oz.\*; and the explosive shall have been made at the works of the Explosives and Chemical Products Limited, at Bramble Island, in the county of Essex.

*Negro Powder No. 2*, consisting of the following mixture:—

Ingredients.	Parts by weight.	
	Not more than	Not less than
Nitrate of ammonium .....	58	55
Chloride of sodium .....	29	26
Tri-nitro-toluol .....	16	14
Graphite .....	1	0.5
Colouring matter .....	0.1	—
Moisture .....	1	—

The explosive is to be used only when contained in a case of paper thoroughly waterproofed with a mixture of carnauba and paraffin waxes; with not less than a No. 7 detonator; the greatest weight of the explosive which may be used in any one shothole shall not exceed 20 oz.; and the explosive shall have been made at the works of Roburite and Ammonal Limited, at Gathurst, near Wigan, in the county of Lancaster.

\* This was the greatest weight which could be loaded into the gun when the explosive was submitted for the test.

*New Fortex*, consisting of the following mixtures:—

Ingredients.	Parts by weight.	
	Not more than	Not less than
Nitrate of ammonium .....	36	33
Nitrate of potassium .....	34	32
Amido compound .....	13	11
Chloride of ammonium .....	21	19
Moisture .....	1.5	—

The explosive is to be used only when contained in a case of paper thoroughly waterproofed with a mixture of ceresine and resin; with not less than a No. 6 detonator; the greatest weight of the explosive which may be used in any one shothole shall not exceed 10 oz.; and the explosive shall have been made at the works of the Explosives and Chemical Products Limited, at Bramble Island, in the county of Essex.

*Permon Powder*, consisting of the following mixture:—

Ingredients.	Parts by weight.	
	Not more than	Not less than
Nitro-glycerine .....	13	11
Collodion cotton .....	0.5	0.2
Glycerine .....	5	3
Flour of potatoes (dried at 100 degs. Cent.) .....	10.5	8.5
Nitrate of ammonium .....	57	54
Nitrate of sodium .....	1.5	0.5
Chloride of sodium .....	18	16
Moisture .....	3	—

The explosive is to be used only when contained in a case of stout paper thoroughly waterproofed with a mixture of paraffin wax, resin and mineral oil; with not less than a No. 6 detonator; and the explosive shall have been made at the works of the Carbonite Syndicate Limited, at Schlebusch, in Germany.

*Pitsea Powder, No. 2*, consisting of the following mixture:—

Ingredients.	Parts by weight.	
	Not more than	Not less than
Nitro-glycerine .....	7	6
Nitrate of ammonium .....	56.5	53.5
Nitrate of potassium .....	11	9
Woodmeal (dried at 100 degs. Cent.) ..	10	8
Oxalate of ammonium .....	19.5	17.5
Moisture .....	2	—

The explosive is to be used only when contained in a stout case of paper thoroughly waterproofed with a mixture of ceresine and resin; with not less than a No. 6 detonator; the greatest weight of the explosive which may be used in any one shothole shall not exceed 8 oz.; and the explosive shall have been made at the works of the British Explosives Syndicate Limited, at Pitsea, in the county of Essex.

*Sheppey Powder*, consisting of the following mixture:—

Ingredients.	Parts by weight.	
	Not more than	Not less than
Nitro-glycerine .....	28	26
Nitrate of potassium .....	32	30
Woodmeal (dried at 100 degs. Cent.) .....	33	30
Oxalate of ammonium .....	7	5
Moisture .....	6	3

The explosive is to be used only when contained in a non-waterproofed wrapper of parchment paper, with not less than a No. 6 detonator; the greatest weight of the explosive which may be used in any one shothole shall not exceed 10 oz.; the explosive shall have been made at the works of the Cotton Powder Company Limited, at Uplees Marshes, near Faversham, in the county of Kent, or at their works near Melling, in the county of Lancaster.

*Sunderite*, consisting of the following mixture:—

Ingredients.	Parts by weight.	
	Not more than	Not less than
Nitro-glycerine .....	10	8
Nitrate of ammonium .....	54.5	50.5
Perchlorate of potassium .....	10	8
Woodmeal (dried at 100 degs. Cent.) ..	9	7
Oxalate of ammonium .....	21	19
Moisture .....	2	—

The explosive is to be used only when contained in a case of paper thoroughly waterproofed with a mixture of ceresine and resin, with not less than a No. 7 detonator; the greatest weight of the explosive which may be used in any one shothole shall not exceed 16 oz.; and the explosive shall have been made at the works of Nobel's Explosives Company Limited, at Ardeer, in the county of Ayr.

The swing of the ballistic pendulum given by 4 oz. of each of the foregoing explosives, compared with a swing of 3.27 in. given by 4 oz. of gelignite containing 60 per cent. of nitro-glycerine, is as follows:—

Ammonite No. 3, 2.12 in.; Expedite, 2.62 in.; Negro Powder No. 2, 2.21 in.; New Fortex, 2.61 in.; Permon Powder, 2.57 in.; Pitsea Powder No. 2, 2.64 in.; Sheppey Powder, 2.10 in.; Sunderite, 2.66 in.

It is stated that the Weardale Coal Company are about to re-open the Ludworth Colliery, which was stopped eleven years ago. Exploration work is being carried on in the Five-Quarter seam, which is known to be of a particularly good quality.



# A LABORATORY STUDY OF THE INFLAMMABILITY OF COALDUST.\*

By J. C. W. FRAZER, E. J. HOFFMAN and  
L. A. SCHOLL, Jun.

The investigation described in this paper was an attempt to devise a reliable laboratory method for obtaining a classification of the great variety of dusts that occur in mines. It was a preliminary investigation, and work in the same direction is being continued by the Bureau of Mines.

## Description of Apparatus.

The apparatus that was used by the authors in the investigations is shown in fig. 1. It consists essentially of the explosion flash *a*, the platinum coil *i*, and devices for putting the dust in suspension and for measuring the pressure developed in *a*. The flask *a*, which has a capacity of 1,600 cubic centimetres, is provided with large tubulures at its top and bottom. Experience indicates that a flask with a capacity of about 1,250 cubic centimetres would probably be preferable. The brass plate *k*, which rests on the end of the top tubulure, carries the platinum coil *i* and the brass tube *m*. The brass plate *c*, on which *a* rests, carries the small glass funnel *b*, which is cemented gastight into *c*. The platinum coil *i* is suspended near the centre of *a* by the two stout nickel leads *j j*, which pass through fibre plugs in *k*. The coil *i* is made of about 100 cm. of No. 26 platinum wire, wound on a quartz-glass frame, which is attached as described above to the leads *j j*. The steel ball *n* is ground to fit practically gastight on top of *m*, which is soldered to *k* and communicates with *a*. The dust to be investigated is weighed into the glass funnel *b*, and at each trial is brought to about the same position in the stem of the funnel, which is then connected by means of a short rubber tube to the 150 cubic centimetre glass bulb *d*. By means of the compression bulb *p*, the air in *d* is compressed until a pressure of 150 mm. of mercury is indicated by the manometer *h*. At the proper instant the dust in *b* is ejected and put in suspension in *a* by suddenly opening the pinchcock *e*. In order to ensure a more uniform dissemination of the dust in *a*, *b* is covered with a small piece of 18-mesh copper gauze. By blowing the dust through the gauze, the adhering particles are more completely separated, and the density of the dust cloud in *a* is rendered more uniform. It has been found inadvisable to use the gauze on *b*, except with samples of coaldust. The pressure developed in *a* is determined by ascertaining by several trials the smallest weight that must be placed on *n* to prevent its being lifted from *m*.

With the apparatus connected as shown in the illustration, the desired current is passed through the platinum coil for exactly three minutes, and during this interval the expanding air in *a* is released at intervals of one, two and two and three-quarter minutes after the instant the current is first passed through the coil. At the end of exactly three minutes, *e* is quickly opened and the dust in *b* is ejected. The experiment is repeated several times, the weight on *n* being varied each time until it is found that the pressure developed in *a* lies between two values differing by 5 grammes. The weight, which is a small flask or other glass vessel containing mercury, is easily varied. In every experiment 0.05 gramme of dust was used for ignition, as with this quantity it has been found that the most inflammable coals are still able to exert the maximum explosive force.

A 220-volt power-house current was used in these experiments, its voltage being reduced by suitable resistance before it passed to the coil *i*. A storage battery, however, should be used as the source of the current. Experiments were made on each dust with current strengths of 5, 5.5, 6, 6.5 and 7 ampères.

In all of the tests recorded the whole of each sample was air-dried to constant weight and then ground fine enough to pass through a 200-mesh sieve, the fineness of all the samples being as nearly as possible the same.

## Results.

In every case the pressure from the air used to put the dust into suspension has been deducted from the pressure caused by the explosion. In addition to samples of coaldust, some artificial mixtures of coaldust and finely-ground shale, also calcium carbonate, have been investigated in order to measure the effectiveness of these substances in diminishing the inflammability of coaldust. The following substances also were investigated:—Wood dusts (four samples), asphalt (four samples), and gluten, flour, starch, sugar, and lycopodium (one sample of each). The dusts investigated have been divided into four groups, according to their nature, as follow:—Group 1, samples of coaldust; group 2, samples of road dusts high in ash; group 3, artificial

mixtures of dusts with known percentages of shaledust or of calcium carbonate; group 4, inflammable dusts other than coaldusts.

In general, the curves are of two types. The curves for the samples of the first division (coals and lignites) rise continuously in a more or less irregular manner with increasing temperature of the coil, whereas those for the second division (chiefly sub-bituminous) rise rapidly at first, but toward the end of the range covered by these experiments rise little, and are practically parallel to the horizontal axis. These results seem to indicate that the samples of the second division of Group 1 exerted their minimum explosive force within the range of the tests, whereas those of the first division did not. It seems that many of the samples of the first division did not ignite, or that the ignition extended only a short distance into the cloud of dust. In none of the samples of the first division does the ignition seem to have extended throughout the whole cloud, for the curves of this division ascend continuously throughout their whole length, and the maximum explosive force of the samples was not developed within the range of the experiments.

The effect of the shaledust in limiting the inflammation was seen with each successive addition, the effect being decidedly marked with the 50 per cent. mixture, but not sufficient to render the sample non-inflammable.

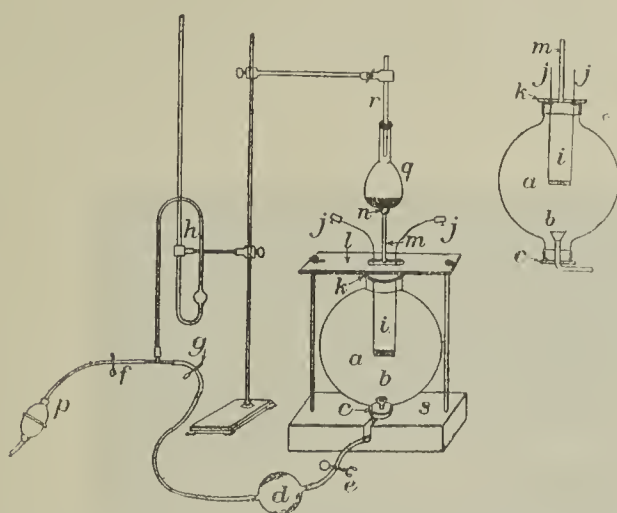


FIG. 1.—APPARATUS USED BY THE BUREAU OF MINES.

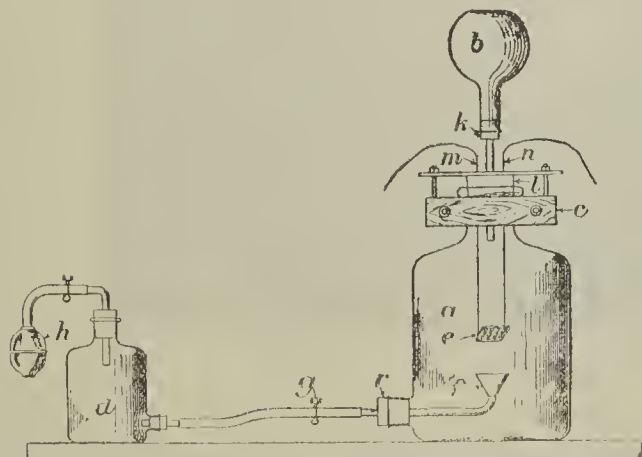


FIG. 2.—APPARATUS FOR DEMONSTRATING THE INFLAMMABILITY OF COALDUST.

The apparatus shown in fig. 2 is designed for demonstrating on a laboratory scale the explosibility of coaldust in air. The apparatus is assembled on the same principle as the laboratory apparatus already shown (fig. 1) for measuring the inflammability of coaldust. It consists of a 14-litre aspirator bottle, *a*, of thick glass, in which is suspended through a rubber stopper *l* a coil of 1.5 metres of No. 26 platinum wire. Through another hole in *l* connection is made, by means of a glass tube, with a 1-litre thin-walled Florence flask *b*, the glass tube passing through a rubber stopper secured in the mouth of the flask by wire. The stopper *l* is held gastight in *a* by means of a steel piece bolted to a split wooden collar *c* clamped round the neck of *a*. Through the tubulure *r*, at the bottom of *a*, is inserted a one-hole rubber stopper carrying a copper funnel *f*, which is directed upward inside the bottle beneath the coil and is covered with a piece of wire gauze to aid the dissemination of the dust. The stopper carrying *f* is secured in place by wiring. About 5 grammes of fine coaldust is placed in *f*, and the projecting end of *f* is connected to the 2-litre bottle *d* by means of thick-walled rubber tubing. By means of the compression bulb *h* the air in the bottle *d* is put under a pressure of about 450 mm. of mercury. The platinum coil, the source of ignition, is heated for about 10 minutes by a current of 6.5 ampères, when the air in *a* is warm. The dust in *f* is then suddenly ejected by opening the pinch cock *g*. When the dust is ejected *a* is filled with flame, and a

loud report follows, caused by the explosion of the flask. The experiment is performed with safety only when the bottle *a* and flask *b* are enclosed in a heavy box with a thick plate-glass front, otherwise injury may be caused by the projected pieces of glass.

## HYDRAULIC TRANSPORT OF COAL AT HAMMERSMITH.

In our issue of November 7 (page 945) brief mention was made of the fact that the Hammersmith Borough Council had applied to the London County Council for sanction to borrow £15,500 to cover the cost of the new coal storage scheme in connection with their electricity works. Since then the whole scheme has been submitted to and approved by the Council, and tenders for the work have been accepted conditionally, of course, on power to borrow being granted, of which there is little doubt.

The London County Council have indicated that the terms of repayment of the money would be as to the coal storage scheme (say, £13,100) 15 years, and as to the hydraulic transportation scheme (say, £2,400) 10 years. As against the annual charge for repayment, it is estimated that the following annual saving will be effected:—By pumping the coal (say, 18,000 tons) £540, saving by permanent and casual labour at the coal yard £120, and estimated annual saving in depreciation of the coal on the existing basis of consumption £917, or a total annual economy of £1,577. The fact is emphasised by the electricity committee that as increased consumption of output is anticipated, there will be a proportionate saving. The greater considerations, however, for the expenditure are, they state, considerations which cannot be stated in figures. With an adequate storage capacity for 6,000 tons, the regular supply of the works will be protected against any interference arising from labour or other trouble. This cannot be done at present, owing to the cost of supplying the coal and the danger of combustion of the quantity stored for any considerable period on the ground.

The lowest tender for the construction of the storage tanks (five in number) was that of the British Construction Company, but that concern were unable to carry out the work within the stipulated period. Consequently that of Messrs. J. Mowlem and Co., Westminster, in the sum of £10,392 19s., has been accepted. The others tenders accepted are:—For the supply of coal hoppers, weighing machines and mixing tank at Chancery Wharf (subject to their substituting an Ingreigh weighing machine for an Avery one), Messrs. Fraser and Chalmers Limited, London Wall-buildings, £658 10s. 6d.; pumping plant at the wharf and electricity works, Messrs. Gwynnes Limited, Hammersmith, £922; electric crane, rail track, and conveying plant, Messrs. Fraser and Chalmers Limited, £2,429; for so much of the pipe erecting, including jointing material and terne plate lengths as may be required, the British Mannesmann Tube Company Limited.

**The Enterprise of the Horden Collieries Limited.**—Sir Hugh Bell presided at the annual meeting of the Horden Collieries Limited, on Friday, and gave some interesting details of the enterprise of the company. He said there had been a considerable expenditure on houses. In providing the accommodation necessary for the company's men, including what has been spent already, they would eventually have to spend nearly three-quarters of a million. In a new colliery like Horden there were no houses in the immediate neighbourhood. Ten years ago there was only a stray farmhouse there. Now there was a town of 10,000 inhabitants, equipped with every modern convenience. During the year they had spent £30,571 at Horden in putting down excellent washing apparatus, and another £4,000 or so would finish the work, and give them an up-to-date washing and drying plant, which would be of very great advantage to the future of the colliery. When that expenditure was completed they would have spent upon Horden Colliery between £560,000 and £600,000—a sum which was by no means extravagant. At Shotton they had expended during the year £27,786 on by-product coke ovens, and the total expenditure when these works were completed would be between £260,000 and £270,000. Blackhall, when completed, would probably cost them between £350,000 and £360,000. They had practically completed the work they set out to do. They set out to win a great tract of coal in the eastern part of the county of Durham. They had spent between 1½ and 1¾ millions of money. The result of that would be an output of between 2½ and 3 million tons of coal a year. They ought to have a cheap colliery representing something like 10s. a ton for every ton of coal drawn. The gross income would probably be £1,400,000. They would have to pay £700,000 a year in wages to the men directly in their employment. They would pay well on to £300,000 a year to people not directly in their employment. They would be spending a million a year in wages, and would provide employment for upwards of 10,000 men. They were doing far more, Sir Hugh thought, than producing coal. They were giving far more employment than that to which he had referred—they were providing the sinews of commerce for an immense amount of industry.

\* From Bulletin 50, U.S. Bureau of Mines.



## MANCHESTER GEOLOGICAL AND MINING SOCIETY.

A meeting of this society was held last Tuesday in the society's rooms, 5, John Dalton-street, Manchester. Sir THOMAS H. HOLLAND, of the Manchester University (president), was in the chair.

### New Members.

The following were elected members:—Member (federated), Mr. Charles Butler, mining engineer and colliery manager, Towneley Collieries, Burnley. Associate members (federated), Mr. Joti Parshad, B.A., mining and prospecting officer, Jamma and Kashmir State, Sirinagar, Kashmir, India; Mr. George Edward Drewitt, Harbour View, 8, Botany-street, Waverley, Sydney, New South Wales, Australia. Student (federated), Mr. Shur King, 75, Ducie Grove, Whitworth Park, Manchester.

### The World's Coal Reserves: Sir Thomas Holland's Warning.

The PRESIDENT presented a report on behalf of the delegates to the International Geological Congress that was held in Canada last August. He and Mr. John Ashworth represented the Manchester Geological and Mining Society at the congress.

The President said it seemed generally to be agreed, among the delegates who met at Toronto in August, that the Twelfth International Geological Congress ranked among the most successful that had so far been held; part of the success was due to the great natural resources of the country visited, but this advantage was turned to full account by the generosity of the Canadian Government and the enthusiastic

The largest estimate for any single country is that for the United States with a possible reserve of  $3\frac{1}{2}$  billion tons. Among European countries the largest contributor to the total estimated reserve is Germany, the figure given being 423,356 million tons.

A comparison of the estimates of actual reserves with those classed as probable shows points of some interest, as the actual reserves form a larger proportion of the total in countries that are more completely known through extensive mining operations. For example, in the United Kingdom, out of a total of 189,533 million tons, 141,499 millions are classed as actual and only 48,034 millions as probable reserves. In Germany the actual reserves are placed at 104,178 millions, while the probable reserves are estimated to total 319,178 millions. No attempt was made to subdivide the estimates for the United States into actual and probable; but the probable must be greatly in excess, as a large fraction of the total is credited to the tertiary coals underlying the northern plains, figures for which must be far from precise. The estimate for China, closely approaching a billion tons, must necessarily be based on uncertain data, while the fields of India, having been carefully surveyed, admit of the formation of a total relatively precise. The total given, 79,000 million tons, is probably well within the mark, as no one knows the quantity of coal concealed by the great spread of lava over the central and western tracts of the peninsula.

These estimates make no allowance for the losses which will occur in mining, and naturally the proportion which it will be worth while to extract will vary considerably from country to country.

Judging by the total of over 7 billion tons, compared with an annual production of still under 1,200 millions, there is no immediate fear of general exhaustion. But it is important to remember that the coal considered to be accessible under present economic conditions will not necessarily all be accessible in the future. Increase in

reserves of mineral fuel. They both may make human life the merrier, but it will be correspondingly shorter.

Another thought that occurs to one on turning over the results of this survey of the world's coal resources is suggested by a comparison of the estimated reserves for different countries. For example, while the estimated reserves of the United States are returned as about 17 times those of the United Kingdom, the economic advantages to the two countries are not exactly in the same ratio, for in the United States large quantities of coal exist in areas where, so far as one can judge by present conditions, it is not likely to be of great value. On the other hand, some of the fields, like those of the Pennsylvanian region, which support the principal fraction of the American iron and steel industry, are likely to be depleted long before there is any approach to general exhaustion in Great Britain. In this country the closer association of coal with the coal-consuming industries will permit of the utilisation of a much larger fraction of the available fuel supply. Transportation facilities have in America brought into association mineral deposits that were otherwise widely separated by nature; but there is naturally an economic limit in transportation costs which will never be reduced, and, with the growing increase of labour charges, they may be already near this limit.

The Coal Report has been issued in three quarto volumes, accompanied by an atlas of well-executed maps, and the whole work supersedes anything of the kind previously attempted, comparing even favourably with the monograph on iron ore which was issued by the congress that met at Stockholm in 1910.

The discussion by the council of the congress regarding the subject of the next monograph resulted in the final decision being left to the executive committee which will be responsible for the next meeting, to be held in 1917 at Brussels. The intention is to prepare in the same way a work summarising the resources of the world in some mineral of economic value.

Sir Thomas Holland stated that in addition to a large number of papers of limited interest or of non-controversial character, the congress was marked by full-dress debates on three large problems, namely—

1. The physics and mechanics of igneous intrusions.
2. The influence of depth on the character of metaliferous deposits, and
3. The classification of pre-cambrian formations.

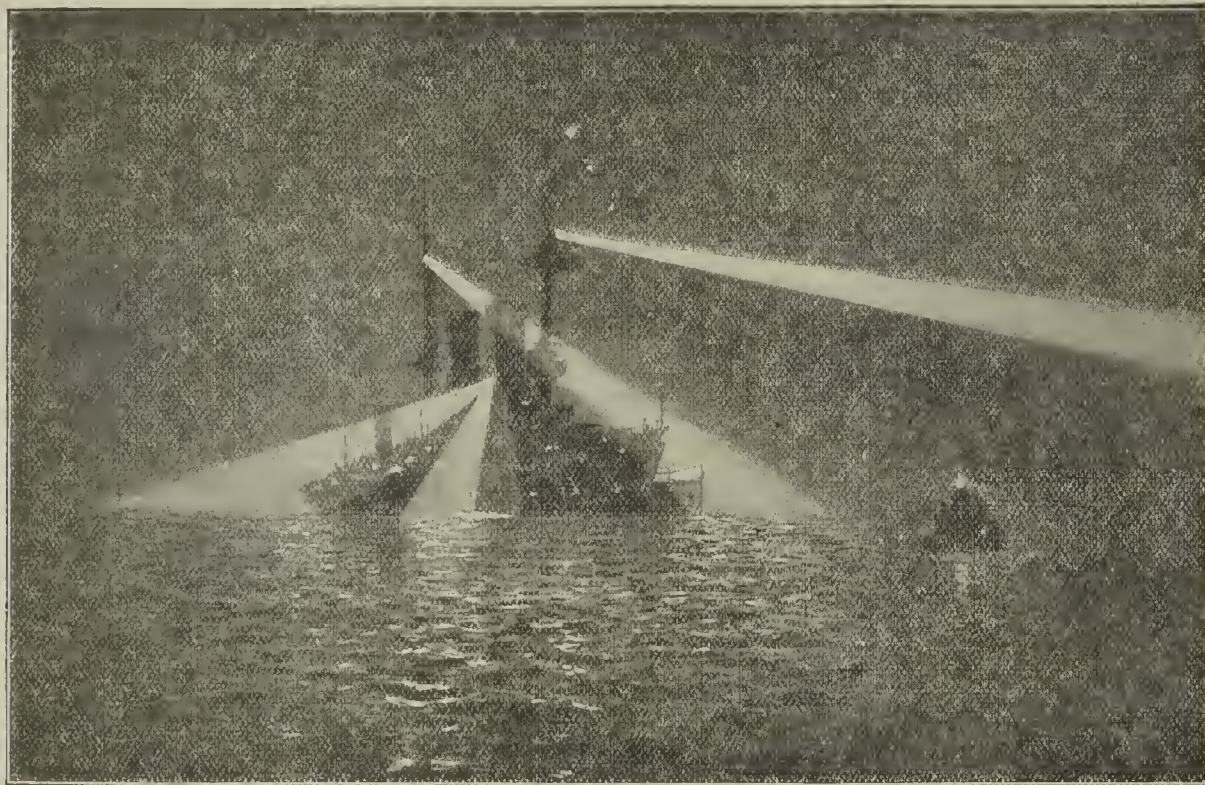
He added that the work of the excursions before, during and after the meeting was greatly facilitated by the well-illustrated guides prepared by members of the Canadian Geological Survey, some of whom accompanied the delegates and provided every possible facility for effective work, even to ready-labelled packing cases for the collection of specimens.

### Firedamp and Gob Fires in Mines.

A report of further discussion on the papers read at the last meeting by Dr. JOHN HARGER on "Firedamp in Mines and the Prevention of Explosions," and "The Detection of Gob Fires" is held over till next week.

**Home Office Prosecution at Kilmarnock.**—Sheriff D. J. Mackenzie on Tuesday heard a case under the Coal Mines Act, 1911. James Smith and David Baillie were charged as manager and agent respectively of the Greenhill Mine belonging to Messrs. J. and R. Howie Limited, Hurlford, with failing to provide and maintain in a condition to be put into immediate operation adequate means for reversing the air-currents in the underground workings, failed to provide and have constantly available for use at the escape shaft a cage constructed in accordance with the provisions of section 40 (7), and failed to provide the necessary space between tubs standing on the rails in the shaft bottom lye or top of the dook and side of the road. The Sheriff found the charges proven. He said he did not regard the first of these as very serious, but the other two were plainly matters which went largely towards the safe management of the mine, and it was impossible for him to pass them over with a merely nominal penalty. He imposed a total fine on each of the accused of £6 5s., or 14 days' imprisonment.—His lordship agreed to state a case for appeal.

**A New Commercial Review.**—Business men who hold enlightened views as to the dignity of their calling will welcome the birth of a high-class monthly review devoted to economic aspects of trade and industry. This function the *International Review of Commerce and Industry*, edited by Mr. T. Swinborne Sheldrake, and published by L. Upcott Gill and Son Limited, at 2s. net, promises to perform. Permanent features of the review include monthly notes on commercial conditions in various parts of the world, a synopsis of official reports, an epitome of the world's commercial Press. There are besides special articles by acknowledged experts on a variety of subjects, such as "Commerce and the Universities," by Prof. Ashley, of Birmingham; "Trade Routes as they will be Affected by the Panama Canal," by W. Leonard Livingston; "Oil Fuel and its Use for Steam Raising," by A. J. Liversidge, A.M.I.C.E.; "Insurance in Great Britain and America," by William Schooling; "The Incidence and Effect of the New American Tariff," by J. A. Hunter; "The Introduction of New Products into Commerce," by A. W. White, F.R.S.E.; "The Commercial Outlook in China," by Edward Collins; "The Merchant System and Oversea Trade," &c. We wish the new venture every success.



A BATTLESHIP COALING AT SEA WITH THE ASSISTANCE OF SEARCHLIGHTS.  
From the A E G Journal.

hospitality of the whole scientific community of Canada. The programme of papers and excursions was extremely varied and full; too full, if possible, for those whose interests covered more than one department of geology. The special attention given to the economic aspects of geology, and the great facilities provided for visits to the mining fields—from Newfoundland to the Yukon—made the congress more than usually interesting to representatives of mining societies. A feature of special interest to this society was the presentation of the great monograph summarising the resources of the world in coal. Although the monograph includes reports from authorities in 64 different countries, the duty of editing the work and summarising its results fell to members of the Geological Survey of Canada, to whom great credit is due for the able manner in which this gigantic task was undertaken and punctually completed.

Not the least interesting feature of the summary is the attempt to form an estimate of the world's resources in coal. The figures are considered as estimates of actual, probable, and possible reserves. The totals for the probable and possible reserves are naturally greatly in excess of those estimated as actual. It is likely that only the figures for actual reserves can be regarded as measurably precise, while the probable and possible reserves are necessarily but approximate, their total being composed of constituents very unequal in reliability. For the five continents the total reserves are estimated in millions of tons as follows:—

	Million tons.
Oceania .....	170,410
Asia .....	1,279,586
Africa .....	57,839
Europe .....	5,105,528
North America .....	784,190
<b>Total .....</b>	<b>7,397,553</b>

the prices obtainable will, of course, permit of the exploitation of the thin and deep seams; but against this advantage must be placed the fact that labour charges all the world over are increasing at a rapid rate, and that coals now regarded as accessible may in future cost more to raise than they will be worth in competition with other sources of energy. Every such increase in the cost of production thus becomes, in actuarial effect, a depreciation of the present value of the natural resources of a country. Whether this growing disadvantage will be counterbalanced by increased facilities for working by mechanical appliances no one can say for certain; but just at present the mental impression produced is, on the whole, in the opposite direction. The increasing cost of production must discourage enterprise in areas where the resources are of doubtful value; and mining engineers in such areas, by providing for a gradually increasing factor of safety, will effectually prevent some coalfields being opened up. At the same time, in areas that are being already worked, operations will be restricted to the more accessible seams of high quality, and in such cases the loss of reserves will be more serious, because the mining of the better seams will result in the development of conditions which will place for ever beyond reach those associated deposits that otherwise might be worth working. Assuming, therefore, that the figure given for total reserves is reasonably correct, we cannot regard the life of our coalfields as properly estimated by dividing the total by any probable annual production. The life of the coal industry, so estimated, will vary much according to the temperament of the calculator, but it might be well for everyone to remember that each item of expense added to the development of a coalfield is in effect a curtailment of the time during which the world will enjoy the pleasures of the coal industry; each strike and each Government restriction may result in cutting out millions of tons from our available



## COALMINING IN SOUTH AFRICA.

The reports on the mineral industries of Natal and the other States in the Union of South Africa are now combined in one volume.

In 1912 the total value of the mineral output of South Africa was £52,711,761, as compared with £47,679,294 in 1911; of the total, coal contributed £10,061,489, as against £8,746,724. The total number of persons employed in the coalmining industry in 1912 was 24,600, or 7·4 per cent. of the total employed in mines. These were employed by 71 different concerns, and consisted of 1,323 whites, 4,095 Asiatics, 19,182 natives and other coloured persons. Of the total, 10,637 were employed in mines in the Transvaal, 1,048 in the Cape, 2,034 in the Orange Free State, and 10,881 in Natal.

Statistics are given of the amounts expended in wages and stores. Thus in 1912 a sum of £879,529 was expended in wages and salaries in coalmines, and £520,025 was expended on machinery and stores consumed during the year; the total sum spent for this purpose by all mines being £12,600,047.

The following table gives the details of coal sales, &c., for the various provinces (in tons of 2,000 lb.) :—

	Quantity.		Value per ton.	
	1911. Tons.	1912. Tons.	1911. s. d.	1912. s. d.
Transvaal	4,343,680	4,751,850	4 8 39	4 4 78
Cape	89,023	74,701	11 6 98	11 0 55
Orange Free State	482,690	525,459	5 8 42	5 4 57
Natal	2,679,551	2,765,068	5 4 98	5 6 99
Total	7,594,944	8,117,078	—	—

Other statistics are as under :—

	Transvaal	Cape	Orange Free State	Natal	Totals.
Producing mines, 1912	31	9	5	20	65
Tons of coal mined	5,538,929	115,390	639,195	3,715,523	10,059,037
Percentage of waste	15·35	35·41	11·74	25·48	—
Coke produced (tons)	2,860	—	—	5,000	7,960
Value (£)	3,469	—	—	8,511	11,980
Tar produced (gals.)	25,895	—	—	—	25,895
Value (£)	806	—	—	—	806

In 1911, 62 mines were producing; the quantity of coal mined was 9,931,327 tons, 2,263,854 tons of waste being sorted out; 5,544 tons of coke, valued at £7,544, were made, and 41,352 gallons of tar, valued at £1,411.

In the Transvaal a considerable amount of slack, formerly set aside as waste, is now being disposed of, the bulk of this being purchased by power supply companies. Whilst, therefore, the average value of Transvaal coal shows a gradual decrease, the sorting of waste has likewise dropped, being only 13·39 per cent. in December 1912, as against 16·58 per cent. in December 1911. Comparisons over periodical averages give 15·35 per cent. waste discarded for 1912, 19·66 per cent. for 1911, 23·10 per cent. for July-December 1910, and 27·09 per cent. for the year ended June 1910.

The Springs-Brakpan and Middelburg coal areas in the Transvaal contributed 13 per cent. and 76 per cent. respectively of the output for that province. Coalmining in the Cape is carried out in the districts of Molteno, Wodehouse, and Engcobo, about 50 miles south of Aliwal North. The coalmines of the Orange Free State are situated towards the northern boundary of the Heilbron district and in the northern and north-western portion of the Kroonstad district. The output of the former district amounted to 84 per cent. of the total. In Natal the largest coal-producing area is the Klip River country. The fields extend north-west and south-west of the town of Dundee, about 40 and 30 miles respectively; 84 per cent. of the coal produced came from this area. The percentage for 1911 was 85 per cent.

In 1912 there were 411 coal-cutting machines in use—25 driven by electricity and 386 by compressed air. In 1911, 406 machines were in use, but the number of electrically-driven machines shows a decline from 33. Of the total, 223 are employed in the Transvaal, five in the Cape, 16 in the Orange Free State, and 167 in Natal. Percentage of the output won by machine is as high as 56·09, being 60·88 in the Transvaal and 59·38 in Natal. The actual number of rock-drilling machines in commission on the Witwatersrand goldfield during December 1912 was 8,840, of the following types :—Large reciprocating piston machines, 5,159; small ditto, 2,064; air-feed hammer machines, 1,323; hand hammer machines, 294.

In 1912 1,413,220 tons of coal were disposed of for bunkers, a decrease of 13,366 tons on 1911. The export for the year amounted to 166,922 tons, an increase of 84,386 tons. India and Ceylon took 58 per cent. of these exports, as against 18 per cent. for 1911; 24 per cent. went to East Africa ports (including 14,398 tons to Egypt), against 29 per cent., but the total exports to these ports were 16,468 tons more than in 1911; 4 per

cent. only went to the Straits Settlements and Dutch East India fields, compared with 32 per cent. in 1911.

The following table summarises the statistics of accidents in coalmines during 1912 and 1911 :—

	Number of deaths.		Death-rate per 1,000 employed.
	1911.	1912.	
Transvaal	20	28	2·70
Cape	—	1	0·88
Orange Free State	4	1	0·52
Natal	24	21	1·95
Total	48	51	2·11

Of those killed four were whites, three Asiatics, the remainder being natives, &c. The death-rate for all mines was 3·22. As usual, falls of ground and mineral account for the bulk of colliery accidents, and in the Transvaal collieries 1·45 persons per 1,000 were killed by falls, and at the Witbank Colliery, the largest in the Union, the rate was as high as 5·84. Taking all mines, the deaths by percentages from various causes were as under :—

	Deaths. All mines. Per cent.
Falls of ground	32·02
Trucks and tramways	6·69
Falling of material	10·13
Explosives	21·23
Machinery	3·04
Falling in shafts, excavations, &c.	6·48
Struck by skip, cage, &c.	5·77
Other causes	14·59

Taking the deaths at all mines, it is estimated that 53·1 per cent. were due to danger inherent to work or misadventure, 4·8 to defective plant or material, 8·7 to carelessness of the deceased, 2·5 per cent. to ignorance, 7·4 per cent. to disobedience to orders, 1·1 per cent. to the fault of the management, 12·6 to the fault of gangers, 6 per cent. to the fault of others, and 3·8 to joint fault.

There were 14 accidents at mines due to electricity six persons being killed below ground and five on the surface. During the year there were 75 cases of over-wind or runaway in shafts or winzes in the Transvaal, and five cases in the other provinces. Detaching hooks were successful in every instance but one, and in this case the clearance in the headgear for the skip bridle was not sufficient, and the rope broke before the safety hook came into action. In one case on the Rand a detaching hook of the ordinary pattern is being successfully used in a "compound" shaft, and no difficulty has been experienced in negotiating the bend or in running on the incline.

## LAW INTELLIGENCE.

## SUPREME COURT OF JUDICATURE.

## COURT OF APPEAL.—December 4.

Before Lord Justice VAUGHAN WILLIAMS, Lord Justice BUCKLEY, and Lord Justice KENNEDY.

## Minimum Wage Act—Validity of Rules.

**Davies and Another v. Glamorgan Coal Company Limited.**—This was an appeal by the defendants from the judgment of Mr. Justice Pickford on the trial of an action without a jury. There was also a cross-appeal by the plaintiffs. The action was brought by the plaintiffs, on behalf of themselves and all others the colliers employed by the defendant company, to test the validity of certain rules made by Viscount St. Aldwyn as chairman of the Joint District Board for South Wales, including Monmouth district, constituted for the purpose of the Coal Mines (Minimum Wage) Act, 1912. The plaintiffs claimed a declaration that that part of Rule 5 which required a workman to give a notice to the official in charge of the district, and Rule 7, were not authorised by the Coal Mines (Minimum Wage) Act, and were *ultra vires*.

Mr. Justice Pickford was of opinion that it was not competent to provide by rules made under the Act that, to ascertain whether the minimum wage had been earned by any workman on piecework, his total earnings during two consecutive weeks should be divided by the number of shifts or parts of shifts he had worked during such two weeks, and that his wages should be adjusted in accordance with the average earnings so ascertained; but that it was competent to provide that his wages should be adjusted having regard to his average earnings during one week. He accordingly held that clause 7 of the rules was *ultra vires*. The learned judge was further of opinion that it was competent by the rules to require a workman, if at any time he was unable, owing to circumstances over which he alleged he had no control, to perform such an amount of work as would entitle him to a sum equal to the minimum rate, to give notice thereof to the official in charge of the district, and that if such notice were not given the workman should forfeit his right to wages at the minimum rate for the particular pay. He accordingly held that clause 5 of the rules was not *ultra vires*.

The defendants appealed, and the plaintiffs gave notice of cross-appeal.

Lord Justice Vaughan Williams said that, with regard to Rule 5, he was of opinion that that rule was not *ultra*

*vires*. By section 1, sub-section 2, of the Coal Mines (Minimum Wage) Act, 1912, the district rules were to lay down conditions with respect to the regularity and efficiency of the work to be performed by the workmen. It seemed to him to be impossible that work should be conducted with regularity and efficiency if a workman who sought to justify short work by alleging circumstances over which he had no control was not under an obligation to give notice thereof at once. With regard to Rule 7, he was of opinion that there was no power and no authority in the joint district board to make any such rule as that. It was not suggested that the words of the Act which defined the duties and powers of the district board expressly gave them any power to make rules for determining on what principle a workman's average actual earnings should be ascertained. And that Court could not confer on the board a power which was not given to them by the Act of Parliament. The question had been discussed how the workman's actual wages were to be ascertained, whether by taking them day by day or by averaging them over a week, or a fortnight, or a month. But counsel for plaintiffs no longer pressed what he had at first contended for, and it was not now necessary to deal with that question. So far as the validity of rule 7 was concerned, he was of opinion that it was *ultra vires*.

Lord Justice Buckley and Lord Justice Kennedy delivered judgment to the same effect.

The Order of the Court was as follows :—Strike out the declaration appearing in the judgment and substitute the following :—The Court, without expressing any opinion as to how the rate is to be ascertained, but expressing the opinion that the District Board has not under the Act power to determine over what period the actual earnings of the workman are to be taken for the purpose of determining the rate of such earnings and the deficiency, if any, of such rate below the minimum rate, declare Rule 7 to be *ultra vires*; declare the disputed portion of Rule 5 to be *intra vires*. No costs of appeal, cross appeal dismissed with costs, and no costs below.

## HIGH COURT OF JUSTICE.

## KING'S BENCH DIVISION.—December 5.

Before Mr. Justice HORRIDGE and a Jury.

## Alleged Nuisance from Coaldust.

**Woodman v. the Pwllbach Colliery Company.**—This case was heard at the recent Glamorgan Assizes. John Edward Woodman, the plaintiff, was a butcher, of Ystalyfera, and the jury found that the defendants, who were conducting screening operations, had caused a nuisance to the plaintiff's slaughter-house by reason of the coaldust which came on the premises, but not to certain adjoining cottages, while, further, there was no negligence on the part of the defendants. His lordship then reserved his judgment for further consideration of the legal aspects of the case.

His lordship said he had come to the conclusion, after reading the leases, that the defendants were fully entitled to do the work of mining, including that portion to which the present action related, that of screening coal. Therefore, the defendants were really able to win. The jury had found there was no negligence, and that was the ground of his judgment. But plaintiff had won on the point of nuisance in respect of the slaughterhouse, and was entitled to his costs so far as that was concerned as against the defendants. He should therefore enter judgment for defendants with general costs, but plaintiff would have the costs of that part of the action which he had won.

Mr. Griffiths Jones asked for a stay of execution, and his lordship said he would consent to this on the usual terms.

## December 9.

Before Mr. Justice BRAY and Mr. Justice LUSH.

## The Stallman System: A Question of Responsibility for Wages.

**Higginson v. the Blackwell Colliery Company and Pitchford v. the Same.**—These were appeals by the plaintiffs from a judgment of Judge Allen, of the Mansfield County Court. The question raised was whether colliery owners are or are not responsible for the wages of day men employed on the "stall" system. The appellants, who were day men, sued the company for three days' wages, their case being that the stallman went away leaving them unpaid. The county court judge held that the stallman was responsible for the appellants' wages. The appellants now appealed from that decision.

The Court dismissed the appeal with costs. Mr. Justice Bray said that the company relied on two grounds—that having paid the stallmen, their liability ended, and that the contract was between the day men and the stallmen, and not the company. For himself, had he had to deal with the case in the first instance he should have decided the case upon the first ground. The established practice of paying through the stallmen had been proved. That was the practice, and the Court must continue the contract in the light of that practice. In the contract between the appellants and the company there were rules and regulations to which the former agreed. One rule provided that the day men should be paid by the stallmen. The company said that when they paid the stallmen they had paid the appellants. The appellants agreed to be bound by that rule, and that being so, and the company having paid the stallmen, had discharged their liability.



to the second point, his lordship thought that there was a contract between the stallmen. It was said that if there was, after the Minimum Wage Act this was void. But this practice had been going on for years, and he thought the Act only provided for the workmen being paid a minimum wage, and, that being so, his lordship was of opinion that the county court judge was right on both points. The day men and the stall men both, however, had a right of claim against a company in the event of the company not paying. Mr. Justice Lush said he concurred, although he had doubts. The appeals were accordingly dismissed.

THE CUMBERLAND COALFIELD.  
Important Developments at Ellenborough Colliery, near Maryport.

A group of Maryport, Whitehaven, and Workington business men, among whom is Ald. Highton (mayor of Workington), who has taken the lead in the matter, have launched a big scheme for the development of the Ellenborough Colliery, which they propose to make one of the largest, if not the largest pit in West Cumberland. The idea is to float a company, with a capital of £200,000, the money to be spent on sinking a new shaft, modernising the present colliery and erecting a battery of 60 by-product coke ovens. A meeting was held at Workington recently, when it was stated that the support received was most encouraging. Steps are also being taken, it is understood, to enlist further support at Maryport and other industrial centres. The promoters include not only a number of well-known business men, but several who are closely connected with the coalmining industry in West Cumberland. Reports have been prepared by a mining engineer and a colliery manager, who state that there are 20 million tons of coal in the Ellenborough Colliery, or sufficient to last for 70 years, if the output is at the rate of 300,000 tons per annum.

The present output is from 1,500 to 2,000 tons per week, and the idea is to increase this from 5,000 to 6,000 per week, or 300,000 tons per annum. If this can be accomplished it is confidently predicted that, with coal at its present prices, and with the by-product industry flourishing as it has been doing, the colliery will become a successful and lucrative undertaking.

The new company purpose sinking a new shaft to a depth of 240 fathoms, which will give convenient access to all seams which remain to be worked in the royalties of and including the lower Three-quarter seams; to deepen the existing downcast shaft to cut the lower Three-quarter seam, to provide the requisite ventilation for the lower seams; to remodel the surface plant, and make it capable of dealing with a much larger output; and to equip the colliery with by-product plant capable of carbonising at least 100,000 tons of coal per annum, and yielding furnace coke, tar, benzol, sulphate of ammonia, &c. The present output of the colliery is about 1,500 tons per week, drawn from the Virgin, Rattler, and Yard seams. The machinery and plant now in use is capable of dealing with an output of about 2,000 tons per week. At the present time, over 200 coal hewers are regularly employed; when the improvements are effected, it is expected that it will give employment to about 500 men, while an additional number will be required to work the by-product plant. The output of coal will be more than doubled.

The Ellenborough Colliery, which is situated about half-a-mile from the town of Maryport, consists of two pits. The old or No. 1 pit is 11 ft. in diameter. It is sunk to the Ten-quarter seam at 96 fathoms, and forms the upcast for the colliery. The pit is fitted with wooden guides to the Virgin seam level at 79 fathoms, the coal from that seam being drawn by cages carrying one tub. A staple pit is sunk from the Ten-quarter seam to the Cannel Band seam, and together with a drift from the latter to the Yard seam, form the upcast and means of escape from the lower workings.

The New Pit (No. 2) is 10½ ft. diameter. It is sunk to the Yard seam at 139 fathoms, and acts as the downcast for the colliery. This pit, which is fitted with wire guides and cages carrying two tubs each, is the winding shaft for coal from the Rattler, Ten-quarter and Yard seams. The seams of coal already won are as follow :—

Seam.	Thickness. Ft. in.	Depth. Fathoms.
Sanhouse Band .....	3 0 .....	31½
Hamilton .....	2 9 .....	68½
Virgin .....	2 9 .....	79
Ten-quarter .....	7 0 .....	96
Rattler Band.....	2 9 .....	103½
Metal .....	2 9 .....	121½
Cannel .....	4 7 .....	120½
Yard .....	1 10 .....	139

The seams not yet sunk to, but known to exist in the adjoining collieries are:—

Little Main.....	2 0 .....	157
Six-uart .....	2 0 .....	170
.....	2 3 .....	198
.....	2 0 .....	204
.....	3 4 .....	220

The seams is suitable for house, the whole of it is well suited for

coking in by-product ovens, and will yield the high percent. age of sulphate of ammonia, tar and benzol peculiar to Cum- borland coal. Of the seams proved, several have been worked to a considerable extent within short distances of the shafts, but there is still in each of them sufficient coal to warrant their re-winning. The Rattler seam, and also the Ten-quarter seam, have both recently been re-won to the west of the shaft, and are opening out well. The Yard seam, which is 2 ft. in thickness, has also been won beyond the fault to the west of the pits by drifting from the Virgin seam. The general conditions underground are more favourable than at many Cumberland collieries. As has already been shown, the number of workable seams is unusually large, which is important as admitting of a large output from a comparatively small area and consequent short haulage distances. The gradients are easier, and the feeders of water, which are chiefly from the upper seams, are not excessive.

The Dearham royalty, which, for the purposes of the proposed extensions, has been recently taken from Lord Lonsdale, lies to the east of and adjoining the Netherhall royalty. The extent is about 1,234 acres. The winnings in the Yard seam are within 400 yards of the western boundary of this royalty, immediately beyond what is a tract of about 800 acres, which is practically unworked. It is thought that under the whole of this area the Yard, Little Main, Six-quarter, Upper and Lower Three-quarter and Four-foot seams will be found, and that over part of the area there exist, in addition, the Ten-quarter, Rattler, Metal and Cannel bands, the whole being under profitable working conditions. Under the remaining portion of the royalty—the portion lying to the extreme east—coal was worked by the Dearham collieries from the Rattler, Ten-quarter, Metal and Cannel seams to a considerable extent, and to a small extent from the Yard and Little Main seams. The seams remaining to be worked are the Yard and Little Main over most of the area, and the Six-quarter, Upper and Lower Three-quarters, which are intact. After making liberal allowances for fault and waste in working, it is estimated that there are 20 million tons of coal in the various seams capable of being worked by the present colliery, or sufficient to last for 70 years at the rate of 300,000 tons per annum.

As possessing very valuable possibilities, it is suggested that the company should secure an option over the sea lying between Lord Leconfield's royalty and the shore, with a view of extending their command of the undersea coal. The company have already an arrangement with the Senhouse trustees for working the area in the Netherhall royalty beyond the large downthfow, which secures to them about 2½ miles of the foreshore.

For the purpose of immediate development, it has been suggested that a new pit be sunk in a suitable position in the colliery yard at Grasslet, to the depth of the lowest seam. The pit, which would become the downcast for the colliery, would be 15 ft. diameter, and have appliances capable of dealing with an output of 750 tons in eight hours. The No. 2 pit would be sunk to the same seam as the proposed new pit, and would act as the upcast of the colliery. If found necessary, this pit could also be used as a drawing shaft for coal from the upper seams. The No. 1 pit could be used as a pumping shaft for dealing with the upper votaries of water.

The colliery is particularly well situated as regards the shipping and bunker trade, being within half a mile of the docks at Maryport, and connected therewith by private railway. For shipment in the Elizabeth dock—the principal coal shipping dock of the port—the colliery, under the lease, has the free use of the shipping hurry belonging to the Senhouse trustees, and coal can be shipped without passing over any public railway or siding and at nominal cost. In this respect alone the colliery has an advantage over the other collieries shipping at the port of from 4d. to 1s. per ton. The colliery branch railway is connected with the sidings of the Solway Iron- works, and both coal and coke can be delivered from the colliery to these works practically free of charge. The colliery sidings are also connected with the London and North-Western Railway and the Maryport and Carlisle Railway companies, which are both within a few hundred yards of the pits, and by which coal and coke can be distributed to the various iron and steel works at Workington, about 6 miles away, and also to the other depots in the district. The situation of the colliery, just outside the town of Maryport and within easy reach of several villages, is also of considerable advantage, on account of the cash sale of household coal to carts at remunerative prices. The works of the West Cumberland By-product Company are within 2 miles by rail of the colliery, which also places it in a most favourable position as regards the sale of tar and the purchase of acid.

The news has created the liveliest satisfaction in Maryport, and it is stated that when the colliery is fully developed it will be one of the most important in the county.

The forty-eighth annual dinner of the Leeds Association of Engineers took place on Saturday. It was reported that the association numbered 300 members, an increase of 40 during the year.

CONTINENTAL MINING NOTES.

**Austria.**

As the result of an inrush of water, on Tuesday, into the Britof mine in the Adelsberg district, 11 men were cut off.

**Belgium.**

The reduction in the price of Belgian coke appears to be rather less than that announced a fortnight ago. The Syndicate, from January 1, 1914, will lower prices by 2 fr., leaving blastfurnace coke 22 fr., half-washed coke 25½ fr., and washed coke 32 fr. This represents no change in the last-named variety. These prices will be maintained during the first half of the year. Great dissatisfaction is expressed by iron and steel makers, who allege that greater reductions should have been forthcoming.

**France.**

We regret that last week we announced in error the death of M. Gosselet. This distinguished geologist, on the contrary, has been nominated a member of the Académie des Sciences.

Exports and imports of fuel during the first 10 months of the present year were as follow :—

	Imports.		Exports.	
	1912. Tons.	1913. Tons.	1912. Tons.	1913. Tons.
Coal .....	13,010,200 ...	15,406,100 ...	1,601,977 ...	1,113,310
Coke .....	2,276,900 ...	2,594,400 ...	163,644 ...	192,659
Briquettes ...	927,500 ...	892,300 ...	166,948 ...	172,315

Imports of British coal have risen from 7,207,500 tons to 9,341,700 tons; those of Belgian coal from 2,873,000 tons to 2,992,400 tons; and those of German coal from 2,713,200 tons to 2,829,600 tons.

*The Eight Hours Day.*—An amusing outcome of the agreement recently come to between the coalowners and the representatives of the unions to suspend all long shifts until the new Law has been passed is reported by the *Réveil du Nord*. At Dourges No. 2 pit the miners, desiring to work overtime, refused to ascend at the appointed time, and had to be removed by force, soldiers and gendarmes being employed in the work of eviction.

*The Financial Condition of French Collieries.*—A well-informed correspondent writes:—There prevails a certain amount of pessimism at present regarding the outlook of French collieries, based upon their situation in the financial markets and the imminence of new legislation which will add further heavy burdens to the industry. Public attention has been aroused by the steady fall which has been going on in the shares of the big colliery companies for the last nine months, during which period the leading concerns in the north of France have lost over 18 per cent. of the market value of their shares, in some instances much more. The price, it is true, stands at a level somewhat inflated in view of the income value, but such heavy falls during the period in question of £64 in the case of Anzin and Courrières, £52 in Béthune and £48 in Marles, with proportionate losses in others, cannot pass unnoticed. As a rule, these securities are very little dealt in on the Paris Bourse, although they have been more in evidence recently. Their market is in Lille, where active speculation goes on in them. The following table, showing the fall of some of the leading colliery shares on the Lille Bourse, may be instructive, since it is to December 1, and takes into account certain fluctuations in November, when an improvement was hopefully expected. In connection therewith, it may be noted that the share capital of the French mines is on the antiquated system of founders' shares, divided and subdivided into fractions of original shares—like some of the old English waterworks. For the purposes of this table, however, the basis of the quotations is a portion of a share of a nominal value of 100 fr., except in the case of Bruay and Lens, where the fraction is 10 fr. nominal value. It may also be mentioned that there are still further sub-divisions, and that in some cases the divisions of the founders' shares are on quaint archaic bases, such as Anzin, the current scrip being the hundredth part of a "denier," and the original capital was 24 "sols" of 12 "deniers" each. The list is:—

	Feb. 15, 1913. Fr.	Nov. 11, 1913. Fr.	Dec. 1, 1913. Fr.
Anzin .....	9,500 .....	7,955 .....	8,130
Béthune.....	7,630 .....	6,263 .....	6,250
Bruay .....	1,895 .....	1,415 .....	1,450
Courrières .....	6,665 .....	4,970 .....	5,025
Drocourt .....	8,900 .....	7,430 .....	7,450
Lens .....	1,870 .....	1,465 .....	1,524
Liévin.....	5,195 .....	4,350 .....	4,290
Marles .....	6,080 .....	4,600 .....	4,800

The cause of this depression, which is still maintained without any prospect of improvement beyond temporary movements of the speculative market, is twofold, viz., financial and economic. To dispose briefly of the financial standpoint—the colliery companies in the North of France return a bare 2½ to 3 per cent. income on the market price of the shares. This market price has been maintained on such a level for the simple reason that the public has optimistically traded on the expected great development of the mines, to the extent of anticipating quite ten years ahead. These previsions are from day to day becoming more dubious. But the main reasons of the reduction in the market value French colliery shares are economic. It is true that, in the



immediate future at all events, the price of French coal is not likely to come down appreciably, even in view of foreign competition, but the output is certain to be reduced as well as its value for dividend purposes. Under normal conditions French coal can generally hold its own market, and the collieries are readily renewing their contracts for next year on the same level of prices as in 1913. The small effect of foreign competition on the "home" markets of the French mines was shown during the recent strike, when the Belgians and Germans made a determined onslaught on the consumers of the North of France, the Belgians especially offering terms relatively 50 c. to 1 fr. a ton under current prices, but without success. There are various and complex reasons why the consumers of the North of France stand loyal to their local mines.

In districts a little further afield, however, Germany may be feared. Be that as it may, French collieries will certainly be able to dispose of their reduced output without reducing prices. This, however, is not satisfactory to shareholders. In the first place the French mines are still at the moment away behind their normal output owing to the strike, coupled with the fortnight's holiday of St. Barbara in October, which have had greater effect this year because of the reduction of overtime. Available labour has also been reduced by the three years military service Bill, which has taken away an extra draft of 5 per cent. of the miners. Under the French social laws, it is almost impossible to replace this shortage in a reasonable time. On the top of this comes the overtime reduction, and still more important is the Eight Hours Day Bill, which is going merrily through Parliament.

Quite apart from this there is taxation, much favoured by the Socialists, on the amount of coal raised. The present Budget provides for a fresh tax upon dividends, which represent anything over 2 fr. a ton on the quantity of coal raised in the year. All sums applied for dividend representing more than this standard 2 fr. a ton on the outturn will be taxed 20 per cent. While this new tax hits the mines of the North of France less hardly than those of the Centre, such mines as Lens, Bruay and Marles will be considerably affected. Marles, for instance, last year paid a dividend equal to 4 fr. per ton extracted. This would now be reduced by 20 per cent. of 2 fr., or 3.60 fr. gross for division instead of 4 fr. Naturally, this 4 fr. has nothing whatever to do with the net pithead profit of the French coal, which in the north is between 7 and 8 francs. It is true that the Government shows every disposition to deal with this tax in a broad way, allowing many items to be debited to revenue account which would otherwise be chargeable to capital or general account. But it is quite an arbitrary calculation, because, of course, a proportion of a mine's profits are obtained from subsidiary sources, and not merely from coal worked.

With the present growth of Socialist finance, there is no saying to what extent such taxation might go. At all events, the "Socialistic" side of the balance-sheet expenses of all French mines is growing every year—in such matters as free housing, free milk, free gardens and utensils, &c.

No better example of this could be found than in the preliminary announcement of the Lens mines balance-sheet for the year ending last October: 4,037,387 tons of coal were produced, an increase of 275,452 tons over last year, and 678,152 tons of coke were made and sold. The mine is heavily interested in a local electrical works which brought in £37,177 profit, besides paying £17,760 for power, supplied. The mine is also constructing an ironworks. The gross profit is estimated between £960,000 and £1,000,000, but apart from the ordinary business expenses there are the following heavy items:—£85,248 to national pension fund, £211,892 for various social schemes such as benefit societies, free milk supply, rent of workmen's houses, &c., £90,446 taxes, rents, &c. This works out to a total equal to 60 per cent. of the sum which would ordinarily be set aside for dividend, and is an increase of £25,306 over last year. It can readily be seen that with the certainty of reduced production, the menace of further social and fiscal burdens, and the increased competition from without, French coal-mining is not offering much inducement to capital.

There are also labour troubles ahead, for there are now two rival unions in the field, the young one (the Syndicat Basly), which has just won a victory in the matter of overtime, and the old one (the Conseil National, under M. Broutchoux), which is eager to justify its existence. The latter is planning a national strike to obtain a minimum pension of 2 fr. a day for miners over 50 years of age.

#### Germany.

A fire broke out in the 200 m. level of the Emma pit at Rybnik, in Silesia, on Sunday morning. At the outset of the rescue operations 16 dead bodies were brought out. On a second search being made, three men were extricated alive, but one of them died on the way to the hospital, and the other two are in a critical condition.

A telegram from Langendreer (Westphalia) states that an inrush of water occurred early on Monday morning at the Bruchstrasse mine, by which a foreman and three miners were cut off. Their dead bodies were afterwards recovered.

**Ruhr Coal Market.**—There is no change in the market situation, the position of the chief consumer, the iron

industry, being very unsatisfactory. Here and there, signs of a slight revival are apparent, but only to a very modest extent; and it will require considerably more to bring about any increased need of fuel. In house coal there is a small increase, but the weather is not calculated to stimulate the demand much. Coking coals are in a very bad way, owing to the unfavourable state of the coke market. Up-river shipments have again been delayed, this time on account of too much water; but business in South Germany still leaves a good deal to be desired, the demand for house coal having slackened, since the wholesalers have got in all they need for the time being, and the trade in industrial coals is not very brisk. The export trade remains on about the same level as before, but the coke market is in quite a bad way, the demand for all grades having receded, so that stocks continue to grow, the profitable nature of the by-products preventing any reduction in output.

**Coal Market in Upper Silesia.**—Difficulty is still experienced in satisfying the demands of consumers in good time. There is practically no shortage in the supply of railway wagons, but the active demand is testing the producing capacity of the pits to the utmost, and though extensions and new sinkings are in progress, it will be a long time before they are completed. The volume of traffic continues very extensive, and, so far as industrial coals are concerned, is fully maintained, although the depression in the local iron industry has reduced consumption in that branch. Deliveries of house coal are increasing, customers being anxious to make up their stocks as far as possible before the river traffic ceases. Locally, dealers have not much stock, but do not feel the lack of it in view of the mild weather, though they may do later on, for which reason they are endeavouring to secure larger supplies. Gas coal is in improved request, and the pits are getting into arrears with delivery; whilst coking coals cannot be sent off fast enough. The large requirements of the export trade cannot be completely met, though favourable prices can be obtained in Russian Poland, where fuel is scarce, and Austria-Hungary offers a very good market. The coke market is very active, nearly all kinds being in equally good demand, and a ready outlet being open for the whole production.

**Naval Coal.**—According to the Budget statements the provisions for the purchase of coal for the use of the German navy in 1913 were 22,735,000 marks, as against 20,469,916 marks in 1912, and 18,704,860 marks in 1911. Of these totals the purchases of foreign coal are:—1911, 4,922,000 marks; 1912, 4,970,000 marks; 1913, 4,755,000 marks. In 1911 the Rhenish-Westphalian Syndicate delivered 701,835 tons of coal, 8,570 tons of coke, and 6,290 tons of briquettes for the use of the navy. The foreign coals are almost exclusively used on distant stations, and owing to the establishment of coaling stations by the Syndicate, the tendency is to rely more largely upon native coal even in distant parts of the globe.

**Consumers of Fuel.**—The following table shows the various classes of consumers supplied with coal, coke and briquettes by the Rhenish-Westphalian Syndicate during 1911 and 1912:—

Group of industries.	1911. Tons.	1912. Tons.
Collieries, cokeworks and briquette works	4,860,173	5,220,499
Oremining	282,285	306,883
Saltmining and saltworks	333,474	334,860
Metallurgical and engineering works	28,249,849	31,769,517
Electrical works	1,070,744	1,176,642
Stone and clay industry	3,233,271	3,267,223
Glass industry	521,098	521,796
Chemical industry	2,022,015	2,261,699
Gasworks	2,274,513	2,481,779
Textile and dyeing industry	2,000,325	2,103,747
Paper and printing industry	901,499	985,555
Leather and rubber industries	249,456	226,766
Woodworking industries	91,548	86,391
Sugar industry	375,911	456,007
Breweries and distilleries	734,600	689,100
Provision trades	649,512	704,682
Waterworks, baths and laundries	319,748	289,875
Household requirements	8,789,934	9,214,753
Railways and tramways	7,926,096	8,112,421
Shipping, docks, fisheries, &c.	2,924,345	3,453,573
Navy	718,609	953,182
Total	63,526,115	74,618,950

In compiling the above, the equivalent is taken of coal used in the manufacture of coke and briquettes.

**Coal Syndicate New Settling Prices.**—The following new settling prices will come into operation on April 1 next for the whole financial year, except in the case of blastfurnace coke and coking coals, for which the change will come into force on January 1 and terminate on September 30. The present prices are given, in parentheses, for comparison:—  
Bituminous coals: Through-and-through slack 10.25 marks (11 marks), through-and-through (25 per cent. large) 11.25 marks (12 marks), mixed (40 per cent. large) 12 marks (12.60 marks), best mixed (50 per cent. large) 12.50 marks (13 marks), through-and-through smithy coal 12 marks (12.60 marks), mixed smithy coal 12.50 marks (13 marks), large coal I. 13.50 marks (14 marks), II. 13 marks (13.50 marks), III. 12.75 marks (13.25 marks), washed nuts I. 13.75 marks (14.25 marks), II. 13.75 marks (14.25 marks), III. 13.50 marks (14.25 marks), IV. 13 marks (13.75 marks), V. 12.50 marks (13.25 marks), washed fines 9.25 marks (10.25 marks), coking coals 12.25 marks (13.25 marks).

Gas and open-burning coals:—Through-and-through slack, 10 marks (10.75 marks), open-burn 10.50 marks (11 marks), through-and-through 11 marks (11.50 marks), through-and-through gas flaming as coal 11.75 marks (12.50 marks), producer coal 12.50 marks (13 marks), through-and-through gas coal, summer price, 12 marks (12.50 marks), winter price, 13 marks (13.50 marks), large coal I. 13.50 marks (14 marks), II. 13 marks (13.50 marks), III. 12.75 marks (13.25 marks), washed nuts I. 13.75 marks (14.25 marks), II. 13.75 marks (14.25 marks), III. 13.50 marks (14.25 marks), IV. 13 marks (13.75 marks), V. 12 marks (13 marks), unwashed nuts I. 13 marks (13.75 marks), nuts slack over 30 mm. 9.75 marks (10.50 marks), below 30 mm. 8.75 marks (9.50 marks), unwashed fines 7 marks (8 marks), washed fines 9.25 marks (10.25 marks).

**Smithy coals:** Through-and-through slack (10 per cent. large) 10.25 marks (11 marks); through-and-through, with 25 per cent. large 10.75 marks (11.50 marks), with 35 per cent. large 11.25 marks (12 marks); best mixed, with 50 per cent. large, 12.50 marks (13 marks), large 13.25 marks (14 marks); washed nuts I., summer 15.50 marks (16 marks), winter 17.25 marks (17.75 marks); washed nuts II., summer 15.50 marks (16 marks), winter 17.25 marks (17.75 marks), III. 14 marks (14.50 marks), IV. 13.25 marks (14 marks); fines 8.50 marks (9.50 marks).

**Lean coals:**—Eastern district: Through-and-through slack with 10 per cent. large 9.50 marks (10.25 marks), through-and-through with 25 per cent. large 10.75 marks (11.50 marks), with 35 per cent. large 11.25 marks (12 marks), nubbles 14.75 marks (14.75 marks), best mixed 50 per cent. large 12 marks (12.50 marks), large 14.25 marks (14.25 marks), washed nuts I. summer 16.25 marks (16.75 marks), winter 17.75 marks (18.25 marks), II. summer 16.25 marks (16.75 marks), winter 17.75 marks (18.25 marks), III. 13.75 marks (14.50 marks), IV. 13.25 marks (14.50 marks), fines 7 marks (8 marks). Western district: Through-and-through slack with 10 per cent. large 9.25 marks (10 marks), through-and-through with 25 per cent. large 10.50 marks (11.25 marks), with 35 per cent. large 11 marks (11.75 marks), best mixed 45 per cent. large 11.75 marks (12.25 marks), large 14.75 marks (15 marks), washed anthracite nuts I. summer, 17.75 marks (18.25 marks), winter 20.25 marks (20.75 marks), II. summer, 21.75 marks (22.25 marks), winter, 24.25 marks (24.75 marks), III. house coal, 18 marks (18.25 marks), III. producer coal 18 marks (18.25 marks), III. steam coal, 13.50 marks (14 marks), IV. 8.15 mm., 11.50 marks (12.50 marks), unwashed fines 5.75 marks (6.75 marks), washed fines (up to 7 per cent. ash), 7.50 marks (8.50 marks).

**Coke:** Blast-furnace coke I. 17 marks (18.50 marks), II. 16 marks (17.50 marks), III. 15 marks (16.50 marks); foundry coke 17.50 marks (19 marks); broken coke I., 50 mm. and over, 19 marks (21 marks), II. a 40/60 mm., 40/70 mm., 20 marks (21.50 marks), II. b., over 30 mm., 19 marks (21 marks), III., over 20 mm., 14.50 marks (14.50 marks), IV., below 20 mm., 8.50 marks (10 marks), semi-screened and semi-broken 16.50 marks (18 marks), nubbles 16 marks (17 marks), screened small 13.50 marks (14.50) screened pearls 8 marks (9.50 marks), coke breeze 1.75 marks (2.50 marks). Briquettes: I. 13.75 marks (14.50 marks), II. 12.75 marks (13.50 marks), III. 11 marks (11.50 marks).

#### Russia.

On November 27 the Industrial Mining and Metallurgical Committee of Central Russia met at Kharkoff. In the report of the organising committee it was stated that in the 12 months ended October 1, 1913, 1,851 million poods of coal, ore and iron and steel products were carried over rail from the district, as compared with 1,669 million poods in the preceding year. The report continues:—"Despite the activity in deliveries of Donetz coal and the rapid development of the colliery undertakings in that coalfield, the market has passed through a difficult crisis which owes its origin entirely to the scarcity and dearth of naphtha residue and the high cost of wood fuel." The congress considered at length the question of free imports, and it appears, from the figures presented, that 1,883,700 tons of British coal had been imported during 1913 for railway consumption. The Podolian railways have just applied to the Council of Ministers for powers to import half-a-million poods of English coal duty free. One of the most remarkable developments in recent months is the number of new anthracite workings, which are springing up like mushrooms; nevertheless, the scarcity of hard fuel is unabated.

**North Staffordshire Institute of Mining and Mechanical Engineers.**—A general meeting will be held on Monday, December 15, 1913, in the North Stafford Hotel, Stoke-on-Trent, at 5 p.m. The following paper will be open for discussion:—"The Reopening of Norton Colliery with Self-contained Breathing Apparatus after an Explosion," by Mr. J. R. L. Allott. Mr. James Lomax, of Bolton, will deliver a lecture on the North Staffordshire coals referred to in his recent paper on "The Microscopical Examination of Coals in relation to Spontaneous Combustion." The lecture will be illustrated by lantern slides, micro-photography, and sections of the various seams. Many of the sections were exhibited under the microscope.



## THE COAL AND IRON TRADES.

THURSDAY, DECEMBER 11.

Scotland.—Western District.  
COAL.

As we are now in the second week of December we have practically entered upon the last lap, so far as the coal trade in the west of Scotland district is concerned, and signs all point to a strong finish. All classes of coal are in eager request, and prices are firm, although in one or two instances, where steamers have been delayed by weather, slight concessions have been made in order to get wagons cleared. Ell coals remain in much the same position as last week, and with tonnage in good quantity collieries are kept busy. There has been very little booking in advance, the disparity between the ideas of coalmasters and exporters being considerable, but a fair amount of business has been closed abroad, and collieries being aware of this their position is strengthened, as it is unlikely that coals, particularly ells, will fall in the early part of the ensuing year to the extent necessary to allow merchants out with a profit. The demand for splint coal is largely in excess of the supply, and prices show a firming tendency. All other qualities are well booked, and the current level of prices is likely to be maintained. In smalls, trebles continue to show some weakness, but this slackness is more than counterbalanced by the demand for doubles and singles. In view of the late arrivals of vessels owing to stress of weather shipments are rather less this week than last, and amount to 96,545 tons, compared with 119,194 in the preceding week and 106,434 tons in the same week last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/3 to 13/9	13/3 to 13/9
Splint.....	13/3 to 16/9	13/ to 16/6
Treble nuts .....	13/	13/ to 13/3
Double do. ....	12/3 to 12/6	12/3 to 12/6
Single do. ....	11/	10/9 to 11/

## IRON.

Practically nothing fresh falls to be reported with regard to the position of the Glasgow pig iron warrant market. Business continued on extremely quiet lines and Cleveland iron closed at 49s. 3d. cash, 49s. 7d. one month and 50s. 1d. three months, being 3d., 2d. and 1d. respectively below the previous week's prices. On the termination of the strike at the Carron Company's works, two furnaces were blown in, but the Langloan Company have put out one of their furnaces and the other three will be blown out shortly. The number of furnaces in blast in Scotland at present is 76, compared with 75 last week and 89 in the corresponding week of last year. Prices of Scotch pig iron have been reduced 1s. per ton. Monkland is quoted f.a.s. at Glasgow, No. 1, 63s. 6d., No. 3, 62s.; Govan, No. 1, 62s. 6d., No. 3, 61s.; Carnbroe, No. 1, 68s. 6d., No. 3, 64s. 6d.; Clyde, No. 1, 69s. 6d., No. 3, 64s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 70s., Nos. 3, 65s.; Glengarnock, at Ardrossan, No. 1, 71s., No. 3, 66s.; Eglinton at Ardrossan or Troon, No. 1, 64s., No. 3, 63s.; Dalmellington at Ayr, No. 1, 65s., No. 3, 63s. 6d.; Carron at Grangemouth, No. 1, 71s., No. 3, 66s. per ton. The imports of pig iron into Grangemouth from Middlesbrough and district amounted to 10,204 tons. The manufacturing branches of the trade continue comparatively inactive and the position is unlikely to alter before the turn of the year.

## Scotland.—Eastern District.

## COAL.

The coal trade of the Lthians is in a very satisfactory position. Further improvement is shown in all classes of coal and both large and small and all descriptions of fuel are moving off in large quantities. Prices in some cases are slightly easier, owing to the late arrival of steamers. At Grangemouth 27,090 tons were shipped, Granton 9,080, Leith 41,211, and B'ness 12,202 tons—total 89,593 tons, compared with 100,074 in the previous week and 101,514 tons in the corresponding week of last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/ to 13/6	13/ to 13/9
Secondary qualities .....	11/9 to 12/6	12/ to 12/3
Treble nuts .....	13/3 to 13/9	13/6 to 13/9
Double do. ....	12/3 to 12/6	12/3 to 12/9
Single do. ....	10/9 to 11/	10/9 to 11/

There is no diminution in the demand in the Fifeshire district and prices remain firm. Business has again, however, been somewhat upset by stormy weather and the consequent late arrival of steamers, and collieries in the meantime are suffering great inconvenience. The total shipments amount to 88,037 tons, compared with 116,499 in the previous week and 117,865 tons in the corresponding week of last year. At Burntisland 28,360 tons were shipped, Methil 55,418, Charleston 149, Tayport 730, Alloa 2,137, Dysart 640, and Wemyss 603 tons.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal.....	16/9	16/9
Unscreened do. ....	14/9	14/9
First-class steam coal.....	12/6 to 13/	12/6 to 13/3
Third-class do. ....	10/9 to 11/	10/9 to 11/3
Treble nuts .....	13/ to 13/6	13/ to 13/6
Double do. ....	11/9 to 12/	11/9 to 12/
Single do. ....	10/6	10/3 to 10/9

Imports from Scottish ports amounted to 335,767 in the preceding week compared with 330,000 in the corresponding week of last year. Imports to date is 890,679 tons.

Northumberland, Durham and Cleveland  
Newcastle-upon-Tyne.

## COAL.

During last week 133,161 tons of coal and 3,589 tons of coke were despatched from Tyne Dock, a decrease of 20,506 tons of coal and an increase of 2,411 tons of coke when compared with the shipments for the corresponding week of last year. The Dunston clearances amounted to 61,266 tons of coal and 785 tons of coke, an increase of 11,887 tons of coal, and a decrease of 1,299 tons of coke. The Blyth shipments totalled 101,692 tons of coal and coke, an increase of 3,897 tons. The volume of forward business done during the past week has been very small. It includes the following items: 50,000 tons of Blyth best steams for January to March (mainly March) shipment at 13s. 6d. per ton f.o.b.; a parcel of Tyne prime steams for January-April delivery at 14s. f.o.b.; 30,000 tons of good unscreened Durham bunkers for delivery over next year at 11s. 9d. per ton f.o.b. Dunston; a quantity of best Blyth steams for January shipment at 13s. 11d. f.o.b. The Trieste Gasworks are enquiring for 30,000 tons of gas primes for January to March delivery, with the option of a larger quantity delivered over the whole year. Tenders are due in to-morrow (Friday). The prompt coal market is very firm, but quite inactive, supplies for loading this month being almost unobtainable excepting at fancy figures. Loading turns are exceedingly congested, one Durham colliery having, for example, 20,000 tons on hand awaiting loading. F.o.b. quotations for prompt shipment have varied very little on the week, the only alterations being as follow:—Steam smalls, Blyths, 3d. reduced on the week; specials, 6d. lower; smithies, 6d. dearer; unscreened bunkers, Durhams, 3d. increased; coking coal, 3d. more; and smalls, 6d. to 9d. advanced. A quantity of best Blyth steam smalls has been sold for this month's loading at 6s. 9d. f.o.b. It is stated that the Portuguese State Railways, which recently received tenders of 38,000 tons of local coal for delivery over 1914, have contracted for about 30,000 tons of Welsh smalls at about 7s. 6d. f.o.b. The fear of a Christmas strike of Northumberland miners over the three-shift system has been definitely dispelled, the county ballot showing an affirmative majority very far short of the two-thirds plurality required to sanction such a stoppage.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.).....	14/9 to 15/	14/9 to 15/
Do. Tynes (Bowers, &c.)	14/9 to 15/	14/9 to 15/
Secondary, Blyths .....	12/6	12/6
Do. Tynes (Hastings or West Hartleys) .....	12/6 to 13/	12/6 to 13/
Unscreened .....	11/ to 12/	11/ to 12/
Small, Blyths ..	7/	7/6 to 7/9
Do. Tynes .....	6/6	6/6
Do. specials .....	8/	8/ to 8/6
Other sorts:—		
Smithies .....	13/6 to 14/	13/6
Best gas coals (New Pelton or Holmside) ...	15/6	15/6
Secondary gas coals (Pelaw Main or similar)	13/6 to 14/	13/6 to 14/
Special gas coals .....	15/6 to 16/	15/6 to 16/
Unscreened bunkers, Durhams	13/3 to 14/6	13/3 to 14/3
Do. do. Northumbrians	10/6 to 11/6	10/6 to 11/6
Coking coals.....	13/6 to 14/	13/3 to 13/9
Do. smalls .....	12/6 to 13/	12/ to 12/3
House coals .....	15/6 to 16/	15/6 to 16/
Coke, foundry .....	21/ to 23/	21/ to 23/
Do. blast-furnace.....	19/ to 20/	19/ to 20/
Do. gas .....	16/ to 17/3	16/ to 17/3

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 100,250 tons of coal and 955 tons of coke, as compared with 96,210 tons of coal and 2,380 tons of coke for the corresponding period of 1912, being an increase of 2,040 tons of coal and a decrease of 1,425 tons of coke. The coal market retains all its late firmness, which is not surprising, considering colliery turns being so full before the holidays. Holders of free coal can secure good prices where shippers are found to be short of their requirements. There is also a good enquiry for January shipment, but buyers are still reserved, hoping to obtain concessions later. Best gas is very difficult to obtain. There is a large business passing in bunkers. Coke is as scarce as ever, and, if anything, dearer. Steam smalls are more plentiful, and easy. Households have been in better demand. The North-Eastern Railway Company have been quietly buying their annual supplies at prices which range from 1s. to 1s. 9d. per ton below the figures of the current contract. The Trieste Gasworks are asking for 30,000 tons of best gas coals to be delivered January, February and March, tenders to be sent in this week. Current quotations are approximately as follow:—

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/6
Secondary do. ....	14/	14/
House coals:—		
Best house coals .....	18/	17/6
Ordinary do. ....	17/	16/6
Other sorts:—		
Lambton screened .....	15/6	15/6
South Hetton do. ....	15/3	15/3
Lambton unscreened .....	13/9	13/9
South Hetton do. ....	13/9	13/6
Do. treble nuts .....	16/9	16/9
Coking coals unscreened...	13/6	13/3
Do. smalls .....	13/3	13/
Smithies .....	15/9 to 16/3	16/
Peas and nuts .....	16/9	16/6
Best bunkers .....	14/9	14/6
Ordinary bunkers ..	14/	13/9
Coke:—		
Foundry coke .....	21/ to 21/6	22/
Blast-furnace coke (dlyrd. Teesside furnaces) .....	20/	20/
Gas coke .....	18/	17/6

Outward chartering is slow and rates easy. The coasting market is represented by London at 3s. 6d., Havre 4s. 4½d., Hamburg 3s. 7½d. For the Baltic few fixtures are reported, Riga being at 5s. 3d., with Aalborg 5s. Very little is being done for the Bay, Bordeaux paying 5s. 3d. Mediterranean freights are difficult to obtain owing to lack of ready turns—Genoa is at 7s. 3d., Algiers 6s. 3d., Port Said 7s. 6d., Oran 6s. 3d., and Barcelona 8s.

## Middlesbrough-on-Tees.

## COAL.

Fuel fully retains its firmness. Free coal and coke command high figures, but when the holidays get over easier rates are likely to rule. Collieries and shippers have no lack of tonnage and loadings are proceeding at a brisk rate, firms being engaged in working off shipments that were arranged for some time ago. Deliveries of gas coal are now at their heaviest and fairly good sales are reported. Best Durham gas coal is 15s. 6d., second kinds 13s. 4½d. to 14s. 6d., and special Wear gas coal 16s. to 16s. 3d. The Trieste Gasworks are asking for 30,000 tons of prime gas coal to be delivered over the first three months of next year. Bunker coal is in good request and needs are met by an ample supply. Ordinary Durhams are 13s. to 13s. 6d. f.o.b., best kinds 14s. 6d., and specials 15s. 6d. Household coal is steady and firm at from 17s. to 18s. Coking coal prices vary somewhat. Smalls are 12s. 6d. to 13s., and unscreened kinds 12s. 9d. to 14s. Coke is still very scarce and dear. Local consumers experience difficulty in obtaining adequate supplies. Average blastfurnace qualities are fully 18s. 6d. delivered at Teesside works, and 19s. is also quoted. Foundry for export is in the neighbourhood of 22s. f.o.b. Gashouse coke ranges from 17s. to 18s.

## IRON.

There is more business passing in pig iron. Buyers are now coming into the market and showing a desire to make arrangements for their spring requirements, but they do not easily agree with sellers as to forward values, and as a consequence, little business for delivery ahead is recorded. It is gratifying to learn however, as emphasising that confidence in the future is not dead, that buyers are prepared to pay more for forward than for early delivery of pig iron. Production of pig iron is being still further reduced by the blowing out of a hematite furnace at the Thornaby Ironworks of Messrs. Whitwell and Co., thus reducing the number of blastfurnaces in operation on the north-east coast to 75. Of this number, 40 are running on Cleveland iron, 24 on hematite and 11 on special kinds of iron. Not for many years have so few furnaces been in blast, with the exception of periods when stoppages have been caused by labour troubles. No. 3 g.m.b. Cleveland pig is very firm at 50s. f.o.b., No. 1 commands 52s. 6d., No. 4 foundry 49s. 6d., No. 4 forge 49s. 3d., and mottled and white iron 49s., at which figures merchants have sold for early delivery, but makers ask higher rates. For delivery over the first quarter of next year, producers are holding out 51s. 6d. for No. 3. After having fallen steadily for some months past, east coast hematite pig has taken a turn and prices now show an upward movement. Buyers offer 60s. 6d. for either early or forward delivery of Nos. 1, 2 and 3. Makers are prepared to do spring business in mixed numbers at 61s. Business in foreign ore is still inactive and market rates remain nominally on the basis of 19s. for best rubio. There is more doing in finished iron and steel. Fairly good contracts for shipbuilding material are reported to have been made and a few orders for rails are coming in. For the latter good enquiries are to hand from India and Nigeria. A 4,000 tons order for the Bangal-Nagpur Railway has been booked by the North-Eastern Steel Company. Quotations for manufactured iron and steel are stationary.

## South-West Lancashire.

## COAL.

For the lateness of the season the household trade can only be described as moderate, but on the other hand the percentage of absentees at the pits is such that although working full time the weekly output is of a disappointing nature. There is no change to report with regard to screened coal for forge and manufacturing purposes. Steam coal for bunkering on contract account is rather quiet, and supplies exceed requirements. There is some little enquiry for outside steamers, and for these lower prices for immediate shipment are being asked, although there is a tendency to stiffen up prices for business nearly approaching the Christmas holidays. For ordinary Lancashire steam coal 13s. to 13s. 3d. up to 13s. 9d. for best qualities may be said to be prices for this week. The coastwise and cross channel trade keeps in a satisfactory position, best coals especially being much enquired for. Shipments for Dublin have not yet been resumed. Slacks vary little from the last few weeks' reports. The demand is slightly on the increase, and it is exceptional where any quantity is standing without orders, or being put into stock.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/	17/
Do. (f.o.b. Garston, net)	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net)	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal.....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/ to 13/9	13/ to 13/9
Best slack .....	10/3	10/3
Secondary slack .....	9/6	9/6
Common do. ....	9/	9/

## South Lancashire and Cheshire.

## COAL.

There was a good attendance on the Manchester Coal Exchange on Tuesday. The demand for all qualities of house fuel has been rather below last week, with no change in prices. Furnace coal remains very quiet, and the same remark applies to shipping coal; in the latter case prices are unsteady. Slack is abundant, and more than current requirements. Reductions in prices are made for spot lots.



Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 14/	13/3 to 14/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

**IRON.**  
The attendance on 'Change in Manchester on Tuesday last was fairly good, but there is nothing fresh to report as regards trade in this district. Pig iron remains much as previously reported. Forges are working short time at the associated rates of £7 5s. for Crown bars, £6 15s. for second quality, £7 17s. 6d. hoops. Steelworks are only moderately employed, and what little new work there is about has to be taken at low prices. Foreign material is being offered at much below English prices. Trade generally is in a depressed condition.

**Yorkshire and Derbyshire.**  
**Leeds.**

**COAL.**  
The pits in West Yorkshire have been able to work practically full time this week, except in one or two cases where there has been a scarcity of empty wagons. The output has been cleared daily, and some slight impression made upon stocks of house coal. Business generally is better as regards the demand for prompt delivery, but forward business all round is disappointing.

*House Coal.*—The distant markets have taken bigger deliveries of house coal this week, and many of the special prices that have been in operation lately have been withdrawn. Reports from London indicate an improvement in the retail trade, but suggest that stocks, both at the depots and at the await-order junctions are very considerable. The coastwise trade is a little brighter, but there is keen competition for this business, and prices are still slightly in buyers' favour. In Leeds, Bradford, Halifax, Huddersfield, and the heavy woollen district, merchants report an improved demand from the public, but not to such an extent as to necessitate extra purchases from the collieries. Generally contract deliveries are ample to meet the requirements of the trade. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other qualities, 14s. to 15s. 6d.

*Gas Coal.*—There is no special feature to report in this branch of the trade. The whole output of the pits is needed to satisfy contract requirements, as these, of course, are especially heavy in view of a probable week's stoppage at Christmas. Very little forward business is offering, buyers generally expecting lower values in the near future. Reserves at the big local works are said to be ample, and considerably in advance of the stocks 12 months ago.

*Manufacturing Fuel.*—Double-screened nuts, washed nuts, and the rougher kinds of slack are moving away freely, but small slacks are still over-plentiful and are being offered at special prices. In the manufacturing centres the consumption of factory fuel is very low at the present time, many of the works being on short time.

*Washed Furnace Coke.*—The demand for prompt delivery is brisk this week, and is likely to continue so until the holidays. Average qualities still realise about 12s. 6d. per ton at the ovens in the open market, and a few short term contracts have been booked at about this figure. Buyers, however, refuse to contract forward beyond the end of March.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ..	14/6 to 15/	14/6 to 15/
Wallsend & London best	14/ to 14/6	13/9 to 14/3
Silkstone best .....	14/ to 14/6	13/9 to 14/6
Do. house .....	12/ to 12/6	12/ to 12/6
House nuts .....	11/6 to 12/6	11/6 to 12/3
Prices f.o.b. Hull:		
Haigh Moor best .....	17/ to 18/	17/ to 18/
Silkstone best .....	16/ to 17/	16/ to 17/
Do. house .....	14/6 to 15/6	14/6 to 15/6
Other qualities .....	14/ to 14/9	14/ to 14/6
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 11/3	11/ to 11/3
Unscreened gas coal ...	9/9 to 10/3	10/ to 10/6
Other sorts:—		
Prices at pit:		
Washed nuts .....	10/6 to 11/	10/3 to 11/
Large double-screened engine nuts .....	9/9 to 10/6	9/9 to 10/6
Small nuts .....	9/ to 9/3	9/ to 9/3
Rough unscreened engine coal .....	9/3 to 9/9	9/3 to 9/9
Best rough slacks .....	6/9 to 7/3	6/9 to 7/3
Small do. ....	6/ to 6/6	6/ to 6/6
Coking smalls .....	6/ to 6/6	6/ to 6/6
Coke:—		
Price at ovens:		
Furnace coke .....	12/ to 12/6	12/ to 12/6

**Barnsley.**

**COAL.**  
With the approaching holidays in view there has been more activity in the steam coal branch of the trade. Both on home and foreign account there is more desire shown to obtain adequate deliveries, and this has had the effect of considerably stiffening prices owing to the reduced output. The shipments from Hull and Immingham are exceptionally large for this time of the year, and are mainly due to the continued buying for South Russia. On current account the best hards are worth from 12s. 3d. to 12s. 6d. per ton, and secondary sorts of large steams are also slightly dearer to the extent of about 3d. per ton, though of the latter class of fuel there appears to be a good bulk available. With regard to the railway companies' contracts the expected early settlement does not appear to have been effected. As already stated, tenders have been sent in on the basis of 12s. 6d. per ton for the best hards, and a corresponding rate of increase of 1s. per ton has been sought

for Parkgate and Shafton coal. The railway companies are naturally keenly watching the situation, and judged by the fact that the North Eastern Company have obtained reductions from collieries in the north, there does not seem to be much prospect that all the coalowners in the South Yorkshire district are likely to succeed in their request. It should be pointed out, however, that last year the collieries in the north obtained a greater rate of increase, and the South Yorkshire coalowners contend they are entitled to the advance asked for in consideration of the fact that during this year they have been supplying coal at a less price than this in the north. So far as the best hards are concerned it seems likely that there will be a keen struggle to obtain the advance asked for, as the quantity available is limited. With regard to manufacturing fuel the quieter state of affairs in the textile cotton districts has considerably decreased the demand, but nuts continue to be in fairly good request, and prices are about maintained. There is no change in the position with regard to rough slacks, of which large stocks are held, and prices are still weak. As expected, the colder weather has given an impetus to the demand for house coal, and deliveries are not so easily obtained from collieries as they were a week ago. Although the bulk of the enquiry is for secondary descriptions best sorts have shown a good recovery, and already delays are experienced in securing this class of fuel. Prices are again up to scheduled quotations, and where stocks have accumulated these are expected to be readily cleared. The position in regard to coke shows little change. Values are a little improved for good class fuel on current account, but in regard to forward business there is still an absence of confidence, and few contracts are being entered into.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone .....	15/6 to 16/	15/6 to 16/
Best Barnsley softs .....	15/ to 15/3	15/ to 15/3
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	13/ to 14/6	13/ to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/3	12/ to 12/3
Secondary do. ....	11/ to 11/3	11/
Best washed nuts .....	11/3 to 11/6	11/ to 11/3
Secondary do. ....	10/3 to 10/6	10/ to 10/6
Best slack .....	7/ to 7/3	7/
Rough do. ....	6/	6/
Gas coals:—		
Screened gas coals .....	12/6	12/6
Unscreened do. ....	11/ to 11/3	11/ to 11/3
Gas nuts .....	12/	12/
Furnace coke .....	12/ to 12/3	12/

**Hull.**

**COAL.**  
The Christmas holidays, when the pits will close down for at least a week, being at hand, there is as usual more activity in the market, exporters being anxious to get cargoes completed, and industrial buyers laying in extra stocks. A fair amount of business is thus passing, mostly for spot lots or nearly prompt delivery. Prices remain steady, and are quoted all round at about the same level as a week ago. Shipments continue to keep up, the volume being added to by the heavy cargoes that have been sent to Black Sea ports within the past few days. Only a few steamers have been fixed in the past few days, and, with plenty of tonnage on offer, rates have become again easier, especially in the Mediterranean and Black Sea directions, 7s. 3d. to 7s. 6d. being quoted for Genoa, and 8s. 6d. to 8s. 9d. Odessa. Baltic rates are on the basis of 5s. 9d. to 6s. Riga, and 5s. 6d. Swedish ports. For Oporto a small steamer has been booked at 9s. 6d. for coal and 14s. 6d. coke. Forward business does not mature very quickly. Exporters who are anticipating easier conditions in the coming year are still holding off purchasing ahead, and are encouraged in their "bear" outlook by the fact that the North Eastern Railway are reported to be still buying their next year's supplies at 1s. to 1s. 9d. per ton less than the figure in the current contract. The Hull trawling companies, who take about 750,000 tons of bunker coal in the course of a year, have not yet bought, and one hears of a special meeting of their association this week at which strong protests were made about the high prices quoted by the coalowners, and some talk indulged in of sending their long distance trawlers north to take in bunkers, and of importing from the Tyne for the North Sea fleet. It is, however, quite likely that this action will not be needed, and that, as in previous years, the talk will end in contracts being renewed in South Yorkshire. The following are the approximate prices for prompt shipment f.o.b. at Hull, etc.:—

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards .....	15/9	15/9
Washed double-screened nuts .....	13/6 to 13/9	13/6 to 13/9
Unwashed double-screened nuts .....	13/ to 13/3	12/9 to 13/
Washed single-screened nuts .....	12/6 to 13/	12/9 to 13/
Unwashed single-screened nuts .....	12/3 to 12/6	12/6 to 13/
Washed smalls .....	9/6 to 10/	9/6 to 10/
Unwashed smalls .....	9/ to 9/6	9/ to 9/3
West Yorkshire:—		
Hartleys .....	13/6	13/6
Rough slack .....	9/ to 9/3	9/ to 9/3
Pea slack .....	8/3 to 8/6	8/3 to 8/6
Best Silkstone screened gas coal .....	14/3	14/3
Best Silkstone unscreened gas coal .....	12/	12/
Derbyshire:—		
Best steam hards (Hull) Do. (Grimsby) .....	15/3 15/	15/3 15/
Derbyshire nuts (doubles) Derbyshire nuts (doubles) (Grimsby) .....	13/ 12/9	13/ 12/9
Derbyshire large nuts ... Do. do. (Grimsby) ...	14/6 14/ to 14/3	14/6 14/ to 14/3
Nottinghamshire hards ... Do. do. (Grimsby) ...	15/3 15/	15/3 15/

**Chesterfield.**  
**COAL.**

There is not much change in the state of the coal trade, so far as the house coal department is concerned, as compared with the condition of things a week ago. The demand is very quiet and collieries are able to execute promptly such orders as come to hand from day to day. Prices are without change and stocks in colliery sidings are not by any means unwieldy. A few days of really cold weather would clear out all the wagons that are under load. With the near approach of Christmas it is not unreasonable to expect a fresh demand to spring up during the coming week. A good business continues to be done in fuel for manufacturing purposes, and heavy supplies of cobbles and nuts are in requisition for the steelworks of the Sheffield district. The position with regard to slack for steam-raising purposes is no worse than it has been during the last few weeks—indeed, there are signs that matters have seen the worst for the time being, and that with the opening of the new year an improved demand will set in with a certain appreciation of values. In other branches of the trade there is a distinctly better tone, and while it may be said that the feverish pressure of a year ago has abated, there is beyond doubt a period of good steady business in prospect for the next twelve months. The export trade is in a satisfactory position and the demand for steam coal for current shipment is exceptionally strong. Prices have advanced fully a shilling per ton within the past fortnight, and supplies are scarce. Collieries find themselves in a much stronger position than usual at this time of the year, and the present satisfactory condition of things will give them courage to adhere firmly to their opinion that next year's prices for steam coal will remain on the present level of values which are accordingly now being quoted. No contracts have been concluded yet, and it is not expected that any substantial sales will be made until next month. There is an active business passing in cobbles and nuts for near Continental ports, for which prices show a hardening tendency. Washed nuts and washed slack move freely without any change in prices. The coke market is firmer, foundry sorts being in specially good demand. Coking fuel is in better request.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	8/	8/

**IRON.**  
The iron trade of the district continues in a depressed condition without any prospect of an early improvement.

**Nottingham.**  
**COAL.**

The colder weather which set in a few days ago has given a certain amount of stimulus to the coal trade of Nottinghamshire, and while the tone generally is fairly active, yet it is not quite up to the average for the time of the year. There has certainly been an improvement in the section for household fuel, and at a few collieries the demand is such as to justify full time being worked, stocks at the same time being drawn upon, but at other pits orders are not quite sufficient to clear the output, and stocking is being resorted to. Prices on the whole are keeping firm, and secondary qualities are just now in good request. Trade in the steam coal branch continues in a satisfactory condition. A good tonnage is being sent away for shipment considering the time of the year, and industrialists in the home market are going out of hand readily—consequently values retain a firmness which is causing buyers to purchase on a moderate scale in the hope that reductions may come along later on. The position in regard to gas coal is favourable to owners, a fair amount of business being done at late rates. Slacks are not selling as actively as desired, and the market at present is favouring buyers, as stocks are inclined to increase. There is a slightly improved demand for coke.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights .....	13/6 to 14/6	13/6 to 14/6
Good house coals .....	13/ to 13/6	13/ to 13/6
Secondary do. ....	11/ to 12/	11/ to 12/
Best hard coals .....	11/6 to 12/	11/3 to 11/6
Secondary do. ....	10/ to 11/	10/ to 10/6
Slacks (best hards) .....	7/9 to 8/	7/9 to 8/
Do. (seconds) .....	6/9 to 7/3	6/9 to 7/3
Do. (soft) .....	6/6 to 7/3	6/9 to 7/3

**Lancashire.**  
**COAL.**

The alteration in the direction of improvement mentioned last week has been continued. There is still an urgency in the demand generally, with a steady and fairly full enquiry. The heavier output has been continued, and with it is good to record no general increase in stocks on hand, deliveries have been good. Local merchants have been rather busier, the colder weather has improved the household demand and they are still pretty well off for business in steam coals. The demand for household coal has shown more movement, the better descriptions coming more into request, and the improvement is more marked in the middle qualities and in small coal. There is a very good demand continuing for steam raising coals of all descriptions, of these there is no stock of any amount. The outlook is showing improvement and it only wants an accession of wintry weather to make business very lively. There is no alteration in quotations, the market remains firm, firmer than last week.



## Staffordshire, North Worcestershire and Warwickshire.

Widnesford.

### COAL.

There is rather more animation noticeable this week in the condition of the coal trade of the Cannock Chase district, and most qualities of fuel are in good request. Most of the collieries are working full time, and will probably be kept very busy from now till Christmas. Prices have altered very little since last report. House coal is in somewhat better request, and there is a fairly satisfactory demand for coal for manufacturing purposes. Railway and canal sales are keeping up very well, and business is improving at the landsale depots.

Birmingham.

### COAL.

A brisker demand is experienced for house coal, and the pits, without being pressed, are employed full time. Prices are firm. Smalls are selling freely, though there is no scarcity. Prices remain as under:—

Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/6
Do. seconds deep .....	16/	16/
Do. best shallow .....	14/9	14/9
Do. seconds do. ....	14/	14/
Best hard .....	15/	15/
Forge coal.....	11/	11/
Slack .....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand - picked cobs .....	14/	14/
Best hard spires .....	15/	15/
Forge (steam) .....	11/	11/
D.S. nuts (steam) .....	10/	10/
Small (do.) .....	8/3	8/3

### IRON.

What change there was in the market was in the direction of improvement. The general tone was a little brighter. Buyers who have been holding off for the last few weeks are coming on the market again for supplies of pig iron, tempted, probably, by the chance of securing bargains. A good many parcels of from 350 to 500 tons have been bought, instead of, as recently, 25 and 50 tons to keep works going. Several makers, under the influence of this spurt, talked about raising prices, but as most of them carry large stocks, customers have shown no inclination to meet them. In the finished trade a considerable volume of business is passing, but the bulk of it consists of casual orders for immediate requirements. The bar mills start on Monday morning with two or three days' orders on the books, but before the week is over sufficient comes to hand to carry them over into the following week. This remark is more applicable to good second-class bars, which are being sold at £7 a ton delivered Birmingham; in the common branches Continental competition affects both output and selling prices. Nut and bolt iron delivered Darlaston and Wednesbury does not make more than £6 10s. to £6 12s. 6d. per ton, representing a reduction of 2s. 6d. since a month ago. Standard bar makers are rather busier, and are still quoting £9 a ton at works. The galvanised sheet industry is probably the most active in the district. Prices continue to appreciate slightly, and stand at £11 to £11 5s. f.o.b. Liverpool for export, and for the home trade as much as £11 10s. The principal makers report sales to the end of next quarter, and are not anxious to book further sales except at increased rates. There is not much doing in gas-strip, and prices are unchanged at £7 to £7 2s. 6d. for lots of 25 tons and upwards delivered in the district. Business in steel does not seem to have been greatly quickened by the reduction of 5s., customers being content to go on buying from hand to mouth. Targets, billets, &c., for home manufacture are selling more freely at £4 15s. a ton for Bessemer, and 2s. 6d. to 5s. a ton extra for Siemens qualities, Continental competition being rather less severe. Copper sheets are now quoted £82 a ton, representing a drop of £1 on the week. The heavy trades of the district are steadily employed.

### Forest of Dean.

Lydney.

### COAL.

Weather of a mild description still prevails, and the collieries report that only an ordinary amount of business is being done in the coal trade here. The house coal pits are still averaging four to five days each week, and even with this restricted output there are stocks to be noticed. Slack coals are easier to place at the moment. The steam coal pits on the whole are doing none too well, there being only a moderate enquiry for all sizes.

Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	17/6
Forest .....	16/6	16/6
Rubble .....	16/9	16/9
Nuts .....	15/	15/
Rough slack .....	6/6	6/6
Steam coal:—		
Large .....	12/ to 13/	12/ to 13/
Small .....	8/ to 9/	8/6 to 9/

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

Messrs. Ackroyd and Best Limited, of Morley, near Leeds, inform us that within the last few days they have received orders for the following installations of their well-known flame safety lamps: Messrs. A. Russell Limited, Framwellgate Colliery Company, Burradon and Cuxlodge Coal Company, Walker Coal Company, Newcastle, 1,222; and Co., Nottingham, 1,300; Inghams & Co., Dawsbury, 600.

## THE WELSH COAL AND IRON TRADES.

THURSDAY, DECEMBER 11.

### North Wales.

Wrexham.

### COAL.

Quite an innovation was caused at the early part of the week in this locality by a one-man strike for one day at the Llay Hall Colliery. With the above exception, all the pits have been able to work full time during the past week. Trade generally has been of a fairly brisk character, though nothing exceptional. In regard to the different grades of fuel, the demand for best large house coal has been moderate, but for smalls and seconds there has been a plenitude of orders. The extra demand for this grade of coal is no doubt accounted for by the fact that all the local charities are just now placing their orders for their requirements for distribution during Christmastide. In respect of gas coal, the supplies on account of contracts have been up to the average; in fact, in many instances, extra supplies have been taken. The steam coal trade is very little different than it was last week, the bulk of course being taken by the several railway companies who have contracts in this coalfield. Local manufacturers also account for a fair tonnage. The shipping trade at Liverpool, Birkenhead and Ellesmere Port has been up to the average standard as regards tonnage, and the prices realised have been satisfactory. The trouble in connection with the labour market at Liverpool appears to have settled down—at least for a while. There are very few nuts, as usual, for the open market, practically the whole made being required for gas-making purposes. The demand for slack of various qualities continues to be satisfactory, and prices are just about the same figures as were quoted last week. Gas coke also remains unaltered in price or demand. The current prices in open market at present are as follows:—

Prices at pit.

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal .....	15/6 to 16/6	15/3 to 16/9
Secondary do. ....	14/6 to 15/3	14/3 to 15/3
Steam coal .....	12/6 to 13/	12/6 to 13/6
Gas coal .....	13/ to 14/	13/3 to 14/
Bunkers.....	12/3 to 12/6	12/4 to 12/6
Nuts .....	11/ to 11/9	11/6 to 12/
Slack .....	6/ to 8/9	6/9 to 8/6
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 19/2	17/6 to 19/2
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

### Monmouthshire, South Wales, &c.

Newport.

### COAL.

Increasing pressure signalises the near approach of the holiday stoppage, strenuous efforts being made to push through business in good time to avoid trouble. Collieries mostly are well stemmed and well booked, although here and there may be found weak spots in the market where the failure to arrive of boats already chartered puts shippers in straits for the want of empty wagons. Generally speaking, however, the conditions are those usual at times of pressure, values being more or less governed by the situation of each individual concern. Since last writing the general advance in values which has taken place amounts to nearly 1s. a ton for large coals of best grades, with rather less for the lower qualities, and for smalls. House coals show no move whatever, the exceptional mildness of the season so far having kept this market very dead. Chartering during the last day or two has been quieter, and with a slow enquiry rates have receded lower than any point previous in the year. Big supplies of pit-wood, combined with the difficulty of securing wagons just now, has set back values a couple of shillings, 21s. to 21s. 6d. being to-day's quotation for best French fir.

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	18/6 to 18/9	17/9 to 18/6
Western-valleys, ordinary	17/6 to 17/9	16/6 to 17/
Best Eastern-valleys .....	16/6 to 16/9	16/ to 16/6
Secondary do. ....	15/9 to 16/3	15/6 to 15/9
Best small coals .....	8/9 to 9/	8/6 to 8/9
Secondary do. ....	8/3 to 8/6	8/3 to 8/6
Inferior do. ....	7/6 to 8/	7/6 to 8/
Screenings .....	9/	8/6 to 8/9
Through coals .....	13/6 to 13/9	12/3 to 12/9
Best washed nuts .....	14/ to 14/3	13/6 to 14/
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/ to 20/	19/ to 20/
Furnace coke .....	19/ to 20/	19/ to 20/
Foundry coke .....	23/ to 25/	23/ to 25/

### IRON.

The general tone of the local iron and steel market is a little brighter than for some time, and for both more enquiry is coming along, and more actual business is being put through. Buyers who have been holding off the market for the past few weeks, are rapidly completing their existing contracts, and again coming on the market. Rather more business is passing in the tin-plate bar department, last prices being well maintained. Mills are well engaged and output normal. Imports of foreign bars for the week amount to nearly 10,000 tons, quotations for these now having a slight upward tendency. Better business is passing in the rail department, and at least one substantial order has been booked by a prominent local firm. Prices are steady, and the outlook considered more favourable. At blast furnaces there is rather more activity, recent business being at rather better figures.

Iron ore values remain unchanged. The tinplate trade is steadier, and many works have booked satisfactory orders, while more enquiries keep coming along. It is hoped that the bottom has now been reached, and that a steady improvement will now take place.

Cardiff.

### COAL.

After the despatch of the report last week, trade was very much disorganised by a strike which was commenced at Llanelly in support of two engine drivers, who had been dismissed for irregularities in connection with the dispute as to the handling of so-called tainted traffic from Dublin. Cardiff was not so much affected, but the whole of the Great Western line from that city to Carmarthen became involved in the trouble, as also their branch lines tapping some of the Glamorgan coal valleys. In three days the strike spread to such an extent that something like 35,000 workers were rendered idle. Happily, through the able leadership of Mr. J. H. Thomas, M.P., of the National Railway Workers' Union, a settlement was effected in the course of Friday, and when 'Change opened on Monday morning, general satisfaction was expressed on all sides at the firm attitude maintained by the Great Western Company, who from the first declared their determination not to reinstate the two men who were the cause of the trouble. These sporadic outbreaks undoubtedly injure trade, and the way in which Mr. J. H. Thomas, immediately he was communicated with, set his face sternly against the strike was very favourably commented upon. Even at the beginning of the present week, in a good many cases work was only partially resumed, as there was a difficulty in obtaining empty wagons. The week's shipments did not show any falling off, the total quantity of coal despatched from the port of Cardiff being over 426,000 tons, but as the returns are not always promptly forwarded, it is possible that the present week's exports will more accurately reflect the mischief done by the strike. Owing to the foggy and stormy weather, a number of vessels were delayed, and there was consequently sufficient coal for the lines of railway serving Cardiff to meet the requirements of shippers. Prices of best steam coals are practically the same as last week. In almost every case it was really a matter of bargaining between buyers and sellers, but a fair average price will no doubt be somewhere round about 21s. 6d. There was, however, very little business passing, as most of the coal at present shipped is under contract. Superior second Admiralties are from 20s. 3d. to 20s. 9d., and ordinary seconds 19s. 6d. to 20s. Dry coals are very firm, best qualities being 19s. 6d. to 20s. per ton. With the near approach of Christmas, there is some indication of a falling-off in chartering, the tonnage taken up last week being slightly over 366,000 tons, or nearly 50,000 tons less than in the previous six days. But though prompt tonnage has been scarce, as an evidence of the freight market, it may be mentioned that rates generally are still easy, and that as low as 7s. has been accepted for Genoa. From present appearances there is but little prospect of freights materially improving for some time to come. As regards the small coal market, it is somewhat unsteady. Whilst some descriptions of bunkerings are firmly held up to 11s. 6d., for cargo qualities, of which there is a more plentiful supply, prices are rather weak, and range round 8s. per ton. A few contracts still continue to be made, it being reported that the Portuguese State Railways have placed orders for about 30,000 tons at prices equivalent to about 7s. 6d. net f.o.b. delivered at Lisbon and Vigo. Some firms who had hitherto been standing out firmly for 10s. per ton for good steam small for delivery over next year, are reported to have offered a substantial concession. A further advance has taken place in Monmouthshire coals, Black Veins being 18s. 6d. to 18s. 9d. and western-valleys 17s. 6d. to 17s. 9d., in each case f.o.b. Cardiff. There is very little enquiry for Rhondda bituminous coals, and No. 3 is nominally quoted at 17s. No. 2 qualities, however, remain steady at 14s. 6d. to 14s. 9d. Fancy house coals are unchanged. The Cardiff Journal of Commerce publishes the following return from the statistical

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals .....	21/3 to 21/6	21/6 to 22/
Superior seconds .....	20/3 to 20/9	20/3 to 20/6
Ordinary do. ....	19/6 to 20/	18/6 to 19/6
Best bunker smalls.....	11/3 to 11/6	11/ to 11/3
Best ordinaries.....	11/ to 11/3	10/9
Cargo qualities .....	7/10 to 8/	8/ to 8/3
Inferior smalls.....	6/6 to 7/6	7/ to 7/6
Best dry coals .....	18/6 to 19/	19/6 to 20/
Ordinary dries .....	17/3 to 17/9	17/6 to 18/
Best washed nuts .....	16/6 to 16/9	16/ to 16/6
Seconds .....	15/6 to 15/9	15/ to 15/6
Best washed peas .....	14/9	14/6 to 14/9
Seconds .....	13/9 to 14/	13/6
Dock screenings .....	12/	11/6 to 12/
Monmouthshire—		
Black Veins .....	18/6 to 18/9	18/6
Western-valleys .....	17/3 to 17/9	17/9 to 18/
Eastern-valleys .....	16/6 to 16/9	17/3
Inferior do. ....	16/ to 16/3	15/9 to 16/
Bituminous coals:—		
Best house coals (at pit)	20/6	20/6
Second qualities (at pit)	17/6 to 18/	17/6 to 18/
No. 3 Rhondda—		
Bituminous large .....	17/	17/
Through-and-through...	14/6 to 15/	14/6 to 15/
Small .....	12/	12/
No. 2 Rhondda—		
Large .....	14/6 to 14/9	14/3 to 14/6
Through-and-through...	12/	11/6 to 12/
Small .....	8/6	8/ to 8/6
Best patent fuel .....	22/6	22/6
Seconds .....	20/ to 21/6	20/ to 21/6
Special foundry coke .....	27/ to 28/	27/
Ordinary do. ....	22/ to 24/	22/ to 25/
Furnace coke .....	19/ to 20/	20/
Pitwood (ex-ship) .....	22/	22/

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.



office of the London Custom House of the average declared price per ton of coal exported from the chief South Wales ports during the month of October:—

	Cardiff.	Newport.	Port Talbot.	Swansea.
	s. d.	s. d.	s. d.	s. d.
Large steam .....	17 3	16 0	16 2	16 0
Through-and-through 13	8	14 6	11 9	11 9
Small .....	9 3	11 1	8 5	9 9
Large anthracite .....	21 7	29 0	17 2	18 3
Household .....	17 0	—	—	—

Prices last year were:—

	Cardiff.	Newport.	Port Talbot.	Swansea.
	s. d.	s. d.	s. d.	s. d.
Large steam .....	15 11	15 3	15 2	15 6
Through-and-through 12	6	11 7	10 10	10 3
Small .....	9 2	10 5	7 10	8 9
Large anthracite .....	21 5	—	16 10	17 6
Household .....	13 9	—	15 3	17 6

There is considerable pressure for patent fuel, and the shipments for the week amounted to nearly 40,000 tons, the Crown Company loading 16,797 tons and other local makers 10,000 tons, Swansea 9,265 tons, and Newport 3,000 tons. Best brands still command 22s. 6d., other qualities about 2s. less. The report that a portion of the North of Spain Railways contract has come to South Wales is confirmed, over 20,000 tons having been placed with Cardiff and Swansea makers for shipment over January and February. It is believed, however, that the bulk of the orders have been captured by Germany, who have also secured the contract for the Algerian lines of the Paris, Lyons and Mediterranean Railways. Their prices for the latter were said to have been about 3 fr. per ton under the tenders of the Welsh makers. Quotations for coke are nominal, special foundry being 27s. to 28s., ordinary foundry 22s. to 25s., and furnace coke round about 19s. per ton. Pitwood is rather weak at 22s.

IRON.

Last week there was only a difference of a few thousand boxes in the receipts of tin-plates and the shipments, but stocks still very closely approach 200,000 boxes. According to the Board of Trade returns for the United Kingdom the exports for November amounted to 44,317 tons, a decrease of 1,217 tons as compared with the corresponding period of last year. So far as Swansea was concerned there was an improvement of 16 per cent.—Roumania taking 2,200 tons more, Japan 2,000 tons, and Russia 1,800 tons more, whilst the Argentine showed an increase of 900 tons. Unfortunately the improvement is discounted to some extent by a falling off on the part of the Norwegian packers to the extent of some 2,400 tons. The railway labour trouble last week had a depressing effect on the tin market, prices for cash falling to £174. Though there was a more general demand for tin-plates, especially for prompt delivery, makers were unable to maintain their prices, and orders for 14 x 20 cokes were placed at from 12s. 7½d. to 12s. 9d., whilst 10 x 20 oil sizes sold at 18s. 7½d. to 18s. 9d.; 18½ x 14 sizes, however, still fetched 13s. 3d., and in some cases 13s. 4½d. per box. Imports of foreign steel have been very heavy, there having been landed at Newport between 9,000 and 10,000 tons of iron and steel bars, rails and plates. Of billets and blooms there have also been received about 11,000 tons. Welsh Siemens tin bars are still quoted at £4 11s. 3d., with the usual deduction for Bessemer bars. The galvanised sheet trade is firmer, £11 being quoted for 24-gauge corrugateds. Most of the works are said to have orders enough on their books to occupy them for two or three months. The exports from the country last month showed an increase of nearly 5,000 tons. For the 11 months the total exports were over 700,000 tons, an increase of over 100,000 tons. There is some talk of Cardiff being in the running for the new works of the Mannesmann Tube Company. It is said that part of the Bute estate between the Taff Vale Railway and the Glamorgan canal at Maindy has been offered the directors on very favourable terms, and that the Corporation have also been very generous in their offer of water. In some quarters it is feared that the offers have been made too late. Welsh pig iron is 64s. f.o.t. Llanelly.

COAL.

The local coal market has not yet got over the effects of the railway strike at the end of last week. Fortunately the stoppage was not a long one, but still long enough to disorganise traffic. The various sidings are crowded to their utmost with wagons and it will be some little time before order is restored. The works of the district have been considerably inconvenienced owing to lack of coal and most of the collieries had to shut down. The market is very much the same as last week. Orders are more plentiful owing to the coming holidays, but prices show no improvement. With the exception of Red Vein, which is in better demand, the market is inclined to be quiet. The steam and bituminous coals are still in very poor demand and prices are only being maintained. This week's quotations are:—

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	21/ to 23/	21/ to 22/6
Secondary do. ....	19/ to 21/	19/ to 20/
Big Vein large.....	18/ to 19/	18/ to 19/
Red Vein do. ....	13/6 to 14/6	14/ to 15/
Machine-made cobbles ...	19/ to 20/	20/ to 21/6
German nuts .....	23/ to 24/	23/ to 24/
French do. ....	23/ to 24/	23/ to 24/
Paris do. ....	23/ to 24/	24/ to 24/
Machine-made beans .....	18/ to 22/	18/ to 20/
Do peas.....	12/6 to 13/6	12/6 to 13/6
Rubby culm .....	5/ to 5/6	4/9 to 5/6
Duff .....	4/ to 5/	4/ to 5/3
Other sorts:—		
Large steam coal.....	16/ to 17/	17/ to 18/
Through-and-through ...	11/ to 11/6	11/ to 11/6
Small .....	9/ to 10/	9/ to 10/
Bituminous small coal ...	10/ to 11/	10/ to 11/

Swansea.

COAL.

The trade of the port during the past week suffered severely from the railway strike and bad weather. There

was a fairly good export of patent fuel, but the coal trade was badly disorganised; the shipments together totalled 85,136 tons. A very good attendance assembled on 'Change this morning, and the undertone of the anthracite coal market was steady. There was very little new business, efforts being mainly confined to loading the tonnage which has accumulated during the railway strike. Swansea Valley large was very firm at last prices, and Red Vein large maintained its steady position. Machine-made nuts were not so firm, but cobbles were very strong. Rubby culm maintained its improved position; duff, however, was weak. In the steam coal market a better feeling was in evidence, large was firm, whilst bunkers were again marked up.

Prices of coal f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	20/ to 21/	19/6 to 21/6
Big Vein large (less 2½ per cent.) .....	18/ to 19/	18/ to 19/
Red Vein large do. ....	15/ to 16/	14/6 to 16/
Machine-made cobbles (net) .....	21/6 to 24/	22/ to 24/6
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 26/	23/6 to 26/
German do. do. ....	23/ to 25/6	23/ to 25/6
Beans (net) .....	16/9 to 18/9	16/ to 18/6
Machine-made large peas (net) .....	13/8 to 14/	13/3 to 13/9
Do. fine peas (net) .....	—	—
Rubby culm (less 2½ p.c.)	5/3 to 5/6	5/3 to 5/6
Duff (net) .....	3/ to 3/6	3/ to 4/
Steam coals:—		
Best large (less 2½ p.c.) ...	19/6 to 21/6	19/ to 20/
Seconds do. ....	14/9 to 15/9	14/6 to 15/6
Bunkers do. ....	11/3 to 12/6	11/6 to 12/6
Small do. ....	7/ to 8/	7/ to 7/6
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/ to 18/	17/6 to 18/6
Through-and-through (less 2½ p.c.) .....	13/6 to 14/6	13/6 to 14/6
Small (less 2½ per cent.)	10/3 to 11/3	10/ to 11/
Patent fuel do. ....	17/ to 18/	17/ to 17/6

IRON.

Trade was good in this district during the past week. There was a good demand for pig iron, and heavy outputs were maintained; outputs at the various steelworks were increasing. There was some improvement in the tin-plate and sheet-rolling mills, and the tinning sets were in full operation. The shipments of tin-plates last week were 110,851 boxes, receipts from works 119,292 boxes, and stocks in the dock warehouses and vans 198,377 boxes.

THE BY-PRODUCTS TRADE.

**Tar Products.**—The market is steady, but quiet. Benzols continue to rule firm, but pitch is on the easy side. There is no change in the position of carbolics, both crude and crystals. Naphthas are quiet but do not seem to attract much attention. Creosote unchanged. Nearest values are:—  
Benzols, 90's ..... 1/1½  
Do. 50's ..... 1/  
Do. 90's North ..... 1/  
Do. 50's North ..... /11  
Toluol ..... /11  
Carbolic acid, crude (60 per cent.) ..... 1/0½ to 1/0¾  
Do. crystals (40 per cent.) ..... /3½  
Solvent naphtha (as in quality and package) ... /9¾  
Crude ditto (in bulk) ..... /5½  
Creosote (for ordinary qualities) ..... /3½  
Pitch (f.o.b. east coast) ..... 40/  
Do. (f.a.s. west coast) ..... 39/ to 40/  
Do. (f.o.b. gas companies) ..... —

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—There is not very much doing either for prompt or future delivery, but prices remain on a level that shows there is a fairly healthy tone about the market generally. Makers show no marked anxiety to offer, and consequently the efforts of speculators to depreciate prices are of little importance. Closing prompt prices are:—

London (ordinary makes).....	£12/5
Beckton (certain terms) .....	£12/12/6
Liverpool .....	£12/18/9
Hull .....	£12/17/6
Middlesbrough .....	£12/16/3
Scotch ports.....	£13 to £13/2/6
Nitrate of soda (ordinary) per cwt. ...	—

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

On the occasion of the annual conversazione of the Royal School of Mines, which will be held in the new buildings of the colleges on the 18th inst., the whole of the full-scale mining plant will be working in the Bessemer laboratory, where there will be shown the concentration and smelting of a copper ore. There will be a realistic representation of a mine, in which the various underground work will be shown. A number of firms are exhibiting mining appliances of their manufacture, and numerous demonstrations will be given during the evening. Several lectures will be delivered, including one on "The Mining Conditions in Sumatra," by Prof. Truscott, A.R.S.M., M.I.M.M. There will be a rock-drilling competition among the students. There will also be numerous exhibits and demonstrations in chemistry, physics, botany, zoology, &c., in the Royal College of Science. The function will conclude with a concert and a dance in the Imperial College Union. Tickets may be purchased from Mr. E. A. Wraight, Royal School of Mines, London.

COALING SHIPS IN THE PANAMA CANAL.

According to the *Black Diamond* the Panama Canal officials and the coal trade are wholly unprepared for supplying coal to the vessels using the waterway, as coaling will be well along in 1915 before the plants will be completed, according to engineering men. In the meantime ships will have to take coal from temporary stations on the Canal, or at coaling depots not adjacent to same.

As has already been stated, the Government is going to sell coal at the Canal, and in doing this it will be entering into competition with the coal merchants who rent space from the plants that it will own and operate. Some time ago, Colonel Goethals, chief engineer of the canal, told the *Black Diamond* that while the Government will have coal for sale at the canal depots, it will not be an active competitor of the coalmen who will rent space and carry stocks of coal in the canal zone for the purpose of providing fuel to ships using the canal. Col. Goethals said that the Government will carry ample supplies of the best grades of coal—that is, those coals that are commonly termed "Admiralty" coals—which will serve as an assurance to shipowners that they can at all times find fuel supplies on the canal and at fair prices. But in naming a price for these coals the Government proposes to take into consideration every expense that a private company will have to bear in selling coal on the canal.

Until the Government knows what its coal plants and their operation is going to cost, they will not be able to say just what they will charge for handling coal. As the Government will provide the equipment and perform all the work of unloading, storing and reloading and putting into bunkers, there will be a specific charge for this service, which will be added to the charge for space. At the recent convention of the British Association Prof. Kirkaldy read a paper in which the economic effect of the Canal was discussed. In this paper it was cited that coals would be sold at the Canal as low as 4.75 dols. per ton, this price being held so low that ships that now use the Suez Canal would be attracted to use the Panama Canal, because of the difference in the price of fuel. American coal men, says the *Black Diamond*, are interested to know where Prof. Kirkaldy got his information as to the price to be asked for coal at Panama when the canal is put in operation. At the moment, the Canal Commission has coal to sell at Cristobal, the Atlantic entrance to the waterway, at 7 dols. per ton. Those who have studied the proposition figure out the cost of selling coal on the canal as follows: Average cost of New River or Pocahontas coal at Hampton Roads, 2.85 dols. per ton; transportation to Panama, 1.40 dols., making cost of coal delivered 4.25 dols. To this must be added cost of discharging and storing. This is as yet an unknown charge. The Government is at present paying 1.29 dols. per ton for transporting coal to the Canal from Norfolk, doing their own discharging, so that the public is not informed as to what the latter costs. Say that the Government discharges, stores, reloads and puts into bunkers for 50 cents per ton, and we have a total of 4.75 dols., to which is to be added taxes, insurance, rents, degradation, overhead charges, &c. It is not believed that the latter expenses can be borne under 1 dol. per ton, which would bring the cost up to 5.75 dols. Other expenses not taken into consideration above will bring the price up to 6 dols. or more. Alabama or inferior Pennsylvania coals may be sold under these prices, but not so low as to permit of the price that Prof. Kirkaldy names.

It is stated that the tardiness in getting the coaling plants on the canal under way and the settling of what users of same will have to pay, is going to delay any real enjoyment of increased coal business from the operation of same until 1915, as all the bunker contracts for 1914 will be closed within the next two months, so that arrangements that will then be entered into by shipping men will be faithfully observed until the contracts expire.

Our Dover correspondent states the No. 3 Pit at Snowdown Colliery is now down to about 1,850 ft., and a 2 ft. 9 in. seam is expected to be reached about 20 ft. lower. The New Rhodesia Mines Limited has entered into a guarantee secured by indentures of the East Kent Colliery Company, which owns Tilmanstone Colliery. The former will receive a bonus upon the conclusion of certain negotiations now in progress, and it further holds certain option rights on Snowdown Colliery preferred ordinary shares. It has been decided to carry the sinking of the pits at Shakespeare Colliery (Kent Colliery Limited) down to the seam, which it is expected to reach at 1,625 ft. Below the upper seam at 1,275 ft. are two seams—one at 1,500 ft. and the other at 1,625 ft.—and it is anticipated that sufficient coal can be raised from these seams—first, to supply fuel for the colliery boilers, and ultimately to give an output up to 500 tons per day. Whilst developing this coal, it is intended to continue sinking the shafts to the 2 ft. 9 in. seam at 1,810 ft., to open it up and afterwards proceed to the 4 ft. seam at 2,225 ft. No. 2 shaft will be fitted for winding coal, this pit being connected with No. 3 at various stages. An agreement has been entered into with the Channel Colliery Trust, under which the trust has guaranteed an option during the next five years to commence the working of ironstone and chalk on lands belonging to or leased by the company.



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Joint Editors—

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**HUBERT GREENWELL.**

LONDON, FRIDAY, DECEMBER 12, 1913.

A joint meeting of the executives of the Labour Party and of the Miners' Federation is being held to-day (Friday) to consider the position of Mr. Barnet Kenyon, M.P. for the Chesterfield division.

Meetings in connection with the Mining Association of Great Britain were held at the Whitehall Rooms on Thursday, when a number of important matters were under discussion. A short report will be found in another column.

Last month the quantity of coal, coke and manufactured fuel exported from the United Kingdom amounted to 6,202,798 tons, valued at £4,357,236, as against 6,465,071 tons, valued at £4,181,008 in November 1912, and 5,793,231 tons, valued at £3,362,129 in November 1911.

During the first eleven completed months of the present year the total exports reached 70,160,934 tons, with a value of £49,066,231. This compares with 61,070,280 tons, valued at £38,642,909, and 61,236,067 tons, valued at £34,918,385, in the respectively corresponding periods of 1912 and 1911.

It is reported that the Rhondda Six-foot coalseam has been discovered at Nantgarw, several miles south of the Rhondda Valley. Great developments are expected.

Presenting to the Manchester Geological and Mining Society, on Tuesday, the report of the delegates to the International Geological Congress held at Toronto in August last, Sir Thomas Holland spoke of the effect which the increasing cost of production was likely to have upon this country's coal resources.

Mr. Walter Hargreaves, in his presidential address to the Midland Institute of Mining, Civil and Mechanical Engineers, on Tuesday, made an interesting and important survey of the present condition of the coal industry both from the technical and public points of view.

The Miners' Federation of Great Britain sat in conference on Wednesday to consider the refusal of the owners to concede an advance of 15 per cent. in the wages of surfacemen. The executive committee have been instructed to arrange a joint meeting of the representatives of both parties concerned to consider the matter.

Lord St. Aldwyn, the independent chairman of the South Wales Joint Board under the Mines Minimum Wage Act, has decided against an application to pay the minimum of 8s. 4.7d. to colliers working less than seven days in three months outside his grade.



A general meeting of the North of England Institute of Mining and Mechanical Engineers will be held at Newcastle to-morrow (Saturday).

At the meeting of the North Staffordshire Institute of Mining and Mechanical Engineers, to be held on Monday next at Stoke-on-Trent, Mr. James Lomax will deliver a lecture on the North Staffordshire coals referred to in his recent paper on "The Microscopic Examination of Coals in Relation to Spontaneous Combustion."

The South Staffordshire and Warwickshire Institute of Mining Engineers meet at Birmingham on Monday next, when Mr. John Brindley will read a paper on "Thirty Years' Experience with Pumping Machinery, and Some Observations and Conclusions Thereon."

A general meeting of the Mining Institute of Scotland will be held at Glasgow to-morrow (Saturday). A paper on "Apparatus for the Determination of Carbon Dioxide and Oxygen in Mine Air" will be read by Prof. D. Burns.

The annual *conversazione* of the Royal School of Mines will be held on Thursday, 18th inst. Several lectures will be given, and numerous mining appliances will be demonstrated.

The award of Sir Robert Romer, as chairman of the Cleveland Board under the Minimum Wage Act, issued this week, shows some slight variations in the rules and rates contained in his original award.

In the King's Bench Divisional Court on Tuesday, the appeal of Higginson and Pitchford v. the Blackwell Colliery Company, from a decision of Judge Allen at the Mansfield (Notts) County Court, was dismissed. The question involved was as to whether colliery owners are responsible for the wages of daymen employed under the "stall" system. The present judgment decides that they are not responsible.

#### Fuel Analyses : A Significant Tendency.

THE scientific basis of fuel value is slowly but surely being recognised in all progressive industrial communities, but there is reason to believe that this recognition, at least in its practical form, is less pronounced in Great Britain than in either the United States, Canada, or Germany. In each of the last-named countries extensive, and to some extent elaborate, investigations have recently been carried out, for the purpose of providing fuel consumers with accurate data upon which power-plant managers can base their selections of coal. Engineers are at last beginning to recognise that it is poor economy to leave to chance the choice of fuels suitable for the particular purpose in view. Whereas formerly it was the general custom to construct the furnace without regard to the nature of the available fuel, it is now considered to be the best practice to adapt the furnace for the most economical consumption of those kinds of coal which come most naturally within the area of supply. There can be no question that manufacturers are giving increased attention to the purchase of coal upon specifications based upon chemical analyses and calorimetric determinations, and the reason is that the significance of chemical analyses is getting to be better understood, and this method is now more widely recognised as being capable of providing a quicker and cheaper means of determining the relative values of different coals than even the much-vaunted methods of practical boiler tests.

Boiler tests are doubtless excellent in their way, but how can they be carried out systematically while the power plant is in active operation, and truck loads of coal are arriving at the sidings? Elaborate tests of this kind can, it is true, be conducted at official testing stations,

such as those of the National Bureau of Mines in the United States and of the McGill University in Canada, and the information thus provided is invaluable for the purpose of elucidating the comparative values of different classes of coal, as well as the correct interpretation of analytical results; but such tests are almost useless to the purchaser who wishes to assure himself that he is receiving the class of fuel he requires, and that his various consignments are up to specified quality.

We take it, then, that objections to laboratory tests, as compared with large scale boiler tests, are becoming antiquated, for the double reason that the former are now better understood, and the latter are too cumbersome for everyday use. Nevertheless, it must be admitted that many colliery agents in this country still look with suspicion upon coal purchase by analysis, and the reason often given is that they are unwilling to guarantee their output when measured by analytical standards.

This attitude, we fear, is mainly the result of the unfortunate circumstance that British coal analyses have never been properly standardised. We suffer the inevitable lot of pioneers. When we held the monopoly of the coal markets of the world, analyses were never seriously considered. Few understood their significance. Even calorific values were regarded as theoretical quantities having but little practical bearing. When 75 per cent. of the heating value of coal was wasted, what was the use of a few British or any other thermal units more or less? But the world has now grown more scientific. Heat engines are becoming more efficient, and thermal units are assuming their proper position in questions of fuel economy, while laboratory analyses are no longer regarded as a mere superfluous ornamentation to a trade circular.

This being conceded, British coalowners are at a disadvantage owing to the fact that most of the available analyses are hopelessly antiquated and out of date, to say nothing of the fact that they lack uniformity. We are led forcibly to this conclusion by the study of the steady progress of other countries in the accumulation of analytical data based upon standardised methods of research. The exhaustive work recently published by the Canadian Department of Mines, entitled *An Investigation of the Coals of Canada*, has recently been followed by a comprehensive volume on *Analyses of Coals in the United States*, issued by the Bureau of Mines only last month. A similar tendency has already been foreshadowed in Germany by the publication entitled *Kohlen - Untersuchungen*, published under the auspices of the Verein für Feuerungsbetrieb und Rauchbekämpfung in Hamburg, containing a series of coal analyses of a large number of British and German coals carried out in the testing laboratory of Dr. AUFHAUSER in Hamburg.

The great value of each of these works lies in the fact that the analytical results have been obtained by uniform standard methods, and not the least of their advantages lies in the fact that the analyses do not pretend to represent picked samples of coal, but rather a fair average, without any selection or undue cleaning. They represent, in fact, the actual grades of coal which the collieries were putting upon the market. In the German series mentioned above are many British coals, with seams and collieries specified, selected, it is presumed, from export cargoes arriving in Hamburg. To British coalowners these analyses should prove of no little interest as affording independent testimony of the actual quality of the coals supplied. In some cases, the average of a number of tests is

given, and the calorific value has been determined not only upon the sample as taken, but also upon the pure coal substance.

In Great Britain we have nothing in the way of a series of truly comparable analyses. A large number of such tests has, it is true, been recently carried out at Eskmeals in connection with the coaldust investigation; but they are of no commercial value because the origin of the samples has been held back in deference to the wishes of the colliery owners concerned. It is not our purpose here to argue the question whether it is detrimental to colliery interests in this country to disclose such information. Apparently it is not so regarded in other producing countries. But whatever may be the justification for such reticence, we can but deplore the fact that less is known of the chemical nature of British coals than is the case abroad. A significant example of the result of this condition of things was prominently exhibited in the investigation now being conducted upon the cause of spontaneous combustion in mines. In the evidence given before the Departmental Committee it was clearly shown that much needed light would be thrown upon this question if we knew more of the chemical composition of the coalseams concerned. But the information is not at present available, and unless it can be procured it is difficult to see how any useful conclusion can be arrived at as to the cause of this mysterious property of certain coalseams.

We cannot avoid repeating here the view expressed at the beginning of this article that sooner or later British coalowners must fall into line with the growing tendency of the age. Buyers of coal are beginning to want similar facilities to those provided abroad. Standardised and comparable analyses will ultimately be demanded, and our existing heterogeneous collections of prospectus analyses will be deemed unworthy of the progressive spirit of the day.

SOME years have now passed since the coal output of the United States overtopped that of the United Kingdom; in 1912, according to the returns of the United States Geological Survey, no less than 450 million tons of bituminous coal and 84 million tons of anthracite were mined, the aggregate being 38 million tons in excess of the previous year; so that the day does not seem to be very far distant when the quantity of coal produced annually in the United States will be double that produced in this country, and before that it is quite likely that the output of German coal—coal and lignite combined—will have passed our own total.

With these striking facts before us, it is indeed remarkable that the external trade of the United States has not developed more rapidly than it has; the main reasons undoubtedly lie in the dimensions of the home market, the geographical disposition of the coalfields, and a fiscal system devised primarily to safeguard the home consumer. These considerations have discouraged any persistent campaign abroad on the part of the American coal operator, and it has, indeed, been left largely to the British merchant to foresee the possibilities of the American export trade in coal. At the present time some of the largest bunkering contractors are devoting very earnest attention to the coals of West Virginia and Pennsylvania.

Probably the Panama Canal is responsible for much of this interest, for this huge enterprise undoubtedly opens markets that hitherto have been closed to American coal; in this country



There have been some speculative estimates as to the prices at which it will be possible to sell coal in the Pacific, once the canal is opened, but we are unable to find quite the same optimism in American coal trade circles, and the figures put forward by Prof. KIRKALDY, at the Birmingham meeting of the British Association, have been seriously disputed. Prof. KIRKALDY estimated that coals could be sold at the Canal at 4.75 dols. per ton, but responsible authorities place the cost at least a dollar higher, when all charges have been included.

The fact is that the economists across the Atlantic are becoming extremely solicitous on the matter of fuel supply. This may seem surprising, in view of the vast resources that the North American continent is known to contain. According to the statement prepared by Mr. MARIUS R. CAMPBELL for the recent Geological Congress at Toronto, these, including seams to a depth of 3,000 ft. from the surface, amount to 3,225,394,300,000 tons, of which only 11,220,532,560 tons have so far been exhausted. Rather more than half of this total belongs to the lignite and sub-bituminous classes, and 20,721,000,000 tons are described as anthracite and semi-anthracite. As regards the latter, the fears of ultimate exhaustion do appear to have some justification, and the waste piles of the past, metaphorically speaking, have assumed such monumental dimensions as to cause much uneasiness even in regard to soft coal. Within the last few years the authorities have opened out a number of enquiries relating to waste in working and in consumption, all pointing to the awakening of the national conscience. Over and above this, however, there is a feeling that the coal trade, vast as it is, is not so robust as it should be in view of the extent of the reserves.

At the recent American Mining Congress this aspect of the question received considerable attention and some interesting papers were discussed, from which it is possible to form a diagnosis of the conditions. A paper on the "Cost of Coal Production" was read by Mr. E. W. PARKER, the chief statistician of the United States Geological Survey, in which he severely criticised the existing systems of working accountancy; on the other hand, Mr. J. G. BOILEAU attributed the troubles of the industry to Government neglect, and Dr. VAN HISE, of the Wisconsin University, and Dr. HOLMES, the director of the United States Bureau of Mines, laid stress on the evils of unrestrained competition. The former made a vigorous attack on the Sherman Anti-Trust Law, which, he said, gives no opportunity to limit output, divide territory, or regulate prices. This is a question that has agitated coal producers in most countries; the interesting fact is the discovery that the economic conditions in the United States are such as to bring it into the foreground. As to the reality of these conditions, however, there can be no doubt.

The Census returns recently published show that the margin of selling price over cost of production in the industry in many cases is insufficient to pay interest on indebtedness. The average profit on anthracite for 1909 was estimated by Mr. PARKER to be 20 cents per ton, making no allowance for interest on capital, amortisation or depreciation; the case of the bituminous industry is even worse. Mr. PARKER said the total value of the bituminous production was 401,577,477 dols., and the value shown in the Census returns of 378,159,282 dols. The expenses are as follows:—

	Dols.
Salaries .....	20,417,392
Wages .....	282,378,886
Supplies .....	45,345,932
Royalties .....	12,035,900
Miscellaneous .....	17,961,172
	378,159,282

From this it appears that 75 per cent. of the total cost and 70 per cent. of the total value was spent in wages. Salaried officials got less than 5.5 per cent. The total capital invested in the bituminous coalmines of the United States in 1909 was, according to the Census bulletin, in round numbers, 960,000,000 dols. The difference between the value of the product and the cost of producing it was approximately 23,440,000 dols., or a fraction over 2.5 per cent. on the capital. The average value per ton of all the bituminous coal produced in the United States was 1.07 dols. and the costs averaged a fraction of a cent over 1 dol., so that the margin of profit to cover interest, depreciation and amortisation was a little less than 7 c. a ton. In some States the expenses exceeded the returns. Take Arkansas, for instance, where the costs totalled 3,630,526 dols. and the value of the product was 3,508,590 dols. Other instances were:—

	Value of product. Dols.	Expenses. Dols.
Iowa .....	12,682,106	12,816,076
Kentucky .....	9,940,485	10,127,987
Tennessee .....	6,548,515	6,691,482
Oklahoma .....	6,185,078	6,536,441
Virginia .....	4,336,185	4,392,440

Pennsylvania, by a long way the most important producer, with an output of 137,300,000 tons, showed a total of expenses of 117,440,000 dols. and of value of 129,550,000 dols.—a balance on the profit side of a little over 12,000,000 dols., or about 3½ per cent. on the capital invested, 358,600,000 dols. The four competitive States—West Virginia, Illinois, Ohio and Indiana—which rank second, third, fourth and fifth respectively in producing importance, all show such narrow margins between income and outlay, that profits are visible only with a microscope. The figures follow:—

	Value of product. Dols.	Expenses. Dols.	Difference. Dols.
West Virginia ...	44,344,067	43,024,716	1,319,351
Illinois .....	53,030,545	51,697,504	1,333,041
Ohio .....	27,353,663	27,153,497	200,166
Indiana .....	15,018,123	14,906,831	111,292
	139,746,398	136,782,548	2,963,850

These four States, with an aggregate production of a little more than the bituminous output of Pennsylvania, showed a total of less than 3,000,000 dols. as the excess of receipts over expenses. The capital invested in the coal-mining industry in these States was something over 310,000,000 dols., so that the returns on the capital were less than 1 per cent.

In the end the Congress passed a strong resolution in which it was alleged that the federal and State laws, which encourage competition and prevent reasonable co-operation, result not only in preventing a fair return for the investment of capital, but in most cases allow only the recovery of from 50 to 80 per cent. of the coal, the balance being irretrievably lost; the resolution asked for the modification of the anti-trust laws as applied to natural resources in order that they might be conserved, and proper safeguards thrown round the employees. This resolution, and a copy of Mr. PARKER's paper, have been sent to the PRESIDENT of the United States.

A week or two ago we analysed the present position of the industry in France and Belgium; it really would seem to be a fact that we are not the only people with troubles to bear.

#### Trade Summary.

The London coal trade for the past week has shown a little more activity. Prices are the same, and the depot trade is weak, but the factors and merchants are inclined

to order more freely in view of the approaching holidays and the possibility of colder weather. Stocks at the wharves and depots are still heavy, but the occasional cold days have given an impetus to the trade generally. Slacks and small nuts are slowly recovering. Steam coals are more plentiful, but prices are well maintained. Kitchener cobbles and bakers' nuts are improving. The shipping trade is weak.

The market at Newcastle is very firm, but supplies are so scarce that actual business is quiet.

The Durham coal trade is strong, any free coal being readily taken up. Best gas coals are very scarce.

Owing to the mild weather, the Lancashire house coal trade still lacks animation. Other branches are quiet, but stocks are not heavy.

West Yorkshire house coals are in rather better request for early delivery, but the forward enquiry is disappointing. Manufacturing coals are steady, but quiet.

South Yorkshire steam coals are more active. Small coals are easy. More house coal is going into circulation.

The Derbyshire coal trade shows little change. House coals are easy. In manufacturing sorts a rather better tone prevails.

The prices of best coals at Cardiff are unchanged. Dry coals are very firm. Small coals are unsteady. Monmouthshire coals have been advanced. Rhondda coals are easy. There is considerable pressure for patent fuel.

The Scottish coal trade is active in all departments.

### THE MINING ASSOCIATION OF GREAT BRITAIN.

A meeting of the executive council of this association was held at the Whitehall Rooms on Thursday afternoon, being preceded by meetings of a special committee and the Parliamentary Committee. In the unavoidable absence of the president, Mr. Arthur F. Pease, the vice-president, Mr. F. J. Jones, occupied the chair, and the following representatives were present:—North of England—Messrs. W. C. Blackett and Reginald Guthrie; Cumberland—Tom P. Martin; Yorkshire—F. J. Jones, W. A. Durnford, W. H. Chambers, J. H. Ashton, E. B. Whalley, C. B. Crawshaw, Dr. W. E. Garforth, Roslyn Holiday, Joseph Warrington, R. Routledge; Notts and Derby—G. A. Longden, Henry Stevenson, W. Hay, H. Eustace Mitton, J. W. Fryar, J. Mein, P. Muschamp, H. Dennis Bayley, Alfred Hewlett *terts*; Leicestershire—E. E. Bramall; Warwickshire—W. G. Phillips; Lancashire—Vincent Bramall, E. L. Johnson, Charles Pilkington, Capt. H. V. Hart Davis, James H. Walker, Ernest Douglas, Tom Stone; Cannock Chase and North Staffordshire—Col. R. S. Williamson, Capt. Harold F. Bidder, J. Selby Gardner, W. Simons, William Hill, J. H. Knight; Somersetshire—G. E. J. McMurtie; South Wales—W. W. Hood, Charles Kenshole, Evan Williams; Scotland—W. Russell, C.B., J. T. Forgie, Robert Baird; Thos. R. Ratcliffe-Ellis, law clerk and secretary; and Arthur Ratcliffe-Ellis, assistant law clerk and secretary.

Letters of apology were announced as having been received from 33 members who were unable to be present.

The principal matters under discussion were the under-named:—Mineral support of railways, income tax on private owners' wagons, dead-buffered wagons, Explosives Order, explosions in mines (Report of Home Office Committee), Royal Commission on Railways, increases in railway rates, rescue (breathing apparatus), Trade Disputes Act, National Insurance Act, 1911 (Unemployment), &c.

**Tyndall Research Studentship.**—The studentship on the foundation of the late Prof. Tyndall for scientific research on subjects tending to improve the conditions to which miners are subject has been awarded for the ensuing year to Mr. J. I. Graham, B.Sc., of Bentley Colliery, Doncaster, for an investigation into the cause of spontaneous combustion of coal, with special reference to gob fires.

**Mining Institute of Scotland.**—A general meeting will be held in the rooms of the institute, 39, Elmbank-crescent, Glasgow, to-morrow (Saturday). Mr. Henry Rowan's paper on "Underground Fires," Mr. John Watson's paper on "The Testing of Fans: a Plea for Standardised Test Conditions," Mr. James Hogg's paper on "Magnesite Deposits in Euboea, Greece," and Mr. Willoughby M. Dunn's paper on "The Electric Winding Plant at South Kenmuir Colliery," and Mr. Henry Briggs's paper on "Gas and Fuel Caps" will be discussed. A paper will be read by Prof. D. Burns on "Apparatus for the Determination of Carbon Dioxide and Oxygen in Mine Air."

**Contravention of Explosives Act.**—At Ayr Sheriff Court on Monday, Alex. Blair and David Shaw, both mining contractors, admitted having, while driving a stone pit for William Baird and Co., under contract, (1) defrauded their employers of 54½ lb. of explosive; (2) failed to report at the end of their shift that explosives remained in their possession; (3) failed to properly store the explosive in accordance with the regulations; and (4) attempted fraud by pinning three hutches. The Fiscal stated that the men simply placed the explosive by the side of the road and covered it up with dirt. There might, in these circumstances, have been a serious explosion at any moment. The sheriff imposed fines amounting in cumula to £22, being a fine of £11 in respect of each accused.



## LABOUR AND WAGES.

## North of England.

The Wages Board report of the Northumberland Miners' Association respecting the recent application made to the coalowners for a general advance of wages has been issued to the lodges. Mr. W. Straker, on behalf of the Board, states that the application was made after very careful consideration of the whole position of the coal market. They asked for an advance of 5 per cent. Mr. Straker says they referred to the relationship of prices to wages under the Conciliation Board which terminated in August of 1911, and pointed out that if anything like the same relationship was to exist at the present time, which on an average existed over the whole life of that Board, they were entitled to what they were asking. The owners in reply said that they were surprised when they received the request. They did not think that the average selling price of coal would be higher than on the last occasion. With regard to the old relationship of prices to wages, they reminded the men's representatives of the increase in the cost of producing coal, owing to recent legislation, and argued that that being so, even if another Conciliation Board was established, the old relationship could not be maintained. In addition to this, they complained of a further increase in cost owing to men absenting themselves from work more now than twelve months ago. For the 14th to the 20th pays of 1912 the average time lost in this way was 11.72 per cent.; for the corresponding pays of this year the time lost in the same way was 15.53 per cent.

The result of the Northumberland Miners' strike ballot on the three-shift question is as follows:—For giving notice to cease work, 15,303; against, 14,114; majority for, 1,189. There were 246 spoilt papers. As a two-thirds majority was necessary for a strike, the comparatively small majority actually obtained leaves the position in the county as it was.

A case connected with the Minimum Wage Act was heard at Gateshead on Saturday, when 65 putters from Heworth Colliery were summoned for absenting themselves from work, 10s. damages being claimed in each case. It was stated that on November 7, a putter named Lunam, instead of employing his spare time in hewing coal, did nothing, and was consequently not paid up to the minimum. He said he had not a pick and none of the hewers would lend him one, and the managers told him that under the Act he had to provide himself with tools and work reasonably. Afterwards Lunam's fellow-workers demanded that he should be paid it, and they refused to work when the demand was not acceded to. For the defence it was contended that the management were actually in pocket, as, through the stoppage, they had not had to pay the minimum at all. The Bench decided in favour of plaintiffs, and agreed to state a case. The men, with the exception of eight, who produced medical certificates accounting for their absence, were each ordered to pay the 10s. claimed.

At Newcastle on Saturday the Northumberland coalowners met the miners' representatives for the purpose of considering a request for an increase of 6d. per day on the basis wage of adult surface workers at the collieries, and 4d. in the case of lads. The owners had offered the concession that the basis wage of able-bodied surfacemen over 21 and under 65 years of age, who are receiving a basis wage of less than 8s. a day, be raised to that figure. On behalf of the men, it was contended that under this scale only a small number of workers would receive an advantage of about 2d. per day, whilst the majority would not be benefited at all.

The dispute between the Whitehaven Colliery Company and their winding engineer has been settled by arbitration, the arbitrator giving his decision in favour of the men. Some time ago they applied for an advance of 4½d. per day in order that they might be put on the same basis as that which obtained before the recent readjustment of the enginemens' wages in Cumberland.

Sir Wm. Collins, the neutral chairman, has made his award respecting the question of the minimum wage paid at the Whitehaven Collieries, which the Cumberland Coal Joint Board was unable to decide. The Whitehaven pits have had the minimum of 6s. 3d. per day, other collieries 6s., and four smaller pits 5s. 9d. Whitehaven applied to be reduced to 6s. the same as the rest of the county. Sir Wm. Collins, in his award, reduces the minimum by a penny from 6s. 3d. to 6s. 2d. In the case of the pony putters at Brayton Domain, for whom no minimum was originally fixed, the chairman awarded a minimum of 3s. 10d. per day. The minimum rate in both cases to be exclusive, and the award shall operate as from December 1, 1913.

The award of Sir Robert Romer, the chairman of the Cleveland Board, under the Mines Minimum Wage Act, was in the hands of the representatives of the Cleveland ironstone mineowners and the miners' representatives this week. A week ago Sir Robert Romer sat at Middlesbrough to hear the claims of both sides. The miners asked for advances and the owners, on the other hand, sought reductions. According to the award the wages of miners, face deputies and shifters will be unaltered, but the machinemens' minimum will be raised from 5s. 11d. to 6s. 4d., whilst the rate for adult pieceworkers, other than miners and machinemens, is increased by 2d. Backbye deputies will receive an advance on their minimum of 3d., and on-setters in charge, and the various other classes of datal workers, will benefit to the extent of 2d. An increase of 3d. is granted to the labourers. Boys will continue to have a minimum of 2s. Regarding the rules, the miners' representatives failed in their effort to get Sir Robert Romer to decide that workers shall be entitled to the minimum if they work 80 per cent. of time offered. At present the minimum is not conceded to a person who works under 100 per cent. Wages will be calculated on a period of one week instead of a fortnight as hitherto. This follows the decision of the

Court of Appeal. The figures at which men are considered aged is however raised from 57 years to 60 years in the case of pieceworkers, and from 63 to 65 years for datal workers.

## Federated Area.

The Derbyshire coalowners, it is stated, have refused to recognise the Under-managers and Deputies' Union, which is demanding increased wages and better conditions for colliery deputies. The owners regard the deputies as officials, and say they must present their grievances individually.

On Friday a meeting of the National Amalgamated Union of Enginemens, Firemen, Mechanics and Electrical Workers was held at Dudley, to discuss with the "night" men the complaints that the agreement entered into by the coalowners of South Staffordshire and East Worcestershire was not being carried out at the Himley Collieries. Mr. J. W. Wright presided. It was resolved that the coalowners be notified that unless the enginemens of the Himley Colliery were paid the proper rates by the 14th inst. a ballot would be taken of the whole of the district with a view to tendering notices.

A conference has taken place at Nottingham between Derbyshire colliery managers and representatives of the Derbyshire Miners' Association, with a view to arriving at an agreement respecting an increase in wages asked for by the surfacemen. After a discussion occupying two hours, the proceedings closed without any settlement being arrived at.

## The Miners' Federation of Great Britain.

A national conference, convened by the Miners' Federation of Great Britain, to consider the proposal for an all round advance of 15 per cent. in the wages of colliery surface men was opened at the Westminster Palace Hotel, London, on Wednesday morning. The position was considered at the annual conference of the Federation held in Swansea in October 1912, and at a special conference held in London on July 29 and 30 last, when a resolution was passed confirming the decision of the Swansea meeting in connection with the necessity of fixing a minimum wage of not less than 5s. per day for surface workers, but in view of the immediate need for steps being taken to improve the condition of this class of labour, claiming at once an immediate increase of wages of 15 per cent. upon the rate of wages paid in February, 1912, where surface workers are members of the Federation. Further, the federation, was in favour of getting these workmen included in the Minimum Wage and Eight Hours Acts. Since then meetings have been held between the representatives of the coalowners and the miners in the various districts of the Federation. The reports, as presented to the conference, showed an almost universal refusal on the part of the coalowners to concede the 15 per cent. advance asked for. The Lancashire miners reported that agreements had been made and signed at a number of collieries in the county which included the 15 per cent. advance asked, with a fixed minimum of 4s. 3d. per day for adult surfacemen when wages are 50 per cent. above the standard with the three increases of 5 per cent. given by the Conciliation Board raising the present wage to 4s. 9d. per day. But it was stated that at the Joint Conference at Manchester a week ago the coalowners refused to give similar terms for the whole county, offering a wage of 4s. 3d. as against 4s. 9d. Yorkshire reported satisfactory agreements at a number of pits in South Yorkshire, but failure to secure similar agreements in West Yorkshire at the conferences held in Leeds. Nottinghamshire reported satisfactory agreements with the coalowners, with a basis wage of 3s. 6d. per day for banksmen, and a present wage of 5s. 9d. per day with the existing wage of 65 per cent. on the standard. The adjoining county of Derbyshire had not succeeded in making a similar agreement. The Scottish miners had made no progress towards a settlement, and in South Wales the coalowners had given a blunt refusal to the men's demand.

Mr. R. Smillie (Scotland) presided at the conference. The proceedings of the conference were held *in camera*, and at the adjournment Mr. A. Onions presented the following official report.

At the outset the President moved a vote of condolence and sympathy with Mr. W. E. Harvey, M.P., vice-president, in the recent loss he has sustained by the death of his wife. The resolution was passed in silence, the delegates standing in their places. The president then called the attention of the delegates to the miners' strike in Vancouver Island, Canada, and requested them to warn the miners in their respective districts against going out to Canada. Mr. Smillie stated that the Vancouver coalowners had sent agents to this country, who, by misrepresentation of the position, were endeavouring to induce miners to go out there to take the place of the men on strike. The conference then proceeded to receive reports from the various districts upon the application for a 15 per cent. advance in wage. The giving of the reports was followed by a long discussion, after which the matter was referred to the executive committee to draft a resolution.

The conference on Thursday decided to ask for a joint meeting with the coalowners of Great Britain to discuss the men's proposal for a 15 per cent. advance in wages. The resolution submitted by the executive expressing regret "that the reasonable claim for a 15 per cent. advance in the rate of wages paid to surface workers had not been conceded," and with the object of obtaining the advance claimed, instructing the executive committee to arrange a joint meeting with the employers of all the mining districts throughout Great Britain, was adopted with the practically unanimous vote of the conference. The only point of difference was that some of the delegates wished the Federation, now that it has met with refusal of the proposal in the districts, to press for a general 5s. minimum throughout Great Britain; but the conference decided to stand by its original claim

for 15 per cent. advance. The case for not changing the claim was strengthened by the fact that satisfactory agreements have already been made at a number of collieries in Lancashire, Yorkshire, Derbyshire and for the whole county of Nottingham. The claim for a universal 5s. minimum will be made and pressed on the amendment of the Minimum Wage Act, and the effort which is to be made to extend its provisions to surface workers.

Mr. Straker reported the result of the ballot which has been taken of the Northumberland miners on the three-shift system. Though there was a majority for a county strike, it was insufficient to take action, the association rules providing for a two-thirds majority before a strike can be entered upon. The matter was referred to the executive for further consideration. The unsettled point is this—that while the county majority was insufficient for a strike, the majority against the system at the 16 pits which are worked on the three-shift system was largely in excess of the necessary two-thirds.

The Durham and Northumberland miners complained of the awards given by Lord Mersey and Sir Robert Romer, the independent chairmen of the District Minimum Wage Boards. The first point was the similarity of the awards, which, in the opinion of the miners, is evidence of consultation and collaboration on the part of the two chairmen, which it is contended is *ultra vires*. It was decided to take counsel's opinion upon the matter. There is also dissatisfaction at the smallness of the minimum wage paid to colliers working on piece, which is fixed at 5s. 8d. per day, and the requirement of 100 per cent. of attendances at work during the period of fortnightly pays.

It was decided to continue weekly grants of £1,000 to the Dublin strikers, and to offer a *per capita* payment if the other trade unions are prepared to undertake that liability.

## Iron, Steel, and Engineering Trades

The dispute which has been pending since July last, between the ironmasters and the blastfurnacemen on the west coast with respect to the men's demands for time and a-quarter for Sunday labour, is still unsettled and is causing some anxiety in the Cumberland iron trade. A special meeting of the Cumberland Iron Joint Board was held at Whitehaven last week, presided over by Mr. Marley, when both the representatives of the ironmasters and workmen were present, and after three and a-half hours' discussion on the matter a deadlock was reached, when it was eventually agreed to accept arbitration as the only solution to the question. Two arbitrators will be appointed—one for the masters and the other for the men. The masters offered to grant the men's demands on condition that they allow the sliding scale prevailing at present in Cumberland to be adjusted to the Cleveland scale, but the men refused to accept these terms. The men contend that the Cumberland special iron was much higher in price and the sliding scale on the west coast much higher than the Cleveland scale, and therefore by accepting the masters' offer they would stand to gain on the week-end labour, yet on the other hand they would lose between 10 and 15 per cent. on their daily wage. The wages in the iron trade are based on a sliding scale, which is regulated by the selling price of iron, and at the present time the scale on the west coast is higher than that of any other part of the country.

Should the arbitrators fail to agree, an independent arbitrator will be called in, and, if no decision is then arrived at, in all probability the men will take drastic steps to enforce their demands.

## INDIAN AND COLONIAL NOTES.

## India.

The Indian Mining Association have protested against the inadequate space provided for stacking coal at the Kidderpore Docks, Calcutta.

## Africa.

*New Coalfield in Southern Nigeria.*—The results of the Southern Nigeria Mineral Survey during 1912 were made known in a Colonial Report issued recently. The investigation of the coal deposits to the north and north-west of Udi was continued, and at the head of the Obweti Valley a vertical rock section was obtained which exposed four seams, their thicknesses in descending order being 1 ft. 1 in., 2 ft. 4 in., 5 ft. 8 in., and 1 ft. 3 in. Near Obolo two seams—4 ft. 3 in. thick and 16 in. thick respectively—were discovered. This is 35 miles north of the big seam in the Udi district. Still more important, says Prof. Wyndham R. Dunstan, director of the Imperial Institute, is the discovery of coal of fairly good quality in a seam 1 ft. 8 in. thick in the Iyokolla River, 7 miles east of Adani and 56 miles due west of Okwoga station. This is the first proof obtained that the coalfield extends for any distance westward.

## Canada.

*Wages in Nova Scotia.*—The agreement between the Dominion Coal Company and the Provincial Workmen's Association expires, says our correspondent, at the end of 1913. A new agreement has been concluded renewing all the terms and conditions of the former understanding, and continuing the contract for a further three years, or until December 31, 1916. An increase has been granted of six per cent. to all able-bodied labourers in and about the mines rated at below two dollars per day, and in some cases will also be granted to deserving men earning two dollars and over per day. Increases are also granted in contract



es where the local conditions are especially the new rates will make the minimum rate of any mine labourer 170 dols. per day instead of 150 dols., and will make the minimum rate of the shift men 185 dols. instead of 175 dols. About 4,000 men will be directly affected by the increases granted, and the general agreement covers about 9,000 men. The new agreement, together with those that preceded it, covers a continuous period of 12 years, during which time the minimum day rate for ordinary mine labour has risen by successive stages from 1.38 dols. to 1.70 dols., and the minimum rate of the shiftman has risen from 1.64 dols. to 1.85 dols. The renewal of the agreement has given very general satisfaction throughout Nova Scotia, as it ensures freedom from any labour troubles, and settled conditions in the mining industry for at least three years to come. It is also generally felt that the unanimity among the workmen to renew the agreement marks the practical obliteration of the influence of the United Mine Workers in Nova Scotia, and removes altogether the fear of any further activity on the part of this organisation in the coalfields of Eastern Canada.

Our correspondent says:—In connection with the placing of an issue of 2,000,000 dols. debenture stock in London by the Nova Scotia Steel and Coal Company, President Robert E. Harris states that the profits from iron and steel during the first five months of the present year exceed those of the same department for the entire year 1912. There has been a large demand for coal, and the whole output for the year has already been disposed of. He has no doubt that the year's earnings will show a considerable increase over those of any previous year. A portion of the money to be raised by the new issue will be expended in the equipment of a new colliery and the construction of an additional blast furnace.

### THE IRISH COAL TRADE

THURSDAY, DECEMBER 11.

#### Dublin.

The coal quays now present more of a normal appearance of business activity than has been the case for some time past, coal boats still being discharged for the various firms without interruption, and deliveries made from most of the stores and supply sheds. Since last week huge consignments of coal have arrived in the port for the different city merchants, and the arrival of so many steamers has caused considerable congestion both in the docks and outside the quays, where a large number of boats are at anchor awaiting berths. In spite of the fact that there is such a large supply, very high prices are maintained, and no change in this direction is anticipated before Christmas. Best Orrell coal is now about 35s. per ton in the city; household coal, 33s., and best slack 24s. per ton; best coke, 26s.; steam coals, from 30s. per ton. The coaling vessels arriving up to Friday last amounted to 37, as compared with 36 the week previously, chiefly from Troon, Workington, Garston, Ayr, Maryport, Glasgow, Preston, Newport, Liverpool, Point of Aire and Whitehaven. The total quantity of coal discharged was 14,372 tons. Consignments for the country districts have been re-started on the canals, as both inward and outward traffic, which has been affected by the labour troubles, is resumed this week, both motor and horse barges being under police protection. Queen's County and Castlecomer coals have been in largely increased demand in Leinster and the Midland counties, owing to the Dublin strikes, the result being considerably more employment and greater activity in the mining centres at Wolfhill and Castlecomer. Much of the coal is conveyed on the canals as well as by rail to the inland towns.

#### Belfast.

The local coal trade is almost without change except that the approach of the Christmas holidays and severe weather have imparted a little more life to the household branch. Tonnage has been somewhat scarce during the week owing to heavy gales, and freights remain high. Prices are keeping firm, but unaltered. Quotations in the city are as follow:—Best Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current rates for steam coals ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton delivered. Cargoes arriving during the week were chiefly from Ayr, Partington, Workington, Ardrossan, Troon, Garston, Maryport, Manchester, Newport, Point-of-Aire, Neath Abbey, Preston and Girvan. From November 16 to 29 the total number of colliers entering the harbour was 115.

### THE TIN-PLATE TRADE

#### Liverpool.

The fall in steel bars and tin has enabled makers to somewhat reduce their quotations, and this has resulted in a little more buying. The trade, however, is still in a very unsatisfactory state. Forward business continues slow. Current quotations may be called:—Coke tins; IC 14 x 20 (112 sh. 108 lb.), 12s. 9d. per box; IC 28 x 20 (56 sh. 108 lb.), 13s. 1½d. to 13s. 3d. per box; IC 28 x 20 (112 sh. 216 lb.), 25s. 3d. to 25s. 6d. per box; IC 14 x 18½ (124 sh. 110 lb.), 13s. 3d. to 13s. 4½d. per box; IC 14 x 19½ (120 sh. 110 lb.), 13s. 3d. to 13s. 4½d. per box; IC 20 x 10 (225 sh. 156 lb.), 18s. 9d. per box; IC squares and odd sizes, 13s. to 13s. 1½d. basis for approved specifications. Charcoal tins are in quiet demand at 14s. 6d. per box IC 14 x 20 and upwards, according to tinning. Coke wasters are easy at the following rates:—C W 14 x 20, 12s. to 12s. 1½d. per box; C W 28 x 20, 12s. to 12s. 1½d. per box; W 14 x 18½, 10s. 7½d. to 10s. 9d. per box; W 14 x 18½, 10s. 10½d. to 15s. per box. Terneplates and request. Quotations for IC 28 x 20 box and upwards for unassorted quality—all f.o.b. and per

### THE LONDON COAL TRADE.

THURSDAY, DECEMBER 11.

The London coal trade for the past week has been very erratic. The retail trade continues dull, and the orders from the general public are not yet up to the usual average, but the wholesale orders on the market have been more plentiful and the disposition to buy (on the part of factors more particularly) has been more pronounced. An occasional stimulus is given to the depot and delivery trade by the passing recurrence of cold weather, but the return to the general run of mild weather has kept off any idea of advancing prices up to the present. Colliery prices are very irregular, and largely affected by stocks on hand. The depots in the principal London centres are still overcrowded with stock coal, and the difficulty of finding room for the contract coals coming forward weekly has kept the merchant from buying in anything like the usual quantities on the open market, in fact at times the merchants and factors considerably undersell the colliery prices, in order to keep the loaded wagons from getting on the siding rent list. The difficulty with the trolley men in one district is still very acute, and as a result, the men have been hawking the coal about at 1s. per cwt., a positive loss for all concerned, except for the householder. A somewhat firmer tone has been maintained on the market since the beginning of the month, and contractors who have been in arrears with their contract quantities are now beginning to pull up the monthly quantities. The working days of the month are also shorter than usual, whilst the approaching holidays lend an additional incentive towards keeping a good deal of stock in reach in case of severe weather. The labour difficulties also keep the market in a very uneasy condition, so that all prices remain fairly firm. The railway companies are reported to be negotiating the renewal of several contracts for the coming year, and although in some cases the second qualities of steam coal are said to be offering at slightly lower prices, the general expectancy is that best hards will be fixed at a slightly higher figure than last year. The falling off in the shipping demand owing to the closing of the Baltic ports, has led to an increased quantity of South Yorkshire and Nottinghamshire best hards being available for the London market, and for a time the over-coals however, are very firm. Slacks and small nuts have plus has somewhat weakened the price. The Welsh steam had a little better demand, and the prices have slightly recovered. There was an important meeting of the trade convened for Wednesday last at the St. Pancras Hotel, when nearly the whole of the London merchants attended, and a strong committee was formed to try and negotiate a better understanding with reference to the advertised London prices. It was felt on all sides that very little cohesion with regard to the rise and fall of the advertised prices during the winter was apparent, and the main object of the meeting was to bring the merchants into direct touch with the collieries so that any change in price might be of mutual advantage. The seaborne market is dull and stationary. The prices remain as they have been for so long, viz.:—21s. 6d. for best Wallsend, and 20s. 6d. for seconds, and 21s. for Charlston Wallsend, and 19s. 6d. for Charlston Main. 17 vessels were reported in the Thames for Monday's market, and 15 for Wednesday; no cargoes pressing for sale.

#### Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/	13/
Do. nuts .....	12/	12/
Birley cube Silkstone .....	12/6	12/6
Do. branch coal .....	16/	16/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone .....	13/6	13/6
West Riding Silkstone .....	13/	13/
Kiveton Park Hazel .....	13/	13/
Do. cobbles .....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	12/	12/
New Charlston Wallsend .....	15/	15/
Wharfedale Silkstone branch .....	16/	16/
Do. Flockton Main .....	15/6	15/6
Do. Athersley house coal .....	12/	12/
Newton Chambers best Silkstone .....	17/	17/
Do. Grange best Silkstone .....	15/6	15/6
Do. Hesley Silkstone .....	14/	14/
Do. Rockingham selected .....	14/	14/
Do. Rockingham Silkstone .....	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best .....	12/6	12/6
Do. large nuts .....	12/3	12/3
Do. small nuts .....	10/	10/
Do. kitchen coal .....	10/6	10/6
West Hallam Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/3	12/3
Do. London brights .....	11/	11/
Do. bright nuts .....	11/	11/
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Shipley do. brights .....	13/	13/
Do. do. nuts .....	12/6	12/6
Mapperley brights .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Cossall Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Trowell Moor brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Grassmoor Main coal .....	13/	13/
Do. Tupton .....	11/6	11/6
Do. do. nuts .....	11/6	11/6

	Current prices.	Last week's prices.
<b>Derbyshire—(cont.)</b>		
Clay Cross Main coal .....	13/	13/
Do. do. cubes .....	13/	13/
Do. special Derbys .....	12/	12/
Do. house coal .....	11/6	11/6
Pilsley best blackshale .....	13/	13/
Do. deep house coal .....	11/6	11/6
Do. hard screened cobbles .....	11/	11/
Hardwick best Silkstone .....	13/	13/
Do. Cavendish brights .....	12/6	12/6
Do. cubes .....	12/6	12/6
<b>Nottinghamshire.</b>		
Clifton picked hards .....	12/6	12/6
Do. small hards .....	12/6	12/6
Do. deep large steam .....	12/	12/
Annesley best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best hards .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	13/
Do. cobbles .....	13/	13/
Do. top hards .....	13/	13/
Do. High Hazel coal .....	14/6	14/6
Bestwood hard steam coal .....	13/	13/
Do. bright cobbles .....	11/9	11/9
Hucknall Torkard main hards .....	12/9	12/9
Do. do. cobbles .....	11/3	11/3
Do. do. nuts .....	11/	11/
Do. do. High Hazel H.P. .....	14/9	14/9
Do. do. London brights .....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts .....	11/3	11/3
Sherwood H.P. hards .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/3
<b>Warwickshire.</b>		
Griff large steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. bakers' nuts .....	11/3	11/3
Do. loco Two Yard hards .....	14/6	14/6
Do. Ryder nuts .....	11/9	11/9
Do. do. cobbles .....	13/	13/
Nuneaton steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Haunchwood steam .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Wyken steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Exhall Ell coal spires .....	14/3	14/3
Do. brights .....	12/6	12/6
Do. large steam coal .....	12/	12/
Do. best screened cobbles .....	12/3	12/3
Do. large nuts .....	12/3	12/3
<b>Leicestershire.</b>		
Snibston steam .....	10/	10/
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small hards .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
Netherseal hards .....	18/	18/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	9/9	9/9
Do. large nuts .....	9/6	9/6
Do. bakers' nuts .....	9/	9/
Do. Main nuts .....	9/6	9/6
Do. hards .....	9/3	9/3
Granville New Pit cobbles .....	11/	11/
Do. Old Pit cobbles .....	11/	11/
<b>North Staffordshire.</b>		
Talk-o'-th'-Hill best .....	13/	13/
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best .....	14/	14/
Do. cobbles .....	13/	13/
Apedale best .....	13/	13/
Do. seconds .....	12/9	12/9
Podmore Hall best .....	13/	13/
Do. seconds .....	12/6	12/6
<b>South Staffordshire (Cannock District).</b>		
Walsall Wood steam coal, London .....		
Do. brights .....	11/	11/
Do. shallow one way .....	11/	11/
Do. deep nuts .....	11/6	11/6
Cannock steam .....	10/9	10/9
Coppice deep coal .....	14/6	14/6
Do. cobbles .....	14/	14/
Do. one way .....	12/	12/
Do. shallow coal .....	13/6	13/6
Cannock Chase deep main .....	16/	16/
Do. Deep kitchen cobbles .....	11/6	11/6
Do. best shallow main .....	13/	13/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles .....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened hards .....	11/9	11/9

#### From Messrs. Dinham, Fawcett and Co.'s Report.

Friday, December 5.—The seaborne house coal market was very quiet, and no cargoes were reported as sold. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Charlston W.E. (Yorks) 21s., Charlston Main 19s. 6d. Cargoes 20.

Monday, December 8.—The seaborne house coal market was again without alteration, the general tone being exceedingly quiet, with no cargoes reported sold. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Charlston W.E. (Yorks) 21s., Charlston Main 19s. 6d. Cargoes 17.

Wednesday, December 10.—The seaborne house coal market continues very quiet, no Durham or Yorkshire cargoes being available. Best (Durham) 21s. 6d., seconds 20s. 6d., Charlston W.E. (York) 21s., Charlston Main 19s. 6d. Cargoes 15.



## BOOK NOTICES.

**Fairbrother on Patents.** By HENRY FAIRBROTHER. 48 pp.; 8½ in. × 6 in. London, Birmingham, and Edinburgh: Bromhead and Co.

This little guide gives, according to the alphabetical sequence of countries, the fundamental features of the patent laws of the world. It is a useful companion to the more elaborate treatises on the law of patents.

**Oil.** By W. ANTROBUS. 98 pp., 9 ill.; 7½ in. by 5 in. Price 3s. 6d. net. Manchester and London: John Heywood.

We have recently seen many books concerning oil, and we certainly cannot agree with the author's plea that the subject has not been dealt with in a practical and comprehensive manner before—that is, if he desires his work to be taken as an attempt to repair the omission. This feeling, however, arises mainly from the obscurity in which Mr. Antrobus introduces his purpose, which is to make it “commercially possible to produce in considerable abundance ample motor fuels in the United Kingdom”—an important branch of the oil industry, but by no means comprehensive. Nor does he help us much to a true understanding of his meaning as we go further into his pages. At first it seemed as if the main remedy for the shortage in oil was to be the Edison storage battery and water power! To be fair, however, it must be added that this is merely an aside, and the author's real motive is the utilisation of low grade carbonaceous materials for the production of motor spirit, &c. He does not tell us very clearly how it is to be done, but, in a process of exhaustion, he gives us an acute, if somewhat crude and biased, criticism of some latter-day propositions.

**Compulsory Arbitration in Industrial Disputes** By W. F. HAMILTON, K.C. 5½ in. × 8½ in.; vi. + 125 + 5 pp. London: Butterworth & Co. Price 3s. 6d. net.

There are few questions upon which opinion is so sharply divided as that which forms the subject of this book, but the more enlightened employers and trade union leaders in this country are uniformly opposed to the principle. Undoubtedly, the Minimum Wage Act and the spread of the trade boards system bring us nearer to the compulsory method, whilst the experience gained in Canada and Australasia has received renewed attention; but compulsory arbitration in the case of British industry can never be more than an expedient, to protect the public from the extremities that followed prolonged stoppages of staple industries; as a means of adjusting the conditions of labour it is inadequate.

Mr. Hamilton has devoted attention mainly to the New Zealand and Australian Acts, and his conclusion is that a similar method of dealing with all kinds of labour troubles in England would not be satisfactory; he recommends however, the adoption of the wages board system in the case of a small number of industries which are essential to the welfare of the community, and has drafted a Bill, embodying his recommendations, which is framed on the model of the Queensland Industrial Peace Act, 1912.

The author's examination of the New Zealand Act, which has been proclaimed so great a success, is rendered more interesting by the situation that exists in the Dominion at the time of writing. By means of continuous rises in wages, counteracted by continuous rises in the price of protected manufactured articles, compulsory arbitration can be given the semblance of success until the resources of the country are taxed beyond endurance. Mr. Hamilton rightly says that “Compulsory arbitration can only continue to be successful when both employees and employers support it”; it would seem to be even more necessary that the judicial authority should be biased in favour of labour. At the present time, there appears to be a desire in New Zealand to adopt the principles of the Lemieux Act, which, in the final event, is unable to enforce the decisions of the Arbitrator beyond influencing public opinion by the publication of the findings.

After an acute survey of the Australian Acts, Mr. Hamilton comes to the conclusion that for every industry in Australia compulsory arbitration has failed, and he asks how, if there has been failure in Australia with its boundless natural resources, an insufficient supply of workers and highly protected industries, it can be more than a partial remedy in England. We think the author is at his weakest when he attempts to devise a system suitable for this country; his argument that the proposed Act would be limited to certain industries is defeated by the experience in the antipodes, where it was first intended to legislate only for “sweated industries”; it is a natural consequence of protecting wages in any industry that other industries will require similar treatment, and the Chancellor of

the Exchequer's proposals to fix the minimum rates of service for agricultural labourers are attributable very distinctly to such Acts as the Minimum Wage Act for coalminers. It is part of the same vicious circle. Again, Mr. Hamilton argues that whilst there are industries in which the margin of profit and loss is so small and the amount paid for wages so large that any appreciable increase in wages would destroy the industry, this observation does not apply to public utility industries, where the increased cost can be handed on to the community. This argument is fallacious; in plain words, it simply means that a successful industry will take longer to break than an unsuccessful industry; and we believe that the habit of handing on the burden of increased cost to the nebulous community is a national evil. The independent arbitrator at the best cannot possibly have that knowledge of an industry which is only to be acquired by those who have had to shoulder the burden of conducting it; his natural disposition must be to take the course which appears to afford the easiest means of ending a strike or lock-out—that is, to pander to the workmen. It may not be till many months later that the bill is rendered to the community; and when it is rendered in the form of increased railway rates, we cannot think that this method of doing business is economical or just.

We should not like it to be thought, however, that Mr. Hamilton is to be classed with those who have blindly wasted so much ink and paper on this question; his is really a very perspicuous essay; and if his suggestions fail to convince, we do not know that any one else has been more successful.

## THE SAFETY OF WINDING ROPES.\*

Preliminary Report of the Prussian Winding-Rope Commission.

(Concluded from page 1160.)

*Signs Indicating that a Rope is Unsuitable for further Use.*—The committee consider that this question is too complex to admit of solution by a simple formula, owing to the variety of factors intervening to limit the working life of ropes; but they point to the following general indications likely to afford information on this matter. A first sign of fatigue in rope is the diminished safety factor revealed by the periodical tests; when these show that the minimum factor is no longer reached, the rope in question should be discarded. According to the Dortmund committee, however, it seldom occurs in practice that ropes have to be laid aside for this cause, the initial factor of safety being so high that other causes of insecurity intervene before the limit is reached. Another sign of fatigue is a sudden fall in the breaking strength between two successive tests, even though the safety factor be still satisfactory. In such event the rope needs careful watching, and should be discarded as soon as any broken wires are discovered. The external appearance of the rope will give some idea of the extent of wear or corrosion; but it is generally agreed the most reliable indication of approaching termination of the working life is afforded by the occurrence of broken wires. When these are noticed the rope must be carefully overhauled. If the rope appears sound externally and has not been very long in use, isolated cases of broken wires need not cause alarm; but in an old rope that is rusty or much worn, broken wires are a sure indication of fatigue; and if careful examination reveals a rapid increase in their number, the rope should be laid aside at once. When broken wires are noticed, useful information on the state of the metal as regards fragility can be obtained from flexion tests. Independently of these considerations, which were mainly put forward by the Dortmund committee, the Breslau committee proposed to calculate the safety factor by deducting the number of broken wires found in 1 metre of rope length, as well as those wires which fail to pass the breaking strength and flexion tests. As regards Koepe ropes, this committee recommends that these ropes should be discarded as soon as the number of broken wires in 1 metre length of the rope amounts to one-sixth the total number of wires present.

*Rope Regulations in Other Countries.*—Special committees visited the coal districts of England, Austria, Saxony, northern France and Belgium. So far as England is concerned, the report states that no official regulations are imposed as to the safety factor of winding ropes, but that, in practice, this factor ranges between 6 and 10, and is calculated on the maximum load of coal raised. The breaking strength varies between 140 kilogs. and 200 kilogs. per square millimetre (199,000 lb. and 284,500 lb. per square inch), and steel of high tensile

strength is considered to give the best results. New ropes are tested for tensile strength and torsion, the latter being regarded as of great importance. On the other hand, tests on ropes in use are rare, the usual practice being merely to inspect and renew the connections, chiefly in order to shift the points of contact with the pulleys or drums at starting. In some districts ropes are condemned when 30 per cent. of the component wires are broken.

In Saxony the safety factor is fixed by the Regulations at 6, calculating on the maximum load to be raised, and with the restriction that the cage load in winding men shall not exceed 60 per cent. of that in winding materials.

*Austria.*—In the Vienna district the safety factor is 8 to 9, and based on the maximum load to be raised. In the Prague district the relation between the radius of the pulleys and the diameter of the rope is taken into consideration. When this ratio is higher than 650, the permitted safety factors are: 7 for winding materials, and 8.2 for winding men; but for ratios between 650 and 550, the factor in the latter case must reach 10.6. Whereas high-tensile steel is rarely used in Saxony, a breaking strength of up to 205 kilogs. per square millimetre is common in Austrian winding ropes; but their working life is relatively short owing to the frequency of broken wires. As regards tests, the regulations prescribe only tensile and flexion tests. In Saxony the tensile tests are made with jaws 5 mm. in diameter, and test pieces 15 cm. long. To pass the flexion test the wires must stand bending eight times when the diameter is 0.5 to 1.95 millimetres, seven times for wires 2.0 to 2.15 millimetres, six times for those between 2.2 and 2.45 millimetres, five times for those between 2.5 and 2.75 millimetres, and four times for those of 2.8 mm. and over. Only 25 per cent. of the wires have to be put through the tests, and such as fail under flexion are not deducted in calculating the safety factor, but figure therein at a reduced breaking strength in conformity with the results of the flexion test.

The Austrian and Saxon regulations deal with the number of broken wires which may be tolerated in ropes used for winding men. In Saxony, if the distance between breakages exceeds 2 m., a wire must be deducted in calculating the safety factor. If several consecutive breaks occur in a length of less than 2 m., one wire must be deducted for each break; but if the last break in a series be more than 2 m. away from the first break in the next series, the deductions are limited to the number of broken wires in the series where these are the most numerous. In the Vienna district, a rope must no longer be used for winding men when a length of 5 m. is found to contain Z broken wires, as determined by the formulæ: (1)  $Z > \frac{2}{3} \frac{2(C - 6.5)i}{C}$

if the ratio of rope diameter to pulley radius is at least 650; and

$$(2) \quad Z > \frac{2}{3} \frac{(C - 8)i}{C}$$

when this ratio is between 650 and 550. In these formulæ, C is the safety factor of the new rope, and i the number of component wires. In the second formula, C must not be less than 9. Where the ratio is not less than 650, the safety factor must be recalculated every three minutes after two years of service; and the rope must be discarded when the number of broken wires amounts to:

$$Z > \frac{2}{3} \frac{(C' - 6)i}{C'}$$

in which formula C' is the safety factor from the previous test. Where the ratio is less than 650, the rope must not be used longer than two years for winding men.

*Belgium and Northern France.*—In these two districts the flat hemp rope is still very largely used, the proportions being about 75 per cent. in the former case and over 80 per cent. in the latter, though as the depth of the shafts increases, the round steel wire rope is being substituted. With regard to rope tests, the Belgian regulations prescribe that the maximum strain to which the rope may be subjected in use must not exceed one-sixth of the breaking strength in hemp ropes, and one-eighth in wire ropes. The ratio between the smallest diameter of the winding bobbin and the diameter of the rope must not be less than 750 and 1,000 for the two classes of rope respectively. In winding men, the load must not exceed 75 per cent. of the maximum load in winding materials. Every rope used for winding men must be inspected at least once a fortnight, and, when considered necessary by the inspector, a piece must be cut off the end of the rope for testing. In the event of the safety factor being found to have fallen to 4½ for hemp rope and 6 for metal rope, the rope shall be discarded. Where no tests are made, hemp ropes must not be kept in use for more than two years, or metal ropes longer than 18 months. Spliced ropes must not be used for winding men until breaking-strain tests have been applied to the two ends to be joined by the splice.

The French regulations prescribe breaking tests

\* Zeitschrift für Berg-, Hütten- und Salinenwesen.



especially under flexion in the case of wire) for new ropes, before and after the same have been used for 20 trial trips under maximum load. No metal rope must be subjected to a load exceeding one-sixth of its breaking strength, the limit for fibre ropes being one-fourth the breaking strength. The tests must be repeated each time a rope is shortened or the rope cap renewed, except when the rope is used for winding not more than four men at a time, in which case the rope must be discarded at the end of two years; and the maximum load must not exceed one-eighth of the breaking strength in the case of wire ropes, or one-sixth for fibre ropes. Ropes used over Koepe pulleys are not subject to the tests mentioned above, but they must not be loaded to a greater extent than one-seventh of their breaking strength when new, or kept in use for a longer period than two years for winding men. Ropes must be inspected at least once a week, and those used for winding men must be tested at least once a quarter during the first year of service, and every two months afterward, by cutting off a length of at least 2 m. If the breaking strength of a sound portion of such test pieces has decreased to the extent of more than 30 per cent. of the original value, the rope must be discarded. If the external appearance of the rope, and especially the condition as regards broken or rusted wires in wire ropes, is unsatisfactory, the rope must be put out of use. Spliced ropes must be run at least 20 times under full load, and the splice found satisfactory before they may be used for winding men. The use of flat ropes that have been turned over owing to wear is prohibited for winding men. A register must be kept of all discarded ropes, stating full particulars of their origin, length of service, and the reasons for discarding them. A special Regulation is in force for the Koepe ropes at the Béthune pits, prescribing that the ropes must be discarded when the number of broken wires in a length of 2 m. in the worst part of the rope exceeds one-fortieth the total number of wires, or when the number exceeds one-eightieth of the total if the increase in the breakages is more than 50 per cent. between two weekly tests; or, again, if the broken wires amount to more than one-twelfth of the total wires in any length of 2 m., or 50 per cent. of the wires in a strand in a length of 2 m.

With regard to high-tensile steel, the experiences gained with this material at Courrières and Béthune are said to have been unsatisfactory, though not at Anzin or at the Harmegnies Works.

## SPONTANEOUS COMBUSTION IN COALMINES.

### A Digest of Evidence before the Committee.

(Continued from page 1176.)

MR. J. R. L. ALLOTT.

Mr. J. R. L. ALLOTT, agent and mining engineer at Birchenwood Collieries and the Biddulph Valley and Grange Collieries, owned by Messrs. Heath and Sons, gave evidence on March 6, 1913. No actual gob fires had taken place in any of the seams at these pits, unless an old gob heat resuscitated at Norton Colliery in the Cockshead seam, and caused an explosion which occurred on February 24, 1912. There have been a number of heats giving off vapour, but they had never seen an actual fire. Only two of the seams are liable to spontaneous combustion, the Seven-feet Banbury and the Bullhurst at Birchenwood, and the Stony Eight-feet at No. 2 Brown Lees, and the Cockshead at Norton.

### HEATINGS AT BIRCHENWOOD.

Witness then described a gob heat which occurred in the Stony Eight-feet seam at Brown Lees Colliery on February 6, 1911. At this point the measures turn and the coal was of a very friable nature lying at an angle of 75 degs. They thought the heat was due to pressure at the curvature of the measures, and the dirt bands with the friction and pressure set up the heating. Next in regard to a gob heat which occurred in the Seven-feet Banbury seam at Birchenwood Colliery on February 19, 1898, witness said the gob heat was found after the slipping of a pillar near a fault. They were of opinion that it was the Billy or inferior bottom coal which caused the trouble. On several occasions they had found heating in the floor of the seam. It is a coal that contains pyrites which appear to disintegrate it very much, and expose fresh surfaces to the absorption of the oxygen. It occurs in nodules in the Billy coal. In the Seven-feet Banbury it is in the laminae, on the facings of the coal. They now got this coal out of the pit to prevent heating. It is really a black carbonaceous shale full of pyrites, which disintegrates into very fine pieces, almost into dust. The following is an analysis of Billy coal carbonaceous shale taken from 7 ft. seam, No. 18 pit:

	Per cent.
Coke .....	70.02
Volatile matter .....	29.98
Coke—	
Fixed carbon .....	59.49
Sulphur .....	1.83
Ash .....	8.70
Volatile matter—	
Gas, tar, &c. ....	23.10
Sulphur .....	0.78
Moisture .....	1.10
	100.00

Witness then described another gob heat in the Seven-feet Banbury seam at Birchenwood Colliery on May 23, 1898. The cause was pressure of the rock roof with a bastard rock and clod overlaying the coal. The clod is very carbonaceous, and there had been a big fall, and heating was found in the pack. The fire actually took place in a dip pack, made of 3 ft. chock timber, clod and bastard rock. This clod was really oily shale, called bannock. Witness said of recent years they had had more trouble with gob fires as they got further to the deep, with much less goaf. They always found they had trouble if they got intermediate goaf. The next case was a heat in the Seven-feet Banbury seam at Birchenwood Colliery on August 16, 1900. To make a general deduction from the foregoing, witness said the majority of their troubles had been from the coal left in the waste, and from the breasting system of working, which allows of coal being left in the waste, and the formation of intermediate goaves between the main ventilating current and the working face.

Witness dealt *seriatim* with other cases of heating. The last of these was a case of heating in the Bullhurst seam at Birchenwood Colliery on January 10, 1913. The depth from the surface to the point of heating was 500 yards. The inclination of the seam was 37 degs. This was the first gob heat in the Bullhurst seam at Birchenwood Colliery, although the seam has been worked for the past 70 years. The district in which it occurred was perfectly dry, and probably the heating was caused by the crushed bands of coal, bass and black shale in the waste near the fault. The seam at Birchenwood is not associated to the same extent with the black carbonaceous shale, known locally as "hussle," as the seam is at the adjoining collieries. At the extreme west of the workings this hussle is about 8 in. thick. It is only recently they have come across this hussle at Birchenwood right at the extreme west-end of the working. It is very thin—that is, it is only from 8 in. to 1 ft. thick; whereas at the adjoining collieries it is a number of feet thick—4 to 6 feet thick. In this case it was a friable coal at the fault that heated. The hussle had nothing to do with it.

Witness gave the approximate analysis of the Bullhurst coal at Birchenwood, and of the Seven-feet Banbury seam.

The approximate analysis of the Bullhurst coal is:—

	Per cent.
Coke .....	66.30
Volatile matter .....	33.70
	100.00
Coke—	
Fixed carbon .....	60.03
Sulphur .....	1.12
Ash .....	4.10
Volatile matter—	
Gas, tar, &c. ....	31.51
Sulphur .....	0.48
Moisture .....	1.70
	100.00

The approximate analysis of the Seven-feet Banbury coal is:—

	Per cent.
Coke .....	64.80
Volatile matter .....	35.20
	100.00
Coke—	
Fixed carbon .....	60.35
Sulphur .....	0.95
Ash .....	3.50
Volatile matter—	
Gas, tar, &c. ....	33.66
Sulphur .....	0.52
Moisture .....	1.02
	100.00

The Bullhurst seam has not caused much trouble by heating at Birchenwood, whereas the Seven-feet Banbury seam has been very troublesome. Several systems of working have been adopted—namely, longwall, breastings, and heading and drifting, but the latter system is undoubtedly the most satisfactory for highly inclined seams subject to spontaneous combustion. The Billy coal occurs in the Seven-feet Banbury, below the seam, but in all cases the heating was not attributable to Billy coal. In some of them it is the crush of the pillars, the coal itself.

### SYSTEMS OF WORKING.

Speaking of the system of working, witness said the seams are recovered by means of a pair of cruts driven at different levels, the low level being the haulage road and the high level the return, thus making natural air crossings. The seam recovered is divided into working breadths by pairs of levels driven 230 yards apart—150 yards of this breadth is worked by driving pairs of dips 120 yards apart to the rise. From these dips levels are then driven 10 yards apart and the coal exhausted downward, leaving the goaf above. This is allowed to become filled with gas, thus preventing spontaneous combustion taking place. Only sufficient air is passed round the face to keep the goaf edges free from gas. The principal objection to this method of working is the large amount of coal left in barriers, which must be sufficiently large to prevent them being broken, and thus allow leakages which would be dangerous. A method of working by which much coal would be saved, and the liability of gob fires reduced to a minimum, would be to drive down to the deep boundary a number of headings and work out the coal with the face advancing to the rise, the goaf being allowed to fill with water, but this method would entail a very large initial expense, and witness was not aware that it had been adopted in North Staffordshire, unless it has, to a certain extent, at Mr. Rigby's Colliery at Bunker's Hill.

Mr. Allott considered that the following principles should be observed in working seams of coal subject to spontaneous combustion:—(1.) The districts should be as small as possible, and worked out quickly. (2.) The minimum amount of ventilation should be passed through them, only sufficient to keep the faces and goaf edges clear of gas. (3.) Avoid intermediate goaves between the intake and the working faces. (4.) Have the minimum number of openings in each district, and always have preparation stoppings in readiness for building off. (5.) Clear out all the coal as far as possible, and particularly in the neighbourhood of faults. (6.) Keep the face as level as possible in the heading and drifting system of working. (7.) The stoppings should not be built close up to a main roadway, but kept back a few yards so that they can be examined for leakages. (8.) All districts should be sealed off when finished, whether there has been trouble from gob heat or not.

Witness said he did not mean to diminish the ventilation in the mine, but to prevent the goaf above the working place being cleared of gas and prevent the air circulating through the goaf. They worked with the face hanging back a bit at the bottom. The collier is working really behind the loader, and the loader is below, so that the face forms a kind of ladder for the coal to go down. Witness added that they extracted their timber, as far as possible, about 75 per cent. It was often broken, and they cut it into 3 ft. lengths to build chocks in the packs. With the highly-inclined seams at Birchenwood it is necessary to build chock every 6 ft. in the packs. A stone pack would not hold up by itself. They had never actually had timber on fire. Witness said they got about 60 per cent. in the Seven-feet Banbury, losing 40 per cent. in barriers and crushed pillars. They got Billy coal up as far as possible, because it was realised that it was likely to give trouble if left in.

Witness said that when the precautions he had mentioned had all been taken there was still one danger remaining. That was if faults passed through the pillars which are formed in driving up these dips, they might have heating in a pillar, in which case there is nothing for it but to seal off the district. They develop very rapidly indeed, and six to eight hours after goaf stink is detected at Birchenwood they often got vapour. It would be extremely dangerous to attempt to dig out a fire in these highly-inclined seams in North Staffordshire. Mr. Allott said they had preparatory stoppings in each district so as to give the shortest possible notice, and they found it much better to build these preparatory stoppings of old oak chocks and brickwork. If all brickwork they crush very badly. They used old wagon headstocks and wagon soles stowed in 3 ft. and 4 ft. lengths and intermixed them with brickwork.

### CONTIGUOUS SEAMS.

Mr. Rigby here pointed out that Mr. Allott's Seven-feet contains highly carbonaceous shale similar to the hussle of the Bullhurst on the west side, and the Seven-feet on the west side does not contain that. It is more like the Cockshead on the east side. The two seams are just reversed as far as gob fires are concerned. Witness also mentioned another point in connection with the working of highly-inclined seams subject to spontaneous combustion, and that was the danger of working a contiguous seam above one that is subject to spontaneous combustion. If they were making a large excavation in the Seven-feet Banbury, they got big rock fractures, and they reached up into the Bowling Alley 50 yards above. If the seam were being worked and there was much goaf in the Bowling Alley above, no matter how carefully they sealed off a district in the Seven-feet Banbury below, it was quite likely to have leakage from this seam into the upper one. Witness said he did not know of any gob fires that had occurred in seams where there is only 4 ft. of coal. On this point the chairman said the only gob fire he had ever heard of in Northumberland was in a seam about 6 ft. thick, and at one place it had what was called swally, an abnormal thickness of about 2 ft. thick, and a gob-fire occurred. Sir Arthur Markham added. Recently in Nottinghamshire, at the Newstead Colliery, they had struck a valley of thick coal and they had had a very considerable number of fires. Mr. Rigby said the Yard seam was the thinnest in North Staffordshire where fires had taken place. It was about 4 ft. 6 in.

### HYDRAULIC STOWAGE.

Witness said hydraulic stowage would be too expensive to use. Their difficulty would be in pumping the water out of the lower level of the mine to the p. bottom. If they could get to the lower boundary first and work up from there, or take 200 yards out and stop that up and work upwards, in that way it could be done; but it would be very expensive. Witness said they drew about as much dirt as coal from the mines at Birchenwood. It was impossible to get that dirt into the mine. It falls in these steep dips at an angle of one in one. It is impossible to get it to the face, and it has to be loaded out.

Witness said the timber cost at Birchenwood was 1 a ton, and the average at most other collieries, which may be taken as normal of the North Staffordshire collieries, is from 5d. to 6d. With an old colliery like Birchenwood, which has been working 60 or 70 years and where there are a lot of old districts and the old coal remaining to be worked is to the deep, it would be a very large initial outlay to have to lay pipes to the working faces at the present day. They would have to go a mile and a quarter to the nearest place. The depth worked was 430 yards, and the nearest working level 700. They were driving now to a new recovery, which would be 800. It would cost something like £7 to £8 ton for suitable pipes. Witness said the mines in North Staffordshire were not now profitable commercial undertakings. It was a poor coalfield, badly fixed both geographically and geologically. If the Legislature



made any alteration of the law, they would rather drive the boundary and work the seams back and fill the gobs with water. The right thing to do, of course, was to get into the lowest seam. At Birchenwood they were down to the Wimpenny coal, the lowest workable seam in the North Staffordshire coalfield. All the main roads could be driven in that coal, and get to the deep and work from the deep upwards. They cut right out from the Wimpenny drive east and west from the Wimpenny coal, and recover the other seams from that.

#### RESCUE WORK AT NORTON COLLIERY.

In the course of some questions about the rescue operations following the Norton explosion, Sir Arthur Markham said: "You may take it from me that the object of Parliament in passing legislation making rescue apparatus compulsory was not for the purposes of protecting property, but only for the protection of the men; and if these rescue apparatus are going to be used for the purpose of recovering districts which otherwise would have been stopped off, does not that entail extra danger on the men, which is clearly outside the intention of the people who passed the Act making these apparatus obligatory?" Witness said he did not agree. If they had recovered this district at Norton Colliery where there might have been a gob fire, the fresh air would have revived it; and it would have been very dangerous proceeding to have had these men in the dip with fresh air.

Witness said that before the pillar could slip you had to ressure, and it exposed a lot of coal over which the fresh air would have to pass, and he thought it was advisable to keep the minimum number of roads for that reason, particularly in seams liable to spontaneous combustion and lying at these high angles. It was a question entirely of the thickness of the seam and the nature of the coal. If it is a thick seam and soft coal, the fewer roads the better, provided good roads are maintained, because in this system of working the main levels are not very long.

#### Mr. GEORGE COOPER.

This witness, who was called on March 6, said he was an overman at Birchenwood Colliery, and had worked nearly 53 years in North Staffordshire—at Birchenwood, Talk-o'-th'-Hill, Podmore Hall and Bidder Elliotts. He said he had never seen a fire in the coal seam; it was always back in the gob, sometimes perhaps 50 yards and less than 100 yards from the working face—sometimes over and sometimes less. They occurred principally in gobs that were travelling and in the breastings. The cause, in his opinion, was the passage of wind through coal that had been crushed, as to the treatment, he believed in beginning at the top end of a working and bringing it down bank and cutting the rest out of it. When he was a boy they used not to do any breasting in the coal main. They used to draw dips up to the top of the headings out and bring the breasting back and bring it all down the bank; and there was no ventilation into this, and they worked with naked lights. Gob fires were then unknown. The heat killed all the firedamp; it would not explode, as there was so much of it. They did not take temperature in those days. Witness added that the coal was more subject to heating where there was moisture. He did not believe in any ventilation at all in the old workings.

In answer to further questions, witness reiterated that in his youth he never heard talk of any gob stinks or gob fires. The gob fires began in North Staffordshire in the early 'seventies.

#### Dr. R. V. WHEELER.

Dr. R. V. WHEELER gave evidence on April 18, and gave an account of his researches with regard to the spontaneous ignition of coal.

#### THE PYRITES THEORY.

He started out with the assumption that it had been proved now that the self-heating was not due necessarily to the presence of large quantities of pyrites in the coal, but to an actual combination of oxygen with the coal substance. Pyrites might, however, have an influence on the coal contains a considerable portion of it, inasmuch as when moisture comes to it that pyrites will cause the coal to split up into small fragments, and will therefore render it more open to attack by the oxygen in the air. In this respect, he should imagine that crystals of pyrites would have a tendency to cause the coal to split up—that is, if they had a crystal of pyrites lanted in the middle of a lump of coal, and moisture got to the crystal, it would oxidise and swell, and in that way split up that lump. But fine particles would present a very much more effective surface for the action of oxygen than that one crystal, and thereby, of course, it might cause a greater number of small cracks and fissures in the coal, and therefore be more effective in allowing oxygen to get to the coal surface. However, this tendency was to put the question of pyrites quite in the background as regards any effect on the spontaneous ignition of coal; the direct oxidation of the coal substance by oxygen was rapid, and it had a high heating effect. It itself it provided a sufficient cause of spontaneous combustion.

#### OXIDATION OF THE COAL SUBSTANCE.

Of course, there were three or four factors that had to be taken into account. If they simply took into account the chemical composition of the coal apart from where it occurred or how it occurred—that is, apart from the strata on which it lay—they had one factor. They had another factor in the nature of its occurrence—that is to say, whether the roof of the seam was good; whether there was any chance of cracks forming in the coal. They had a third factor—that of the presence or absence of pyrites—which was a factor, but a small one, he thought. If they took different coals and ascertained their chemical composition, they found a rather remarkable relationship between their chemical

composition and the ease with which they could get them to "self-heat," and that relationship seemed to be this—that the higher the oxygen content of the coal, the more readily would that coal self-heat. By oxygen content, he did not mean oxygen present in the coal as the gas oxygen, but present in combination with other bodies forming chemical compounds. This oxygen in the coal was present in the form of bodies the compositions of which were not definitely known. If they took 50 or 60 coals and analysed them to find out what were the "ultimate constituents" which they contained, they would find that the amount of oxygen in different coals varied between very wide limits, between 1 per cent. by weight in anthracite coals up to 17 or 20 per cent. in some bituminous coals. They would then find that in general, with very few exceptions, the higher the percentage of oxygen that a coal contained, the lower was the temperature at which self-ignition of that coal took place. A high percentage of volatile matter in a coal would not necessarily make it likely to self-heat easily, and, as far as witness could judge, the moisture seemed to make very little difference. Witness added that, apart from the coals listed in the appendix to the Second Report of the Explosions in Mines Committee, he had had some very interesting samples of coals which had self-heated when they had been stacked, and each one of those had had a high oxygen content.

#### THE COMPOSITION OF COAL.

As to the reason why the oxygen content of a coal was an important factor, Dr. Wheeler said he believed it to be this. He regarded coal as being a conglomerate of at least two different types of bodies. The first type were readily decomposed by heat, when they yielded the paraffin hydrocarbons as their main gaseous products; the other type required a higher temperature to decompose them freely, the gases then evolved being chiefly hydrogen and the oxides of carbon. That type contained the majority of the oxygenated bodies in the coal. The first type could be regarded as derived from the resins and gums originally present in the plants that formed the coal; the second type appeared to consist of degradation products of the celluloses or woody fibre of the coal plants.

Continuing, witness said his idea was that it was quite possible that, after the heating of the coal had proceeded to a certain extent by atmospheric oxidation, a temperature was reached at which they got an interaction between the oxygen compounds in the coal and the more inflammable parts of the coal substance; that is to say, they might have an actual "self-heating" of the coal. They had, so to speak, the oxygen compounds in the coal feeding upon the more inflammable portion of the coal substance. Of course, that was an hypothesis that required further investigation. Witness admitted that the samples of coal tested by him might have been exposed for some time in the mine before they were taken, and the amount of oxygen that would be taken up might certainly affect the results; but if they considered the amount of oxygen by volume which was taken up by a freshly won coal, that volume might be large, but the weight of it (and it was the weight which was shown on chemical analysis) was comparatively small. He quite agreed that it was just possible that one was arguing in a circle, and simply saying a coal was more liable to self-ignition because it was capable of taking up oxygen readily.

Dr. Wheeler then gave a brief description of the method adopted in making the experiments. He added that if the hypothesis were applied to two coals, the heating propensities of which in practice were known, and failed to disclose a difference in the relative temperature of self-ignition, it would simply mean that they would have to look for another factor, which might be a difference of the roof, or difference in the amount of small coal formed.

Mr. Rhodes pointed out that where the Barnsley bed is worked at the greatest depth in South Yorkshire, such a thing as spontaneous combustion is absolutely unknown and unheard of; whereas, within 2½ miles of it, where it is worked at a shallower depth, the same seam is continuously liable to a spontaneous combustion. —Sir Arthur Markham added that the chief difference in the analyses of the two coals in question was that the coals lying in the Doncaster district contain a very considerably larger percentage of moisture and slightly more sulphur; otherwise the analyses of the coals were identical.—Mr. Rhodes pointed out, however, that very much the highest percentage of moisture in South Yorkshire is found in the West Yorkshire district, where spontaneous combustion is practically unknown.

#### SUGGESTED LINES OF INVESTIGATION.

As to the proper lines of scientific investigation to be pursued with a view to arriving at the specific cause of spontaneous combustion, witness suggested that, in addition to the method already described, a method of experiment which would probably give most valuable results would be to determine the rate of absorption of oxygen by the coals under different conditions, moist and dry for example, and also at the same time to try to find out what is the exact mechanism of the combustion that took place when oxygen was absorbed by coal. He added that he had made some experiments of that nature which were not very conclusive. He would not like to say that the main factor in spontaneous combustion of coal was its chemical composition. For example, they might have a coal of exactly the same chemical composition in two different mines, and in one mine find it liable to fires and in another not. But then they should be able to see exactly what was the difference in the methods of working, or in the condition in which the coal existed in those two mines, and then they would be able to find out what was the extra factor which was liable to cause fires in the mine. He recalled experiments made some time ago upon samples of road-dust, some of which fired at 100 degs. Cent., and he found those contained oil—engine oil; so that it was quite

possible that oil entering from the roof might affect the liability of coal to spontaneous ignition.—Sir Arthur Markham interpolated the statement that the roof at Brodsworth contained in the black shale about 15 per cent. of oil; but those conditions did not prevail at Hickleton, the adjoining colliery, where there were no fires. Mr. Rhodes said very large quantities of oil came out of the rock in the Park Gate seam—in fact it filled buckets hour by hour, and yet they never knew such a thing as spontaneous combustion in the Park Gate seam of the Rotherham district.

Continuing, witness suggested that the value of any enquiry must depend upon obtaining a large number of results with different coals. It was impossible to form any conclusion from a few samples of coal only. It would be a very useful thing to have a whole series of analyses of the Durham coals and Staffordshire coals to see how they compared.

#### OCCCLUDED OXYGEN.

As to the mechanism of combustion, Dr. Wheeler said that, as was generally known, when freshly-won coal was exposed to air or oxygen at atmospheric temperature, a considerable volume of oxygen was apparently absorbed. In some cases, but not in all, a certain proportion of carbon dioxide and carbon monoxide was produced at the same time. As to the absorption of oxygen, the experiments he had carried out (in which he had been assisted by Messrs. Burgess and Platt) had involved the continuous circulation through finely-powdered coal, packed in a glass tube, of pure oxygen, the coal being maintained at a constant temperature. The rate of absorption of oxygen under different conditions had been measured, and the composition of the gases produced examined. In those cases he used freshly-won coal. The great rapidity with which the absorptive power of the coal fell off after short exposure to the air was remarkable. The fact that ignitions at the face were extremely rare was due, he thought, to the air current passing through; that any heating effect that was produced by the absorption of the oxygen was immediately dissipated. It was only on occasions where they had quite a slow circulation of air, and the heat which was produced by the oxidation of the coal was not allowed to escape, that they would have self-heating. That was the conclusion arrived at by Fayol. There were two distinct reactions when coal was exposed to oxygen; on the one hand an occlusion or condensation of oxygen, as oxygen, inside the coal. The occlusion of oxygen inside the coal was accompanied by a slight evolution of heat; so that it might be a factor in causing the ultimate heating up of coal, although the amount of heat that was given out when oxygen was occluded by coal was comparatively small. It was a physical action. All the oxygen that was condensed in that way by coal they could remove from the coal again. In the case of carbon and coal the occluded oxygen produced slight chemical action, but one assumed that that took place after the occlusion. The idea was that the oxygen was practically in the form of a liquid in the pores of the coal; that the molecules of oxygen were squashed up very close together as in the case of a liquid. Contracted together was perhaps a better phrase. Mr. Rhoad and witness had made some experiments quite recently upon the combustion of pure carbon. They used purified wood charcoal, and it appeared that in that case the oxygen formed a complex with the carbon. It did not form at first either of the two well-known oxides of carbon, carbon monoxide and carbon dioxide. The first reaction between the carbon and the oxygen was not to form either of those two oxides, but a physico-chemical complex was formed. The carbon and the oxygen seemed to be attracted to each other, and loosely combined. It was not a purely chemical combination, and it was not a purely physical absorption.

#### BOUDOUARD'S RESEARCHES.

As to the secondary action, Dr. Wheeler said he could not speak very clearly about it because he had not gone very far with it. But there had been some work done in France by Boudouard, who came to the conclusion that part of the action of air on coal is to oxidise the "humic" substances in the coal. He was not quite clear what the humic substances in the coal are supposed to be—but he believed they were somewhat of the same nature as were found in rotten wood. He did not think they were the resins extracted by pyridine, but he would not like to say exactly that they were not. They had not any definite chemical formula. But the importance of the reaction investigated by Boudouard was that certain substances in the coal were capable of adding on oxygen and forming chemical compounds, and it appeared that the humic substances in the coal were capable of doing that. Whether, in the course of that, heat was evolved, witness could not say. No evidence had been obtained in the course of the experiments described above of any accelerating or retarding effect of moisture on the rate of absorption of oxygen by coal. But since then some experiments had been made in a slightly different manner, which seemed to show that moist coal did not absorb oxygen so readily as dry coal. That was at ordinary room temperature, and he did not say what would happen at higher temperatures. That was the work he was going on with. This statement referred to the effect of moist air and dry air, not to the question of the moisture in the coal. In one experiment, the coal being heated to about 50 degs. Cent., the moisture was driven out from the coal and condensed in a cooled condensing vessel; so that by the end of the day all the moisture was abstracted from the coal. After that, dry air would be circulated through the coal. No falling off in the rate of absorption of oxygen was observed when the coal became dry. In a comparative experiment in which the water was not condensed, but in which there was a wash-bottle placed, so that the air bubbled through the water before it came to the coal, there was not any difference in the rate of absorption of oxygen. Lately,



ever, he had made some experiments in which he had dried coal with dry air in the first case and with moist air in the second, the coal having previously had all the gases extracted from it by heating in vacuo at 100 degs. Cent. Having done that, he took that coal and drew dry air through it at the temperature of the room (25 degs. Cent.) for 24 hours. He then again extracted the gases from the coal. A certain volume of oxygen was taken up by the coal, and a certain amount of that oxygen had combined with carbon to form carbon dioxide. He estimated what that quantity was, using in the first place dry air, and the result roughly was that when dry air was used for every 100 grammes of coal taken 6.5 cubic centimetres of carbon dioxide were formed in 24 hours. When moist air was taken, for every 100 grammes of coal, 4.6 cm. of carbon dioxide were formed in 24 hours. It was less. He would not like to say definitely now that moisture had no effect. From the practical point of view, any work which was done upon the effect of moisture on the rate of absorption of oxygen was, of course, of great value, and witness suggested that that was a line of work which ought to be taken up.

#### INFLUENCE OF MOISTURE.

Mr. Rhodes here mentioned that at one colliery in West Yorkshire there was slack which they had analysed, and the report of the analyst was that the coal itself contained 8 per cent. of moisture as it came out of the pit. Sir Arthur Markham observed that the amount of moisture in the coal depended very largely on the time the mine had been opened out. He had had some experiments made on that question; and it appeared that the coal, when analysed after the weight had been on for some time, contained a less percentage of moisture than when it was opened out from the rib side. That was taken very carefully at the Markham Colliery when it was opened out by Mr. Joseph Humble.

#### BACTERIA AND SPONTANEOUS IGNITION.

Witness next drew attention to Potter's work, whose experiments, he thought, were very striking. He showed that if they kept coal under conditions which were not favourable to bacterial life, they got no oxidation of that coal. Potter published a paper in the *Proceedings* of the Royal Society in 1908 on the subject. He took two samples of coal, both of which he sterilised by boiling in water. It might be impossible to sterilise coal in a pit, but there were poisons which they might use. The experiments which Potter made were very striking indeed. He showed that the amount of carbon dioxide formed from a sample of coal which had been first of all sterilised and then treated with bacteria was at 20 degs. Cent. 2 milligrammes, at 30 degs. Cent. it was 3.1, and at 40 degs. Cent. it was 4.6 milligrammes; but at 100 degs. Cent. it was nil. That temperature was the temperature at which the bacteria died. Moist, warm air was the most favourable for bacterial activity. The witness thought the research was one which was well worth going on with. In Mr. Potter's case, he was dealing with the question of the assimilation of carbon in soil cultivation, not with the question of coal at all; but he did refer in his memoir to the importance bacteria might play in causing the spontaneous ignition of coal.

Witness agreed that in any experiments that were undertaken the shales and roof might be analysed as well as the coals. If possible, experiments should be made on rather a larger scale than could be done in a chemical laboratory. It would be well to find out what was the exact chemical reaction which takes place. It might be possible to treat the coal with various liquids.

Mr. Rhodes said they must begin by recognising the fact that they must have very large quantities of air circulating, especially in all deep mines; not only on account of dealing with the enormous quantity of gas given off, but on account of the health of the men; and in order to bring the temperature at which they worked down to a reasonable figure; and he did not see how they were going to reduce the percentage of air to deal with the question of gob fires. Dr. Harger's suggestion was absurd from that point of view. Dr. Wheeler pointed out that coal would take up oxygen, even if there was only 1 per cent. of oxygen in the air and the rest was nitrogen. As to whether a seam, low in oxygen to start with, would absorb more oxygen than one high in oxygen, was a point upon which he had no definite information.

With regard to the effect of carbon monoxide on birds, witness hazarded the opinion that the birds might become immune, and instanced the fact that men could stand a larger quantity of carbon monoxide after a time than they could at first. The birds ought to be changed frequently.

At a meeting of the governors of the George Heriot's Trust held in Edinburgh, it was reported by the Heriot Watt College Committee that they had given further consideration to the erection of the proposed mining laboratories and rescue station, and recommended the Castle Brewery as the most suitable site. The brewery buildings are the property of the Trust, and according to the intentions of the committee, the building will be converted into a sort of model mine. The deep well of the brewery will represent the shaft, and the vaults, in which the beer barrels were stored, will represent the galleries. By these means and proper appliances, students will be trained for a diploma in mining. Part of the curriculum will be practical training in rescue work, and for this purpose the latest rescue appliances will be provided and utilised. A central rescue station will be established, and in the event of a disaster from explosion in a mining district, a student with the requisite rescue apparatus will be sent to the scene. A sub committee was authorised to have a meeting with coalowners on the subject.

#### MINING AND OTHER NOTES.

Mrs. Dixon, of Fairleigh, Bothwell, has intimated to Hamilton Burgh School Board that, having regard to the great interest which her husband, the late Dr. James S. Dixon, a former president of the Institution of Mining Engineers, took in the education of students of mining science, she was desirous of making provision for the benefit of students of the Hamilton Technical School, so that they might be assisted and encouraged to attend the mining classes at Glasgow University. She proposes to give the sum of £600 to the School Board of Hamilton, to be held in trust, the revenue thereof to be applied for the purpose of providing a bursary for pupils at Hamilton Technical School proceeding to attend the mining classes at Glasgow University. The one condition attached to the gift is that the bursary shall be known as "The Dr. James S. Dixon Bursary."

At a meeting of the Junior Institution of Engineers last week in London, the new president, Sir Boverton Redwood, Bart., who took the chair in succession to Sir Trevor Dawson, read a communication to the members from Mr. Albert Vickers, stating that he desired to endow a fund for the presentation each year of a gold medal and a premium in books or instruments for the best paper read by a member. It was decided that the medal should be known as the "Vickers Gold Medal of the Junior Institution of Engineers."

Mr. David Stevenson, instructor at the miners rescue station, Cowdenheath, has designed a new smoke helmet for use in mines. The advantages claimed for the new design of helmet are that it affords clearer vision, as no mica plates intervene between the eyes and the objects ahead, better hearing, and independence of the bellows. The Fife Mine-owners' Association have adopted Mr. Stevenson's design. At the same time they have ordered a supply of 60 pulmotors, to be distributed among the various pits, for the purpose of providing artificial breathing to a worker overcome by gas. Mr. Stevenson has also designed an improvement on the Weg breathing apparatus. By means of a screw, the wearer can regulate the amount of oxygen which he desires to inhale, according to his lung capacity.

Sir Charles Thomas Skelton, chairman of Messrs. C. T. Skelton and Co. Limited, of the Sheaf Bank Works, Sheffield, left estate of which £33,880 is net personalty.

A syndicate has recently been formed, it is stated, to work a valuable seam, or seams, of coal underneath the parish of Kirk Hallam, on the outskirts of the borough of Ilkeston, and on the Ilkeston border of that parish. The coal at present available consists of 150 acres, and with the other seams in contemplation railway and sidings facilities have already been obtained, and operations will be commenced in the very near future.

In the Lands Valuation Appeal Court last week, counsel were heard in an appeal by A. G. Moore and Co., coalmasters, Glasgow, against the valuation of minerals at Blantyreferme and Birkenshaw, Lanarkshire, at £572 11s., and the valuation of minerals at Meadowbank, in the parish of Bothwell, at £203 18s. The figures which had been proposed by the assessor were respectively £801 12s. and £285 10s. Appellants contended that they should be £458 1s. 4d. and £163 3s. 6d., claiming that these figures would represent a lordship of 4d. per ton, which was the lordship on which the entries in the valuation roll for the past six years were based. The assessor arrived at his valuations by assuming that the minerals could have been leased to a mineral tenant under the usual conditions in Lanarkshire for a lordship of 7d. per ton. The Valuation Committee decided that a fair rate of lordship would be 5d. per ton. The court sustained the appeal, and restored the valuation. Lord Salvesen said that if the assessor wished to get an increase in assessment, he ought to produce evidence from current leases of similar coals let under them, and if he could find that the current rates payable for similar coals in this district worked out at a higher figure than 4d. per ton, then it might be open to him to revise his valuation.

Receivers have been appointed for the Pittsburg and Buffalo Coal Company, Four States Coal and Coke Company, and the Johnetta Coal Company, all three firms being controlled by the same interests. The concerns are capitalised at many millions of dollars, but the liabilities have not been scheduled.

The King has been graciously pleased to award the Edward Medal of the First Class to Joseph Campbell, and the Edward Medal of the Second Class to Alexander Farquharson. Campbell is a fireman, and Farquharson a miner. They both displayed very great courage in attempting to rescue a fireman after an explosion of fire-damp at the Swinhill Colliery, Larkhall, on February 7, 1913.

Prof. James Geikie has retired from the office of Dean of the Science Faculty in Edinburgh University, but retains his professorship. The Senatus has approved of the recommendation of the Faculty, and formally ratified the appointment of Prof. T. Hudson Beare, Regius Professor of Engineering, to the vacant Deanship.

Important new clauses respecting strikes, which it is proposed to introduce into all bills of lading, have been issued by the International Shipping Federation. These clauses confer wide powers on shipowners to act, in the

event of strikes, in the interests of the merchants owning the cargo as well as themselves, and provide that any expenses incurred shall be borne jointly by the owners of the ship and cargo. Hitherto no responsibility has definitely been placed on the owners of cargo.

The annual meeting of the Sheffield branch of the Coal Trade Benevolent Association was held on the 6th inst. The president (Mr. T. K. Fox, of Royston) occupied the chair. The committee in their annual report, stated that the receipts of the branch for the year totalled £221 10s. 9d. This total was £100 less than last year. During the year three widows and one colliery traveller had been added to the cases receiving relief, and one widow in receipt of relief has died. Mr. H. Ashley Longthorpe was elected president for the ensuing year.

Mr. H. Eustace Mitton, chief colliery agent of the Butterley Company, speaking at a meeting at Codnor, said that in the Langley district, his company had been prospecting and boring, and had found good coal in two seams—the Deep Hard and the Deep Soft—and they were now driving a heading and believed they would be able to lengthen the life of the Bailey Brook Colliery for many years to come and for a considerably longer period than it would otherwise have lasted. In the Britain district, also, they had been exploring at the top of the hill, and although the boring was not finished, so far the results had been quite as satisfactory as they expected.

The Coppice Colliery Company have appointed Mr. John Dilks as under-manager at their Heath Hayes Colliery, near Cannock, Staffs.

Those interested in the land duties should obtain the useful little pamphlet on test cases issued by the Land Union, which gives a précis of all important decisions on questions of principle. At present, important questions dealing with reversion duty and mineral rights duty raised by the Union, are before the court. These include the actions brought against the Commissioners by the Marquis of Anglesey, the Duke of Beaufort, Canon Foran, Joicey and Mrs. Shaw Storey. The Foran case, which raises the important point as to whether an owner of unworked minerals can amend his return on Form IV, is now under Appeal.

The 30th annual meeting of the Inland Colliery Owners' Subscription Room (London Coal Exchange) was held on Monday last at the Hotel Metropole. About 230 sat down to dinner. Mr. B. Richardson, of the Birley Collieries, was in the chair. Speeches were delivered by a great number of representatives in the London trade, and the proceedings were enlivened by a very good programme of music.

Messrs. Wm. Johnson and Sons (Leeds) Limited, Castleton Foundry, Armley, Leeds, have recently secured orders for four complete fuel briquette-making plants of an aggregate output of 750 tons per day. Three of these plants are for shipment abroad, and one is for a works in the Midlands. They have also received orders for a large number of stamp battery parts for South Africa, and tube mills for a mining property in the south of England. They are, moreover, busily engaged on the manufacture of a special mill for the production of stonedust for use in coalmines as a preventative to explosions.

The annual meeting in connection with the Mauricewood Pit Disaster Relief Fund was held in Edinburgh on Tuesday, Lord Provost Inches presiding. The report stated that the roll of beneficiaries now stood at 24. The balance at the credit of the fund was £9,476. The chairman, in moving the adoption of the report, said that the fund had been in existence for 24 years, and during that period £22,733 had been disbursed on behalf of the sufferers. The report was adopted.

Amongst the contracts recently closed by Messrs. Ed Bennis and Co. Limited, Little Hulton, are the following:—Messrs. Daniel Doncaster and Sons Limited, Sheffield, two "Bennis" stokers and self-cleaning compressed air furnaces; the Lofthouse Colliery Limited, near Wakefield, two "Bennis" hand-fired furnaces (repeat order); the Coppice Colliery Company, near Cannock, Staffs, two "Bennis" hand-fired furnaces.

The section of the new general mine regulations relating to the use of electricity was discussed at a joint meeting of members of the Midland branch of the National Association of Colliery Managers and of the Notts and Derbyshire branch of the Association of Mining Electrical Engineers at the University College, Nottingham, on Saturday afternoon, December 6, Mr. J. Strachan, Stanton Hill (president of the Midland branch of the N.A.C.M.), was in the chair, and there was a good attendance of members representative of the two associations. For upwards of an hour various rules were under consideration. The chairman, in opening the discussion, gave a hearty welcome to the electrical engineers, and stated that the object of the joint meeting was to get a better grasp of the meaning of the rules, and at the same time to consider the best method of carrying them out, inasmuch as some of them appeared to be rather complicated. As managers they recognised that the electrician at collieries had in recent years been raised to a higher and more important position, and it was the desire of the members of the Midland branch of their association to work harmoniously with electrical engineers.



## MINE MANAGERS' EXAMINATIONS.

(Continued from page 1163.)

## For Second-class (Under-managers') Certificate.

SUBJECT No. 1.—*Mine Working.*

(Five questions only to be answered.)

1. State the circumstances under which you prefer:—(1) Chocks and props on a longwall face, (2) props alone on a longwall face, (3) steel girders on a roadway, (4) wooden bars on a roadway. Show in elevation how you would set the legs under a bar where the roof is heavy and there is no side pressure. (60)
2. In a main road the bars have become low owing to the quantity of loose *débris* lying on such bars. Describe in detail how you would replace them, the work to be done at night, and the road to be ready for work each morning. (60)
3. Show how you would open out a small district to the rise in a 2-ft. seam dipping 1 in 4. Sketch the roads and packs, and show how the coal is got into the tub or mine wagon. State the number of men the district will hold. No coal-cutters or conveyors are used in this example. (60)
4. A place is approaching old workings containing water. How would you work it having due regard to safety? Describe some method whereby you could control the flow of water through a borehole. (60)
5. In some seams roads driven into the solid coal stand better than roads formed in longwall workings, and in other seams roads formed in longwall workings stand better than roads driven in the solid coal. Why is this? (60)
6. Describe the various circumstances under which an explosive is most liable to give off flame. (60)

SUBJECT No. 2.—*Ventilation.*

(Six questions only to be answered.)

1. What is meant by the expression "equivalent orifice of a mine"? What data are required in order to calculate its value? and to what use can the results of that calculation be applied? (50)
2. Sketch a plan showing an upcast and a downcast shaft; levels extending in opposite directions to about the same distance on each side from the shafts; an area of longwall workings like a semi-circle on the rise side of the levels, with the shafts as its centre; the intake and return airways necessary to ventilate the working faces with two separate splits of air; two air-crossings; and as few doors as possible. (50)
3. Describe and illustrate by means of sketches several methods of ventilating a single heading 10 ft. wide driven in a seam of coal for exploring purposes beyond the general limits of the workings. (50)
4. Make a sketch of the best portable apparatus known to you for watering the dust near the site of a shot-hole, and describe how it is used. Also describe minutely how the inflammable properties of the dust near a shot-hole are neutralised in the mine best known to you. (50)
5. Write the chemical formula which shows the quantity of oxygen necessary for the complete combustion of fire-damp, and give the results of that combustion; also state the atomic weights of the gases which take part in the reaction. (50)
6. If a quantity of air amounting to 50,000 cubic feet per minute requires a pressure equal to 4 in. of water-gauge to cause it to pass through an airway of given length and area, what pressure, or water-gauge, will be required to cause it to pass through two airways, each of exactly the same dimensions as the first? Calculate the horse-power in each case. (50)
7. What are the leading characteristics of the three principal gases contained in air? State generally in what respects the return air differs from the intake air. (50)

SUBJECT No. 3.—*Explosions in Mines, Underground Fires and Inundations.*

(Five questions only to be answered.)

1. What are the most common causes of explosions and underground fires? In each case what preventive measures should be taken? (20)
2. If at the moment of an explosion you were with a number of workmen in a distant part of the mine not reached by the destructive force of the explosion or by afterdamp, what steps would you take for the safety of your party? (20)
3. In working a seam of coal known to be subject to spontaneous combustion, what special instructions would you give to your officials and workmen—(1) To prevent gob fires; (2) to ensure early detection of heating? (20)
4. In the case of a gob fire happening in one of the districts of a pit under your charge during working hours, what points would you consider in deciding for yourself whether or not to withdraw the workmen? (20)
5. In reopening the workings of a mine after an explosion how would you organise rescue men for repairing an air crossing in afterdamp, 100 yards from fresh air, the work being expected to occupy 12 hours? (20)
6. In the case of an outbreak of fire in an engine room between the intake and return airways near the pit bottom during working hours, what points would you have to consider in deciding whether or not to reverse the fan? (20)

SUBJECT No. 4.—*Machinery.*

(Five questions only to be answered.)

1. Sketch and describe a loose flange joint for 4-in. bore mild steel pipes making the construction quite clear. (20)
2. Describe shortly two devices adopted for preventing the passage of too high currents through electrical circuits. (20)
3. In connection with ram pumps, what are the following appliances used for:—The air vessel? The snifting cock? The suction and delivery valves? (20)
4. A hauling engine is described as having (a) two cylinders with (b) slide valves and (c) Stephenson link reversing gear with (d) pinion on crank shaft gearing into (e) spur wheel on drum shaft. The pinion and spur wheel have (f) double helical teeth. The drums are (g) gunmetal bushed running loose on shaft controlled by (h) clutches and fitted with (i) post brakes. Describe shortly what is meant by the phrases italicised and marked (a) to (i). (20)
5. In connection with the main winding engine at a colliery:—How are the winding ropes fastened to the drum and what does the Coal Mines Act say about the length of the ropes? (20)

6. Reproduce twice in your answer book the curved road shown on the accompanying sketch. In one sketch fill in



(Scale reduced.)

the rails and guide sheaves for main and tail haulage, and in the other the rails and guide sheaves for endless rope haulage. (20)

SUBJECT No. 5.—*Arithmetic and Surveying.*

(Five questions only to be answered: No. 6 is compulsory.)

1. A piece of coal weighs 32 oz. in air, and 7 oz. in water. What is the specific gravity of the coal, and how much will a cubic foot and a cubic yard weigh respectively? (18)
2. If the standard wage be 4s. plus 8½ per cent., how much coal must a hewer produce to earn the standard wage if the hewing rate be 3s. per ton? (18)
3. Two seams of coal lie 50 yards apart vertically from the floor of the upper seam to the roof of the lower. The rate of dip is 1 in 7½ (1 vertical to 7½ horizontal). What will be the length of a level crosscut mine, or cross measures drift, between these seams? Plot an outline section and check your answer therefrom. What will such a mine or drift cost at 42s. 6d. per yard? (18)
4. The sides of a triangle measure 300, 400, and 500 yards respectively. One angle of the triangle is a right angle. What is the area of the triangle in square yards, and in statute acres? (18)
5. Take a length of 5 in. from your foot rule, or scale, and divide it into three equal parts, and afterwards divide one of these parts into 10 equal divisions. This is to be done geometrically and not directly by trial with dividers. (18)
6. Plot the following bearings to a scale of 1 in. equal 100 links. Find the bearing and length of the line joining A and B:—  
From A N. 30° W., 175 links, level.  
N. 15° W., 215 " "  
N. 45° E., 200 " "  
E., 255 " "  
S. 10° E., 300 " " rising 1 in 2 to B.  
How far is B above the level of A? (28)

SUBJECT No. 6.—*General Management and Mining Legislation.*

(Five questions only to be answered: No. 1 is compulsory.)

1. What are the prohibitions and regulations as to the employment of boys at and in the mines? (20)
2. What are the provisions in the Coal Mines Act, 1911, relating to the inspections of the mine before commencing work and during shifts? Also what inspections of shafts are required? (20)
3. Choose some important accident of which you have recently had experience or knowledge, and write a report of the same such as you would send to your manager. (20)
4. What are the provisions of the 1911 Act relating to the use of safety lamps? (20)
5. What are the shot-firing regulations as set out in the Explosives Order of September 1, 1913? (20)
6. What are the provisions of section 50 of the 1911 Act relating to timbering and the general support of the roof? (20)

**Hull Coal Imports.**—According to the official returns, the imports of coal into Hull in November amounted to 614,926 tons, of which 573,274 tons were by rail and 41,652 by water. The total in November 1912 was 644,316. During the first eleven months of the year the imports were 7,398,376 tons, as against 6,448,784 in the corresponding period of 1912.

**North Staffordshire Mining Classes.**—The annual presentation of prizes to the students of the North Staffordshire mining classes took place at the Town Hall, Stoke-on-Trent, recently, the Mayor (Ald. P. Elliott) presiding. Mr. J. T. Stobbs (mining lecturer) reported that during the past session mining classes in the various stages of instruction were held at a number of centres in the Stoke-on-Trent County Borough and in the county area, being attended by 688 students. In addition, special classes for the training of firemen under the new Coal Mines Act were held at five centres. In all probability, before their next annual gathering, the advanced classes would be accommodated in the new college. Mr. T. W. D. Gregory (lecturer in experimental science) also reported a record number of students and a high standard of work. Col. A. H. Heath, who distributed the awards, addressed the students, and referring to the forthcoming opening of the Mining and Pottery School, hoped that as a result the attendance at the classes would be still further increased. Turning to recent mining legislation, he regretted that the Home Office took it upon themselves to interfere so unnecessarily with the management of the mines. A great deal of their managers' time was taken up in attention to details which, he felt, could not in any way contribute to the safety of the mine. He had taken the trouble to enquire at one of his own collieries about the number of reports that were daily presented to the manager, and he was informed they were no fewer than 70. It took the manager over a solid hour a day to look over those reports and sign them. These reports came to be depended upon for the safety of the mine, for the managers had so much of their time taken up in looking through them and attending to other regulations, that they no longer felt the same personal responsibility as in former days.

## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**"Slump" in Coal Freights—Decline in November Shipments Explained—More Complaints of Dock Congestion—Important Judgment as to Award Rules—Port Talbot Extensions—Statutory District Board and Men's Fresh Demands—Decisions by Independent Chairman—The "Per Capita" Output; Decline or Recovery?**

Several incidents of the week are noteworthy, but probably the most striking is in the freight market, where on Tuesday a coal cargo for Genoa was fixed at 7s. True, other fixtures were higher—to 7s. 9d.—but that particular transaction is remarkable as evidencing the decline in rates which is now in progress. Twelve months ago the rate was nearly double—round about 13s. A fixture at 7s. shows that the new tonnage coming on the market, combined with decrease in the whole-world quantity of commodities requiring transport, has (as was foreseen) made their influence seriously felt, for Genoa at 7s. is not a paying rate to the shipowner. On the other hand, of course, these lower rates will materially stimulate the export trade in coal.

One other item in the week's news calls for special comment, namely, the reduction of South Wales coal exports by over 300,000 tons during November, as compared with the corresponding month last year. Largely this is attributable to the stoppage at Senghenydd on account of the explosion; also to stoppages at Llanhilleth and elsewhere, as reported from time to time, several thousands of men being idle. The month's unfavourable comparison does not indicate permanent conditions, for these all point to increased output. Vast sums have been and are being spent here on colliery development, and already this year, compared with the relative period of 1912, shows an increase in shipments of 5½ millions of tons. As will be remembered, the comparison is with a strike year, but, as compared with the period in 1911, we are 6 millions higher in shipments.

According to Mr. D. A. Thomas, head of the Cambrian Combine, whilst shipping and tin-plate as well as iron-trade conditions are unsatisfactory, the coal trade is enjoying strength and prosperity. He told a meeting in Cardiff that those interested in collieries were getting higher prices this year by one shilling per ton than they got in their contracts twelve months ago. Having regard to general conditions why was the coal trade so strong? One reason was that the demand for Welsh coal went on steadily increasing. It was required all over the world, for there was no coal like it.

Mr. Thomas followed with remarks that are curiously contradictory of the foregoing paragraph, part of the explanation of the contradiction being that he refers to a period wherein the exceptional restrictive effects of the Eight Hours Act, great strikes (twelve months at the Cambrian alone), shortage of labour and other causes have been operative. He said that, on the other hand, the output was increasing so slowly that he did not think purchasers realised its stationary character. Figures which had come before the Coalowners' Association for the three months ended September showed that the output had fallen.

The figures for 1913, he continued, would show an increase of some million tons compared with 1912. He did not think the trade had reached its culminating point; but it was a serious matter that during the past few years, even if they had not been stationary in the coal trade, it had increased at a very slow rate indeed. They must not live in a fool's paradise. Competition was increasing, both from Germany and America. Operators in the latter had taken the West Indian trade, which South Wales previously had, and they were now pressing upon Welsh sellers to South America.

Another matter was the unsatisfactory character of the dock accommodation. Barry and Cardiff were making some additional provision for increase; but whenever there was extra pressure, they had congestion in the docks, such as was being experienced at present. That congestion in the docks was prejudicial, not alone to the coal trade, but also to the general community.

Labour troubles, so rife in South Wales, occasioned increased annoyance; and because of a railway dispute so far away as Llanelli, the Cambrian pits were then on stop. Mr. Thomas described the sympathetic strike as "sympathetic lunacy," and said it produced much anxiety in the coal trade, for though he did not think there would be trouble in that trade, he feared they might be involved in other labour disturbances.

It has to be noted that Mr. Thomas's remarks run contrary to an impression which has been prevalent in some quarters, it having been supposed that owing to the opening out of new collieries, with large developments in some of the older undertakings, the output was increasing materially and steadily. There is, however, no more careful speaker than Mr. Thomas; and certainly no one with a fuller knowledge and better understanding of the economics of the coal trade in South Wales, coupled with a wide view of colliery operations throughout the world. The Cambrian staff includes a statistical department, kept in the highest state of efficiency; and as chief of the vast organisation that centres in the great office adjacent to Cardiff Exchange, Mr. Thomas is not only fully informed, but (what is of equal importance) he is always closely up to date. Naturally, his utterances upon the coal trade are followed with the deepest interest; and it is very rare for anyone to criticise adversely what he says.



With reference to the case which the High Court had referred to the Conciliation Board, as to which that Board failed to agree, further argument was heard at the Court during Wednesday and Thursday of last week. In the result, it was determined that Rule 5 (requiring a man to give notice when his working-place became abnormal) was *intra vires*; but that Rule 7 (which fixed a fortnight for averaging the day-rate of wage) was *ultra vires*. As to Rule 5, Lord Justice Kennedy said that the requirement of notice was as much in the workman's interest as in the employer's, for it enabled immediate inspection of the place to be made for determining at once whether a claim was justified. It was a business-like and reasonable provision; a condition which ensured that work should be properly done; and therefore he thought was contemplated by the Act. As to Rule 7, the method of averaging would have to be settled by agreement, arbitration, or some tribunal; but there was nothing in the Act to show how the average should be ascertained; and the Court could not uphold the rule which laid down the way in which average earnings should be ascertained.

The progress of Port Talbot in respect of railway and dock developments, due almost entirely to growth of the coal trade, is made manifest in plans which have been deposited at the offices of the town clerk of Aberavon and the clerk of Margam Council. Railway station enlargement, dock and breakwater extensions, additional sidings, new overhead line, with other important improvements, are indicated, at a cost of some hundreds of thousands of pounds.

It is now announced that the great dock work at Newport has so far advanced that the new lock will be opened next July. This is 1,000 ft. long and 100 ft. wide, and gives a new deep-water entrance.

The South Wales District Joint Board, established under the Minimum Wage Act, sat in Cardiff on Monday and Tuesday to deal with notices from both sides, seeking variation of the award made by Lord St. Aldwyn (the independent chairman) last year. From the owners' representatives, one demand had relation to freedom in moving a pieceworker to another place when his original place proved unsatisfactory and prevented his earning the minimum rate. The workmen's representatives sought classification of several additional grades of men—pumpmen, underground banksmen, sheavemen, roller-men, &c.—and in particular for advance in the minimum rates.

For colliers and timbermen, they desired to abolish the different status of day and piecework men, the former now having a base wage of 4s. 3d., whilst the latter have 4s. 7d., the desire being that 4s. 7d. should apply to both sections. The owners, however, considered that the distinction should be maintained, one reason being that it offered an inducement for men to bring their abnormal places back to normal again, so much depending upon the men themselves in that respect. They wished to retain the inducement for coal hewers to continue on piecework.

The figures would be plus percentages; so that the collier's full pay would total 7s. 4d., the existing percentage being 60 above the standard (the maximum).

From the employers' side, it was argued that the independent chairman had no power to advance wages, his function being limited to establishing the minimum upon "the average daily rate" of the different classes of workmen in the district.

To this the men retorted that the rates fixed were subject to revision; and that inasmuch as the previously-existing lowest rates had been extinguished under the last award, the "average" daily rate must to-day be higher, and therefore an advance was due.

As to colliers, they pointed out that the average last year (when the award was made) was 8s. 12d. The minimum (plus percentages) worked out for piecework colliers at 6s. 10½d. per day, and for day-wage men at 6s. 4½d., and there were nearly 19,000 men who had been originally below the piecework minimum of 6s. 10½d. But, as those had now been raised, it made 3½d. per day difference on the average—so that the average was at present 8s. 470d. as against the previous 8s. 12d. Colliers were, it was contended, entitled to increase on that basis alone.

Where a collier is called upon to do other work, the demand was that he should have the collier's minimum, and not that of the class he was temporarily working with. Seven days out of every three months, a collier may be required to assist with hauliers or others; and, under the award, he is now entitled only to the rate for that class. Lord St. Aldwyn decided against the men on this point.

His lordship also decided against the men upon their application as to the bonus turn. This they wished to have fixed at the minimum rate, the employers having been paying at the old rate which prevailed before the Act came into force.

The owners seek to have amendment made in the rule which permits a collier to pay his helper, in certain circumstances up to 6d. a day above the standard of

The question as to "average" came up, in reference to the case which has been in the High Court (as already reported) wherein judgment was given to the effect that Rule 7, prescribing a fortnight, is *ultra vires*. Averaging being an admitted necessity, it is probable that the question will come before the Conciliation Board, the two sides agreeing to abide by the decision of Lord St. Aldwyn.

One more point urged from the workmen's side came in contrast to a speech by Mr. D. A. Thomas on Saturday evening, for it was to the effect that the output per man had increased from 228 tons per annum during 1911 to 250 tons per man during 1912, after allowing for the strike periods. This was attributed to the employers having expedited clearance so effectively.

A statement that has caused some comment is that of Mr. D. A. Thomas, made on Saturday at the Cardiff chartering clerks' dinner, when he said that, as compared with 25 years ago (when he first became associated with the selling agency of Cambrian collieries), they were to-day making less profit on 18s. per ton for the best Cambrian large than they made when the price was only 9s. The daily return and reports in the case of one pit that had to be signed by the manager were over a hundred; and legislation was very irritating. Then, again, the output per man in South Wales to-day was something like 25 per cent. lower than it was in 1899. It had fallen far more than in the rest of the United Kingdom.

At the same dinner Mr. J. T. Duncan, president of the Chamber of Commerce, referred to the lack of dock accommodation. He was convinced the output of coal was going to increase greatly, and that before long they would have such congestion at the docks as would compel vessels to be waiting out in "The Roads" for their turn. It took five years to build and equip a modern dock, and it was high time to wake up and face the situation. The stoppage of work in the docks at one o'clock on Saturday frequently entailed very heavy loss to the collieries, as well as to the shipowners, particularly those engaged in the coasting trade. As president of the Chamber he felt ashamed of his helplessness and hopelessness in this matter.

Mexico's civil war has had its result upon South Wales trade, increasing it by a demand for patent fuel, wherewith to replace oil. Until a comparatively recent period, the Mexican railways took a fairly large quantity of patent fuel; but about five years ago the engines were altered in order that oil might be used. Now, however, the "rebels" have possession of the oil wells, and the railway managers have to resort to patent fuel once more. Shipments are being made to Vera Cruz.

By reason of a strike of a section of men at North's Collieries, Tondur has run the risk of being entirely without gas, for the works supplying the town are connected with the collieries. The officials of the company kept up a sufficient supply for house-lighting; but the public lamps could not be supplied, and therefore the streets were in darkness.

### THE FREIGHT MARKET.

The outward freight market has been fairly active during the past week. On the north-east coast, coasting business has been done on the basis of about 3s. 6d., Tyne to London, 3s. 7½d. to 4s. to Hamburg, and 4s. 4½d. to 4s. 9d. to Havre. The Baltic is easier, at from 6s. to 6s. 3d. to Riga. The Bay is substantially unaltered, at 5s. 3d. to Bordeaux. Mediterranean rates are comparatively low, at from 7s. 3d. to 7s. 6d. to Genoa. At South Wales there has been a very fair volume of chartering, but business is now quiet, with a slow demand and stems difficult to arrange, while rates in all directions have a drooping tendency. Exceedingly little has been done at the Humber. The Clyde is very quiet, with rates tending downwards. Homewards, New York advices report a slow market, with tonnage offering largely in excess of requirements. Rates in most directions are little altered, however, holders holding out for full recent figures. The cotton and grain trades are quiet, whilst time-charter tonnage meets a moderate request at late figures. Case-oil tonnage for forward positions has been taken up on a considerable scale at rates favouring owners. At the Black Sea, rates favour shippers. The Danube and Azof are slow and easy. The Mediterranean and ore trades are steady. The Baltic is firm. The Eastern market is fairly steady, but quiet. There is an improved enquiry at the River Plate, especially for February loading. Australia is dull and unaltered.

Tyne to Algiers, 3,200, 6s. 6d.; 2,800, 6s. 7½d., from Dunston; 2,600, 6s. 3d.; 600, 2,700, 6s. 6d.; Almeria, 1,100, 8s.; Barcelona, 2,700, 8s. 3d., from Dunston; 2,000, 8s.; Bas-Indre, 2,800, 5s. 6d.; Bordeaux, 4,000, 5s. 3d.; 2,200, 5s. 6d., 500, from Dunston; Bruges, 1,000, 5s.; Cetta, 2,500, 8s. 6d.; 2,500, 8s.; Cork, 2,600, 5s. 3d.; Gibraltar, 2,200, 7s.; 2,000, 6s. 6d.; 2,800, 6s. 6d.; Genoa, 5,000, 7s. 6d.; 3,600, 7s. 6d., from Dunston; 6,000, 7s. 3d.; Havre, 2,200, 4s. 6d., from Dunston; 2,000, 4s. 4½d.; 1,150, 4s. 9d.; Hamburg, 2,000, 3s. 9d.; 2,600, 3s. 7½d.; 1,400, 4s.; 2,000, 4s.; Kallundborg, 1,000, 5s. 7½d.; Kiel, 1,600, 5s. 3d.; Las Palmas, 5,000, 7s. 9d.; London, 2,400, 3s. 6d.; 1,400, 3s. 6d.; Marseilles, 5,800, 7s. 3d., 700, from Dunston; 4,600, 7s., from Dunston; Oran, 4,500, 6s. 3d.; 4,000, 6s. 6d., 400; Odessa, 6,800, 8s. 6d., January; Oporto, 900, 9s. 3d.; Palermo, 1,600, 8s. 6d.; 1,600, 8s. 9d.; Port Said, 4,500, 7s. 6d.; Piræus, 4,200, 8s.; Pozzuoli, 2,400, 8s. 6d. coal, 9s. 6d. goods; Riga, 2,500, 6s. 3d.; 2,300, 6s.; Savona, 1,700, 7s. 3d.; Toulon, 2,000, 8s. 6d.; Venice, 4,900, 8s. 9d., 500.

Cardiff to Algiers, 2,000, 8 fr., end December; 2,700, 8½ fr., December 15; 4,000, 8 fr.; 2,200, 8 fr.; Barcelona, 2,700, 8s. 6d.; Bordeaux, 3,500, 6 fr.; 3,000, 6 fr.; Campana, 4,600, 14s. 6d.; 3,200, 14s. 3d.; 5,200, 14s. 3d.; Caen, 1,600, 5s.; Cadiz, 1,500, 7s. 4½d.; 1,450, 7s. 3d., December 20; 1,250,

7s. 3d., early January; Colombo, 5,000, 10s. 6d., end December; Genoa, 4,200, 7s. 9d., December 15; 6,800, 7s. 6d.; 5,500, 7s. 6d.; 4,300, 7s. 9d.; 3,800, 7s. 9d., December 15; 4,200, 7s. 7½d., December 15; 5,000, 7s. 9d.; 4,400, 7s. 9d.; 5,000, 7s. 4½d., December 15; 5,000, 7s. 3d., December 15; 7,500, 7s.; 2,700, 7s. 9d., December 20; 7,000, 7s.; Havre, 2,000, 4s. 6d.; 1,500, 4s. 7½d.; 2,800, 4s. 7½d., December 15; Honfleur, 2,200, 5s.; Islands, 1,800, 7s. 9d.; 8s. 3d., December; Leghorn, 4,500, 8s. 4½d., 500; 5,300, 7s. 6d., December 15; 4,600, 7s. 10½d.; 6,800, 7s. 6d.; 3,200, 7s. 6d., December 15; Lisbon, 2,800, 5s. 6d., 500, December 17; La Pallice, 2,900, 5½ fr.; 2,400, 5½ fr.; monthly cargoes over 1914 of about 3,000-3,320, 5½ fr., with options; Las Palmas, 1,800, 7s. 9d.; 2,200, 8s. 3d.; 1,700, 7s. 3d., end December; Madeira, 2,200, 8s. 3d.; 1,800, 7s. 9d.; Morlaix, 550, 6s. 3d.; Malta, 2,000, 7s.; Maddalena, 7,200, 8s., December 15; Marseilles, 4,700, 9½ fr.; 3,800, 9½ fr., December 15; 5,800, 9 fr.; 4,800, 8½ fr.; 5,300, 9 fr.; monthly voyages over 1914 at 887½ fr.; 937½ fr. for 2,000 tons, December; Monte Video, 4,500, 13s. 6d., January; Naples, 4,500, 8s. 4½d., 500; 4,600, 7s. 10½d.; 2,800, 7s. 9d., 800; Nantes, 1,700, 6½ fr.; monthly cargoes of about 3,000-3,320, 5½ fr., over 1914, with options; Port Said, 5,300, 8s., December 22; 5,200, 8s. 3d.; 5,200, 8s., December 13; Piræus, 4,700, 8s. 3d., December 14; Port Sudan, 5,400, 11s., December; Palermo, 5,800, 7s. 9d.; River Plate, 6,000, 14s. 9d., fuel; 5,000, 14s. 6d., reported; 5,800, 14s. 6d.; 5,800, 14s., December 29; Rosario, 4,600, 15s. 6d., fuel; 4,600, 15s.; 5,200, 14s. 6d., December 22; 3,200 14s. 9d., January 1; Rio de Janeiro, 5,000, 14s. 6d., December 22; 14s. 6d., December; Reggio, 8s. 6d., December; Rochefort, 1,800, 6½ fr.; monthly cargoes of about 3,000-3,320, 5½ fr., over 1914, with options; Rio Grande do Sul, 15s., December; Savona, 5,300, 7s. 6d., December 15; 3,500, 7s. 9d.; 4,200, 7s. 9d., December 15; 7,500, 7s.; 6,800, 7s. 6d.; 2,700, 7s. 9d., December 20; 4,300, 7s. 9d.; 4,200, 7s. 7½d.; 4,400, 7s. 9d.; 5,000, 7s. 9d.; Spezzia, 4,000, 7s. 9d.; 7,500, 7s.; 5,300, 7s. 6d., December 15; 6,800, 7s. 6d.; St. Paul de Loanda, sail, 17s. 6d., December-January; St. Servan, 2,400, 4s. 9d.; 2,400, 4s. 10½d.; Suez, 5,400, 11s., December; St. Malo, 2,000, 4s. 9d.; St. Nazaire, monthly cargoes of about 3,000-3,320, 5½ fr., over 1914, with options; Tunis, 3,500, 10½ fr. and 11½ fr.; Venice, 5,500, 9s., December 18; Valencia, 2,700, 7s., 96 tax; 1,300, 7s. 1½d., free tax; Villa Constitucion, 4,600, 14s. 6d.; 5,200, 14s., December 22.

Newport to Sicily, 4,000, 7s. 9d., 400; Algiers, 2,000, 8 fr.; 3,200, 8 fr.; 8½ fr., December; Palermo, 4,000, 7s. 9d.; Messina, 4,000, 7s. 9d.; Catania, 4,000, 7s. 9d.; Genoa, 7s. 6d., December; Savona, 7s. 6d., December; Spezzia, 7s. 6d., December; Leghorn, 7s. 6d., December; Marseilles, monthly voyages over 1914 at 887½ fr.; 2,000, 9-37½ fr.; St. Paul de Loanda, sail, 17s. 6d., December-January; Naples, 4,300, 7s. 6d., 800.

Birkenhead to Alexandria, 4,800, 8s., December 15.

Port Talbot to Genoa, 4,800, 7s. 9d.; Trouville, 950, 5s. 6d.; Oran, 1,350, 9 fr. coal, 10 fr. fuel, 350; Morlaix, 580, 6s. 3d.

London to Buenos Ayres, 2,500, 19s. 6d., cement. Swansea to Venice, 4,500, 9s. 3d.; Naples, 2,100, 8s. 3d.; Alicante, 1,200, 8s.; Bordeaux, 2,100, 7 fr.; 1,900, 6½ fr.; Rouen, 1,200, 6s.; Honfleur, 680, 5s. 9d.; Dover, 1,800, 4s. 7½d.; Port Said, 1,500, 8s. 9d.; Genoa, 1,800, 8s. 6d.; 3,300, 7s. 9d., December 19; Algiers, 4,000, 8½ fr. coal, 9½ fr. fuel; Rochefort, 1,000, 7 fr.; 7 fr. coal, 7½ fr. fuel; Stockholm, 1,800, 6s., end December; Norresundby, 1,300, 5s. 9d.; Leghorn, 1,500, 8s. 6d.; Barcelona, 1,500, 8s. 3d.; Oran, 2,000, 9 fr.; Calais, 1,300, 5s. 3d.

Hull to Lisbon, about 2,000, 6s. 4½d., 350; Oporto, 1,000, 9s. 6d. coal, 14s. 6d. coke.

Blyth to Alexandria, 5,000, 8s. 4½d.; Varna, 4,000, 9s.; Salobrena, 1,500, 10s. 3d.; Riga, 2,500, 6s. 3d.; 3,600, 5s. 3d.; Odessa, 6,500, 8s. 6d., January; Hamburg, 2,500, 3s. 9d.; Kiel, 1,600, 5s. 3d.

Hartlepool to Leghorn, 4,500, 8s., 500; London, 2,400, 3s. 6d.; Kallundborg, 1,000, 5s. 7½d.; St. Nazaire, 1,800, 5s. 1½d., 600, 5s. 3d., 500.

Partington to Novorossisk, 9s. 6d., December.

Fowey to Rouen, 1,000, 6s. 9d., china clay; Garston, 400, china clay, 6s. 6d., free dues; Runcorn, 450, 6s. 3d.

Newport River to Algiers, 2,200, 9½ fr.; 500, fuel, December; Barcelona, 2,100, 9s. 3d., fuel.

Burntisland to Skien, 725, 6s.; Rio de Janeiro, 4,400, 14s. 6d.

Fife port to Nakskov, 1,200, 5s. 6d.; Rendsburg, 1,600, 5s. 4½d.; Libau, 2,600, 5s. 4½d.; Odense, 2,600, 4s. 10½d.; Fredericia, 800, 5s. 6d.; Brest, 700, 7s.; Trieste, 3,500, 9s.; Kiel, 5s. 1½d.; Eckernfjord, 1,500, 5s. 3d.; Porto Ferrajo, 6s. 1½d.

Immingham to La Pallice, 1,100, 5s. 3d.

Hamburg to Charleston, 6,000, 9s. 9d., kainit; Brunswick, 4,200, 10s. 3d., kainit; Savannah and Wilmington, 3,400, 10s. 6d., kainit.

Goole to Antwerp, 900, 4s. 9d.

Grangemouth to Hamburg, 2,200, 4s. 6d.

Glasgow to Riga, 2,000, 6s.; Genoa, 3,000, 7s. 3d.; Bayonne, 3,000, 7 fr.

Wear to Algiers, 3,200, 6s. 6d., 600; Bordeaux, 4,000, 5s. 3d.; Aalborg, 1,400, 5s.

Emden to Algiers, 3,400, 8½ fr.

Rotterdam to Marseilles, 4,000, 9 fr. steam coals, 10 fr. fuel, December 15; Piræus, 4,500, 8s. 3d. steam coals, 9s. fuel; Barcelona, 3,200, 8s. 3d. steam coals, 9s. fuel; Porto Vecchio di Piombino, 5,800, 6s. 7½d.; Genoa, 4,500, 7s. 3d., December 16-17; Bagnoli-Porto Ferrajo, 6,800, 6s. 9d., December 20; 5,800, 6s. 1½d., December 17-18; Malta, 5,200, 6s. 4½d., December 13; Marseilles, 5,600, 8½ fr.; Port Said, 5,200, 7s. 7½d.

Bo'ness to Gibraltar, 6s. 6d.

Cardiff, Glasgow, Liverpool, Manchester (three ports), to Bombay, 21s., December.

Granter co Oporto, 1,500, 9s. 3d.

Mersey to Reval, 2,300, 5s. 3d., 400.

Troon to Genoa, 2,500, 7s. 9d.

Forth to Karrabeksminde, 1,600, 5s. 1½d.; Aalborg, 1,300, 5s. 1½d.; Fredrikshaven, 800, 5s. 7½d.; Libau, 1,500, 5s. 3d.

Wales to Callao, sail, 20s.; South Georgia and home to United Kingdom-Continent, sail, 39s. on d.w.; West Coast South America and home to United Kingdom-Continent, sail, 40s. on the round, fuel out, December-January.

Homeward charters.—Kherson, 5,200, L.H.A.R., 9s, option Kherson and Odessa 9s. 3d., in case of ice to complete at Odessa at 6d. less, ppt.; Japan, 2,393 net, New Zealand, 16s., December; Baltimore, 4,700-5,200, Algiers, 12s. 3d.,



EXPORTS OF COAL, COKE, AND MANUFACTURED FUEL FROM THE UNITED KINGDOM

During November and the first eleven months of 1911, 1912 and 1913.

To	November, 1913.						November.					
	Coal—Small.		Coal—Through-and-through (unscreened).		Coal—Large.		All coal. Quantity (tons).			All coal. Value (£).		
	Tons.	£	Tons.	£	Tons.	£	1911.	1912.	1913.	1911.	1912.	1913.
Russia .....	39,376	21,471	6,466	4,321	333,595	238,977	192,752	230,544	379,347	104,849	147,193	267,772
Sweden .....	79,593	45,104	36,980	21,541	287,962	198,482	356,048	421,431	404,540	185,961	260,197	268,127
Norway .....	67,313	34,597	8,898	5,473	131,555	90,004	190,718	250,621	207,766	89,266	150,913	130,974
Denmark .....	75,834	45,385	52,797	36,746	161,339	78,793	270,348	236,323	244,970	136,239	174,437	160,924
Germany .....	249,953	147,488	250,415	117,907	176,706	115,415	853,625	785,036	677,074	399,198	423,709	410,810
Netherlands .....	61,963	35,846	58,632	33,527	38,015	25,900	182,410	235,685	157,610	89,651	139,513	100,273
Belgium .....	77,247	37,786	38,181	23,688	46,663	31,838	135,524	149,920	162,091	61,279	78,350	93,312
France .....	407,572	212,601	257,442	161,889	366,413	282,813	862,612	1,086,703	1,031,427	474,547	650,489	657,303
Portugal, Azores, and Madeira .....	20,872	12,031	15,821	10,432	65,023	52,588	90,852	146,930	101,724	57,182	98,992	75,051
Spain and Canaries .....	33,685	26,826	90,251	64,233	142,813	116,645	254,174	350,676	280,749	155,597	240,769	207,704
Italy .....	134,773	60,696	179,320	117,645	470,042	376,705	776,070	873,867	784,135	488,937	573,999	555,046
Austria-Hungary .....	13,299	7,778	15,235	10,131	49,532	41,055	69,122	41,074	78,066	34,827	23,581	58,964
Greece .....	8,088	5,119	20,905	12,879	46,580	39,558	55,883	79,468	75,537	30,411	65,620	57,556
Turkey .....	2,825	1,915	18,932	11,934	39,399	32,475	23,631	5,983	61,156	19,303	4,052	43,324
Egypt .....	23,823	12,608	54,082	35,508	237,390	186,644	257,181	261,939	315,390	162,018	180,313	234,760
Algeria .....	24,911	13,979	41,976	26,472	46,945	37,230	91,200	125,962	113,832	49,464	76,958	77,681
United States of America .....	—	—	—	—	150	192	699	1,311	150	517	866	192
Chile .....	95	95	—	—	48,957	40,976	33,122	30,451	49,052	24,757	24,619	41,071
Brazil .....	4,508	4,360	5,053	3,011	128,410	114,879	152,719	182,435	137,971	116,247	148,591	122,250
Uruguay .....	1,754	1,470	—	—	54,285	46,540	109,844	62,074	56,039	84,257	49,356	48,010
Argentine Republic .....	16,731	13,642	—	—	273,531	230,886	292,541	343,594	290,262	221,210	268,207	244,528
Gibraltar .....	4,146	2,181	7,669	5,070	29,082	23,642	16,889	31,815	40,897	8,872	21,692	30,893
Malta .....	10,335	4,943	7,373	4,905	55,352	45,516	44,123	64,460	73,060	28,297	46,012	55,364
British South Africa .....	328	230	—	—	1,010	836	3,371	6,111	1,338	2,622	4,351	1,086
„ India .....	874	652	—	—	11,081	8,892	32,756	1,432	11,955	20,952	1,046	9,544
Straits Settlements .....	158	246	—	—	—	—	6,520	497	158	5,666	741	246
Ceylon .....	697	314	—	—	14,723	11,457	29,540	18,299	15,420	21,915	14,646	11,771
Other countries .....	9,998	8,301	8,265	5,374	143,179	120,273	153,631	122,699	161,742	111,648	89,828	133,948
Total { Anthracite .....	119,546	79,817	—	—	136,413	120,929	243,684	268,098	255,959	196,535	227,296	200,746
Steam .....	1,023,670	537,710	300,080	186,686	2,993,712	2,314,614	4,032,455	4,529,410	4,322,462	2,366,440	2,925,942	3,039,010
Gas .....	71,969	41,972	746,202	478,637	118,658	82,871	921,458	958,261	936,829	452,852	542,781	603,480
Household .....	48,001	30,251	8	6	92,120	64,187	115,461	156,401	140,129	62,508	95,741	94,444
Other sorts .....	111,575	70,934	137,406	85,360	9,044	6,610	229,817	285,275	258,025	107,224	167,190	162,904
Total .....	1,374,761	760,684	1,133,696	750,689	3,354,947	2,589,211	5,547,905	6,197,445	5,913,404	3,185,559	3,958,950	4,100,584
Total (November 1912) .....	1,456,420	747,190	1,195,179	676,308	3,545,846	2,535,452	—	—	—	—	—	—
Total (November 1911) .....	1,235,904	540,120	1,149,982	559,381	3,162,019	2,086,058	—	—	—	—	—	—
Coke .....	—	—	—	—	—	—	110,992	125,601	126,307	80,335	107,693	108,855
Manufactured fuel .....	—	—	—	—	—	—	134,334	142,025	163,087	96,235	114,365	147,797
Total of coal, coke & manufactured fuel .....	—	—	—	—	—	—	5,793,231	6,465,071	6,202,798	3,362,129	4,181,008	4,357,236

First eleven months of 1913.

First eleven months.

Total { Anthracite .....	1,272,504	891,873	339	339	1,454,050	1,285,568	2,233,164	2,316,909	2,726,893	1,692,806	1,865,372	2,177,780
Steam .....	11,883,694	6,443,298	3,234,142	2,010,259	33,912,742	26,159,746	42,863,716	42,329,063	49,030,578	24,773,484	27,266,860	34,613,303
Gas .....	889,408	499,648	8,571,382	5,251,636	1,086,248	763,321	9,594,122	9,730,410	10,547,038	4,671,454	5,197,284	6,516,605
Household .....	494,915	305,686	2,433	1,723	1,137,987	767,149	1,374,219	1,497,808	1,635,335	721,390	892,411	1,074,563
Other sorts .....	1,438,289	900,765	1,684,515	1,038,713	108,017	76,256	2,740,134	2,873,446	3,230,821	1,307,888	1,556,732	2,015,734
Total .....	15,978,810	9,041,270	13,492,811	8,302,675	37,699,044	29,054,040	58,805,355	58,747,636	67,170,665	33,167,022	36,778,659	46,397,985
Total for eleven months of 1912 .....	13,520,612	6,734,012	12,153,349	6,484,203	33,073,675	23,560,444	—	—	—	—	—	—
Total for eleven months of 1911 .....	13,262,763	5,849,281	11,963,483	5,758,559	33,579,109	21,559,182	—	—	—	—	—	—
Coke .....	—	—	—	—	—	—	948,883	928,612	1,115,317	711,201	771,090	1,044,046
Manufactured fuel .....	—	—	—	—	—	—	1,481,829	1,394,032	1,874,952	1,040,162	1,093,160	1,624,200
Total of coal, coke & manufactured fuel .....	—	—	—	—	—	—	61,236,067	61,070,280	70,160,934	34,918,385	38,642,909	49,066,231

December; La Plata, 10s. 3d. o.c., United Kingdom-Continent, no reduction, December; Sulina or Kustendje, 5,200, Rouen, 9s. 6d., December-January; Sulina, Kustendje, Novorossisk or Theodosia, 20,000 qrs., 10 per cent., 400, 9s. n.c. or any, 9s. 6d. Hamburg, December-January; Alexandria, 1,840 net, Hull, 7s. 6d., December 10-20; Carthage, 3,800, Middlesbrough, 6s., December; 4,200, 5s. 10½d., end December; Eupatoria Coast, 5,000, Rotterdam, 8s. 9d., 3d. less barley, 500 tons oats 1s. 6d. extra, ppt.; Nicolaieff or Odessa, 7,200, Weser 8s., Hamburg 8s. 3d., with 3d. less barley, ppt.; 4,800, Rotterdam 7s. 9d., Weser 8s., Hamburg 8s. 3d., with 3d. less barley, ppt.; 5,800, ditto; Novorossisk or Theodosia, 6,000, Antwerp or Rotterdam, 7s. 6d., no reduction barley, ppt.; 7,500, 7s. 9d. one port, 8s. both ports loading, ppt.; Danube, 5,200, Rotterdam 9s. 6d., Antwerp 9s. 9d., with 3d. less barley, 1,000 tons oats 1s. 6d. extra, ppt.; 5,100, Rotterdam 9s. 3d., Antwerp 9s. 6d., with 3d. less barley up to 1,000 tons and 1,000 tons oats 1s. 6d. extra, in case of ice to load or complete at Sulina at 1s. 6d. less, ppt.; Rosario, 4,800, 10 per cent., United Kingdom Continent, 13s. o.c., no reduction direct, ppt.; Villa Constitucion, 6,000, 10 per cent., United Kingdom-Continent, 12s. 6d. o.c., no reduction direct, December; Bahia Blanca, 7,000, 10 per cent., United Kingdom-Continent, 14s. 6d. o.c., less 6d., January 15-February 15; Sydney, N.S.W., 6,000, 10 per cent., United Kingdom-Continent, 31s. 6d., January; Bombay, 3,149 net, Japan, 12s. one port, 12s. 6d. two ports, December; 2,448 net, United Kingdom-Continent, 18s. 6d. one port, 19s. two ports, on d.w., December-January; Kurra-chee, 7,000, London, 15s. 9d., December; La Goulette, 5,000, Rotterdam, 7s. 9d., ppt.; Benisaf, 4,300, Middlesbrough, 7s. 1½d., option Tyne Dock 6s. 10½d., January; Vivero, 3,300, Rotterdam, 4s. 6d., 1,000-1,000, December 12-22; Riga, 900 stds., Manchester, 29s., d.b. and b.; time charter, States and West Indies, 3s. 9d., four months; time charter, Spanish fruit trade, £400, three months; South Australia, Melbourne, Geelong or Sydney, N.S.W., 30s.; Hull, option Barcelona 31s. 3d., January-February; nitrate ports, 24s., United Kingdom-Continent; Portland, Me., to Avonmouth, 2s. heavy grain, 1s. 9d. barley, 1s. 6d. oats, January; Nicolaieff, 5,090, London or Rotterdam, 7s. 9d., with 1,500 tons oats 1s. 6d. extra, ppt.; Sulina, 3,600-3,850, 9s. n.c. or any, 9s. 6d. Elbe, December 10-20; 5,100,

Rotterdam 7s. 6d., Antwerp 7s. 9d., ppt.; 2,500, 10 per cent., Belfast, 9s. 6d., heavy barley; Marbella, 2,300, Port Talbot, 6s., ppt.; Porman, 2,500, Antwerp, 9s. 6d., zinc ore, ppt.; Calcutta, 5,200, Colombo, Rs. 4, January; 3,459 net, Rs. 4, December-January; Madras Coast, 2,881 net, Marseilles, 25s. 9d., option 750 tons unshelled 20s. extra, February-March; Huelva, 3,600, New York, Philadelphia or Baltimore, 9s., 250-250, Tinto terms, end December; 4,600, Rotterdam, 5s. 6d., Tinto terms, January; 5,000, do., do.; 2,400, Antwerp, 8s., f.d., December; Pomaron, 1,400, Nantes, Chantenay or Granville, 7s. 1½d., January; Gulf, two ports, 1,713 net, United Kingdom-Continent, 35s. one p.p., 36s. 3d. two p.p., December; San Lorenzo, not above, 4,400, 10 per cent., United Kingdom-Continent, 13s. 6d. o.c., less 6d., January 1-20; 13s. 6d., no reduction, January 1-31; 4,400, 10 per cent., 15s. 6d. o.c., less 6d., February; 4,500, 10 per cent., 14s. o.c., less 6d., days, January 5; 15s. 7½d. o.c., half seed 6d. extra, balance 1s. more, Feb. 1-28; Kustendje, 3,000, East Coast U.K., 8s. one port, 8s. 6d. two ports, end Dec.; Hornillo Bay, 3,600, Newport River, 5s. 9d., option Alexandra Dock 5s. 6d., December; Torrevieja, 5,000 max., Calcutta 9s. 6d., January-February; Rivadesella, 1,100, Middlesbrough, 6s. 6d., December 20; Villaricos, 5,000, Rotterdam 5s. 9d., ppt.; Genoa, 5,300, Oslebshausen, 6s. 6d., ppt.; Bilbao, 2,300, Newport, 4s. 9d., December; 2,800, West Hartlepool, 4s. 9d., ppt.; Philadelphia, Baltimore, &c., 6,000, San Diego, 440 dols., Government form, December 15-January 31; Port Pirie, 3,052 net, Antwerp 29s., February; time charter, South American trade, 3s. 9d., one round trip, delivery Antwerp, re-delivery United Kingdom-Continent; nitrate ports, 24s., United Kingdom-Continent; La Falaie, 3,800, Barrow, 7s. 10½d., end December; Santander, 1,500, Oslebshausen, 6s., ppt.; Nicolaieff, 5,700, London or Rotterdam 7s. 9d., Emden or Weser 8s., Hamburg 8s. 3d., with 3d. less barley, December; Nantes, 2,100-2,200, Grangemouth, 3s. 9d., December 16; Australia, 3,932 net, United Kingdom-Continent, 30s., February; Kohsichang, 6,000-7,000, United Kingdom-Continent; 25s. one p.p., 25s. 9d. two p.p., cleaned rice, February; Poti, 4,800, Middlesbrough, 9s. 9d., December; 4,400, London or Rotterdam 7s. 9d., Emden or Weser 8s., Hamburg 8s. 3d., with 3d. less barley, ppt.; Kustendje or Bulgaria, 5,900, Antwerp or Rotterdam, 7s. 9d. one port, 7s. 10½d. two ports,

8s. three ports loading, 3d. less barley, ppt.; South Australia, sail, 30s. 6d., United Kingdom-Continent; 25s. 6d.; Delagoa Bay, 12s. 6d., New Zealand; St. John, N.B., 35s., Glasgow, part cargo of 750 stds.

**Shipment of Bunker Coals.**—The quantity of coal, &c., shipped during the month of November for the use of steamers engaged in the foreign trade was 1,755,090 tons, as compared with 1,714,064 tons in November 1912 and 1,679,141 tons in November 1911. The aggregate so shipped during the first 11 completed months of the present year was 19,189,501 tons, as against 16,734,586 tons and 17,696,757 tons in the corresponding periods of 1912 and 1911 respectively.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—E. C. Strong and H. Rossell and Co. Limited, carrying on business as manufacturers and dealers in drills, at Hope Works, Sussex-street, Sheffield, under the style of The Strong Twist Drill Company; Ellen C. Woodward and Agnes Withers, carrying on business as metal workers and enamellers, at Johnson-street, London, under the style of the Misses Woodward and Withers; F. W. Hirst and T. Waller, carrying on business as engineers, at Lees-street, Ancoats, Manchester, under the style of Thomas Walker and Co.; S. Heath and T. Beach, carrying on business as sheet metal workers, at Linacre-street, Oldham-road, Manchester, under the style of the Economic Manufacturing Company; T. Moberley and W. Ernest Boaler, carrying on business as hollowware manufacturers, at Lye, under the style of Hill and Boaler; E. G. Cox, of Sowood-road, Ossett, Yorks, and S. Cox, of Thornes-road, Wakefield, carrying on business as iron-mongers, at Market-place, Ossett, under the style of Cox Brothers.



## COAL AND COKE EXPORTED FROM PORTS IN ENGLAND, SCOTLAND AND WALES

During the month of November 1913, compared with the corresponding month of 1912.\*

Port.	November 1913.		November 1912.		Coals.		Coke.	
	Coals.	Coke.	Coals.	Coke.	Increase.	Decrease.	Increase.	Decrease.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle	854,902	20,062	892,307	20,600	—	37,405	—	538
North Shields	70,639	446	72,379	—	—	1,740	446	—
South Shields	137,824	261	147,879	932	—	10,055	—	671
Sunderland	227,954	1,387	267,826	4,822	—	39,872	—	3,435
West Hartlepool	95,787	1,998	101,473	1,669	—	5,686	329	—
Goole	103,667	2,843	102,083	2,778	1,584	—	65	—
Blyth	308,590	1,215	291,145	590	14,445	—	625	—
Newport	384,684	1,667	410,081	1,611	—	25,397	56	—
Liverpool	44,033	1,383	42,045	461	1,988	—	922	—
Methil	226,836	330	194,287	2,175	32,549	—	—	1,845
Glasgow	146,641	1,716	156,096	4,587	—	9,455	—	2,871
Kirkcaldy	9,076	—	11,481	—	—	2,405	—	—
Burntisland	117,279	3,049	146,379	1,603	—	29,100	1,446	—
Cardiff	1,506,945	5,668	1,706,844	5,688	—	199,899	—	20
Borrowstoness	32,897	1,365	42,602	1,570	—	9,705	—	205
Llanelli	13,355	—	16,989	—	—	3,634	—	—
Middlesbrough	1,470	1,719	971	3,389	499	—	—	1,670
Seaham	81,692	—	80,956	—	736	—	—	—
Swansea	291,307	497	292,250	1,837	—	943	—	1,340
Granton	10,859	2,606	12,108	2,627	—	1,249	—	21
Port Talbot	131,456	—	172,273	—	—	40,817	—	—
Alloa	9,251	—	13,360	—	—	4,109	—	—
Grangemouth	137,422	7,855	113,603	10,649	23,819	—	—	2,794
Neath	—	—	14,908	—	—	14,908	—	—
Hull	383,572	6,673	331,259	7,025	52,313	—	—	352
Amble	39,867	—	43,330	—	—	3,463	—	—
Troon	4,852	—	9,023	—	—	4,171	—	—
Grimsby	70,472	1,989	101,314	274	—	30,842	1,715	—
Ayr	10,621	—	7,959	—	2,662	—	—	—
Greenock	1,028	—	—	—	1,028	—	—	—
Leith	127,364	—	169,929	—	—	42,565	—	—
Ardrossan	10,467	—	5,399	—	5,068	—	—	—
Stockton	—	—	—	—	—	—	—	—

## COAL AND COKE SHIPPED FOR LONDON AND OTHER PORTS IN THE UNITED KINGDOM.\*

Port.	November 1912		November 1913.		Port.	November 1912		November 1913.	
	Coals.	Coke.	Coals.	Coke.		Coals.	Coke.	Coals.	Coke.
	Tons.	Tons.	Tons.	Tons.		Tons.	Tons.	Tons.	Tons.
Newcastle	455,596	790	371,722	772	Ayr	62,884	—	54,085	—
North Shields	2,837	—	86	—	Irvine	5,068	30	4,855	—
South Shields	5,282	—	—	—	Alloa	630	—	1,555	—
Blyth	32,099	—	28,770	—	Whitehaven	19,317	—	17,809	—
Amble	6,453	—	6,244	—	Liverpool	161,106	—	140,540	212
Sunderland	136,441	—	118,538	—	Grimsby	2,937	—	3, 50	—
Seaham	83,536	—	78,044	—	Granton	18,602	—	21,049	—
Hartlepool	64,209	15	61,750	—	Borrowstoness	13,265	—	11,861	—
Stockton	—	—	—	90	Burntisland	50,015	—	18,815	—
Middlesbro'	6	130	—	—	Kirkcaldy	683	—	2,179	—
Hull	126,537	—	64,251	500	Methil	20,390	—	29,712	—
Goole	130,982	—	129,632	—	Port Talbot	18,510	400 p.f	10,638	90c 1389 p.f.
Swansea	23,795	350	32,160	—	Glasgow	32,834	725	25,079	520
Cardiff	233,227	2,350	231,651	60	Grangemouth	13,904	—	14,455	600
Llanelli	3,342	—	4,873	—	Greenock	1,004	360	744	—
Newport	63,489	29	48,025	—	Neath	8,186	—	—	—
Troon	17,189	—	16,471	—	Leith	4,294	—	4,335	16
Ardrossan	2,153	—	4,081	—					

\* From Browne's Export List.

## COAL, IRON AND ENGINEERING COMPANIES.

**Alldays and Onions Pneumatic Engineering Company Limited.**—The report for the year to August 2 last states that the result of the year's trading (after providing for depreciation and all other outgoings) is a net profit of £18,436, to which is added £20,097 brought from the last account, making a total of £38,533. The directors recommend:—Dividend on preference shares at the rate of 6 per cent. per annum for the six months ended July 31, £1,500; dividend on ordinary shares at the rate of 5 per cent. per annum for the year ended July 31, less interim dividend paid April 1, £1,125; bonus on ordinary shares at the rate of 5 per cent. per annum, £2,250; transfer to reserve fund for contingencies and equalisation of dividends, £10,000; balance to be carried forward, £17,443.

**Australian Coking and By-products Company Limited.**—The report for the year ended September 30 last states that construction of works at Islington, Newcastle, New South Wales, proceeded during the year, but progress was slow over part of the year owing to prolonged bad weather, accompanied with floods, seriously affecting deliveries of bricks manufactured locally, and to heavy breakages of firebricks from Europe, on account of which the company claimed and obtained compensation. Notwithstanding the delays the works, comprising 48 coke ovens, complete with storage bunkers and washery plant, by-product plant, railway sidings and railway wagons, were completed within a few weeks of the close of the financial year. From the latest cabled information from Australia coke is now being produced and the by-products recovered. So far as the directors are in a position to estimate, the final accounts covering erection expenses having not yet arrived from Australia, the works, including certain equipment not provided for in the original estimates, will be erected within the estimated cost as shown in the prospectus.

**Bayliss, Jones and Bayliss Limited.**—The directors recommend a dividend of 5 per cent. on the ordinary shares for the year, allowing £10,098 for depreciation, placing £5,000 to reserve for equalisation of preference dividends, and carrying £12,758 forward.

**Bissell (G. E.) and Co. Limited.**—This private company has been registered, with a capital of £4,000 in £1 shares, to acquire the businesses of George Ernest Bissell and Chas. Wilkins, now carried on at Crown Works, Malt Mill-lane, Blackheath, Staffs., and at 148, Conybere-street, Birmingham, under the styles of G. E. Bissell and Co. and Charles Wilkins and Co., respectively, and to carry on the business of manufacturers of steel, iron and other metals, and of ironwork for electrical and other purposes; also to agree with G. E. Bissell and C. Wilkins. Registered office: Crown Hill-lane, Blackheath, Staffs.

**Briquet Limited.**—This private company has been registered, with a capital of £4,000 in £1 shares (1,750

preference), to acquire the invention of improved perforated, smokeless coal briquettes, together with the British Patent No. 26692, and all improvements as a substitute for coal, and to carry on the business of coalmasters, ironmasters, ironfounders, and coal dealers, &c.; also to enter into an agreement with Henry Faraday. First directors include: Stanley Lingard, 22, Booth-street, Manchester, and F. F. Page, 32D, Brown-street, Manchester.

**Bristol Wagon and Carriage Works Company Limited.**—Interim dividend on the called-up capital of 2 per cent., free of income tax, for the half-year to September 30.

**Brynmelyn Quarry Company Limited.**—This private company has been registered, with a capital of £3,000 in £1 shares, to carry on the business of quarry owners, formerly carried on by Joseph Llewellyn and W. E. Evans, at Swansea Valley; and to carry on the business of colliery proprietors, &c.; also to enter into an agreement with J. Llewellyn and W. E. Evans, who are included in the first directors. Registered office, 32, Woodfield-street, Morriston, Swansea.

**Cammell, Laird and Co. Limited.**—Applications have been invited for an issue of £500,000 5 per cent. first mortgage debenture stock, of which £344,390 has been agreed to be taken by holders of the existing £500,000 4 per cent. first mortgage debentures in exchange, at par, for their holdings of such debentures, and the balance, £155,610, being offered for subscription at par. The 4 per cent. first mortgage debentures not agreed to be exchanged, which become due on December 31, 1913, will be repaid out of the proceeds of the present offer. The stock will be due and repayable at 103 on July 1, 1930, with power to the company to redeem at 105 at any time on six months' notice. The average annual profits for the past three years, after allowing for depreciation, have amounted to £253,623.

**Cast Iron Braziers and Metallurgists Limited.**—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire the business of a cast iron brazier, now carried on at 2, Gough-street, Elm-street, Gray's Inn-road, Holborn, E.C., and to carry on the business of ironfounders, mechanical engineers, brass-founders and metallurgists, &c.; also to enter into an agreement with Count Callamachi.

**Cheneau Nut Lock Company Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire all the rights and interest of an invention called the Cheneau nut lock from Jean Cheneau, and to manufacture same, and to carry on the business of iron and brass founders, &c.; also to enter into an agreement with Jean Cheneau. Registered office, Norfolk House, Laurence Pountney-hill, E.C.

**Contract Development Trust Limited.**—This company has been registered, with a capital of £25,000 (24,000 ordinary shares of £1 each and 20,000 deferred shares of

1s. each), to acquire mines and mineral properties, and to prospect for and work minerals, ores, coal and other similar substances.

**Cortonwood Collieries Company Limited.**—Further interim dividend of 2½ per cent. (6d. per share).

**Coventry Chain Company Limited.**—The directors' report shows net profits of £14,247, which, with £2,779 brought forward, makes an available balance of £17,026. The directors recommend payment of a dividend of 8 per cent. on the share capital, absorbing £6,304, transferring £7,000 to general reserve, and carrying forward £3,422.

**East Indian Coal Company Limited.**—The directors have declared a dividend at the rate of 14 per cent. for the half-year ended October 31.

**Electricals Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business of electrical and mechanical engineers, &c. Registered office, Cathedral-buildings, Dean-street, Newcastle-on-Tyne.

**Gauntletts (1913) Limited.**—This company has been registered, with a capital of £195,000 (85,000 6 per cent. participating preference shares of £1 each, and 440,000 ordinary shares of 5s. each), to acquire and carry on the business of Gauntlett Limited and the Foreign Lithographic Company Limited, carrying on business at Corbyn's Hall Works, Kingswinford, Staffs., and to carry on the business of metal workers, tin-plate makers, iron masters and founders, steelmakers and ironmongers, &c.; also to enter into agreements (1) with Gauntlett Limited and (2) with the Foreign Lithographic Company Limited. First directors: Right Hon. Viscount Cobham, Hagley Hall, Worcestershire; Major the Hon. C. Charles Guest, 20, Queen's-gate, S.W.; Harry B. Vogel, Angle House, East Molesey, Surrey; H. T. Williams, Churchill Court, near Kidderminster; J. L. F. Vogel, Parliament Mansions, Victoria-street, S.W.; and Frederick William Gauntlett, Kingswinford, Staffs.

**Kayser, Ellison and Co. Limited.**—An interim dividend on the ordinary shares of 5s. per share, free of income-tax, for the six months ending December 31.

**Martin (Ernest) and Co. Limited.**—This private company has been registered, with a capital of £5,000 in £1 shares, to carry on the business of dealers in mineral substances, and also the business of ironmasters, steel-makers, colliery proprietors, tin-plate makers, ironfounders and miners, &c. Signatories: Albert Joseph Stockton and Sidney Bourne, both of 48, Mark-lane, E.C.

**Middleburg Steam Coal and Coke Company Limited.**—The directors report for the year to June 30 last that the output of coal aggregated 294,375 tons, being an increase of 31,235 tons over the previous year. The appropriation account for the year may be summarised as follows: By balances brought forward from previous year, £16,340; by net profit from colliery for year, £19,741; by dividends, interest, rents, &c., £534; total, £36,615. To London expenses, £719; to income-tax account, £552; to royalty paid to Government, £1,146; to directors' fees and managing directors' remuneration, £900; to reserve account, £2,500; to share reserve account, £3,000; to debenture interest, £798; to dividends Nos. 13 and 14 on preference shares, £3,245; to dividends Nos 5 and 6 on ordinary shares, £7,084; leaving to be carried forward, £16,671. A dividend at the rate of 7½ per cent. on the ordinary shares on account of the profits of the year has already been distributed. It is now proposed to distribute a balance dividend of 9d. per share (less tax), making 7½ per cent. for the whole year.

**Nantyglow and Blaina Ironworks Company Limited.**—The report states that the net amount received from royalties and wayleaves for the year to September 30 was £35,522, and from rent of land and houses and other sources of income £5,237, making a total of £40,760. The directors have paid since their last report two instalments of dividends on account of arrears upon the preference shares, amounting to £30,000—namely, on April 15 £3 per share and on November 14 £3, making together £6 per share. The output of coal and other minerals has been 1,753,098 tons. The amount allowed for depreciation of the properties for the year is £4,000, which, with the income from investments, £876, has been added to reserve for depreciation account. As a result of the new lease granted by the Marquis of Abergavenny the directors have been able to enter into new arrangements of a satisfactory character with some of the principal mineral lessees.

**North Lonsdale Iron and Coal Company Limited.**—The balance-sheet for the year ending September shows that after writing off £7,500 for depreciation, there is a balance to credit of £28,073, which, with £3,427 brought forward, leaves £31,501 for distribution. The sum of £6,000 is placed to the reserve fund, and £5,000 to works renewal fund. A dividend of 10 per cent. is declared, and £3,501 is carried forward.

**Power-Gas Corporation Limited.**—The annual report of the directors states that important contracts have been secured for the installation of power-gas plant, and also contracts for the extension of existing installations. The results for the year show a total profit of £16,019 0s. 6d., to which has been added £3,131 12s. 5d. brought forward from last year's account, making altogether £19,150 12s. 11d. This the directors propose to apply as follows:—To reserve fund, £3,120; dividend at 5 per cent. per annum upon the ordinary shares, to be paid less income tax, £12,481; balance to be carried forward to next account, £3,549 12s. 11d.

**Power Gas Economy Limited.**—This private company has been registered, with a capital of £10,000 in £1 shares, to carry on the business indicated by the title, and that of tool makers, iron and brass founders, metal workers, smelters, iron and steel converters, and mechanical and electrical engineers; also to enter into an agreement with K. Huessener and Thomas Macmillan Hunter, who are the first directors. Registered office, 37, Cole Park-road, Twickenham, Middlesex.

**Threlkeld Lead Mines Limited.**—This company, which has a capital of £75,000, divided into 75,000 ordinary shares of £1 each, offer for subscription at par 50,000 ordinary shares. There are no debentures, preference, or deferred shares, consequently the entire net profits available for dividend will belong to the ordinary shareholders. The directors are:—Messrs. C. Cockson, director of Roburite and Ammenal Limited (chairman); A. D. Balmain, joint owner

Continued on page 1239.



A Prospectus has been filed with the Registrar of Joint Stock Companies, which states, *inter alia*, that The SUBSCRIPTION LIST IS NOW OPEN, and CLOSES on SATURDAY the 13th day of December, 1913.

# THRELKELD LEAD MINES, LTD.

(Incorporated under the Companies Acts, 1908 and 1913.)

SHARE CAPITAL - - - £75,000,

Divided into 75,000 Ordinary Shares of £1 each.

There are now offered for Subscription at par 50,000 Ordinary Shares of £1 each,

PAYABLE AS FOLLOWS:—

	Per Share.		Per Share.
	s. d.		s. d.
On Application	2 6	2 Months after Allotment	2 6
On Allotment	2 6	3 Months after Allotment	2 6

and the balance of 10s. per share will be called up as and when required by instalments of not exceeding 2s. 6d. per share at intervals of not less than one month between each call, and 30 days' notice of each call will be given.

There are no Debentures, Preference or Deferred Shares, consequently the entire net profits available for dividend will belong to the Ordinary Shareholders.

## DIRECTORS.

- CHARLES COCKSON**, Swindon Manor, Cheltenham, Director Roburite & Ammonal Limited, Mining Engineer, Chairman.

**ANDREW D. BALMAIN**, Fairfield, Victoria Park, Colwyn Bay, Joint Owner Cyddy Lead and Blende Mines, North Wales.

**ROBINSON JAMES HUTCHINSON, M.D., J.P.**, Challoner House, Cocker-mouth, Chairman Threlkeld Granite Company Limited and Jennings Brothers Limited.

**JOHN C. McKELLAR, J.P.**, Glasgow, Director Yorkshire Insurance Company Limited, Scotch Board.
- GEORGE SMITH MARPLE**, Coronation-buildings, Sheffield, Managing Director of Marple & Gillott Limited, Metal Merchants, Sheffield, Birmingham, Gateshead, &c.

**GEORGE RHODES, K.C., J.P.**, Allandale, Bowdon, near Manchester, Chairman Shireoaks Colliery Company Limited, and Director Bury's and Co. Limited, Sheffield.

**E. T. WILKS, C.C., F.R.G.S.**, Ashlyns, Watford, Herts, Butler, Wilks and Co., Coal Factors, Coal Exchange, London.

- BANKERS**—Barclay and Co. Limited, Lombard-street, London, and Branches.
- SOLICITORS**—Frederic W. Spink, Trinity House-chambers, Hull, and Quay-road, Bridlington, East Yorks; G. Preston Rhodes, 51, South King-street, Manchester.
- CONSULTING ENGINEER**—W. H. Borlase, J.P., M.E., M.I.M.E., Greenside Lodge, Glenridding, Westmorland, Manager of the Greenside Lead Mining Company, Limited, Patterdale.
- CONSULTING CHEMIST**—G. Watson Gray, F.I.C., 8, Inner Temple, Dale-street, Liverpool.
- AUDITORS**—J. W. Best and Co., Chartered Accountants, Sheffield.
- SECRETARY AND REGISTERED OFFICE**—E. H. Wigglesworth, A.C.I., Trinity House-chambers, Hull.

This Company has been formed for the purpose of acquiring and working the property known as the "THRELKELD MINES," which are situated about one mile and a-half from Threlkeld Station, on the Cocker-mouth, Keswick and Penrith Railway, between Keswick and Penrith, in the County of Cumberland, and abut on the County Road between Keswick and Penrith.

The mine was purchased by the late owners in 1906. The purchase price then paid for it was £11,000. Since 1906 the Books and Accounts show that over £10,000 has been expended in further development and equipment of the mine, and in machinery and plant. Since the original opening of the mine over £38,000 has been spent in development and equipment, and this Company acquires the whole of the undertaking at less than one-third of that sum, viz., £8,000 in Cash and £4,000 in Ordinary Shares.

The following is a short description of the property to be acquired:—

(a) About 16 acres 2 roods and 15 perches of land, partly freehold and partly of customary tenure, on which the whole of the fixed plant is erected.

(b) The benefit of a lease in a Take Note of three years from 1st September, 1913, carrying with it the option of renewal from time to time, granted by Henry Charles Howard, Esq., in respect of a level in the Mines known as "The Old Levels."

(c) Mining rights embracing an area of nearly 2,000 acres, comprised in a Take Note for three years, carrying with it the option of a thirty years' Lease, from date of application, granted by the Earl of Lonsdale, at a Dead Rent of £10 per annum, merging in a sliding scale of Royalties, which are exceedingly liberal, varying from 1-30th to 1-80th of the market price of the ores.

(d) Electric Power Station 100 feet long, 20 feet wide, with two Suction Gas Plants of 110 Horse-Power, two 100 Horse-Power Gas Engines with Electric Generator, 120 amps, 600 volts, also one ten ton Travelling Crane, erected in 1907 at a cost of over £7,000 (an up-to-date power plant in first-rate order). Underground, and at the surface, there are 10 Electric Motors, 5 to 40 Horse-Power each, for use in the various departments. Machinery and Electric Plant, consisting of a Pumping and Winding Engine driven by Electric motors. The Dressing Plant already erected is capable of treating 25 tons per day. A further quantity of ore dressing machinery capable of treating 70 tons per day is ready for erection on foundations of concrete already constructed. Also a considerable quantity of mining plant, with rails, tubs, shaft cages, &c.

(e) Slime Ore Dumps and Waste Gravel. There is a large tonnage of dumps at the surface, and with the proposed means of concentration these can be turned into a marketable product which should realise a substantial profit, and some 50,000 tons of spar gravel waste, which it is believed will find a ready market for concrete purposes at 2s. 6d. per ton free on rail Threlkeld Station.

On the property there is a good water supply for power purposes. The No. 1 shaft is sunk from the surface to the 20 fathoms level, and a crosscut intersects the vein. The Adit or Day Level is driven into the Saddleback range of mountains about ¾ of a mile, and from this base the upper workings have been wrought 65 fathoms in height, which produced large quantities of Lead and Blende (Zinc) ores. The previous owners devoted their attention to the sinking of the No. 2 shaft about ¾ of a mile from the mouth of the Adit Level and sunk it to a level of 30 fathoms below the adit, and also connected this shaft with the 20 fathoms level already driven north. When this was accomplished the driving of the 20 fathoms level was taken up and extended about 200 fathoms northward, which produced considerable quantities of Lead and Blende ores, and there remains in the Sole and Roof of this level a large quantity yet to be mined.

The 30 fathoms level is extended about 160 fathoms north of No. 2 shaft, and Jackson's Sump from the 20 fathoms level is connected therewith. The North Sump is sunk to the base of the 30 fathoms level, but as the level is not far enough north there is no communication effected. A level is driven south of this sump to within 28 fathoms of accomplishing this object, but the previous owners had to suspend the work before this important operation could be done. Had this work been carried out the mine would not have been stopped, as it would have given direct communication with No. 2 shaft, a most valuable section of ore ground, estimated to contain 20,000 tons of crude ore containing 15 per cent. of Lead and Blende Ores.

To save the expense of pumping, the water has been allowed to rise to the main adit level. Since the workings below such level are only of limited extent, and as the flow of water is only 5,000 gallons per hour, there will be no difficulty in restarting the pumps and drawing the water from the mine. The Engineers estimate that the mine can be freed from the standing water in seven weeks at a cost of from £500 to £700.

The lands acquired provide sufficient surface for deposit of waste, and for additions to the plant which is contemplated.

The book of Royalties shows that during the working of the mine 171,000 tons of crude ore were treated and produced 24,600 tons of Lead and Blende Ores, the approximate value being £134,500, which proves that the mine is a productive one, and particularly so as the rich portion of the main lode is increasing in length and width and assay values as it deepens. From 1906 to 1910, 15,000 tons of crude mine ore were treated and produced 1,706 tons of Lead ore and 1,328 tons of Blende ore,

which is equal to 16 per cent. extraction by the present mill.

The mine may reasonably be considered in its infancy, as the deepest explorations are only some 30 fathoms below the Adit or Day Level. In addition to the lodes mentioned, other important and promising lodes of Lead, Copper and other minerals are known to exist on the property. The ground wrought by the old Company is shown by the productions above stated to have been good ore-bearing ground, and with economical methods and improved plant the Company's working should, at the present prices, yield a good return, the marketable ore being of a very high quality, assaying fully 82½ per cent. of lead and from six to nine ounces of silver per ton of dressed ore, and the blende from 45 per cent. to 55 per cent. of zinc. The whole output can readily be disposed of.

The increasing consumption of lead for electrical work and other purposes leads the Directors to believe that good prices will continue to rule for this metal.

With the profits which may be expected in the future, the Directors believe that having regard to the advantageous position of the paying lodes, and the proved readily accessible ore, the Company will be able to hold its own with advantage, even in times of depression.

The length of ore ground in sight and sampled in the present 20 fathom and 30 fathom levels being—1,200 feet North of No. 2 Shaft, 5 feet wide and 60 feet high, gives 33,332 tons of crude ore. Taking only one half of this tonnage, viz.: 16,666 tons, carrying 7·7 per cent. Lead and 15·7 per cent. Blende, the contents are 1,283 tons Lead ore, 2,616 tons of Blende:—

Taking Lead Ore at £13 per ton. Value—£16,679  
and Blende at £5 10s. per ton. Value—£14,388

The total value being £31,067

Capital is required for the further development of the mine, and providing machinery for the more economical treatment of the crude ore at surface, to bring the capacity of the mill to a minimum of 70 tons of mined ore per day, instead of 25 tons with the existing plant.

**CAPITAL AND ESTIMATED PROFITS**—The Capital to be provided by this issue is ample for properly developing the mine for a continuous output of about 70 tons per day, say 1,800 tons of crude ore per month, and taking 13 per cent. as the mean ore contents, the average working profit on this output should reach from £700 to £800 per month after payment of the Development Charges, based on the average prices of the last 20 years. Taking the present price of metals 1,800 tons of crude ore per month would yield:—117 tons of Lead Ore at £14 per ton (Pig Lead £20 per ton), 117 tons of Blende Ore at £5 per ton (Spelter £20 per ton), Total £2,223. Less working expenses £1,080 (i.e., 12s. per ton on the crude ore, although the Consulting Engineer of the Company estimates 10s. per ton as ample), leaving a profit of £1,143 per month, or £13,716 per annum, which is the equivalent of over 27 per cent. on the present issue of Shares when fully subscribed and paid up.

This Company has secured an option to purchase for £4,000 (to be satisfied as to £1,000 in cash, and the allotment of 3,000 shares of one pound each, credited as fully paid up) the Brundholme Lead Mine. This Mine is practically virgin, on which a shaft is sunk 30 fathoms from the surface, and levels driven at depths of 20 and 30 fathoms each, and about 50 fathoms in length, which have opened up a very good deposit of Silver Lead Ore. The extensive grant (over 1,800 acres) contains other undeveloped lodes of great promise to the North and East of the workings before mentioned outcropping at the surface, showing Lead, Copper, Iron, Iron Pyrites and Wolfram. Altogether this grant comprises a large mining area containing rich mineralised ground in close proximity to the junction of the Metamorphic and Sedimentary Rocks—a position much valued by Mining Engineers.

In a direct line and within the limits of the grant, the Railway is only a mile and a-half distant.

The Brundholme mining area adjoins the Threlkeld area, and as a result both properties can be worked under the same management with advantage.

The present issue of shares when fully subscribed and paid up will provide sufficient capital for the further development of the Brundholme Lead Mine. No revenue or profits from this mine have been taken into consideration in the estimated profits given above.

All estimates and Statements referred to in the Prospectus are based on the Engineers' Reports.

The Vendor to the Company is Mr. E. H. Wigglesworth, of Trinity House-chambers, Hull, and in consideration of the sale to the Company of the property purchased by him and for services rendered by him in the promotion of the Company, Mr. E. H. Wigglesworth, as vendor and promoter, will receive from the Company the sum of £8,000 in cash and an allotment of 4,000 Ordinary Shares in the Company credited as fully paid.

Mr. W. Bawden, M.I.M.E., Consulting Mining Engineer, Keswick, in his report upon the Threlkeld Mine, dated 2nd October, 1913, states:—

"I beg to say I have witnessed the working and mining of this Mine from the highest to the lowest level, and without hesitation I state there is no diminution of the vein, as depth is attained. I recommend the undertaking as one above a speculation."

Copies of the contracts and of the Memorandum and Articles of Association can be seen at the offices of Mr. F. W. Spink, Solicitor, Trinity House Chambers, Hull, during business hours.

The Report and Plans by Messrs. J. W. Morris, M.I.M.E., W. Bawden, M.I.M.E., and W. H. Borlase, Junr., M.E., can be seen at the offices of the Company at any time during business hours.

A brokerage or commission of 3d. per share will be paid by the Company on allotment made upon application (other than applications made by or in relief of underwriters) bearing broker's stamps.

Application will be made to the Manchester and Sheffield Stock Exchanges in due course for a Settlement and Quotation of the shares.

The total preliminary expenses (other than brokerage and under-writing commissions) such as registration fees, cost of printing, distributing and advertising this Prospectus, and the legal and other expenses down to the first allotment of Shares are estimated not to exceed £3,500, and that sum will be paid by the Company to Mr. E. H. Wigglesworth in consideration of his agreeing to pay or satisfy such preliminary expenses.

APPLICATIONS FOR SHARES, on the terms of the full Prospectus, should be made on the form below, or that accompanying the full Prospectus, and forwarded with cheque for the amount payable on application to the above-mentioned Bankers, or to one of their branch banks.

Where no allotment is made the application will be returned in full, and where the number of shares allotted is less than that applied for, the balance of the deposit will be applied towards the sum payable on allotment. Failure to pay instalment when due will render the previous payments liable to forfeiture.

Full Prospectuses, upon the terms of which applications will alone be received, and forms of application can be obtained at the offices of the Company, or from the Bankers or Solicitors.

This Form of Application for Shares may be Used.

## THRELKELD LEAD MINES LTD.

CAPITAL - - - £75,000

Divided into 75,000 Ordinary Shares of £1 each.

Issue of 50,000 Ordinary Shares of £1 each at par.

To the Directors of THE THRELKELD LEAD MINES LTD.

Gentlemen,—Having paid to the Company's Bankers the Sum of....., being a deposit of Two Shillings and Sixpence per Share on Application for..... Ordinary Shares of One Pound each in the above-named Company, I/we hereby apply for, and request you to allot me/us that number of shares, and I/we hereby agree to accept the same, or any less number that may be allotted to me/us, upon the terms of the Company's Prospectus dated 22nd November, 1913, and the Memorandum and Articles of Association of the Company, and I/we authorise you to place my/our name on the Register of Members of the Company as the holder of such Shares so allotted to me/us, and I/we further agree to pay to the Company the further sum of Two Shillings and Sixpence per share on allotment, in respect of any Shares so allotted, and the balance as provided by the said Prospectus.

Ordinary Signature.....

Name (in full) .....

Address (in full) .....

17 .....

Profession or Business .....

Date.....1913.

NOTE.—This form of application may be used, and should be filled up and sent, together with a Bearer Cheque for the amount payable upon application, to the Company's Bankers, Barclay and Company, Limited, Lombard-street, London, E.C., or to any of its branches.



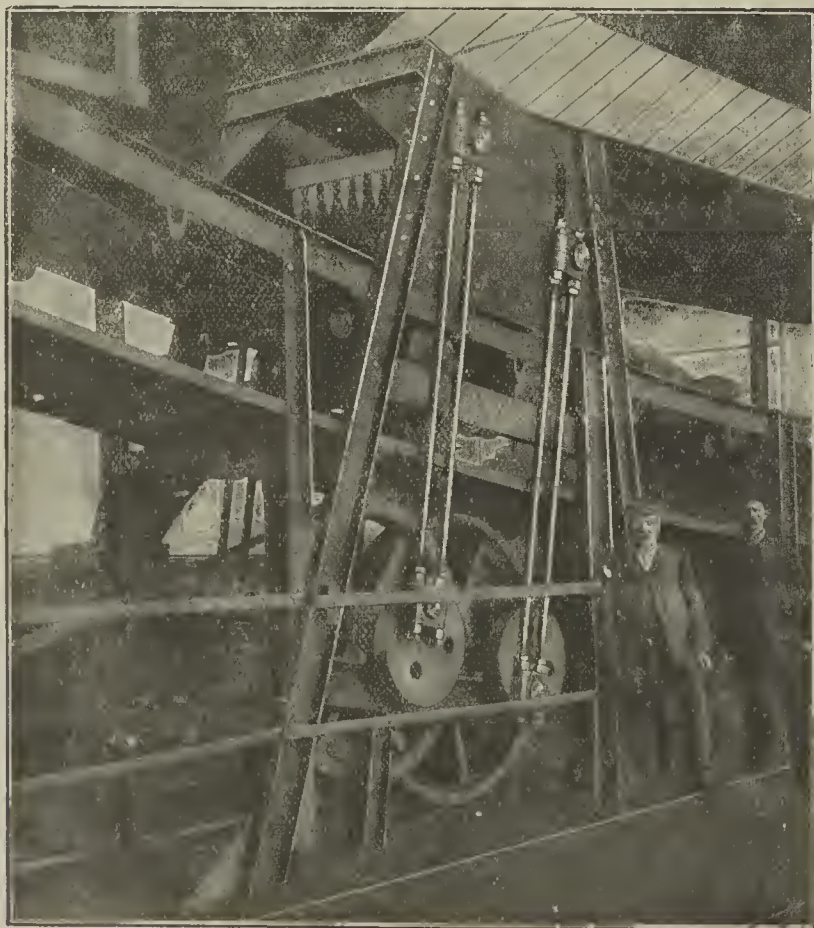
New Forms, &c.. recently issued under the Coal Mines Act.

Numbered No. Please when ordering	STATUTORY RULES AND ORDERS. &c.		
H.O., 953	Explosives in Coal Mines Order of September 1, 1913. Pamphlet Form	...	2d. each. By post 2½d.
H.O., 34	The same (without Schedules). In Sheet Form for posting	...	1d. each. By post 1½d.
H.O., 1861	List of Authorized Explosives, Jan. 1, 1913	...	2d. each. By post 2½d.
H.O., 341	Order relating to the keeping of Mixed Explosives in Registered Premises	...	1d. each. By post 1½d.
H.O., 10	General Regulations dated April 1, 1913, as to Hours of Employment of Winding Enginem	...	1d. each. By post 1½d.
H.O., 886	Coal Mines (Reference) Rules, 1913	...	1d. each. By post 1½d.
H.O., 748	Coal Mines: Safety Lamps Order, dated August 26, 1913 (revoking all previous Orders)	...	1s. each. By post 1s. 2½d.
	General Regulations dated July 10, 1913, under Section 86	...	2½d. each. By post 3d.
	PREScribed FORMS.		
H.O., 11A.	Electricity Rules: Daily Log Sheet	...	1s. 6d. per 100
H.O., 11B.	Electricity Rules: Daily Log Book	...	4s. each. By post 4s. 8d.
H.O., 15D (Metal.)	Electricity Rules: Daily Log Book	...	2s. each. By post 2s. 6d.
H.O., 11C.	Electricity Rules: Notice to Inspector of the District under Rule 2 (ii.)	...	1d. each. By post 1½d.
H.O., 11D.	Electricity Rules: Notice to Inspector of the District under Rule 2 (iii.)	...	1d. each. By post 1½d.
H.O., 15C (Metal.)	Electricity Rules: Notice to Inspector of the District under Rule 2 (ii.)	...	1d. each. By post 1½d.
H.O., 20	Form of Register of Boys, Girls and Women Employed—Section 94	...	4d. each, postage extra
H.O., 20A (Metal.)	Form of R-gister of Boys, Girls and Women Employed—Section 6	...	½d. each, post free
H.O., 23	Form of Annual Return to Inspector of Division	...	1d. each. By post 1½d.
H.O., 21	Notice of Accident or Dangerous Occurrence	...	1d. each, post free
H.O., 22	Notice of Accident, Books containing 100 Forms with Duplicates	...	2s. each, postage extra
H.O., 33	Conviction Returns*	...	1d. each, post free
H.O., 35	Register of Extension of Time	...	4s. each, postage extra
H.O., 36	Form of Report Book for Inspection on behalf of Workmen—Section 16	...	9d. each do.
H.O., 37	Form of Book for Record of Measurements of Air Currents—Section 29 (2)	...	7d. each do.
H.O., 38	Form of Book for Daily Record of Damage to Safety Lamps—Section 34 (1) (ii.)	...	1s. 6d. each do.
H.O., 39	Form of Report of Thorough Examination of Steam Boiler—Section 56	...	1d. each do.
H.O., 40	Form of Book for Report on Quarterly Internal Examination of Steam Boilers—Section 56 (1) (c) and (3)	...	6d. each do.
H.O., 41	Form of Book for Daily Report on Condition of Roads as to Coal Dust—Section 62 (5)	...	1s. 3d. each do.
H.O., 42	Form of Report Book for Firemen, Examiners or Deputies—Sections 64 and 65	...	1s. each do.
H.O., 42A.	Similar to H.O. 42. Suitable for use in large collieries, 2 Forms on a page, about 400 pages	...	4s. 6d. each do.
H.O., 42B.	Similar to H.O. 42. Suitable for use in large collieries, 1 Form on a page, about 400 pages	...	2s. 6d. each do.
H.O., 43	Form of Book for Daily Report of Examination of External Parts of Winding Machinery, Guides, &c.—Section 66 (a)	...	1s. 6d. each do.
H.O., 44	Weekly Report of Machinery, Gear and other Appliances (other than Winding Machinery, Gear, &c.)—Section 66 (b)	...	1s. 3d. each do.
H.O., 45	Form of Book for Weekly Report on State of Shafts in which Persons are Lowered or Raised—Section 66 (c)	...	1s. 3d. each do.
H.O., 46	Form of Book for Weekly Report on State of Airways—Section 66 (d)	...	1s. 3d. each do.
H.O., 47	Form of Book for Reports on Places from which Workmen have been Withdrawn—Section 67	...	9d. each do.
H.O., 48	Form of Notice of Accident Causing Loss of Life or Serious Personal Injury, to be sent to Representative of Persons Employed—Section 80 (1)	...	1d. each do.
H.O., 49	Form of Notice Specifying the Period of Employment and Times Allowed for Meals of Boys, Girls and Women—Section 93	...	1d. each do.
H.O., 50	Form of Book for Horsekeeper's Record and Daily Report of Horses under his care—Schedule III. (13)	...	2s. 6d. each do.
H.O., 51	Register of Hours of Winding Enginem	...	8d. each. By post 1s.
H.O., 52	Form of Book for Daily Record of Shots Fired—Explosives in Coal Mines Order	...	9d. each, postage extra
H.O., 53	Record of Readings of Barometer and Hygrometer	...	9d. each, postage extra
H.O., 54	Coal Mines Act, 1911. General Regulations, in Sheet Form	...	3d. each, postage extra
H.O., 55	Coal Mines Act, 1911. The Abstract, the General Regulations, and the Explosives in Coal Mines Order. (For Officials superior to Firemen, Examiners, or Deputies)	...	½d. each, 3s. per 100, postage extra
H.O., 56	Coal Mines Act, 1911. The parts of the Abstract and General Regulations required to be supplied to:—		
H.O., 57	Mechanical Engineers	...	½d. each, 3s. per 100, postage extra
H.O., 58	Firemen, Examiners, and Deputies†	...	½d. each, 3s. per 100, postage extra
H.O., 59	Electricians and Assistant Electricians‡	...	½d. each, 3s. per 100, postage extra
H.O., 60	Winding Enginem	...	½d. each, 3s. per 100, postage extra
H.O., 61	Banksmen	...	½d. each, 3s. per 100, postage extra
H.O., 62	Onsetters	...	½d. each, 3s. per 100, postage extra
H.O., 63	Horsekeepers and Drivers in charge of Horses	...	½d. each, 3s. per 100, postage extra
H.O., 64	Boiler Minders	...	½d. each, 3s. per 100, postage extra
H.O., 65	Persons in charge of Ventilating Machines	...	½d. each, 3s. per 100, postage extra
H.O., 66	Shot-firers§	...	½d. each, 3s. per 100, postage extra
H.O., 67	Underground Workmen in "Naked Light" Mines†	...	½d. each, 3s. per 100, postage extra
H.O., 68	Underground Workmen in "Safety Lamp" Mines†	...	½d. each, 3s. per 100, postage extra
H.O., 69	Surface Workmen	...	½d. each, 3s. per 100, postage extra
H.O., 70	Persons employed in Sinking Operations‡	...	½d. each, 3s. per 100, postage extra
	Haulage Enginem and Persons employed in Hauling Operations	...	½d. each, 3s. per 100, postage extra
	* Conviction Returns can also be supplied in books of 20 Forms and 20 Duplicates, 3s. each, postage extra. † Nos. 57, 66, 67, and 69 conclude with Extracts from the "Explosives in Coal Mines Order of the 1st September, 1913." ‡ No. 53 concludes with a Memorandum on the Electricity Regulations. § No. 65 commences with the Explosives in Coal Mines Order.    No. 62 commences with the Third Schedule to the Coal Mines Act, 1911.		

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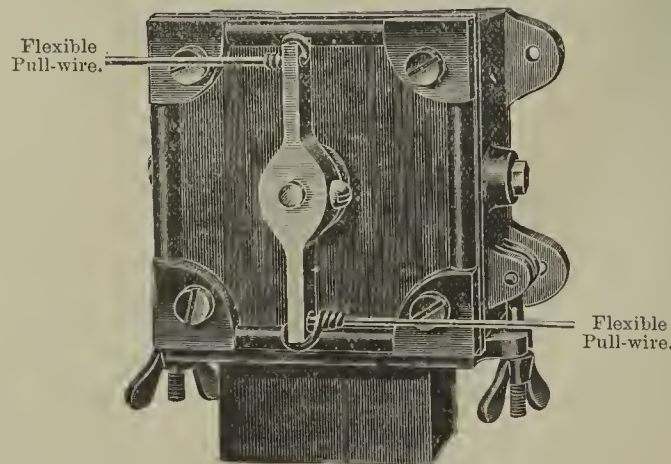
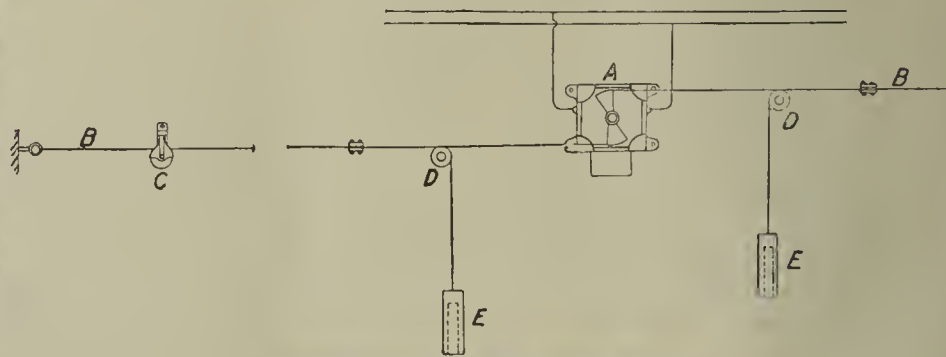
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MECHANO-ELECTRIC SIGNALS

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This System is considerably cheaper than gas-proof pushes, and more efficient.  
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Cyddy Lead and Blende Mines, North Wales; R. J. Hutchinson, M.D., J.P., chairman Threlkeld Granite Company Limited and Jennings Brothers Limited; J. C. McKellar, J.P., Glasgow, director Yorkshire Insurance Company Limited, Scotch board; G. S. Marple, managing director of Marple and Gillott Limited; G. Rhodes, K.C., J.P., chairman Shireoaks Colliery Company Limited, and director Bury's and Co. Limited, Sheffield; and E. T. Wilks, C.C., F.R.G.S., of Butler, Wilks and Co., coal factors, Coal Exchange, London. The consulting engineer is Mr. W. H. Borlase, J.P., M.E., M.I.M.E., manager of the Greenside Leadmining Company Limited, Patterdale; and the consulting chemist, Mr. G. Watson Gray, F.I.C., Liverpool. The secretary and registered office are Mr. E. H. Wigglesworth, A.C.I., Trinity House Chambers, Hull. The company has been formed for the purpose of acquiring and working the property known as the Threlkeld Mines, between Keswick and Penrith, in the county of Cumberland. The mine was purchased by the late owners in 1906. The purchase price then paid for it was £11,000. Since 1906 the books and accounts show that over £10,000 has been expended in further development and equipment of the mine and in machinery and plant. Since the original opening of the mine over £38,000 has been spent in development and equipment, and this company acquires the whole of the undertaking at less than one-third of that sum—viz., £8,000 in cash and £4,000 in ordinary shares. The book of royalties shows that during the working of the mine 171,000 tons of crude ore were treated and produced 24,600 tons of lead and blende ores, the approximate value being £134,500, which proves that the mine is a productive one, and particularly so as the rich portion of the main lode is increasing in length and width and assay values as it deepens. From 1906 to 1910, 15,000 tons of crude mine ore were treated and produced 1,076 tons of lead ore and 1,328 tons of blende ore, which is equal to 16 per cent. extraction by the present mill. The mine may reasonably be considered in its infancy, as the deepest explorations are only some 30 fathoms below the adit or day level. In addition to the lodes mentioned, other important and promising lodes of lead, copper and other minerals are known to exist on the property. Capital is required for the further development of the mine and providing machinery for the more economical treatment of the crude ore at surface, to bring the capacity of the mill to a minimum of 70 tons of mined ore per day, instead of 25 tons with the existing plant. The company has secured an option to purchase for £4,000 the Brundholme leadmine. The Brundholme mining area adjoins the Threlkeld area, and as a result both properties can be worked under the same management with advantage. The present issue of shares, when fully subscribed and paid up, will provide sufficient capital for the further development of the Brundholme leadmine.

**Transvaal Oil Shale Syndicate.**—The report of the Transvaal Oil Shale Syndicate from the formation of the company to June 30 last states that upon the original portion of the farm the top seam had been proved and is estimated by Mr. Goodwin to contain about 1,000,000 tons of shale of a payable grade, and there are also several small seams of coal. Seven boreholes have been put down on the farm adjoining the Tweefontein Colliery, in three of which seams of coal of a satisfactory thickness were encountered.

**United Wire Works Limited.**—The balance at the credit of profit and loss is £7,210. After providing for the preference share dividend and remuneration to the directors, the board recommend a dividend of 2 per cent., free of tax, on the ordinary shares, leaving, after providing for accrued dividend on the preference shares to September 30, a credit balance of £1,211. Last year the dividend was 3 per cent.

**Valley Coal Boring Syndicate Limited.**—This private company has been registered, with a capital of £25,125 (25,000 shares of £1 each, and 2,500 deferred shares of 1s. each), to obtain any options over land for the purpose of boring for coal and other minerals; to acquire any collieries, and seams and beds of coal, &c., situated in Kent, and to carry on the business of colliery proprietors, &c. Registered office, 4, Irongate, Chesterfield, Derby.

**Wright (John and Edwin) Limited.**—The report for the year ended September 30 states that the balance of the revenue account, after adding the amount (£4,847) brought forward, and deducting the interim dividend (£1,177) paid on the preference shares for the half-year ended March 31, is £12,111. The directors propose to pay a dividend on the ordinary shares of 10 per cent., tax free, to place £1,000 to the reserve fund, and to carry forward £4,934. A year ago the dividend was at the same rate.

**South Staffordshire and Warwickshire Institute of Mining Engineers.**—The next meeting will be held at the University, Edmund-street, Birmingham, on Monday afternoon, December 15, at 3 p.m., when a paper on "Thirty Years' Experience with Pumping Machinery, and some Observations and Conclusions Thereon," will be read by Mr. John Brindley.

**North of England Institute of Mining and Mechanical Engineers.**—A general meeting will be held in the Wood Memorial Hall, Newcastle-upon-Tyne, at two o'clock to-morrow (Saturday). The following papers will be open for discussion: "Notes on Coalmining in the United States of America, with Special Reference to the Treatment of Coaldust, and Haulage by Electric Locomotives," by Mr. Samuel Dean; "The Comparative Inflammability of Mixtures of Pit-gas and Air, ignited by Momentary Electric Arcs," by Prof. W. M. Thornton. The following papers will be read or taken as read: "Notes on a New Process for the Washing of Coal at the St. Nicholas Pit of the Société des Charbonnages de l'Espérance et Bonne Fortune, near Liège, Belgium," by Mr. Leo Dorey Ford; "Notes on the Working of the St. Nicholas Pit of the Société des Charbonnages de l'Espérance et Bonne Fortune, near Liège, Belgium, with Special Reference to the Hydraulic Packing of the Goaf," by Mr. Leo Dorey Ford. A new brake for colliery tubs will be exhibited, described and demonstrated by Mr. Enos Parry. A new device for automatically supporting a pit cage in the event of the winding rope breaking will be exhibited, described and demonstrated by Mr. F. W. Nunn.

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages

### Abstracts of Contracts Open.

**BOOTLE (LANCASHIRE), DECEMBER 17.**—About 400 tons of steam coal and 3,000 tons of slack, for use at the Electric Light Station, for the Corporation. Forms from borough electrical engineer's office, Electric Light Station, Pine-grove, Bootle.

**BRISTOL, DECEMBER 15.**—Coals, for the Sanitary and Improvement, and Health Committees of the Corporation. Forms at the offices of the city engineer, 63, Queen-square, Bristol.

**CHESTER, DECEMBER 15.**—House coal, slack and coke, for the Guardians. Forms from Mr. G. S. N. Hull, clerk to the Guardians, 161, Foregate-street, Chester.

**CHRISTIANIA (NORWAY), DECEMBER 15.**—*Coal Discharging Machinery.*—Tenders are invited by the Norwegian Main Railway for the supply of two coal-discharging machines, each capable of discharging at least 50 tons per hour.\*

**DURBAN (SOUTH AFRICA), JANUARY 7.**—*Gas Electric Plant.*—Gas electric plant for that town. Specification obtained at the office of the borough electrical engineer, Municipal-buildings, Durban, on deposit of £1 1s. (returnable).

**EXETER, DECEMBER 15.**—Steam (washed bean or pea) coal, for the Corporation. Forms obtainable at the office of Mr. H. Lloyd Parry, town clerk.

**GAYTON, DECEMBER 17.**—About 35 tons of good house coal, for the Gayton Fuel Allotment. Tenders to Mr. Robt. J. Cullum, of Gayton.

**OXFORD, DECEMBER 31.**—Best Moira screened cobbles, for the Corporation. Sealed tenders, endorsed "Tender for Coal," to Mr. R. Bacon, town clerk, Oxford.

**RUGBY, DECEMBER 16.**—About 50 tons of steam coal, for the Urban District Council. Forms from the Council surveyor, Benn-buildings, Rugby.

**SLOUGH, DECEMBER 24.**—Best quality approved Tredegar large smokeless steam coal, for the Waterworks Department of the Slough Urban District Council. Sealed tenders, endorsed "Steam Coal," to Mr. W. W. Cooper, manager, Council Offices, Slough.

**WELLINGTON (SALOP), DECEMBER 18.**—Coal and coke, for the Guardians. Tenders to Mr. R. Gwynne, clerk, Elgbaston House, Wellington, Salop.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &c.

**ANTWERP, JANUARY 26.**—*Cranes.*—Tenders are invited by the Municipal authorities of the above city for six electric cranes for the Bassin-Canal extension.\*

**BIRKENHEAD, DECEMBER 22.**—*Dee Tunnel and Pipe Line.*—Construction of a pipe line (consisting of about 10 miles of cast iron and steel pipes 25 in. in diameter, and about 3½ miles of cast iron and steel pipes 28 in. in diameter) extending from Connah's Quay, in the county of Flint, to Birkenhead, in the county of Chester, including a tunnel about 450 ft. long to be driven under compressed air beneath the estuary of the River Dee, for the Corporation (Alwen Supply). Specification of Sir Alexander Binnie, Son and Deacon, St. Stephen's House, Victoria Embankment, London, S.W., on payment of £5 (returnable).

**DUBLIN, DECEMBER 19.**—*Gas Controllers.*—Supply of 150 automatic gas controllers for use with 4 cubic feet burners; also 3,000 4 cubic feet pressure governors, for the Corporation. Further particulars from the Superintendent, Public Lighting Department, Tara-street, Dublin.

**GLEN (ORANGE FREE STATE, SOUTH AFRICA), JANUARY 7.**—*Pumping Plant.*—Complete pumping plant required in connection with the irrigation scheme at Glen, Orange Free State.\*

**LEIGH (LANCS.), DECEMBER 19.**—*Boiler.*—One water-tube boiler, complete with mechanical stoker, forced draught plant, air heater, &c., for the Corporation. Particulars and specification from Mr. Arthur T. Smith, borough electrical engineer, Leigh, Lancs.

**LITHGOW (AUSTRALIA), JANUARY 12.**—*Iron and Steel.*—Tenders are invited by the Commonwealth Department of Defence for the supply of iron and steel for the manufacture of rifles at Lithgow, New South Wales, during the period ended June 30, 1916. Specification from the manager, Small Arms Factory, Lithgow, New South Wales.\*

**LONDON, DECEMBER 16.**—*Steel Rails.*—The Government of Nigeria invite tenders for the supply of acid steel rails, British standard section. All particulars obtainable on application at the office of the Crown Agents for the Colonies, Whitehall-gardens, London, S.W.

**LONDON, DECEMBER 17.**—*Galvanised Sheets, &c.*—For the directors of the East Indian Railway Company:—(1) Galvanised sheets, &c.; (2) pig iron (Summerlee and cold blast); (3) wrought iron, bars, &c.; (4) steel material (angles, bars, plates, sheets, &c.). Specification on payment of £1 1s. (not returnable). Mr. C. W. Young, secretary, Nicholas-lane, London, E.C.

**MALVERN, DECEMBER 23.**—*Cast Iron Pipes.*—About 1,750 yards of 4 in. cast iron pipes and specials, for the Gas and Electricity Committee of the Urban District Council. Specification from the engineer, Mr. W. H. Johns, Council Offices, Church-street, Malvern.

**MANCHESTER, DECEMBER 18.**—*Cast Iron Pipes, &c.*—About 165 tons of cast iron main pipes, 30 in. diameter, and several cast iron irregular pipes, for the Gas Committee of the Corporation. Specification from Mr. Fredk. A. Price, superintendent Gas Department, Town Hall, Manchester.

**MELBOURNE (AUSTRALIA), JANUARY 7.**—*Steel Bars, &c.*—Tenders are invited by the Victorian Railways Commissioners for the supply of the following:—(1) 150 steel channel bars for engines; (2) 45 copper plates for engines; (3) seamless copper tubes for engines; (4) 10,000 porous pots for batteries; (5) 180 steel boiler plates for engines;

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

(6) 60 Yorkshire iron angles for engine boilers; (7) 17 tons of copper rod for engines; (8) 3,960 brass locomotive boiler tubes; and (9) 237 cast steel wheel centres for engines and tenders. Specifications from the secretary, Victorian Railways Offices, Spencer-street, Melbourne.\*

**MELBOURNE (AUSTRALIA), DECEMBER 17.**—*Fan, &c.*—Tenders are invited by the Victorian Railways Commissioners for a motor-driven ventilating fan for the State coal mine. Particulars from the general manager, State Coal-mine, Wonthaggi, Victoria. A deposit of £2 is required.\*

**NEW HUNSTANTON, DECEMBER 23.**—*Gasholder Tank, &c.*—A brick and cement gasholder tank, with inlet and outlet pipes, and other appendages; the manufacture and erection of a telescopic gasholder, for the Urban District Council. Forms obtained on payment of £1 1s. (returnable) from Messrs. E. H. and S. E. Stevenson, 38, Parliament-street, Westminster.

**OTTAWA (CANADA), JANUARY 13.**—*Steel Pipes.*—About 42 miles of welded steel pipe, 54 in. internal diameter; about 32 miles of welded steel pipe, 58 in. internal diameter; and about 11 miles welded steel pipe, 51 in. internal diameter, for the Corporation. Forms and specification from Sir Alex. Binnie, Son, and Deacon, St. Stephen's House, Victoria Embankment, London, S.W.

**PRETORIA (SOUTH AFRICA), JANUARY 7.**—*Pumping Plant.*—Tenders are invited by the Union Tender Board for the supply and erection of a pumping plant at Glen, Orange Free State. Specifications obtainable from the Director of Irrigation, P.O. Box 399, Pretoria, on deposit of the sum of £2 (returnable).

**SALFORD, DECEMBER 22.**—*Retorts.*—An installation of vertical retorts on the continuous system capable of carbonising 100 tons of coal per 24 hours, for the Gas Committee of the Corporation. Specifications obtained on deposit of £1 1s. (returnable) from Mr. William W. Woodward, engineer, Gas Offices, Bloom-street, Salford.

**STAVANGER (NORWAY), JANUARY 11.**—*Gasometer.*—Tenders are invited by the Stavanger Gasworks for a gasometer of 12,000 cubic metres capacity. Tenders to "Gasværkets Kontor," Stavanger.

**SYDNEY (AUSTRALIA), DECEMBER 15.**—*Pumping Machinery.*—Tenders are invited by the Sydney Water Supply and Sewerage Board for the manufacture, supply, and delivery of a complete set of turbine-driven centrifugal pumping machinery. Specifications from the President, Metropolitan Board of Water Supply and Sewerage, 341, Pitt-street, Sydney, N.S.W.\*

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

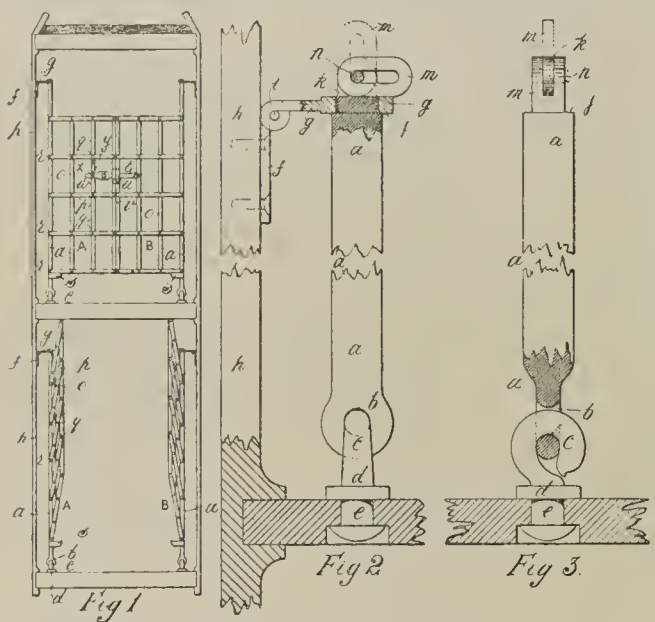
**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, December 2, 1913, is as follows:—Antwerp, 707 tons; Amsterdam, 3,288; Alexandria, 7,940; Bordeaux, 2,111; Bremen, 3,172; Buenos Ayres, 9,168; Copenhagen, 303; Christiania, 3,811; Christiansand, 26; Drontheim, 253; Gefle, 1,724; Gothenburg, 1,216; Ghent, 447; Hamburg, 6,382; Harlingen, 1,574; Harburg, 2,927; Kiel, 3,590; Kalmar, 1,481; Libau, 1,194; La Rochelle, 1,854; Larvik, 341; Monte Video, 5,112; Masnedsund, 483; Marseilles, 3,599; Newfairwater, 305; Oran, 499; Oxelosund, 3,209; Rotterdam, 2,544; Rouen, 15,984; Riga, 20,930; Reval, 4,342; Roumo, 3; Stettin, 349; Stockholm, 856; Venice, 304; Wasa, 52; total, 112,078 tons. Corresponding period December 1912, total, 80,670 tons.

**Home Office Prosecution at Hamilton.**—On the 3rd inst, in the Hamilton Sheriff Court, before Sheriff Shennan, John Richmond, colliery manager, London-street, Larkhall, was tried on charges of having between August 1 and 14, he being manager of Skellyton Colliery, occupied by Darngavil Coal Company, contravened certain sections of the Coal Mines Act, 1911. There were in all five charges. The first was alleged to be in contravention of section 43 (2) by allowing a worker to ride on a rake of hutches proceeding at a greater speed than three miles an hour along the haulage road in the Millburn section of the Kiltongue seam. The next three charges related to the refuge holes in the same haulage road, it being alleged that the holes were not all on the one side of the road, that they were not numbered, and that in four instances the distance between was greater than the maximum length specified in the Act. The fifth charge was that accused failed to have No. 8 road in the same section of sufficient height as to allow the ponies to pass without rubbing themselves or their harness against the roof and the bars supporting the roof. The facts as regards the first four charges were not really in dispute, the respondent admitting them. The circumstances appeared to have arisen from a misreading by the manager of a section of the Act. Section 43 is composed of three subsections, the first of which comes into operation on January 1, 1914, while the third came into operation on January 1 of the present year. Nothing is expressly stated in the section as to when the second subsection comes or came into operation, and the manager, therefore, erroneously assumed that it did not take effect till January 1914. As a matter of fact, as pointed out, another general section of the Act states that the Act would come into operation on January 1, 1912, "except where otherwise specially provided." Accused denied the fifth charge, and evidence was led principally on this point, although bearing incidentally on the whole charges. Sheriff Shennan, at the close of the trial, found the fifth charge, relating to the ponies, not proven. The other four charges were held proved, and his lordship imposed a fine of 30s. or five days' imprisonment.



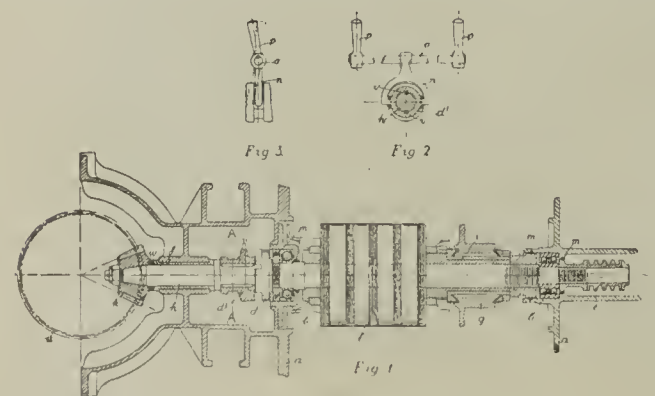
### ABSTRACTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

1520 (1913). *Improvements in or in connection with Pit Ladders, Hoists and the like and more especially to the Former.* S. Broad, Adderley Cottage, Anchor-road, Longton, Stoke-on-Trent, Staffordshire.—The object is to provide an improved form of gate which will comply with the Coal Mines Regulation Act of 1911 and allow of the gate being opened and closed as required and held in position when closed, and at the same time allow it when open to be folded together and laid along the bottom of the cage out of the way of the tubs without entirely removing it from its bottom pivotal supports. Fig. 1 is a front elevation of a two-deck mine cage fitted with the improved gate, which is shown closed on the top deck and partially opened on the lower deck; fig. 2 front elevation, partly in section, to an enlarged scale of one of the main pillars of one gate, and fig. 3 side elevation, partly in section, of same. The gate is made preferably in two halves. Each half of the gate consists of an upright pillar *a* which at its lower end is so pivoted or hinged that it can not only turn about a vertical centre line at the lower pivotal point but can also be turned into a horizontal position so as to rest on the floor of the cage or hoist. The upper end of the pillar *a* is normally supported by a bearing formed of hinged plates *f* and *g*, one of which *f* is secured to the side *h* of the cage, whilst the other is adapted to be turned about the hinge pin *i* on the upper end of the pillar so as to support it or to be released from the pillar to allow the latter to be turned



into the horizontal position, before referred to. The hinged plate *g* of the top bearing is provided with a hole and can be held in position to prevent it being disengaged by turning down the pillar *a* to leave a shoulder *j* on which the plate rests, and by slotting the extreme upper end of the pillar at *k* and securing therein an elongated link *m* by means of a pin *n* passed through the pillar and the link. The width of the link corresponds to the diameter of the reduced portion of the pillar, so that when it is turned into a vertical position, as indicated by dotted lines in figs. 2 and 3, the hinged plate can be lifted off the pillar for the purpose before referred to. On the other hand, when the link is turned at right angles, as shown in full lines, to the position stated, the hinged plate is held in position whilst allowing the pillar to be rotated. The main gate portion of each half of the gate consists of vertical and horizontal bars *o* and *p* respectively pivoted to each other at their points of intersection *q*, the ends of the horizontal bars nearest to the pillar *a*, previously referred to, being pivoted to the latter at *r*. When the half gate is in working position, the bars are held at right angles to each other by the lowermost horizontal bar resting upon a bracket or arm *s* forming part of or projecting from the pillar *a*, as shown in fig. 1. On the other hand, the bars can be collapsed and folded into a very small space, as shown in fig. 1, by pushing them in the direction of the pillar, and can be opened out with equal facility. (Three claims.)

6627 (1913). *Improvements in Coal-cutting Machines and the Like.* Beckett and Anderson, of 71, Lanark-street, Glasgow, and R. C. Anderson, of the same address.—Relates to machines for cutting coal and other minerals, and is specially adapted to the undercutting of coal on the long-wall system. It consists in a disconnecting device involving the construction of the horizontal shaft in two parts, which can be connected by a clutch, one part of the shaft being adapted to be driven by the motor, while the other part carries a bevel pinion which is in constant connection with the cutting element through the agency of suitably arranged



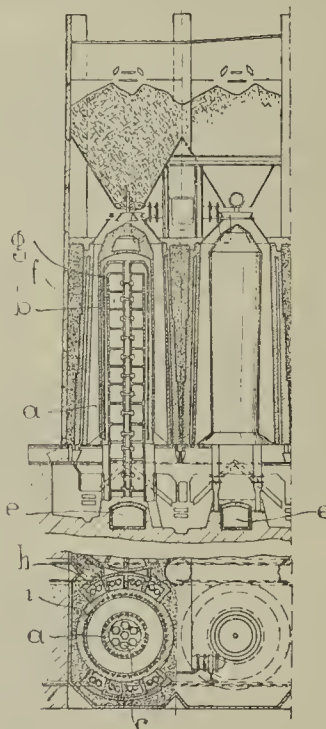
gears, the part carrying the bevel pinion being supported in a single bearing (preferably of considerable axial length), which bearing is located between the bevel pinion and the clutch. Thrust washers may be provided at one or both ends of this bearing, or other devices provided to take up the end play in one or both directions. The portion of the shaft which is driven by the motor—and which, in the case of an electrically-driven machine, may carry the armature of the electric motor—is provided with two bearings. These bearings, if desired, be of the ball-race type, and one

or both may be constructed to act as combined radial and axial bearings. The construction of the horizontal shaft in two parts connected by a clutch is not in itself new, and it has previously been proposed to provide the second or driven portion of the shaft with a worm which transmits the power for cutting and with a bearing between this worm and the clutch; but a worm necessitates the provision of a second bearing beyond the worm, and this, together with the one-sided location of the worm, involves an inconvenient design of frame which the invention obviates. Fig. 1 is a sectional plan of an electric coal-cutting machine, according to the invention; figs. 2 and 3 illustrate the means provided for operating the disengaging gear, fig. 2 being a section on the line A A of fig. 1, and fig. 3 an end elevation of fig. 2 looking from right to left. (One claim.)

13501 (1913). *Improvements in and Relating to the Manufacture of Primary Explosives.*—R. Calvet, of No. 34, Calle de Gerona, Barcelona, Spain.—The primary explosive which constitutes the subject matter of the present invention contains as essential ingredient a mixture of one or more sulpho-cyanides of copper with potassium chlorate or perchlorate. By mixing one part of the sulpho-cyanide with 1½ or 2 parts of chlorate or perchlorate of potassium, an explosive is obtained which possesses considerable strength, is capable of being exploded by shocks, friction, or by heat at a temperature higher than 160 to 180 degrees Cent., and has a wave of explosion at least as intensive and quick as any of the explosive mixtures based upon the use of fulminate of mercury. (Four claims.)

21861 (1913). *Improvements in Air Regenerators for Portable Breathing Apparatus.* D. C. H. Schumann and Hanseatische Apparatebau-Gesellschaft, vorm. L. von Bremen and Co., mit beschränkter Haftung, both of Rödingsmarkt 35, Hamburg 11, Germany.—According to the invention, granular chemicals are mixed with an inert and highly porous granular material, such as coarse granulated pumice stone. The granules of porous material, unattached to the granules of the chemicals, separate the latter from each other and absorb moisture during the reaction which takes place in the regenerator. The mixture of porous granular materials and chemicals may be arranged in layers which alternate with layers of the porous material alone, all the layers being arranged transversely of the path which the air takes through the container, and the layer at each end of the series being one of the layers of porous material without admixture of chemicals. (Two claims.)

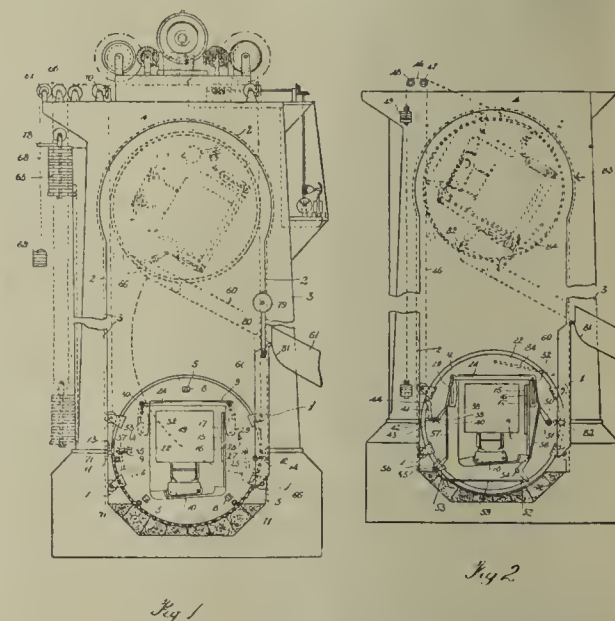
26302 (1912). *Improvements in or relating to Apparatus for Making Gas and Coke.* H. Nelsen, of 117, Julienstrasse, Essen-Rüttenscheid, Germany.—Comprises the arrangement in the interior of the central portion of an annular vertical retort, of a regenerator or recuperator for the preliminary heating of the combustion air consumed in the heating flues of the said portion. This results in a substantial advantage that a discharge conduit passing through the coke chamber in the upper portion becomes superfluous. Moreover, the air in the interior of the central portion is heated in a very



efficacious manner, and the said portion is at the same time cooled in the desired manner. A construction is shown in the accompanying drawing. From the heating flues *b* the combustion gases pass at the upper end of the retort into the recuperator tubes *c*, from which they escape at the bottom into the main flue. The combustion air passes through the conduit *e* at the bottom into the chamber *f* surrounding the tubes *c* and escapes from the said chamber at the top, in order to pass downwards to the heating flues *b* through the conduits *g*. The recuperators *h* for the outer heating flues *i* are arranged between the retorts. (Two claims.)

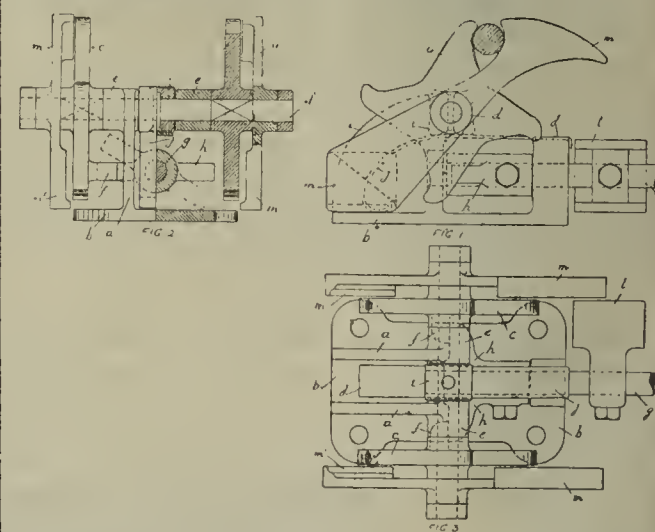
26451 (1912). *Improvements in Truck Tipplers or Means for Discharging the Contents of Trucks and like Vehicles.* G. A. P. Provay, Box 321, Lourenço Marques, Portuguese East Africa.—Relates to truck tipplers or to the means applicable for dumping or emptying railway trucks, wagons and like vehicles which traverse a permanent way or track. It has especial reference to that type of truck tippler in which the truck or light vehicle is received bodily in a revolvable structure whereby the truck can, if desired, be raised to a suitable height above the permanent way or track, and then partially inverted in order to empty it of its contents, such as is described in the Specification of a prior Application for Patent of May 4, 1912, under number 10632 of 1912. The present improvements appertain to the construction of the tippler or revolvable structure and the superstructure in which the tippler is adapted to be raised, revolved and lowered; to the means whereby the truck is clamped or held in the tippler; to means for taking up longitudinal thrust of the tippler; to means which bring the hinged chute into position beneath the inclined truck to receive its contents when tipped; to means for reducing the extent of the free fall of the material between the truck and the movable chute; to means for indicating to the driver or operator when the tippler is in the proper position for the lowering of it to be commenced; to modifi-

cations in the construction and arrangement of the lifting and revolving ropes for the tippler; to alternative means for manipulating the lifting and revolving ropes of the tippler; to means for bringing the truck into contact with the tippler lining in order to prevent longitudinal movement of the truck inside the tippler, and to certain other details of construction as hereinafter described and pointed out in the claims. Fig. 1 is an end elevation of one construction of the apparatus embodying certain of the improvements. Fig. 2 is an end elevation of certain portions of the apparatus illustrating other improvements. The manner in which the arrangement operates will be readily understood on reference to fig. 2, in which figure the parts are shown in full lines with the tippler in its lowermost position and the truck upright, and in dotted lines when the tippler is in its uppermost position and has been partially rotated to incline the truck. During the raising or lowering of the tippler the weights 49 maintain their respective actuating levers 41 substantially vertical or with a slight inclination towards



the truck, which as previously explained operates to keep the beam or bar 24 in its uppermost position, clear of the top of the truck. When the tippler is in its uppermost position and its rotation has commenced in order to tip the truck the weight, acting through the lever 41, will move the bars or beams 24 into contact with the upper edges of the sides of the truck. When the bars or beams 24 are in this position the weights will continue to be raised so long as the rotation of the tippler continues in the same direction. When the direction of the rotation of the tippler is reversed, to place the truck in an upright position, the weight will ultimately operate to release the bars or beams 24 from the upper edges of the sides of the truck and place them in their uppermost position as shown in fig. 2. As the tippler descends the weight will then be raised. From the position in which it is shown in dotted lines to that in which it is shown in full lines, it will be evident that the weights 49 will serve to partially counterbalance the tare weight of the tippler. (Twenty claims.)

26970 (1912). *Improved Railway Stops for Controlling, Retaining and Releasing Colliery Corves and the like.* J. McBean, 18, Alexandra-road, Mexborough.—This invention is for an improvement in the construction of apparatus described in a prior Patent No. 3470 of 1911, the object of this invention being to improve the mechanism and better adapt it for the position in which such apparatus is generally fixed, and to provide against any undue violence such apparatus is subjected to. Fig. 1 is a side elevation of the improved apparatus, fig. 2 is an end elevation partly in



section, and fig. 3 a plan of the same. Against the star wheels at each end of the shaft *d* are placed levers *m*, hooked at their upper ends, and retained in their normal positions by balance weights *m*<sup>1</sup> at their lower ends, or their equivalents. These hooks are depressed by an advancing corve, which passes over them, comes to rest against the star wheels, and allows the hooked levers *m* to rise and clasp the axle against the star wheels, which prevents the axle overleaping the star wheels, which otherwise may occur by the violent impetus of a corve. (One claim.)

28772 (1912). *An Electric Miners' Lamp.* P. Rosenberg, of 79-80, Reichenbergerstrasse, Berlin, Germany.—Relates to an electric miners' lamp, having a positive closure which is controlled by a magnet. The feature of the invention consists in that by the particular construction of the outer part of the cover a more effective distribution of light is produced than is the case with lamps of known construction. The superimposed part is, in the interior, provided with an oscillatory steel lever which, when placing the part in position, engages with a groove in the receptacle and thus prevents the removal after the part has been placed in position. Fig. 1 is a plan; fig. 2 is a front elevation of the lamp, the receptacle being partly broken away; fig. 3 is a section on the line A B of fig. 4; and fig. 4 is partly a longitudinal section. The part *a* is of such a construction that the rays of the electric lamp *b* can be thrown down-



BRUSSELS EXHIBITION: "GRAND PRIX."

ROUBAIX EXHIBITION, 1911: "GRAND PRIX"

# HOPKINSON'S

## "RDS" Steam Trap

PATENT

SUITABLE FOR ANY PRESSURE.

A large number of these traps have been in use for several years, and our experience has been so satisfactory that we have every confidence in recommending them to steam users. The workmanship and material are of the highest quality, and is altogether a far superior article to the many cheap bucket traps now on the market.

### SPECIAL FEATURES.

SIMPLICITY.

RELIABLE.

QUICK IN ACTION.

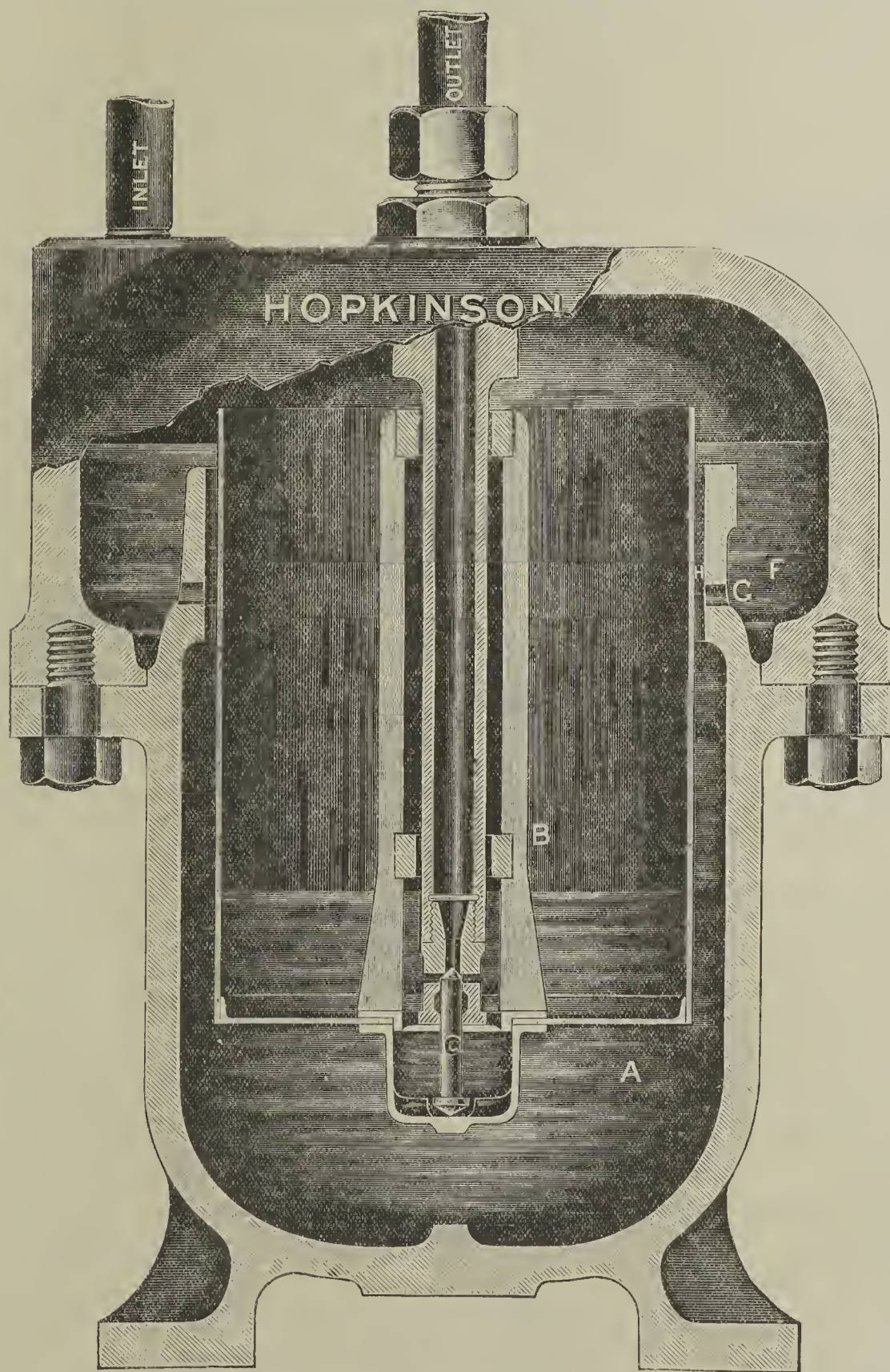
NO DRIBBLING.

STRONG INTERMITTENT  
WATER DISCHARGE.

QUICK CUT-OFF.

WILL LIFT ITS WATER  
2 ft. FOR EVERY 1 lb.  
STEAM PRESSURE.

FITTED WITH VALVE  
AND SEAT OF . . .  
HOPKINSON'S 'PLATNAM'  
METAL, which is five  
times harder than .  
bronze and admirably  
suitable for with-  
standing the cutting  
action of the water,



CAST IRON BODY AND LID,  
HOPKINSON'S "PLATNAM" METAL VALVE AND SEAT.

### DESCRIPTION.

This steam trap is of the open float type, and consists in its simplest form of a Water Chamber A, Float with central guide B, Valve C, Water Inlet Pipe, and Water Discharge Pipe. The discharge pipe forms the guide for the float.

The valve remains on its seat until the float has sunk low enough to touch the collar on valve; it then immediately begins to discharge.

The Gallery or Water Pocket F is an important feature, as it fills with water when the Float is at rest; when the Float begins to rise from its lowest position, the water thus collected flows through the hole C into the body A, thus ensuring a rapid elevation of the Float independent of a small amount of water passing into the trap. The valve is not rigidly connected with the bucket, and it is therefore held on to its seat until the Float acts on the Valve. This device is, therefore, most valuable under all conditions of working, but more especially when the volume of water entering the trap is small. Its lifting effect on the Float is indicated by the sharpness with which the water discharge is cut off.

Write for Catalogue 660, 4th Edition, post free, which illustrates and describes

### HOPKINSON'S PATENT SAFETY BOILER MOUNTINGS AND VALVES

For High-pressure Superheated Steam, High-class Exhaust and Water Sluice Valves for Condensing Plants, &c., Automatic Exhaust Valves, Reducing Valves, Steam Traps, &c., &c.

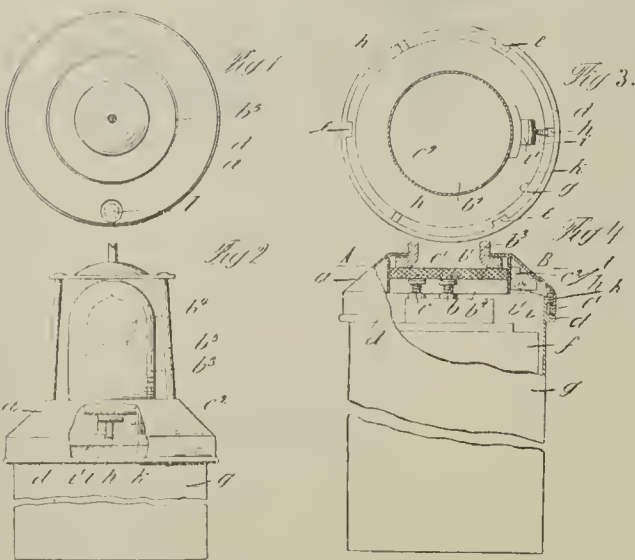
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# J. HOPKINSON & CO. LTD.,

## HUDDERSFIELD.



as the surface is inclined at an angle of about 45 degs. The lamp  $b^4$  is enclosed under a globe  $b^3$ , whilst a series of projecting rods  $b^5$  are provided against mechanical injuries to the glass globe. The part  $a$  is further provided with projections  $e^1$  which engage between corresponding edges  $d$  of the receptacle  $g$  containing the battery immediately after they have passed between the recesses  $c$  in the edge  $k$  (bayonet closure). The battery  $f$  is provided with contacts  $b^c$  which rest against corresponding contacts  $b^1$   $c^1$ . The latter are mounted in an insulating plate  $b^2$  provided in the part  $a$  of the casing. The edge  $k$  of the receptacle  $g$  is further provided with a series of grooves  $h$ , which are disposed between the recesses  $c$ . In the interior of the superimposed part  $a$  is provided as a bearing for an oscillatory steel lever  $i$ , a projection  $i^1$ . When placing the part  $a$  in position the lever  $i$  slides on



the edge  $k$  of the receptacle  $g$  until the bayonet closure is produced by the engagement of the projections  $e^1$  with the recesses  $c$ , and by the further rotation of the superimposed part  $a$ . A position is then obtained in which the lever  $i$  must fall into one of the grooves  $h$ . When in this position, it is impossible to rotate the part  $a$  in one or the other direction. Above the lever  $i$  is provided an opening  $l$  which, after the insertion of the lamp and after the security against rotation has been produced by the lever  $i$ , is soldered up. If the lamp battery is to be changed the soldering is removed, and by the application of a magnet the lever  $i$  is removed out of the groove  $h$ . It is then possible to rotate the superimposed part  $a$  until the projections  $e^1$  come below the recesses  $c$ , whereupon the part can be removed. (Three claims)

### NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

#### Applications for Patents.

27633. Absorption pyrometers. G. A. Alder and A. O. Cochrane.  
 27648. Combustion of fuel. A. Morin, L. Hamon, and E. Hess.  
 27660. Protection of electrical distributing or current-carrying systems. H. W. Clothier.  
 27661. Protection of electrical distributing or current-carrying systems. P. V. Hunter.  
 27671. Boring machines. H. M. Dixon.  
 27678. Reversible regenerative furnaces for use in the manufacture of steel, glass, and the like. J. S. Atkinson, Coke Oven Machinery Company Limited, and K. Huessener.  
 27703. Chain-reinforced belt. J. Holland.  
 27709. Signalling apparatus employed in connection with the winding engines of mines and other works. H. D. Bayley and B. Froggatt.  
 27755. Mechanical stokers. Babcock and Wilcox Limited and C. S. Davy.  
 27765. Treatment of peat and the like, and apparatus for use therein. E. G. Lea.  
 27766. Apparatus for heating peat pulp or the like. International Nitrogen and Power Company Limited, E. A. Buckle, and O. D. Lucas.  
 27787. Crushing, pulverising, and disintegrating machines. H. T. Tovey.  
 27794. Device for easy signalling in mines from the coal face to the haulage engine without the use of electricity. D. Llewellyn.  
 27806. Apparatus for coaling ships. J. Scott.  
 27822. Device for backward supporting central buffer couplings of vehicles. Akt.-Ges. der Eisen- und Stahlwerke vorm. Georg Fischer.  
 27824. Relay arrangements for the automatic control of electric circuits or apparatus. Siemens Schuckertwerke G.m.b.H.  
 27838. Internal-combustion pump for raising water. A. Ochotorena and J. Gurich.  
 27849. Bearing-springs for railway and like rolling stock. G. H. Sheffield and McKerrow and Co. Limited.  
 27854. Multiple bearings for derrick sheaves and the like. C. F. Perkins and Perkins-MacIntosh Petroleum Tool and Boring Company Limited.  
 27855. Apparatus for applying lubricant to the wheels of vehicles. J. H. Jones.  
 27856. Sprag device for locking the wheels of vehicles. J. H. Jones.  
 27860. Steam generators. Soc. Anon. dos Etablissements Delaunay-Belleville.  
 27868. Production of high-grade steel and slag rich in soluble phosphates. Deutsche-Luxemburgische Bergwerks- und Hütten-Akt.-Ges. and A. Vögler.  
 27886. Ratchet device for rock drills and like purposes. J. E. Brown.  
 27888. Gas producers. A. Sahlin.  
 27900. Methods of electrically welding steel. W. Andrews.  
 27901. Apparatus for pit cages, hoists, and the like. S. White.  
 27902. Apparatus for moulding. A. N. King and F. Holmes.  
 27903. Apparatus for gas and power installations. A. H. Lymn.  
 27904. Water-tube boilers. Clarke, Chapman, and Co.  
 27905. Apparatus for raising water. A. Woodson.  
 27906. Apparatus for raising water. G. Lister.

27954. Grading or screening apparatus. J. Engels.  
 27960. System for taking the ore from mines. G. F. Despatures.  
 27962. Manufacture of ammonium sulphate. J. Y. Johnson. Badische Anilin und Soda Fabrik, Germany.)  
 27964. Hot working iron and iron alloys. C. A. Allison. (International Metal Products Company, United States.)  
 27966. Metallic iron and alloy product, and process of manufacturing same. C. A. Allison. (International Metal Products Company, United States.)  
 27970. Method of and apparatus for producing blasting charges in which liquid air is used. A. Kowatch and C. A. Baldus.  
 27973. Means for controlling electric motors. J. E. Olvis.  
 27976. Device for fixing check tickets or tallies to goods trucks and the like. H. Kleinholz.  
 27977. Tanks for separating combustible liquids and sludge from waste water. A. Kützer.  
 28015. Generation of steam from the heat contained in slags. C. Vautin.  
 28048. Reheating furnaces. F. K. Siemens.  
 28049. Regenerative gas furnace. F. K. Siemens.  
 28055. Discharging apparatus for vertical retorts. S. Glover and J. West.  
 28060. Device for dressing castings and the like. T. Stieglmeyer.  
 28061. Process and apparatus for hardening articles of iron or steel, for instance tools, files, or the like. P. Orywall and G. Bauer.  
 28094. Miners' refuge when sinking shafts, and luminous beacons to work by, instead of dangerous lamps. E. J. Hobbs.  
 28117. Skips for conveying and discharging coal, coke and the like. Robert Dempster and Sons Limited and W. Mitton.  
 28118. Automatic apparatus for filling skips or other receptacles. Robert Dempster and Sons Limited and W. Mitton.  
 28123. Process of utilising the energy of furnace gases. R. MacLaurin.  
 28191. Extraction or recovery of valuable products from clay and the employment thereof in the manufacture of bricks and the like. G. P. Crowden.

#### Complete Specifications Accepted.

To be published on December 24, 1913.

1912.  
 22218. Weighing machines. Manufacture d'Horlogerie de Bethune.  
 27545. Fluid-pressure engines and pumps. Vane.  
 27624. Control of electric motors. British Thomson-Houston Company (Allgemeine Elektrizitäts Ges.).  
 27633. Electric batteries. Lowe.  
 27662. Conveyors or screens for coal or other minerals or materials. Berrisford.  
 27714. Safety lamp for mines. Palmer.  
 28108. Rotary converters. Phoenix Dynamo Manufacturing Company and Pohl.  
 1913.  
 544. Facing or milling machine. Paterson and Widnes Foundry Company.  
 2009. Systems for measuring the capacities of electric circuits. Campbell, Blackwell and Colpitts.  
 2805. Lixiviating apparatus for ores and other material. Robinson.  
 4556. Construction of the elevator or bucket-chain drums of screens. Taylor and H. R. Marsden Limited.  
 5342. Coke screens. Glasgow.  
 5790. Wagon and like couplings. Smellie.  
 6270. Centrifugal machines. Wrightson, Rinkist, and Head, Wrightson and Co.  
 6851. Open-hearth furnace ports. Carnegie.  
 7512. Air compressor. Sturme.  
 8863. Manufacture of metal bars, rails and the like. Dicks.  
 9312. Water-tube boilers. Babcock and Wilcox Limited  
 10483. Dams for mines and other places. Herzbruch.  
 19010. Air compressors or pumps. Drysdale and Displayer Company.  
 22054. Apparatus for lubricating the axles of colliery tubs and similar vehicles. Joseph Cook, Sons and Co. and Cusson.  
 22384. Automatic axle lubricator. Burrill.  
 22514. Method and devices for measuring the heating value of fuels. Junkers.  
 22723. Electric furnaces. Stassano.  
 22724. Electric furnaces. Stassano.  
 23228. Crushing jaw for disintegrating machines. Birchler.

#### Complete Specifications open to Public Inspection before Acceptance.

1913.  
 24355. Magnetic separators. Fried. Krupp Grusonwerk.  
 26987. Method of operating centrifugal compressors. Akt.-Ges. Brown, Boveri et Cie.  
 27347. Effecting the automatic interruption of the current in single electric conductors upon a short circuit or serious leakage occurring. Felten and Guillaume Carlswerk Akt.-Ges.

**Grimsby Coal Exports.**—During the week ended Thursday, the 4th inst., the exports of coal from Grimsby were shown by the official returns to total 29,105 tons to foreign ports and 805 tons coastal, compared with 30,448 and 548 tons respectively for the corresponding week last year. Shipments:—Foreign: To Antwerp, 241; Bergen, 1,408; Christiania, 665; Christiansand, 672; Copenhagen, 1,636; Dieppe, 1,032; Drammen, 1,646; Egersund, 463; Esbjerg, 205; Gefle, 2,304; Gothenburg, 1,018; Hamburg, 914; Ilborg, 200; Karlskrona, 951; Malmo, 1,478; Norrköping, 1,268; Randers, 520; Riga, 1,628; Rostock, 1,067; Rotterdam, 608; Skive, 1,063; Stavanger, 777; Stockholm, 1,810; Sundswall, 1,488; Svaneke, 309; Trondhjem, 1,952; and Vallo, 627. Coastal: To London, 205; and Lowestoft, 600.

### GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named **post free**.

- Local Taxation Returns: Part 3, 1911-12, 1s. 5d.  
 EXPLOSIVES IN COAL MINES ORDER, 13/11/13 (No. 1187), 1½d.  
 Trade Reports, &c.: Tongan Islands, Report for 1911-12 and 1912-13, 4d.; Swaziland, 1912-13, 3½d.; Bechuanaland, 1912-13, 3½d.; British Solomon Islands, 1912-13, 5d.  
 Boiler Explosion at Huthwaite, near Mansfield, Report (No. 2264), 2½d.  
 MINES AND QUARRIES FORMS: Nos. 24 and 25, 1d. each.  
 Trade and Navigation Returns, November 1913, 1s. 9d.  
 Colonial Survey Committee: Report, 1912-13, 4s.

### PUBLICATIONS RECEIVED.

- THE COAL RESOURCES OF THE WORLD (three volumes and atlas). Edited by W. McInnes, D. B. Dowling, and W. W. Leach. Toronto, Canada: Morang and Co. Limited.  
 MICROSCOPIC ANALYSIS OF METALS. (Second edition.) By Floris Osmond. London: Charles Griffin and Co. Limited. Price 8s. 6d. net.  
 A MANUAL OF AMBULANCE. (Sixth edition.) By J. Scott Riddell. London: Ch. Griffin and Co. Limited. Price 6s. net.  
 THE SAMPLING AND ASSAY OF THE PRECIOUS METALS. By E. A. Smith. London: Ch. Griffin and Co. Limited. Price 15s. net.  
 THE "MECHANICAL WORLD" ELECTRICAL POCKET BOOK FOR 1914. Manchester: Emmott and Co. Limited. Price 6d. net.  
 "Journal of the Chemical, Metallurgical and Mining Society of South Africa" (Vol. 14, No. 4), October, price 3s.; "Cassier's Engineering Monthly" (Vol. 44, No. 6), December, price 1s.; "Publications de l'Association des Ingénieurs de l'Ecole des Mines de Mons" (Tome 7); "Report of the Glamorgan Education Committee on Summer Mining School and Tours in 1913"; "The Journal of the Monmouthshire Colliery Officials' Association" (Vol. 3, No. 1), December; "Possible Causes of the Decline of Oil Wells," by L. G. Huntley (Technical Paper 51 of the U.S. Bureau of Mines); "Bulletin et Comptes Rendus Mensuels de la Société de l'Industrie Minérale" (Tome 4, No. 11), November; "Revue Universelle des Mines et de la Métallurgie" (Tome 4, No. 2), November.

### CATALOGUES AND PRICE LISTS RECEIVED.

S. N. Brayshaw, (2 and 4 Mulberry-street, Hulme, Manchester) forwards a new index list of manufactures. We are informed at the same time that a new works has been taken at Vernon-street, Longsight, which will be used as a branch for the furnace department. Milling cutters and light mechanism will be made at Mulberry-street as formerly. The Brayshaw specialties include furnaces, pyrometers, steel hardening, light mechanism, milling cutters, &c. Some useful metric conversion tables are given in the catalogue.

Messrs. Siebe Gorman and Co. Limited (187, Westminster Bridge Road, S.E.) in addition to being one of the leading makers of rescue and diving apparatus, do an extensive business in small air compressors and vacuum pumps, generating sets, fans, blowers, &c. A new catalogue, which has just reached us, deals exhaustively with these and similar appliances. Air compressors are made for outputs of from ½ cubic foot per minute upwards and for pressures up to 3,000 lb. per square inch; and vacuum pumps for producing vacua up to 28 inches. One of the pumps illustrated is a two-cylinder, double acting, oil-driven air pump, in which the cylinder and valve chambers are wholly submerged; the same pump can be worked by hand, or be driven by electricity. Another pump is fitted with an arrangement whereby each cylinder delivers air independently of the other, or the air, if desired, is delivered from one nozzle. An interesting machine is a pump adapted as grouting apparatus.

**Home Office Prosecution at Haddington.**—Sheriff Macleod, at the Haddington Sheriff Court on Monday, heard evidence in a complaint brought at the instance of the Procurator-Fiscal against James Rankine Wilson, manager, Bankpark Colliery, Tranent, for four alleged breaches of the Coal Mines Act, 1911. The first three charges were for alleged failure to appoint a competent person to examine thoroughly once in every 24 hours the state of the rope or ropes in No. 2 shaft of the colliery; alleged failure to carefully examine the ropes; and alleged failure to have a partition in the engine-house separating the two engines used for No. 1 shaft and No. 2 shaft. The Sheriff found Mr. Wilson not guilty of any of these charges. The fourth charge was alleged failure to have the top and sides on the cages used in the shaft completely covered in. On this head the Sheriff found the charge proven, but in respect that Mr. Wilson, immediately the matter was brought under his notice by the mine inspector, had provided new cages, and that these had been running for six weeks before the prosecution was brought, the Sheriff admonished Mr. Wilson on that charge.



# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

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FRIDAY, DECEMBER 19, 1913.

No. 2764.

## NORTH OF ENGLAND INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

Mr. W. C. BLACKETT presided over a meeting of members of the North of England Institute of Mining and Mechanical Engineers, held in the Wood Memorial Hall, Newcastle-upon-Tyne, last Saturday afternoon.

### The Late Mr. A. L. Steavenson.

The chairman said that his first duty was to propose a vote of condolence with Mrs. Steavenson and her family in the loss of the institute's good old friend, Mr. A. L. Steavenson. Mr. Steavenson was one of the oldest members of the institute, who had served for many years upon its council. He was for many years a vice-president, and was at one time president. He had always had the best interests of the institute at heart. It was exactly 20 years since Mr. Steavenson was president of the institute. It was in 1855 that he first became a member. Right over that period of more than 50 years he gave his services ungrudgingly to the institute in order that the objects for which it was formed should be consistently carried out. At all the meetings he was an authority upon almost every subject that came up; and it was very few years after his election in 1855 that he read a paper upon "Coking," which stood as a standard article to that day. His advice and views upon other subjects—such as ventilation and the working of the ironmines in Cleveland, and kindred subjects—they always looked forward to with great interest.

The vote was passed in the usual way, the members rising.

The following were admitted into the institute:—Members: Mr. Wm. Spence Haswell, consulting engineer and agent, Milburn House, Newcastle-upon-Tyne; Mr. Frederick Geo. Moore, civil engineer, architect, and surveyor, 9-10, Fleet-street, Torquay; Mr. Jas. Turnbull, colliery manager, Oaktree House, Acomb, Hexham; and Mr. John Reginald Straker Wilson, engineer, 3, St. Nicholas's-buildings, Newcastle-upon-Tyne. Associate members: Mr. Herbert Morgan, H.M. sub-inspector of mines, 7, Nelson-road, Dudley; and Mr. Winfred Raine, Inglewild, Durham. Associates: Mr. Mortimer Croudace, colliery under-manager, Front-street, Pelton, County Durham; Mr. Wm. Goodin, H.M. sub-inspector of mines, 11, Emerald-street, Saltburn-by-the-Sea; Mr. Kenneth Malcolm Guthrie, colliery overman, Ashfield, Pelton, County Durham; and Mr. Thos. Geo. Kent, Washington Colliery, Washington Station, County Durham.

### American Mining and Coaldust Treatment.

Mr. SAMUEL DEAN's "Notes on Coalmining in the United States of America, with Special Reference to the Treatment of Coaldust and Haulage by Electric Locomotives" were open for further discussion, and a number of communications were read by the SECRETARY (Mr. Laurence Austin).

Mr. JAMES ASHWORTH (Vancouver) wrote that he assumed that Delagua Colliery was the mine referred to in the paper. An output of 6 long tons (2,240 lb.) per hewer and of 4.15 tons per employé was certainly a good record from a seam 5 to 6 feet thick, worked on the room-and-pillar method. There were a few data which, if given, would have added to the interest of this section of the paper, such as the dip of the seam, its depth below the surface, and the character of the roof and floor, all of which would affect the output per man employed. There were many mines in the United States of America where electricity could not be applied as described, and where compressed air would have to be employed instead. The size of the tubs or cars used for the transportation of the coal might easily form the subject of a very useful paper. He had found that tubs holding from 1½ to 4 tons, if loaded under a shoot, could, with advantage, be employed in steep mines; but in cases where the gradient was variable, and the tubs had to be jiggled down inclines, he much preferred tubs of a size which could be handled by men or boys when necessary. With regard to the use of steam and other means for saturating the air of a mine with moisture, it was necessary to remember a fact to which the writer's

attention had been drawn—namely, that in the United States of America it was not necessary to consider the effect of moist air of, say, 90 degs. Fabr., on the miners as the underground temperature in no case exceeded 70 degs. Many attempts had been made by leading men in that country to show that damp air was the best safeguard against the propagation of an explosion, and, in doing so, they had persistently given their figures in percentages of moisture, and not in grains per cubic foot. To get over the difficulty of temperature, attempts had been made to raise the temperature of the intake air by radiators and by the use of both exhaust and live steam, and the haulage roads had also been converted into the return airways. The best safeguard for both winter and summer was adobe or some similar dust. Mr. Dean had referred to Mr. John Verner's statement that there were always "two movements of the air" in a colliery explosion. There certainly were; but their sequence and direction depended entirely on the part of the mine in which they occurred. Thus, in the case stated, the effect was similar to that produced by steam in an ejector—namely, by the force of the blast sucking air from an adjacent road, followed by the pressure created by the explosion as a whole. In the path of the explosion, however, that would not occur, as the hot blast would come first, and would be followed by the air-current rushing into the mine to destroy the vacuum caused by the condensation of the hot gases resulting from the explosion. That inrush of air undoubtedly saved the men in No. 3 district, at the time of the explosion at Fernie, in 1902. In conclusion, the writer agreed with the author in his statement that "the maximum mine temperature at which the humidifying method would be considered effectual, and allowable, has not been determined," and, he would add, never would be.

Mr. GEORGE F. DUCK (Scranton, Pennsylvania) wrote that he had, in conjunction with Mr. J. C. Roberts, the engineer of the United States Bureau of Mines, made investigation into the explosion at the No. 3 mine, Delagua; and, upon consulting the meteorological statistics at Pueblo, 80 miles north, that being the nearest office of the United States Weather Bureau, had found that for a period of 21 years the following were averages for the month of November:—Temperature, 43.9 degs. Fabr.; barometer, 25.31 in. Humidity: 6 a.m., 62.9 per cent.; and 6 p.m., 41 per cent. On the day of the explosion the temperature and relative humidity were—for 6 a.m., 54 degs. Fabr. and 13 per cent., and for 6 p.m., 65 degs. Fabr. and 6 per cent. respectively. Anyone interested could calculate the tons of water removed per day, under these conditions, by an air-current which approximated in volume to 55,000 cubic feet per minute, with the mine temperature at rather more than 65 degs. Fabr. Mr. Dean had related the experience of two miners, who escaped in the Cokedale explosion, who had first felt an inrush of cold air, followed immediately by a hot wave from the interior of the mine. He (Mr. Duck) had interviewed the men in question a few days after the accident, and the description of their sensations under the influence of carbon monoxide corresponded closely with that of the late Sir Clement Le Neve Foster and his associates at the Snaefell disaster. With regard to the preliminary inrush of cold air, was that not probably due to the sudden expansion of the gases on their entering a large area of old workings just inbye the point where the men noticed the phenomena in question? That expansion would create a partial vacuum outbye, with a consequent inrush of cold air. Certainly at Cokedale, and he (Mr. Duck) believed, also at Lick Branch, there was a sudden expansion of the gases in an area of several acres just after they had left a narrow entry connecting these workings with the main road; and, at the inbye end, these old workings were connected with the outcrop through a second and correspondingly narrow entry, which the men who escaped had just entered.

Mr. A. C. WATTS (Salt Lake City, Utah), wrote with respect to the treatment of dust in coalmines in Utah, that sprinkling was first employed in the year 1890 in the Castle Gate Mine of the Utah Fuel Company, with

the view of preventing the dust explosions which had been of frequent occurrence. The practice of the Utah Fuel Company was so to wet the dust that, when taken in the hand and compressed, it caked and showed the impress of the fingers. During the night exhaust steam was turned into the main intakes, thus materially assisting in keeping the dust wet and preventing the air-currents from drying out the mines. No deleterious effect upon the health of the mine workers, due to a moist atmosphere, was apparent; in fact, it was claimed to be beneficial because, first, it reduced the amount of dust breathed, and secondly it reduced the temperature of the mine, the result being greater efficiency of both men and animals. He (Mr. Watts) was of the opinion that sprinkling had a tendency to reduce falls of roof rather than to increase them, as it had been noticed that most accidents occurred at the working-faces and were due to the miners not taking proper precautions in timbering. At these places the injurious effects of sprinkling, if any, had not had sufficient opportunity to show results. In the dry climate of the Rocky Mountains region the large volumes of dry air introduced into the mines by the ventilating systems dried out the shales and sandstones of the roof and caused them to disintegrate and fall, and sprinkling tended to counteract that.

Mr. JOHN VERNER (Chariton, Iowa) wrote that with respect to Mr. Dean's reference to his (Mr. Verner's) position in regard to the presence of air movements and their influence in causing explosive inflammation of coaldust, there was abundant and conclusive proof, furnished by many tests, that an explosive ignition of coaldust could not be produced by conductivity or radiation, and that the same kind of dust, used in the same apparatus and in the presence of the same sized flame, was exploded with unvarying success when the air and dust mixture was blown into the flame by an air blast. When a shot was fired—for instance, at the face of an entry—the air and what dust there might be present were driven away from the face by the expansive force of the heated and burning gases from the shot. That expelling force, however, was instantly checked, apparently through the effects of a growing depression at the face, caused by the rapid cooling of the gases there and their consequent rapid shrinkage in volume. That depression was immediately filled by an inrush or backrush of air along the bottom towards the face, while the heated gases in the upper part of the entry kept on their course outbye. The force and volume of the inrush of air along the bottom varied considerably in the different observations, the conditions in that respect being evidently determined by the size of the depressions near the face. In view of that it might be rightly concluded that, if the inrush of air along the bottom was of sufficient volume, and carried with it sufficient dust, and if it reached the heated gases near the face before they were cooled below the ignition point, then inflammation with explosive effects might take place. If explosive inflammation was effected in the first local explosion by the injection of the air and dust mixture into the highly heated or burning gases, explosive inflammation must be caused in every subsequent local explosion in the same manner. It seemed difficult to believe, but, nevertheless, it had been shown that, under favourable conditions, the explosion of the shot and the starting of the air inrush might be practically simultaneous occurrences. In one of the Altofts experiments, the presence of the air inrush was noted within a twentieth of a second after the explosive wave had passed a given point.

Mr. GEORGE S. RICE (United States Bureau of Mines, Washington, U.S.A.) wrote that the most noticeable contrast with European fields was the small number of workable beds in the bituminous coal measures, there being usually only two or three seams over 3 ft. thick in any one section, and sometimes only one seam; on the other hand, there was usually one seam from 5 to 10 ft. thick. Close competition led to only the best seams in any one locality being worked, and that, in turn, led to a totally different kind of mine development from that which prevailed in Great Britain or Europe. The excep-



his condition were found in the anthracite and bituminous coals, where the beds were numerous and some of great thickness. With regard to haulage, the electric trolley locomotive had, as Mr. Dean had pointed out, come into general use in a great majority of mines which were considered non-gaseous or only slightly gaseous—only a small percentage of the total number of mines in the United States of America were admittedly gaseous. The use of the electric trolley locomotive, however, while providing cheap haulage, had added new dangers. Several of the greatest American mine disasters of recent years had undoubtedly originated through the ignition of coaldust by the short-circuiting of the trolley wire on the occasion of wrecks, which had also stirred up the dust. Many smaller explosions were considered to have been similarly caused. The compromise was made in some States of permitting such locomotives on roadways that had a fresh or intaking current of air. "Topping," or building up with lump coal above the sides of the cars, was generally practised. Tight cars were not used, and the gates were often very loose, and the quantity of coal which dropped off in the course of a day's run was surprising. The use of large tubs undoubtedly permitted low transportation costs; but, on the other hand, they had their disadvantages, as they retarded the introduction of a longwall system of working with face-track, and the number of haulage accidents was doubtless larger than would be the case with smaller cars. There were good reasons why the longwall system had not been more extensively adopted. Inflexible labour agreements made it difficult for an individual mine to experiment with a new system, and, in comparison with European coals, most of the coals were very hard and, usually, there was no proper rock-material for pack-walls. Further, except in the anthracite and Connellsville districts, coal in the ground might be purchased very cheaply, and, therefore, the incentive to mine cleanly did not exist. The cheapest mined coals were those produced in West Virginia, where the thickness of the coal seams mined ranged from 4 ft. to 10 ft. The total costs of West Virginian coals in 1909 averaged only 3s. 3d. (79 cents). Calculations and studies had led him (Mr. Rice) to believe that the system of driving headings either to the boundary of the property or to some division, and withdrawing all coal on the retreat, would pay. Others had also arrived at the same conclusion, but profits had generally been so small and uncertain that it was difficult to enlist capital to make the necessary preliminary investment. According to statistics, the coalmines of the United States had in recent years worked on an average only 171 to 234 days per annum, the figure for 1911 being 211, and the hoisting was practically all done in one eight-hour shift. The mechanical capacities of the plant were as a rule greatly in excess of the daily output of the miners. It was probably safe to say that, taking the country as a whole, a third of the mines could be closed and the present total annual production still maintained. As already indicated, coaldust gave rise to one of the greatest and most difficult questions which had to be faced in the coalmines of the United States. As the roadways were made almost exclusively in coal, dust was continually coming from the weathering and chipping off of the coal-ribs as well as from the haulage; and, as the roof was usually strong, there was not as much admixture of shale and rock dust as prevailed in many European mines. The present general method of meeting this difficulty was to water the roadways and to moisten the air in the intake airways with exhaust steam from the fans; but too often this was not as well done as it should be. With regard to the reported inbye rushes of cold air toward the explosion, he (Mr. Rice) thought that when an explosion wave rushed along a dusty roadway, it might easily happen that air was drawn from a parallel or cross-entry before the explosion had finished its course. With safe holes, the use of permissible explosives, and proper shotfiring, there would be no occasion to check the ventilation by stopping the fans. He failed to see anything in the argument that oxygen was added, owing to the existence of a ventilating current, as contended by some; since an explosion checked and reversed any current previously moving towards the approaching explosion. Of course, if the oxygen content was very much lessened by absorption and combustion, it might have some influence, but analyses had not indicated that that happened in the several hours during which the fan was shut down; on the other hand, the methane content was liable to become dangerous at the faces. Undoubtedly the larger quantities of air employed in the ventilation of mines at the present time had enhanced the tendency to dry the coaldust, and therefore had increased that danger; but, hand in hand with the bigger air-current, which was good for the workers, should go increased means of preventing the propagation of explosions. Apparently, the reduction in the absolute amount of oxygen present at higher altitudes did not perceptibly affect the explosibility of gas or dust. The Primero mine (Colorado), which was situated at an altitude of 6,900 ft. above sea-level, had had two explosions, the last being violent and extensive; and while the origin was considered to be pockets of firedamp, the propagation was undoubtedly due to coaldust. The recent explosion at Dawson (New Mexico) was a true dust explosion. Analyses of mine air samples taken two days previous to the explosion, and of samples taken after the explosion, indicated practical freedom from methane. The coalbed was at an elevation of about 6,500 ft. above sea-level. Apparently, the degree of explosibility of gases did not appreciably change within the pressures compassed by human life—that is, from one atmosphere to several atmospheres. It was found that explosions in the lignite and sub-bituminous coals were practically unknown. That was quite different, as, for example, there had been a (New Mexico) explosion in a mine producing

sub-bituminous coal. There had also been lesser explosions in some of the other lignite mines. Laboratory and gallery tests at Pittsburg of the dusts from black lignite coals found in the West had shown that, despite a moisture content of 15 to 20 per cent., they were extremely explosive when fresh and finely ground. Usually, however, these coals did not produce so much fine dust as the coking coals. Nor must it be inferred that all bituminous districts in the United States were free from gob fires. They were of frequent occurrence in the high-sulphur coking (but not in the true coking) coals of some parts of the central fields, such as in Central Illinois and Iowa. Some authorities doubted whether the pyrites was responsible, and thought that the draw slate played some part in the production of a gob fire. The United States Bureau of Mines was about to begin a series of large-scale experiments at Pittsburg to follow up this matter.

Speaking for the whole country, the use of wet curtains mentioned by Mr. Dean was exceptional; watering with water-tank cars was undoubtedly the most usual method. In the mines in which exhaust steam from the fans was used, the steam was usually discharged by jets direct into the intake, and in a few mines the intake air was heated by steam coils in winter, in addition to the use of steam jets. To some extent fixed water-sprinklers were employed, but were usually supplemented by other methods of watering. Calcium chloride was also being used as a moistener to a considerable extent in West Virginia. Washing with water-hose was practised only to a limited extent outside of Utah, where it was required by the State laws. With the exception of a few isolated cases, the use of stonedust or rockdust had not yet been introduced into mines in the United States. In the arid portion of the United States he had urged the trial of adobedust or rockdust.

M. J. TAFFANEL (Lens, France) wrote that moistening the air with water-vapour might be a good process in mines in which the temperature was generally low, but would be less commendable or practicable in deep mines. The use of stonedust was much more advisable under the conditions applying in most European mines, and was now employed in almost all French dusty mines. It was, in that country, considered necessary to control the application of the process, and to verify from time to time the average proportion of ash in the mixture of coaldust and stonedust lying in the galleries, which proportion must be maintained according to the degree of inflammability of the pure coaldust. The Liévin testing station had constructed an apparatus called *Inflammateur à Oxygène et Flamme*, which was now used in several French mines and gave, by a simple and rapid operation, the degree of danger of the dust collected in the galleries. In order to be sufficiently safe, some mines must maintain the average proportion of stonedust higher than 70 per cent. That high percentage, sufficient, in many cases, to prevent or to arrest a coaldust explosion, would, however, be sometimes insufficient to stop a violent initial explosion due to firedamp, or one that had originated in some secondary galleries or in working places not treated with stonedust. To overcome that and to limit the propagation, the districts of the mine were separated by *arrêts-barrages*, an application which might now be found in about 1,800 places in French mines. Mr. Deau had referred to two cases in which the first intimation of a coaldust explosion was, according to the evidence, a blast of air rushing inbye. One must receive with some caution the evidence of men who had just escaped after a great explosion. The first current, which raised the dust ahead of the flame, was a direct current, rushing away from the centre of disturbance. The flame travelled in this direct current, leaving the smoke behind it, which, therefore, could not extinguish the flame, except in the case of slow explosions, when the cooling of the burnt gases drew the flame behind and brought on a counter current. These laws were necessary consequences of the theory of explosions, and had been verified by many experiments. He (M. Taffanel) had measured the speed of the direct current and had found it to be about 98½ ft. (30 m.) per second in the first stage of the propagation, increasing rapidly to 328 ft. (100 m.) and 656 ft. (200 m.) or more per second. At such considerable speeds it was, comparatively speaking, quite the same whether the fan stopped or not, and therefore, in his opinion, to stop the fan during shotfiring was a bad practice—useless in non-gaseous mines, and dangerous in gaseous mines. The stopping of the fan during some minutes had no practical effect upon the moisture of the mine and the danger of coaldust.

Mr. LEONARD R. FLETCHER (Atherton, Lancashire) wrote that he had been in communication with Mr. Dean in response to an enquiry from him as to a method of spreading stonedust by the use of compressed air at Atherton Collieries. In that method an ejector pipe was connected, at certain points, to the main range of compressed-air pipes, with one leg of the ejector placed in a tub of stonedust, and the dust was then easily spread. Mr. Dean's method was, of course, more efficient, owing to the fact that the tub containing the stonedust was kept moving slowly along, and, in consequence, he (Mr. Fletcher) imagined that the application would be a very even one. He was rather surprised at the small quantity (600 lb.) blown per hour by Mr. Dean's machine, as he would have thought that it would have spread about three times that amount. Mr. Dean had commented on the distance over which the air-current carried the fine stonedust, and he (Mr. Fletcher) had himself found very distinct traces of stonedust in working places three-quarters of a mile from the point of distributing. It was interesting to note that, in America, there was no use for small tubs, and that it was considered almost a crime to

keep a man at the coal face waiting for empties. He should imagine that recent legislation in this country had at last drawn attention to this point.

Mr. T. H. O'BRIEN (Dawson, New Mexico) thought Mr. Dean was somewhat hasty in claiming that any definite results had been obtained by their method of distributing dust.

Mr. H. F. BULMAN thought that it was doubtful whether the use of the large tub increased the output by the hewer. Towards the end of his shift a hewer might feel tempted not to try to fill a 2-ton tub, where he might be disposed to tackle a 12-cwt. tub. Probably the American miner was not so prone to restriction of output as was the British miner. Mr. Bulman quoted figures from nine collieries which showed that the colliery with the smallest tub had the highest average output per man. The advantages of the small tub were that it occupied less size and moved about more easily; but perhaps the large tub had hardly received the consideration it deserved.

The CHAIRMAN thought it a quaint idea that a wave of air should rush towards the advancing wave from an explosion. Of course, what really happened was that the returning air-current, which the two men mentioned in Mr. Dean's paper noticed, was rushing by its easiest path to the vacuum which happened to be left behind, and not before, the explosion. The barriers which M. Taffanel set up seemed to the speaker to be largely unnecessary if they could achieve the prevention of the beginning of explosions in mines. Were they to try to arrive at a conclusion as to the possible explosions in mines from the extremely limited means they had in a gallery, they would, in all probability, deceive themselves.

Mr. J. B. ATKINSON, ex-Government inspector of mines for the Newcastle district, thought that more might be done in preventing dust during the haulage operations. As to the movements of air in connection with explosions, it was quite possible after explosions to find, where there had been a *cul-de-sac*, evidence of reversed force, showing that the air had been compressed and had come out, and, in a great many cases, the explosion never went in at all, because the dust had never been raised by the through current, but simply through the compression of air that had taken place. At a small explosion at Whitehaven, a pure firedamp explosion in a stone drift, an overman was sitting in a cabin by the side of the road about ¼ mile away. He felt the explosion and came out of the cabin door, and found a current of dust-laden air coming in the direction of the origin of the explosion. It was simply the return current of air resuming its ordinary way laden with the dust. There was another point the speaker wished to emphasise, because he did not often see it mentioned, and that was that coaldust was more dangerous than firedamp in one respect. With firedamp they had both a maximum and a minimum quantity at which an explosion would travel; with coaldust there was a minimum, but no maximum, so far as they could observe. As many haulage roads contained above that minimum, they had always the conditions for a violent explosion extending along the whole length.

Mr. C. C. LEACH remarked that, in the second explosion at Cadeby, the explosion stopped when there was only 36 per cent. of stonedust in the coaldust on that road.

The discussion was then closed.

#### Inflammability of Pit Gas and Air.

Prof. W. M. THORNTON's paper on "The Comparative Inflammability of Mixtures of Pit Gas and Air Ignited by Momentary Electric Arcs" was further discussed.

Mr. ROBERT NELSON, H.M. electrical inspector of mines, London, wrote that the present paper appeared to him mainly to show that, of the three gases with which Prof. Thornton had experimented—coal gas, methane, and pit gas—pit gas was, in general, appreciably less sensitive than the other two. Both Prof. Thornton's papers on the inflammability of explosive mixtures of gas and air by electric arcs were in his (Mr. Nelson's) view reassuring, as they seemed to minimise such risk of explosion as had been regarded as attached to lighting circuits and to signalling circuits below ground.

Dr. F. C. GARRETT (Armstrong College) wrote criticising some details of the paper, and remarking that there was good reason to believe that the arc was not sensitive to small differences in the composition of the gas.

The CHAIRMAN stated that, on reading the paper, he was struck with one or two of the terms that were used and, as he was, at the same time, very much afraid, with his limited scientific knowledge, of tackling a professor, he shifted the burden of doing it to other shoulders by sending the paper on to Dr. Wheeler, at Eskmeals, for his comments. Dr. Wheeler, in his reply, regretted that some of the terminology—as, for instance, "explosive inflammability"—adopted in the paper was so obscure, and challenged the accuracy of the statement that the reduction of oxygen by means of an inert gas to 17 per cent. was sufficient greatly to hinder if not entirely to prevent the inflammation of methane. He stated that a number of experiments Mr. Burgess and he had made as to the limits of inflammability of methane with air having a reduced oxygen content



showed that the inflammability was not greatly hindered by the reduction of the oxygen content to 16 or 17 per cent.

Dr. THORNTON, replying on the discussion, said the whole point of the paper was the extraordinary degree in the increase of safety obtainable by the addition of nitrogen.—Replying to an interjection by Mr. J. B. Atkinson, Dr. Thornton stated that his theory was that the gases were not ignited by heat at all, but that it was entirely a matter of ionisation. In criticising the speaker's terminology, Dr. Wheeler was hypercritical. The speaker really would like to impress upon his chemical friends, Dr. Garrett and Dr. Wheeler, that when one was looking at a picture one did not spend all one's time criticising the brushmarks, but looked at the picture as a whole. His criticism of these gentlemen was that they did not see these things as a whole. By the electrical method one could get an accurate gauge of inflammability of every mixture at every point. His position was that the ignition of a gas was not thermal, but electrical—a position he hoped to develop shortly in another paper to be read before another society.

The discussion then ended.

#### Coalmining and Coalwashing in Belgium.

Mr. LEO DOREY FORD contributed two papers: "Notes on the Working of the St. Nicholas Pit of the Société des Charbonnages de l'Espérance at Bonne Fortune, near Liège, Belgium, with Special Reference to the Hydraulic Packing of the Goaf," and "Notes on a New Process for the Washing of Coal" at the same colliery.

In the first paper Mr. Ford stated that the royalty, which is situated near the northern limit of the coal basin, contains numerous seams, varying in thickness from 2 to 5 ft. In general the seams are fairly flat and regular. The general method of working is to drive winnings in the coal to the full rise, from which level galleries are turned away and continued to the boundaries. The coal between the various galleries is taken out in a series of long straight or stepped faces, which, generally speaking, are kept quite straight and as long as possible, and vary in length from 197 to 443 feet. A series of level stone drift from the shafts are driven at various depths to meet the seams, connecting them with the seams at frequent intervals by means of staple pits. Whenever possible—that is to say, when the faces are long and straight enough—the haulage is performed by means of shaking conveyors known as *couloirs*. The writer was greatly struck by the ease with which these conveyors are worked, by their efficiency, and by the very slight amount of trouble which they occasionally give. The *couloir* is simply a long shallow trough of wrought iron 0.118 to 0.157 inch thick, having a section 13½ in. wide by 2½ to 3½ inches deep, made up of short lengths of about 10 to 13 feet, and is operated by a compressed air or electric motor, which communicates a motion in an uphill direction to the entire *couloir*. In Belgium the methods of working are particularly favourable to the use of *couloirs*, which are sometimes worked without a motor where the slope is sufficient, and they are as firmly established and indispensable as the rails in the haulage roads. Systematic timbering is always employed, and very little, if any, of the timber is ever withdrawn. The invariable method of timbering the faces is to place half-round planks, flat side up, against the roof, with props in rows along the entire length of the face, the distance between each row, known as a *hève*, being from 40 in. to 48 in. The distance between the individual props in a row varies from 40 in. to 60 in. according to circumstances of roof, &c. When the top is bad, owing to fractures or short "ramble," faggots of wood, 1 in. to 1½ in. in diameter, are placed from plank to plank, and these in turn are, when necessary, lofted with brushwood. This combination of faggots and brushwood is very effective. When the faces are very bad and heavy, owing to the presence of breakers running parallel with the face, short cross-planks are used supplementary to and in the same way as the faggots, but at greater intervals, which, of course, depend on the nature of the roof.

Hydraulic packing has been introduced within the last two years at the St. Nicholas pit as an experiment, with the view of avoiding, if possible, the large amount of damage done to the surface and the expenses incurred thereby. With regard to the costs and the effect on the roofs of the faces hydraulically packed, and also on the roadways, the results have been very satisfactory. Like all other methods, however, it has its drawbacks, one of them being that the mine is not made any pleasanter to work in, especially as the seams are so flat, on account of the large quantity of water necessarily thrown into the workings. On the other hand, hydraulic packing does away entirely with the dust nuisance and its attendant dangers, and plays a large part in rendering the air of the mine cooler. At the present moment only two seams, both of which are largely worked out, are being packed hydraulically, and in one of them (the Pawon) there is only one face. This face is about 295 ft. long, and has a total height of 27½ in., of which 23½ in. is coal. The seam is worked with an electrically-driven bar cutter in conjunction with a *couloir*, and advances regularly 40 in. per day. As much of the dirt as possible is cast into the goaf, and this helps to form the end packs and part of the stowing. In the other seam (the Quatre Pieds) there are four faces, all of which are packed hydraulically. Three of the faces are worked with electrically-driven bar cutters, and they all employ *couloirs* for the transportation of the coal. The fourth face is worked by hand. In general, it may be said that one face per day is packed, although occasionally it is necessary to stow two, in which case they have to be taken separately one after the other. The

plant allows, at its maximum, of the packing of six faces of from 262½ ft. to 426½ ft. in length, corresponding to an output of about 400 tons, or rather more, per day. It is not advisable to pack more than four *hèves* at once, on account of the danger from falls, also because, when the space packed is too wide, the stowing is not so efficient, and spaces are left next to the roof. When the roof is very bad, it is necessary to pack every two rows advanced. Mr. Ford gave a very detailed description of the method of packing and the plant employed for the purpose, and stated that the greater part of the materials employed for packing consists of dirt from the washery, and amounts to about 170 tons of soft shale per day, varying in diameter from 9 to 2½ inches. In the event of there not being sufficient *débris* from the washery, a small jaw concussion crusher, driven by a 25-horse power electric motor and capable of crushing 15 tons of coal shale per hour to a diameter of 1½ in., is provided. The material, on leaving the crusher, falls on to a shaking screen, also worked by the 25-horse power electric motor, which delivers all particles into a hopper, whence they are taken by tubs to the tip heap; the remainder of the material falls into another hopper, and thence directly into the pit by way of the shoot. The general cost amounts to about 5½d. (58 c.) per ton of coal, calculated on the output from the faces packed hydraulically. This amount is made up approximately in the following table:—Cost of hydraulic packing of goaves per ton: Labour and wages, 1.631d.; laying of principal mains and the costs occasioned by the rare stoppages, 0.096d.; planks, faggots, &c., for making the draining fences at the faces, calculating 2.688d. per metre (39½ in.) of face, 0.768d.; wedges, bolts, &c., 0.384d.; upkeep, additions and the paying-off of the first installation, 1.920d.; upkeep of pump and the paying-off of the cost of new underground reservoirs, &c., 0.384d.; pumping, 0.384d.; total, 5.567d. The first cost of the installation amounts to a total of £4,280, made up as shown:—First cost of installation of hydraulic storing plant, sinking of pit for *débris*, &c., £400; reservoirs at the surface for water, £300; pipes and valves at the surface and at the 114½ ft. (35 m.) level, £160; installation of crusher, &c., £500; signalling apparatus, £120; pipes, £2,800; total, £4,280. In addition, £1,000 should be included for dealing with the water underground in the form of reservoirs, &c.

In his second paper Mr. Ford said the process for the washing of coal, which employs solely ascensional, descensional and horizontal currents of water, is at the present moment just emerging from a more or less experimental stage. The only existing installation of any importance, other than that at the St. Nicholas pit, which has also proved a great success, is at Pont à Vendin, France, where the Société des Mines de Lens have erected at their central washery a plant for washing two sizes of *finer*. Experiments were originally made with an apparatus of the Stromapparatus type, which led to a modification and improvement of the apparatus and to the invention of a new one, to which the name of "Rheolaveur" was given. The Rheolaveur gave such unexpectedly good results that the management finally decided to do away entirely with jigs and to adopt it as the sole method of washing. As yet the transformation is not quite complete, three jigs being still employed for the two largest sizes of coal washed, and the arrangement of the washery, though satisfactory, is not altogether such as would be adopted for the installation of an entirely new plant. The Rheolaveur is in its elementary form simply a chamber partly rectangular and partly pyramidal, having a dividing partition or wall across the upper portion of its breadth. The portion of the chamber on one side of this partition communicates with an opening in the trough above, while the other portion communicates with a water pipe. The bottom of the chamber is provided with a circular opening. The action in the chamber is as follows:—A current of water is admitted by water pipe from a reservoir so arranged as always to maintain a constant head; this current first descends, then, after passing under the dividing partition, splits into two, one branch of which ascends and flows into the trough above, while the other descends and is evacuated at the circular opening. The quantity or the velocity of this flowing water is regulated by means of a suitable tap or valve placed on the pipe. The ascending split has for its function the arresting and carrying back into the trough of the particles of lesser density which it is not desired should fall, and also to lift, in a certain measure, the main stream of water and materials in the trough itself above the point, thus lifting the lighter particles, and further preventing their tendency to fall with the denser grains. These latter, as they fall against the ascending current, are flushed away through the orifice by means of the descending current. The orifice of discharge is regulated by a special valve which, in itself, forms another means for the regulation of the velocities of the ascending and descending currents. The size of the orifice is, in order to avoid loss of water, so adjusted as to be just sufficient to permit of the exit of the denser grains without causing obstruction in the chambers. In practice, the employment of a series of chambers such as those described entails the unnecessary consumption of a large quantity of water, and leads to the complication of the apparatus and distributing pipes, and difficulty in supervision. To avoid this, a number of washing elements, each comprising an inlet compartment and an upward passage, are combined and arranged, according to the various purposes for which they are intended, to discharge into a common chamber having a single orifice of discharge only.

In comparison with jigs, the water consumption with Rheolaveurs shows a considerable decrease for all sizes of coal up to, approximately, 1½ in., but from 1½ to 2½ inches, above which size it is seldom necessary to wash, as the coal can readily be hand-picked, the water consumption shows a considerable increase. The extra power necessary for the pump is, however, amply

compensated for by many savings in other directions. In any case, as the bulk of the water is used over and over again, the water consumption is not of great importance, as the washery can be so arranged that little water is lost, and this loss can be compensated by a small main from an auxiliary source. The plant at St. Nicholas pit, as at present, is capable of dealing with 80 tons per hour.

Mr. Ford's paper included a very careful and detailed description of the apparatus of which he wrote.

Discussion on these papers was deferred until next meeting, and the members adjourned.

#### FLUCTUATIONS IN THE COAL TRADE.

##### Mr. D. A. Thomas on Future Cycles.

'At a meeting of the Royal Statistical Society held on Tuesday evening at the Royal Society of Arts, John-street, Adelphi, London, under the chairmanship of Prof. F. Y. Edgeworth, the president, a paper on "Trade Fluctuations" was read by Mr. D. H. ROBERTSON.

At the outset of his deliberations, Mr. Robertson said it had been argued that the length of the boom and the severity of the depression in any trade depends largely on the time needed to construct and put into working order new instruments of production in response to a rise in prices. It was suggested that in the case of coal that "period of gestation" was longer than in the case of other products. He submitted the following table of figures indicating the production and price of coal for each year from 1868 down to 1912:—

Year.	Pig iron production. Million tons.	Coal production. Million tons.	Pig iron prices. B. of T. indices.	Coal prices. B. of T. indices.
1868	5.0	103	—	—
1869	5.4	107	—	—
1870	6.0	110	—	—
1871	6.6	117	72.1	58.3
1872	6.7	123	119.7	93.9
1873	6.6	127	148.0	124.0
1874	6.0	125	111.9	102.8
1875	6.4	132	86.3	79.3
1876	6.6	133	74.2	65.4
1877	6.6	135	68.2	60.8
1878	6.4	133	63.7	56.6
1879	6.0	134	61.3	52.2
1880	7.7	147	76.1	53.0
1881	8.1	154	65.8	53.5
1882	8.6	156	66.8	54.4
1883	8.5	164	61.8	55.7
1884	7.8	161	54.7	55.6
1885	7.4	159	51.3	53.5
1886	7.0	157	50.6	50.4
1887	7.6	162	54.9	49.6
1888	8.0	170	50.4	50.1
1889	8.3	177	59.5	60.9
1890	7.9	182	72.6	75.0
1891	7.4	185	62.4	72.4
1892	6.7	182	61.2	65.9
1893	7.0	164	55.7	59.1
1894	7.4	188	54.6	63.0
1895	7.7	190	56.9	55.8
1896	8.7	195	56.7	52.8
1897	8.8	202	57.3	53.4
1898	8.6	202	62.5	59.3
1899	9.4	220	82.6	63.7
1900	9.0	225	100.0	100.0
1901	7.9	219	74.6	83.1
1902	8.7	227	77.1	73.8
1903	8.9	230	75.1	70.1
1904	8.7	232	69.6	66.7
1905	9.6	236	75.0	63.4
1906	10.2	251	83.2	65.5
1907	10.1	268	88.2	76.5
1908	9.1	262	75.3	76.5
1909	9.5	264	76.9	67.8
1910	10.0	264	81.2	70.4
1911	9.5	272	76.2	68.5

Proceeding, Mr. Robertson went on to say:—

"It will be noticed from the figures given in the table that the price of coal tends to reach both its maxima and its minima later than that of pig iron. While there are other causes for this, part of the explanation seems to lie in the longer period of gestation necessary in the coal trade. According to Mr. Hull it takes 'practically a year' in America to build a new blast furnace. From an English ironmaster I gather the impression that in this country some fifteen months would be required. But a coalmine which is begun to be sunk now will not be in working order for several years. Further, it seems likely that the period of gestation in the coal trade should have become longer during the past half century with the necessity of sinking deeper shafts. It is likely, perhaps, moreover, to be longer for those mines sunk towards the end than for those sunk towards the beginning of the boom."

"This *a priori* reasoning is confirmed by the figures. In the boom of the 70's the first considerable rise in prices took place in 1872, and began to make its full effect on output felt in 1875. Between the break of prices in 1873 and the new influx of 1875 there was restriction of output. Again, since new enterprises were apparently begun at least as late as 1874, production was not restrained till 1878, though, indeed, by the latter year some of the worst mines had begun to go out of use.

"In the next cycle the first considerable rise in prices was in 1882; consequently (assuming the period to have increased to about five years) the new influx was delayed till 1887. High prices continued till 1884 and large production till 1889; but by 1890 (five years after the slump) we might expect to find some restriction, had not a new demand for coal arisen in that year, so that the



his cycle is, as it were, telescoped into the of the next.

the next cycle high prices began in 1889 and in 1891, so that (still with a five years period) the new influx began in 1894 and increased till 1896. Again, a new demand for coal arose in 1897, so that this cycle and the next are telescoped together. The assumption of a five-year period also explains the curious stagnation of production, in spite of rising prices, in 1898. Investment in new mines does not cease altogether, even in years of low prices; it is only less extensive than in times of boom. But in the year of the great strike (1893) it is likely to have been considerably less than usual—hence the comparative shortage in 1898.

"In the next cycle the analogous quinquennia are 1897-1902 and 1901-06, leaving room for restriction of output in 1901. Again, as on every occasion except 1878-79, the final curtailment is rendered superfluous by rising demand. In the next cycle it seems more reasonable to refer the new growth of output in 1909 to failure to check permanently the vast additions to the source of supply made in the 1900 boom than to the boom of 1906-07, which supposes an improbably short period of gestation. Indeed, I have heard of enterprises undertaken in the 1900 boom which, even in 1912, were not in working order; and, of course, in every case the new mines of one cycle form a permanent addition to productive capacity, ready to take advantage of the first stirrings of demand in the next—witness the large expansion of output under an apparently inadequate price-stimulus in 1880-81.

"Mr. D. A. Thomas, indeed, in his celebrated paper before this Society in 1903, asserted that very few enterprises had been started in the 1900 boom, but his estimate seems to have been falsified by the subsequent course of prices and production. But it seems not impossible that the period of gestation is becoming so long as to exert an appreciable influence against over-investment in times of boom. In this case a secular change, such as the working-out of the English coal-fields, is important not only in itself, but in its influence on 'cyclical' fluctuation."

The length of the depression and the date of the beginning of the next boom depended in part on the length of time of the instruments of production. Karl Marx long ago suggested that the decennial character of the crises was due to the fact that the fixed capital of the world needed replacement every ten years. Viewing the pig iron and coal industries from this aspect, Mr. Robertson said we have to consider not only the length of life of the instrument, but also the facility with which it can be temporarily put out of use. This furnished an additional explanation of the greater severity of depression in the coal than in the pig iron trade. For technical reasons a mineowner was very unwilling to shut down a colliery, but the damping down of a blastfurnace, though inconvenient and costly, was not half so serious a matter. Indeed, in this country, even in boom years, a large percentage of the furnaces in existence was out of use. Hence, even if over-investment had been less in coal than in iron, its effects on prices were more severe.

Mr. D. A. THOMAS, who opened the discussion, criticised the paper exclusively from the standpoint of a South Wales coalowner. He rather differed from Mr. Robertson in his statement that it takes longer now to sink a coalmine than it did a few years ago. No doubt pits were sunk deeper than formerly, and, owing to greater improvements in the methods, required more capital, but his experience was that to-day shafts can now be sunk so as to produce coal in a shorter period and in sufficient quantities in a more limited time than a generation, or half a generation, ago. He knew of pits being sunk 500 yards and producing coal in three years—providing, of course, the unexpected did not happen, such as an inflow of water sufficient to prevent or hinder the workings. Mr. Robertson had also referred to the shortage of coal in 1898. He, however, appeared to have overlooked the fact that in that year there was a prolonged strike in South Wales, which lasted about five months. Then, again, Mr. Robertson, after his flattering description of the paper he (Mr. Thomas) read before the society 10 years ago, said that the estimates therein given had been falsified by the subsequent statistics of production. He had at once to admit that his estimate might require revision, but having looked at what happened three years before the paper was read, he was inclined to think that his figures were right. But the period of gestation, as it bears upon industrial cycles of trade, was only one factor out of very many—perhaps more important and constantly varying—factors in this connection. The experience of 10 or 20 years ago was only a very small guide to what they might expect in the future. For instance, in the South Wales coal trade, there had been, during the five years 1907-12, no increase in the production. This had been due to constantly recurring labour troubles. Another factor bearing upon the future course of events was the enormous amount of legislation that had affected the coal industry in the last few years. Another factor which should not be overlooked in considering the future of the coal trade was the fact that trade unionism in the coal industry exerts a very much greater influence

than it did a few years ago, and its influence was really restrictive in the matter of production. The common experience was that as prices and wages rise, there was a diminution of the output per man per annum. Then again, as prices fall, the fact that the men work harder accentuated the depression that followed the period of the boom. Mr. Robertson, in his table, had taken annual production and annual prices as guides for his theories. He would suggest that if that gentleman was to deal scientifically, and go further into the matter, he would require a more sensitive barometer. He would require to take the facts month by month if he wished to arrive at any co-relation between production and prices. His own view was that in future those periods or cycles of fluctuations would be shorter. He based it upon the fact that with greater facilities of intercommunication, and with a greater knowledge of trade in its wider aspect, fluctuations would not be as frequent or long prolonged as in the past. Enormous strides had been made during the past half century. Steamships had taken the place of sailing vessels, and they could do half a dozen voyages in the time the latter used to take. Then again, by telegraphic and telephonic communication they could do business in a mere fraction of the time its transaction used to take. These two factors in themselves must result in shorter periods of trade fluctuations.

There was further discussion, but no direct reference was made to the coal industry.

Mr. ROBERTSON, in acknowledging a vote of thanks and replying to the discussion, expressed regret that he had unintentionally misinterpreted Mr. Thomas. He did gather from that gentleman's paper that investments had not been greater during the 1900 boom. He had found that rather difficult to reconcile with the slow response to coal prices in 1906 and with the large increase in production, and wondered whether, after all, there had not been a good deal of investment during the 1900 boom.

#### MIDLAND INSTITUTE OF MINING, CIVIL AND MECHANICAL ENGINEERS.

##### Annual Meeting.

The PRESIDENT (Mr. W. Hargreaves) took the chair at the annual meeting of the Midland Institute of Mining, Civil and Mechanical Engineers, held at the Great Northern Hotel, Leeds, on December 9, 1913.

##### Presidential Address.

In his presidential address, he said the past year had not been an uneventful one in the coalmining industry, for although, happily, they had witnessed no great strike, as in 1912, there had been many of a minor character and threats of more; but the most important point to be noted was that the industry has enjoyed a remarkable spell of prosperity despite these detrimental influences and the subsidence of the general trade boom, which now was showing signs of coming to a premature end, owing partly, probably, to the war in the Near East and the complications which followed it. After a period of lean years, collieries had been able to make satisfactory progress of late, although by no means so great as was generally believed. The cost of production had been greatly increased by recent industrial legislation, by large advances in prices of every kind of stores, and by the advances in miners' wages. The higher wages earned by miners had undoubtedly inclined them to work shorter time, and this inclination had been encouraged in many districts by the wrongful interpretation of a rule in the Minimum Wage Act, by which a workman who attended 80 per cent. of the days the mine worked in any week did not forfeit his right to the benefit of the Act. During the past year the coal industry had probably been operating at not more than 75 per cent. of its full productive capacity, and that in the same period the cost per ton of coal had increased more rapidly than ever before known. The boom in trade, with a consequent advance in selling prices, had for the moment submerged the fact of this greatly increased cost of production, but much of this increase would be found to be permanent.

In 1882 the average price at the pit's mouth in England was 5s. 8d., in Wales 5s. 9d. and in Scotland 4s. 5d. per ton; while in 1886 it was even lower, being 4s. 11d., 5s. 2d. and 4s. respectively. In 1911 the corresponding averages were 7s. 9d., 11s. 5d. and 6s. 10d. Taking England alone as the "predominant partner" and adding to the 1911 price another 2s. 6d. as being roughly the increase obtained by collieries on contracts this year, they got 10s. 3d. as a probable average for 1913, which represented an advance of nearly 110 per cent. during the last 27 years.

If costs of production were reflected in selling prices of coal, then, despite all the progress which had been made in the scientific mining of coal during the period in question, the cost of production had gone up over 100 per cent., and this, he believed, was borne out in actual practice. They might, perhaps, console themselves with the knowledge that this advance has been even greater in many other countries. Whilst we have long lost supremacy as the cheapest and chief coal-producing country, we lead the world in the effort to secure safety in our mines. It seemed almost a mockery of their efforts to render underground work safer that no sooner had the new regulations come into operation than one of the worst mining disasters the world has ever seen

should horrify them all. The publication within the last few days of the "Fifth Report of the Explosions in Mines Committee" had come at a peculiarly welcome time, and he felt sure the mining industry will recognise the near approach of finality; and the members of that institute would hail with satisfaction the reward which had fallen to the persistent advocacy of Dr. Garforth. Further, having got this expression of opinion, it should not be unreasonable to expect the Government to relieve all collieries in which roads are stonedusted up to requirements of all restrictions regarding dry and dusty mines, as suggested by Mr. W. C. Blackett and supported by Dr. Haldane.

The President said he believed also that they had entered upon a new era in the lighting of the working-places of mines. Within the last couple of years the electric lamp had received an enormous fillip, and would appear to be fairly on the way to oust all other kinds of light, and they had to-day several types of miners' electric lamps which were a veritable blessing to the underground workers who had the good fortune to use them. In such mines the nightmare of the deficient lamp was removed from everybody, the workman was better able to detect and protect himself against defects of roof and side; and whilst the owner might have to pay more for the light, he should be able to reckon on better and cleaner workmanship, a reduced compensation account for accidents, and (as their medical experts told them) a very hopeful prospect of checking and eventually curing miners' nystagmus.

As to the future of the oil lamp, it must of necessity remain as a detector of gas, for the present at all events; but the speaker had submitted to him an instrument for the detection of gas, of remarkably simple design and construction, light, portable, and strong, and capable of detecting either methane or carbon dioxide in most minute quantities, compared with the oil safety lamp. He was not suggesting in ordinary inspections a need for testing down to any such low percentage as this apparatus would give; but up to now the only means for the detection and estimation of the percentage of gas whilst in the mine had been by the flame of the safety lamp. Anything more definite than this could only be ascertained by taking samples of air and bringing them to the surface for analysis. The inventor had promised to read a paper before the institute on his gas detector. The use of some such instrument in conjunction with the electric lamp should be a great help to the colliery official, who was at present compelled to make his inspections with the feeble light of the oil lamp.

The compulsory searching of workmen had had a most salutary effect on the careless introduction of matches and other means of producing a light into our mines. Another class of accident—perhaps the one which is the greatest source of loss in mines—namely, those arising from falls of roof and side, had been seriously tackled both by legislation and managerial initiative, but it was undoubtedly to the workman himself they must look if they were to see the mortality tables further improved. On the whole, they might claim to have succeeded in making the miner's occupation a less dangerous and a much healthier one than many other callings which were not supposed to be dangerous or unhealthy at all.

The legislation which had been passed lately, directly and indirectly, affecting the coalmining industry formed a fruitful subject of discussion wherever mining men congregated together, and gave rise to many questions of a controversial nature. There was no disguising the fact that they were suffering from a plethora of legislation. Both the Workmen's Compensation Act and the National Insurance Act had given rise to a serious amount of malingering. Since the Workmen's Compensation Acts of 1897 and 1906 came into operation, the number of cases claiming compensation had greatly increased, and many medical men to-day believed that the duration of slight injuries were greatly extended by the fact that compensation was not payable for one week after the accident, and was then dated from the date of injury. Sir John Colley, in a lecture on "Malingering in Accident and Disease," a few months ago, made a summary of his recommendations for preventing malingering, which were as follows:—

1. A system of organised lay inspection.
2. Repeated periodical independent medical supervision.
3. Complete independence of the medical attendant.
4. Some system of registration which shall make apparent what is the full amount of sick pay and other benefits, if any, of which the patient is in receipt.

It was noteworthy that immediately payments had to be made under the National Insurance Act for sick benefit, the question of malingering attained notoriety, and they might perhaps hope that the prominence thus given to it might be made the basis of some relief. Apart from malingering, some of the decisions in the courts in compensation cases had been strained to breaking-point in favour of the applicants. That was as it should be, perhaps, but when they found one colliery ordered to pay compensation in the case of a man who was scratched by a cat while playing with the animal in the stable, they wondered how much further the law might be stretched.

Other measures which were all now in operation and affected the coalmining industry alone were—the Eight Hours Act, the Mines (Rescue and Aid) Act, the Minimum Wage Act, and the Mines Regulation Act. He did not intend to say anything about the Eight Hours Act—it was too much like flogging a dead horse. Its worst feature was that it has cast the burden on the collieries least able to bear it, and incidentally has not conferred any real benefit on anybody. The Rescue and Aid Act was one which engaged their sympathy, and the coalowners of the district were doing their best to comply with the requirements both in letter and in spirit. The unfortunate repetition of fatalities to trained



users of portable breathing-apparatus, which, of course, had its limitations, had caused much criticism as to its practical utility, and he would be a bold man who declared any apparatus perfect on the market to-day. The splendid records of service rendered, however, in various parts of the country to life and property have given these appliances a place in the equipment of a modern colliery outfit.

The Minimum Wage Act was another instance of a law which had satisfied nobody. There could be no doubt that it had operated to the detriment of many collieries, while the miners were no more contented than they were before the great strike of 1912, which brought it about. The men were dissatisfied with most of the awards under it, and the Miners' Federation of Great Britain, judging by its Scarborough programme, regarded it as only an earnest of what was to come. What the Act is costing the coal industry at the present time it was difficult to ascertain with any amount of precision, but it was certain that the country generally still regarded the principle with misgiving. With the principle of a living wage they might agree, but there was surely no need for State interference where powerful trade unions were concerned.

The effect of the General Regulations under section 86 of the Coal Mines Act, 1911, in actual practice could hardly be gauged as yet. But some of them were regarded with much misgiving by mining engineers, as being just as likely to increase as to reduce the number of accidents in mines; while the cost of carrying the Act into effect must be a severe tax upon the resources of even the most profitable and best conducted collieries, and this Act was so contrived that Whitehall was apparently able to issue as many more as it likes without the consent of Parliament. There seems to be great danger, therefore, of the industry being bound in red-tape fetters, if it was not in that condition already. Forms and notices of all kinds abounded, and the colliery manager's signature was always in demand, debarring him from attending to more important duties which might urgently need his undivided attention. Indeed, it would appear that the Home Office, through its technical advisers, was now to a large extent "running" the coalmining industry, and that its attitude was likely to become more arbitrary as time went on. The Government experts were very capable men, and there was little or nothing to be said against them; but the official mind nearly always had a weakness for a multiplicity of documents and pigeon holes which was apt to disagree with the practical man in charge of a mine and responsible for it, who knew all its peculiarities and particular necessities more thoroughly than anyone else could possibly do. There might be wisdom in a multitude of counsellors, but in an overwhelming multitude of rules, some of them more or less petty, vexatious and anomalous, there was only bewilderment and the seeds of disaster. In view of the extra burdens laid upon the coalmining industry, it was little wonder that selling prices had increased materially since 1911, and the greater proportion of that advance must be maintained unless many collieries were to close down. A good deal of competition for labour was making itself felt at present, and was becoming of serious importance in the older, as well as in the newer, colliery districts, and he saw a prospect of much greater internal competition for experienced workers.

The president thought the coal industry in their day, at all events, need have no serious alarm for its future as threatened by oil; and as the years roll on the mining engineer must be in more urgent request than ever. With the working of seams formerly neglected as unprofitable, with the conduct of operations at greater depths, the growing necessity of keeping down the cost of production as much as possible, and the exigent call for fresh precautions against the perils of the mine, his inventiveness and ingenuity would probably be taxed as they were never taxed before. It was his belief that the coal industry of this country and the mining engineer still have a great future before them, although the day of cheap coal, as the term was understood 30 years ago, had gone never to return. There had been great changes in the past, and they must look for further great changes in the future, particularly in regard to the by-product industry. It had grown by leaps and bounds of recent years, and was now a valued and trusted auxiliary of the colliery owner. The time might come when practically all the coal raised in the country would be partly coked before it was put to other uses, when any waste of by-products would be regarded as little short of madness, and, perhaps, be forbidden by law as a wanton squandering of the national resources. It might be, too, that the British coalfields would come to be regarded as oilfields rather than coalfields, that the by-products would be considered as of primary importance, and the coal itself valued mainly as the basis of them. Already attempts had been made to induce the householder to substitute coke for coal on the domestic hearth, and the gas companies were endeavouring to promote its use under boilers in London and elsewhere.

He could hardly close without a word of reference to the proposed application for a Royal charter for the Institution of Mining Engineers, which proposal seemed at last to be materialising. Their institute had been able to do all that was asked of it towards raising its proportion of the capital fund, and he hoped that before the next annual meeting the institution would have taken its proper place amongst other kindred societies.

Mr. W. H. CHAMBERS moved a vote of thanks to the president for his admirable address. With regard to the legislation which particularly affected them in the duties they had to fulfil, he thought the president had expressed the views of most of the practical men present, and there was no doubt, he thought, in many of their minds, that a good deal of it was done without con-

sideration of the use and the real reason and urgency for them. It was very difficult for the officials of the mine to carry in their heads all that was required to be done, and he thought there was no doubt about it that there was not a mine in the country where an inspector could not find some breach of the law somewhere.

Mr. BEECH said it gave him the very greatest pleasure to second the vote of thanks, and the motion was carried with applause.

#### The Zeiss Level.

Mr. J. HUSBAND (University of Sheffield) then read a paper on "The Zeiss Level."

Mr. Husband said the types of levelling instruments with which British engineers were most familiar were all constructed on very similar lines, and their distinctive principle of action had remained practically unaltered for the past 80 or 100 years. Practically all British models depend for the levelling motion upon the manipulation of three or four vertical screws which control the verticality of the axis supporting the telescope. Of these two types only the three-screw or "tribrach" instrument may be regarded as really efficient, since the four-screw level is practically obsolete as an instrument of precision. The principal defects of British levelling instruments are—the absence of a sufficiently delicate motion for the adjustment of the eye-piece of the telescope, the tentative, tedious, and relatively clumsy methods of adjustment, and, in many cases, excessive weight. On the other hand, the workmanship and optical details are generally excellent. Attempts have been made from time to time—as, for example, in the case of the Cooke level, to simplify the method of adjustment, and increased lightness in some models has been attained by the employment of other alloys than bronze for the more massive parts. The Zeiss level, an instrument of relatively recent origin, differs essentially in many respects from the well-known British types.

The essential and desirable attributes in a levelling instrument of reasonable precision, may be stated as follows:—

1. Large magnifying power of telescope.
  2. Sensitive mechanical means of levelling.
  3. Sensitiveness of spirit-level.
  4. A high degree of perfection of the lenses, upon which depends the clearness, definition, and accuracy of the sighting.
  5. Rigidity of the tripod, and the connection of the instrument to the tripod.
  6. Lightness, provided that this feature is not carried to the extreme.
  7. Rapid, simple, and accurate method of adjustment; and
  8. Compactness and portability.
- To these may be added other desiderata, which, although not essential to the instrument, are yet frequently in evidence, namely:—
9. Some arrangements, usually subtense lines or points, for the rapid estimation of distance; and
  10. Clamp and tangent motion to the vertical axis.

Accessories, such as a compass-needle, clinometer, or other extraneous fittings, are disregarded as being matters of individual fancy or preference. High magnifying power is quite general in all modern instruments. Sensitive mechanical methods of levelling are obtained by increasing the fineness of thread of the levelling screws. The degree of sensitiveness desirable will depend upon the sensitiveness of the spirit-level, since finely-threaded screws with a bubble-tube of low sensitiveness would merely result in waste of time; whilst coarse screws with a very sensitive spirit-level would cause the bubble to fly from end to end of the tube at the slightest touch. The degree of sensitiveness of the spirit-level—or, in other words, the curvature given to the tube—will be governed by the precision required in the levelling operations. An over-sensitive bubble involves waste of time where the sites are relatively short and the levelling operations need be merely approximate. The degree of perfection of the lenses is closely associated with the length of the telescope. It is a common fallacy that a long telescope confers greater accuracy upon a level. This is true only in a relative sense. If the lenses be of first-class quality, a short telescope will effect better results than a much longer one with inferior lenses; whilst greater error is liable to arise from temperature variations with a long than with a short tube. The length of telescope was frequently excessive in the older instruments, some of which were jointed for portability, thus further increasing the liability to error. Incidentally, in this connection, the use of erecting eye-pieces is not to be commended.

Tripods are of two distinct types—(1) those having heavy single legs, and (2) the framed or photographic pattern, which is usually much lighter. The former frequently err on the side of heaviness, especially when the hinges are deficient in rigidity. All are familiar with the heavy-legged tripod which has narrow hinges of light design developing "head ache" after a short period of use. On the other hand, the framed type may err on the side of lightness to the extent of being readily affected by the wind. That the connection of the instrument to the tripod must be rigid is obvious, and this detail is generally well arranged. Lightness of instrument is chiefly desirable as an accessory to portability; but, if this be carried to an extreme, the instrument will be unstable in a moderate wind. A rapid, simple, and scientific method of adjustment is possessed by really few spirit-levels. This results in the average operator being disinclined to tamper with adjusting screws lest the last state of the instrument be worse than the first. Obviously many instruments thus continue in use in a state of imperfect adjustment, whereas a simple and ready means of adjustment would secure more accurate work, and save much time and expense.

Compactness and portability are controlled by the length of telescope and the minimum weight desirable. Jointed or telescopic legs for tripods are inadmissible if careful and accurate work be the criterion.

The Zeiss level owes its inception to H. Wild, of Jena, a well-known Continental engineer, and the author gave details and drawings of the various features. A description has already appeared in the *Colliery Guardian* (July 18, 1913, p. 120).

Capt. HENICI said he thought it was time this country took some notice of the Continental improvements in levelling instruments and methods of levelling. Some three years ago, on the Ordnance Survey, it was decided to re-level the main principal lines of levelling across the country. He went into various makes, and came to the conclusion that the large-size instrument was far and away superior to any other levelling instrument that he could hear of. He had one of the French patterns used for their most precise work, and the one used by America and India designed by the American Survey people; and he came to the conclusion that the instrument under discussion was far and away the best. Of course, the accuracy that he was striving after was not the accuracy that was required in ordinary engineering operations. To show what he had got with that instrument, he said he had completed two circuits each of between 260 and 300 miles of levelling, and the error when he had got round was 0.032 on one circuit, and 0.022 of a foot on the other. Of course, that was double levelling—repeated twice, for precaution. Of course, it was no use trying to read more accurately than the accuracy of their staff. He had only just succeeded in getting a pair of staves at a very high price which were really accurate. For ordinary engineering purposes, he thought the small-size level was quite as accurate as any 12 or 14 foot level. In the Zeiss level the method of viewing the bubble was very convenient, in that they could see the position of the bubble in moving round the instrument, and the actual setting of the bubble was far more accurate by bringing the two ends into coincidence than endeavouring to set the bubble symmetrically between the marks on the tube. He should think that the error was halved by setting the bubble by that method. With reference to the telescope, the change of adjustment due to change in the collimation line was minimised in that instrument. That was the chief point he had to mention, but he would like to emphasise the fact that in levelling he did not think that the large-size instrument—certainly not the largest—was at all necessary for ordinary engineering work. It was no use using so accurate an instrument unless they got far more accurate staves and were far more careful as to the firmness of the supports of the staves when levelling than was generally the case in ordinary work. The ordinary staff was not accurate enough to make a large-size instrument worth using. The small-size instrument was quite good enough for that, and the only doubt he had about it was the steadiness in the wind. His experience of the ordinary levels was that one was continually trying to adjust the collimation line by adjusting the cross-hairs, and they were always loose. The more he had studied the instrument, the more he had liked it, and he had been at it now nearly three years with the instrument.

Prof. HARDWICK said there was one point he was still in doubt about, and that was how the line of collimation was marked on the telescope. He would like to ask Mr. Husband whether, in that telescope, there was any arrangement for making the measurements by means of subtense lines. He would also like to ask whether he had used the telescope in the dark, because the illumination of the cross-hairs was a matter in some instruments that gave not exactly difficulty but a little trouble; and when considering that instrument, it struck him that the small tube was particularly suited to use underground, because the telescope was much shorter than those frequently used, with less stretching of the arm for the purpose of illuminating the cross-hairs than in the case of a longer telescope. He did not know that lightness was particularly against the instrument, so far as underground work was concerned, on account of the fact that the air-current was steady and the eddies of wind to be contended with on the surface were not present.

Communications were read from Mr. HENRY DAVIES and Mr. JOSHUA RAWLIN on the subject.

Mr. HUSBAND, in reply to the discussion, said his personal experience was confined mainly to the smaller instrument. The larger one was essentially an instrument of precision, and no engineer would use it for ordinary everyday work. The smaller instrument he had been using for a little over two years; and for ordinary outdoor work, such as going round a circuit from  $\frac{3}{4}$  mile to  $1\frac{1}{4}$  miles in extent, he found it could be relied upon with an error of 0.01 ft., at the inside, and on several occasions he had had no apparent error whatever. In explanation, he paid tribute to the great progress made by all instrument makers—British amongst



though British instrument makers had not made the same progress collectively as instrument makers on the Continent. No one held a higher regard for a first-class British-made instrument than he had. With regard to Prof. Hardwick's remarks, he was sorry he had not had any experience of the instrument in the dark. The other question was with regard to the position of the cross-hairs; they were marked on the two object glasses, the object glasses suspended on two lenses in close contact. The cross-hairs were marked on the interior surface, on the inside joint, and were perfectly protected from any possible dust or moisture. All the instruments were provided with subtense lines. In most of the instruments with subtense lines they had 12 or 14 inches to add to the estimated distance. In this instrument the constant was so small that it was quite negligible. The instrument was almost perfectly anallatic. Mr. Husband promised to make some experiments in the dark and let the secretary know the result.

The PRESIDENT seconded the vote of thanks, which was carried.

#### The Effect of Increased Atmospheric Pressure on the Height of the Gas Cap.

A paper on this subject was read by Mr. GEORGE A. LODGE. He said the question of the effect of the increase of atmospheric pressure on the height of the gas cap first engaged his attention in 1912 when in conjunction with Mr. James Eagle (principal of the Doncaster Technical School) an apparatus was designed by means of which a pressure of 3 in. of mercury above atmospheric pressure could be maintained during a test. The apparatus consisted of a pressure-tight metal chamber having the necessary taps for the admission and regulation of air and gas, a window for observation purposes, an agitator for mixing, an arrangement for altering the height of the flame whilst under pressure and a gauge for measuring the pressure which was obtained by means of a foot blower. From observation alone, without any method of measuring the cap, he formed the opinion that an increase of atmospheric pressure decreased very slightly the size of cap for a given percentage.

Early in 1913 he arranged with Mr. Hailwood, of Messrs. Ackroyd and Best Limited, to adapt one of his patent gas cap observation chambers to this purpose, and proceeded to continue his experiments, being assisted by Mr. Hailwood and Mr. Pickering, the chemist, at the above-named works. The shape of the chamber was altered by making the top conical so as to give greater strength, and also to facilitate the closing of the chamber. All the joints are screw joints provided with rubber rings. The arrangement for altering the height of the lamp flame consists of a screw regulator working through a stuffing box. An agitator for mixing the air and gas is provided, the handle of which also works through a stuffing box. The method of increasing the pressure is to close up the chamber tightly and then run water into it through a tap at the bottom. By this means the air or gaseous mixture is compressed until the pressure—which is measured by a mercury gauge—reaches the desired point. No difficulty is experienced in getting a pressure of 3 in. of mercury over and above the atmospheric pressure. When it is required to change the percentage the water is quickly run out of the chamber by means of a tap in the bottom.

In June 1913 a number of experiments were made and the opinion was formed that if the increased pressure made any difference at all it was very slight indeed. Wishing to obtain some definite measurements, the writer tried various means of measuring the height of the cap. It was eventually found that by colouring the cap by means of a trace of ammonium hydrate (a suggestion of Mr. Pickering's) and placing in front of it a glass scale having black lines  $\frac{1}{8}$  in. apart, and behind it a narrow strip of opal glass, it was possible to measure the cap satisfactorily. The method of introducing the ammonium hydrate is to place a little on some cotton wool which is placed in the chamber near the lamp.

The method adopted of making a test is to introduce a given percentage of gas into the chamber, put the test flame to a given height and read the height of the cap. Water is then run into the chamber until the gauge indicates that the pressure has reached the desired point, when the flame is again adjusted (if necessary) to the given height and the cap measured. In each case the agitator is worked before measuring the cap. By means of a tap provided for the purpose the excess pressure may now be released, the height of the test flame adjusted and the height of the cap read a third time. This third reading should agree with the first, and was found to do so in all the experiments performed. The three observations are all made within five minutes, so that any diminution of the oxygen, or of the gas, due to the burning of the lamp, is so small as to be practically negligible. All the experiments were carried out with coal gas, and were made at the same place.

A considerable number of experiments have been made, the results of some being given in the paper. Using an Ackroyd and Best lamp, with flat wick, burning benzene, no change was noticed. In one case a cap was observed while pressure was being released, but no alteration in size of cap was noticed. Using an Ackroyd and Best lamp, with flat wick, burning oil, two experiments were made with percentages of  $1\frac{1}{2}$  and  $2\frac{1}{2}$  per cent. of gas respectively. No alteration was noticed. When the pressure was increased in the gas percentage to 4, the height of the cap given at atmospheric pressure, decreased to  $1\frac{3}{8}$  in. with  $3\frac{3}{8}$  in. mercury. At 5 per cent. the height of the cap decreased from  $\frac{3}{4}$  in. to  $\frac{11}{16}$  in., and at 6 per cent. it was  $\frac{1}{2}$  in. in the height of the cap were

observed with a pressure of 2 in. mercury, the gas percentage being 3 and  $4\frac{1}{2}$  per cent. respectively. In all the experiments the testing flame increased in height when the pressure was increased, and had to be adjusted to the standard height before reading. When the pressure was relieved the testing flame decreased in height, and the wick had to be turned up.

The PRESIDENT said he was not sure that his experiments were entirely conclusive as to the effect of pressure on gas caps.

Prof. L. T. O'SHEA expressed the same opinion. The height of the cap depended on so many things, which in some cases needed accurate adjustment, that when it came to a difference of  $\frac{1}{32}$  in., or even, perhaps,  $\frac{1}{16}$  in., he would ask Mr. Lodge if he did not think that there might be some other slight errors of adjustment which might account for such very small measurements. The differences he had found occurred in the high percentages of gas where they were measuring  $1\frac{1}{2}$  and caps of that size. It seemed to him that in this case, perhaps there was likely to be some modification in the condition of the atmosphere which would cause the plane cap to decrease. He had noticed in his own experience in

#### THE GRIFFIN MILLS FOR GRINDING STONEDUST.

The chief desiderata in plants for the grinding of stone and shale dust are that the necessary degree of fineness shall be secured, so that the ground particles shall remain in suspension in the air for the longest possible period, combined at the same time with cheapness and ease in operation. These requirements are amply fulfilled in the well-known Griffin mill and Giant Griffin mill, over 3,000 of which are in use all over the world.

The Griffin mill works on the principle of a pestle and mortar on a large scale, and Messrs. the Bradley Pulverizer Company, of 37, Walbrook, London, E.C., who have had an experience of over 20 years with this type of mill, have succeeded in producing a machine which is particularly adapted for use where a very fine product is required. By its use at a single operation and without any auxiliary apparatus, material can be reduced from 1 in. pieces to a product which will pass a sieve having 200 meshes per linear inch and finer, with a minimum expense for power and upkeep.

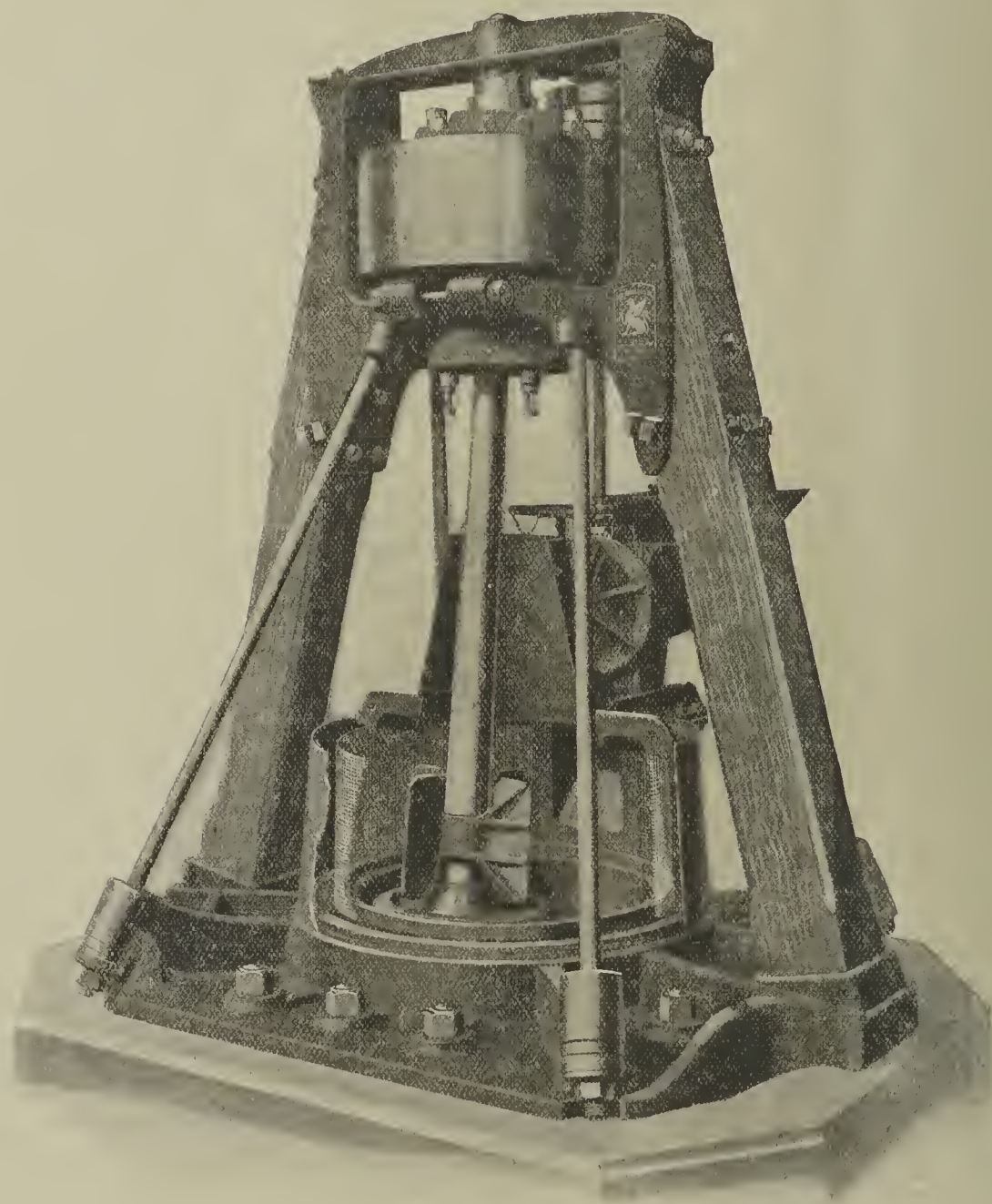


FIG. 1.—30 IN. COMPOSITE WOOD AND IRON FRAME GRIFFIN MILL.  
(Opened up.)

making tests that where the percentage of gas was very high, the size of the cap did decrease during the test, and he thought Mr. Lodge would bear him out in that respect, especially when testing in a closed chamber. He had made one or two experiments, and his experience was that high percentages with the pressure did not make any appreciable difference in the size of the cap. From the theoretical point of view, he could see no reason why pressure should interfere with the size of the cap. If anything, it seemed to him it would tend to increase the height rather than decrease it.

Mr. LODGE said the conclusions he had come to were the same as those of Prof. O'Shea—that the increase in pressure did not make any difference, but that the slight errors which were shown in the paper might possibly be experimental errors—probably were experimental errors. He did not think the alteration in the size of the cap could have much effect in this case in the short time taken in making the test, because the chamber was a very thick one—a matter of 6 cubic feet—and in the course of a minute or two he did not think the effect would be very much. He had not done with the subject yet, and he would like to make a series of experiments with methane, and also introduce different temperatures at the same time. Increase of pressure and increase of temperature at the same time might give some interesting results.

Mr. Lodge was thanked for his paper.

The grinding is accomplished by means of a roller running within and against the inner surface of a die ring, being held in contact with it by centrifugal force. The single roll of this mill is suspended by a shaft extending from a universal joint in the head of the mill downwards into the grinding chamber, and, by use of an ingenious mechanical movement used only in this machine, is made to do the work in an exceedingly simple and advantageous way. This peculiar action is effected by the positive rotation of the roll, by means of which it pulls itself around the die ring on which it runs and operates. The roll has a drawing action on the material, pulling it, so to speak, between the roll and the die, and exerting a crushing and abrading action which no other machine does. Its efficiency is further increased by the fact that all journals are removed from the grinding chamber, and are therefore free from dust. This point is of especial importance in machines used for grinding very hard materials, as in doing this work an unusual amount of heat is developed. The machine necessarily becomes very hot, and this heat is destructive to lubricated bearings.

The principle of driving the roll in the Griffin mill is a peculiar one. It has puzzled many who have examined it, and has appeared paradoxical to many, owing to the



fact that the pulley and the roll shaft being axially connected, must of necessity revolve in the same direction and with the same angular velocity, and yet the roll runs round the die ring in a contrary direction to the pulley, and with a greater number of revolutions per minute than the pulley. These apparently paradoxical motions and variations in speed are, of course, easily explained upon a critical examination.

The Griffin mills are largely used for grinding the raw materials from which Portland cement is made—that is,

framework, and cushioning the severe vibratory strains which are necessarily set up in a machine doing this kind of work. Within the last year substantial improvements have been made by the manufacturers in the design and construction of the machine. One of the principal improvements consists in newly-designed mechanism for the universal joint in the pulley, which has been made with a view to giving larger bearing surfaces for the wearing parts, and thus to provide more fully for the heavy strains which are found in machines of this

Even a finer product than this can be obtained in some special cases where necessary. The horse-power required is 25-B.H.P. applied to the pulley at head of the mill. The best size of feed is  $\frac{3}{4}$  in. down, that is, all to pass a  $\frac{3}{4}$  in. ring, and the material should be fed to the mill as dry as possible. The wear and tear is extremely small on grinding such stone as referred to for colliery purposes, certainly not more than  $\frac{1}{4}$ d. to  $\frac{1}{2}$ d. per ton ground.

The great development of the Portland cement industry in recent years has resulted in the construction of immense works, which necessitates the machinery being in larger units. To meet this demand the makers have designed and constructed the Giant Griffin mill (fig. 3). It employs the same principle of grinding, and is built on the same general lines as the 30 in. mill, but in it they have embodied new and improved details of construction, which were suggested by many years of experience in operating the lighter mills. The base alone of this mill weighs about 7 tons, while the weight of the complete mill is nearly 12 tons. The frame of this mill is of angle iron, strongly riveted and bolted together, making a much more satisfactory frame than either the solid cast iron or the composite frames which were used on the smaller mills.

The Giant Griffin mill shows a marked increase in efficiency, both as to the power required to operate it, and in the fineness of the product obtained. The power required to drive the Giant Griffin mill is 55 to 60 B.H.P. applied to the pulley at head of the machine. It has a capacity of from twice to two and a-half times that of the 30 in. Griffin mill to the same fineness, and materials can be fed to the Giant Griffin mill up to  $1\frac{1}{2}$  in. in size, and should be as dry as possible.

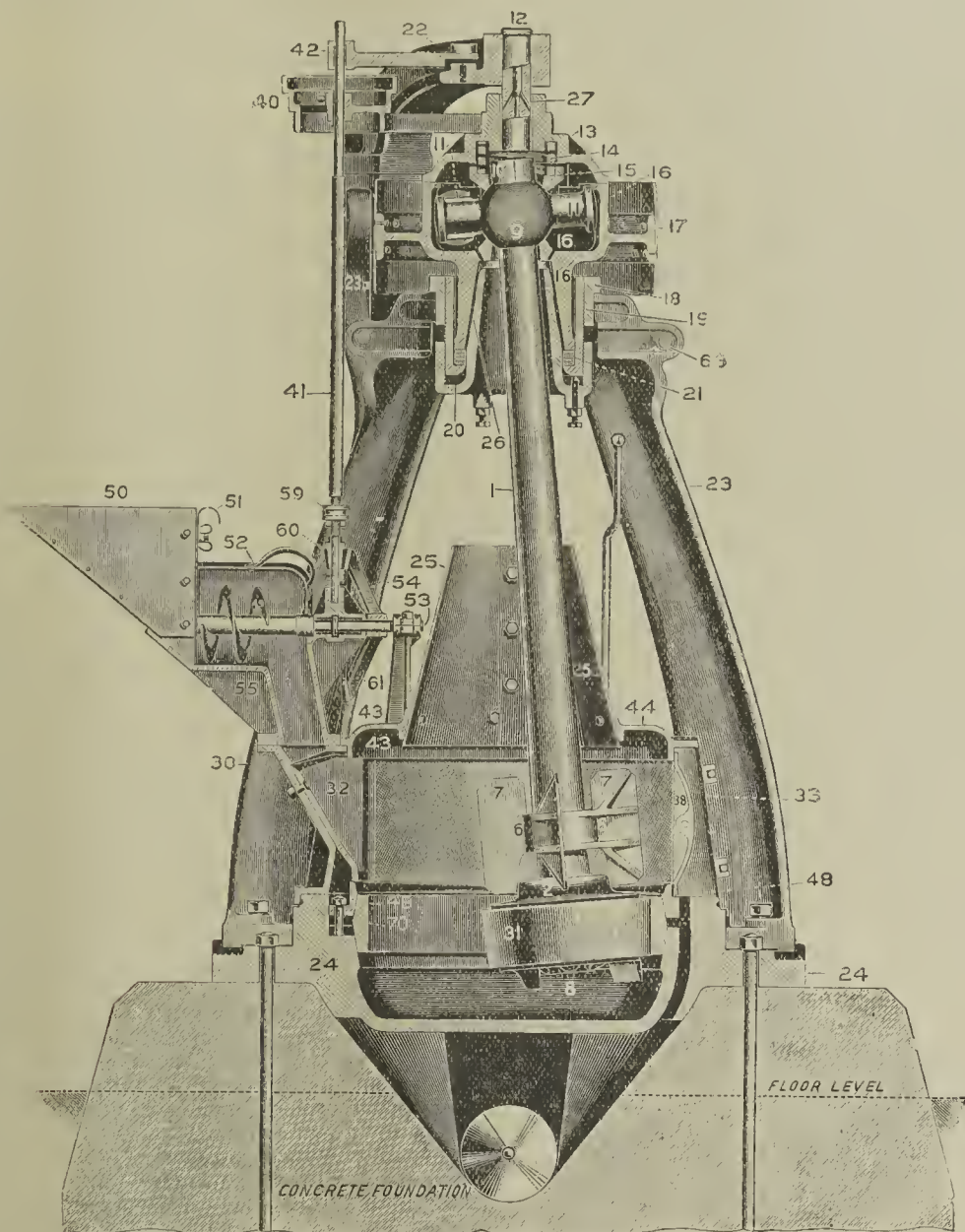


FIG. 2.—30 IN. "D" TYPE IRON FRAME GRIFFIN MILL.  
(Sectional Elevation.)

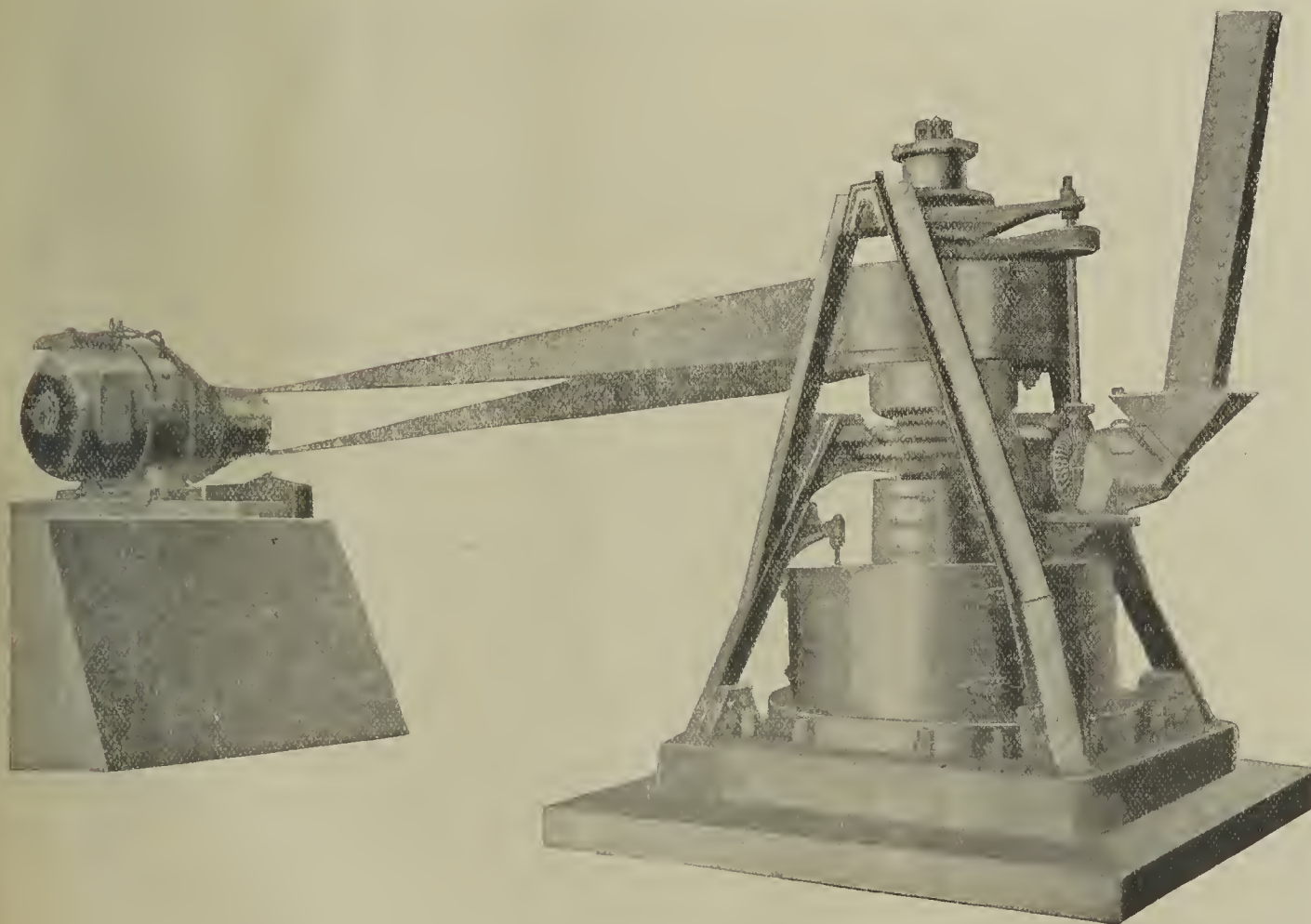


FIG. 3.—40 IN. GIANT GRIFFIN MILL.  
(Direct Motor Driven.)

limestone, shale, clay, &c., and for the reduction of the coal used for burning the cement to a clinker, which is also very generally ground in Griffin mills to the requisite degree of fineness. The mill, as originally made, was equipped with a heavy and substantial iron frame, and by many this style is preferred to-day. It is also made with what is known as a wood or composite frame. This style is made with wooden standards, which rest on rubber blocks, thus giving a large measure of elasticity to the

class. Other improvements are in the method of securing the parts in order to simplify and to make it easier to renew them when necessary.

The 30 in. Griffin mill (figs. 1 and 2) has an output of 10 to 20 hundredweights per hour on grinding stonedust (varying according to the quality of the stone ground). The fineness can be set at anything desired between 5 per cent. residue on a sieve having 180 meshes per linear inch, and 10 per cent. residue on the same sieve.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—J. Armitage and T. Kettlewell, carrying on business as coal merchants, at Harrogate, Yorks, and elsewhere, under the style of Armitage and Kettlewell; W. H. Benson and A. Tipling, carrying on business as hydraulic and general engineers and millwrights, at Westfield Ironworks, Wesley-street, Morley, Yorks, under the style of Waring, Tipling and Benson; F. W. Lennard, T. W. Lennard and G. A. Cooper, carrying on business as ironfounders, smiths and metal workers, at Eagle-street, Holborn, under the style of Harold Cooper and Co., so far as regards G. A. Cooper; F. H. Prentis and J. P. Hawkes, carrying on business as engineers and manufacturers, at Roden-street, Ilford, under the style of Packer and Prentis; E. P. Marley and W. E. Marley, carrying on business as locksmiths, brassfounders and general architectural metal workers, at Viaduct Works, Aston, Birmingham, under the style of Marley Brothers.

**The Co-partnership Scheme of Wm. Cory and Son Limited.**—An extraordinary general meeting of Wm. Cory and Son Limited was held on the 27th ult. at Cannon-street Hotel for the purpose of confirming a resolution passed on the 11th ult. altering the articles of association with the object of creating employees' shares, and also considering a resolution increasing the capital of the company for that purpose. Sir Arthur C. Cory-Wright, Bart., presided. The chairman said for some time past the directors have had under consideration a scheme whereby the numerous employees of the company should be directly interested in its welfare and obtain some benefit from its progress and prosperity, and they hoped the scheme now proposed would have this result by offering inducement to the employees to place some of their savings in the company, thereby becoming co-partners in the undertaking and being directly interested in its more economical working. It was proposed to create and issue 250,000 employees' shares at par, ranking *pari passu* with the existing ordinary shares, and to give employees who are male members of the Cory Thrift Society the right to subscribe for any number of these shares up to 100 each, priority being given to applications in order of their dates. The shares will be a special class and will not be dealt in on the Stock Exchange; they will only be transferred for cash and at the par value of the shares. Should an employee desire to part with his shares he must give notice to the company, who undertake to arrange the sale. In the event of an employee leaving the service of the company, the company is to have the right to ask that the shares shall be retransferred to them or their nominees. The advantage to the employees is that they will only pay par value for their shares and will receive dividends at the same rate as the existing ordinary shareholders. This averages slightly over 10 per cent. since the commencement of the company. The result of this must be that men of all grades will be brought into closer touch with each other and with the management, and they will take a more intelligent interest in their work and in the welfare of the company of which they are part proprietors. The resolution was carried unanimously. The Chairman next moved:—"That the capital of the company be increased to £2,250,000 by the creation of 250,000 new shares of £1 each, which shall be employees' shares, to be issued and held under the terms of the articles of association of the company applicable to employees' shares."—This also was agreed to.



## THE COAL AND IRON TRADES.

THURSDAY, DECEMBER 18.

## Scotland.—Western District.

## COAL.

Although there is nothing fresh to report with regard to the coal trade in the west of Scotland, the position remains very satisfactory. The tone of the market is very firm and collieries generally are fully booked up to the holidays. The demand for all classes of coal is well maintained and, while the local gasworks are taking heavy supplies of coal, the shipping demand is also extremely brisk. Ell coals are booked up to the end of the year, while splint is practically out of the market. The demand for navigations and steams is as strong as ever and it is with great difficulty that supplies are arranged. In smalls, treble nuts continue to show a little weakness, but doubles and singles are firmer. Shipments are extremely good for this time of the year and amount to 121,672 tons, compared with 96,545 in the preceding week and 82,205 tons in the corresponding week of last year.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/9 to 14/	13/3 to 13/9
Splint .....	13/9 to 17/	13/3 to 16/9
Treble nuts .....	13/	13/
Double do. ....	12/3 to 12/6	12/3 to 12/6
Single do. ....	10/9 to 11/	11/

## IRON.

Business in the Glasgow pig iron warrant market has continued dull during the week, the total turnover amounting to about 16,000 tons. On account of the decrease in public stocks at Middlesbrough, sellers have been less in evidence and, with a moderate amount of buying, prices have gained 5½d. per ton on the week and Cleveland iron closed at 49s. 10½d. cash buyers. The import of pig iron into Grangemouth from Middlesbrough and district amounted to 7,029 tons, a decrease of over 6,000 tons compared with the same week last year. The number of furnaces in blast is 76, being the same as in the previous week, and 14 fewer than at the corresponding period last year. Monkland is quoted f.a.s. at Glasgow, No. 1, 63s. 6d., No. 3, 62s.; Govan, No. 1, 62s. 6d., No. 3, 61s.; Carnbroe, No. 1, 68s. 6d., No. 3, 64s. 6d.; Clyde, No. 1, 69s. 6d., No. 3, 64s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 70s., Nos. 3, 65s.; Glengarnock, at Ardrossan, No. 1, 71s., No. 3, 66s.; Eglinton at Ardrossan or Troon, No. 1, 64s., No. 3, 63s.; Dalmellington at Ayr, No. 1, 65s. 6d., No. 3, 63s. 6d.; Shotts at Leith, No. 1, 70s., No. 3, 65s.; Carron at Grangemouth, No. 1, 71s., No. 3, 66s. per ton. The position of the manufacturing branches of the trade is practically unchanged from last week. Works as a rule are greatly in need of orders and employment for the most part is very irregular, and it is probable that the number of idle furnaces will be added to before the end of the year, though nothing definite is known as to the ironmasters' intentions in that respect.

## Scotland.—Eastern District.

## COAL.

The coal trade in the Firth of Forth district, which was feeling the effects of a scarcity of tonnage, has fully recovered, and there is now a fair number of steamers available, and consequently collieries are extremely busy. At Grangemouth 34,825 tons were despatched, Granton 10,378, Leith 42,939, Bo'ness 17,263—total 105,405 tons, against 89,593 in the preceding week and 122,149 tons in same week last year.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal	13/ to 13/6	13/ to 13/6
Secondary qualities .....	11/9 to 12/6	11/9 to 12/6
Treble nuts .....	13/3 to 13/9	13/3 to 13/9
Double do. ....	12/3 to 12/6	12/3 to 12/6
Single do. ....	10/9 to 11/	10/9 to 11/

The Fife coal trade is experiencing a period of sustained briskness, and the position this week is firmer, and prices have an upward tendency. Large coal, which is somewhat scarce, is in good demand, while nuts are being well taken up, especially singles. There is a large amount of tonnage at the various ports, and shipments are well up to the average. At Burntisland 34,000 tons were shipped, Methil 71,994, Charleston 45, Tayport 406, Alloa 2,040, Dysart 766, and Wemyss 40—total 109,291 tons, compared with 88,037 in the preceding week and 107,297 tons in the corresponding week of last year.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	17/	16/9
Unscreened do. ....	15/	14/9
First-class steam coal .....	12/9 to 13/3	12/6 to 13/
Third-class do. ....	11/	10/9 to 11/
Treble nuts .....	13/ to 13/6	13/ to 13/6
Double do. ....	11/9 to 12/	11/9 to 12/
Single do. ....	10/9	10/6

Owing to the continued mild weather the demand for household coal has been off considerably. The aggregate shipments from the various ports during the week amounted to 274,175 in the previous week and 274,175 in the corresponding week of last year. The demand for the week to date amounts to 855,416 tons.

## Northumberland, Durham and Cleveland Newcastle-upon-Tyne.

## COAL.

During last week 136,406 tons of coal and 1,348 tons of coke were despatched from Tyne Dock, an increase of 101,567 tons of coal and 1,256 tons of coke when compared with the shipments for the corresponding week of last year, when the North-Eastern railwaymen were on strike. The Dunston clearances amounted to 59,175 tons of coal and 1,841 tons of coke; there were no shipments from Dunston during the corresponding week of last year. The Blyth shipments aggregated 88,078 tons of coal and coke, an increase of 80,737 tons. Sales of North-west Durham bunkers, Priestman quality, are stated to have been arranged for delivery over next year at from 11s. 9d. to 12s. 6d. per ton f.o.b. The total quantity is said to amount to from 250,000 to 300,000 tons. Twenty thousand tons of good Durham bunkers for similar delivery are stated to have been sold at 12s. 3d. f.o.b. Sales of a number of other parcels of bunkers for like loading are stated to have been arranged at from 11s. 9d. to 12s. 6d. per ton f.o.b., according to quality. In several cases the transactions are said to have been entered into by local shipowners for their ensuing year's supplies, and the total quantity arranged for aggregates a good many thousands of tons. A quantity of best Blyth steams for early January loading has been sold at 14s. 4½d. f.o.b., and another lot for January shipment has changed owners at 14s. Tyne gas primes for delivery over 1914 have been sold at 13s. f.o.b. It is reported that a quantity of Durham gas coal for delivery from January to March has been sold at from 11s. 6d. to 12s. A quantity of good average gas coal has been sold direct for delivery over next year at 12s. 6d. The buyer of the Paris Gasworks has been on Tyneside during the last few days and has purchased a small quantity of good gas seconds for delivery over next year at 12s. per ton. The Paris Gasworks now invite offers of 500,000 tons of best Durham gas coal for delivery over next year. Tenders were due in on Wednesday of this week. The Russian Marine has been in the market for immediate offers of 75,000 tons of best Blyth steams for shipment over next season. The prompt market has been exceedingly quiet. Strong westerly winds have delayed expected tonnage and thrown loading turns somewhat out of gear, with the result that a few catch turns for spot loading has been possible. Supplies for this month's loading have, however, been almost unobtainable. The volume of forward business is only small, buyers in most instances preferring to hold off until after the holidays. The only changes in f.o.b. quotations for prompt shipment during the week have been that Blyth steam smalls are now from 6d. to 9d. cheaper, Tynes weaker, and specials 6d. reduced. All other descriptions of fuel are steady.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	14/9 to 15/	14/9 to 15/
Do. Tynes (Bowers, &c.) .....	14/9 to 15/	14/9 to 15/
Secondary, Blyths .....	12/6	12/6
Do. Tynes (Hastings or West Hartleys) .....	12/6 to 13/	12/6 to 13/
Unscreened .....	11/ to 12/	11/ to 12/
Small, Blyths .....	6/9 to 7/	7/
Do. Tynes .....	6/ to 6/6	6/6
Do. specials .....	7/6	8/
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	15/6	15/6
Secondary gas coals (Pelaw Main or similar) .....	13/6 to 14/	13/6 to 14/
Special gas coals .....	15/6 to 16/	15/6 to 16/
Unscreened bunkers, Durhams .....	13/3 to 14/6	13/3 to 14/6
Do. do. Northumbrians .....	10/6 to 11/6	10/6 to 11/6
Coking coals .....	13/6 to 14/	13/6 to 14/
Do. smalls .....	12/6 to 13/	12/6 to 13/
House coals .....	15/ to 16/	15/6 to 16/
Coke, foundry .....	21/ to 23/	21/ to 23/
Do. blast-furnace .....	19/ to 20/	19/ to 20/
Do. gas .....	16/ to 17/3	16/ to 17/3

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 106,885 tons of coal and 1,705 tons of coke, as compared with 87,500 tons of coal and 665 tons of coke during the corresponding period of 1912, being an increase of 19,385 tons of coal and 1,040 tons of coke. The position of the coal trade has not materially changed, the tone being still firm with supplies now practically unobtainable for December, except that an occasional term may be arranged where tonnage is late in coming to port. For January shipment, sellers are indicating 6d. to 1s. reduction from current prices for best steams, but buyers continue reserved and very little

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/6	15/6
Secondary do. ....	14/3	14/
House coals:—		
Best house coals .....	18/6	18/
Ordinary do. ....	17/	17/
Other sorts:—		
Lambton screened .....	15/9	15/6
South Hetton do. ....	15/6	15/3
Lambton unscreened .....	14/	13/9
South Hetton do. ....	14/	13/9
Do. treble nuts .....	16/6	16/9
Coking coals unscreened ..	13/6	13/6
Do. smalls .....	13/3	13/3
Smithies .....	16/6	15/9 to 16/3
Peas and nuts .....	17/	16/9
Best bunkers .....	14/9	14/9
Ordinary bunkers .....	14/3	14/
Coke:—		
Foundry coke .....	22/	21/ to 21/6
Blast-furnace coke (divrd. Teesside furnaces) .....	20/	20/
Gas coke .....	18/	18/

business is recorded. Contracts aggregating 200,000 tons of ordinary Durham bunkers have been made for shipment over next year on the basis of 11s. 9d. f.o.b., while 12s. 3d. was paid for 20,000 tons over the same period. A large quantity of good second Durham gas has also been sold at from 11s. 6d. to 12s., delivery over next year. The Paris Gasworks are inviting immediate tenders for about 500,000 tons of best gas over next year.

The outward freight market is quiet and rates easy. Recent fixtures include:—London at 3s. 3d., Antwerp 4s. 1½d., Hamburg 3s. 6d., Bay: Bordeaux 5s. 3d., St. Nazaire 5s. Baltic: Riga 5s. 3d., Stettin 5s. 7½d., Malmö 5s., Reval 5s. 6d., Königsberg 5s. 6d., Mediterranean: Naples 7s. 6d., Piræus 8s., Port Said 7s., Civita Vecchia 8s., Savona 7s., Genoa 7s., Palermo 9s. 3d., Varna 8s. 3d., Alexandria 8s., Oran 6s.

## Middlesbrough-on-Tees.

## COAL.

The fuel market continues very strong, though largely nominal. There is much pressure for all classes of fuel on this year's account, and the pressure seems likely to continue well over January. Delivery of gas coal is at its height. Best Durham kinds are 15s. 6d.; second sort, 13s. 6d. to 14s. 6d.; and special Wear, 16s. to 16s. 3d. The Paris gasworks are said to be in the market for next year's supplies of about 500,000 tons. The somewhat heavy demand for bunker coal is fairly well met. Ordinary Durham bunkers are 13s. 6d. f.o.b., bests 15s., and specials 16s. Household coal is strong at from 17s. to 18s. Coking coal is in good request. Small at 12s. 6d. to 13s., and unscreened coking coal 12s. 9d. to 14s. 3d. Coke continues very scarce and dear. Local needs are difficult to fully satisfy. As much as 19s. is quoted for average blastfurnace coke delivered at Teesside works. Foundry coke for shipment is in the neighbourhood of 22s. f.o.b., gashouse coke ranges from 17s. to 18s.

## IRON.

Traders appear to have concluded that bottom prices for pig iron have been seen, and they now look for a renewal of activity. Certainly the tone of the market is much improved, and values of all descriptions of pig iron are now moving steadily upward. Producers of pig, however, still complain that current rates are unremunerative, and consequently they are not pressing sales. They hold to the belief that they are likely to do better by waiting. Relief in cost of production is expected by reduction in price of coke after the holidays. Amongst visitors to the Cleveland market this week have been large consumers of hæmatite pig from Sheffield. No. 3 g.m.b. Cleveland pig is steady and firm at 50s. 6d. f.o.b., No. 1 is 53s., No. 4 foundry 50s., No. 4 forge 49s. 9d., and mottled and white iron each 49s. 3d.—all for early delivery, enquiries on forward account eliciting quotations of about one shilling above these rates. The minimum quotation for early delivery of Nos. 1, 2, and 3 East coast hæmatite pig is now 61s. 6d., and for delivery over the first quarter of next year the general market quotation is 62s. There are fairly good enquiries in the market for foreign ore. Consumers are showing a disposition to operate, and it is understood that they are prepared to buy on the basis of 18s. 3d. ex-ship Tees for best rubio. Sellers, however, are not disposed to accept such terms, and as a rule they still quote on the basis of 19s. for best rubio. The freight Bilbao-Middlesbrough is 4s. 9d., and rubio of 50 per cent is 12s. 6d. as it lies at Bilbao. To this must be added commission and other small charges such as insurance etc., 6d., loss in moisture say a unit and a half, 9d., and two units of silicon 3d., bringing the cost of best rubio at Middlesbrough up to 18s. 9d. Quietness characterises the manufactured iron and steel trades. Many producers are still well off for orders, but some firms are getting rather short of work. Quotations are stationary with the exception of the price of galvanised corrugated sheets, in which branch an effort is being made to re-establish the association for fixing prices, and the figure may now be put at £11 5s. f.o.b., less the usual 4 per cent. discount, which is 5s. above the price that has ruled for some time past.

## South-West Lancashire.

## COAL.

During the past week there has been an improved demand in the household trade, possibly due to the near approach of the Christmas holidays, although even yet the demand is not equal to what it might be for the time of the year. The position as regards screened coal for forge and manufacturing purposes still remains unchanged. Bunker coal is in good request, and steamers are taking full quantities on contract account. There are a few outside orders in the market, and in some cases better prices are being obtained than has latterly been the case. There is not much coal for this class of business, and no doubt from now on to and over the approaching holidays prices will stiffen. Railway traffic is not working too well, and this tends to restrict supply—coal urgently wanted in some cases being put on ground for want of wagons. Prices of Lancashire steam coal range from 13s. 3d. to 13s. 6d. for ordinary qualities, up to 13s. 9d. to 14s. f.o.b. for very best sorts. The coastwise and cross-Channel trade keeps brisk, the supply not being equal to the demand now that shipments have been to some extent resumed to Dublin. The position as regards slack remains pretty much as reported last week, except that prices are, if anything, a shade on the easy side.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/	17/
Do. (f.o.b. Garston, net) .....	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net) .....	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net) .....	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/ to 13/9	13/ to 13/9
Best slack .....	10/ to 10/3	10/3
Secondary slack .....	9/3 to 9/6	9/6
Common do. ....	8/9 to 9/	9/



South Lancashire and Cheshire.

COAL.

There was a full attendance on the Manchester Coal Exchange on Tuesday. House coal is meeting with better demand, doubtless owing to consumers getting in supplies before Christmas. Furnace coal shows a slight improvement, but business in shipping coal is dull, with prices unsteady. There is a good demand for slack, with plentiful supplies offering, and some at low rates for prompt sale. There is some hesitation on the part of buyers to renew contracts. The general price list is as below.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best	17/3 to 18/	17/3 to 18/
Medium	16/ to 16/9	16/ to 16/9
Common	13/3 to 14/	13/3 to 14/
Furnace coal	12/6	12/6
Bunker (f.o.b. Partington)	14/	14/
Best slack	10/ to 10/6	10/ to 10/6
Common slack	9/ to 9/6	9/ to 9/6

IRON.

We cannot report any improvement in the trade here. there is nothing doing and no buyers except for very hand-to-mouth quantities. Good foundry iron can be bought at 55s. 6d.; the foundries using this iron are none too busy. Forges are all on short time, and report very little work in new orders for iron. The association makers continue to quote £7 5s. and £6 15s. for crown and second quality, steel £7 17s. 6d.; sheets are offered as low as £7 15s. Steelworks are also on short time, and bars can be bought at £6 12s. 6d., hoops £7 12s. 6d., billets £5 2s. 6d., foreign billets at considerably less. The wire drawers are being very badly hit also by foreign competition. Wagon builders report rather a better feeling than there was some three weeks ago, but there is no improvement in the outlook that we can see.

Yorkshire and Derbyshire.

Leeds.

COAL.

The attendance at Tuesday's market was above the average and a fair number of orders for all descriptions of coal were given out. These were mostly for small parcels for prompt delivery, forward business being neglected. The pits have been able to work full time this week, and it looks as though colliery siding stocks of house coal would be about cleared before the stoppage. Wagons are again scarce, a good many being detained at the ports, or held up with stocks of factory fuel.

House Coal.—There has been an appreciable improvement in the demand from London and the southern and eastern counties, more especially for the better qualities. Contract deliveries are also being taken more readily, although reports of the retail trade in London are disappointing. Coastwise shipments are very much less as compared with a year ago, but prices are maintained at a high level. In the local markets the public are taking better deliveries from the retailers, but the weather will have to be much colder before the trade becomes anything like satisfactory. Current pit prices:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other qualities, 14s. to 15s. 6d.

Gas Coal.—Although fresh business is very limited, the entire output of the pits is going into consumption and there are no stocks. There is considerable pressure for extra deliveries to the inland works, as it is expected that the pits will work very little after next Wednesday until the new year.

Manufacturing Fuel.—The consumption in the Bradford, Leeds, and heavy woollen districts is much below the average, as there is a great deal of short time being worked at the mills. Stocks of slacks are still heavy, and prices irregular. Washed fuel, however, sells readily, surplus supplies of washed nuts finding a ready outlet for shipment.

Washed Furnace Coke.—The output of the ovens will all be needed in view of the holidays, and prompt sales are reported at 12s. 9d. to 13s. per ton. Business over the first quarter of next year also realises about the same figures. Stocks both on the benches and in trucks are low. Supplies of coking slacks are moving off more freely, but prices show no improvement.

	Current prices.	Last week's prices.
House coal:—		
Prices at pit (London):		
Haigh Moor selected	14/6 to 15/	14/6 to 15/
Wallsend & London best	14/ to 14/6	14/ to 14/6
Silkstone best	14/ to 14/6	14/ to 14/6
Do. house	12/ to 12/6	12/ to 12/6
House nuts	11/6 to 12/6	11/6 to 12/6
Prices f.o.b. Hull:		
Haigh Moor best	17/ to 18/	17/ to 18/
Silkstone best	16/ to 17/	16/ to 17/
Do. house	14/6 to 15/6	14/6 to 15/6
Other qualities	14/ to 14/9	14/ to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal	12/ to 12/6	12/ to 12/6
Gas nuts	11/ to 11/3	11/ to 11/3
Unscreened gas coal	9/9 to 10/3	9/9 to 10/3
Other sorts:—		
Prices at pit:		
Washed nuts	10/6 to 11/	10/3 to 11/
Large double-screened engine nuts	9/6 to 10/6	9/9 to 10/6
Small nuts	9/ to 9/6	9/ to 9/3
Rough unscreened engine coal	9/3 to 9/9	9/3 to 9/9
Best rough slacks	6/9 to 7/3	6/9 to 7/3
Small do.	6/ to 6/6	6/ to 6/6
Coking smalls	6/ to 6/6	6/ to 6/6
Coke:—		
Price at ovens:		
Furnace coke	12/3 to 12/9	12/ to 12/6

Barnsley.

COAL.

The increased activity in most branches of the trade, which was apparent last week, has been well maintained, owing to the approaching holidays, which will possibly last

for a week. Especially active has been the business on export account, shippers making strong efforts to complete their contracts and quick deliveries from the collieries have been sought. So far as the best large steams are concerned, the surplus tonnage on offer has not been large and there seems to have been more difficulty in securing spot lots of secondary descriptions of Barnsley hards. The export trade at this time of the year is remarkable and, of course, is mainly due to the continued purchases which have been sent by way of the Black Sea ports. This keeps prices fairly firm and is having some little influence in regard to forward business. With regard to next year's contracts, the position is of an interesting character and it is evident that the railway companies and other large consumers are out to resist the demand which has been made upon them for 1s. per ton advance on the expiring contracts. As an indication of the feeling, it may be stated that, although the period is so advanced, the North-Eastern Railway Company (who take a large tonnage from this district) have not yet even made enquiries, and it is possible that the company named, who have before fought a keen struggle with the coalowners, will endeavour to deal with the collieries individually, in the hope of obtaining a more satisfactory settlement than appears to be possible at the present time. The Midland Railway Company, who have tenders in for a considerable time, are not pushing the situation, and, as already reported, the Humber trawling companies, who have yet to place a large portion of their tonnage, are threatening to repeat the tactics of 1908 by purchasing coal on the Tyne, when they succeeded in obtaining a valuable concession. The coalowners are acting through their association and are putting up a bold front, but there seems to be some foundation for the report that some of the larger collieries will act in accordance with their own ideas. At the local market on Wednesday, there was a good attendance and a strong enquiry for all descriptions of manufacturing coal, though the extra demand appears to be for temporary purposes. Buyers found that the best class of coal was rather scarce and coalowners were able to obtain their prices, but, on the other hand, rough slacks had still to be sold at lower rates. There was also a larger quantity of gas coal on offer and, although the enquiry was fairly good, prices were hardly so firm as a week ago. During the week there has been a strong rush for all descriptions of house coal and merchants are complaining of delays again occurring in regard to deliveries of best grade fuel. The demand for coke was possibly a little stronger, but the position continued to be far from strong and forward arrangements are very quiet.

Prices at pit.

	Current prices.	Last week's prices.
House coals:—		
Best Silkstone	15/6 to 16/	15/6 to 16/
Best Barnsley softs	15/ to 15/3	15/ to 15/3
Secondary do.	12/6 to 14/	12/6 to 14/
Best house nuts	13/ to 14/6	13/ to 14/6
Secondary do.	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals	12/3 to 12/6	12/3
Secondary do.	11/ to 11/3	11/ to 11/3
Best washed nuts	11/3 to 11/6	11/3 to 11/6
Secondary do.	10/3 to 10/6	10/3 to 10/6
Best slack	7/ to 7/3	7/ to 7/3
Rough do.	6/	6/
Gas coals:—		
Screened gas coals	12/6	12/6
Unscreened do.	12/	11/ to 11/3
Gas nuts	12/	12/
Furnace coke	12/ to 12/3	12/ to 12/3

Hull.

COAL.

The little "rush" there has been in buying to complete cargoes this side of Christmas is now over, and prices for the best Yorkshire steam hards have eased off in consequence, and could be bought to-day at 15s. 6d. for shipment in the next two or three days. The slight falling off, however, is regarded as only temporary, and the feeling seems to be general that there will be a recovery after the holiday—to what extent, of course, depends on the various conditions. Secondary sorts are steady at late values, and rough slack for manufacturing purposes has been in better demand. There is very little moving with regard to forward contracts, but it is understood that much of the spot buying is being done by those who are deferring their annual contract until the more favourable opportunity which they are anticipating. It is, however, certain that little will be done before the new year, when the market will have shaped itself more definitely. The colliery owners, as a rule, remain firm, and this has led to the strained position with regard

	Current prices.	Last week's prices.
South Yorkshire:—		
Best steam hards	15/6	15/9
Washed double-screened nuts	13/6 to 13/9	13/6 to 13/9
Unwashed double-screened nuts	13/ to 13/3	13/ to 13/3
Washed single-screened nuts	12/9 to 13/	12/6 to 13/
Unwashed single-screened nuts	12/6	12/3 to 12/6
Washed smalls	9/6	9/6 to 10/
Unwashed smalls	9/ to 9/3	9/ to 9/6
West Yorkshire:—		
Hartleys	13/3	13/6
Rough slack	9/3 to 9/6	9/ to 9/3
Pea slack	8/3 to 8/6	8/3 to 8/6
Best Silkstone screened gas coal	14/3	14/3
Best Silkstone unscreened gas coal	12/	12/
Derbyshire:—		
Best steam hards (Hull)	15/3	15/3
Do. (Grimsby)	15/	15/
Derbyshire nuts (doubles)	13/	13/
Derbyshire nuts (doubles) (Grimsby)	12/9	12/9
Derbyshire large nuts	14/6	14/6
Do. do. (Grimsby)	14/ to 14/3	14/ to 14/3
Nottinghamshire hards	15/3	15/3
Do. do. (Grimsby)	15/	15/

to the supply for the Hull steam trawling fleet. The Hull Trawler Owners' Association have had another meeting this week, at which the members protested that the state of the fishing industry will not permit of their paying the prices asked by the coalowners; and, presumably with a view of bringing pressure to bear, they have decided to send a number of vessels to the Tyne to take in bunkers. In fact, two or three vessels have already gone north, but this proceeding is not likely to be profitable, except to the larger vessels which go on the long voyages to Iceland and the White Sea. The North Sea fishing boats would have to go a good distance out of their way, and to accommodate them the talk is of fetching the coal in sea-going lighters. But, after all, it is a matter for negotiation, and the South Yorkshire Association are quite alive to all the circumstances. It is reported that some of the smaller collieries outside the Association are seeking the business. Shipments foreign at Hull keep up fairly well, but London and coastwise the quantity despatched is not so heavy. The freight market has had a further relapse, plenty of tonnage being on offer, and the demand strictly limited. Baltic rates are at 5s. 6d. Riga and 5s. Swedish Sound, while for the Mediterranean tonnage is on offer at 7s. Genoa. Only two or three small steamers have been fixed during the week.

Chesterfield.

COAL.

The approach of Christmas, when pits will be closed down for several days, has induced buyers of house coal to place orders a little more freely. If in the course of the next week or two the weather becomes colder, matters in this branch of the trade would doubtless show considerable activity. Notwithstanding the mildness of the season stocks are low. There is a good demand for various classes of fuel for industrial purposes, and extra supplies are asked for this week in anticipation of the forthcoming reduction of output owing to the intervention of the holidays. The tone this week is firmer, and although there is a good deal of talk about prices having reached the top for the time being, the consumption continues on a large scale. The turn of the year may bring a better demand than many people anticipate. Already there is an improvement as regards slack for boiler firing, and orders are more numerous than they have been for several weeks past. Prices, too, are inclined to move upwards. Gas coal is in brisk request, and steam coal is much wanted. The export trade is remarkably active for the time of year, and prices are strong for steam coal for current shipment. Foreign buyers still refrain from closing contracts for next year, as they are looking for lower prices. Collieries, however, show no inclination to reduce quotations, and matters are therefore at a standstill. Cobbles and nuts for near Continental ports continue to be ordered freely. There is more doing in the coke trade, and prices are firm. Washed fuel is in good demand.

Prices at pit.

	Current prices.	Last week's prices.
Best house coals	15/6	15/6
Secondary do.	13/6	13/6
Cobbles	12/6	12/6
Nuts	11/6	11/6
Slack	8/	8/

IRON.

There is no change on the week. As regards pig iron, buyers will not contract for forward delivery, but the current output of the furnaces is going into consumption, and prices are fairly steady.

Nottingham.

COAL.

The approach of Christmas has helped to give a stimulus to the coal trade of Nottinghamshire during the past week, and the general position has manifested a distinct improvement. This has been particularly noticeable in the section for domestic fuel, which has also been assisted by more seasonable weather. Whilst the public have been purchasing to lay in a stock over Yuletide, local merchants have had to replenish their supplies. A feature of the increased demand has been an active request for best quality house-holds, and, at the same time, medium qualities have gone out of hand freely, common grades also selling better. A more active tone has prevailed in the steam coal branch, a strong feature of which has been industrials, owners of inland works being anxious to secure adequate supplies to tide them over the holiday period. Considering the time of the year, the amount which is being sent away for shipment is very satisfactory. Best steams are just now in better request, and little complaint can be made in regard to second-grade fuel. The slack market has shared in the general improvement, with the result that prices are steadier. Gas coal is in good demand. Coke is selling steadily at late rates.

Prices at pithead.

	Current prices.	Last week's prices.
Hand-picked brights	14/ to 14/6	13/6 to 14/6
Good house coals	13/ to 13/6	13/ to 13/6
Secondary do.	11/6 to 12/	11/ to 12/
Best hard coals	11/6 to 12/	11/6 to 12/
Secondary do.	10/ to 11/	10/ to 11/
Slacks (best hards)	7/9 to 8/	7/9 to 8/
Do. (seconds)	6/9 to 7/3	6/9 to 7/3
Do. (soft)	6/6 to 7/6	6/6 to 7/3

Lancashire.

COAL.

Since last writing the general state of business has shown a quite marked improvement. No doubt the nearness of Christmas has influenced the demand and the improvement has also been aided by the more seasonable weather. There has been a better demand for the best household coals and stocks of these are clearing and the output of them is being sent out. Also there is a very good demand for household



and the medium sorts also. The amount of business in steam coals of all sorts is fully maintained. The collieries are now very slight, whilst the market has been fully maintained. A busy time is looked for till Christmas. The market fully upholds late quotations, with no tendency to give way at all. Local merchants are busier than they have been for some time past and are feeling the effect of the Christmas distributions.

### South Staffordshire, North Worcestershire and Warwickshire.

Hednesford.

#### COAL.

Owing to the near approach of the Christmas holidays and to the colder weather experienced there is increased activity this week in the coal trade of the Cannock Chase district. Orders are coming in well for most qualities of coal, and the collieries are being kept busy. There is not very much coal in stock. The improvement in the house coal trade is well maintained, and for coal for manufacturing purposes there is a fairly satisfactory demand. There is a fair enquiry for slack. A good business is being done at the landsale depots.

Birmingham.

#### COAL.

An expanding demand is being experienced for house fuel, and the pits in this branch are working full time. For manufacturing coal the trade is slower. Slacks are on the side of scarcity. Prices remain as follow:—

Prices at pit.

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep.....	18/6	18/6
Do. seconds deep.....	16/	16/
Do. best shallow.....	14/9	14/9
Do. seconds do.....	14/	14/
Best hard.....	15/	15/
Forge coal.....	11/	11/
Slack.....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked cobs.....	14/	14/
Best hard spires.....	15/	15/
Forge (steam).....	11/	11/
D.S. nuts (steam).....	10/	10/
Small (do.).....	8/3	8/3

#### IRON.

Business was on the quiet side, but an interesting topic for conversation on 'Change was provided in the formation, or rather the resuscitation, of the Galvanised Sheet Association. The new organisation, it is understood, embraces the leading Welsh and English firms, and its object is to regulate the trade, especially in the matter of output. The old Association existed from 1905 until 1910, and it was dissolved because it could not stand the strain of competition from outside firms. Ever since then galvanised sheets have been a sensitive market, a slight decline in demand having generally been sufficient to bring about severe price cutting. It is now hoped to obviate this. Recently prices have improved, and the present quotations range from £11 5s. to £11 10s. Merchants do not look upon the movement with favour, and it is contended by many that by artificially raising prices it will give an opening in the South American and South African markets for American makers. Business generally on the market was of small volume and, with one or two exceptions, old prices remain in force. There are some optimists who declare that the new year will witness at least a partial revival of activity, and it is not without significance that many manufacturers are anxious to take advantage of the present low prices to replenish their stocks, which, on a falling market, are generally allowed to go down to the minimum commensurate with safety. Pig iron makers, on the other hand, are asking for better terms for remote deliveries. A few good sales have been negotiated, but the present basis is practically cost. Northamptonshire ranges from 48s. to 50s., Derbyshire 51s. to 52s., South Staffordshire 50s. to 52s., and part-mine 51s. 6d. to 52s. 6d. Makers of best bar iron are well employed on orders for the better class of engineering work, but the second-class bar mills are going not more than four days a week. They will close down for the Christmas holidays on Wednesday, and the break will last about a week, during which the usual repairs will be effected. For merchant qualities the average price is £7 a ton delivered Birmingham. The black sheet trade is dull, and gas strip is inactive and unchanged in price. Steel-makers have acquired a fair volume of work for rolling stock and structural purposes. In the semi-finished branch there is a good deal of Continental competition. Bessemer sheet bars range from £4 15s. to £4 17s. 6d., and Siemens up to £5.

### Forest of Dean.

Lydney.

#### COAL.

The steam coal collieries are doing a fair business, but only about half of them are at regular work, the others averaging about five days in the week. Stocks on the whole are not excessive. The demand for the house coal of the district has been rather better since last writing, and the collieries are making good time this week. Shipments have been heavier, whilst there has been more movement in the railborne branch of the trade. Slacks are in good demand again.

Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block.....	17/6	17/6
Forest.....	16/6	16/6
Rubble.....	16/9	16/9
Nuts.....	15/	15/
Rough slack.....	6/6	6/6
.....	12/6 to 13/	12/ to 13/
.....	8/6 to 9/6	8/ to 9/

Price extra f.o.b. Lydney or Sharpness.

### Devon, Cornwall, and South Coast.

Plymouth.

#### COAL.

Messrs. W. Wade and Son report that the wholesale and retail coal trade on the south coast continues to show no sign of activity, and the competition in retail prices of coal and coke was never more keenly felt. This state of things is usual when there is an absence of demand, and would quickly end if the weather became at all wintry. Coke is being retailed at a very low price, and some merchants are selling contract coal at very little profit. Most of the wholesale imports are on contract account, there being very little doing in outside purchasing. Stocks generally are low for this period of the year, and in view of the coming colliery holidays.

### THE WELSH COAL AND IRON TRADES.

THURSDAY, DECEMBER 18.

### North Wales.

Wrexham.

#### COAL.

There has not been any notable change in the amount of business done in this district during the past week, excepting that there has been a general increase in the tonnage disposed of, owing to the close proximity of the Christmastide, and also the cold snap of weather we have experienced. All the pits are working full time. With reference to coal for household purposes, there is almost an abnormal demand for good quality fuel, and merchants are sending in large numbers of private wagons for immediate loading, so that they may be able to cope with their extra trade. The landsale depots too are busily engaged in the retail trade just now. A fair amount of trade is current in regard to steam coal for manufacturing purposes, and this will continue right up to the time for closing down for the holidays, after which a week or two of poor trade will probably follow. All the railway companies having contracts here are pressing for extra supplies to enable them to deal with their traffic during the time the collieries are stopped next week. With reference to the coal for shipment ex the Mersey ports, the tonnage has been of an average kind, and wagons have been returned fairly satisfactorily, but things might yet easily be better in this respect. In the gas coal department there is also a special demand, nearly every gas works begging for extra supplies; and, as regards nuts, owing to the great demand for gas making, there is none on the open market. Slack is well sold, and there are no stocks at the collieries to any extent, excepting what is required for home consumption. The demand for gas coke is a little better than was the case last week. In regard to prices for immediate delivery, these are good, and no doubt this will continue right up to the end of the year, but with reference to future contract figures the position is a little uncertain, and a number of contracts are being held in abeyance, which generally have been fixed up before this date of the year. Naturally, the sellers are trying to fix at the highest figure they can, but buyers maintain that the market tendency is downwards, and ask for a reduction. Probably when the contracts are fixed up it will be found that there will not be much in it, but that, if anything, the price will be to the advantage of the buyer, to the extent of a few pence per ton. In regard to the open market figures these may be taken as being as below:—

Prices at pit.

	Current prices.	Last week's prices.
Prices at pit f.o.r.:—		
Best house coal.....	15/9 to 16/6	15/6 to 16/6
Secondary do.....	14/6 to 15/3	14/6 to 15/3
Steam coal.....	12/6 to 13/	12/6 to 13/
Gas coal.....	13/ to 13/9	13/ to 14/
Bunkers.....	12/3 to 12/6	12/3 to 12/6
Nuts.....	11/ to 11/9	11/ to 11/9
Slack.....	6/3 to 8/6	6/ to 8/9
Gas coke (at works).....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal.....	17/6 to 19/2	17/6 to 19/2
Seconds.....	16/8 to 17/6	16/8 to 17/6
Slack.....	10/ to 12/6	10/ to 12/6

### Monmouthshire, South Wales, &c.

Newport.

#### COAL.

The increasing difficulty of filling up stems as the holidays approach nearer keeps business down to a very small actual quantity just at present. For prompt shipment there is some irregularity in quotations, shippers who require wagons being obliged to make concessions to clear, but otherwise prices are ruling very firmly and, indeed, for small coals, quotations are 3d. to 6d. higher than last week. The market is following its normal course at such times, sellers' ideas being governed entirely by their position at the moment. As regards January business, there is little spirit shown, the very small difference from to-day's prices which colliery salesmen are offering giving buyers insufficient stimulus to attract business. The house coal trade maintains a dull

Prices f.o.b. cash 30 days, less 2½ per cent.

	Current prices.	Last week's prices.
Steam coals:—		
Best Black Vein large ...	18/6 to 18/9	18/6 to 18/9
Western-valleys, ordinary	17/6 to 17/9	17/6 to 17/9
Best Eastern-valleys.....	16/9 to 17/	16/6 to 16/9
Secondary do.....	16/3 to 16/6	15/9 to 16/3
Best small coals.....	8/9 to 9/	8/9 to 9/
Secondary do.....	8/3 to 8/6	8/3 to 8/6
Inferior do.....	7/6 to 8/	7/6 to 8/
Screenings.....	9/	9/
Through coals.....	13/6 to 14/	13/6 to 13/9
Best washed nuts.....	14/3 to 14/6	14/ to 14/3
Other sorts:—		
Best house coal.....	18/ to 19/	18/ to 19/
Secondary do.....	17/ to 18/	17/ to 18/
Patent fuel.....	19/ to 20/	19/ to 20/
Furnace coke.....	19/ to 20/	19/ to 20/
Foundry coke.....	23/ to 25/	23/ to 25/

and uneventful tone, having presented practically no fluctuation for months. Pitwood supplies are just about equal to a slow demand, good wood now ruling round about 21s. 3d. ex-ship. In the freight market there is not much doing, the present tendency of rates being irregular.

#### IRON.

There is very little change to report in the conditions of the local iron and steel trades, the outlook is much better, and there is more actual business passing. Bar mills are well engaged, and output normal, prices remaining firm at last figures. Imports of foreign bars for the week total over 10,000 tons, quotations in this quarter trending upwards. At rail mills work continues fairly good, and prices are unaltered on the week. The outlook in this department is now considered more favourable. Conditions at the blast furnaces have improved a little, and the feeling appears to be fairly general that prices have reached the bottom, purchasers seeming to accept that fact. Prices remain nominally as a week ago. Iron ore is a steady market at last quoted rates. The tinplate department remains very little changed, many works are fairly well placed as regards orders and a good enquiry is coming along. Quotations remain as a week ago.

Cardiff.

#### COAL.

The general topic of conversation on 'Change is the lack of accommodation at the docks, and complaints of delay are to be heard on all sides, both on the part of colliery proprietors and shipowners. It is not an uncommon occurrence for a vessel to be in dock for 9 and even 10 days after giving notice of readiness before she is able to obtain a tip, and with a prospect of good trade during the ensuing year, it is felt that the present facilities are totally inadequate to meet the requirements of shippers. As time passes the position is bound to become more acute because the construction of a new dock, even if commenced at an early date, would take five years to complete, and with the developments that are taking place in all parts of the coalfield, it is believed that the output will be very largely increased in the near future. At the present time there is plenty of tonnage in dock, but owing to the great congestion of traffic numbers of collieries find a difficulty in providing full work at the pits due to the lack of empty wagons. The disorganisation caused by the railway strike a few days ago is reflected in the week's shipments, the total exports from the port of Cardiff being only 402,786 tons as compared with 531,731 tons in the corresponding week of last year, or a decrease of nearly 129,000 tons. There was also a falling off at Newport, Swansea and Port Talbot. As usual just before a holiday, the miners are working better, and outputs more nearly approach the normal than they have done for some time. This makes it certain that loading pressure will continue not only up to Christmas but afterwards. Freights are still very weak with little prospect of an improvement, Gonzo having been done several times as low as 7s., which is a record for a very considerable time. Chartering has not been on quite such an extensive scale, the vessels taken up during the week only representing 277,950 tons as compared with nearly 366,000 tons in the preceding six days. With regard to prices, the nominal quotation for best Admiralties is 21s. to 21s. 6d., but those merchants who have been fortunate enough to have a vessel under a tip have been able to purchase at considerably less than this figure, especially from colliery owners who were pressed for empty wagons. With regard to the future, colliery sales agents are still taking a very optimistic view, and show little inclination to reduce quotations. Over the whole of next year 19s. is firmly demanded, and an even higher figure for the first six months of the year. Superior second Admiralties are offering at 20s., and ordinary qualities from 19s. 3d. to 19s. 6d., at which prices the market shows considerable firmness. There is not much change in the small coal market, best bunker smalls being 11s. to 11s. 3d., best ordinaries at 10s. 9d. to 10s. 10½d., and cargo sorts down to 7s. 9d. or 8s. The tenders invited by the Portuguese State Railways for 98,000 tons of Cardiff smalls for delivery at Lisbon and Oporto over next year have been sent in, and it

Prices f.o.b. Cardiff (except where otherwise stated).

	Current prices.	Last week's prices.
Steam coals:—		
Best Admiralty steam coals.....	21/ to 21/6	21/3 to 21/6
Superior seconds.....	20/	20/3 to 20/9
Ordinary do.....	19/3 to 19/6	19/6 to 20/
Best bunker smalls.....	11/ to 11/3	11/3 to 11/6
Best ordinaries.....	10/9 to 10/10½	11/ to 11/3
Cargo qualities.....	7/9 to 8/	7/10½ to 8/
Inferior smalls.....	7/ to 7/6	6/6 to 7/6
Best dry coals.....	19/ to 20/	18/6 to 19/
Ordinary dries.....	18/ to 18/6	17/3 to 17/9
Best washed nuts.....	16/6	16/6 to 16/9
Seconds.....	15/6	15/6 to 15/9
Best washed peas.....	14/3 to 14/6	14/9
Seconds.....	13/9	13/9 to 14/
Dock screenings.....	12/ to 12/6	12/
Monmouthshire:—		
Black Veins.....	19/	18/6 to 18/9
Western-valleys.....	18/3 to 18/6	17/3 to 17/9
Eastern-valleys.....	17/9 to 18/	16/6 to 16/9
Inferior do.....	15/9 to 16/3	16/ to 16/3
Bituminous coals:—		
Best house coals (at pit)	21/	20/6
Second qualities (at pit)	18/	17/6 to 18/
No. 3 Rhondda:—		
Bituminous large.....	17/ to 17/6	17/
Through-and-through...	15/ to 15/6	14/6 to 15/
Small.....	12/ to 12/6	12/
No. 2 Rhondda:—		
Large.....	16/6	14/6 to 14/9
Through-and-through...	13/6	12/
Small.....	8/6 to 9/	8/6
Best patent fuel.....	22/6	22/6
Seconds.....	21/	20/ to 21/6
Special foundry coke.....	27/ to 28/	27/ to 28/
Ordinary do.....	22/ to 25/	22/ to 24/
Furnace coke.....	18/ to 20/	19/ to 20/
Pitwood (ex-ship).....	21/6	22/

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.



is reported that the contract has been secured by Messrs. Lysberg Limited, at a price stated to be 17s. 11d. c.i.f. It is also reported that the Paris-Orleans Railway Company, who have been in the market for their requirements over next year, have decided to take one-third only from South Wales and two-thirds from the north. In previous years this ratio has been reversed, but owing to the high rates at present ruling the bulk of their supplies for 1914 will be taken from the north of England. Monmouthshire coals show a slight upward tendency, best Black Veins being about 19s., western-valleys 18s. 3d. to 18s. 6d., and eastern-valleys 17s. 9d. to 18s., in each case f.o.b. Cardiff. In Rhondda bituminous coals quotations are a little easier, and although sellers are holding out for 17s. 6d. for No. 3 Rhondda large, business in several instances has been done at 17s. Other varieties are practically without change, and the same remarks apply to tarcy house coals, which are still quoted at 21s. and 18s. respectively at the pit. According to the Board of Trade returns just to hand, the quantity of coal shipped from the Bristol Channel ports during November amounted to 2,382,723 tons, compared with 2,614,539 tons in the corresponding month of last year, or a decrease of 231,816 tons. From Cardiff the shipments were 1,502,082 tons, or a decrease of 200,732 tons; from Newport 411,355, an increase of 20,047 tons; from Port Talbot 159,167 tons, or a falling off of 16,010 tons; and from Swansea 289,924 tons, or a decrease of 31,436 tons. The following table shows the quantities of coal exported from the Bristol Channel to the chief foreign countries of the world during the month of November as compared with the shipments in the corresponding month of last year:—

	Nov. 1913.	Nov. 1912.
	Tons.	Tons.
Russia .....	16,065	19,443
Sweden .....	11,909	22,679
Norway .....	10,654	32,054
Denmark .....	40	6,883
Germany .....	18,349	26,586
Netherlands .....	9,523	21,201
Belgium .....	39,633	35,078
France .....	569,452	625,775
Algeria .....	69,698	59,747
French Somaliland .....	5,663	12,369
Madagascar .....	5,588	—
Portugal .....	47,242	79,620
Azores .....	1,653	5,166
Madeira .....	10,199	14,426
Spain .....	92,180	112,229
Canary Islands .....	63,608	85,071
Italy .....	462,127	510,318
Austria-Hungary .....	35,544	37,522
Greece .....	50,251	74,653
Roumania .....	22,151	10,100
Turkey (European) .....	12,550	—
„ (Asiatic) .....	19,561	—
Egypt .....	190,031	145,550
Tunis .....	8,033	14,610
Chili .....	37,739	27,149
Brazil .....	107,477	161,134
Uruguay .....	42,138	46,036
Argentine Republic .....	237,067	295,530
Channel Islands .....	6,737	7,592
Gibraltar .....	31,494	23,867
Malta and Gozo .....	62,582	53,254
Sierra Leone .....	5,584	2,153
Aden and Dependencies .....	5,981	10,383
British India .....	10,888	250
Ceylon and Dependencies .....	8,970	18,299
Wei-hai-Wei .....	5,107	5,164
Hong Kong .....	—	5,903

Patent fuel makers continue busy and the shipments last week totalled 30,646 tons, of which the Crown Company despatched 11,240 tons, Newport 6,350 tons and Swansea 13,056 tons. For current business the price remains at 22s. 6d. for best brands and for delivery over next year the quotation is firm at 20s. 6d. The coke market is very disappointing and what little business is passing is really a matter of negotiation between the parties. Special foundry is quoted at 27s. to 28s., ordinary foundry at 22s. to 25s., and furnace at 20s., although the latter has been sold during the last few days at as low as 18s. to 18s. 3d. There is a large quantity of pitwood in the port and quotations are weak at 21s. 6d. per ton.

IRON.

There is an improved demand for tin-plates, probably owing to the low prices at present ruling, and shipments last week amounted to 133,934 boxes, whilst the receipts from works totalled 91,272 boxes, leaving stocks in the docks, warehouses and vans 155,715 boxes. Bessemer standard cokes are quoted 12s. 7½d. to 12s. 9d. and in some quarters, where the order books are pretty full, makers are asking 12s. 10½d. Oil sizes are 13s. 3d. and 20 × 10 sheets 18s. 7½d. to 18s. 9d. Imports of foreign iron and steel, including plates and bars, have been very heavy during the past month, totalling over 55,000 tons, of which 13,529 were landed at Cardiff, 29,694 tons at Newport, and 14,356 tons at Swansea. These heavy importations naturally have a depressing effect on local trade and, although the Siemens Bar Association still maintain their quotation of £4 11s. 3d. for Siemens bars and £4 10s. for Bessemer qualities, it is reported that business has been done at 2s. 6d. per ton under the association price. In the galvanised sheet trade a firmer tone prevails and some heavy shipments have taken place during the week, one parcel of 1,653 tons having been despatched from Newport to Bombay. The price for 24-gauge corrugateds is still maintained at £11. The rail mills have been busy, particularly on heavy sections for Colonial railways. Prices remain unchanged. Welsh pig iron is slightly easier at 64s., f.o.t. In iron ore quotations are a trifle firmer, best rubio being held for 18s. to 18s. 6d., seconds 17s. 6d. to 17s. 9d. and Almeria 18s. Prices of scrap metals are as follow:—Cast 57s. 6d., steel 52s., heavy wrought 50s., double headed iron rails 65s., ditto steel 62s. 6d., and mixed sections 52s. 6d.

Swansea.

COAL

Notwithstanding the fact that there was an ample supply of tonnage in dock, only a small portion was loaded last week, due to the congestion caused by the railway strike. The shipments of coal and patent fuel totalled only 84,801 tons. There was a capital attendance on 'Change this morning, and the undertone of the anthracite coal market exhibited a firm tone. Fresh business was limited, as sellers

were heavily booked up to Christmas, and were unwilling to accept further stems. There was ample tonnage at hand, and a large demand for prompt supplies. Swansea Valley large was in excellent request, and values were firm. Red Vein large continued firm at last figures. Machine-made nuts and cobbles were very strong, but German nuts were slow in moving off. There was a better enquiry for rubbly culm; duff, however, was easy. In the steam coal market there was a brisk demand for bunker coals, and a further advance in prices was noted.

Prices of coal f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/9 to 21/	20/ to 21/
Big Vein large (less 2½ per cent.) .....	18/ to 19/	18/ to 19/
Red Vein large do. ....	14/6 to 16/	15/ to 16/
Machine-made cobbles (net) .....	21/6 to 24/6	21/6 to 24/
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 26/	23/6 to 26/
German do. do. ....	23/6 to 25/6	23/ to 25/6
Beans (net) .....	16/9 to 18/9	16/9 to 18/9
Machine-made large peas (net) .....	13/6 to 14/6	13/3 to 14/
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.) .....	5/6 to 5/9	5/3 to 5/6
Duff (net) .....	3/ to 3/6	3/ to 3/6
Steam coals:—		
Best large (less 2½ p.c.) ..	19/6 to 21/6	19/6 to 21/6
Seconds do. ....	14/9 to 15/9	14/9 to 15/9
Bunkers do. ....	12/6 to 14/	11/3 to 12/6
Small do. ....	7/ to 8/	7/ to 8/
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/6 to 18/	17/ to 18/
Through-and-through (less 2½ p.c.) .....	13/9 to 14/6	13/6 to 14/6
Small (less 2½ per cent.) ..	10/3 to 11/3	10/3 to 11/3
Patent fuel do. ....	17/3 to 17/9	17/ to 18/

IRON.

There was no change in the condition of the iron and steel trades last week. There was an average yield of pig iron at the blastfurnaces, and the steel trade was fairly brisk, the bar mills working regularly. There appears to be a better tone in the tin-plate market, with the promise of an improved demand in the new year; prices are firmer. The shipments of tin-plates last week were 133,934 boxes, receipts from works 91,272 boxes, and stocks in the dock warehouses and vans 155,715 boxes.

Llanelli.

COAL.

The Christmas holidays are having a marked effect on the bituminous market, and there is a very good demand for all kinds. There are little or no stocks on hand, and to have sufficient supplies over the holidays the manufacturing works are willing to pay more money. The collieries will be idle from Wednesday to Monday, where as some of the larger works will probably be keeping their furnaces on work throughout the week. There has also been a big demand in the prices of bunkers, and through coals have advanced about 2s. per ton during the past week or so. Steams, however, are still very plentiful, and prices are down. For contracts over the next three and six months collieries are asking an advance of 3d. and 6d. per ton on furnace coals. Anthracite shows no improvement, and the market is very dull for most kinds. The continued mildness of the weather is having a very detrimental effect on the demand, and prices show no sign of improving. The machine made qualities are most difficult to place even at the low figures offering. Prices this week are:

Prices f.o.b.

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large .....	21/ to 22/6	21/ to 23/
Secondary do. ....	19/ to 20/	19/ to 21/
Big Vein large .....	18/ to 19/	18/ to 19/
Red Vein do. ....	14/ to 15/	13/6 to 14/6
Machine-made cobbles ...	20/ to 21/6	19/ to 20/
German nuts .....	23/ to 24/	23/ to 24/
French do. ....	23/ to 24/	23/ to 24/
Paris do. ....	23/ to 24/	23/ to 24/
Machine-made beans .....	18/ to 22/	18/ to 22/
Do peas .....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	5/ to 5/6	5/ to 5/6
Duff .....	4/ to 5/	4/ to 5/
Other sorts:—		
Large steam coal .....	17/ to 18/	16/ to 17/
Through-and-through ...	13/ to 13/6	11/ to 11/6
Small .....	9/ to 9/6	9/ to 10/
Bituminous small coal ...	10/6 to 11/6	10/ to 11/

**South Staffordshire Mines Drainage.**—The reports of the engineers of the South Staffordshire Mines Drainage Commissioners were issued on Saturday. Regarding the Tipton district, Mr. E. Howl states that the pumping has been 10,043,900 gallons in 24 hours, compared with 10,894,200 in the previous month, and 10,889,000 in the corresponding period last year. The rainfall was 2.50 in. The Gospel Oak Mond gas plant was being worked full speed to assist the new Moat engine. The old Moat engine has been worked a few turns only during the month. The water at the Bradley engine was slightly less than a month ago. The Deep-fields engine was keeping the water down to the bottom coal level at three-quarter speed. There was slightly less water to be dealt with at Park Lane engine, and practically no change at Crown Meadow and Leabrook. In regard to the Old Hill district, Mr. W. B. Collis states that the pumping plant has been overhauled and put in readiness to deal with any increase in water that may come with the winter's rains. The Buffery level has been maintained in good order, and the height of the water in the Saltwells and Waterfall Lane pounds has not varied.

THE BY-PRODUCTS TRADE.

**Tar Products.**—Things are rather quiet, and prices in some cases are easier. Benzols remain much about the same. Pitch continues to rule easy. Naphthas and creosote are unaltered, while crude carbolic is perhaps just a shade firmer. Nearest values are:—

Benzols, 90's .....	1/1 to 1/1½
Do. 50's .....	1/1½ to 1/
Do. 90's North .....	1/
Do. 50's North .....	1/11
Toluol .....	1/10½ to 1/11
Carbolic acid, crude (60 per cent.) .....	1/0½
Do. crystals (40 per cent.) .....	3/3½
Solvent naphtha (as in quality and package) ...	1/9½
Crude ditto (in bulk) .....	5/5½
Creosote (for ordinary qualities) .....	3/3½
Pitch (f.o.b. east coast) .....	40/
Do. (f.a.s. west coast) .....	39/ to 40/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—There is really very little doing, so that prices are more or less nominal. In the forward position £13 5s. is named for January delivery, and 2s. 6d. more for February-March, but these values must be accepted with caution, and careful enquiry as to conditions generally. Closing prompt prices are:—

London (ordinary makes) .....	£12/2/6
Beckton (certain terms) .....	£12/12/6
Liverpool .....	£12/18/9
Hull .....	£12 16/3
Middlesbrough .....	£12/15/0
Scotch ports .....	£13 to £13/2/6
Nitrate of soda (ordinary) per cwt. ...	10/6

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

THE TIN-PLATE TRADE.

Liverpool.

A fair amount of business has been booked and most works are now full up for January. Prices do not show any improvement, however, although buyers evidently do not anticipate them going any lower, judging by the way orders have been placed lately. Makers are standing better to their quotations, which may be called as follows, for delivery over next three months to suit works:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 12s. 9d. per box; I C 28 × 20 (112 sh. 216 lb.), 25s. 6d. to 25s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 1½d. to 13s. 3d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 3d. to 13s. 4½d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 3d. to 13s. 4½d. per box; I C 20 × 10 (225 sh. 156 lb.), 18s. 9d. to 18s. 10½d. per box; I C squares and odd sizes, 13s. to 13s. 3d. basis for approved specifications. Charcoal tins run 14s. 9d. basis and upwards according to tinning, and are in moderate request. Coke wasters meet with a fair demand. Quotations:—C W 14 × 20, 12s. 1½d. per box; C W 28 × 20, 24s. 7½d. to 24s. 9d. per box; C W 14 × 18½, 10s. 9d. per box; C W 20 × 10, 15s. per box. all f.o.b. Wales, less 4 per cent.

**Grimsby Coal Exports.**—During the week ended Thursday, 11th inst., the exports of coal from Grimsby, as shown by the official returns, totalled 34,269 tons foreign and 530 tons coastal, compared with 15,856 and 630 tons respectively for the corresponding week last year. Shipments:—Foreign: To Aarhus, 4,470 tons; Antwerp, 554; Diep e, 961; Drammen, 1,843; Esbjerg, 319; Elsinore, 880; Gothenburg, 2,070; Halmstad, 1,732; Hamburg, 5,734; Ilborg, 200; Korsør, 938; Landskrona, 1,714; Malmo, 3,691; Middlefurt, 981; Narvik, 3,200; Randers, 520; Ronne, 1,872; Ronneby, 2,176; Rotterdam, 414. Coastal: To Gravesend, 420; and London, 110.

**The Edward Medal.**—On Tuesday, the King decorated a number of men with medals for acts of special gallantry in saving or attempting to save life in colliery accidents. Mr. Joseph Campbell, a fireman, and Mr. Alexander Farquharson, a miner, received respectively Edward Medals of the First and Second Class, for a gallant attempt to rescue a fellow workman at the Swinhill Colliery, Larkhill, on the occasion of an explosion of firedamp. For going to the assistance of two fellow workmen in some old workings at the Lodge Mill Colliery, Lepton, Huddersfield, through a foul atmosphere, Mr. Thomas Chatterton was awarded the Edward Medal of the Second Class. Similar decorations were bestowed upon Mr. Thomas Thomas and Mr. Matthew Withers. The former, at an accident at the Llewellyn Sinking pit, Glamorganshire, went down the shaft with the aid of a rope to the rescue of some men although falls were occurring at intervals. Withers, when a workman was buried by a fall of roof at the Annesley Colliery, near Nottingham, made persistent efforts to rescue him despite injuries he had himself received. His Majesty then received a number of men of the St. John Ambulance Corps who were recommended for decoration with a silver medal of the Order of the Hospital of St. John of Jerusalem in England for gallantry displayed on the occasion of the terrible disaster at Denaby Main Pit. These were:—The Rev. Sidney Featherstone Hawke, Vicar of Denaby Main; Dr. James Forster; Dr. Dhum Feroze, surgeon to the colliery; Mr. Basil Henry Pickering, colliery manager; Edward Feeney, deputy; William R. Goodwin, deputy; Benjamin Lansbridge, machine man; Fred Adams, deputy; Joseph Blenkinsop, dataller; Harry Rockliff, dataller; Albert Wall, dataller; Walter Wilkinson, deputy; George Wilding, collier; Joseph Bucknell, deputy; George Milner, under-manager; Arthur Sykes, deputy; and Thomas Sear. The King shook hands with each of these men in turn, and pinned the silver medals to the breasts of each.



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(A Classified List appears on page 1296.)

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\*\* For other Miscellaneous Advertisements see Last White Page.

## The Colliery Guardian

AND

Journal of the Coal and Iron Trades.

Joint Editors—

J. V. ELSDEN, D.Sc. (Lond.), F.G.S.  
HUBERT GREENWELL.

LONDON, FRIDAY, DECEMBER 19, 1913.

The average value of coal, coke and manufactured fuel exported from the United Kingdom during November was 14s. 0½d. per ton, as compared with 12s. 11½d. in November 1912 and 11s. 7½d. in November 1911.

The value during the first eleven completed months of the present year is 13s. 11½d. per ton, as compared with 12s. 7½d. and 11s. 4½d. respectively in the corresponding periods of 1912 and 1911.

Of the total exports of coal during November, the mean value of the large coal exported was 15s. 5½d.; through-and-through (unscreened) coal, 12s. 8½d.; and small coal, 11s. 0½d. The average value of all kinds of coal exported was 13s. 10½d., an increase of 0½d. as compared with the preceding month. Otherwise divided, it fetched the following values:—Steam coal, 14s. 0½d.; gas coal, 12s. 10½d.; anthracite, 15s. 8½d.; household coal, 13s. 5½d.; and



other sorts of coal, 12s. 7½d. The value of the coke exported was 17s. 2½d. per ton, and of the manufactured fuel 18s. 1½d. per ton.

Balloting is at present taking place by the Northumberland miners on the question of raising their contributions from 6d. and 3d. to 9d. and 4½d. The increase, if agreed to, will bring in an additional £10,000 to the association.

A peculiar strike has taken place at the Kelloc Colliery, Durham, where 1,200 men have laid the pit idle, owing to their having no water for drinking or household purposes.

At a meeting of the South Wales Coal Conciliation Board on Monday, the owners refused to agree to the proposal that all workmen at the collieries should be expected to become members of the Federation. They stated that they could not be parties to coercing the men to join any union.

The North of England Institute met on Saturday and further discussed Mr. Samuel Dean's paper dealing with American conditions.

The Lord Mayor of London has convened a conference at the Mansion House on Monday, January 19, to consider the expediency of establishing a central national fund for the relief of distress arising from colliery accidents of all kinds.

A disastrous explosion has occurred at the Vulcan Mine, Newcastle, Colorado, U.S.A. Over 40 men, it is reported, have been entombed.

The King decorated several miners on Tuesday with the Edward Medal. A number of St. John Ambulance men who rendered conspicuous service at the Cadeby Mine disaster received the silver medal of their order.

Mr. J. R. L. Allott's paper on "The Reopening of Norton Colliery with Self-contained Breathing Apparatus" was discussed at some length at the meeting of the North Staffordshire Institute of Mining and Mechanical Engineers at Stoke on Monday.

At the meeting of the Mining Institute of Scotland at Glasgow, on Saturday, several interesting papers were discussed, and Prof. D. Burns described an apparatus for the determination of carbon dioxide and oxygen in mine air.

The meeting of the South Staffordshire and Warwickshire Institute of Mining Engineers was held at Birmingham on Monday, when a contentious paper dealing with a 30 years' experience with pumping machinery was read by Mr. John Brindley.

**Explosions in Electric Mains.** THE use of bitumen for junction boxes in electric cable installations is particularly suitable in cases where acid mine waters are liable to obtain access. It has many

obvious advantages over lead, and it has proved durable under ordinary underground conditions. Yet it has its dangers, and a recent fatal case of gaseous explosion at Hebburn, caused by the gas given off by the electric heating of bitumen, has led to the appointment by the Board of Trade of a committee to consider what precautions may be advisable to prevent the occurrence of similar disasters in future.

The case referred to above has already formed the subject of an investigation by Prof. W. M. THORNTON and Dr. J. A. SMYTHE, of the Armstrong College, Newcastle-upon-Tyne, and they have obtained some interesting results concerning the nature of the gases evolved from bitumen at certain temperatures. Selecting Trinidad pitch from the cable trough at Hebburn, adjoining the seat of the explosion, they found that while at temperatures below a dull red-heat the gases evolved from bitumen by slow distillation contained 80 per cent. of methane,

at higher temperatures, when conducted under such conditions that the vapours evolved during the later stages passed over the heated coke produced in the earlier stages, the composition of the resulting gas was materially altered, the result being a large increase in the unsaturated hydrocarbons (olefines) at the expense of the saturated hydrocarbon methane.

That sufficient explosive gas may thus be evolved from bitumen to cause a serious explosion we know from actual occurrences. In the Hebburn case two houses were completely wrecked by the explosion of bitumen gas accumulated beneath the flooring of the rooms on the ground level. The heating and distillation of the bitumen had been caused by a short circuit. The cause of the fault in the cable may possibly be traced to a displacement at a point where there was both a dip and a bend. The heat developed was sufficient to distil about 22 lb. of bitumen, occupying about 6 ft. of cable box filling. The resultant gas, probably mostly methane, would occupy about 70 cubic feet, and, when mixed with air in the proportion necessary to give a lower limit mixture, it is clear that a large quantity of explosive gas would be available.

Interesting speculations arise as to whether such a mixture of inflammable gas and air would be capable of self-ignition. Under the circumstances, it seems highly probable that such would be the case; for although fusion of the cable would cut off the current, the heat generated would not be at once dissipated. Inflammable gas, molten copper and red-hot carbon would form a sufficiently dangerous combination to be avoided at all costs.

It should not be assumed, however, that the use of bitumen should necessarily be regarded as inadvisable for colliery cables, although such a suggestion was made by Dr. THORNTON in the course of the Cadder enquiry. Upon this point the Board of Trade Committee may be able to form a conclusion. It should, however, be noted that this enquiry was not primarily instigated by considerations of safety in mining, but with regard to electric installations in general from the point of view of public safety. It would certainly be a pity if the enquiry stopped short of a complete investigation of this matter by reason of any assumed conflict of duty with that of the Home Office. The fact that Mr. ROBERT NELSON is a member of the committee is in itself a recognition of the interest which the Home Office has in connection with questions of this kind, as well as a guarantee that colliery conditions will not be overlooked.

**An Employers' Defence Fund.** THERE is no indication that the United Kingdom Employers' Defence Union, of which much has been heard during the past few months, will meet with any great support from the coal trade. Briefly the objects of the organisation are to enforce agreements and to afford mutual protection to employers against the combined attacks of labour. For this purpose it is proposed to form a guarantee fund of £50,000,000, annual calls being limited to 7½ per cent. on the amount guaranteed by any member.

The best that can be said for such a project is that it is a logical offspring of the Trade Disputes Act—which has most unfairly adjusted the balance against employers—and the supineness of the Legislature; it is proposed that the union should be registered as a trade union, and so enjoy the privileges conferred by the Act, which, in the case of a large association of employers, may well be tangible and important; indeed, the

successful formation of such a union may be the readiest means of securing that amendment in the law which all employers demand with unanimity. Otherwise, it is beset with considerable objections.

In the first place, the one thing definite about the union is the "fifty million" fund, which is to be utilised in the furtherance of objects as indefinite as they are unexceptionable—because they are indefinite. The inevitable result would be to create the impression that the inviolability of contracts, the continuity of labour, and so forth, are to be procured by the expenditure of money. Money will do most things, but the result, in this case, is just as likely to be the intensification of reprisals on the part of the trade unions and their poor relations, the syndicalists, with the certainty of a large measure of support from the public, who abhor any mention of the word "trust." During the past year or two, the series of strikes directly aimed at the community, of which the railwaymen's strike was the first and the municipal strike at Leeds the latest, if not the last, has done much to make the man in the street appreciate the domestic troubles of employers and to divert sympathy from the unions. The latter, as they have become more wealthy, have been tempted—very ill-advisedly, we think—to run mains with the public, and the employers, however great their present worries may be, should hesitate before they commit a similar folly.

This brings us to the second point—namely, that the allocation of large funds to the subversion of trade unions—this is the inference, if not the avowed intention—is uneconomical if uncontrolled by personal necessities. Many employers can ill afford to abstract sums from their gross profits for such a purpose, and, under these circumstances, there is always a tendency to get one's money's-worth, even if the net results are unprofitable. If A has supported B through a series of strikes or lock-outs, sooner or later he may feel a desire to get level with his coadjutor, by having a strike himself.

Not that we miscalculate the value of co-operative associations of employers, but all the more important industries have the legitimate means within their grasp—and generally employ them—without going to the extremes now advocated. The Mining Association of Great Britain, or the Engineering Employers' Federation—to take but two instances—are sufficiently powerful and representative to afford real protection to their members; but to fight the workmen is neither their sole nor even their principal purpose. They have other important functions—namely, to promote the efficiency of the industries which they represent, to inform the public and the Legislature of their special points of view, and to consider technical, legal and commercial questions that affect the members in whole or part. No general union could possibly fulfil such a purpose, as the members would frequently be found in opposition; and, if all such objects are to be expunged, the union remains, as we said before, simply a fighting force. For the smaller unorganised industries, which are frequently the butt of the sympathetic strike, the union may be a welcome means of defence, but that it will excite any degree of warm approval in the coal trade and other staple industries is improbable.

#### Trade Summary.

The London coal trade for the past week has been very brisk. Colliery orders have increased, but prices are unaltered. The colder weather and the near approach of the holidays have stimulated the delivery trade, and the reports from the wharves and depôts show an increasing volume of trade. Empties are scarce, and the difficulties in



increasing. Steam coals have shown an improved slack and small nuts are recovering slowly. are selling freely. Coke continues weak. market at Newcastle is very quiet, bad weather having delayed the arrival of tonnage. Supplies, however, are exceedingly scarce. Forward business is small, owing to the approach of holidays.

The Durham coal trade has changed but little, the prevailing tone being one of firmness.

The Lancashire house coal trade is dull for the season. Bunker coal is in good request. The prices of slack are easy.

There has been an appreciable improvement in the demand for West Yorkshire house coal. The consumption of manufacturing coal is below par, owing to the working of short time.

In South Yorkshire the export demand has been fully maintained, and prices are firm. There is a strong call for manufacturing coals for immediate needs, but common sorts are rather slack. House coals are going off better, and the demand for coke has improved somewhat.

Derbyshire house coal has been sold rather more freely, and stocks are low, despite the mildness of the season. There is a good demand for industrial grades.

The pressure at Cardiff is considerable, owing to the approach of the holidays, and the outlook is very promising. Small coals are unchanged. Monmouthshire coals are rather dearer; on the other hand, Rhondda bituminous coals are easier. Patent fuel makers are busy. Coke is very dull.

The position of trade in Scotland remains very satisfactory.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinion expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

### INJECTORS IN OXYGEN APPARATUS.

SIR,—In an article on the above in your issue of November 28, 1913, by Bergassessor Forstman, D. Eng. (from a paper read at the International Life-saving Congress, Vienna, 1913), giving experiments with rescue apparatus fitted with connections at different points for taking samples, and with short intermediate pieces with orifices of different dimensions (5, 2 and 1 millimetres diameter) provided, the article states that from experiments made with an admission orifice (leak) of 1 mm. diameter, the amount of air entering the apparatus is far below 30 cubic inches per minute even when heavy work is being done, and the value does not exceed the above limit with a 2 mm. leak unless the wearer is performing heavy tasks; but with a 5 mm. leak a larger amount than the critical volume may be drawn in, even with the wearer of an apparatus at rest. With a 2 mm. leak it is, however, below 30 cubic inches per minute, and therefore such a leak could not be dangerous in presence of carbon monoxide, since unconsciousness could not supervene unless more than 30 cubic inches of external air (containing 1 per cent. of CO) entered per minute during a period of two hours, and, even with a high percentage of carbon dioxide in the fumes, could not be dangerous, as the regenerators of the Westfalia and Draeger apparatus, being so largely dimensioned, that they could absorb any dioxide entering in this way without impairing their working efficiency.

Now, when it is known that air containing as little as 0.2 per cent. produces a dangerous effect, and the person may be too far gone to do anything for himself, I consider that an apparatus, whether of the injector or non-injector type, that has a leak of even the smallest dimensions possible, is not safe. As CO is rapidly absorbed and retained by the haemoglobin of the blood, it accumulates as more air containing the gas is breathed, and is therefore a cumulative poison and is most dangerous even in small proportions.

Again, when it may be assumed that the average man produces about 3½ cubic feet of CO₂ during two hours' work, the regenerators have sufficient work to do to absorb this amount and keep the wearer fit; while, should there be a leak which would allow an extra quantity of CO₂ to enter the regenerator, it is obvious the greater the amount of work they are called upon to do, a correspondingly less time will they last, and therefore their working efficiency is bound to be impaired. The supply of an excess of oxygen will not do away with the evil effects of an excess of CO₂.

The moral is, therefore, "that it is better to be 'sure' than sorry."

G. H. B. JAMES.

London, Maesteg.

Dec. 19, 1913.

### COLLIERY ACCIDENTS.

#### Glynea.

The enquiry was held last week by Mr. W. W. Brodie, deputy coroner, at Llanelly, into the circumstances attending the death of the victims of the Glynea Pit explosion, which occurred on October 18. Eight men succumbed to injuries while under medical treatment.

Griffith Jones, Bynea, the only survivor, stated that he heard a shot fired in the face when he was knocked down. He did not see the fireman before starting work, but received intimation that everything was all right by a mark on the shovel which was in the stall.

William Price, the manager, stated that when he was informed of the explosion he immediately sent for help, and organised two search parties. John, the fireman, was quite conscious, and witness asked him how the explosion occurred. "I don't know," he replied, "because I found no gas there." About two hours later, he made a careful examination, and noticed a blown-out shot and a small quantity of gas on the face of the coal. He also examined some 200 yards up from the face, but found no other traces of gas.

Witness stated that he himself signed the appointment of David John. His signature, however, was not on the counterfoil of the certificate. The usual sign for danger was crossed timbers. In subsequent examination regarding the cause of the blowing out of the shot which led to the explosion, witness stated that, according to what an examination of the gas showed, he thought the solidity of the rock was such that he, personally, would not have considered it advisable to have fired the shot. Witness later admitted that safety lamps had been used in the Upper East Heading since it had been started three years ago, because this seam had more gas than the others, which were practically free from gas. He had resorted to the use of permitted explosives some eight or nine months ago as a result of a conversation with Mr. Owen, the inspector of mines. He also stated that a letter had been received from Dr. Atkinson at that time advising the use of permitted explosives.

The next witness called was Mr. Thomas Protheroe, Old-road, Llanelly, managing director of the colliery.

Mr. John Dyer Lewis, Swansea, H.M. inspector of mines, said that examinations which he had made of the mine had shown everything to be satisfactory. An examination which he carried out subsequent to the explosion disclosed the fact that very little force had been exerted by the blast, and only the top hole where the blast had occurred was affected. The cause of the blast, in witness's opinion, was the ignition by the blown-out shot of gas which must have been present in the heading. He believed that gas existed in a train from the top hole to the face, a distance of eight yards. It must have been at least 1 ft. thick on the face. The accumulation was due to defective ventilation as far as that particular part of the workings was concerned. There should have been an air pipe from the airway to the face. In his opinion it was not safe to fire a shot there. The colliers, just at the district where the explosion occurred, were working through a seam containing more firedamp than they had been accustomed to.

The jury returned a verdict of "Accidental death," and added by way of a recommendation that the accident, in their opinion, was due to the blown-out shot having ignited the gas which had accumulated in that particular portion of the workings, which they thought was not adequately ventilated. They also intimated that in their opinion the management should provide better means of ventilation, but that their failure to have done so did not amount to culpable negligence.

#### Wigan.

An interesting enquiry was recently held at the Wigan Borough Police Court by Mr. H. Milligan. The particulars were to the effect that Albert Boyers, a pit sinker, Orrell, and other men were engaged in sinking an air shaft at the Lawns Colliery, Upholland, owned by Mr. John Laithwaite. Boyers was ramming a shot with a wooden rammer, when an explosion occurred, the charge striking Boyers full in the face, and causing injuries which ended fatally at the Wigan Infirmary.

One of the men, giving evidence, said the hole which they were charging was in a "bench" in one corner, and the hole, which had been drilled by a hand drill and hammer, was about 28 in. deep. It was a three-corner shaped hole, but he did not know its diameter, nor that of the cartridges. The cartridges were all of the same size. He did not see anything drop in the hole to stop the fourth cartridge going down as easily as the other three. It might have got more "across" than the others. Compressed gunpowder was used for that and two previous charges, but before that they had used gelnite. The powder was fired by fuse and caps. The wooden rammer was much thinner at one end than the other. The thinner end was used to ram the powder. The cartridge stuck half-way down the hole. Boyers lifted the rammer out of the hole and then sent it down with considerable force. He was obliged to knock it to send the cartridge through.

Mr. John Laithwaite, who said it was the first accident of the kind they had had in about 70 years' experience, stated that the hole was three-cornered: 2½ in. one way, 2½ in. and nearly 2½ in. the other ways. The diameter of the

cartridge was 1½ in. There would not be an inch clearance all round.

Mr. Nicholson, H.M. inspector of mines, said it was very likely that there was some little ledge in the hole, which was smaller lower down than at the top. Possibly a piece of debris got in, and as there was not sufficient clearance, have caused the cartridge to stick. Then when pressure was applied a spark might have been caused by the friction of the piece of grit against the side. In ramming cartridges home it was possible for pyrites to cause a spark. It was not the wood but the pressure to it that caused the sparks.

The jury returned a verdict of "Accidental death," and that no one was to blame.

### MINING AND OTHER NOTES.

The executive council of the Association of Chambers of Commerce have received communications from the secretary of the Railway Clearing-house to the effect that the general managers of railway companies would be prepared to receive deputations from the executive council on the subject of railway rates and demurrage charges on Tuesday, February 10. The council have appointed a number of gentlemen to meet the general managers on that date.

An important meeting of ironmasters in the galvanised sheet iron trade was held on Friday to attempt to re-form the All-England Galvanised Association, which was dissolved in 1910. Under the old association, formed in 1905, prices advanced from £10 to £17 17s. 6d., but the association dissolved at £12 10s. To-day's maximum price is £11 5s. It was resolved to support the movement.

At Merthyr on Friday, the Dowlais (Cardiff) Colliery Company Limited, Abercynon, summoned their head lampman, Thomas Charles, for committing a breach of the Coal Mines Act, 1911. The alleged offence was under section 34. There was no dispute in regard to the facts of the case. On November 14 the fireman at the Dowlais Colliery found a man named Jacob Parry going to his work with an unlocked safety lamp. Enquiries had been made, and it was found that Parry had received the lamp from defendant lighted but unlocked. Parry was prosecuted at Abercynon Police Court, and was fined 20s. and costs. Questions then arose as to what defendant's position was, and it was apparent that he had committed a breach of the regulations. A fine of £1 and costs was imposed.

The Barnsley Education Committee are keeping to the front the need of a new technical school.

A new colliery is in the process of preparation at Stobswood, Northumberland, and gives promise of being a very successful venture. With the colliery will, of course, come the new village, which, indeed, is already in the course of erection. The site for the new village is one of the most attractive in a romantic district, for the houses will nestle among trees in gently undulating uplands, and will be quite convenient for railway accommodation. A previous colliery worked on a small scale was closed down a few years ago.

A new colliery is to be opened near Balmorie, Whitburn, by Messrs. W. Baird and Co. They already work two important pits in the West Lothian Bathgate district, Easton and Hopetoun. Meantime the new field includes the mineral rights from Longridge to Tippetthill.

Mr. Joseph Morrison, manager at Alice Colliery, near Maryport, has been successful in obtaining a post as lecturer in a mining college in Staffordshire. He is at present conducting lessons on mining at Dearham evening classes.

On Tuesday morning, Mr. T. C. Ekin, M.Inst.C.E., inspector to the Local Government Board, held a public enquiry at the Town Hall, Maryport, into the application of the Maryport Urban District Council to borrow £2,600 for the purpose of supplying Flimby with gas. The clerk to the Urban District Council said the Council had had negotiations with regard to the taking of coke oven gas, but they fell through because the owners of the coke ovens asked too big a price. It might come up again some day, and some expense might be needed in that direction. The latest case was Middlesbrough, which had secured a supply of gas from coke ovens at 4d. per 1,000 ft. If the people in that neighbourhood had asked any such like figure, the council would have been asking for powers to take gas from the coke ovens.

Our Dover correspondent says: Another fine seam of coal was struck at a boring on the area of the Kent Coal Concessions Limited between Dover and Canterbury on Thursday of last week. This seam proved to be of 7 ft. 2 in. in thickness, and in the same boring the following seams have already been struck: 3 ft. 1 in.; 3 ft. 1 in.; 4 ft. 3 in.; and 2 ft. 2 in. The Anglo-Westphalian Company's boring at Sturry, near Canterbury, has been abandoned at about 1,100 ft. on account of water trouble, and it has been decided to start a fresh boring about a quarter of a mile distant. The Haven Committee of the Sandwich Town Council have given a trial order for coal from Tilmantene Colliery for their tug, while the Gas Committee of the same Council have placed an order for 300 tons. According to the latest news from Shakespeare Colliery (Kent Collieries) No. 3 shaft has been sunk to 1,200 ft., and after sinking another 80 ft. ventilation will be effected, and the working



of the coal commenced. Upon the property of this company a boring has been put down to prove the iron ore in the district, and this has shown results which have confirmed the company's anticipations with regard to the quality and quantity of the ironstone deposits. At the annual meeting of the New Rhodesia Company mention was made to the fact that by the option they had obtained from the East Kent Colliery Company they would first be able to investigate, and if these investigations proved satisfactory, to acquire control of the unalienated areas secured by Mr. Burr for his various companies.

The Lord Mayor of London has, we understand, convened a conference at the Mansion House for Monday, January 19, to consider the expediency of establishing a national fund for the relief of distress arising from fatal colliery accidents of all kinds. With the view of ascertaining the opinion of those directly interested in, and best qualified to advise upon these matters, the Lord Mayor is inviting those in control of existing special disaster funds, the managers of miners' permanent provident societies, the Coalowners' Association, and the miners' federations (four delegates from each), and civic officials and others whose advice may be valuable to the conference.

Early in the new year the Wirrall Colliery Company Limited, who have taken over the Neston Colliery, near Parkgate, Cheshire, intend carrying out important improvements in the shape of tapping new seams and effecting important surface improvements with a view to increasing output. The number of workers at the Neston Colliery is being gradually increased.

The Alderbank Colliery Company of Wardle, near Rochdale, have decided to erect an engine house and coal shed in Hollingworth-road. They propose to open up a new drift seam in the hillside at Cleggswood. The Abram Colliery Company are opening up new seams, and otherwise improving their properties at Abram. There is an increasing output of coal of good quality from the Bickershaw Six-foot Mine.

Some few years ago Messrs. Nimmo put down a line of borings in the valley south of Port Seton golf course to the Four-foot seam, which has been lately found to reach nearly the surface of the hill towards Riggonhead. Boring, it is reported, has again been commenced, going down to the "diamond" on West Seton Farm, a little to the east of the old quarry and south of the golf course.

At about five o'clock on Monday morning an explosion occurred at the boiler-house of No. 5 Blair pit and coke ovens belonging to Messrs. William Baird and Co. Ltd., at Dalry, Ayrshire. No lives were lost, but the engine was kept practically for pumping purposes, so as to admit of working No. 7 coalpit adjoining, where about 70 to 80 miners are employed. These are meantime thrown idle.

The substantially-built rescue station recently placed in Trindle-road, Dudley, has now been placed under the care of Mr. F. Hancock. The cost of maintaining the rescue station is to be borne by the association of the coalowners of the district subscribing at the rate of 5s. per thousand tons on their output.

We understand that Sir Bernhard Samuelson and Co., of the Newport Ironworks, Middlesbrough and other large north of England industrial undertakings, have purchased the Sherburn Colliery, one of the well-known Lambton group. The colliery is situated near Fence Houses, county Durham.

One of the three enquiries into fatal pit accidents in West Fife, held before Sheriff Umpherston and a jury recently, concerned the death of Wm. Laurenson, jun., the pit roadman. The evidence disclosed that in the Mary Pit, Lochore, of the Fife Coal Company, an iron girder used for roof support had been crushed down by a move in the strata, and in its descent it had fractured the sheathing of a cable used for electric lighting. Laurenson had come in contact with the girder, which became alive, and before the current could be switched off, death had ensued. On behalf of the Home Office Mr. Robert Nelson, H.M. electrical inspector, expressed the opinion that the voltage was far too high for a lighting cable. The jury, after retiring, brought in a verdict to the effect (1) that the present high voltage should at once be reduced, (2) that in exposed and dangerous places the cable should be so constructed as to prevent an accident such as had occurred, and (3) that officials who were likely to be required should receive instruction which would help to prevent accident.

At the offices of the Institution of Gas Engineers recently, a conference was held between representatives of the London Coke Committee and of provincial gas undertakings who find it necessary to market coke in London. The question of the quantity of coke which is sent from the Midlands to London and the prices at which it is offered in the London market was under consideration, and after some discussion it was agreed by the representatives from the provinces that the views of the London Coke Committee should be taken from time to time on the prices at which provincial coke should be offered in London. Representatives of the provincial gas undertakings were also invited to attend the monthly meetings of the London Coke Committee from time to time, to discuss the coke situation. The conference also discussed what was considered would be a real remedy for avoiding excessive stocks of coke and the subsequent sale of spot lots on "foreign" ground to

clear the yards, i.e., that each undertaking should endeavour to increase the outlets for its coke in its own district. It was thought that if the coke industry as a whole could embark on a joint campaign to push the advantages of gas coke as a smokeless fuel with the public, it would bring a speedy remedy for the present situation, and it was decided that the lead of the London Coke Committee in this direction should be followed in the provincial towns represented.

The British Mannesmann Tube Company, which recently nearly completed negotiations for a site in Trafford Park, Manchester, has now, it appears, acquired over 100 acres at Newport for new works. The negotiations at Manchester, it will be remembered, broke down on the Ship Canal Company's requirements in connection with a proposed wharf.

After undergoing training at the Lancashire and Cheshire Coalowners' Rescue Station, 500 men drawn from various parts of the South Lancashire coalfields have been presented by Dr. W. E. Garforth, of Altofts, Yorks., at the Wigan Mining College, with silver medals and certificates for proficiency in mining rescue work.

Messrs. George Cohen and Sons (600 Commercial-road, E.) inform us that they have purchased the whole of Messrs. John Aird and Co's plant now lying at Imperial-road, Fulham. The plant and machinery include 20 locomotives, and a large number of steam cranes, navvies, derricks, pumps, and portable boilers, &c.

Mr. T. H. Byrom, F.I.C., chief analytical chemist to the Wigan Coal and Iron Company Limited, has left Wigan to take up a position in London and has been presented by the members and ex-members of the laboratory staff with a gold hunter watch suitably inscribed, as a mark of esteem, the presentation being made by Mr. G. Dunsford, head assistant at the laboratories.

The Atherton (near Manchester) District Council have arranged with the Lancashire and Cheshire Coalowners' Association to allow members of their fire brigade to undergo a course of instruction in the use of the breathing apparatus at the splendidly-equipped Rescue Station at Howe Bridge, Atherton. Negotiations have been opened too on behalf of the Council for securing a like privilege for their gas manager and one of the workmen.

The little colliery town of Askern is anxious to be exempted from a Bill under which the Leeds Corporation are to supply water to Doncaster and the mining district around. The contention of Askern is that it can be better served by the Askern Main Colliery Company than through the Leeds scheme. The colliery is prepared to supply softened water to the parish at 8d. per 1,000 gallons, equal to an annual charge of £973. As regards the Leeds scheme, assuming that Doncaster charges Askern 1s. per 1,000 gallons to cover the cost of water, for which they have to pay Leeds 8d. per 1,000 gallons, the annual charge works out at £1,460, a difference which would increase with the growth of population. Therefore, Askern is asking Doncaster Rural District Council to use its influence to exempt it from the operation of the Bill.

Once again Messrs. Bruce Peebles and Co. Limited, of Edinburgh, send us their desk companion for the coming year. Instead of the squared paper which was formerly to be found in the little reference book, a diary has this year been inserted, the diary being arranged with three days to the page. In this reference book are abridged specifications and approximate price lists of the firm's manufactures, in addition to quite a number of half-tone illustrations. It is a thoroughly useful present, and one that the firm's customers no doubt greatly appreciate.

Prior to the last joint meeting with the Notts and Derbyshire branch of the Association of Mining Electrical Engineers at the University College, Nottingham, on Saturday afternoon, December 6, a meeting of the Midland branch of the National Association of Colliery Managers was held. Mr. J. Strachan (branch president) presiding. Mr. R. Laverick (branch secretary) read a description of the system of checking workmen entering and leaving mines, which a member had forwarded to him. It was decided that the annual dinner of the branch should take place at the Albert Hotel, Nottingham, towards the end of January. A resolution was passed recommending the general council to adopt the suggestion of the South Midland Branch to take steps towards securing the incorporation of the Association. It was also agreed to recommend the General Council to take into consideration the inconvenience which was caused to mining students, in consequence of their being debarred from taking the position of a deputy until they had reached the age of 25.

This week the Earl of Ellesmere has opened extensive new coal wharves at Clifton, near Manchester, which are connected with his lordship's collieries in the Walkden district by means of a private railway which has just been completed. A new engine house and other surface improvements are being provided at his lordship's Ashton Field Colliery, Farnworth.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, December 9, 1913, is as follows:—Antwerp, 867 tons; Amsterdam, 1,156; Abo, 1,053; Alexandria, 6,833; Alderney, 286; Bremen, 1,672; Copenhagen, 234; Christiania, 1,283; Drontheim, 51; Degerhamn, 763; Ghent, 267; Gothenburg, 625; Gefle, 4,599; Hallsta, 1,128; Harburg, 2,412; Hamburg, 4,562; Harlingen, 1,042; Kiel, 2,619; Malmö, 1,448; Novorossisk, 5,137; Oxelosund, 5,444; Odessa, 5,151; Pernau, 2,292; Rouen, 6,141; Riga, 10,100; Rotterdam, 1,784; Reval, 4,100; Santos, 5,148; Sebastopol, 5,101; St. Petersburg, 463; Stockholm, 1,536; Stettin, 2,501; Trieste, 300; Tuborg, 1,455; Venice, 307; total, 89,363 tons. Corresponding period last year, 57,732 tons.

## LABOUR AND WAGES.

### North of England.

A report of the special council meeting of the Northumberland Miners' Association, held in November, on the financial position of the union, and regarding proposals to increase the contributions of the members' has been sent to the lodges, who are invited to vote on the following resolutions:—"That the contributions be 9d. for full members and 4½d. for half members." "That the contributions be 9d. for full members and 4½d. for half members, except surfacemen, who shall remain as at present." For the purpose of this resolution, "surfacemen" do not include "checkweighers" and "banksmen." At the council meeting the first resolution was lost by 43 votes to 20, and the second proposal was carried by 43 votes to 19. It was then pointed out that if the contributions were raised as was proposed by the executive committee in the first resolution, there would be an additional income of between £9,000 and £10,000 per annum. The association has an overdraft at the bank of £13,000. The votes of the branches on the resolutions must be returned to Burt Hall, Newcastle, on or before Saturday, 27th inst.

A serious state of affairs has arisen at East Hetton, or Kelloe Colliery, owned by Messrs. Walter Scott Limited, where the men have laid the pit idle owing to having no water for drinking or household purposes. According to agreements between the Durham Rural District Council and the colliery owners, the latter have to supply the water, which is pumped from the feeder in the shaft; but the complaints have been so numerous regarding the unsatisfactory supply that the Council have entered into an agreement with the Weardale and Consett Water Company to supply East Hetton with a regular supply, and a Local Government Board enquiry was held in Cassop Schools a fortnight ago regarding a proposed loan. About 1,200 men and boys are employed at the colliery, the population of the affected districts being about 3,340.

At Newcastle Police Court last week several shifters and hewers, employed at the Ann Pit of the Walker Colliery, were summoned for having absented themselves from work without reasonable cause. In the case of the shifters they were summoned in respect of three dates, and 5s. per day damage was claimed from them. Mr. E. S. Fawcett, manager of the colliery, said the 5s. damages was purely a nominal sum. The Ann Pit was not a much hotter pit than others in Northumberland. The trouble had not been because of the heavy nature of the work, but because the men would not go to work.—The Bench made an order for the payment of the amount claimed in the case of the shifters, and in the case of the hewers who were summoned in respect of one day, they were ordered to pay 4s. damages each.

The miners at Chopwell Colliery, who have been on strike since November 21, resumed work on Monday, pending the consideration of their complaints by the executive committee at Durham.

### Federated Area.

At a special meeting of the Cannock Chase miners council, held at Hednesford, it was reported that new medals would be issued on January 17, and with a view to ascertaining whether all miners were financial members, an examination of medals would take place on January 28 and 29, joint action being taken in the matter by the Cannock Chase and Pelsall districts. With regard to the proposal to cease work at noon on Saturdays, the matter was adjourned for 14 days, when a further special meeting of the council will be held to consider it. In the meantime preparations for joint action will be completed between the Cannock Chase and Pelsall districts. Mr. A. Stanley reported that the Midland Federation had taken the opinion of Mr. John Sankey, K.C., upon the question of the remuneration of checkweighers, and the manner in which that remuneration might be contributed by workmen. Mr. Sankey made it perfectly clear that, in his opinion, whether workmen were under the minimum wage or not, they were in law bound to contribute to the support of the checkweigher. Mr. Sankey also made it perfectly clear that where requested by the workman so to do, an employer had a perfect right to make those deductions from the wages of the workman in the colliery office. There are one or two parts of the Midland Federation where the matter has become acute.

Mr. James Martin, J.P., has been re-elected president of the Derbyshire Miners' Association, with Mr. W. Sewell (Halfway) vice-president.

A conference between representatives of the Midland Counties' Coalowners' Association and of the Notts Miners' Association was held at the Victoria Station Hotel, Nottingham, on Monday, December 15, to consider the wages and hours worked by surfacemen in the county, other than those engaged in the manipulation of coal. The subject was discussed at some length, but eventually the conference was adjourned until after the national conference, which, it is expected, will be held early in the new year.

### Scotland.

The colliery firemen at Walkinshaw pits stopped work on Friday, due to a demand for 6d. increase on their shift, their present wages being 6s. 4d. These men were refused first the 12½ per cent. granted by Lord Balfour of Burleigh shortly after the national strike, and have been making repeated efforts to get it. The strike will throw 300 miners idle.

### The Iron, Steel and Engineering Trades.

The workmen employed in the large Glenbank Steelworks, in Ayrshire, have been informed that owing to dull trade all contracts with them will expire on December 20, and thereafter engagements will only be from day to day until further notice.



## CONTINENTAL MINING NOTES.

## Belgium.

According to the report of the Nord de Genly Company, the boring at Sars-la-Bruyère, in the new South Hainaut coalfield, has encountered coal measures at 580 metres. Between 600 and 700 metres three seams of from 70 to 80 centimetres in thickness were passed through, containing from 13 to 14 per cent. of volatile matter. A fine seam of coking coal was cut at 900 metres.

## Germany.

**Ruhr Coal Market.**—The retrograde movement in the market continues, and although the traffic returns are higher than for this time last year, this is entirely due to the fact that there is very little shortage in the supply of railway wagons. The demand for industrial coals is poor; and it is significant that wholesalers are hanging back and even cancelling existing contracts, owing to the bad state of trade. In these circumstances short time is increasing, the producing capacity of many pits being in excess of their participation under the Syndicate. The recent further curtailment of the coke output percentage clearly demonstrates the unsatisfactory nature of the situation. The actual production is being maintained, owing to the profits obtained on the by-products, and therefore stocks are growing to enormous proportions. The ironworks pits are less affected by these conditions, having a considerable outlet for coke in their own works, since the production of pig iron is being fairly well maintained. The export trade continues to relieve the congestion to some extent, but it is not up to the mark of last year, conditions having taken an unfavourable turn in other countries as well. Thus the exports to France in October were 60,000 tons less than last year, and matters are also unsatisfactory in Belgium. Deliveries to South Germany are restricted, although the river is in good condition, the local stockyards being full and the demand slack.

**Coal Market in South Germany.**—Now that the Syndicate has issued its list of settling prices, large industrial buyers are beginning to place their contracts for Ruhr coals, particular activity being displayed in Elsass and Switzerland. Elsewhere, however, consumers are not in a hurry to make up their minds, since they have nothing to lose by delay unless they require any special qualities. Industrial coals are not in very active request, and the weather is too open to stimulate the demand for house coal, so that buyers of large house nuts are getting into arrears with their delivery specifications, and the consumption of large broken coke is below par for the season, so that stocks are growing. On the other hand, supplies of bituminous nuts II. and anthracite are short, and any sudden change in the weather would result in inconvenience. Broken coke III. is scarce, but there is little demand for gas coke. The river is in good condition, and craft can be loaded to their full capacity.

**Coal Market in Upper Silesia.**—The traffic returns for November show an increase of 29,000 wagon loads, or 10 per cent., over the corresponding period of last year. The demand remains satisfactory, and in most cases is so pressing that it cannot be met without difficulty. Coal is being raised as fast as possible, but the pits have reached the limits of their capacity, and there is still a scarcity of labour, so that the output is disposed of at once, and the stocks so desirable at this time of year cannot be accumulated. Owing to the shortness of the supply, it is impossible to satisfy the large demands of Austria-Hungary and Russian Poland. There is little change in the consumption of the various classes of fuel. Coking coals cannot be supplied fast enough, and the cokeries are complaining of delay. The demand for gas coal is well maintained, and industrial coals find a ready sale, whilst more interest is being displayed in house coal. The coke market is very active, the output being disposed of at once, even the smaller grades finding an improved outlet.

## Russia.

During 1912, 43,209,300 poods of coal and lignite were produced in Western Siberia, 80,590,400 poods in Eastern Siberia, and 5,994,500 poods in Turkestan, the total being 25 million poods in excess of 1911.

## THE IRISH COAL TRADE

THURSDAY, DECEMBER 18.

## Dublin.

Greater activity now prevails in the coal trade generally, and the improvement in shipping facilities since the port was reopened has removed many of the inconveniences occasioned by the recent diversion of traffic to other ports. Difficulties with regard to the cross-Channel trade are gradually diminishing, and the imports have very materially increased during the past week, the docks still being greatly congested, as well as the traffic on the quays. Local coal firms continue to employ free labour as well as the clerical staffs to unload the boats, but at the various outlying sea-side districts the strike is practically at an end, and the carrying and delivering of the coal is proceeding unhindered. Prices of best qualities of house coal in Dublin this week by 5s. per ton, Orrell coal being 10s. 6d. per ton, and ordinary household 28s., best Orrell slack

24s. per ton, best coke 28s., delivered. The steam colliers arriving amounted to 45, as compared with 37 the week previously, chiefly from Garston, Preston, Ayr, Troon, Partington, Point of Aire, Swansea, Ardrossan, Newport, Cardiff and Maryport. The total quantity of coal discharged upon the quays was 21,556 tons.

## Belfast.

Business in the port continues to be below the normal for the season, although the approach of the holidays has given a slight stimulus for household requirements during the week. The supply of most qualities is plentiful, prices being steady and unchanged. Quotations in the city are:—Best Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current prices of steam coals ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton delivered. Cargoes arriving during the week were chiefly from Liverpool, Troon, Sharpness, Maryport, Ayr, Garston, Glasgow, Irvine, Ardrossan, Whitehaven, Workington, Neath Abbey, Partington, Swansea, Burryport and Ellesmere Port.

## THE LONDON COAL TRADE.

THURSDAY, DECEMBER 18.

The London coal trade for the past week has been fairly brisk. The near approach of the holidays, and the more seasonable weather has created a better demand, and given an impetus to the delivery trade, so that from all sides an improvement has been felt in the general trade, both wholesale and retail. The stocks at the colliery end have rapidly disappeared, and considerable inroads have been made in the stocks at the London wharves and depots. Not a few of the Midland collieries have declined booking any further orders, as they have now a sufficient number of orders to last until the end of the year. The wharves and depots all report a good delivery trade, and already the difficulties in the transit are beginning to make themselves felt. Empties are also becoming scarce, and in many cases short time has been worked in consequence. The seaborne market has also improved. The number of vessels entered for Monday's market was 36, and 10 for Wednesday's, but all sold. The brighter aspect of the ordinary house coal market has led to a far better attendance on market, and the general public are evidently desirous of getting better supplies in before the Christmas traffic lessens the quantity available. The only drawback to the present outlook is that the iron and steel market still looks very gloomy, and values are apparently lessening. Some of the makers, however, are looking confidently for an improved demand in the new year. Many of the factories along the riverside still report a large number of orders on their books, and work is very brisk; hard steam coals, however, are in good demand. In the house coal market, the principal demand has been for the brights and nuts, the best qualities are not in such good request. Seaborne quotations are still given at 21s. 6d. for best Wallsend, and 20s. 6d. for seconds, but as these quotations have been regularly returned throughout the whole year, the prices are largely nominal. Sharlston are quoted this week at 21s. best Wallsend, and 19s. 6d. Sharlston Main, but it is reported that dealings for all South Yorkshire qualities are very restricted. The Coal Merchants' Society of London held their annual meeting on Monday last, and after augmenting the number of merchants to serve on the committee, decided not to attend the market on Wednesday, the 24th inst. There will be no market, therefore from Monday next until the following Monday.

Market quotations (pit mouth):

NOTE.—Although every care is exercised to secure accuracy, we cannot hold ourselves responsible for these prices, which are, further, subject to fluctuations.

	Current prices.	Last week's prices.
<b>Yorkshire.</b>		
Wath Main best coal .....	13/	13/
Do. nuts .....	12/	12/
Birley cube Silkstone.....	12/6	12/6
Do. branch coal .....	16/	16/
Do. seconds .....	11/	11/
Barnsley Bed Silkstone.....	13/6	13/6
West Riding Silkstone .....	13/	13/
Kiveton Park Hazel .....	13/	13/
Do. cobbles.....	13/	13/
Do. nuts .....	12/	12/
Do. hard steam .....	12/	12/
New Sharlston Wallsend .....	15/	15/
Wharfedale Silkstone branch .....	16/	16/
Do. Flockton Main .....	15/6	15/6
Do. Athersley house coal.....	12/	12/
Newton Chambers best Silkstone.....	17/	17/
Do. Grange best Silkstone .....	15/6	15/6
Do. Hesley Silkstone .....	14/	14/
Do. Rockingham selected .....	14/	14/
Do. Rockingham Silkstone .....	13/6	13/6
<b>Derbyshire.</b>		
Wingfield Manor best.....	12/6	12/6
Do. large nuts.....	12/3	12/3
Do. small nuts.....	10/	10/
Do. kitchen coal .....	10/6	10/6
West Hallam Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/3	12/3
Do. London brights .....	11/	11/
Do. bright nuts .....	11/	11/
Do. small nuts .....	10/	10/
Manners Kilburn brights .....	12/6	12/6
Do. do. nuts .....	12/	12/
Shipley do. brights .....	13/	13/
Do. do. nuts .....	12/6	12/6
Mapperley brights .....	12/6	12/6
Do. hard steam .....	11/6	11/6
Cossall Kilburn brights.....	12/6	12/6
Do. do. nuts .....	12/	12/
Trowell Moor brights.....	12/6	12/6
Do. do. nuts .....	12/	12/
Grassmoor Main coal .....	13/	13/
Do. Tupton .....	11/6	11/6
Do. do. nuts.....	11/6	11/6

## Derbyshire—(cont).

Clay Cross Main coal .....	13/	13/
Do. do. cubes .....	13/	13/
Do. special Derbys .....	12/	12/
Do. house coal .....	11/6	11/6
Pilsley best blackshale .....	13/	13/
Do. deep house coal .....	11/6	11/6
Do. hard screened cobbles .....	11/	11/
Hardwick best Silkstone .....	13/	13/
Do. Cavendish brights.....	12/6	12/6
Do. cubes .....	12/6	12/6

## Nottinghamshire.

Clifton picked harda .....	12/6	12/6
Do. small harda.....	12/6	12/6
Do. deep large steam .....	12/	12/
Annesley best harda .....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Linby best harda.....	12/6	12/6
Do. bright cobbles .....	11/9	11/9
Digby London brights .....	13/	13/
Do. cobbles .....	13/	13/
Do. top harda .....	13/	13/
Do. High Hazel coal .....	14/6	14/6
Bestwood hard steam coal.....	13/	13/
Do. bright cobbles .....	11/9	11/9
Hucknall Torkard main harda .....	12/9	12/9
Do. do. cobbles .....	11/3	11/3
Do. do. nuts.....	11/	11/
Do. do. High Hazel H.P. ....	14/9	14/9
Do. do. London brights.....	12/3	12/3
Do. do. large nuts .....	12/3	12/3
Do. do. bright nuts.....	11/3	11/3
Sherwood H.P. harda .....	12/6	12/6
Do. hard steam.....	11/6	11/6
Do. brights .....	11/3	11/3
Do. cobbles .....	11/3	11/3
Do. large nuts .....	11/3	11/3

## Warwickshire.

Griff large steam coal.....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. bakers' nuts .....	11/3	11/3
Do. loco Two Yard harda .....	14/6	14/6
Do. Ryder nuts.....	11/9	11/9
Do. do. cobbles .....	13/	13/
Nuneaton steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts .....	11/3	11/3
Haunchwood steam .....	11/	11/
Do. screened cobbles.....	11/6	11/6
Do. nuts .....	11/3	11/3
Wyken steam coal .....	11/	11/
Do. screened cobbles .....	11/6	11/6
Do. nuts.....	11/3	11/3
Exhall Ell coalspires.....	14/3	14/3
Do. brights .....	12/6	12/6
Do. large steam coal.....	12/	12/
Do. best screened cobbles .....	12/3	12/3
Do. large nuts .....	12/3	12/3

## Leicestershire.

Snibston steam.....	10/	10/
Do. cobbles .....	10/6	10/6
Do. nuts .....	10/6	10/6
South Leicester steam .....	10/	10/
Do. cobbles or small harda .....	10/6	10/6
Do. nuts .....	10/6	10/6
Whitwick steam .....	10/	10/
Do. roasters .....	10/6	10/6
Do. cobbles .....	10/6	10/6
Do. nuts.....	10/6	10/6
Netherseal harda .....	18/	18/
Do. Eureka .....	12/6	12/6
Do. kitchen .....	10/6	10/6
Ibstock kibbles .....	9/9	9/9
Do. large nuts .....	9/6	9/6
Do. bakers' nuts .....	9/	9/
Do. Main nuts .....	9/6	9/6
Do. harda .....	9/3	9/3
Granville New Pit cobbles.....	11/	11/
Do. Old Pit cobbles .....	11/	11/

## North Staffordshire.

Talk-o'-th'-Hill best .....	13/	13/
Sneyd best, selected .....	14/6	14/6
Do. deeps .....	14/	14/
Silverdale best.....	14/	14/
Do. cobbles .....	13/	13/
Apedale best .....	13/	13/
Do. seconds.....	12/9	12/9
Podmore Hall best .....	13/	13/
Do. seconds.....	12/6	12/6

## South Staffordshire (Cannock District).

Walsall Wood steam coal, London .....		
Do. brights.....	11/	11/
Do. shallow one way.....	11/	11/
Do. deep nuts.....	11/6	11/6
Cannock steam.....	10/9	10/9
Coppice deep coal .....	14/6	14/6
Do. cobbles .....	14/	14/
Do. one way .....	12/	12/
Do. shallow coal .....	13/6	13/6
Cannock Chase deep main .....	16/	16/
Do. Deep kitchen cobbles .....	11/6	11/6
Do. best shallow main .....	13/	13/
Do. shallow kibbles .....	13/6	13/6
Do. best brights .....	13/	13/
Do. yard cobbles.....	13/6	13/6
Do. yard nuts .....	12/6	12/6
Do. bakers' nuts .....	10/3	10/3
Do. screened harda.....	11/9	11/9

## From Messrs. Dinham, Fawcus and Co.'s Report.

Friday, December 12.—There were no seaborne Durham or Yorkshire cargoes on offer at to-day's market. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston W.E. 21s., Sharlston Main 19s. 6d. Cargoes 21.

Monday, December 15.—The seaborne house coal market was unsteady to-day, with no cargoes on offer. Best (Durham) 21s. 6d., seconds (Durham) 20s. 6d., Sharlston W.E. (Yorke) 21s., Sharlston Main 19s. 6d. Cargoes 36.

Wednesday, December 17.—The seaborne house coal market continued steady to-day; no cargoes disposed of, but a small quantity of Yorkshire passed hands at current prices. Best (Durham) 21s. 6d., seconds 20s. 6d., Sharlston W.E. (York) 21s., Sharlston Main 19s. 6d. Cargoes 10.



# MANCHESTER GEOLOGICAL AND MINING SOCIETY.

The discussion on the two papers read by Dr. John Harger at the November meeting of the Manchester Geological and Mining Society was continued at the December meeting held in the society's rooms, 5, John Dalton-street, Manchester, on Tuesday, December 9. Sir THOMAS H. HOLLAND, K.C.I.E. (president), was in the chair.

## The Late Mr. W. Pickstone.

A vote of sympathy with the relatives of the late Mr. William Pickstone, one of the older members of the society, who had died since the previous meeting, was passed, on the motion of Col. HOLLINGWORTH (hon. treasurer).

## Firedamp and Gob Fires.

The papers were on "Firedamp in Mines and the Prevention of Explosion," and "The Detection of Gob Fires."

The PRESIDENT said there was one remark which ought to be made before they proceeded with the discussion—that was in reference to a thought that had been put forward at a previous meeting, to the effect that proposals like those submitted by Dr. Harger ought not to be made unless they were obviously of practical value and were presented in such a way that they could be put to practical account. He did not think that was the right attitude to take up towards the scientific results of a purely scientific worker. The scientific worker was not necessarily responsible for turning his results to some practical account. Whenever he came across an idea and worked it out from his own point of view and put it before the practical men, it was their business to see if it could be applied practically and, if so, to undertake the supplementary work required in order that that idea might be applied to conditions in the mine. He had thought it right to say this without judging the question whether or not Dr. Harger's propositions were practical and applicable to mining conditions. The so-called practical man had far more theories than the scientific man, only his theories were of no use.

The HONORARY SECRETARY (Mr. Sydney A. Smith) said he had a letter from Mr. Leonard Fletcher, who was at home ill and sorry he could not attend the meeting to take part in the discussion. Mr. Fletcher said, as regards Dr. Harger's proposal to suck out the firedamp from the coal face by means of a pump, in the case of old workings built off with a pipe left through the stopping the matter would be easy enough. But with an advancing coal face and extensive workings his suggestion, though ingenious, seemed absolutely impracticable. The second remedy—to mix inert gas with the intake air—seemed worse than the disease, and appeared to lose sight of the health and comfort of the men. In any case, surely Dr. Harger would only recommend this remedy for mines suffering from gob fires and not for those mines fortunately free from this evil. As regards the proposal to reduce the ventilation, he (Mr. Fletcher) would never agree with Dr. Harger that a mine could be too well ventilated. It had yet to be proved that any explosion had been caused by too much ventilation. If the velocity was too great on the intake roads the right remedy was to enlarge or duplicate those roads. It was nearly always most difficult to get the air to the point where it was most wanted, and it must not be forgotten that as soon as the total quantity was reduced the small quantity in these remote and difficult parts of the mine would become still smaller. Dr. Harger had called attention to a very interesting subject, but he did not think he would find many colliery managers to agree with his proposed remedies. They would do better to turn their eyes to the dimensions of their intake and return airways and the many points of leakage, to the coaldust lying in a black deposit on many of these roads, and adopt simpler and more practical remedies than any that Dr. Harger had suggested.

Mr. J. DRUMMOND PATON (Manchester) said he wished to take exception to the president's remarks, for he considered that modern education should produce men who were able to apply the results of their investigations. With regard to the comments on Mr. Winnill's paper, he considered it necessary that investigations should show the behaviour, both of very small coal and of all sizes met with, either in the goaf or suspended in the air. There was no doubt that there were thousands of tons of small dust which conformed to Mr. Winnill's conditions for his investigation, and also it was quite apparent that Dr. Harger's sizes, as taken for investigation, were equally present in either goaf or workings generally. In regard to Dr. Harger's definition of the changes and his description of the various chemical actions which took place, he would like to revive the question which he (Mr. Paton) previously asked Dr.

Harger at one of his former lectures at the Manchester University, whether he considered electrolytic action had any influence on the production of higher hydrocarbon gases or provided conditions for which immediate chemical solutions were not apparent. He admitted, or had stated, that gob fires originated and fired most rapidly in the substance known as "mother-of-coal." From his (Mr. Paton's) slight knowledge in relation to coal and mother-of-coal, he estimated that mother-of-coal could be compared to coal in the light of a conductor in an insulator. Consequently, if they took, say, an area of one foot in a seam of coal where a slide was taking place between the layers of strata, the enormous compression that accompanied the moving layer was constantly increasing the friction, due to the pressure brought to bear on the two faces, and that must result in a tremendous local heating, or, in other words, a certain amount of frictional electricity, which was not apparent externally, but would produce in the mother-of-coal a local current of electricity. If these circuits took place anywhere in the vicinity of a pocket of gas, might it not be possible that they had certain actions in ionising the gases under such force and temperature for which a chemical solution is not yet apparent? In his own experience he had had some peculiar results with thermocouples where platinum rhodium wires of 10 per cent. rhodium were joined up with a platinum rhodium wire of 2 per cent. rhodium composition. When these joined wires were submitted to a high temperature in the presence of free hydrogen gas, there was a transuission, or rather transfusion, of rhodium, from the 10 per cent. wire to the 2 per cent., until finally a balance was obtained of seven in the one and five in the other. These actions could hardly be described as chemical, but they were associated with electro-thermic currents, and this fact had suggested the possibility of the transference of constitutional elements of gas either into the coal or into a more intense hydrocarbon form. With reference to Dr. Harger's mention of the firing of coal residues which were left after extraction by pyridine, he would like to ask whether these residues were to be classed amongst the humus, resinous, or the carbon residual of the coal, and was the flash point of the same residue determined by the temperature at which these residues were obtained? Were they obtained from low temperature distillation or destructive distillation at high temperatures, as the nature of distillation had a very distinct effect on the production of residue of a special nature. Mr. Paton next asked if any statistics or figures had been obtained which showed the respective output of gas from the goaf and the coal face, because he considered that the attitude of the institute and of mining engineers generally to this evil was one of palliation, without any distinct effort being made to strike at the root of the evil and eliminate the entire trouble. Hydraulic stowing completely annihilated all goaf troubles. He would suggest for Dr. Harger's consideration that where a mine had hydraulic stowing in operation it was easily feasible to apply his own suggestions of local extraction by the special system of piping. The same pipe system could be utilised for Dr. Harger's ideas of pumping back the gases from the faces where the firedamp was very serious.

Mr. GEO. B. HARRISON, H.M.I.M., said he had no desire to criticise Dr. Harger's papers very much, but there were one or two questions he would like to ask him. With regard to gas, he would like to ask Dr. Harger whether with a test lamp he would get the same cap if there were 2½ per cent. of methane present instead of four or five. Mr. Murray, he thought it was, gave a list of analyses of gases got from pits, some from the goaf, and some from the face, and some from other places, and he showed how rare it was to get a gas that was for practical purposes anything very different from methane. His own reading of mining books taught him that it was practically the same, whether the gas came from the goaf or any other place; that it worked out pretty much the same, but he had known places where gases had been got that were considerably different from methane. Dr. Harger thought the ventilation of mines was excessive. That view he for one could not accept. So far from objecting to present-day ventilation he thought if the ventilation had been twice as good, or twice as excessive, they would not have had as many pit disasters as they had had. In two-thirds of the explosions he had knowledge of, the ventilation had broken down, gas had accumulated, and while men were trying to remove it, it somehow got fired. He was surprised to hear the ventilation at the Hulton Collieries described as excessive. Mr. Tonge gave evidence at the official enquiry and stated that air was admitted at the rate of 60,000 cubic feet per minute, but it did not follow that that represented the ventilation in all parts of the mine, or anything like it. He (Mr. Harrison) knew well the pit where the explosion occurred; it was reasonably well

ventilated and there was nothing to justify the use of the word gale. There might be pits that were over-ventilated. If there were he had not known them. If they were to have suction pipes to take away the foul gas they would want electricity or compressed air to work those pumps. Thus they would have two sets of pipes instead of one, and, if they could have their gas concentrated they might dispose of it, but those were rare cases. As every one knew, gas came out in unexpected places, and when they went to look for it they could not find it. Mr. Harrison concluded by complimenting Dr. Harger on his zeal in this matter.

The PRESIDENT remarked that Dr. Harger did not object to ventilation; he regarded it simply as a palliative, and when it broke down there was danger. What was the difference, he would like to know, between an atmosphere that had been diluted by an inert gas and one which they got at a high elevation? He had worked, for example, very hard in India for over seven months at a time, at a height of 17,000 ft., and he did not think he was any the worse for so doing. What was the difference between having the atmosphere diluted by a gas that was inert and such an atmosphere? The possible explanation was that if the atmosphere were diluted by carbonic acid gas a sense of fatigue would ensue, but he could not see what difference there was between an atmosphere diluted by pressure like that at an elevation of over 10,000 ft. and one by inert gas. He would like to hear the medical people talk about that.

Mr. W. H. MURRAY, H.M.I.M. (Liverpool), thought they needed to give up the idea that the ordinary firedamp in the pit was almost entirely pure methane.

Mr. J. W. CASE (Hulton Park, Bolton) said it seemed to him, in regard to the pumping of gas from mines, that if they had a concrete packing of the seams, they would prevent breaking of the roof and the inflow of gas would cease, and they would only have the gas to deal with that came from the coal face. That would be given off over a large area, and it would be practically impossible to collect it.

Mr. VINCENT BRAMALL (Pendlebury Collieries) said in his judgment the gas was not released until the face was exposed. Dr. Harger would only get it, therefore, through a little hole, the amount would be of no practical value, and the cost of maintaining the pipes would be prohibitive.

Mr. A. J. A. ORCHARD (St. Helens) said, in his experience, the most serious inflow of gas was due to subsidence of the strata. The gas was forced out through cracks in the seams, and they could not tell to a hundred yards where the greatest pressure was.

Dr. HARGER, in his reply, dealt first with the questions that had just been put to him. With reference to the president's remark that it was the mining engineer's business to apply theories to practice, and that it was no part of the scientist's business to put his theory into execution, he was quite in agreement with Sir Thomas, but the difficulty was to get the practical men to put them into practical execution. As regarded percentages of oxygen in the air, all physiologists were agreed there was no greater difficulty in men working at a reduced pressure than in their working with a reduced quantity of oxygen, though there might be some difficulty if there were an excessive amount of carbon dioxide. Mr. Leonard Fletcher, in his communication, said he would never agree that there was too much ventilation, and that he would rather alter the dimensions of the roads than lessen the ventilation. That was the practical difficulty, altering the width of the roads, and keeping them in repair. In the deep mines of Yorkshire it was a much bigger item keeping the roads in repair than any other. In answer to Mr. Paton, Dr. Harger said that he took his samples in the most convenient place near the goaf. The samples were taken when there were no fires. The object was to detect the first sign of heating, and when they found a place where the oxygen was being reduced, then they knew there was something wrong and they looked for the cause. No doubt there had been several possible gob fires, but they were detected before they became actual ones or in any way dangerous. As to the pyridine residues, it was the residues that fired. Ordinary coal, if they had it fine enough, would fire at a degree or two above 100 degs. The place where it could get the air was red hot. Curiously enough, this was explained by the fact that some coal had the oxygen in itself. As to the ratio of the gas at the face and the goaf that depended on the mine, a big quantity came out of a gaseous coal when it was broken at the face. A good deal remained inside, and they had to get that out by some means.

Concerning the cap question, he thought there was no doubt the cap would show dangerous gas with 2½ per cent. of methane as it would with 4 per cent. It would have a different colour, more white if they got some of



a very heavy gas that they got in goaves. Mr. Harrison, he noticed further, held that statistics showed that accidents in mines were less frequent and less disastrous ones than they used to be. In his opinion statistics did not prove that the mines were any safer. The fact was that more managers were better educated and they got their men out now at the first sign of danger. Then the safety lamps were now better. The Davy lamp caused far more explosions than it ever prevented, simply because men thought they were themselves safe with them and went into places where otherwise they would not have ventured. Replying to Mr. Case, Dr. Harger said that in the deep Yorkshire mines he was perfectly certain no hydraulic stowing was feasible. Take a bucket of water and throw it on the side of a road, and half an hour afterwards they would find a fall, and to add moisture to air at a temperature of 90 degs. would affect adversely the health of the workers. In the ordinary mine he thought the bulk of the gas came from the working face.

With reference to the criticisms passed upon his papers at the former meeting, Dr. Harger said, in answer to Mr. Gerrard, that his experience was that taking ordinary temperatures was no guide to the detection of gob fires in the very early stages, but taking wet and dry bulb temperatures (always in the same places day after day) was certainly a guide. At the spot where the heating was taking place, the air was robbed of some of its oxygen and was laden with moisture and warmed up. On passing over several feet of coal the gas got cooled down again to goaf temperature, but it retained its high quantity of moisture. In the later stages temperature did, of course, show, but one could generally detect heating by smell before one got increased temperature. The object of his research, which he thought had been very successful, was to get a still earlier warning than that given by smell.

Mr. Parker's remarks opened up a large field for discussion. It was obvious to any technical man that materials could be burnt with much less oxygen than 16 per cent. How otherwise could they make producer gas? His object was to prevent explosions and fires taking place under normal conditions—not to consider what could be done in the way of tricky experiments. Personally he had never tried striking matches in 16 or 17 per cent. oxygen air, but he was quite certain without trying that an ordinary match could not burn in the air in which a candle went out. What Mr. Parker probably did was to use what was equivalent to a blow-pipe, which, of course, entirely altered the nature of the flame. How it altered it was not very clear. The removal of the products of combustion did affect the ordinary burning of materials, but only a little. His experiments on this subject were done in a very large glass vessel, and the products of combustion were removed, and in many of the experiments the carbon dioxide absorbed. A good current of air was kept up by an electric blower, and under those conditions a candle always went out when the oxygen was between 16.9 and 17 per cent.

He would describe a 17 per cent. oxygen atmosphere as a safety atmosphere in the same sense as a safety lamp was called a safety lamp. All mining people knew, or should know, that a safety lamp was only a safety lamp under certain normal conditions. Even now he believed there was only one kind of lamp—the Clifford lamp—with which they could not make an ignition of gas and air if one used the most explosive mixture and the right amount of draught in the right direction. With regard to men working in 17 per cent. oxygen, he had several times seen men working their shifts in as low a percentage as 12, but such places were, of course, stagnant, very hot, and absolutely saturated with moisture, so they were certainly bad places to work in. If anyone would provide the means there would be no hesitation on his part, or, he thought on the part of anyone who knew, in working in such an atmosphere as 17 per cent. oxygen.

With regard to the phenomenon of luminescence (mentioned by Mr. Caldwell) caused by impinging of steam on metal it was not likely that such luminescence could ignite a gas or dust mixture, but it was certainly possible that a body might become sufficiently charged by that means to cause an electric flash which was the most effective way of igniting dust and gas explosive mixtures. Mr. Murray was a little mystifying when he said, "He thought that instead of making the theory fit the colliery conditions it looked like an attempt to make the colliery conditions fit the theory." Of course that was the whole idea. The conditions in the collieries were admittedly wrong for them to have such things as huge explosions at times, and gob fires, and other fires

He quite agreed that cooling large volumes was a big task. He would point out, however, that it was not so much the cooling of the air that was

required as preventing it getting moist and hot. He could not help thinking that a good deal of moisture which got into the air in hot mines might be kept out by loading coal quickly and covering the tubs.

He would also like to draw attention to the ignition of gas in mines. His impression was that those ignitions were usually of pockets of gas or accumulations in the roof. Often the flame ran along the part of the gas in contact with the fresh air below for a big length, and that small ignition mixed up the rest of the gas with air, and the flame darted back over its previous course with increased violence. Now that was not a case of a mixture of gas and air firing at the start, but the gas burning in the air in contact with it; there was not the slightest doubt that, if the air below contained only 17 per cent. oxygen that, burning could not take place. He would like to know if the bulk of the gas ignitions were similar to that or not.

The meeting passed a hearty vote of thanks to Dr. Harger. Most likely the discussion will be carried on at a subsequent meeting of the society.

#### NORTH STAFFORDSHIRE INSTITUTE OF MINING AND MECHANICAL ENGINEERS.

A general meeting of the members of this institute was held, under the presidency of Mr. HUGH JOHNSTONE (divisional inspector of mines), at the North Stafford Hotel, Stoke-on-Trent, on Monday.

Mr. Arthur Hassam was appointed hon. treasurer of the institute.

The following gentlemen were elected as members:—Mr. Caleb Johnson, manager, Mossfield Colliery, Longton; Mr. Wm. Saint, inspector of mines, Stafford; and Mr. Joseph Smith, colliery manager, Chesterton.

#### Reopening of Norton Colliery.

The paper by Mr. J. R. L. ALLOTT on "The Reopening of Norton Colliery with Self-contained Breathing Apparatus after an Explosion" (*Colliery Guardian*, June 6, 1913, page 1214) was discussed.

Mr. G. H. GREATBATCH said he had had a long experience of large areas of old workings; and he had come to the conclusion it was practically impossible, however good the stoppings might be, to prevent that area from what he called "breathing." Referring to the discussion in London, Mr. Henshaw told him that he had made experiments, and samples were taken in an area that was going to be built off, and strange to say, in the whole of that area the samples showed practically no difference. Yet he supposed there ought to be a difference according to the law of the diffusion of gases. So far as the rescue work was concerned, remarks were made in the discussion of the paper in London as to the amount of oxygen necessary for the men using breathing apparatus, and personally he held different views. There was no doubt that different men required different amounts of oxygen, and that the same men doing identically the same work at one practice, would use more oxygen than they did at another practice, or *vice versa*. If they gave a man an excessive quantity of oxygen, they upset him and he could not get through his work. It distressed him; the pressure was so great that he could not get rid of the exhaled air. Recently a local colliery manager wanted to have some stoppings put in, and at his request he (Mr. Greatbatch) sent the necessary breathing apparatus. The apparatus at the rescue station had been working at 1½ litres of oxygen per minute, and before it was sent, he had it altered to 1¼ litres. The work was done successfully. The captain told him they did very well except that they had too much oxygen. He (the speaker) was sure from the practices he had seen that if the apparatus were fixed at 2 litres, the men would not do so much work or such good work. During the whole course of training the instructor had impressed on the men the absolute necessity of not over-exerting themselves. He was certain a man would do more efficient work using his by-pass as he felt he required it, rather than giving him 2 litres of oxygen. There could not be too much detailed instruction given to the men. If a man remained cool and collected, he could do practically anything with rescue apparatus. If a man got irritable at his work he was getting very near the end. He congratulated Mr. Allott on the success with which the work was carried out; they in North Staffordshire had done what had never been done at any colliery before.

Mr. E. B. WAIN also congratulated Mr. Allott and his men on the way in which the work had been carried out. He thought the cause of the explosion was the fact that the old gob fire had been assumed to be out and that too many openings were made into that goaf immediately on the rise of the lower working level—No. 3 South Level. The system of working through an air-lock and keeping only one road open for a consider-

able period was, it appeared to him, the only practical way of dealing with such a situation, and the real danger was practically over when it was proved that No. 1 stopping was intact and not disturbed by the explosion.

Mr. LEEK, a member of one of the teams which reopened the Norton Colliery, said at the onset he was a little dissatisfied with his apparatus, but when it was altered to 1½ litres he worked very much better and with more confidence, not having to use the by-pass so much.

Mr. FRANK RIGBY said in London during the last few months he had heard a very great deal of criticism on the use of rescue apparatus at all under such circumstances as this. It had been pointed out to him and emphasised that the Government, when they issued the Rescue in Mines Order, had no intention that the apparatus should be used for the saving of property, but purely and simply for the saving of life. He pointed out in reply that they in North Staffordshire had rescue brigades even before the Order was made. The results of the use of the apparatus at Norton Colliery were sufficient answer to any criticism of the sort he had referred to.

Mr. ALLOTT, replying, thanked them for the complimentary references to himself and the men. With regard to the diffusion of gases, he was interested to hear Mr. Greatbatch say Mr. Henshaw had proved that the analyses they took at the stoppings were likely to have been conclusive as to the condition of the area at the bottom of the dips. The point was raised in London, and he had an experiment made with a mixture of gases in a large pipe placed at the same angle as the dip of the mine, and they found the composition of the gases at the top was not the same as at the bottom of the pipe, and they came to the conclusion that the composition of the gases, as they took them, was not the same as lower down the dip. With regard to the amount of oxygen used by the men, it was quite right to say 1½ litres was found to be sufficient in the training gallery, but it was a very different thing working under conditions like those in a mine. After the alteration was made, the whole of the men worked very comfortably with the apparatus, but they could not possibly go on with 1½ litres. The success of the work at Norton, Mr. Allott observed, was largely due to the care and interest Mr. Greatbatch had taken in the training of the men at the Berryhill station. With regard to Mr. Wain's remarks as to the one opening into the district, he should like to make it quite clear there were only two openings into the district—the intake and return—and these were much below the point where the old gob fire was. As to Mr. Rigby's observations, when he (Mr. Allott) gave evidence before the Committee on Spontaneous Combustion in Mines, he made it quite clear that if they had attempted to recover Norton Colliery without using apparatus, it would have been far more dangerous than with the apparatus.

The PRESIDENT, Mr. Hugh Johnstone, in closing the discussion, said, as to Mr. Rigby's point, one could easily understand it was very inadvisable to risk human lives, solely for the purpose of saving property, beyond certain well defined limits. With regard to saving life there were two classes—the direct method of recovering those exposed to danger, and the indirect method of preventing the loss of life, which was another way of saving it. If it had been tried to reopen Norton Colliery in the old-fashioned way of restoring the ventilation throughout the pit, he had no doubt they would have had a succession of explosions. He thought Mr. Allott and the owners were well advised in taking the course they did—anticipating the worst and preparing for it—and their success justified all they did. Diffusion of gases took place in every gob, but before they could have reliable conclusions based on the diffusion they must know whether there was any other change at work—whether there was only the diffusion or some circulation. In a steep working such as this they might have a certain amount of circulation. If there were any gob fire, or any heating whatever, they might have the hotter gases ascending along the roof of the working and replaced by cooler gases coming along the floor, and in that way they might have a mixture of gases from circulation and not from diffusion at all. Therefore the gas taken at the top might be no accurate criterion to the gas in the lower levels. As to the consumption of oxygen, Dr. Haldane had been conducting experiments on behalf of the London County Council, and he demonstrated that even 2 litres of oxygen was totally inadequate for certain work. In connection with fire brigade work, he had found it necessary to have a special apparatus brought into use with supplies of 3 litres of oxygen per minute, and that was found just enough for a man to do hard work. He thought it was rash indeed to provide a man with less than 2 litres per



minute, for the reason that a rapid change in the condition of supply from the apparatus was, under these conditions, not very easily accomplished. He did not think there was much in the question of back pressure affecting men's breathing. If the back pressure became uncomfortable and handicapped the man in his work, it was a simple thing to relieve it and allow the oxygen to escape. The worst thing was the loss of oxygen, and it might be the only means of keeping the men safe, which was the object. He moved a hearty vote of thanks to Mr. Allott for his paper, which, he said was of a very valuable character.

Having been cordially adopted, the vote was acknowledged by Mr. ALLOTT.

#### Microscopical Examination of Coal

Mr. JAMES LOMAX, of Bolton, gave a lecture on the lines of his recent paper on "The Microscopical Examination of Coals in Relation to Spontaneous Combustion," dealing particularly with two North Staffordshire seams—the Cockshead and Bullhurst. The lecture was extensively illustrated by lantern slides and micro-photographs. He said his object in writing the paper was to point out the characteristics in different seams that would account for outbreaks of gob fires. That paper could now, he added, be greatly enlarged.

In the course of a brief discussion, Mr. FRANK RIGBY asked whether, supposing shafts were sunk in a virgin coalfield, he would be able to tell from the microscopical examinations, compared with the slides he had already made, whether the new coals would be liable to spontaneous combustion.

Mr. LOMAX said where there had been a systematic microscopical survey of coals known to be liable to spontaneous combustion, then they could tell whether the coal in a virgin coalfield was liable to spontaneous combustion or not, but a system must first be made. As to coking, the more of the resinous bodies contained in the coal the better it was for coking purposes, and that was the only thing they could go upon.

Mr. Lomax was heartily thanked for his lecture.

**The "Clou" Dry Hand Fire Extinguisher.**—Much attention has been given of late years to the subject of fire extinguishing. The importance of having an effective extinguisher ready at hand lies in the fact that most big fires have quite a small origin, and if dealt with immediately would result in little damage being done. A fire-extinguishing apparatus must needs be of a simple nature, and capable of being very easily handled. The "Clou" extinguisher, with which a demonstration was given on the Aldwych island site recently is simplicity itself. The apparatus comprises a conical-shaped sheet iron tube, which when filled with the extinguishing powder weighs but 4½ lb. Its efficiency was proved by putting it to some very severe tests. Flames caused by setting a light to mixtures of tar, petrol and benzine; and a wooden hut sprinkled with petrol and fired on all sides, were successfully extinguished within a few seconds. A great advantage in this apparatus is the fact that the powder is perfectly harmless, and can be removed afterwards with the aid of a brush.

**Miners' Relief Fund Rules.**—At Newcastle County Court, on the 10th inst., there was heard, before his Honour Judge Greenwell, a case in which John Bradley, miner, formerly employed at Dorothy Pit, Newbottle, asked for the enforcement of an order made in his favour by the Appeal Committee of the Northumberland and Durham Miners' Permanent Relief Fund. Mr. Meynell explained that the case had been brought under the Friendly Societies Act, 1896, and contended that the jurisdiction of the court only extended to the enforcement of the award. Mr. Meynell, continuing, said the accident happened on August 27, 1909, but the extent of the injury was not known until April 1912, the man's sight failing gradually. His employers paid compensation, and it was the custom of the friendly societies to follow the findings of the employers on such matters, and so save expenses. In this case, the general secretary of the Fund, Mr. Barnes, disallowed plaintiff's claim on the ground that he had not applied for benefit within 35 days of the accident. The general committee confirmed the advice given by the general secretary. An appeal to the appeal committee was allowed. There was no right of appeal at all from the findings of the appeal committee, and the court was asked to enforce the award.—Mr. Lowenthal, for the defence, argued that the claim not having been made within 35 days, the appeal committee had no jurisdiction. The case went to the root of the constitution of the society, and his Honour's decision would be of vital importance. The appeal committee chose to strike a rule out. The question before his Honour was: Could they do that?—His Honour, in giving judgment, said it was quite conceivable that the appeal committee might be led away by sympathy to disregard the rules. He came to the conclusion, having read the rules, that the award was made entirely without jurisdiction, and therefore that it could not be upheld. His reading of the rule imposing the 35 days' limit was that it applied to all injuries, and that by that rule the society was protecting itself against such cases as that before the court. The appeal committee was bound by the four corners of the rules. Judgment was for the defendant, with costs.

#### MINING INSTITUTE OF SCOTLAND.

A largely-attended general meeting of the Mining Institute of Scotland was held on Saturday, December 13, in the rooms of the institute, 39, Elmbank-crescent, Glasgow. Mr. JAS. HAMILTON, Glasgow, the president of the institute, occupied the chair.

The following gentlemen were admitted to membership: Members: Messrs. F. M. Calder, colliery manager, Niddrie; G. S. Frame, mining engineer, Carmunnock; D. McKelvie, civil and mining engineer, Armadale; Peter Milligan, jun., colliery manager, Gorebridge; and Thomas Meek, sub-inspector of mines, Kilmarnock. Associates: Messrs. James Dickson, under-manager, British Columbia; Andrew Wilson, under-manager, Arniston, Gorebridge; and Robert Bonar, mechanical engineer, Kirkcaldy. Students: Messrs. R. J. Graham, jun., apprentice surveyor, Royal Bank House, Kilsyth; and Alexander Johnston, surveyor, Cowdenbeath.

#### Underground Fires.

The discussion was resumed on the paper previously read by Mr. HENRY ROWAN, Cowdenbeath, on "Underground Fires."

Mr. ROBERT McLAREN, H.M. inspector of mines, recalled that as far back as 1900 he (Mr. McLaren) read a paper before the Mining Institute in which he described the methods of working in Balgonie Colliery. On that occasion he expressed certain views as to the prevention of gob fires. He might say that he still adhered to those opinions. If they could prevent the air from getting into the wastes, either by packing tightly, working out in panels or by introducing stoppings, he thought they would have gone a long way in the direction of doing away with fires underground. Was it not a fact that in recent disasters the pits where these had occurred had all been extraordinarily well ventilated? In the course of the paper the author had devoted some space to the methods practised in finding out the presence of carbon monoxide. On that subject he thought it might be well if young students of mining, of a scientific turn of mind, would steep their brains so as to ascertain some good and reliable method whereby it was possible readily to detect the presence of carbon monoxide. Mr. Rowan seemed to prefer birds. Dr. Haldane, on the other hand, who had a good deal of experience of carbon monoxide, thought that mice were better; but he, again, was contradicted by another eminent mining man, Mr. Burrell. Proceeding, Mr. McLaren passed on to deal with his experience as a member of the rescue party at the underground fire in Cadder pit. It might be, he said, that the birds at Cadder had bigger hearts than the men who formed the rescue party; but the fact remained that three of the explorers were overcome by carbon monoxide, while the birds gave no indication whatever that they felt the presence of the deadly gas at all. It had been suggested, he believed, that probably the rescue parties were at the time excited. He could only, in that connection, speak for himself, and, having been through the whole thing, he could say that he was much cooler then than he was to-day. Indeed, he had been rather surprised that any question should arise that the men who were overcome were excited.

Mr. JAMES BAIRD (one of the rescue party at Cadder) said he thought there was no doubt that carbon monoxide was in the pit at the time Mr. McLaren was speaking of. He did not experience the same phenomenon that Mr. McLaren had alluded to, although he went into the workings after that gentleman had been there in the morning. He took charge of the birds himself, and he certainly saw to it that they were kept hopping about as much as possible. He could assure them that he had a headache for a good long time after being in the workings.

Mr. A. H. STEELE, H.M. inspector of mines, said that at the time of which Messrs. McLaren and Baird were speaking there would only be a very small percentage of carbon monoxide present, as the air had then been reversed.

Mr. THOMAS J. JAMIESON said that when the explorers went down through the north section or machine section the birds were taken there first of all. The birds toppled off their perch there. His impression was that the carbon monoxide was circulating all round this part of the working and bringing it up the dook.

Mr. JAMES MCPHAIL remarked that the volume of smell in the workings was not always a sure indication of the quantity of carbon monoxide present. Indeed, so soon as the air was reversed the smell would remain in the wood along the workings, although after all there might not be much carbon monoxide. He believed there was something in the point which had been raised regarding excitement, and his experience was that men who were excited breathed more quickly and, as a consequence, they collapsed much sooner. In dealing with

fires he had found that the nearer they built a stopping to the seat of the fire the better it was. As to the cause of these fires, he was inclined to agree with the view expressed by Mr. Rowan. As a rule, he had always seen them taking place whenever they had a crush on the coal. He had always found it a safe course to have as much fresh air going through the area of the fire for the time being as possible for the purpose of keeping down the heat.

Mr. BROWN asked if it was not the case that Mr. McLaren and the other members of the rescue party at Cadder were to some extent exhausted through having fought against the fire for so long.

Mr. ROBERT McLAREN replied that they might be hungry, but he could not say they were exhausted.

Mr. A. H. STEELE observed that there was another indicator, in addition to birds and mice.

Prof. BURNS said there was an indicator in which they had to use selenium chloride, and in his view it was not a very safe thing to use.

The PRESIDENT said it struck him that the point Mr. McLaren had raised regarding the birds at Cadder was one more for the physiologist than the mining engineer.

Mr. HENRY ROWAN, in replying to the discussion, said that notwithstanding what Mr. McLaren had said about birds, he had not lost any confidence in them. He had tried them repeatedly in carbon monoxide, and the results had always been satisfactory. He had tried selenium chloride, but his opinion of that was that there might be a discoloration from smoke merely which would, of course, mislead them. In his view, it was not necessary that cages should be so constructed that birds had to exert themselves when being used for the purpose of detecting deleterious gases. The cage in use for underground work was from 6 to 8 inches wide, and about 9 in. high. He might say that the first time he had occasion to use a bird for this purpose it was in an ordinary-sized cage. The bird fell from its perch repeatedly, but it always recovered when it was taken into the fresh air. As to the use of water at a fire, he thought it was always right to use it if properly applied. It must be used, however, without stint or not at all. If they were going to dig out the fire, water at high pressure should be used. If, on the other hand, it was to be drowned out, it should be completely submerged.

On the call of the PRESIDENT, a cordial vote of thanks was passed to Mr. Rowan.

#### The Testing of Fans.

The discussion was thereafter resumed on the paper by Mr. JOHN WATSON—namely, "The Testing of Fans: A Plea for Standardised Test Conditions."

The AUTHOR, in closing the discussion, said it was justifying to the writer to observe that the consensus of opinion amongst those who had taken part in the discussion was that the time had arrived when the conditions of testing fans should be standardised, or reduced to uniformity. He appealed to the council of the institute at once to appoint a committee to consider the matter, to invite the co-operation of the other branches of the institution in making experiments, to draw up standard forms for testing fans, and to point out to users of fans the advantages which would accrue from making their tests in the prescribed form.

The PRESIDENT, in moving a vote of thanks to the author, said Mr. Watson's suggestions would be considered in due course by the council.

#### Electrical Winding Plant at South Kenmuir Colliery.

The meeting thereafter proceeded to discuss the paper which had been read by Mr. WILLOUGHBY M. DUNN on "The Electric Winding Plant at South Kenmuir Colliery."

Mr. A. B. MUIRHEAD, electrical engineer, Glasgow, who introduced the discussion, said if he were inclined to disagree with the opinions expressed by the author of the paper, it would only be with the historical data given by him at the outset, where he stated that "the first electrically-driven winding engines for mines were installed so recently as 1900," because it was a fact that an electrical winder was applied to winding—in a staple pit, it was true, but still, a winding shaft of 20 fathoms depth—in the year 1890, and was still in use a year or two ago. He had paid a certain amount of attention to the system adopted at South Kenmuir Colliery, and he had been attracted by the apparent simplicity of working and ease of control, and the measure of reliability and obvious efficiency obtained by it. The most important factor that enabled the electrical winder to compete successfully with the steam winder lay in the fact that the electrical winder was, for practical purposes, entirely independent of the source of its power from the point of view of distance. For this reason, it was not fair to either type to make a comparison from the point of view of first cost only. The choice of the system of winding



ended as much on the conditions of power supply as on conditions of winding, and both must be considered if the best result was to be obtained. When the winding speed and rate of acceleration was high, the peak loads might also be so high as to make the use of a three-phase motor impossible, because of the demand on the line or on the generating station. Therefore, in such cases, the use of the motor converter with storage fly-wheel system might be necessary, and the regenerative principle incorporated in this system might be valuable, owing to the high rate of retardation. In other cases, especially where a low winding speed was permissible, it would be found that the storage flywheel converter system, as well as the regenerative system without the storage flywheel, offered no advantage over the simple three-phase motor system. Again, in cases where the power costs were appreciable and the rate of winding or average number of winds per 24 hours was low, the use of converters, with or without flywheels, might prove uneconomical, owing to the fact that they must be kept running continuously to be ready against any emergency, whether the winding motor was running or not.

Messrs. SUTCLIFFE (Messrs. Siemens Brothers), R. W. Dron (Glasgow) COLQUHOUN (Cleland) R. McLAREN (H.M. inspector of mines) and JAMES BLACK (Airdrie) also joined in the discussion, which was adjourned till next meeting.

#### "Magnesite Deposits in Eubœa, Greece."

It was agreed to close the discussion on the paper read by Mr. JAMES HOGG on "Magnesite Deposits in Eubœa, Greece," and the author was awarded a cordial vote of thanks for his contribution.

#### Apparatus for the Determination of Carbon Dioxide and Oxygen in Mine Air.

Prof. DANIEL BURNS, of the Royal Technical College, Glasgow, read a paper on "Apparatus for the Determination of Carbon Dioxide and Oxygen in Mine Air." After a full consideration of this matter, he said, he was convinced that it was quite possible for any careful man with no scientific training to conduct an analysis on the spot, with a sufficient degree of accuracy for all practical purposes, provided he had at his command a suitable form of apparatus. He (Prof. Burns) had designed the apparatus which he had now the pleasure of submitting to the members of the institute.

The apparatus consisted of a burette of 25 cubic centimetres capacity fitted with a single way stopper at the upper end, and a two-way stopper at the lower. The stem of the burette was graduated to read up to 2 per cent. of the volume, each division of the scale having a value of 0.1 per cent. It would thus be apparent that readings could be obtained from  $\frac{1}{10}$ th of 1 per cent. to 2 per cent., which was considerably above the standard fixed by the Mines Act. The tubes were connected one to each of the two separate branches below the two-way stopper. One tube contained a 20 per cent. solution of caustic potash, while the other contained water acidulated with hydrochloric acid and coloured with a little litmus.

This form of apparatus might be used indirectly for the rough estimation of oxygen, as the volume of carbon dioxide formed by the union of carbon and oxygen was the same as that of the oxygen taken from the air to form it. For this reason, it followed that the percentage diminution of oxygen was directly represented by the percentage of carbon dioxide in the sample, provided, of course, that the carbon dioxide had been formed at the expense of the oxygen in the air of the mine. In most mines the greater portion of carbon dioxide found in the air was so formed, but it must be kept in mind that there existed two causes which prevented that from being strictly applicable to all mines. In the first place, carbon dioxide was given off by the strata. This condition gave a smaller oxygen decrease than that corresponding to the volume of carbon dioxide found in the general body of the air, and the error of assuming the oxygen decrease to be the same was on the right side, so far as keeping within the legal standard was concerned. In the second place, carbon coals absorbed oxygen at ordinary temperatures, particularly when in a finely-divided state. At the commencement of such absorption no carbon dioxide was given off, so that in these cases there would be an error, but in the latter instance it would be upon the wrong side of the legal standard.

With these features in mind he (the author) considered it advisable to modify his apparatus in such a way as to render it capable of determining the percentage of carbon dioxide and oxygen direct. No new principle was claimed for either of the two pieces of apparatus, but the arrangement had been designed to simplify the well-known methods of Hempel and others, and to put them in a form that would admit of their being used in the mine. The graduations of the burettes only admitted of the instruments being used to determine 2 per cent. or less of carbon dioxide, and from 18 to 21 per cent. of oxygen. These percentages were slightly over the range of the standards set by the Mines Act, and as the instruments were primarily intended for use in the mines, the graduations had been purposely kept within bounds. It was not suggested that a high degree of accuracy was obtainable, but against standard methods had shown that estimating either of the two gases did not

It was agreed to take up the discussion of this paper

#### SOUTH STAFFORDSHIRE AND WARWICKSHIRE INSTITUTE OF MINING ENGINEERS.

A meeting of this institute was held at the University, Birmingham, on Monday, the 15th inst. In the absence of the president (Dr. J. Cadman), who is still abroad, the chair was taken by the VICE-PRESIDENT (Mr. G. M. Cockin).

The following gentlemen, having been approved by the council, were elected:—As associate member: Mr. Arthur Herbert Clark, The University, Bournbrook, Birmingham. As associate: Mr. Isaac James Daken, Church-street, Chasetown.

#### Experience with Pumping Machinery.

The CHAIRMAN then called upon Mr. John Brindley to read a paper on "Thirty Years' Experience with Pumping Machinery, and Some Observations and Conclusions Thereon."

At the outset, Mr. BRINDLEY recalled seeing many years ago a 100 in. cylinder pump at the Talargoch leadmine, near Prestatyn, North Wales. This engine, except in the case of one made for the Earl of Dysart's colliery in Scotland, was about the largest constructed, and is at the present time working at a colliery near Wrexham, still doing effective work after 60 years or more of use. At the date when this engine was in active operation, the importance of a colliery manager was reckoned more by the size of the pumping engine at his colliery than by the output of coal produced, whilst the pits were laid out more with a view to making it convenient to instal the pumping engine rather than for the output of coal or dealing with the latter.

Up to about the year 1875 these huge pumping engines were almost universally employed for mines drainage, but about that time American direct-acting pumps were introduced. The introduction of the direct-acting steam pump was beneficial in several ways. It not only caused the owners and managers to take more care with the shafts to avoid falling water, which of course usually does damage to the brickwork lining, but in many cases where there was little or no ventilation previously, the effect of taking the steam pipe down the shaft, and in some cases turning the exhaust steam into the same shaft, produced a strong upcurrent of air, and did away in many instances with furnace ventilation. It was not until Tonkin, a Cornish man, by-the-bye, introduced a form of direct-acting valve gear in which there were no tappets and no mechanical contact, that the direct-acting pump really took a firm hold of the work of mines drainage. About the year 1885 the duplex, or Worthington, type pump was introduced to this country, and, figuratively speaking, took the mining world by storm, and for a long time the only pump that colliery proprietors would look at or think of installing was a duplex pump. It, however, always appeared to the writer that this latter form of pump, though eminently suited for some work, was not the sort of thing to instal in a general way for underground use in mines, and though many such pumps were installed, he does not hesitate to state that those in use at the present time are very few.

The objection to this form of pump is, of course, its very short stroke, the fact that it has double the number of working parts of an ordinary pump, and that a very small matter upsets the working.

A type of engine which was introduced for mine pumping about 1880 was the Davey patent differential gear engine. This type, which is still largely in use, has some very good points about it, and is a sort of intermediary between the old cumbersome lifting sets and the cheaper, but less economical, direct-acting pumps. During this transitory period there were many attempts to instal self-contained flywheel pumping engines underground. Many vertical flywheel pattern pumping engines of moderate size were installed underground, and where there was plenty of headroom, and not requiring very extensive foundations, this class of engine had, and still has, its field, which, however, is a somewhat limited one.

At the first introduction of electric driving, the centrifugal pump, which theoretically would appear to be an ideal one for driving from an electric motor, had not been developed except for pumping large quantities of water on low heads, but at the present time many minds are at work on the subject, and this class of engine has been developed to a wonderful extent. Nevertheless, in the writer's opinion, the centrifugal pump in its present form, known as the "turbine centrifugal" pump, when applied to high lifts, is not by any means an ideal form of pumping appliance. They are never very highly efficient—that is to say, only in exceptional cases is it possible to get more than about 65 per cent. to 70 per cent. mechanical efficiency from them, whilst after a very small amount of wear takes place in the running parts between the stages the efficiency falls off very considerably, and, in many cases the writer knows of, this efficiency has declined to as low as 35 per cent. after a few months' running. Acid or gritty water is very deleterious, and produces rapid deterioration of the running parts. Nevertheless, where a large body of water has to be dealt with, and such water is free from grit and excess of acid, many of these pumps have done and are doing excellent work. They are low in first cost, and where the cost of generating or purchasing the necessary current for the motor is low, they compare favourably with other types.

Nevertheless, in the writer's opinion, the ideal form of electrically driven pump for mining purposes is the treble-ram-type, running at a moderate crank speed. Its mechanical efficiency is exceedingly high; in several cases that have come under the writer's notice it has been from 88 per cent. to 92 per cent., and the volumetric efficiency 99 per cent. This latter type of

pump can be depended upon to run continuously year in and year out with but a trifling cost for upkeep. The variation of load during the revolution of the crank is only 14 per cent., and in the majority of cases it is not necessary to employ an air vessel. On an average it will do a given amount of work with about half the current required to drive a corresponding turbine centrifugal pump, and is a most satisfactory and reliable machine.

Many attempts have been made to introduce fast-running ram pumps, driven direct from an electric motor; and although these fast-running pumps, including one brought out by the writer, have shown promising results in their early stages, they have not survived the strain of continuous operation at high speed for lengthy periods.

The author next contributed a few remarks concerning the persons who purchase and use pumping appliances and those who have the responsibility of running same. The writer has read many works on the subject of pumps, but in no case does one find any instructions as to what is the best form of pump to apply for any particular work, how to adjust it to get the best results, how to deal with difficulties or remedy ill-working, such as shocks either in the pump or in the pumping column; nor, in fact, except as a record as to what has been done in the past, is there any guide as to what a person should do who wants to instal a pumping appliance, or deal with troubles that exist in connection with one in operation.

Usually the decision as to what pump is suitable or shall be installed, is regulated in many cases entirely by the matter of cost, no matter how cheap, inefficient or unsuitable the type of pump adopted; or merely on the recommendation of a neighbour, or the persuasion of the glib-tongued representative of some manufacturing concern—the decision in the majority of instances within the writer's knowledge being made by persons quite unable to decide on the merits of the case, either from a scientific or commercial point of view. The colliery engineer is looked upon as a sort of "necessary evil" at a colliery or mine. He is generally stowed away in some dark or dusty corner as much out of sight as possible, as though the management were ashamed of his existence; and though he is occasionally consulted on important matters, in the majority of cases the writer is afraid his views do not carry much sway. Therefore one cannot be much surprised that the colliery engineer on the subject of pumps is woefully ignorant. His knowledge rarely carries him beyond sending a requisition up for a "pump that will about fill up a 6 in. pipe," quite ignorant of the fact that you can get as much water as you like through a 6 in. pipe if you put enough pressure behind it; or "that the water rises in our shaft at the rate of a yard per hour," without thinking it necessary to mention anything as to the diameter of the shaft or what communications it may have with other shafts, &c. The nomenclature of the parts of pumps and pumping machinery are a matter of indifference to him. He speaks of the ordinary cup leather used for packing the bucket of a pump as a "leather bucket," a "bucket," a "grathing," a "weaze," or a "plunger jacket." An ordinary pump ram he will describe as a "plunger," a "forcer" or a "pole." A common rubber valve disc he will describe promiscuously as a "fall," a "clack," a "cover," a "lid," a "weaze," and various other names rather than by its plain description—an indiarubber valve disc.

The average consulting engineer is by no means an expert in his knowledge of pumping appliances and their application. He is frequently a man who has been engaged in all sorts of businesses, either as an employee, or a proprietor, or as a part-proprietor, in which capacity he has been a failure, and having gone through the mill in this respect, sets up in business to advise other people. He usually considers that the subject of pumps is quite beneath his close study, and that as long as he knows all about electricity, has some knowledge of architecture and constructional details, can work the slide rule, and, more important still, impress his clients with his supposed deep knowledge on most subjects, he is for the time being treated with the greatest respect; indeed, he is quite the most important man in connection with the mine or colliery for the time being. If his fees are regulated by a commission on the value of the material purchased, he usually takes care that the most elaborate and expensive appliances are purchased, and to spend as much money in show and elaboration as possible, (1) because his fees are proportional to the expense, and (2) because a showy and elaborate plant will impress others with the importance of the man who has designed same, and in a measure justify his existence.

The other class of consulting engineer is the man who sets to work to cut down everything to the lowest possible expense, advises his clients as to buying the very cheapest appliance that can be obtained, and frequently obtains second-hand rubbish which causes endless expense and trouble subsequently, and is usually wasteful in power, &c.

Some few years ago a sort of standard specification for treble ram pumps was published by one of these consulting engineers, which found its way by some extraordinary means to quite a number of colliery managers and other parties having to purchase pumping plant of this description. One of the strong points in this specification was that the working barrels or ram cases had to be lined with best gunmetal. Now any engineer with any rudimentary knowledge of such pumps should know that the rams do not fit closely in the working barrels or ram cases, but work in a clearance space; therefore, what possible object there could be in lining the barrel with "best gunmetal" the writer could never understand. Nevertheless, for quite a long period the same specification cropped up in all directions, and has only died out after manufacturers who have had to deal with it had pointed out the absurdity of the clause. Another consulting man specified ball bearings for a treble ram pump, where the connecting rods had for



one-half of the revolution a load of about 10 tons to contend with, while during the other half of the revolution there was practically no load on. Furthermore, it is not possible to get a satisfactory ball-bearing on to the crankpin of the slotted crank type specified without having the ball-race in halves.

It has always been the writer's opinion that steam pipes have never received proper treatment or been installed on scientific lines, due allowance not being made for expansion and contraction, or the size of pipe regulated to suit the amount of steam to be fed through same. He has known most extraordinary examples of "how not to do it" in connection with steam pipe installation in shafts. Most men confuse the question of loss of pressure through wire-drawing, with loss of pressure due to condensation. Both losses can be calculated out to a nicety, and when installing electric mains the electrician watches the point carefully, whereas when installing steam pipes it is usually a matter entirely of guesswork. Now the writer has found from experience in connection with several installations of long lines of steam pipes, for which he has been responsible in connection with pumping engines underground, that on an average the actual loss by condensation, due to surface radiation with reasonably-covered pipes, is not more than from 2 per cent. to  $2\frac{1}{2}$  per cent. of all the steam passed through on a length of 600 yards, and he has frequently been able to get the same pressure at an underground pumping engine as on the boilers at surface 500 or 600 yards away.

Furthermore, he is of opinion that it is possible to get as economical a steam-actuated pumping engine underground, as the type of generating engine usually employed for producing electric current at the surface, when driving electrically-operated pumps, and as there are dynamo and motor losses to reckon with, and the further mechanical loss in the pump, it should be obvious to any intelligent person that there can be no economical advantage in driving pumps electrically where steam is at all permissible, unless in cases where power can be generated by means of exhaust steam turbines, or can be purchased from some power company at well under  $\frac{1}{4}$ d. per unit. If turbine centrifugal pumps are employed for doing the pumping, in order to compare favourably with steam-actuated pumps, the current would not have to cost more than 0.125 of a penny per unit at the switchboard.

The installation of electric pumps inbye in gassy or dusty mines has always appeared to the writer to be a suicidal policy. Compressed air, when applied on a scientific principle—that is to say compressed in stages, and utilised also in stages, as recommended by Mr. J. Morrison of the Cramlington collieries, and Prof. Galloway some year ago—is, in the writer's opinion, a far better and quite an efficient way of dealing with comparatively small quantities of water in dip workings, &c., underground, whilst the hydraulic or column-pressure operated pumping engine has much to recommend it for similar work.

#### Discussion.

The CHAIRMAN (Mr. G. M. Cockin), in opening the discussion, said Mr. Brindley had given them the benefit of some very interesting experiences, some of which were very amusing.

Mr. ALEXANDER SMITH (Birmingham) said that where the paper had dealt with the history and the particulars of the different classes of pumps it was of value, but he felt it was devoid of sufficient information and data upon the particular pumps Mr. Brindley recommended; this was promised in a future paper, which would undoubtedly be most valuable. There was one portion of the paper that he sincerely regretted. He, as a consulting engineer, had always appreciated the value of the experience of manufacturers and those that specialised on any subject. Mr. Brindley, however, had taken upon himself to generalise and to condemn pretty well all mining and consulting engineers, because they could not specialise in every one of the subjects they had to deal with. This, it went without saying, was impossible, and to designate all conscientious professional men as either incapable or dishonest was rather too bad, coming from one of their class in a paper read before a scientific institute, and he wished to make his strongest protest.

Mr. D. E. PARRY said there was not a great deal to be said in favour of some of the views Mr. Brindley had expressed. Mr. Brindley had said that the Davey patent differential pump was less economical than the lifting sets which had been in operation up to that time. He (the speaker) would like to know in what respect Mr. Brindley considered it less economical than the lifting sets. The speaker had had Davey differential pumps under his supervision, and they had been amongst the most economical that he had known in his experience. He did not know to what collieries Mr. Brindley was referring when he spoke in somewhat disparaging terms of the knowledge possessed by colliery managers in general and by colliery engineers in regard to pumps. Possibly the experiences he had related had reference to somewhere in the extreme limits of the known coalfields and possibly to some of the leadmines.

Mr. ARTHUR HALL said he did not think Mr. Brindley had made out the best possible argument for steam pumps as against electrical pumps. He could not agree

with Mr. Brindley when he spoke of electricity being generated at 0.125d. per unit. That, he thought, would be impossible in any colliery. He did not think they would get below a halfpenny, or, at any rate, a farthing per unit. Still, he admitted, great difficulty was experienced in finding out exactly what electricity did cost. The speaker was inclined to agree with Mr. Barry that Mr. Brindley had scarcely been just in the manner in which he had slated the present-day colliery engineer. His (the speaker's) view was that our modern collieries were proud of their engineers, and did not relegate them to a dirty office in the background. He should like to hear Mr. Brindley's opinion on turbine pumps, and he hoped that Mr. Brindley in reply would give them some information upon high-speed pumping. Undoubtedly the rotary pump had come to stay.

Mr. S. F. SORWITH was of opinion that the paper would have been more valuable to the institute if the author had given the various efficiencies—that was to say, if figures had been quoted in support of his argument. In fact, he did not think that Mr. Brindley had advanced any very conclusive arguments in favour of steam as against electrically-driven pumping apparatus. They had had at the Cannock Chase Colliery an electrically-driven triple-ram pump, and he could bear testimony as to its efficiency. He could not give the figures, and he thought it would be useful if, as an appendix to that paper, they might have the actual experience of various colliery managers in the district in regard to the different classes of pumps at work. At Cannock they had electrically-driven turbine pumps, and these were put in because of the small space they occupied, and because they wanted electricity for other purposes. Personally, he was not at all sorry that they had gone in for electricity. They did not find the steam pumps inefficient, but they decided to go in for electrically-driven pumps because of having the exhaust steam in the shaft.

Mr. J. L. JEFFERY said that Mr. Brindley had seemed to suggest that high-speed ram pumps were in a somewhat experimental stage; but he would like to inform him that they were already an accomplished fact at the Dolcoath Mines, Cornwall. These were electrically driven, direct-coupled to the motors, and could be driven at three speeds. They were working successfully, and had been in actual operation for three or four years; he (Mr. Jeffery) had seen them working himself.

Mr. G. M. COCKIN said that although Mr. Brindley had been somewhat severe in some of his remarks, he had brought before them a subject of very great interest, and he would like to propose that a very hearty vote of thanks be accorded to him.

Mr. D. E. PARRY seconded the vote, which was carried unanimously.

Mr. BRINDLEY, in his reply, acknowledged the vote of thanks, and said he thought the suggested adjournment of the discussion was the best course. He would like to have given figures in support of his remarks, but the date of the paper had been advanced, and he had had to give it in rather a fragmentary form. With regard to the criticisms that had been made, he would like to say that, though he might have been hard on some of them, he had really said nothing that there was any need for them to trouble about. No one expected colliery managers and engineers to be experts in regard to pumps—he was only sorry that they were not.

**Royal Commission on Metalliferous Mines and Quarries.**—Meetings of the Commission were held on Wednesday, Thursday and Friday, December 10, 11 and 12, at Winchester House, 21, St. James's-square, S.W. Evidence was given by Mr. W. D. Hobson, manager of Penrhyn Quarry. The Commission also had their report under consideration.

**Doncaster Rescue Station.**—The handsome new mines rescue station which has been erected at Wheatley, Doncaster, to serve the new collieries around in the event of disaster, has now had its instructor and trainer appointed. This is Mr. D. McGaskell, formerly a second officer at one of the London Fire Brigade stations. He has already taken up his residence at the station. The building is not yet linked up with the telephone, neither has the rescue apparatus been fitted up, but these matters will very shortly be attended to, and it is then understood that training will commence forthwith. Our correspondent hears that important tests have been carried out during the past few days at a neighbouring colliery with a view to determining upon the very best of the various life-saving apparatus at present upon the market, and it is rumoured that the colliery officials have had the assistance of a scientist of high repute to enable them to arrive at a decision. The new mines station is the first to be erected in the Doncaster district, the nearest heretofore being at Wath. It will serve an important group of pits, and its erection has aroused great interest in mining circles. The building has previously been described in our columns.

## SPONTANEOUS COMBUSTION IN COALMINE.

A Digest of Evidence before the Committee.

(Continued from page 1232.)

Mr. AMOS DANIELS.

Mr. AMOS DANIELS, manager of the Jamage Colliery and the Bignall Hill Colliery, gave evidence on March 6, 1913. He said he was only manager of the Rookery pit at the present time. Mr. Latham was in charge of the Jamage and Jamage Main. He said the coalseam with which he was acquainted, which was liable to gob fires, is the Bullhurst seam. At the colliery he was now connected with the coalseam itself is split up by dirt bands into four parts. This is usual, but is not always the case, for sometimes one band of dirt is absent or an extra one may be present. The thicknesses of each part of the seam and of the dirt bands, and of the seam itself, vary very much in different parts of the mine and in different parts of the same district even. The total thickness of the seam varies from 9 ft. up to 22 ft. The inclination is very variable, from flat to 60. It is always thicker in the flat. There have never been any fires in the highly-inclined parts yet. The seam is badly faulted, both with large faults and numerous smaller ones. Rolls in floor and in roof are common, and reverse or overlap faults are not unknown. The dip is very changeable both in amount and in direction. The seam is generally thickest where there is a syncline or a basin. The nature of the roof varies in different parts of the pit, and in different parts of the same district. No iron pyrites is found in this seam.

#### METHOD OF WORKING AT BIGNALL HILL.

The method of working has been to cut up the coal into blocks more or less rectangular in shape, and when the boundary has been reached, or when further progress has been prevented by a fault, to work back the pillars. It has been found that by this method there are too many roads into and out of a goaf, and also that if heating takes place there are too many roads to build stoppings in. The method of working now being initiated is a modification of the bord-and-pillar system. The area to be worked is divided, as far as possible, into panels of a size approximating 140 yards by 160 yards. There are only two or, at the most, three roads into a panel, and, before drifting or broken work is commenced, preparatory stoppings are built in these roads. These stoppings can be closed and air shut off from the enclosed workings in a very short time. Other preparatory stoppings of brickwork or concrete are built much nearer to the working face than the main stoppings. The panel is opened up by a pair of dips driven to the rise the full distance up to the barrier. Level headings 23 yards apart are driven in about 130 yards. These headings are connected by rise thirlings not less than 30 yards apart, and further if it is possible. The recovery dips are driven on one side of the panel because the ventilation is simple, and also because in broken working, when the dips are in the centre, the working out of pillars on each side of the top of the dips causes a great deal of crush which gives rise to heating, and which also makes it very difficult to keep the road. Three level headings are driven together at the same time in the wall coal or wall coal and middles, and are connected by thirlings. When these headings reach the barrier, the pillars of coal formed by them are worked back to the dip. The air-current travels in along the bottom heading, across the face of the two drifts, and returns along the top heading. In drifting, the wall coal and middles are got out first, and the little tops posted up. Timber is afterwards drawn, and the little tops dropped and loaded out. Sometimes the big tops fall at the same time, and at other times they do not. If not, they are again posted up whilst the other coal is loaded out, then the timber is withdrawn again and the big tops got down. Here again the coal may come away clean from the roof, or the roof may collapse at the same time. If this happens, as much coal as possible is loaded out, but it is impossible to recover it all.

When the pillars are worked back to the dip, stoppings are put in the dips and air shut off. Whilst these pillars have been drifting back, two other headings have been driven out below them, and will be ready for drifting by the time the top drifts finish. The idea in working the panel is to abstract the coal from the rise side first, and to allow the goaf to charge itself with gas, and to keep the ventilation on the edge of the goaf, and not to allow any oxygen to pass through or over it. In working only two drifts at once, the object is to keep control of the roof pressure by not having long uneven lines of goaf breaks, and also that there may be only two or three stoppings to be closed.

#### GOB HEATINGS IN THE BULLHURST.

In three instances, cases of gob fires or gob heatings have occurred at this colliery in goaves where the roof has been strong and has not fallen close, and the top coals have been recovered. Other gob fires have occurred, but they have been so situated that it has been impossible to ascertain the state of the goaf as to whether it has been upstanding or close goaf, but in no known case has a fire occurred where the goaf has closely fallen in and has at the same time contained buried coal. Apparently, the fires have always occurred in the goaf of the broken workings as distinguished from the headings of whole workings. At none of the fires which have been built off has the heated coal, slack or other carbonaceous material been actually discovered. Gob stink has been detected in the goaf, and although thorough search has been made for the seat of the fire, no one has ever been able to locate it with certainty. On many occasions, in the course of ordinary working, witness has noticed that the coal and slack at the corners of pillars on the goaf edge have been warmer than elsewhere in the drift, but in the case of a fire he has never been able to get any gob stink at such points, or to find that they were warmer than usual. On two separate occasions the temperature at the corners of



ers by the side of a haulage road has risen from 80 to 90 degs. Fahr. But whether this was local heating or whether these were points at which heat from the fire further in the goaf made its escape, he was not able to prove, as these pillars were on the edge of a goaf which had just been closed off on account of gob stink, and the stoppings where the heating was noticed were promptly strengthened with facings of concrete. The first symptoms of heating which may eventually lead to a gob fire vary very much even in the same seam and in the same district of that seam. The following are the symptoms experienced in working the Bullhurst seam:—A feeling of sensation of unusual dryness in the atmosphere when approaching the goaf—as a rule this is a dangerous symptom; a feeling of dampness or moisture when approaching the goaf; after either of the above, a smell of paraffin or tar; a rise in temperature; the appearance of a thin mist in the atmosphere; on one occasion a distinct smell of burning sticks or wood was experienced.

Witness said he was not prepared to hazard any suggestion as to what parts of the seam heating had actually started in, but taking the seam as a whole, he should say it was a mixture of the whole. He should rather say that the fine coal itself, if there were a certain amount of grind or weight, would be a cause rather than the hussle.

Witness said that if the roof was favourable he should say they recovered 80 per cent. of the timber; there are other places where probably they would not draw more than 30 per cent. of it.

#### CHANGES IN CHARACTER OF THE SEAM.

There is a very strange or remarkable difference between the seam at Jamage and the Bullhurst at Bunker's Hill Colliery, which is an adjoining colliery. There there was so much pyrites that a lump on the screen more than 18 in. was broken in two in order to get it out. They never had a fire at Bunker's Hill, only heatings. In the colliery at Bignall Hill, where they do not get those lumps and yet sulphur occurs and pyrites occurs in so small specks as not to be visible to the naked eye, they do get fires.

Witness qualified the statement, however, by adding that at Bunker's Hill, although they had no fires, there was heating on every occasion if they did not work out quickly. There they had a roof that always fell and closed up so close that they could never circulate air round the face. Practically every fall of roof amounted to stopping to a certain extent, and the goaves were as tight as possible. It was what he attributed the salvation of the place from gob fires to.

Witness said that when the roof was good they practically got 90 per cent. or 95 per cent. of the coal. When the roof was bad it depended on the conditions. They might get 70 or 80 per cent.

Mr. Daniels said the only objection to two intakes was that there would be another stopping and another road, and if the pillars were not sufficiently large there would be a great tendency to creep and crush. But it would not attack the goaf at all, because the circulation of the air would be kept to one side.

#### TREATMENT OF FIRES.

If a fire occurs, and there were a possible chance of getting at it, witness thought the best method was go at it and see that it was dug out. But that was not a wise procedure to adopt in the Bullhurst seam, nor in seams liable to spontaneous combustion. They could not get at it if they tried, because if they were working pillars back and had coal which was only 6 ft. thick and the roof might have fallen some 10 or a dozen yards, they had a great heap a dozen yards high probably before it had blocked itself up against the roof in the goaf, and could not possibly dig anything out like that. By the time they tried to dig it out they would probably have something else happen. Then there was nothing to be done but stop the place off. He had not considered the question of hydraulic stowage.

Witness said the coal fired on the surface if it was stacked. It had not fired at 12 ft., and they had never stacked it at more, but there had been evidence of heat. There was no doubt it would fire if you stacked it high enough. They had never been able to detect moisture at any particular part where they had had trouble; but recently they had a stopping that was built of sand and a 2 ft. brick stopping in front of it, and evidently some of this got through the stopping on to the sand behind. The stopping had been in 15 months, and the bricks were quite warm. There were two pipes through, and that got up to 110 degs. in nothing but sand. The heating was due to the water going in that sand. When they opened the pipe, the air was quite warm out of it. That is the 3 in. pipe which conveyed the air into the mine to work the engine, and was evidently broken by the explosion; because by opening that pipe they could get gas and take samples of it. The 2 in. pipe only went through the stopping, and the air out of both of them was hot, very much hotter than usual. Witness decided to knock a road through the stopping, and as they knocked it through steam came out in quite a volume, and the temperature was 110. There was no heating beyond, and the heat was all in the sand. The only thing he could put to it was, that in putting this sand in they had mixed some small fine dirt of the Bullhurst roof or floor, or some of the coal, probably, but he was not able to find that this was so. The sand came from the sand hole at Alsager straight into a railway truck, and was loaded at the colliery in the pit tub and sent down for that stopping, and had been standing there 15 months. When the sand was got at they could not detect anything but sand. The water did not enter the sand hot, as the temperature of the mine at that part was not 110 degs. The sand may have been very close to the fire, and there may have been a fair amount of water in that particular patch that the stopping was built of.

Witness added that there was a very strong opinion in Staffordshire that moisture was really one of the first causes, but it had not been his own experience. There was quite a division of opinion in North Staffordshire as to the action of pyrites. Witness said they did not get firing from falls in the face. All the fires happened in the goaf. As to the period after working within which they got fires, it varied considerably. Witness had known heating to occur after coal had been working for two years, and had known it to occur when it had only been working for about nine months. In retreating, he had never known one to happen in nine months if they worked properly.

#### MR. GRANVILLE POOLE.

Mr. GRANVILLE POOLE, the secretary to the Committee, gave evidence on March 6. He said he had had experience of gob fires in Staffordshire, chiefly in South Staffordshire. Referring to the evidence given by Mr. Daniels, he said he had noticed sand that had been brought dry into the pit and placed along the roadside in case it was necessary to use it at short notice, owing to the wet condition of the mine, had got warm. They thought at the time it was due, perhaps, to organic matter in the sand, owing to the roots and stuff that were found near the surface. As to the influence of moisture, witness thought in some instances gob fires had taken place where the neighbourhood of the fire had been more damp than at other places. Generally speaking, coking coals were more liable to spontaneous combustion.

#### HYDRAULIC STOWAGE IN SOUTH YORKSHIRE.

Witness said that at the time he was inspector in the Doncaster district he made a suggestion that where fires had taken place, sand and water or hydraulic stowage should be pumped in; that a borehole should be put into the seat of the fire and hydraulic stowage material pumped in by force, and an attempt made to fill up all the cavities and stop the heating. He thought that would be a wiser precaution than driving scour roads into the seat of the fire; because in driving those roads they naturally facilitated the percolation of air. As soon as the gob stink was smelt in the roadside boring should be undertaken with a sort of pivot machine, so that they could bore in any direction and thereby find the hottest place in the goaf, and when the hottest place was found, if the hole was suitably lined and a cementing material pumped in under pressure by means of pumps worked by compressed air or electricity, or by hand, they would then put the fire out and also make a block of concrete, more or less, which would prevent the air getting to the seat, because witness's experience in those mines was that these fires very often occur just inside the waste near the pack, and it was very often the case that a prop has been left in there, and there has been an open space. That is where the fire occurs. Witness added that it was his experience that the primary reason of all these fires first occurring was due to the large quantity of timber being gobbled. Timber had been found at the seat of the fire generally. During the time he was in the Doncaster district he did not remember any fire where timber was not found. With regard to the packs, his opinion was that the gob roads should be such a distance apart that mid packs could be done without, and that the weight would not be thrown on the face. He would have as wide a pack as possible, say 4 to 6 yards, and if possible have a sealing packed inside built of clay or some other soft earth, inside the pack itself. Witness said he was aware that when the Doncaster pits were first started very large amounts of dirt were sent out of the pit, and that since all the dirt had been kept in the pit and the men had tipped all the rubbish into the gobs, gob fires had apparently diminished for that reason.

#### RAPIDITY OF WORKING AND LOST TIMBER.

Sir Arthur Markham mentioned the curious fact that at Hickleton fire is practically unknown with one exception, a chock getting on fire, which was due to a piece of coal and wood not being properly looked after, and the adjoining colliery extending eastwards, Brodsworth, is very liable to fires. At Hickleton the face is worked very slowly, and at Brodsworth it is worked very quickly. Witness said he did not think that quick working would cause these fires. Perhaps it was the method of working and the amount of coal that is left in that would contribute more than the speed of working; in view of the fact that there would be a much larger percentage of inferior coal left in these Doncaster pits than in these western pits, where there is a larger percentage of good coal. If the top coal could be packed up solid there would be less fires.

Witness thought that if a fall had taken place in the face, it was advisable to drive back and afterwards recover the timber. If the work was done at the right time, there was as a rule no difficulty. Many fires have occurred round the shaft pillars of the mines in South Yorkshire, and if the gates just above the shaft pillar could be packed solidly, and a cementing material forced in for some distance, that air would not get through along the side of the shaft pillar, and it would prevent so many fires occurring round the shaft pillar.

If there was a gob stink and 2 per cent. of gas in the air-current, witness would withdraw the men. In a case 80 yards back, where the goaves in the district are fairly tight, 30 yards from the working face, he would examine carefully before withdrawing the men to see if there was very much danger, because stinks had been known to die away again.

As to the practicability of hydraulic stowing, the great difficulty in the Doncaster district would be in the material. The material is not available for a great number of years in the neighbourhood, and it would probably all have to be brought from Lincolnshire. Of course, water had a very bad effect on the roads; but when the system of hydraulic stowage would be in vogue, of course the natural conditions of the mine

would be altered, and the water in the roads might not have the same damaging effect as at present.

Witness repeated that falls in the face, ribs of coal being left in, and timber being left in, were, in his opinion, a primary cause of these fires. Of course, there is a small seam above the Barnsley seam in that area which bleeds oil sometimes, and that might have a contributory effect. As to the possibility of adopting the retreating method of working, witness said he had thought several times that roads could be driven in the Dunsil seam underneath the Barnsley seam, perhaps, one in the Dunsil and one in the Barnsley, to prevent leakage. He would prefer the intake in the Dunsil and a higher road for the return, or both roads for some distance in the Dunsil. He appreciated the difficulty that in the retreating system they would have to have gates every 50 yards apart, probably, which would have to be driven into a solid coal, and the possibility of cracks forming the roof. As to the suggestion that the Day Bed seam being so close to the Barnsley was a factor which operated in the direction of creating fires, witness said it might have the same effect as the hussle in North Staffordshire, a sort of blanketing effect in the goaf. Witness said he had never seen fires less than 80 yards from the face. The burying of the packs and getting the roads well up was a good thing. He thought it was possible even then to exclude the air if they set up a sufficient distance and got right above the packs, and the suggestion had been made to wet the bottom somewhat to solidify it more. In this district where fires had occurred, stonedusting should be resorted to in roads contiguous to the fire, when there was any coaldust at all, or any gas. There was another point with regard to working near faults. He thought it necessary to get all the coal from the fault, if possible, and the cavity which may be formed should be filled up solidly.

Mr. Rigby made the suggestion, with respect to the comparison between slow and rapid working, that the latter would have the effect on the packs that there would be rather a longer length of pack, that would be porous. This, witness admitted. He added that he had no experience as to how far back from the face or what length of time it took to make the pack solid. He had seen it tight or practically tight, as tight as a pack could be, 80 or 100 yards from the face; but of course near the gob road. As to the middle waste, he could not say. At one colliery he had known a fire near the face in the goaf; but at another colliery where the face was advancing about the same rate, he had not known a fire near the face. He agreed that it was an open question as to whether waste packs were advisable or not. He thought it a good suggestion to have double packs at the side—say a 4-yard pack. Then in the goaf side another 3 or 4 yard pack, and hydraulic stowage in between those two. Then on the opposite side of the gate the same thing. It would double the packing practically. Witness said he had known gob fires occur near an intake road where there had not been much likelihood of leakage right through the goaf, and that the goaf itself breathed. So that it was possible for the waste itself to draw in air from the roadside without having any leakage directly through the goaf. That was one reason why he had suggested that the pack along the side of the road should have some soft material in it to prevent any air being drawn in. Witness said he was aware that since he left the district the whole system of these main gate roads had been altered, and practically all the packs were buried within 60 yards of the working face. In that case Mr. Rigby's point did not arise; because not only were the packs buried, but the roads were brought up to within 50 or 60 yards and the whole thing was buried.

#### PROF. BEDSON.

Dr. F. PHILLIPS BEDSON, Professor of Chemistry at Armstrong College, Newcastle-upon-Tyne, gave evidence on April 18, 1913.

#### EXPERIMENTS WITH STAFFORDSHIRE AND DURHAM COALS.

Witness said the first occasion on which he was brought into contact with the subject of spontaneous combustion was in 1883, in connection with the explosion of the air receiver at Ryhope. This air receiver was found to be lined with a carbonaceous mass formed by the lubricant and coaldust, and that led him to consider the question of the spontaneous heating of coal. His experiments were contained in the appendix to the report made to the North of England Mining Institute in 1887 or 1888. He took the line that spontaneous heating and ignition of coal was explicable in the same manner as spontaneous ignition of yellow phosphorus and the rusting of easily oxidisable metals. The oxidation was associated with heat production, and unless means were taken for the dissipation of the heat it would gradually accumulate and gradually raise the temperature of the combustible body to the temperature of inflammation. When they had the slow combustion beginning in the way indicated the oxidation would be more and more accelerated by the heat so developed, and thus become what they would call more ordinarily rapid combustion or inflammation. He should attribute the firing in South Staffordshire to the existence in the coal there of coal substances which are readily oxidised. In connection with these, Dr. Bedson referred to some experiments which he made some 20 years ago with coal from the Bullhurst seam. In one set of experiments he found the coal readily ignited at temperatures between 180 and 230 degs. Cent. working on a laboratory scale. Working with a larger quantity than in the first, but with the same coal, he found the temperature of inflammation to be between 144 degs. Cent. to 160. He was speaking of the Durham coal now at Ryhope. Then turning to the Bullhurst coal. Some years ago he got samples of the shale and coal from the "Fair Lady" pit at Newcastle.



under-Lyme. The shale was ground and spread in layers of about  $\frac{1}{2}$  in. thick over an area of something like 7 in. square and heated in an air bath in the same way as when experimenting with the Ryhope coal. With the air bath at a temperature of 122 degs. Cent., in six hours the temperature of the shale in one experiment rose to 151 degs. In another with the air bath at 110 degs. in three hours it rose to 164. Then he took the middle seam, and that was analysed. Experimenting in the same way, in six experiments, he got three ignitions with the temperature of the air bath ranging up to 140 degs. Cent. With the top seam there were only three experiments, and in two he got ignitions. Of course they knew so very little about the constitution of the compounds contained in coals, that it was difficult to put their finger on any particular set as the source of this oxidation. He did not attach very great importance in the problem to the presence of pyrites. The proportion of pyrites was very small compared to the whole of the coal substance, and of the coal substance a large proportion must consist of easily oxidisable bodies. There was the oxidation of the disposable hydrogen in the coal leading to the formation of water and the oxidation of some of the carbon leading to carbon dioxide. In addition to that they had the formation, he should take it by the combination with oxygen, of new compounds, coal-like in appearance certainly, and he supposed they would speak of them as coal, because they were black and combustible. All these were factors in heat production. He had spent a good part of his life in trying to get to know something of these compounds; but they were very elusive problems, and one could do very little single-handed. The proper way would be to see whether by means of solvents they could obtain any information as to the nature of the compounds entering into the composition of them. For instance, many years ago he suggested the use of pyridine as a solvent. One of the difficulties experienced in connection with the study of the constitution of the compounds entering into the composition of coal was the fact that these extracts, or the substances extracted, altered in composition on being brought into contact with the air. The problem was one that required a good number of workers and appliances and a thorough training in chemistry.

#### THE ALTERABILITY OF COAL.

Continuing, witness pointed out that the ready alterability of coal by contact with air at slightly elevated temperatures found recognition in the method usually adopted for the estimation of the moisture in a sample of coal. This method prescribed the estimation by ascertaining the loss which a given weight of finely powdered coal experienced when heated for one hour at a temperature of 105 to 110 degrees Cent. Whilst this loss was empirically regarded as due to moisture driven off, it was recognised that the heating must not be prolonged beyond the specified time, as, should this be done, it not infrequently resulted in a gain in weight. The increase in weight became more apparent the higher the temperature to which the coal was heated, and was associated with the production of water and of carbon dioxide by the oxidation of hydrogen and carbon respectively, and at the same time there was a fixation of oxygen, forming new substances. As they did not know the nature of the compounds in the coal itself, so it would be rather difficult to say what the new substances would be. Then, in illustration of this change in composition, witness cited an example from Richter's work. This example also showed how the properties of coal suffer from heating. A comparatively small change in total—about one part of total hydrogen per 1,000 parts of carbon—caused a loss in calorific power of 307 calories.

Similar changes were naturally produced in coal in shorter times by heating at more elevated temperatures, and these changes in composition naturally resulted in alteration in the physical properties of the coal—for example, the specific gravity and its behaviour when heated—and further, this alteration was shown frequently in the fact that heated coal had a greater absorption power of moisture than the original coal. In one case he had seen cited coal which had been heated in this way altered very materially in its behaviour on ignition. It gave off acid vapours, whereas the distillation of ordinary coal was associated with the production of alkaline vapours, so that these alterations in the physical properties were but indications of alterations in composition and in the production of new compounds. Witness, in answer to questions, said he thought the power possessed by a coal of absorbing oxygen was only finished when it was completely burned. After it had been exposed to the atmosphere for some time it did not absorb so much. That was at ordinary room temperatures, as it were—normal temperatures—average atmospheric temperatures.

Witness said these compounds in this behaviour, to which he had referred, had their analogues in the drying oils, which, by absorption of oxygen from the air, gradually formed dry, resinous solids. Like such oils, coal would absorb iodine, and this iodine absorptive power might be utilised to ascertain the proportion of such substances in a coal, just as the behaviour of coals towards dilute solutions of potassium permanganate might be employed to indicate the proportion of easily oxidisable bodies in coal. The iodine absorption value in a coal might give information as to whether coal contained a considerable proportion of these unsaturated compounds or not, just in the same way as its behaviour with potassium permanganate. Some years ago he (witness) made some experiments with regard to the action of potassium permanganate on some of the coals in Northumberland and Durham, but unfortunately he had not been able to lay his hands on the notes. In the case of coal, the action would be both physical and chemical. If a fibrous coal—a coal possessing a struc-

ture something like that of charcoal, then they would expect to find absorption from the purely physical point of view; but he thought they should confine their attention to the purely chemical point of view.

#### GOB STINK IN THE LABORATORY.

In the course of further evidence Prof. Bedson said that very often in their experiments they knew they were going to have an ignition by an odour pervading the laboratory which he now recognised as a "gob-stink." He was then speaking of the experiments with Durham coals, which are not subject to gob fires. He took it only as a general indication that there was some coal substance burning.

Witness was interrogated as to his opinion on the work or influence of bacteria in originating self-heating of coal. He said it would be absolutely wrong to dismiss the subject without consideration; but from the fact that they had in coal material which they knew readily absorbed oxygen—oxidisable material—he did not think it was necessary to go to the bacteria to help them. This idea of fermentation changes in the coal had been started years ago, but he did not think there was any reason that they should entertain it.

#### DR. HALDANE'S EXPERIMENTS WITH ADDED PYRITES.

Sir Arthur Markham mentioned that Dr. Haldane had found by recent experiments he had made that by adding pyrites to coaldust, the power of absorbing oxygen had enormously increased, and the coal took up this oxygen at a very rapid rate. Witness said they had to consider the relative stability of the two.

Sir Arthur also asked witness what was the most stinking material known to a chemist? The point was that if they could place in the gob some material which they could break after the place was sealed up, and then could perceive any of this stink material coming through the gobs, they would then know that air was coming into the gob, and it was not sealed tightly off. What they were doing at the collieries he was associated with was that they are using eucalyptus; but they had not any material which would make a sufficient smell for the officials to find when they put any given material in the gob. Witness said he thought he could put them in touch with some compounds which would help in that direction. Benzyl mercaptan, for instance, was a substance they had had a good deal of trouble with in Newcastle, and it had a very disagreeable odour. There were several unoxidised sulphur compounds which they called mercaptans which would answer that purpose. They are very disagreeably smelling bodies, and very volatile. They could be selected to give off fumes at the ordinary temperature of air.

(To be continued.)

#### OBITUARY.

The death is announced of Mr. Wm. Martin, sole partner of the Dundyan Ironworks, Coatbridge. The deceased was a man of marked individuality, and stood almost alone in declining to join the Scottish Malleable Iron Combine, formed two years ago.

The death took place on Saturday last, at his residence, Bolton Royd, Bradford, of Mr. John Rhodes, proprietor of the Prince of Wales Colliery, Pontefract. The deceased gentleman was 92 years of age, being born in Bradford in 1821. He was first engaged in the wool trade of Bradford, but after gaining a position of considerable responsibility there, he started in the colliery business. His first venture was at Dudley Hill, Bradford, but later he went to Pontefract, where, in 1872, he opened up the Prince of Wales Colliery. Here also he opened up the Victoria Collieries at Snydale. Whilst at Pontefract he took a great interest in public affairs. Twenty-five years ago he disposed of his Snydale possessions to Messrs. Henry Briggs, Son and Co. Limited, and left Snydale Hall to reside in Bradford. Since then he has been prominently identified with various commercial activities in Bradford, perhaps the most notable of which was the resuscitation of the famous Saltaire Mills, founded by Sir Titus Salt, Bart., which had fallen upon hard times. He maintained an active interest in the Prince of Wales Colliery, at Pontefract, until his death, and paid weekly visits to the colliery until he was over 90. Mr. Rhodes married twice, but he survived all his children, and when he relinquished the managership of the Prince of Wales Colliery he was succeeded by his nephew, Mr. Fred Rhodes.

The death is announced of Mr. C. P. Sandberg, M.Inst.C.E. Mr. Sandberg was well known as consulting and inspecting engineer to the Swedish, Chinese, and Siamese Governments, and to many other railways, especially in matters relating to permanent way. He introduced many improvements in the design and manufacture of rails. His sections of rails, known as the Sandberg sections, were first brought out in 1878, and a later design in 1894. They were widely adopted. In recent years he had introduced what became known as the Sandberg silicon steel rails, which are being widely adopted by both railways and tramways.

The death occurred recently of Mr. Edmund Jackson, of Jacksonville, managing director of the Lamplugh Iron Ore Company.

We have much pleasure in announcing that the Right Hon. the Earl of Plymouth, C.B., &c., will preside at the next annual festival dinner of the Coal Trade Benevolent Association which will take place in the Grand Hall of the Hotel Cecil, on Monday, April 27 next.

#### NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Co-ordination of Mining Instruction—Demand that Non-union Men be Refused Employment: Employers' Decisive Refusal—Colliery Assessments Question: Increase Foreshadowed in Merthyr Union: the Practice at Pontypridd—Banksmen's Wages and Hours: another Strike Threat—Peculiar Cases in the Courts—A Conundrum for Christmas—Tredegar Officials' Annual Gathering: Mr. Tallis upon State-paid Firemen Proposal.**

Co-ordination of mining instruction will be discussed at a conference summoned by the Lord Mayor of Cardiff, to be held in that city on Monday next. His lordship has acted upon request by the county councils of Glamorgan and Monmouth and of other authorities concerned, including University College and the Coal-owners' School of Mines. The object is to arrange such a scheme as will prevent overlapping, now due to independent action and the different organisations, and it will be proposed that all the public authorities from Carmarthen to Monmouth, with the College and the School of Mines, shall unite in forming one representative central body, which may—as a consultative and advisory board—deal with the general question of mining instruction throughout the South Wales coalfield.

The workmen's representatives brought forward a striking request at the meeting of the Conciliation Board on Monday, namely, that only Federation members should be employed at the collieries. It was submitted by Mr. J. Winstone, vice-president of the Federation, his argument being that owing to collective bargaining and through the Conciliation Board great benefits had been secured throughout the coalfield, and that therefore it was only reasonable that all who enjoyed the benefit should contribute towards the expense of obtaining them. He desired the employers to agree that all workmen expected to be parties to the Conciliation Board agreement should also be expected to join the Federation, which is responsible to the owners for due observance of the agreement.

Mr. F. L. Davis, on behalf of the employers, stated that they could not assent, for they would not be parties to coercing the men into joining any union. All men must be free to decide whether they would join or not. This had always been the employers' policy. The agreement had been made between the owners of specified collieries with workmen's representatives, who undertook to represent all the men employed, whether unionists or not.

Three days' holiday at Christmas was fixed by the Board, making 13 for the year; and the employers' directed attention to the fact that as this exceeded the 12 provided for in the agreement, the men should consider the taking of only 11 days next year. Promise was made that the suggestion should be considered.

On Saturday, the Merthyr Union Committee discussed the question of colliery assessments, and finally passed a resolution inviting coalowners to meet them and confer upon the terms of an agreement, the desire being to assimilate the practice of this union to that which prevails in Pontypridd. Incidentally, the substitution of the imperial for the "long" ton, as a basis, was mentioned. It was said that the adoption of the Pontypridd arrangement would work out to an immediate increase of 15 per cent. in colliery assessments; but the figures quoted do not agree. One speaker put the Pontypridd average at 8½d. per ton when coal sold at 12s. f.o.b. Cardiff, rising 5 per cent. for each additional shilling to a maximum of 15 per cent.; and it was pointed out that this compared with an average of 6½d. per ton in Merthyr Union. Some companies work coal both in Merthyr and Pontypridd, paying at a different rate in the two unions.

It was alleged that past assessment committees had been lax in their methods, and that, in earlier years, when prices of coal rose, an additional percentage—sometimes to the amount of 15 or 20—was made to the assessment, and the colliery companies paid it.

Two meetings on Saturday dealt further with the banksmen's wages and conditions. The first was that of a joint committee representing both employers and employed, and it was held in continuance of discussion previously initiated. Its special subject was the wage-rate at certain collieries, agreement having been already reached as to hours, which will be nine per day. This meeting was ultimately adjourned till the 20th inst. The second meeting was at Pontypridd, and consisted of delegates from all parts of the coalfield. These sought a uniform rate of wages, and objected to the joint committee dealing with the collieries individually. The banksmen urge that for 20 years their position has not been improved, notwithstanding increased responsibility arising from new legislation; and they instructed their delegates to insist upon a standard rate of 4s. 6d. per day, percentages to be added; yet their formal resolution called for a standard of 5s. Unless these terms be conceded, the assent to a nine-hour day to be withdrawn, and an eight-hour day be demanded. The executive council of the Federation will be approached to sanction the tendering of notices by banksmen on January 1, in support of these demands.

A peculiar case, the first of its kind taken under the new Mines Act, was heard at Caerphilly, on Tuesday. A collier was charged with failing to report a source of danger. The haulier had knocked down a brattice sheet, and requested defendant to replace it; but he answered that he was not paid for it, and would not. Subsequently, the manager found defendant working in



there being an accumulation 17 yards long and wide; and on being asked why he had not replaced the lattice, defendant said, "It's not my work; I had no nails." The Bench imposed a fine of £3, with costs. Defendant's solicitor asked the Bench to state a case upon the point he had raised, and the magistrate agreed to do so.

Another case at Caerphilly has raised an interesting point. Defendant was fined for having a packet of cigarette papers in his possession; but the question has arisen—Did he contravene the law? The Act forbids the possession of anything to produce a light or of any "contrivance for smoking." Is the cigarette paper, apart from tobacco, a contrivance for smoking? Whilst engaged in solving this conundrum for Christmas, it should be borne in mind that tobacco is taken into the mines for chewing.

A further examination of Senghenydd Colliery was made on Tuesday, in order to discover the origin of the explosion. Prof. Redmayne with other inspectors, Mr. Shaw with the managers previously named, and Mr. Watts Morgan with other representatives of the Miners' Federation, formed the party. Several hundreds of men are now at work in the uninjured portion of the mine.

"Non-unionist" trouble, in its more common form of men falling into arrears of contribution, has occasioned the stoppage of a large number of men at Abergorki Colliery, in the Rhondda. The pits are being kept open for those who desire to work, the stoppage being only partial, and an early full return expected.

Upon the question of miners' relief funds, raised because of the Senghenydd and other contributions, a matter of much weight is the relative cost of distributing the older fund benefits. This point has previously been discussed, it being recognised that expenses of distribution, which were quite justifiable in earlier years, are not so now, when the number of beneficiaries has become much reduced. As a rule, children pass out of benefit at 13 years of age; deaths and re-marriages also reduce the numbers on the fund; and therefore the work of distribution is considerably lessened. It is pointed out in the case of the Morfa Fund that the 223 beneficiaries of 20 years ago are now reduced to 36, but that a clerk and distributor are still paid—a motion reducing the salary of the clerk and dispensing with the services of the distributor having been rejected at a recent meeting.

Tredegar Company's staff, to the number of 500, from London, Cardiff, Newport, and Tredegar, had their ninth annual dinner in Cardiff, on Saturday, Mr. Arthur Lawrence (director) presiding, and Col. Wyllie with Mr. Johnson Fergusson, other directors, being also present. In the course of an interesting speech, Mr. A. S. Tallis, general manager, approved the practice of stone-dusting in order to prevent explosions, and said it was being adopted in the company's collieries. They were also introducing electric lamps.

Referring to the current idea that underground examiners should be appointed and paid by the State, Mr. Tallis said he considered this impossible. Those persons who had advanced the idea could not have thought of the conditions they would set up in the collieries—two distinct classes of officials, one a law unto themselves, the other a law unto the company. So long as a colliery was under the control of a certificated manager, so long must the officials be under his direction, otherwise it was impossible for him to control the colliery. If they had men appointed by the State, who would be their responsible superior? If they were responsible to the inspectors of mines, the number would have to be increased a hundredfold. Such a system would create friction of the worst kind and chaos. It would not make for safety, but the reverse. The greatest factor of safety was in the workmen themselves making frequent periodical examinations of the mine and satisfying themselves as to its state.

Among the developments in this district—developments so numerous that it is all but impracticable to keep count of them—is the establishment of a great industry at Newport, with the consequent effect upon the coal trade. The Mannesmann Tube Company have been in negotiation to acquire 100 acres of land for establishing works which will, it is said, ultimately employ 3,000 hands, and occasion the erection of some hundreds of houses, with the extension of the water-works, &c. They will, however, be erected in sections. Newport has been chosen because of the facilities it affords in respect of importing raw material, and of distributing the finished product by the different lines of vessels that run from the port.

It was stated in connection with the general miners' congress in London that the South Wales coalowners had given a "blank refusal" on the question of surface-men's wages; but the refusal is not "blank." On the contrary, there is a reason attached, namely, that wage questions are under the agreement which still has nearly 18 months to run. It is, however, as already shown, not the wage rate alone which troubles surfacemen here; the hours of working also occasion serious complaint.

Another one-man strike is reported from Tareni, where 900 men have been idle because of an allegation as to filling dirty coal, made against one of their number.

## THE FREIGHT MARKET.

The outward freight market has only been moderately active during the past week. On the north-east coast considerable embarrassment has been caused to shippers by the strong westerly gales, which have been delaying tonnage arrivals and throwing loading turns somewhat out of order. Coasting business has been done at the low bases of from 3s. 1½d. to 3s. 3d., Tyne to London, and 3s. 6d. to 3s. 9d. to Hamburg. The Baltic has had Libau at 5s. 3d., Malmö at 5s., and Riga at 6s. The Bay is quoted at from 5s. to 5s. 3d. to Bordeaux. The Mediterranean has been done at 7s. to Genoa. At South Wales, Mediterranean rates are irregular, stems being difficult to arrange, while the enquiry all round is limited. Rates in most directions are fairly well maintained. On the Clyde there is a moderate enquiry, at steady rates. Practically nothing is doing at the Humber. Homewards, Black Sea figures for both berth and chartering sizes are decidedly easier. The Azof and Danube have a poor demand and a weaker tone. The Mediterranean and ore trades are slack. The Baltic is inactive. Eastern rates are weaker. At America, tonnage is still at a discount for near positions. River Plate rates are fairly steady. Tonnage for January-February is scarce in the Australian market, and rates tend to improve.

Tyne to Alexandria, 4,000, 8s., 500; 4,000, 7s. 9d.; Antwerp, 1,600, 4s. 1½d.; Algiers, 2,000, 6s. 3d., from Dunston, 2,000, 6s. 1½d.; Bourgas, 5,000, 8s. 3d.; Bas-Indra, 2,600, 5s. 6d.; Bordeaux, 3,000, 5s. 3d.; Civita Vecchia, 2,100, 8s.; Genoa, 4,800, 7s.; Gibraltar, 1,800, 6s. 6d.; Horsens, 750, 5s. 9d.; Hottentau, 1,400, 5s. 3d.; 1,400, 5s. 1½d.; Hamburg, 2,400, 3s. 9d.; 1,700, 4s.; 3,100, 3s. 6d.; Hennebont, 1,200, 6s. 6d.; Konigsberg, 3,500, 4s. 6d.; London, 700, 4s. 6d.; 2,100, 3s. 3d.; 3,000, 3s. 3d.; 2,800, 3s. 1½d.; Libau, 1,550, 5s. 3d.; Malmö, 2,500, 5s.; Nykjobing Falster, 1,300, 5s. 1½d.; Oran, 1,700, 6s., from Dunston; Palermo, 2,100, 8s. 3d.; Port Said, 4,000, 7s. 6d.; 4,500, 7s. 9d.; 3,800, 7s. 1½d.; from Dunston, 6,000, 7s., 400, option 300 coke same rate; Persgrund, 850, 5s. 9d.; Port Mahon, 950, 10s., 250; Riga, 3,500, 5s. 3d.; 2,300, 6s.; Rouen, 2,000, 4s. 9d.; Rochester, 1,500, 3s. 6d.; Reval, 3,200, 5s. 6d., January; Stockholm, 2,200, 5s. 7½d.; Savona, 3,300, 7s.; 6,200, 7s.; St. Nazaire, 2,800, 5s., 600; Seville, 1,700, 6s. 7½d.; Varna, 5,000, 8s. 3d.

Cardiff to Alicante, 1,700, 7s., end December; Alexandria, 5,500, 7s. 6d., January 2; Algiers, 2,500, 8 fr.; 2,000, 8 fr.; 3,600, 7½ fr., January 2; 2,600, 7½ fr.; Almeria, 1,500, 7s. 9d.; Ancona, 6,000, 8s.; Arzew, 2,200, 8½ fr., 300, end December; Buenos Ayres, 14s., December; Bordeaux, 3,000, 6 fr.; Barcelona, 1,400, 7s. 10½d.; 2,800, 8s.; Brest, 1,250, 4s. 7½d.; Civita Vecchia, 3,800, 8s.; Campana, 14s.; 13s. 6d.; Caen, 1,650, 4s. 9d.; 1,000, 5s. 6d.; Colombo, 5,500, 10s., December; 6,000, 9s. 6d., January; Calais, 2,500, 4s. 4½d.; 3,300, 4s. 3d.; Chantenay, 1,900, 6½ fr.; 2,800, 5½ fr.; Djibouti, 5,500, 10s.; Dieppe, 2,400, 4s. 7½d.; Ferrol, 750, 6s. 9d., 200; Gibraltar, 1,100, 6s. 6d.; Genoa, 5,000, 7s.; 5,500, 7s.; 3,100, 7s. 6d., December 20; 5,100, 7s. 6d.; 6,200, 7s. 1½d., December 20; Havre Canal, 1,700, 5s.; Islands, 6,000, 7s. 6d., early January; 2,200, 7s. 3d., January 5; 1,600, 6s. 9d.; 2,400, 7s. 3d., January 1; Lisbon, 3,000, 5s. 6d., 350, reported; 3,200, 5s. 3d., 500, December 30; 1,400, 6s., 300, December 20; 3,200, 5s. 9d., 400, December 22; 2,800, 5s. 7½d.; 2,400, 5s. 7½d., 400; 2,000, 5s. 6d., 350; La Rochelle, 2,100, 5½ fr.; 2,500, 5½ fr.; Las Palmas, 2,100, 7s. 3d.; La Pallice, 3,200, 5 fr., with option; Leghorn, 5,500, 7s. 6d., 500, December 29; Monte Video, 5,200, 13s., end December; Mombasa, 4,700, 7s. 1½d.; Malta, 3,700, 6s. 9d., 6s. 6d., end December; 4,300, 6s. 4½d., Jan. 2; Marseilles, 4,800, 9 fr.; 5,000, 8½ fr.; 6,400, 8½ fr., reported; Nantes, 3,200, 5½ fr.; Naples, 4,700, 7s. 1½d., 800; 5,500, 7s. 6d., 500, December 29; Oran, 2,700, 7½ fr., 600; Port Said, 4,500, 7s. 6d.; 5,700, 7s. 3d., early January; 4,500, 7s. 9d.; 6,400, 7s. 6d.; 5,000, 7s. 1½d., December; 5,000, 7s. 3d.; 4,500, 7s. 1½d.; 5,000, 7s. 9d.; 5,500, 7s. 3d., end December; 4,600, 7s. 4½d., January 1; Perim, 6,000, 10s., January; Philippeville, 2,000, 9½ fr. and 10½ fr.; Piræus, 3,000, 8s.; Rio de Janeiro, 7,500, 14s., January 5; Rosario, 3,000, 14s. 6d.; 4,500, 14s. 3d., December 22; 14s., December; River Plate, 2,800, 13s. 9d., January 1; 14s., December; 4,400, 13s. 6d., early January; 5,000, 13s., early January; Rouen, 1,250, 5s. 6d.; 700, 6s.; 950, 5s. 9d.; Rochefort, 2,100, 6 fr.; St. Nazaire, 3,700, 5½ fr.; 2,200, 5½ fr.; Salerno, 2,700, 7s. 10½d., end December; St. Malo, 900, 5s. 3d.; Santos, 5,500, 17s. 9d.; Savona, 3,100, 7s. 6d., December 20; 6,200, 7s. 1½d., December 20; Santander, 2,300, 6s.; Sables, 1,400, 6½ fr.; Sabang, 5,500, 10s., early January; Torre Annunziata, 3,800, 8s.; Teneriffe, 2,100, 7s. 3d.; Venice, 6,000, 8s.; Villa Constitución, 14s.; 13s. 6d., December; Valencia, 1,100, 7s., 250.

Newport to Bordeaux, 2,100, 6 fr.; Lisbon, 1,400, 6s.; Genoa, 5,000, 7s., December; 5,500, 7s.; December; Marseilles, 4,800, 9 fr.; 1,700, 9 fr.; Almeria, 1,500, 7s. 9d.; Aguilas, 1,250, 8s. 6d.; Ferrol, 750, 6s. 9d.

Swansea to Barcelona, 1,800, 8s. 1½d.; La Rochelle, 1,700, 6 fr.; Sables, 6½ fr.; Genoa, 3,300, 7s. 9d.; 1,400, 8s. 3d.; Porto Empedocle, 1,500, 9s., end December; Licata, 1,400, 10s., December 28; Bordeaux, 1,400, 6½ fr.; Chantenay, 2,300, 6½ fr.; 1,900, 6½ fr.; Rouen, 3,100, 5s.; 1,400, 5s. 9d.; 800, 6s. 1½d.; Calais, 500, 5s. 6d.; 1,300, 4s. 9d.; 2,000, 4s. 9d.; Stettin, 1,200, 5s. 9d.; Melilla, 4,000, 15s. 3d.; Venice, 3,000, 9s., 400, December 29; Brest, 1,400, 4s. 9d. and 5s. 3d., December 23; Bayonne, 8 fr., December; Alexandria, 3,600, 8s. coal, 8s. 9d. fuel; St. Servan, 900, 5s. 3d.; Honfleur, 700, 5s. 9d.; Savona, 1,400, 8s. 3d.; Leghorn, 1,400, 8s. 3d.

Llanelli to Dieppe, 950, 5s. 3d.; Hamburg, 1,100, 4s. 6d.; Calais, 1,500, 5s.; Boulogne, 1,500, 5s.

Fife port to Rouen, 1,500, 5s.; Kiel, 2,650, 4s. 9d.

Wales to nitrate port and home to United Kingdom-Continent, sail, 40s., fuel, December-January, loading this side; Mexillones and home to United Kingdom-Continent, sail, 40s. on the round; West Coast South America, 19s. 3d., January 15; West Coast South America and home to United Kingdom-Continent, sail, 40s.; Mexillones, sail, 17s.

Thames to Buenos Ayres, 19s. 6d., cement.

Partington to Oporto, 1,450, 8s., December.

Hull to Riga, 2,400, 5s. 10½d.; 1,500, 5s. 10½d.; Oporto, 1,000, 9s. 6d. coal, 14s. 6d. coke; Genoa, 4,200, 7s. 3d.; New Zealand, one port, 18s. 6d., coal, December; Rouen, 1,900, 5s.; Reval, 2,500, 5s. 6d.

Goole to Rouen, 1,500, 5s. 3d.

Emden to Bordeaux, 3,300, 4s. 7½d.; Port Said, 5,000, 7s. 6d.; Marseilles, 4,850, 8½ fr.

Mersey to Suez Canal, two places, 9s. 9d., December; Calcutta, 10s., salt, January.

Bo'ness to Libau, 1,550, 5s. 3d.

Port Talbot to Algiers, 2,800, 8 fr.; Genoa, 2,300, 7s. 9d.;

Bayonne, 1,600, 8 fr.; Bordeaux, 1,800, 6½ fr. coal, 7 fr. fuel; Stettin, 1,200, 5s. 9d.; Savona, 2,050, 7s. 3d.; Granville, 800, 5s. 3d.; Chantenay, 2,700, 5½ fr.; 2,700, 5 fr. Wear to Bordeaux, 2,700, 5s.; Genoa, 4,400, 7s. 3d., 500; 7s., 800; Naples, 3,800, 7s. 6d., 800; Torre Annunziata, 3,800, 7s. 6d., 800.

Blyth to Rensburg, 1,900, 4s. 9d.; Piræus, 3,000, 8s., 500; Syra, 3,000, 8s.; Alexandria, 4,900, 7s. 6d., 700.

Glasgow to River Plate, 13s. 9d., end December; Bordeaux, 2,200, 6 fr.

Immingham to Brest, 750, 6s. 3d.

Newport, Glasgow and Liverpool to Bombay, 20s.

Glasgow and Liverpool to Calcutta, 22s., December.

Fourth to St. Brieux, 950, 7s.; Riga, 2,000, 5s. 3d.; Aarhus, 950, 5s. 6d.

Hartlepool to Bordeaux, 3,200, 5s. 1½d.

Rotterdam to Chantenay, 2,550, 4s. 6d., December 22; Marseilles, 4,600, 8½ fr., 600, 8 fr., 900, 500 tons coke, 200 tons fuel; Leghorn, 4,800, 7s. 9d. coal, 8s. 6d. fuel, 9s. 9d. coke, December 20; Port Said, 5,200, 7s. 7½d.; Havre, 1,600, 4s. 3d., December 22; Honfleur, 2,600, 4s. 6d., December 22; 1,700, 4s. 6d., beginning of January; Venice, 4,000, 8s.; Malta, 5,300, 6s., December 28; Constantinople, 4,800, 8s. 6d., 500, December 18-20; St. Nazaire, 4,200, 4s. 4½d.; Bilbao, 3,800, 4s. 4½d.

Hamburg to Savannah and Wilmington, 5,500, 10s., kainit; Savannah, 4,600, 9s. 3d., kainit; Charleston, 6,500, 9s. 6d., kainit.

Homeward charters:—Port Pirie, 3,078 net, Antwerp, 29s., ore, February-March; Kurachee, 2,244 net, Continent, p.p., 14s. 9d., net terms, January-February; 2,433 net, Hull, 14s. 9d., January; Japan, 3,214 net, Singapore, 3 25 dols., January; 2,409 net, 3-50 dols., Jan.-Feb.; Bombay, 2,345 net, U.K.-Cont., 18s. 3d. one port, 18s. 9d. two ports, on d.w., December-January; 3,103 net, Japan, 12s. 6d. one port, 13s. two ports, December; 6,000, New York and Philadelphia, 20s. 6d., ore, January; Poti, 6,400, Antwerp, 9s. 9d., December; 5,400, 9s. 3d., December; 5,200, 9s. 6d., December; Odessa, 5,200 berthed, Rotterdam, 7s., spot; Nicolaieff, 4,600, London or Rotterdam 7s. 6d., Emden or Weser 7s. 9d., Hamburg 8s., with 3d. less barley, ppt.; Sulina, 6,000, Rotterdam 7s., Antwerp 7s. 3d., Hamburg 7s. 6d., with 3d. less barley, option 1,000 tons oats 1s. 6d. extra, ppt.; Bilbao, 3,000, Rotterdam, 4s. 4½d., ppt.; 3,300, Middlesbrough, 4s. 9d., ppt.; 1,750, Grangemouth, 4s. 10½d., ppt.; Alexandria, 1,979 net, Hull, 6s. 9d., early January; 2,572 net, London, 7s. 3d., option 2,500 tons general, spot; Porman, 4,000, West Hartlepool, 6s., December-January; 5,800, Rotterdam, 6s. 9d., f.t., ppt.; Huelva, 2,000, Garston, 7s. 6d., f.d., ppt.; Pensacola, 1,300 stds., 10 per cent., Mediterranean, four ports, 10s., January; 1,033 net, Huelva, Malaga, Carthagena, 11s., January; Buenos Ayres or La Plata, 5,000, 10 per cent., Rotterdam, 11s., London 11s. 6d., no reduction direct, December 20-January 20; 4,200, 10 per cent., United Kingdom-Continent, 14s. 9d. o.c., no reduction direct, oats, January 1-31; 5,000, 10 per cent., 12s. 8d. o.c., less 6d. direct, option New York 12s., ppt.; Gulf, 1,837 net, Bremen, 32s., cotton and 1,000 tons general, December; Sulina or Kustendje, 4,000, 10 per cent., Continent (Bordeaux to Hamburg, ex Rouen), 9s. one port, 3d. extra both ports loading, heavy grain, December 25-January 5; 20,000 qrs., 10 per cent., 400, 8s. 3d. n.c. or any, 8s. 9d. Hamburg, December; La Goulette, 5,400, Rotterdam, 7s. 6d., f.t., ppt.; time charter, Transatlantic trade, 4s. 1d., one round trip, delivery Hamburg, re-delivery United Kingdom-Continent, via United States; Newcastle, N.S.W., sail, 25s., Peru, option Callao 24s. 6d.; Portland, Or., sail, 30s., United Kingdom-Continent, January; Wilmington, about 27s. 6d., Liverpool, ppt.; Baltimore, 1s. 10½d., Avonmouth or Rotterdam; Venice, 3,600, West Hartlepool, 6s. 9d., ppt.; Villaricos, 4,300, max., Rotterdam, 5s. 6d., ppt.; Larnes, 4,400, Rotterdam, 5s. 9d., ppt.; Talante Channel, 3,500, Middlesbrough, 7s., ppt.; 3,100, ppt.; West Hartlepool, 6s. 9d., 600-600, 6s. 6d., 800-800, ppt.; Portland, 40,000 qrs., 10 per cent., Avonmouth 1s. 9d., Hull, Tyne or Leith, 1s. 10½d. one port, 2s. two ports, January; Gulf timber port, 1,100 stds., 10 per cent., Mediterranean, four ports, 10s., January; 1,150 stds., 10 per cent., Havre and Calais, 90s., option 600 tons round logs under deck at 20s. per std. extra, January; Australia, 6,500-7,000, United Kingdom-Continent, 31s., February; Novorossisk, 5,800, Antwerp or Rotterdam 7s., Emden or Weser 7s. 3d., Hamburg 7s. 6d., no reduction, barley, ppt.; 3,200, 10 per cent., 8s. 6d. n.c. or any, 9s. Hamburg, ppt.; Villa Constitución, not above, 4,500, 10 per cent., U.K.-Cont., 13s. 6d. o.c., less 6d., December; Santa Fe, 5,200, 10 per cent., Continent, p.p., 22s., no reduction direct, quebracho, February-March; Bahia-Blanca, 6,000, 10 per cent., United Kingdom-Continent, p.p., 15s. 6d. per ton oats, no reduction direct, end December; Sagunto, 6,900, Rotterdam 6s. 9d., f.t., ppt.; Vladivostok, 2,801 net, United Kingdom-Continent, 27s. 3d., January; Burmah, 3,759 net, United Kingdom-Continent, 23s. 9d. o.c., January-February; 2,867 net, 23s. 9d., o.c., January-February; Nicolaieff, Odessa or Novorossisk, 4,000, 10 per cent., 9s. 3d. n.c. or any, 9s. 9d. Hamburg, 10s. 3d. Rouen, January-February; San Lorenzo, not above; 5,400, 10 per cent., United Kingdom-Continent, 13s. 6d. o.c., less 6d., seed 3d. extra, option Santa Fe 1s. more; January 1, 3,800, 10 per cent., 15s. 7½d. o.c., less 6d., February 20-March 20; 6,000, 10 per cent., 13s. 6d. o.c., less 6d., half seed as wheat and balance 1s. extra, January 10-25; Rosario, not above, 5,500, 10 per cent., United Kingdom-Continent, 13s., o.c., no reduction direct, seed 1s. extra, option Villa Constitución only 3d. less, January 1-10; Parazuelos, 4,200, Tyne Dock, 7s. 6d., ppt.; Nicolaieff or Odessa, 4,600, Rotterdam 7s., Weser 7s. 3d., Hamburg 7s. 6d., with 3d. less barley, ppt.; Passages, 3,100, Rotterdam, 4s. 7½d., ppt.; Calcutta, 2,584 net, Barcelona, United Kingdom-Continent, Antwerp, Holland, two ports, 21s., jute basis net terms, January; Melbourne, sail, 30s., United Kingdom-Continent, end February; Puget Sound, sail, 47s. 6d., West Coast South America; nitrate ports, sail, 24s., United Kingdom-Continent, August-September; time charter, Transatlantic trade, about 4s. 2d., one round trip, delivery Karatzin, re-delivery China or Japan; time charter, United Kingdom-Continent and River Plate; three ports to five, 16s. 3d. net, January; Weston Point, 10s., Calcutta, salt.

At the Denaby Main Parish Church last week the Bishop of Sheffield conducted a confirmation service, and unveiled and dedicated a memorial mural tablet to the victims of the Cadeby disaster of July 9, 1912, on which is inscribed the names of the men who perished in that disaster.



## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages

## Abstracts of Contracts Open.

DURBAN (SOUTH AFRICA), JANUARY 7.—*Gas Electric Plant*.—Gas electric plant for that town. Specification obtained at the office of the borough electrical engineer, Municipal-buildings, Durban, on deposit of £1 ls. (returnable).

GLIN (IRELAND), DECEMBER 29.—About 100 tons of best 4 ft. Wigan, Whitehaven, or Orrel coals, screened and free from slack, for the board of management. A sum of £5 (returnable) must be lodged with the clerk with each tender. Endorsed tenders to Mr. John Conway, clerk to Board.

LONDON, JANUARY 1.—Coal and coke for the Wandsworth Borough Council. Forms at the Council House, East Hill, Wandsworth, S.W.

NEWPORT (MON.), DECEMBER 29.—House coal, steam coal and coke, for the Corporation. Forms from the Borough Engineer, Town Hall, Newport.

OXFORD, DECEMBER 31.—Best Moira screened cobbles, for the Corporation. Sealed tenders, endorsed "Tender for Coal," to Mr. R. Bacon, town clerk, Oxford.

SLOUGH, DECEMBER 24.—Best quality approved Tredegar large smokeless steam coal, for the Waterworks Department of the Slough Urban District Council. Sealed tenders, endorsed "Steam Coal," to Mr. W. W. Cooper, manager, Council Offices, Slough.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &amp;c.

ANTWERP, JANUARY 26.—*Cranes*.—Tenders are invited by the Municipal authorities of the above city for six electric cranes for the Bassin-Canal extension.\*

BIRKENHEAD, DECEMBER 22.—*Dee Tunnel and Pipe Line*.—Construction of a pipe line (consisting of about 10 miles of cast iron and steel pipes 25 in. in diameter, and about 3½ miles of cast iron and steel pipes 28 in. in diameter) extending from Connah's Quay, in the county of Flint, to Birkenhead, in the county of Chester, including a tunnel about 450 ft. long to be driven under compressed air beneath the estuary of the River Dee, for the Corporation (Alwen Supply). Specification of Sir Alexander Binnie, Son and Deacon, St. Stephen's House, Victoria Embankment, London, S.W., on payment of £5 (returnable).

CARLISLE, DECEMBER 31.—*Turbo-alternators*.—For the Corporation:—Two 1,250-kw. high-pressure turbo-alternators ("Impulse" type turbines); two sets of surface condensing plant for above turbo-alternators; two 600-kw. rotary converters; high-tension switchgear. Specification upon payment of a deposit of two guineas (returnable) from Mr. Fredk. W. Purse, Electricity Offices, Victoria Viaduct, Carlisle.

DARLINGTON, JANUARY 7.—*Coal Store Roof*.—Steel coal store roof, railway gantries, inspection chambers, &c., at the gasworks, for the Corporation. Specification on application to Mr. Frank P. Tarratt, gasworks engineer, at the Gasworks, on payment of £2 2s. (returnable).

GLEN (ORANGE FREE STATE, SOUTH AFRICA), JANUARY 7.—*Pumping Plant*.—Complete pumping plant required in connection with the irrigation scheme at Glen, Orange Free State.\*

LITHGOW (AUSTRALIA), JANUARY 12.—*Iron and Steel*.—Tenders are invited by the Commonwealth Department of Defence for the supply of iron and steel for the manufacture of rifles at Lithgow, New South Wales, during the period ended June 30, 1916. Specification from the manager, Small Arms Factory, Lithgow, New South Wales.\*

MALVERN, DECEMBER 23.—*Cast Iron Pipes*.—About 1,750 yards of 4 in. cast iron pipes and specials, for the Gas and Electricity Committee of the Urban District Council. Specification from the engineer, Mr. W. H. Johns, Council Offices, Church-street, Malvern.

NEW HUNSTANTON, DECEMBER 23.—*Gasholder Tank, &c.*.—A brick and cement gasholder tank, with inlet and outlet pipes, and other appendages; the manufacture and erection of a telescopic gasholder, for the Urban District Council. Forms obtained on payment of £1 ls. (returnable) from Messrs. E. H. and S. E. Stevenson, 38, Parliament-street, Westminster.

OTTAWA (CANADA), JANUARY 13.—*Steel Pipes*.—About 42 miles of welded steel pipe, 54 in. internal diameter; about 32 miles of welded steel pipe, 58 in. internal diameter; and about 11 miles welded steel pipe, 51 in. internal diameter, for the Corporation. Forms and specification from Sir Alex. Binnie, Son, and Deacon, St. Stephen's House, Victoria Embankment, London, S.W.

PRETORIA (SOUTH AFRICA), JANUARY 7.—*Pumping Plant*.—Tenders are invited by the Union Tender Board for the supply and erection of a pumping plant at Glen, Orange Free State. Specifications obtainable from the Director of Irrigation, P.O. Box 399, Pretoria, on deposit of the sum of £2 (returnable).

RHYL, DECEMBER 22.—*Cast Iron Standards, &c.*.—Cast iron standards and steam tubing for the Urban District Council. Particulars on application to the town surveyor, Mr. A. A. Goodall, Council Offices.

SALFORD, DECEMBER 22.—*Retorts*.—An installation of vertical retorts on the continuous system capable of carbonising 100 tons of coal per 24 hours, for the Gas Committee of the Corporation. Specifications obtained on deposit of £1 ls. (returnable) from Mr. William W. Woodward, engineer, Gas Offices, Bloom-street, Salford.

SHEFFIELD, JANUARY 6.—*Gas Mains*.—Supply of 30 in., 24 in. and 20 in. diameter steel gas mains for the Grimesthorpe Works, for the directors of the Sheffield United Gaslight Company. Specification upon application to the engineer, Mr. J. W. Morrison, at the company's offices, Commercial-street, Sheffield.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 75, Basinghall-street, E.C.

SOFIA (BULGARIA), JANUARY 2.—*Wagons*.—Tenders are invited by the Bulgarian Directorate-General of Railways and Ports for the supply of 200 coal wagons of 20 metric tons capacity each. Specifications from the General Direction der Eisenbahnen und Häfen, Sofia, on payment of 30 fr. (24s.)\*

STAVANGER (NORWAY), JANUARY 11.—*Gasometer*.—Tenders are invited by the Stavanger Gasworks for a gasometer of 12,000 cubic metres capacity. Tenders to "Gasværkets Kontor," Stavanger.\*

TUAM (IRELAND), DECEMBER 27.—*Oil Engine, &c.*.—An oil engine and pump at the Tuam Waterworks Pumping Station, for the Rural District Council. Specifications from Prof. Rishworth, Guthard, Galway, on payment of 10s. 6d.

WARSAW (RUSSIA), FEBRUARY 16.—*Engines, &c.*.—Two vertical compound engines with plunger, piston, or differential pumps, or of two turbines with centrifugal or turbo-pumps, with travelling crane and accessories, for the Municipality. Specifications, &c., from the Comité de la Canalisation et d'Alimentation d'Eau, Hotel de Ville, Varsovie, on payment of five roubles.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 75, Basinghall-street, E.C.

## COAL, IRON AND ENGINEERING COMPANIES.

Albion Iron and Steel Company (Tipton) Limited.—This private company has been registered, with a capital of £22,000 in £1 shares (1,000 preference), to carry on the business indicated by the title. Signatories: O. C. Parsons and George S. Parsons, both of 3, Dudley-port, Tipton.

Anglo-French (Transvaal) Navigation Coal Estates Limited.—An interim dividend of 3½ per cent. (9d. per share) has been declared on account of the 7 per cent. cumulative preference shares.

Berry and Hartley Limited.—This private company has been registered, with a capital of £600 in £1 shares, to carry on all operations connected with the trade of ironfounders, &c. First directors: O. Ashworth and William W. Hall. Registered office, Railway Foundry, Fittington, near Bury.

Butcher (W. and S.) Limited.—This private company has been registered, with a capital of £50,000 in £1 shares, to carry on the business of manufacturers of and dealers in iron, steel and other kinds of metal. Registered office: 41, Eyre-street, Sheffield.

Cleveland Bridge and Engineering Company Limited.—For the year to September 30 last gross profit is £13,610, which, after payment of interest on debentures and making ample provision for depreciation, leaves a net balance of £27,745, which, added to £8,081 brought forward, makes £10,826. It is recommended that this balance be applied in payment of a dividend of 5 per cent. on the preference shares for the year, less tax, £2,320, directors' fees, £750, and carrying to next year's account £7,756. It has not been considered advisable to pay any dividend on the ordinary shares.

Gormack, Allin and Hardman Limited.—This private company has been registered, with a capital of £600 in £1 shares, to carry on the business of consulting engineers, &c.; also to enter into an agreement with Henry P. Allin. Registered office, 31, Old Queen-street, Westminster, S.W.

Dutil-Smith, McMillan and Co. Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to acquire from Dutil-Smith, McMillan and Co. the business formerly carried on at 29, Great St. Helens, E.C. (their London branch), and to carry on the business of merchants and dealers in railway and other rolling stock, and in iron and steel castings, &c.; also to enter into an agreement. First directors: N. M. Rodkinson, Reginald H. Lilley and C. Quay. Registered office, 1, Central-buildings, Tophill-street, Westminster, S.W.

Evans (Richard) and Co. Limited.—Interim dividend of 3 per cent. actual, free of tax, on the ordinary shares.

Haggie (R. Hood) and Son Limited.—The directors have decided to recommend, in addition to the usual dividend on the preference shares, that a dividend at the rate of 10 per cent. per annum should be paid on the ordinary shares for the year to October 31 last, together with a bonus of 1s. per share on the ordinary shares; that £10,000 should be transferred to the reserve account, making this £60,000; also, that £6,000 should be written off capital expenditure account for extensions of buildings and machinery. The sum to be carried forward to next year is £11,793 0s. 9d.

Hall and Sons (Birmingham) Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to acquire and carry on the business of iron, steel and general merchants and engineers now carried on by Isaiah Hall at Birmingham and elsewhere, under the style of "Hall and Sons." Signatories: Harry P. Manners, Norris Hill, Ashby-de-la-Zouch; and J. Hall, 66, Hagley-road, Edgbaston, Birmingham.

Ingersoll and Company Limited.—The directors have declared a dividend of 3 per cent. on the preferred stock.

Kysltim Corporation Limited.—Interim dividend of 2s. per share, free of income tax.

Manor-Powis Coal Company Limited.—The directors recommend a dividend of 6 per cent. on the preference shares for the year ended October 31 last.

Midas Steel and Engineering Company Limited.—This private company has been registered, with a capital of £1,000 in £1 shares, to acquire the business of engineers and ironfounders formerly carried on at Leeds-road, Attercliffe, Sheffield, under the style of "Worrall, Smith and Akeroyd"; and to carry on the business indicated by the title. First directors, Henry Smith, S. Akeroyd, and P. R. Hailwood. Registered office, Leeds-road, Attercliffe, Sheffield.

Natal Navigation Collieries and Estate Company Limited.—A dividend of 3½ per cent. has been declared for the half-year ending December 31.

National Explosives Company Limited.—The report for the year ended October 31 last states that a profit of £13,140 has been earned after allowing for the debenture interest amounting to £2,363. After deducting from the before-mentioned profit the amount of £8,564, which stood to the debit of profit and loss account at October 31, 1912, there remains a sum of £4,576 standing to the credit of profit and

loss. The directors propose to write off the expenses in connection with the issue of debentures, amounting to £3,194, and to carry the balance then remaining of £1,382 to a reserve account against renewals and depreciation of plant.

New Duvant Colliery Company Limited.—This private company has been registered with a capital of £25,000 in £1 shares, to carry on the business of colliery proprietors, &c., &c.; also to enter into an agreement with the Duvant Penlan Collieries Limited. First directors: George Rowe, D. J. Evans, Henry Folland and James Webber. Registered office: Atlantic-buildings, Gloucester-place, Swansea.

North Wales Iron and Manganese Company Limited.—The accounts for the year ended September 30 show a loss of £228. The balance at credit is now £3,127.

Phoenix Bridge and Ironworks Company Limited.—Interim dividend of 1½ per cent.

Read Conveyor Company Limited.—This private company has been registered, with a capital of £2,000 in £1 shares, to carry on the business of coal merchants and colliery agents, and to undertake the loading, discharging and conveying of coal, ore, minerals and other substances; also to enter into an agreement with W. G. Read. Signatories: A. Read, 29, St. Andrew's-road, Birkenhead; and William George Read, Whiston-fields, Prescot, Lancs.

Redpath, Brown and Co. Limited.—The directors report that, after deducting all trade charges, depreciation of plant and buildings, and making allowances for the realisation of the accounts, there remains a profit for the twelve months ending October 31 last of £53,836 6s. 7d., which, added to the balance carried forward from last year, £7,051 3s. 8d., makes a total available balance of £60,887 10s. 3d. The directors recommend that this sum be dealt with as follows:—Reserve fund (general), £25,000 (making this £40,000); 6 per cent. dividend on preference shares, less tax, £8,757 10s., paid on May 15 and November 11, 1913; 8 per cent. dividend on ordinary shares, free of tax, £10,000 (of which 4 per cent. was paid as interim dividend on June 27, 1913); 6 per cent. bonus on ordinary shares, free of tax, £7,500; leaving a balance of £9,630 0s. 3d. to be carried forward, subject to directors' fees.

Rhymney Iron Company Limited.—The directors have decided to recommend an interim dividend at the rate of 5 per cent. per annum (2s. 6d. per share).

Rishton (Henry) Limited.—This private company has been registered, with a capital of £5,000 in £1 shares, to acquire the business of ironmoulders and ironfounders carried on by F. Rishton, Edward Rishton and A. Rishton, at Kendal, under the style of "Henry Rishton." Registered office, Stricklandgate, Kendal.

South Staffordshire Mond Gas (Power and Heating) Company.—The London City and Midland Bank Limited, and Messrs. Hoare, 37, Fleet-street, E.C., have been authorised to receive applications for £100,000 5 per cent. permanent debenture stock at 95 per cent. and 7,500 6 per cent. cumulative preference shares of £10 each at par in the above company.

Stephenson (Robert) and Co. Limited.—Sir William B. Peat, receiver and manager, has addressed a letter to the debenture-stock holders in which he states that he has been directed by the court to convene meetings to consider the terms of a provisional agreement entered into for the sale of the Darlington works. For the current year it is estimated that the profit from the Darlington works will amount to about £25,000, this being exclusive of any rent or interest receivable from Palmer's Shipbuilding and Iron Company Limited in respect of the Hebburn works. In order to close the receivership, it is proposed that a company be formed, with an authorised capital of £275,000, divided into ordinary shares of £1 each, to take over the Darlington works and the other unrealised assets. The purchase consideration receivable from the new company will permit of a distribution among the 4 per cent. debenture-stock holders of 11 fully-paid shares of £1 each in the new company for each £10 of debenture stock held in discharge of principal and interest. The Industrial and General Trust Limited, who are holders of a large amount of 4 per cent. debenture stock, have undertaken to form the new company and to procure for it advances up to £100,000, in order to discharge liabilities and to provide it with about £20,000 working capital. At the meeting of the debenture-stock holders on Tuesday the above new scheme was unanimously agreed to.

West Flandria Import and Export Company Limited.—This company has been registered, with a capital of £88,000 (8,000 ordinary shares of £10 each, and 8,000 founders' shares of £1 each), to carry on the business of importers and exporters of and dealers in coal and coal products, &c. First directors: Rene Lourvaeghe-Lamaire, Rue de Verger, Thourout, Belgium; Michel Cloet, 29, Rue de la Gare, Dixmude, Belgium; A. Cloet, 5, Rue de Woumen, Dixmude, Belgium; G. Blonde, 14, Kaar Straat, Nieupoort, Belgium; P. Van Haecke, Bempart du Bassin, Bruges, Belgium; and Jules Van Haecke, Quai Long 45, Bruges, Belgium.

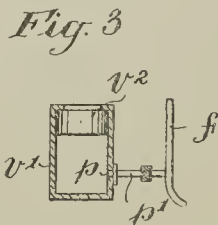
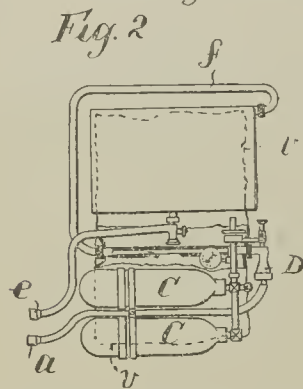
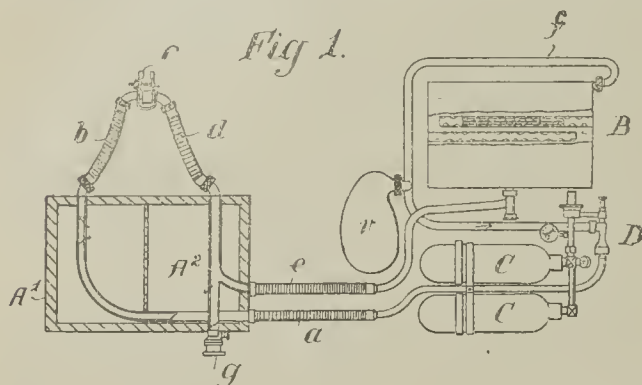
Withbank Colliery Limited.—The directors report for the year ended August 31 that the output reached a total of 756,631½ tons, being an increase of 10,008 tons upon that of the preceding year. The appropriation account for the 12 months may be summarised as follows: Balance brought forward from previous year, £41,139; profit realised during the year, £73,324; rents, interest, and sundry revenue, £1,115; net amount received in connection with the company's mineral rights on Blesboklaagte, £1,016; total, £116,594. Less audit fees for previous year, £263; royalty paid to Government for previous year, £2,769; amount written off for capital expenditure, £2,165; sundry items, £39; dividends Nos. 16 and 17 of 15 per cent. and 10 per cent. declared during the past year £52,500; directors extra remuneration, £1,500; leaving a balance to be carried forward of £57,358.

The London Gazette announces that at the expiration of three months, unless cause to the contrary be shown, the following, amongst other companies, will be struck off the register and dissolved:—Ackworth Coal Syndicate Limited, Davies Patent Boiler Limited, Gellihir Colliery Company Limited, Greymouth-Point Elizabeth Railway and Coal Company Limited, Grimshaw Quarries Limited, Hendreforgan Anthracite Colliery Company Limited, Kilgaty Colliery Company Limited, Middleburg Central Collieries Syndicate Limited, Plasycod Collieries Company Limited, Pontardawe Collieries Company Limited, Rotherham Silkstone Collieries Limited, and Southern Coal Company of N.S.W. Limited.



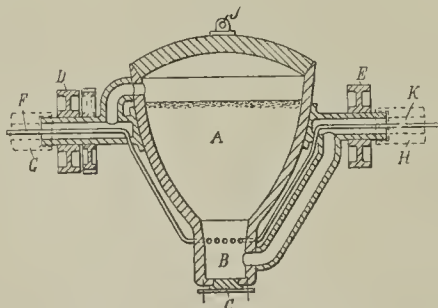
## LISTS OF PATENT SPECIFICATIONS RECENTLY ACCEPTED.

1915). *Improvements in Breathing Apparatus*. H. C. JENKINS, of Meco Works, Maccfields, Sheffield.—According to the invention, on the suction side of the injector, and between same and the regenerator, a container or vessel is inserted in or connected to the circuit, which serves for equalising any sudden strong demand for air or gas on the suction side of the apparatus so that at this point there will always occur an equal or positive pressure as compared with the atmospheric pressure. The said equalising container or vessel may be an elastic or flexible bag, belt, or the like



of any airtight material which can be effected by atmospheric pressure, or it may take the form of a cylinder or vessel fitted with an airtight piston which can be operated by the atmospheric pressure or by the pressure of a spring or weight or other device. The pressure equaliser may be inserted in the air passages themselves or may be attached thereto by a suitable connection. The accompanying drawing illustrates by way of example the application of the invention to a typical form of breathing apparatus, this being shown partly in section in fig. 1, whilst fig. 2 illustrates a modification, and fig. 3 illustrates a further modification. (Three claims.)

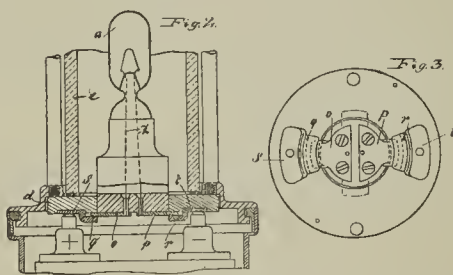
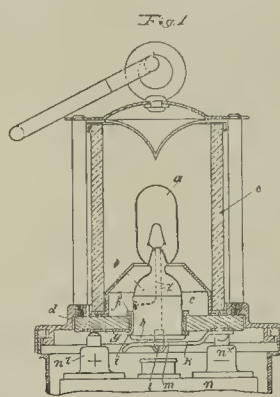
3673 (1913) *Process and Apparatus for the Gasification of Fragmentary, Gritty or Powdery Fuels.* F. C. W. Timm, of 86, Wandsbecker Chaussee, Hamburg 23, Germany.—Relates to a process for gasifying fine fuels, such as breeze, slack coal, slime deposits of collieries, sawdust, peatdust and the like. In the present process it is a question of an intermittent particular method of working the gasification with air travelling in a downward direction, so that first, all the as yet ungasified material remains at rest, for it has not got to slip down as in a continuously worked gas producer with upward or downward draught. Thereby the regular bedding of the charge is maintained during the whole gasification period, the fire advancing regularly at all points of the same cross-section, and the gas is consequently comparatively poor in carbon dioxide. Further, a very great air pressure may be employed, which results in an accelerated gasification, and there is no danger of the fine material being thrown out. Owing to the adoption of a cross-section for the material to



be gasified considerably greater than that for the ungasified residue remaining after stopping the gasification, the expense of each filling up necessary for a periodic working is reduced on account of the comparatively high proportion which the gasified material bears to the whole contents of the gas generator. The drawing illustrates, by way of example, the construction of a generator in accordance with the process described. For working this gas generator it is filled with fuel which is kindled at its upper surface, then the cover is put on and air blown in through the pipe G, or gas exhausted through the pipe H. The fire then gradually advances downwards from the upper surface. But gasification is stopped by closing the suitable conduits as soon as the fire has arrived approximately in the neighbourhood of the lower constriction. Thereupon the cover is lifted off and the residue emptied out of the gas generator by tipping. (Four claims.)

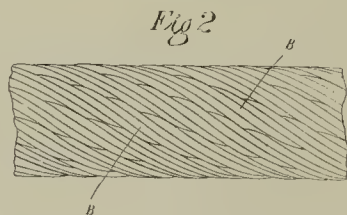
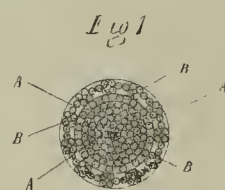
6700 (1913). *Improvements in or relating to Miners' Electric Safety Lamps.* P. Wolf, of Zwickau, in Saxony, Germany.—The object of this invention is to provide improved means for fastening the lamp bulbs, such fastening enabling the bulb to be fixed and removed in a convenient manner without removing any part of the lamp except the battery holder, and consists in a novel combination for this purpose. The invention is illustrated in the accompanying drawing, which shows two forms of construction and in which fig. 1 is a central vertical section of the upper part of the lamp according to one construction; fig. 2 is a similar section of the lamp according to the second construction; fig. 3 is a bottom plan view of the bulb holder according to the first invention; and fig. 4 is a side view of the lamp bulb, which has a foot *b* provided with a glass insulating plate *d* carries the glass

cylinder *e* of the lamp and has a central aperture which is provided with a metal lining *f* and through which the lamp can pass. The lining is in contact with a metal plate *g* let into the plate *d*. The lamp is inserted from below into the socket formed by the said aperture and its metal lining, the upward movement of the bulb being limited by a flange *h* at the bottom of the sleeve *c*, and a washer or packing ring *i* being inserted between the flange *h* and the plate *d* to make a tight joint. The lamp is held up in its socket by means of a spring *k*, which is pivoted to the underside of the plate *d* so that it can be turned aside for inserting the lamp bulb. The spring *k* is provided with a depression *l* for engagement with a projecting plug *m* to which one of the leading-in wires *Z* is connected. The spring *k* does not make contact with the sleeve *f*, but is in contact with the terminal *n*<sup>x</sup> of the battery *n* when the plate is in position in



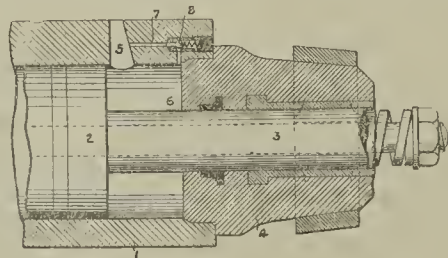
the lamp as shown in fig. 1. The other leading-in wire  $z$  is joined to the sleeve  $c$ , and is accordingly electrically connected by the socket lining  $f$  to the plate  $g$ , which rests on the terminal  $n$  of the battery. In the construction shown in figs. 2 and 3 the leading-in wires  $z$  are joined at the foot of the bulb, to contact plates  $o$  and  $p$  respectively, which are fixed to the foot and project somewhat beyond the circumference thereof. These plates  $o$  and  $p$  form stops limiting the upward movement of the bulb, and when the bulb has been inserted it is rotated so that the plates  $o$  and  $p$  are engaged with metal hooks  $q$  and  $r$  respectively, joined to contact plates  $s$  and  $t$  fixed to the underside of the insulating plate  $d$ . When the insulating plate  $d$  is in position, as shown in fig. 2, the plates  $s$  and  $t$  rest on the terminals of the battery. (Three claims.)

6909 (1913). *Improved Construction of Wire Rope*. T. C. Batchelor, Latch and Batchelor Limited, Hay Mills, near Birmingham.—A locked coil wire rope is covered with one or more concentric layers of flattened or other strands of wire, the flattened or other strands each comprising a



plurality of wires twisted together and being coiled about the locked-wire rope, with the coils in the same direction as the outer-coiled layer of wire of the locked-coil rope, or opposite thereto. Fig. 1 is a section and fig. 2 side elevation of a locked-coil wire rope A surrounded by flattened strands B. (One claim.)

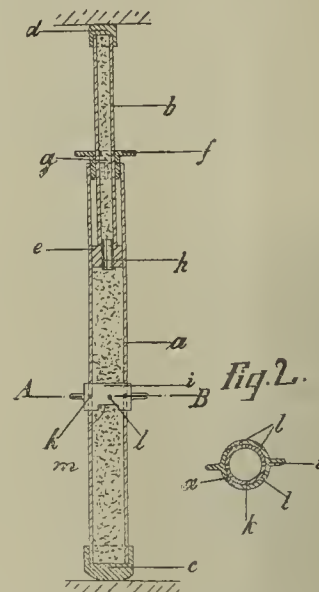
9233 (1913). *Improvements in Fluid-actuated Percussive Coal-cutters and the like* W. Mauss, Commercial Exchange-buildings, Main-street, Johannesburg, Transvaal. — Has reference to fluid-actuated percussive coal-cutters and the like, and is illustrated in the accompanying drawing, which shows a longitudinal section of the fore part of such a machine. The invention employs such a valve 8 controlling passage 7, in conjunction with a spring-controlled movable



head 4 or like means whereby, upon the fluid in the cushioning chamber reaching the pressure necessary to cushion the piston, it forces out said head and thereby escapes to atmosphere. Rebound of the piston is thus prevented; but after escape of the fluid and reseating of the head, further fluid flows in relatively slowly through the by-pass 7 and returns the piston at reduced speed. (Two claims.)

17885 (1913). *Improvements in Adjustable Mine Props*. C. Treinies, of Mecklinghofen, Westphalia, Germany.—Relates

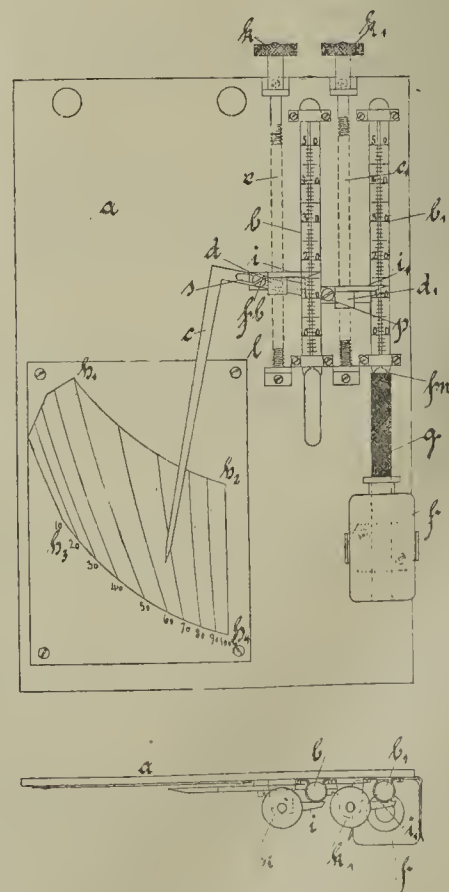
to a mine prop of the kind composed of telescopic tubes which are supported relative to one another by a filling such as sand or the like, means being provided for discharging sand from the lower tube for shortening the effective length of the prop while *in situ*. According to the invention the



upper tube has at its lower end, which is plugged, a guide block by means of which it is guided within the lower tube, a split flanged conical socket being arranged in the upper end of the lower tube so as to form a second guide for the upper one. Fig. 1 represents a longitudinal section of the prop; and fig. 2 a cross-section of the same on the line A—B of fig. 1. (One claim.)

28791 (1912). *Improvements in the Manufacture of Coke.* J. Moeller, of 8, Union-court, London, E.C., and H. C. Woltereck, of Queen Anne's-chambers, Westminster, S.W. —Relates to the treatment of coal, coaldust, slack and the like in suitable retorts which are heated from the outside, and where gas and other volatile products are driven off by the heat generated from the outside. It has been found that coal, coaldust, slack, lignite and other mineralised carbonaceous material, when treated in the retorts with superheated steam at a temperature of 400 to 600 degrees Cent., is coked very rapidly comparative to the present methods, and a larger amount of the volatile products is obtained. The temperature of the steam to be used and the duration of the process depends upon the quality of the coal or other material to be treated. It is equally dependent upon the heat of the steam employed and the coal used to obtain a coke of a softer or harder quality. The superheated steam is employed at a low pressure, i.e., a maximum pressure of 4 lb. to 5 lb., or merely sufficient to allow the steam to pass through the superheater and apparatus. In case of the coal being in form of a fine powder, the same is advantageously moistened with 10 per cent. of water, in which case it may be rammed into the coking space and will produce a coke of a superior quality. (One claim.)

288\*8 (1912). *Hygrometers or Instruments for Ascertaining the Degree of Moisture contained in the Air.* F Hellige, of Freiburg - im - Breisgau, Germany. — The improvement applies more particularly to that kind in which a reading of the degree of humidity is obtained mechanically with the aid of a system of links connecting the motion of the wet bulb and dry bulb thermometer indices in such a manner as to furnish an immediate reading of the humidity on a scale. The instrument consists in the usual way of two thermometers mounted side by side upon a base *a* made of



metal, glass, or wood, as shown in the drawing. One of these thermometers  $b$ , the dry bulb thermometer, registers the temperature of the surrounding air;  $b_1$  is the wet bulb thermometer and has its mercury bulb  $f w$  placed in contact with a wick  $g$  of suitable material. This wick dips into the water container  $f$  and thereby supplies the mercury bulb  $f w$  continuously with moisture. The thermometer  $b_1$  is thus in a sense surrounded by an atmosphere saturated with water vapour and will record a lower temperature



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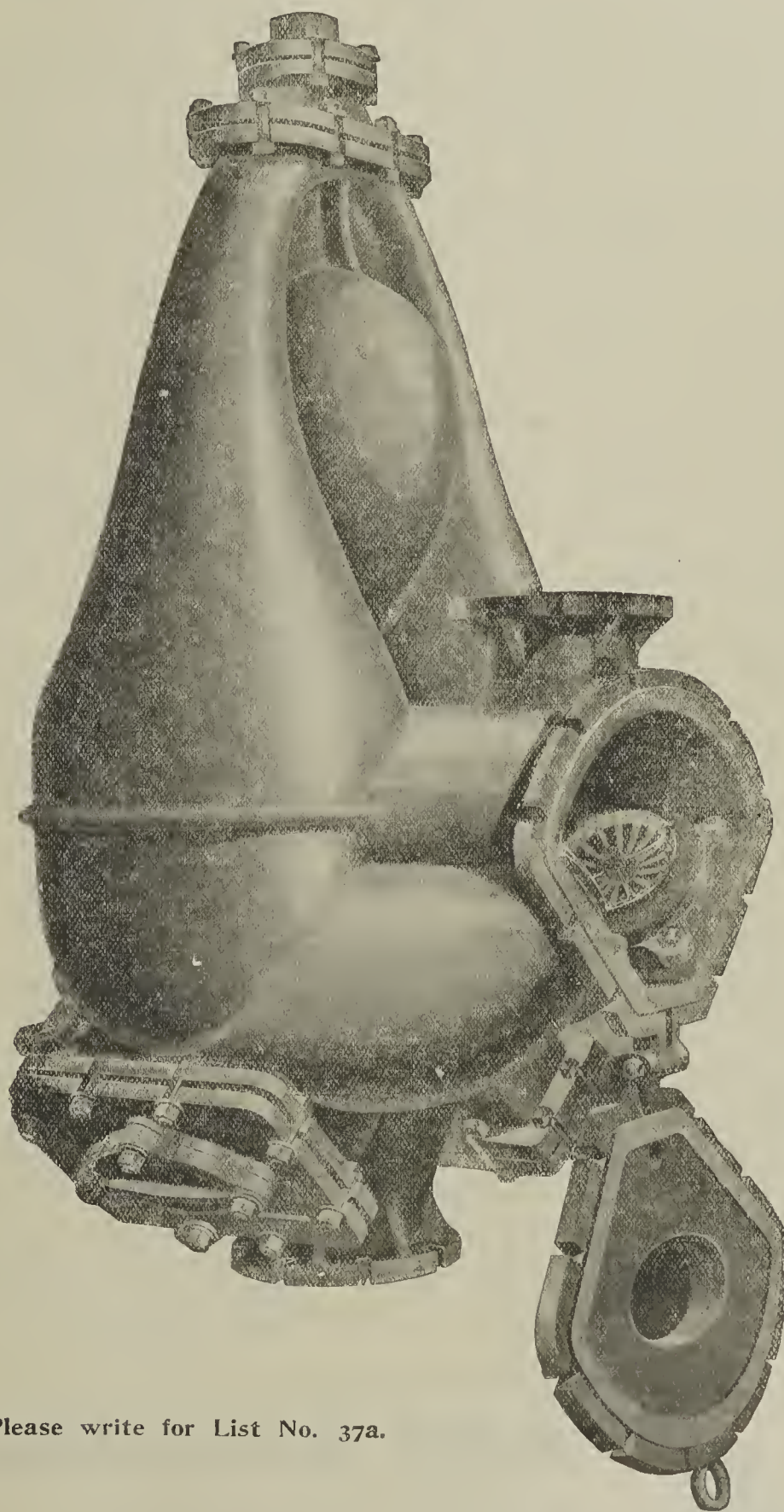
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the thermometer  $b$ . Any difference which subsists in readings of the two thermometers supplies an immediate criterion of the relative humidity of the air at the time being. Readings of the degree of humidity of the air are obtained mechanically by a pointer constrained to move in the following manner:  $e$  and  $e_1$  are spindles capable of turning in bearings attached to the base plate and mounted parallel to the thermometers. A portion of these spindles is provided with a screw thread  $d, d_1$ , which passes through a nut bearing an index  $i, i_1$ . When the indices are set to the menisci of the threads of mercury in the thermometers they displace a system of links consisting of a pointer  $c$  and a broad link with two points of rotation on the index pieces. The setting of the indices is effected by simply turning the milled heads  $k, k_1$ . At the end away from the pointer  $c$  the broad link is pivoted about a stud  $p$ , whereas at  $s$  it is provided with a longitudinal slot, through which passes the stud  $f, b$ , the pointer  $c$  being thus constrained to follow the movements of the screw nuts  $d, d_1$ , with their indices  $i, i_1$ . Whenever the indices  $i, i_1$  are set to the temperatures recorded by the thermometers  $b, b_1$ , the end of the pointer  $c$  is thus made to sweep over a fixed system of curves  $h_1, h_2, h_3, h_4$  inscribed on the base  $a$  at the side of the thermometers. These curves are determined empirically or by comparison with physical standards and indicate the relative humidity of the air. (One claim.)

**Miners' Relief.**—The annual meetings of the Blantyre and Udston accident funds were held at Glasgow on the 10th inst., Lord Provost Stevenson presiding. The report of the Blantyre fund showed that the amount of subscriptions after the accident in October 1877 was £48,246 14s. 3d., and the amount of assets in the hands of the executive committee, valued at market prices on October 22, was £7,500 2s. 8d. The number of recipients on the roll at the inception of the fund was 440, and at October 22 last 94. The ages of those on the roll run from 39 to 81. The Lord Provost moved the adoption of the report. He said it might seem rather strange that an accident which occurred 36 years ago should still be the subject of meetings of a committee such as that. The committee had had before it the suggestion that it might be desirable to wind up the fund and hand over the beneficiaries either to an insurance company or some public authority. They were of opinion that the time had not yet come to do so, but they would have the question before them in the present year, and might probably report next year as to the possibility of an arrangement. The main reason for the change was that the cost of administration, as a fund of that sort grew older, became out of proportion to the money expended in relief. In this case it was 22 per cent. With the number of beneficiaries on the fund, the question of handing them over was a serious one. Col. King seconded, and the report was adopted. The meeting of the Udston fund was held immediately after. The report showed that the amount of subscriptions after the accident in May 1887 was £11,592 3s. 1d., and the assets, valued at May 28 last, were £5,860 7s. 1d. The number of recipients at the inception of the fund was 156, which was now reduced to 10. The Lord Provost, moving the adoption of the report, said that what had been said in connection with the Blantyre fund practically covered this. With the number of beneficiaries reduced to 10, the possibility of the fund being closed was much nearer than in the other case, and it was even more desirable, since the cost of administration was 55 per cent. of the benefits conferred. Mr. Neil Robson seconded, and the report was adopted.—The annual meeting of the trustees of the Oaks (Barnsley) Colliery explosion fund was held at Barnsley on the 11th inst. The fund was established in 1866, when 361 lives were lost by an explosion at the Oaks Colliery. Mr. G. B. Lancaster (secretary) presented the annual report. There are now on the fund 57 dependants, and £953 14s. was paid during the year. Five recipients had died, and two new applicants had been admitted. The income for the year had been £810, and the expenditure £1,012 14s. 11d. The balance of capital was £27,000. The total payments up to date amounted to £68,802 16s. 5d., and the amount originally raised for the fund was £48,750 1s. The total interest received from investments is £47,465 3s. 4d. The report and accounts were adopted.

## NEW PATENTS CONNECTED WITH THE COAL AND IRON TRADES.

### Applications for Patents.

28218. Centrifugal pumps. H. B. Watson and T. C. Billetope.  
28245. Direct recovery of ammonia from the products of the destructive distillation of coal or the like. Carl Still (Firm of).  
28247. Treatment of shale oils. W. McMullen.  
28251. Toothed gear-wheels. British Insulated and Helsby Cables Limited and J. Tennant.  
28255. Heating materials in gaseous atmospheres. C. D. McCourt and P. St. G. Kirke.  
28309. Shaker conveyor for use in mines. V. Bramall.  
28336. Refuse destructor and like furnaces. A. B. Scorer and Meldrums Limited.  
28338. Accumulators. H. W. van Raden.  
28345. Melting furnaces and apparatus for stirring or agitating molten material therein. I. Hall.  
28389. Purifying apparatus for generator gas, water gas, and the like. Berlin-Anhaltische Maschinenbau Akt.-Ges.  
28390. Reducing and oxidising apparatus for generating hydrogen from iron ore and steam. Berlin-Anhaltische Maschinenbau Akt.-Ges.  
28392. Portable forges. D. Morrison.  
28406. Means for extracting broken drills and the like. G. M. O'Rourke.  
28440. Production of pure iron, pure iron alloys, and phosphorised pure iron and alloys. R. B. Carnahan, jun.  
28446. Gas producers. P. A. J. Cousin.  
28450. Manufacture of tin andterne plates and other like metal-coated plates or sheets, and the machinery or apparatus employed in the said manufacture. R. B. Thomas, H. S. Thomas, and W. R. Davies.  
28481. Weighing-attachment for cranes and other lifting or pulling apparatus. J. Henery.  
28508. Safety apparatus applicable to mine cages and the like. W. Lott and D. Davies.  
28519. Valves for pneumatic hammers, pneumatic hammer drills, percussive drills, direct-acting pumps, and engines. A. W. Daw and Z. W. Daw.  
28543. Manufacture of pipes. H. Wade. (Stephan Frölich and Klüpfel, Germany.)  
28551. Apparatus for raising coal and other material, unloading ships, excavating, and similar purposes. D. Donaldson.  
28554. Water-pressure, air leakage, and air-pressure indicators. C. W. Thompson.  
28558. Electrical accumulators or secondary batteries. H. W. van Raden.  
28566. Steelyard weighing-apparatus. W. and T. Avery Limited, F. C. G. Hill, and W. Munroe.  
28571. Method of working pure iron. R. B. Carnahan, jun.  
21574. Tell-tale appliances for indicating signals from pit bottoms or pit heads and the like. R. B. Brodie and A. Alison.  
28579. Drying-apparatus for casting moulds. C. A. Aahman.  
28593. Hot working iron and iron alloys. R. B. Carnahan, jun.  
28606. Manufacture of iron. R. B. Carnahan, jun.  
28607. Manufacture of iron. R. B. Carnahan, jun.  
28634. Electric fuses for blasting purposes. Bickford-Smith and Co. Limited and W. N. Bickford-Smith.  
28638. Means for introducing goods into annealing and other furnaces and for removing same therefrom. A. Smallwood and F. V. Hadley.  
28643. Winches. Clarke, Chapman and Co. Limited and W. A. Woodeson.  
28682. Materials for purifying producer and like gas. J. M. Wallwyn and F. S. Sinnatt.  
28735. Process of and apparatus for obtaining ammonia from solid fuels. K. P. Sachs.  
28742. Air grates for gas-producers. A. W. Dixon and W. H. Pearson.  
28751. Hoisting apparatus. N. Savon.  
28798. Pit-prop drawing or hauling apparatus. J. Davis.  
28817. Lining pits, shafts, and the like. F. E. Walker.

### Complete Specifications Accepted.

To be published on January 1, 1914.

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9654. Fractional distillation. Rosanoff.  
20348. Treatment of refractory materials and apparatus therefor. Weintraub and Rush.  
23049. Construction of turbine and like rotors. Parsons, Carnegie, and Cook.  
27968. Purification or extraction of iron. Benjamin.  
28115. Method of and means for screening or grading and conveying coal, coke, and other materials. Benson and Head, Wrightson, and Co.  
28116. Pneumatic stamps for crushing ore and the like. Holman and Holman.

28328. Plant or apparatus for conveying and tipping mine or quarry or like refuse. Chambers.  
28385. Drills for rock drilling. Glendinning, Clayden and Stephens.  
28395. Apparatus for preventing incrustation in steam generators and the like. Coke-oven Machinery Company (Herweg).  
28416. Envelopes and the like for explosive charges. Boecker.  
28936. Gas producers. Franks and Sanders.  
29075. Turbine rotors. Hutson and Ford.  
29086. Machines for testing the lubricating properties of oils and greases. Hislop.  
29414. Mounting of a wheel upon its axle. Siffken.  
29537. Method for the separation, and instrument for the separation, detection and estimation of elements in alloys and other chemical substances. Fletcher.  
29798. Registering or counting mechanism. W. and T. Avery Limited and Johnson.

1913.

1518. Instruments for indicating the velocity of the wind or air-currents. Munro and Rooker.  
1783. Gas producers. Home.  
1849. Furnaces for roasting ores. De Spirlet.  
3453. Pumping systems. Rosencrans.  
4451. Coal-washing plant. Thomson.  
5624. Hydraulic pumps. Mistral and Broche.  
6201. Chain belts for the transmission of power. Brooks and Holt.  
6408. Portable electric miners' lamps. Wolf.  
6639. Furnaces for pulverous fuel. Von Porat.  
7413. Process of sinking shafts. Schneiders.  
7643. Artificial briquette fuel. Eaton.  
7897. Governing mechanism for elastic fluid turbines. Warwick Machinery Company (1908). (General Electric Company.)  
9323. Trucks or the like. Godfrey.  
11471. Concentration of ores. Greenway and Lowry.  
11814. Device whereby pins of shackles and the like are made secure. James.  
12164. Brick trucks. Von Horstig.  
12781. Bricks and the like. Priestnall.  
13129. High-speed air compressor. Lang.  
15344. Conveyors, more particularly intended for conveying coils of wire. Fried. Krupp Akt.-Ges.  
17431. Centrifugal compressors. Mellersh-Jackson (Ingersoll Rand Company).  
23703. Construction of gear wheel. Parsons, Carnegie and Cook.

### Complete Specifications open to Public Inspection before Acceptance.

1913.

22522. Boring and drilling apparatus. Petit.  
24850. Electric furnaces. Rennerfelt.  
26652. Chain conveyors. Schmidt.  
27536. Process for briquetting iron ore and the like. Crusius.

## GOVERNMENT PUBLICATIONS.

\*\* Any of the following publications may be obtained on application to this office at the price named post free.

- Reports of Tax Cases, Vol. 6, Part 4, 7d.  
EXPLOSIVES IN COAL MINES ORDER, 25/11/13 (No. 1217), 1½d.  
Scotch Educational Circular C 363, re Examinations in Science and Art, 1914, 1½d.  
MINES AND QUARRIES: Form No. 29, 1d.  
Trade of Senggora, Siam, 1912-13, 3d.  
Local Government Report, 1912-13, Part 3, Public Health, &c., 2s. 10d.

## PUBLICATIONS RECEIVED.

- MINE SURVEYING. By Edward B. Durham. London and New York: The McGraw Hill Book Company. Price, 15s. net.  
"The Engineering Magazine" (Vol. 46, No. 3, December, price 25 cents); "Le Mois Scientifique et Industriel" (No. 171); "The Concrete Institute" Transactions and Notes (Vol. 5, Part 1); "The Mining Magazine" (Vol. 9, No. 6), December, price 1s.; "The Queensland Government Mining Journal" (Vol. 14, No. 161), October; "Transactions of the Institution of Engineers and Shipbuilders in Scotland" (Vol. 57, Part 2); "Monthly Mining Report of the Chamber of Mines, Victoria" (Vol. 10, Part 2), price 1s.

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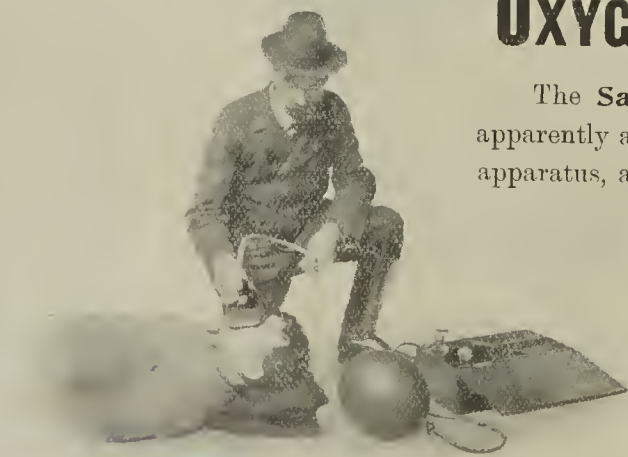
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# THE COLLIERY GUARDIAN

AND JOURNAL OF THE COAL AND IRON TRADES.

VOL. CVI.

WEDNESDAY DECEMBER 24, 1913.

No. 2765.

## EXPERIMENTS WITH SMALL ANIMALS AND CARBON MONOXIDE.\*

By GEORGE A. BURRELL and FRANK M. SEIBERT.

The Bureau has experimented with most of the more common small animals, such as canaries, guinea pigs, rabbits, chickens, dogs, mice and pigeons, and finds that canaries or mice are the most suitable for the work. Of the two, the Bureau finds canaries to be the most sensitive. One of the objects of this paper is to give the results of experiments by the Bureau which have shown that they may be used repeatedly in rescue operations without danger of their being more susceptible to carbon-monoxide poisoning after several or many exposures. This fact had not been determined experimentally hitherto, as far as the authors are aware. A second important point has to do with the relative behaviour of men and small animals to carbon monoxide.

### Effect of Repeated Exposure to Carbon Monoxide

In these experiments, canaries, mice and guinea pigs were repeatedly exposed to carbon monoxide under different conditions. In some experiments they were exposed to atmospheres that distress them in about two minutes. In the case of canaries, 0.25 per cent. was used in some experiments, and the animals were exposed 7 to 10 successive times. For instance, the animal was exposed to collapse, and then, when it had apparently recovered (7 to 12 minutes), it was exposed again and again. No acclimatisation effect was noticed. The same experiment was performed with mice and guinea pigs, with the same result. Different percentages than 0.25 per cent. were also used in the case of both canaries and mice. The experiments were also carried further, to the extent that the same animals that had been exposed several or many times on one day were exposed several or many times the next day, and on successive days.

Animals were also exposed to percentages that quickly distress them, and after removal from the atmosphere and recovery were placed in atmospheres that ordinarily do not apparently affect fresh animals. This experiment was also reversed in the case that the animals were first placed in atmospheres that do not affect them—say 0.10 per cent. in the case of canaries (for a long time, at least)—and then they were exposed to atmospheres that ordinarily affect them quickly, to see if results different from the ordinary could be obtained.

It is believed that the experiments performed show that animals will not become acclimatised to carbon monoxide under the conditions surrounding recovery work in mines, and hence become less useful, and even a source of danger.

It should be mentioned that two Canadian investigators, G. G. Nasmith† and D. A. S. Graham, found that the animals finally become acclimatised by continued exposure—i.e., if a guinea pig is exposed for days or weeks, to small percentages, it can finally stand exposures that would otherwise kill it; but our tests have shown that in the case of small animals which are quickly removed to fresh air (after distress is shown), and then exposed again for a reasonable number of times, this acclimatisation effect is not apparent. The two methods of experimentation are not parallel. It is pertinent to add that the effect Nasmith and Graham observed in guinea pigs—an increase in the red-blood cells—has been observed in men working around blast-furnaces. Blastfurnace gas contains a high percentage of carbon monoxide.

### Effects on the Different Animals of the Same Proportions of Carbon Monoxide.

The Bureau has performed many experiments in order to draw some conclusions regarding the effect on different animals of the same species of a given proportion of carbon monoxide. It was found that in general a given proportion of carbon monoxide affected different animals of the same species in about the same length of

time—at least, as far as the application of the results to the practical use of the animals in mines is concerned—but that once in a while an animal might behave markedly different from what is expected. This is more true of mice than of canaries, yet even in the case of the latter, several of them should be taken with an exploration party.

### The Relative Effect of Small Amounts of Carbon Monoxide on Men and Small Animals

In reading over accounts of rescue and recovery work in mines, one is impressed with the fact that some users of small animals have not been entirely satisfied with the behaviour of mice and birds (especially mice), in that men have apparently felt distress before the animals became affected. The Bureau, as the result of many experiments made to determine the resistance of small animals to carbon-monoxide poisoning, believes it has the data at hand which explains this dissatisfaction.

It was found, for instance, that almost all of the animals tried do not show sufficient distress in one hour's time with 0.10 per cent. of carbon monoxide to make them valuable for detecting this percentage of the gas. In some cases the length of exposure was extended to three hours without any effects being observed. In one case only was a canary affected in so short a time as 12 minutes by 0.10 per cent. of carbon monoxide. With another bird, and the same percentage of carbon monoxide, distress was scarcely observable in three hours. Only a disposition to remain quiet was observed. Eight different canaries were used and six different mice. Only one mouse out of many was slightly affected in so short a time as 30 minutes with 0.10 per cent., but was not overcome in four hours. Neither chickens nor pigeons were visibly distressed. With 0.15 per cent. both canaries and mice began to be affected. With 0.15 per cent. carbon monoxide canaries showed distress in from 5 to 30 minutes. A mouse showed slight distress at the end of an hour. With 0.20 per cent. canaries responded in from two to five minutes, except in one case (35 minutes). Three mice responded in 12 minutes, and a fourth one in 46 minutes. No blood tests were made, the object being to determine the usefulness of the animals for mining work, where their behaviour as apparent to the eye is the only guide. Haldane states that 0.06 per cent. carbon monoxide is sufficient to produce distinct symptoms in mice.\* The authors of this paper do not hesitate to say that because of his greater experience in experimenting with small animals Dr. Haldane might detect outward symptoms in a mouse that would escape the authors' attention. On the other hand, the authors have had greater experience than many of those who might use small animals in mines. Further, in the laboratory, observations are better made than in the mine, where the light may be poor.

Haldane's observations on mice are not entirely in accord with those of the authors of this paper. The reasons are probably, as already stated, differences in observation. The authors are convinced from their experiments that in a mine, with poor light, and perhaps only hurried examination of the animal, and by persons more or less inexperienced in the actions of the animals, mice and canaries will not usually show distress pronounced enough to give good warning with 0.10 per cent. or less of carbon monoxide. Haldane's work shows that this percentage may finally affect men—a headache in 40 or 50 minutes perhaps, or slight tendency to palpitations in less time. This condition will be a considerable time removed from actual distress or unsteadiness of movement. At the end of 20 minutes one of the authors of this paper had only a slight headache when he exposed himself to 0.25 per cent. carbon monoxide (in air). Later, however, he became very ill. Canaries collapsed in just a few minutes.

These facts, although they appear damaging against the use of small animals for the purpose proposed, only militate in part against their usefulness. They still

remain, in the authors' opinion, the best indicators of carbon monoxide for exploring parties in mines that we have. Canaries will give ample warning of percentages of carbon monoxide immediately dangerous to men. When the proportion of carbon monoxide is 0.15 per cent., canaries will show distress usually in from 5 to 12 minutes. With 0.20 per cent. the distress is apparent, usually, in from two to six minutes. For distress to appear in men with these percentages requires much longer time, although in the case of some individuals the effects may, when they do appear, last for hours. Men cannot stand the exposure to collapse from carbon monoxide as animals can. Canaries and mice, after distress and collapse, recover quickly if exposed to fresh air—only a matter of minutes usually. In the case of men exposed to collapse, recovery is often a matter of days.

In assigning reasons for the different effects produced on men and small animals by small quantities (say, 0.10 per cent. and under) of carbon monoxide, the authors would say that it is largely a question of observation. The blood of the animal is, of course, taking up the carbon monoxide, but only slowly, and to the extent that even after a long time, one hour or more, the only effect in the animal may be a slight sluggishness or disinclination to move about. Men, on the other hand, especially when moving about or doing hard work, absorb much more oxygen, and hence more carbon monoxide, than when at rest, and may finally feel a slight or even a severe headache in the same gas mixture that is only slightly or not affecting the animals (as far as can be observed). The men may even finally become very sick. It is not believed that any pronounced acclimatisation effect is produced in an animal on a short exposure which would account for the apparent resistance. It must be remembered that a man is in an excellent position to determine effects upon himself long before distress occurs, in the case of small percentages of carbon monoxide.

When the carbon-monoxide content of an atmosphere is raised from 0.10 per cent. to, say, 0.15 or 0.20 per cent., the susceptibility of a canary or mouse to the gas is markedly increased, as judged by the action of the animal—so much more than in the case of men, that a canary especially may show distress in five minutes, while a man may require 30 or more minutes. A man, if he exposes himself this long, however, may finally become very sick, and for longer periods may become dangerously so.

### Effect of Carbon Monoxide on Different Men

The Bureau has compiled data from different sources to show the effects produced on different persons by carbon monoxide. The fact is clearly brought out that the gas may affect different persons in a different manner. In the case of the same individual, the final blood saturation is what counts. The point is that different people may withstand different degrees of blood saturation. In the case of blastfurnacemen, the same men may be exposed to collapse or severe temporary sickness time and again. The exact action of the gas in producing bad nervous disorders still remains somewhat obscure. Some do not believe the action so simple as to merely temporarily deprive the system of oxygen, as in the case of suffocation, although most of the good experimental evidence points to this view. An analogy has to do with men who work at high altitudes or suddenly ascend to extreme heights in balloons, where the oxygen tension is very low. Different individuals also may be affected differently at high altitudes.

As regards acclimatisation to the gas, it has been strikingly shown that guinea pigs may become immune. The compensation found in pigs has also been in part observed in men. The red-blood cells increase to compensate for those put out of action by the carbon monoxide. How long this may continue without pronounced distress on the part of the men is important.

In the conduct of exploration work one sometimes hears it said that certain individuals of a party were able to withstand atmospheres that caused distress in other members of the same party. This may be true because some men are more affected than others by the

\* From a paper presented before the Coal Mining Institute of America, Pittsburg, Pa., December 4-5, 1913. Published with the permission of the Director of the Bureau of Mines.

† "The Hæmatology of Carbon-monoxide Poisoning," *Journal Physiology*, 1906, Vol. 25, Nos. 1 and 2, pp. 32-52.

\* "The Relation of the Action of Carbonic Oxide to Oxygen Tension," J. S. Haldane, *Journal Physiology*, vol. xviii., 1895, pp. 201-217.



proportions of the gas, but one or two other causes be kept in mind. Afterdamp in different parts of mine (in some places quite close together) will differ much in composition, to the extent that at one place a very small and insignificant amount of carbon monoxide might be present, while at another place close by a harmful proportion might exist. One person in a party unknowingly might encounter the latter atmosphere while his comrades do not. Another reason usually less apparent to an exploring party has to do with the fact that the amount of carbon monoxide absorbed depends, of course, upon the air breathed. A man at rest may breathe 7 or 8 litres of air per minute. By even moderate exertion this can be increased to three or four times that quantity. It follows that if one or more members of an exploring party work harder than others they will become poisoned more quickly than the others.

#### Summary.

1. Small animals may be used repeatedly in exploration work without becoming less useful as indicators of carbon monoxide.

2. Of the more common small animals canaries are best adapted for exploration work.

3. Men may feel distress, especially if they work hard, in the presence of small proportions of carbon monoxide (0.10 per cent. or under) when animals at rest in their cages do not show it distinctly.

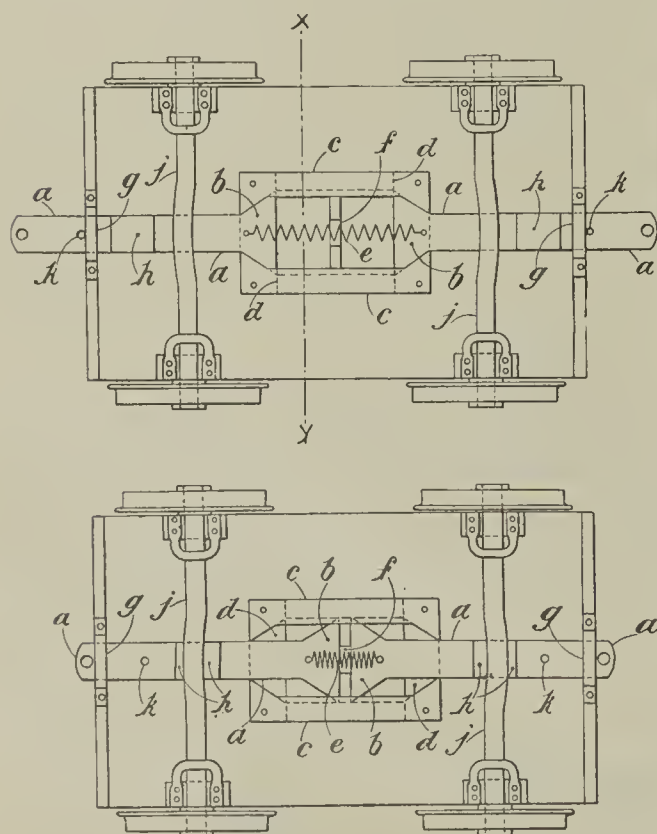
4. It is found occasionally that different animals of the same species may be affected differently by the same proportion of carbon monoxide; hence more than one animal should at a time.

The conclusions given are drawn from the authors' work on small animals and men, from the work of J. S. Haldane on small animals and men, from the accounts of exploration work of users of small animals (especially mice), and some miscellaneous observations by the authors on the use of small animals and general effects of carbon monoxide.

#### A NEW BRAKE FOR COLLIERY TUBS.

At the last meeting of the North of England Institute of Mining and Mechanical Engineers Mr. Enos Parry, miner, of 76, Laburnum-road, Fulwell, Sunderland, showed a model of a new brake for colliery tubs.

The brake mechanism consists of a collapsible centre bar in three sections, the two outer ends suitably shaped, and adapted to slide in a cradle, which latter is fixed centrally to the bottom of the tub or other vehicle. The sliding bars are connected by a rustproof spring, which tends to draw them together. The axles are



slightly bowed to permit the entrance of a raised portion or stop upon the sliding or draw bar. The brake is worked by the "tractive force," or "pull," and as each bar is released from the pull—as, for instance, in the case of the breakage of a rope or coupling—the spring pulls inward the drawbars, bringing the stop or raised portion upon each drawbar into contact and co-action with the axles, thus stopping the rotary motion of the axles and consequently the wheels. The brake can be rendered inoperative at either or both ends of the vehicle by a button device, or, if necessary, by a pin arrangement.

The dinner was arranged to hold the annual dinner under the auspices of the Mining Institute of Scotland in Edinburgh, Saturday, February 14, 1914.

#### SULPHATE OF AMMONIA.

##### Its Position and Prospects.

[SPECIALLY CONTRIBUTED.]

The present time is in many ways suitable for a brief survey of the situation generally, and the future possibilities of sulphate of ammonia in the field of nitrogenous fertilisers in particular. There are not wanting signs of altered conditions prevailing, and it is wise to take cognisance of these and consider their probable effect on the market, if only for the sake of familiarising the mind with the notion of new influences. There is less likelihood of producers being startled by exaggeration on the part of dealers as these possibilities approach nearer to actualities, apart from the fact that at least a skeleton *modus operandi* may have been evolved from the shadows forecasted by their progress.

The prime factors that will affect the future of sulphate of ammonia are—new sources of supply, not only of ammonia, but other classes of nitrogen carriers; production; and consumption. As regards the more distant future, an eye must be kept on the trend of affairs, as influenced by the efforts of science, to improve the production of concentrated fertilisers and evolve fresh compounds of this class. The selling side may also help towards uniformity.

In the first place, let us look at the progress made in

##### New Sources of Supply.

They have to be reckoned with, but need not be regarded with undue apprehension. Their future influence upon the market is, in many cases, still very much in the future, and their possibilities must be viewed in the light of the changes in production and consumption that will then prevail. It is in this fashion that several new sources of actual sulphate of ammonia production must be considered. This is notably the case with the development of the anthracite coal deposits at Vryheid, Natal, in the hands of the new company known as Natal Ammonium Limited.

No doubt other deposits will also afford opportunities for the extension of operations under such methods as those adopted in the Mond and also the Moore processes; but their real proportions, as compared with the world's markets for nitrogen, must not be overlooked. Developments may also be expected from the shale beds of Sweden and the fresh deposits in Skye; the former will most likely produce other forms of nitrogen than ammonia. Norway looks like becoming a producer of some importance, not only of atmospheric nitrogen but also of guano—an excellent source of nitrogen—owing to the remarkable extensions that have occurred in their whaling industry. The Norwegian production of calcium nitrate *via* atmospheric nitric acid has reached proportions to be reckoned with. Their recent output of 80,000 metric tons a year had risen to 100,000 last October, and by 1915 an output of 160,000 tons is expected. This may well be the case, not so much owing to extended installations of generating plant, but more so to the great improvements made in the actual production of the nitric acid, the strength of which has now been more than trebled, thereby affording a much larger production of calcium nitrate from existing plant. All the same, these prospects must be discounted somewhat by the fact that calcium nitrate has yet fully to justify itself in the eyes of agriculturists, and those who are familiar with the struggles of sulphate in its early days will know how to apportion the rate of discount.

In the future, Egypt also will enter the field as an important producer of atmospheric nitrogen through the medium of the vast water power available from the falls at the Assuan dam. Yet here again is a striking instance of the need for studying local conditions before applying such apparently menacing developments as arguments either for or against the future of the sulphate market. Even when this atmospheric nitrogen arrives on the scene we shall not find it threatening a good market, for recent statistics show that out of the 7,000 tons of nitrogenous fertilisers used by Egypt per year 56,000 were nitrate of soda. The advent of calcium nitrate may injure the nitrate market, but sulphate of ammonia will, if anything, slightly have the advantage of it in trying to extend and retain its hold upon the Egyptian market.

In the same way, it should be noted that while we are looking to America as an important and probably improving customer for sulphate of ammonia, their advances in the production of cyanide are slow, the output at present only amounting to the comparatively negligible total of 9,000 tons.

##### Production.

From among the usually recognised sources of supply to-day there is not much alteration in gasworks output, nor is there likely to be any marked alteration at home in this direction. American progress is slow, but atten-

tion must be paid by the propagandists to the steady advance in Dutch gasworks' output, which has increased by about 1½ million kilogrammes in the past six years. As far as British production from iron, coke and shale works is concerned, the two former have, if anything, declined. Without doubt, however, there will be an increase in supplies from coke ovens. There are at least seven extensive installations of the by-product recovery type in the field in Great Britain and eight or more in Belgium, and this is a branch of the coke industry that is growing in popularity, and will, therefore, in all probability extend. The foregoing applies quite as much to the chief Continental and American centres of the coke industry as to our home trade, and this fact is seemingly viewed with some apprehension by a certain section of home producers. But as far as competition with other nitrogenous products is concerned, it really is a most encouraging fact to find the promise of growing activity is most markedly evidenced in this particular province, because, from estimates formed in different quarters, it appears that, up to the present, coke-oven sulphate is far and away the cheapest source of nitrogen extant. This throws much of the competition foretold and bemoaned by those who wish to depreciate the sulphate market somewhat into the background. This possibility of cheapest nitrogen should be a useful weapon in the hands of sulphate producers, and it rests solely with themselves whether they profit by the proposals arising out of the recent international meeting of manufacturers, and use it aright, or abuse it by reverting to the ill-considered tactics that proved so disastrous some 12 or 14 years ago.

A word of caution ought to be given concerning reports on the future of the American market. That it will prove a progressive one there is no room for doubt. Anything fresh that is at all "fit" will have a chance, and it is chiefly from this country that "ideals" as to the production of more scientifically prepared compound fertilisers are emanating. This being so, it is evident that the old-fashioned it-always-has-been-so-since-my-father's-time methods will avail nothing if the United States is to be retained as the good market it is, and ought to be, for us. On the other hand, there seem to be two parties dealing with this market. According to one the spread of recovery coke ovens calls forth the statement that if all the nitrogen from the United States coke production were recovered it would more than double the consumption. From the other side (which truly seems perfectly competent to judge in the matter, seeing it has the authority of the Department of Agriculture) all the nitrogen from gas, gaseous fuel and coke ovens, and in fact the nitrogen from all the coal coked in the United States, would be more or less insignificant in comparison with the continually increasing demand.

Again, from Germany we hear that the production of sulphate has not outstripped the demand, and yet last year they took 40,000 tons of nitrate of lime from Norway. Surely there must be something faulty in the scheme of propagandisation or sales control for such a state of things to prevail?

Then, lastly, there are the estimates of the world's production, and from these we see how extremely difficult it is to accurately gauge their bearing on the market if only the fertiliser trade is considered. According to one estimate the increase was 150,000 tons in 1912, from another 139,000, and yet according to another 340,000, whilst a fourth estimate brings it out at even 133,000 tons less than the second estimate. In fact, the sum totals of production as estimated vary from 1,164,000 to 1,495,000 tons.

##### Consumption.

This, again, is even more difficult to estimate with anything like precision. From one source we learn that production has increased nearly threefold, while consumption has about kept pace with this increase. But if we are to accept the estimate based on a comparison of now and twelve years ago, the consumption is some 337,000 behind the output, but in this estimate the great difficulty of accurately arriving at the consumption is admitted. And therein we have a warning against building too much on such statistics. It is generally acknowledged that the fertiliser trade is an inadequate indication, because there is a very large industrial outlet in other directions, and the Sulphate of Ammonia Association would be doing a very great service to the future welfare of the producers they are mostly associated with if they were to instigate enquiries that would lead to more trustworthy data for computing the total consumption. Possibly the proposal to confine the information so arrived at to members of the association only, would assist them in obtaining from industrial users more reliable information.

Our own Iron and Steel Institute opines a distinctly rising consumption, and, we think, rightly so.



**Sales Control.**

There has been some bemoaning of the fact that fertiliser merchants are likely to be in a quandary owing to the "control" of the sales of cyanamide nitrate, blood and sulphate of ammonia, but whatever the Continental position, we hardly think this applies to Great Britain. Still, it cannot be denied that now is the time to strengthen and widen the organisation of producers, especially in the matter of a fuller and more statesman-like comprehension of the world's markets. It is highly desirable that steps should be taken to avoid the unnecessary flooding of markets with dear or cheap sulphate, and the prevention of panic sales. It is only by organisation that the scares and exaggerations of dealers and the large consumers can be effectually sifted, and, in the long run, it is better for users that a stable market should prevail than to indulge in a game of battledore and shuttlecock, because, as a rule, it is the shuttlecock that gets most knocking about, and when there are constant and extreme variations in the price, it is usually the fortunate few alone that benefit by snatching at a decline, while the majority have to suffer when the rebound takes place and the need of supplies is imperative.

And even supposing the erstwhile dog-in-the-manger attitude is adopted, it only means that an excellent trade is demoralised to the advantage of competitors, while users are robbed of one of their cheapest and best sources of nitrogen. A little genuine co-operative organisation can prevent all this, and, therefore, why not get to work at it now, and be prepared? By the way, Russian trade is worth attention and fostering.

**Pioneering Possibilities.**

In this direction there is more to be done than some are inclined to think, and to the average man at the head of a business to-day such matters often seem vague and impractical. But this is the case with all impending factors affecting trades and markets, and we strongly recommend to the consideration of those in authority the desirability of either taking to the pursuance of some of these "ideals" as hobbies, or providing for some of the younger members of the firm (possibly enjoying the advantages of a scientific training) undertaking a systematic investigation of new ideas, as well as continually keeping a watchful eye on technical literature for information about new sources of supply for raw materials, which at present are too scarce or dear to permit some of the ideals coming to fruition. Likewise it is well to keep in touch with all phases of scientific progress, always looking at them through your own particular pair of spectacles. It is often from quite unrelated sources that the key to successful laboratory experiments is found. Such work is bound to benefit the rising generation, if not the present, and this is an additional incentive to the encouragement of the junior partners in this direction. For instance, merely as one isolated example, take the future of the compound fertiliser—not compounded fertiliser, but rather new compound salts. The excessive freights and carriage rates are a severe handicap to individual components like sulphate of ammonia, and already the idealist has projected the desirability of a mixed nitrogenous phosphatic and potassic compound in the shape of a double salt—namely, the double phosphate of potassium and ammonium. Already we have the mixture of super-phosphate kainit and sulphate of ammonia, and subsequently we have arrived at potassic-superphosphate as a merchantable product. Why should not the double phosphate originate from the sulphate manufacturer? Again, the ideal nitrogen carrier is ammonium nitrate, but though there are difficulties in the way now, are they to be insurmountable? Most certainly not, and as often as not it happens that such difficulties are overcome by the man who has kept an open eye upon progress rather than from the specially trained scientist. Keep a watch on the advent of potash deposits of any kind, methods of liberating phosphoric acid, the theories of atomicity and molecular construction persistently for five years from now, and it would be foolhardy to gainsay the future possibilities of the present-day sulphate of ammonia manufacturer.

A report by the Local Government Board for Scotland for the year ending May 15, 1913, as to the proceedings of distress committees in Scotland, has been issued. It states that the work of the committees continues to be conducted on a very limited scale, a state of affairs that can only be ascribed to the satisfactory condition of trade. The engineering trades were responsible for 9.16 per cent. of the applications for relief. Of the applicants in Glasgow, 87.7 per cent. belonged to the engineering trades, as compared with 43.06 last year, the large reduction being attributable to some extent to the operation of Part II. of the National Insurance Act.

**MIDLAND INSTITUTE OF MINING, CIVIL AND MECHANICAL ENGINEERS.****Annual Dinner.**

The annual dinner of the above institute took place on December 9, the PRESIDENT (Mr. W. Hargreaves) being in the chair.

Dr. W. E. GARFORTH, in proposing the "Trade of the West Riding," said that under the larger portion of the West Riding they had valuable coalseams, and in working those seams there were, according to the last return, something like 100,000 men and boys engaged underground, and about 50,000 engaged on the surface. Although many seams had in the past been exhausted (he was referring more particularly to the thick seams), there were other seams which the manufacturer and the merchant would be glad to know would give them a cheap and good supply of coal for another century. By mechanical contrivances many seams to-day were being worked profitably, that two decades ago were considered to be unprofitable. Therefore, if they were not restricted by Parliamentary interference, and the men only had a fair share of what they were entitled to (unfortunately, as they know, they got more than their fair share), he believed they would be able to give a cheap supply of fuel for many years to come.

Mr. HUGH LUPTON, who replied, spoke of the great work Dr. Garforth was doing in experiments as to explosion and stonedust in mining. They all knew of those experiments, and it was of particular interest to him to think of what he had been told on excellent authority—namely, that the Senghenydd explosion in South Wales the travel of the fire from the east to the west side of the mine was prevented by the quantity of stonedust there was in the drift connecting the two. With regard to the toast, they had had lately a period of very good trade, but he thought most of them must be agreed that there were signs of a certain slackening now. That slackening, perhaps, was not a bad thing, and they could quite well get over it if they kept their heads and their workpeople kept their heads.

Prof. L. T. O'SHEA proposed the toast of "Kindred Societies," to which Mr. J. HARTLEY WICKSTEED responded.

Mr. W. MIDDLEBROOK, M.P., submitted the toast of "The Coal Trade."

Mr. GEORGE BLAKE WALKER, in reply, admitted that the price at which coal stood to-day was too high for the permanent prosperity of their industry. There was a good deal of talk how coal and other things were to be made cheaper in order that the public might benefit, and amongst other things they had a good deal of talk in these days about nationalisation. Economic law said "you can't get something out of nothing." He believed it was Mr. Asquith who—talking on one occasion about the nationalisation of railways—said they were up against this, that the workmen were to have more, the trader was to have cheaper carriage, and the taxpayer was to make up the difference. Who was the taxpayer? Ultimately, whoever might be the mediums through which taxes were paid, his (Mr. Walker's) belief was that the man who was actually producing at the bottom was the man who paid taxes. If either miners or postmen or railwaymen or anybody else, got more than their economic wage, it was one of those things that was sure to topple over, and in the end they would be worse off than they were before. With regard to the nationalisation of mines, he did not object to it personally. He did not think any of them objected to being bought out at a fair price, but when these mines, which were now carried on by the individual enterprise, intelligence, and self-interest of intelligent men, were handed over to a public body which had no special training in mining, he did not quite see how it stood to reason that they were going to manage the mines better and more economically than those who did it at present. In the eastern part of that county there were vast resources of coal. Before they could reach those vast resources, however, engineering difficulties had to be overcome, and there was now work going at Thorne which was going to cost an enormous amount, and which was enough to frighten anyone else from going into the same district and doing the same thing. If the county council or some other public body were to have the responsibility of developing the mining resources of Yorkshire, did they not think there would be a good deal of hesitation before they entered upon an enterprise like that, and did they not think the council and the unfortunate engineers would have rather a bad time if they got down to the permian strata and found more water than they could deal with? No sooner had they spent their half or three-quarters of a million than they immediately became the vilest of the vile. He thought there was something to be said for the fact that these people should be screened from unmerited obloquy which fell upon them, and that the community should undertake that great enterprise, and run the risks and lose the money. And if there was money to be made, after capital had received its modest 5 per cent., by all means let them have it. They knew that when they talked about an average of 5 per cent. on the profits of mining, they were not talking a great deal of nonsense. If they took the profits which exceeded 5 per cent., and balanced them against those less than 5 per cent. for 20 years, there was not very much difference. They would come back to 5 per cent. in the long run, or 4 per cent. it might be. With regard to the future of the coal trade, there was an

old saying about "live and let live." The collier was at present doing exceedingly well. He was very glad that was so. He would like him to do better, because there was no colliery manager in that room who did not know that the proportion of money that the colliers took home was in the proportion of four to six of what they might take home. If the output was not restricted as it was being restricted at the present moment, they would not have coal quite so dear as it was at present. It was better for them all if coal was at a reasonable price. He did not say that he hoped that coal would come down somewhat from its present figure, but he did say this, that the cost of coal had been permanently raised by a number of legislative enactments. It was not the colliery owner or the mining engineer who was responsible for that. It was a cost which was being put upon the industry, and which the poor man eventually had to pay. There was only one way in which it could be cheapened, and that was by making coal do more work. That was the direction in which mining sciences was moving, and the direction in which it must proceed. Within the next 10 or 20 years they might see an immense change pass over the coal trade, and the virtual price of coal very much cheapened, although the price per ton might still remain high.

Prof. FEARNSIDES gave the toast of "The Midland Institute of Mining, Civil and Mechanical Engineers." He said he was a newcomer as the first occupant of the Sorby Chair of Geology in the University of Sheffield, and he therefore took that opportunity to ask for their co-operation in the task which lay before him. At present he was as a shepherd without sheep. The fold, now in process of building, was almost ready to receive the flock. The University of Sheffield was doing its part, and it now rested with those who controlled the mining interests and the training of men to decide whether the geological instruction which was offered was worth the having, and was worth the sacrifice of time which was required to make its training a success. He hoped they would send him students.

The PRESIDENT replied.

**Important Minimum Wage Case in North Staffs.**—An interesting case came before his Honour Judge Ruegg, K.C., at the Longton County Court last week, Herbert Fairbanks, a contracting collier, being the plaintiff in an action to recover £2 6s. 6d., being six days' wages, at 7s. 9d. per day, alleged to be due to him by the Florence Coal and Iron Company Limited. Mr. Breton, at the outset, raised a preliminary objection that it was a case which should go before the local Minimum Wage Board. Mr. Moody, for the plaintiff, said his claim was for six days' wages earned, and which he would show from the way in which the wages had been paid, he was entitled to on the field rate of wage of 7s. 9d. per day and that it was payable by contract, and was not, therefore, subject to revision by the Minimum Wage Board. Mr. Breton said the defence would be that that was not so in fact. He took it that this man was a contractor and 7s. 9d. was the minimum wage for a contractor having men working under him whom he had to pay. The men concerned were dismissed for inefficiency. The actual money (£9 7s.) earned by the men had been tendered and refused. After a lengthy hearing his Honour said the case had given him about as much trouble as any case he had had. They had been, admittedly, contracting colliers in the place No. 91. There the men had received a certain sum, which was regulated by the colliery—7s. 9d., and it was admitted they sometimes made more; at any rate, they got more than the ordinary wage which, by the rules of the colliery, was paid to the other men. Then the men went from No. 91 to No. 92. He (his Honour) was not satisfied they were there in the capacity of contracting colliers. They were, he thought, taken on as men working in a colliery with fluctuating wages, which had to be, by the custom of the colliery, made up to a certain sum. The amount which the employers made up each week-end in that case was the sum it was necessary to give those men, not the minimum wage in that district, which, he understood, was 7s. 3d., but to give them a sum of money which was sufficient to make up the wages to 7s. 9d. It was said if they got that the Court had jurisdiction, and that the Board formed by that Act of Parliament lost its jurisdiction because, it was said, it was not a dispute with regard to the minimum wage at all, but a dispute with regard to an agreement. He had come to the conclusion that it was not an agreed wage by contract, but that it was a custom in that colliery, whilst the men were working as they did work, not as contractors, to make up what they did in fact earn to what might be described as the customary minimum wage of that colliery. If he were right in saying that 7s. 9d. could be correctly described as the customary minimum wage paid to that class of men at that colliery, then he thought it was a case within the jurisdiction of the Minimum Wage Board. He (his Honour) thought they could have a minimum wage by custom in a colliery which might be something higher than the statutory minimum wage. It was said that if he were to hold that, the Board in that district would have no jurisdiction at all, because everybody was being paid higher than the statutory minimum wage. That, of course, would be a very startling result—a result which he thought was never contemplated under the Act of Parliament. He still thought that a wage higher than the statutory minimum might be perfectly described as the customary minimum wage for that colliery, or for that group of collieries, or for a certain district within a bigger district. The employers said they were prepared to justify their action on the grounds that the men had forfeited their right to the minimum wage by not complying with the conditions as regarded regularity and efficiency of work. He was not deciding whether they were right or wrong, but it was exactly of the kind of dispute which was meant to be referred to such a Board, and such a dispute as the Board were capable of dealing with. He found that was not a question of an express wage fixed between the parties themselves by contract. Therefore he thought the Board had jurisdiction, and that he had not. The case must be dismissed. At the request of Mr. Moody his Honour altered his decision to a non-suit.



MINING ACCIDENTS IN 1912.\*

1,262 separate fatal accidents occurred in and about the mines and quarries of the United Kingdom, causing the loss of 1,394 lives. Compared with the previous year, there is a decrease of 87 in the number of fatal accidents and of 13 in the number of lives lost. Of the 1,262 separate fatal accidents, 1,191 causing the loss of 1,319 lives happened at mines, and 71 causing the loss of 75 lives happened at quarries.

At mines there is, as compared with the previous year, a decrease of 62 in the number of fatal accidents and an increase of 11 in the number of deaths.

The total number of non-fatal accidents which disabled the injured person for a period of more than seven days was 151,858 at all mines, by which 152,302 persons were injured, as against 167,883 non-fatal accidents and 168,360 persons injured in the previous year.

The figures in Table A show the death-rates during the last ten years.

In 1851 about 19 persons were killed per 1,000,000 tons of coal raised from mines; in 1912 the death-rate was 4.67 for a like quantity of mineral at mines under the Coal Mines Act. The death-rate per million tons of mineral raised from coalmines alone was 4.77.

In classifying the accidents according to place or cause, we find (Table B) that in 1912 44.6 per cent. of the deaths were due to falls of ground, 26.3 per cent. to miscellaneous causes underground, 9.4 per cent. to explosions of firedamp and coaldust, and 6.1 per cent. to shaft accidents.

Explosions of Firedamp or Coaldust.

The death-rate from explosions of firedamp or coaldust per 1,000 persons employed underground in 1912 was 0.138, whilst the average death-rate from this cause during the last 10 years was 0.168. In the following table the accidents are classified according to the number of deaths, and according to the cause:—

Cause.	No. of fatal accidents.	No. of deaths.	No. of non-fatal accidents.	No. of persons injured.*
Lighting—				
Naked lights.....	10	12	101	131
Matches or smoking ...	2	5	—	5
Safety lamps—				
Illegally opened .....	1	1	—	1
In defective condition ..	—	—	1	3
Shot-firing—				
Flame used for igniting fuse .....	—	—	1	1
Flame or sparks from fuse or igniter .....	—	—	1	1
Flame of explosive .....	1	3	2	5
Underground fires—				
Accidental or spontaneous ignition of mineral, timber, or other material .....	3	92	2	13
Miscellaneous or unknown ..	3	11	2	13
Total in 1912 .....	20	124	110	178
Total in 1911 .....	23	36	127	220

\* Including persons injured by explosions which proved fatal to others.

Of the five explosions due to explosives, one each was caused by bobbinite, ammonite, monobel powder, compressed powder, and an igniter.

The Scotch and the Welsh coalfields, including Monmouthshire, though employing only about 57 per cent. of the number of men employed in the remaining coalfields, and producing only 56 per cent. of the output, had nearly four times as many explosions from the use of naked lights.

Falls of Ground

During 1912, 589 persons were killed and 53,401 persons were injured† by falls of ground at all mines under the Coal and Metalliferous Mines Regulation Acts, a decrease of 46 in the number of deaths, and of 5,370 in the number of persons injured, on the figures for the previous year. Four accidents caused three deaths each, nine accidents two deaths each, and the remaining 559 one death each. The following table shows falls of ground at all mines under the Coal and Metalliferous Mines Regulation Acts, classified according to place of occurrence:—

Place where the fall occurred.	Fatal accidents.		Deaths.	
	1911.	1912.	1911.	1912.
At the working face .....	424	366	433	372
On roads while repairing or enlarging .....	109	107	113	113
On roads while otherwise working or passing .....	85	93	85	97
In shafts .....	3	6	3	7
Total from falls underground ..	621	572	635	589

Comparing the number of fatal accidents and deaths from falls with the total number of fatal accidents and

\* The General Report on Mines and Quarries, by Mr. R. A. S. Redmayne, H.M. Inspector of Mines.  
† The Notice of Accidents Act, 1906.

TABLE A.—DEATH-RATE FROM ACCIDENTS IN AND ABOUT ALL MINES UNDER THE COAL AND METALLIFEROUS MINES REGULATION ACTS, PER 1,000 PERSONS EMPLOYED, FROM 1903 TO 1912.

Year.	Death-rate from Accidents per 1,000 persons.						
	Underground workers taken separately.					Surface workers taken separately.	General death-rate of all persons employed both above and below ground.
	Explosions of firedamp or coaldust.	Falls of ground.	Shaft accidents.	Miscellaneous.	All causes underground.		
1903 .....	020	832	102	396	1351	895	1258
1904 .....	031	753	126	438	1348	831	1243
1905 .....	251	758	106	404	1519	720	1358
1906 .....	076	773	104	472	1424	767	1291
1907 .....	057	755	133	511	1455	761	1316
1908 .....	157	741	111	458	1467	740	1322
1909 .....	272	736	108	505	1621	670	1432
1910 .....	579	760	111	467	1917	748	1686
1911 .....	041	721	124	422	1308	725	1193
1912 .....	138	653	089	388	1273	803	1181
Average for 10 years	168	746	111	446	1471	764	1330

TABLE B.—ACCIDENTS AND DEATHS AT ALL MINES UNDER THE COAL AND METALLIFEROUS MINES REGULATION ACTS, ARRANGED ACCORDING TO PLACE OR CAUSE.

Place or cause of the accident.	Fatal accidents.						Non-fatal accidents, disabling the injured persons for more than seven days.			
	Number of separate accidents.	Percentage of total number of accidents.	Deaths from accidents.	Percentage of total number of deaths.	Average for pre- ceding five years.		1912.		1911.	
					Separate accidents.	Deaths.	Separate accidents.	Persons injured.	Separate accidents.	Persons injured.
I. Underground accidents:										
1. Explosions of firedamp or coaldust.....	20	1.7	124	9.4	20.4	187.2	95	146	116	187
2. Falls of ground .....	572	48.0	589	44.6	597.4	619.4	53,201	53,401	58,528	58,771
3. Shaft accidents .....	78	6.6	80	6.1	83.0	97.6	865	938	598	692
4. Miscellaneous .....	343	28.8	347	26.3	375.6	393.6	85,886	85,985	95,812	95,926
II. Surface accidents .....	178	14.9	179	13.6	148.0	150.8	11,811	11,832	12,769	12,784
Total .....	1,191	100.0	1,319	100.0	1,224.4	1,448.5	151,858	152,302	167,883	168,360

deaths at mines, it will be seen that falls are responsible for 48 per cent. of the total number of accidents and 44.6 per cent. of the total number of deaths. If compared only with fatal accidents and deaths underground, the percentages are 56.5 of the accidents and 51.7 of the deaths. The curve for 1912 is the lowest on record, the actual death-rate being 0.658 as against 0.721 in 1911, and 0.760 in 1910.

In respect of mines under the Coal Mines Regulation Act, the numbers of non-fatal accidents and persons injured by falls of ground reported under the Notice of Accidents Act were respectively as follows:—

	Accidents.	Persons injured.
At the working face .....	42,213	42,354
On roads while repairing or enlarging .....	5,529	5,554
On roads while otherwise working or passing.....	5,201	5,226
In shafts .....	47	47

Shaft Accidents.

Seventy-eight fatal accidents causing 80 deaths, or 6.1 per cent. of the total number of deaths in and about all mines under the Coal and Metalliferous Mines Regulation Acts, were caused by shaft accidents. Two accidents each caused two deaths, and the remaining 76 caused one death each. Sixty-eight deaths occurred in coal mines, three in iron mines, and nine in other mines.

The following table shows the shaft accidents in all mines under the Coal and Metalliferous Mines Regulation Acts, classified according to cause:—

Cause.	Fatal accidents.		All non-fatal accidents disabling for more than seven days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.
Overwinding .....	3	4	13	71
Ropes or chains breaking .....	2	3	2	2
Whilst ascending or descending by machinery* .....	6	6	56	62
Falling into shaft from surface... ..	2	2	39	40
Falling from part way down .....	23	23		
Things falling into shaft from surface .....	5	5	217	221
Things falling from part way down ..	5	5		
Miscellaneous .....	32	32	538	542
Total.....	78	80	865	938

\* Exclusive of accidents coming under the two previous headings.

The death-rate from shaft accidents per 1,000 persons employed underground was 0.089. Compared with the average of the previous five years there was a decrease of 17.6 deaths by shaft accidents.

Miscellaneous Underground Accidents

Under this division are included all underground accidents other than those from explosions of firedamp or coaldust, falls of ground, and shaft accidents. It is an important division, which in 1912 caused 343 separate fatal accidents or 26.3 per cent. of all the deaths at mines. Four of the accidents caused two deaths each, and 339 caused one death each.

The following table, in which the accidents are classed under eight sub-heads, enables us to say at once that haulage was responsible for 70 per cent. of the miscellaneous fatal accidents:—

Cause.	Fatal accidents.		All non-fatal accidents disabling for more than seven days.	
	Separate Accidents.	Deaths.	Separate Accidents.	Persons Injured.
Explosives .....	24	25	235	258
Suffocation by natural gases .....	6	8	7	8
Underground fires .....	1	1	7	8
Irruptions of water .....	1	1	2	2
Haulage:—				
(a) Ropes or chains breaking ..	23	23	177	191
(b) Run over by trams and tubs* .....	190	191	21,295	21,317
(c) Other haulage accidents ...	26	26	14,245	14,260
Electricity .....	7	7	18	18
Machinery .....	10	10	479	479
Sundries .....	55	55	49,421	49,444
Total .....	343	347	85,886	85,985

\* Not including accidents coming under (a).

Explosives.—The tables which include surface accidents show an increase over the preceding year of five deaths and a decrease of 92 persons injured by accidents from explosives.

Underground Haulage.—By underground haulage in 1912, there were 239 fatal and 35,717 non-fatal accidents, resulting in 240 deaths and injuries to 35,768 persons; the accidents showing a decrease over the preceding year of 25 deaths and 8,745 persons injured.

The following table gives some indication as to the nature of the work performed by the victims when the accidents occurred:—



Occurrence of accident.	Fatal accidents.	Deaths.
While engaged in haulage operations .....	136	136
While walking in-by or out-by to or from their work.....	46	46
Miscellaneous .....	57	58
Total in 1912 .....	239	240
Total in 1911 .....	264	265

**Electricity.**—There were 11 fatal accidents by which 11 persons were killed through the use of electricity in and about mines, which is a decrease of one in the number of accidents and of two in the number of deaths, as compared with 1911.

On Surface

At all mines classed under the Coal and Metalliferous Mines Regulation Acts there were 178 separate fatal accidents on the surface involving the loss of 179 lives. The number of fatal accidents and deaths shows an increase of 28 and 23 respectively as compared with the preceding year. The death-rate per 1,000 persons employed above ground was 0·808, and surface accidents account for 13·6 per cent. of the deaths in and about all mines. One of the accidents caused two deaths, and 177 caused one death each.

The following table shows the fatal and non-fatal accidents on the surface at all mines under the Coal and Metalliferous Mines Regulation Acts, classified according to the cause.

Cause or place.	Fatal accidents.		All non-fatal accidents disabling for more than seven days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.
Machinery .....	40	40	719	719
Boiler explosion .....	—	—	13	14
Railways, sidings, or tramways .....	78	79	3,943	3,948
Electricity .....	4	4	18	18
Miscellaneous .....	56	56	7,118	7,133
Total .....	178	179	11,811	11,832

The death rate from surface accidents at mines in 1912 shows an increase on the preceding year.

Comparison of Coalfields with one Another.

Table C institutes a comparison between the different coalfields as regards accidents :—

TABLE C.—NUMBER OF DEATHS FROM ACCIDENTS IN 1912, AND THE DEATH-RATE PER 1,000 PERSONS EMPLOYED AND PER 1,000,000 TONS OF MINERAL RAISED IN AND ABOUT COAL MINES IN THE DIFFERENT COALFIELDS DURING THE YEARS 1911 AND 1912.

Coalfield.	Deaths.		Death-rate from accidents per 1,000 persons employed.		Number of deaths per 1,000,000 tons of mineral raised.		1912.		
	1912.		1912.		Total.	1912.	Percentage of Total Number of Persons Employed.	Percentage of total mineral raised.	Percentage of total number of deaths from accidents.
	Under-ground.	Above-ground.	Under-ground.	Above-ground.					
1. Scotch coalfields .....	137	24	1·24	0·91	1·38	3·98	4·26	12·7	12·8
2. Northern coalfield ..	150	44	0·85	1·02	0·95	3·75	3·60	20·4	15·4
3. Yorkshire, &c., coal-field .....	285	34	1·43	0·66	0·99	4·80	3·55	23·4	25·4
4. Lancashire and Cheshire coalfield ..	113	17	1·36	0·75	1·08	5·64	4·64	9·9	10·3
5. Midland coalfields ..	93	16	1·32	0·76	1·30	4·65	4·73	8·5	8·7
6. Small detached coal-fields .....	22	2	1·05	0·36	1·54	4·97	8·27	2·5	1·9
7. North Wales coalfield	14	1	1·09	0·36	1·30	4·57	5·73	1·5	1·2
8. South Wales coalfield	270	36	1·41	1·06	1·42	6·08	6·22	21·0	24·3
9. Irish coalfields .....	—	—	—	—	1·27	—	11·69	0·1	—
Total and average ...	1,084	174	1·25	0·84	1·17	4·77	4·47	100·0	100·0

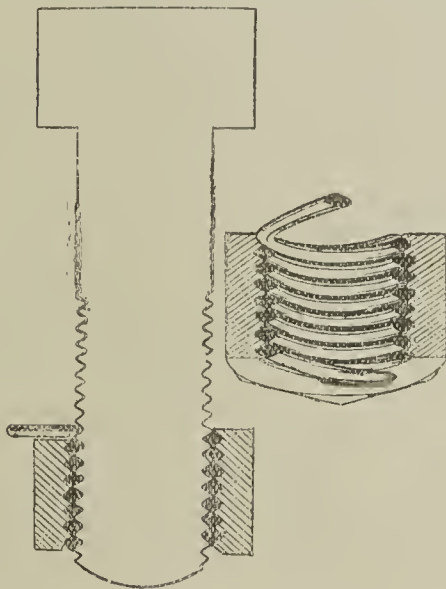
Duration of Accidents.

Of the 152,302 persons injured by accidents which have occurred at mines, a greater number of persons are disabled for two to four weeks than for any other of the stated periods, viz., no less than 77,750, or over 50 per cent. of the total. From 1,259 mines returns were made showing that no accidents had occurred thereat.

**Hull Coal Exports.**—The official return of the exports of coal from Hull for the week ending Tuesday, December 16, 1913, is as follows:—Antwerp, 102 tons; Abo, 998; Amsterdam, 791; Buenos Ayres, 5,374; Brest, 750; Bremen, 1,525; Copenhagen, 429; Christiania, 3,144; Drammen, 425; Drontheim, 256; Gothenburg, 330; Ghent, 373; Gefle, 1,013; Hamburg, 13,473; Harlingen, 1,274; Harburg, 104; Kherson, 3,954; Kiel, 1,308; Libau, 576; Marseilles, 513; Malmo, 4,138; Marinopol, 2,905; Naples, 498; Nicolaieff, 11,508; Oscarshamn, 1,618; Oxelosund, 2,620; Odessa, 9,905; Oporto, 2,620; Passages, 1,498; Pernau, 4,184; Riga, 13,391; Roval, 2,315; Rotterdam, 258; Rouen, 5,039; Stockholm, 1,093; Stettin, 337; total, 100,639 tons. Corresponding period December 1912, total 83,816 tons.

THE "PERFLOC" LOCK-NUT.

A new lock-nut, known as the "Perfloc," which has lately been introduced by the Engineering Improvement Company Limited, of 39, St. James's-street, London, S.W., combines in one unit the functions of a nut and locking device, consequently doing away with the usual second nut and split pin. The nut itself is of standard form and thread, but a size larger than the bolt, in order to allow a spiral spring to be embedded in the thread of the nut. One end of the spring is firmly fixed in the base, while the other is left free and projects slightly beyond one of the faces of the nut, a slot being cut on the latter to accommodate the free end so that it does



not jam on the face of the washer against which the nut bears. The spring is of a special diamond section, so that, in reality, its inner surface becomes the actual thread of the nut, enabling the latter to be screwed on the bolt in the customary manner, locking itself automatically and instantaneously into position. All tendency for the nut to slacken, under even the greatest vibration, is arrested by the binding of the spiral-spring thread on the bolt.

The removal of the nut, notwithstanding its tight grip of the bolt thread, is quite a simple matter, it being only necessary to apply a slight pressure to the free end of the spiral-spring thread, which releases the binding action of the latter, it being possible to turn back the

GEOLOGY OF THE KENT COALFIELD.

At a meeting of the Geological Society of London, on December 3, Dr. AUBREY STRAHAN, F.R.S., president, in the chair, Prof. E. HULL exhibited a block of lower lias from the junction with the carboniferous. He said that this block was sent from No. 3 pit of Dover Colliery by the manager, Mr. John Kiers. It seemed to him (the speaker) a specimen of peculiar interest, since it had been taken from the bottom of the lias at its junction with the coal measures, at a depth of 1,161 ft. below the surface. It consisted of hard, bluish, brecciated limestone, angular pebbles of stone being cemented together, and contained numerous fossils of liassic species—generally in a fragmentary condition. It had been called by the miners "a piece of the old shore"—an appropriate name, as it was evidently made up of fragments of stone which had been knocked about on the beach of the liassic sea when being deposited on a shore of submerged coal measures. Dr. F. L. Kitchin had informed him that this lowest lias at Dover has been shown to belong to a position in the upper part of the *Capricornus* zone; it has yielded *Ammonites maculatas* Young and Bird. Of lamellibranch remains he could only name *Unicardium cardioides* Phillips. There are also present some rhynchonellids, but Dr. Kitchen has not been able to determine them.

A paper, entitled "A Contribution to our Knowledge of the Geology of the Kent Coalfield," was afterwards read by Dr. E. A. NEWELL ARBER, M.A., F.L.S., F.G.S. In this paper an attempt is made to give a general and connected account of the carboniferous rocks of Kent, based on the evidence of some 19 borings or sinkings. The mesozoic cover of this wholly concealed coalfield is ignored. It is shown that the proved area is 200 square miles (128,000 acres), partly lying beneath land and partly beneath the North Sea, the Straits of Dover and the English Channel. The general strike is about 30 degs. south of east and north of west, and the dip of the transition coal measures is 2 degs. to 3 degs., in the two localities where reliable evidence is alone available on this point. The area, as a whole, is a syncline, limited on the north and south by Armorican folds, of which the northern has been now fairly accurately located. There is evidence also of a fold on the east, and it is maintained that the Kent coalfield is not continuous with that of the Pas-de-Calais. There are reasons for believing that the western boundary is a great fault. The chief surface feature of the coal measures is that of an inclined plane, sloping rapidly but regularly westwards and south-westwards from an elevated region near Ripple and Deal in the east. The lower carboniferous rocks exceed 450 ft in thickness, and were denuded before the coal measures were deposited. The coal measures consist of the transition series (1,700 to 2,000 feet thick) and the middle coal measures (2,000 ft.). No lower coal measures or millstone grit occur. The measures are grey throughout, and no red rocks, Espley rocks, *Spirorbis* limestones, nor igneous rocks occur. The coals are well distributed, and are often of considerable thickness, although there is a frequent tendency to splitting and inconstancy. Steam and household coals predominate, but gas coals also occur. The most productive portions of the measures are the higher part of the transition and the lower part of the middle coal measures.

The same author contributed a paper "On the Fossil Floras of the Kent Coalfield." The floras of 10 further borings in Kent are here recorded, and the number of species known from the Kent coalfield is raised to 96, as compared with 10 known in 1892 and 26 in 1909. A number of the more interesting records are described and figured, some of them being new to Britain, or not previously found on the horizons in question. As regards the horizons present in Kent, the plant-remains indicate that, in the area so far proved, only middle or transition coal measures, or both, occur.

In the discussion on the two foregoing papers, Mr. G. W. LAMPLUGH remarked that the borings had now given a better knowledge of the underground structure of East Kent than was possessed for any other area of secondary rocks in England. It was interesting to find that the strike of the concealed jurassic rocks diverged from that recognised in the coal measures, as well as from that of the exposed cretaceous strata. The evidence brought forward seemed hardly sufficient to prove the suggested southerly curve of the carboniferous rocks beneath the Channel.

Mr. E. A. MARTIN remarked that, although it had been stated that there was no evidence of overthrust, such as had been found in the coalfields across the Channel, there seemed to be a possibility of an overthrust between the western boundary of the Kent coalfield and Brabourne, where devonian rocks were found, and Chilham, where the silurian was proved. It was not clear that there was a north-and-south fold



... sea off the coast of Kent, and it might just ... st-and-west. The speaker asked for evidence ... stings in the northern parts of the county.

Dr. J. W. EVANS asked whether the boundaries were not seriously modified by the variation in level of the palæozoic surface.

Dr. MALCOLM BURR expressed his great gratification on listening to these extremely interesting papers. The systematic exploration of the coalfield by one influence, at an expenditure of upwards of £180,000, had looked almost exclusively to a study of the fossil flora for guidance, and had not once been misled. No pains had been spared to preserve every item of scientific value, and both fauna and flora of all the beds and their lithology had been placed in competent hands for examination. He fully agreed with the author as to the untrustworthiness of measurements of dip and strike from boreholes; even if an accurate measurement were

MINING LABOUR IN 1912.\*

The total number of persons employed at mines and at the quarries under the Quarries Act in the United Kingdom and the Isle of Man during the year 1912 was 1,197,035, of whom 1,117,148 were employed in or about mines, and 79,887 in or about quarries. Of the 1,117,148 persons employed at mines 895,485 worked underground, and 221,663 above ground; of the latter, 6,662 were females. Compared with the preceding year there is an increase of 14,483 males working underground, and an increase of 6,225 males and of 202 females working above ground, making a total increase of 20,910 persons. The increase at coalmines was 22,496, at iron mines there was a decrease of 1,115, and at "other" mines a decrease of 471 in the number of persons employed.

Table A gives a general summary of the number of persons employed in each of the three classes of mines:—

TABLE A.—PERSONS EMPLOYED AT ALL MINES UNDER THE COAL AND METALLIFEROUS MINES REGULATION ACTS, CLASSIFIED ACCORDING TO AGE AND SEX.

Kind of mine.	No. of mines at work.	Under-ground.	Above ground.		Total under and above ground.	Per-centage of total number.	Comparison of total number employed with that of preceding year.
		Males.	Males.	Females.			
Coalmines .....	3,093	865,119	200,817	6,457	1,072,393	96.0	+ 22,496
Ironmines .....	146	13,964	3,991	4	17,959	1.6	- 1,115
Other mines .....	671	16,402	10,193	201	26,796	2.4	- 471
Total in 1912 .....	3,910	895,485	215,001	6,662	1,117,148	100.0	+ 20,910
Total in 1911 .....	3,977	881,002	208,776	6,460	1,096,238	100.0	+ 18,155

TABLE B.—PERSONS EMPLOYED AT COALMINES, CLASSIFIED ACCORDING TO THE COALFIELDS

Coalfield.	No. of mines at work.	Under ground.	Above ground.		Total under and above ground.	Comparison with preceding year.
		Males.	Males.	Females.		
1. Scotch coalfields .....	469	110,350	23,364	2,942	136,656	+ 5,342
2. Northern coalfield .....	417	175,998	42,838	90	218,926	+ 2,193
3. Yorkshire, &c., coalfield .....	610	199,058	51,885	19	250,962	+ 5,851
4. Lancashire and Cheshire coalfield .....	377	83,196	19,884	2,668	105,748	+ 1,789
5. Midland coalfields .....	411	70,543	20,892	116	91,551	+ 2,391
6. Small detached coalfields .....	125	20,917	5,152	456	26,525	- 66
7. North Wales coalfield .....	43	12,870	2,806	4	15,680	+ 256
8. South Wales coalfield .....	620	191,535	33,786	162	225,483	+ 4,668
9. Irish coalfields .....	21	652	210	—	862	+ 72
Total in 1912 .....	3,093	865,119	200,817	6,457	1,072,393	+ 22,496
Total in 1911 .....	3,192	849,421	194,242	6,234	1,049,897	+ 17,195

made, it would only apply to an area of a few inches in diameter, which, when produced over as many miles, would involve an enormously magnified error. Often in one boring, the cores would show a strong dip in one place and yet be perfectly horizontal a few feet lower down.

The AUTHOR, in reply, stated that the evidence for a boundary to the east rested on the fact that the transition coal measures can be shown to thin rapidly in that direction, and that the carboniferous limestone at Oxney and Ripple has been proved at comparatively shallow depths. The Waldershare, Maydensole and Oxney borings lie almost along a straight line a little south of due west to east from Waldershare, and the thinning of the measures in this direction showed plainly that the eastern, and not the northern, boundary was involved. In reply to other questions, the author pointed out that all the lines of the map were strike-lines, and not out-crops. He had no information as to the results of the borings in the extreme north-west of the field, but an account of an unsuccessful boring at Thornden Wood would be found included in the first paper.

Our Dover correspondent says:—The Whitstable and Canterbury Coalfields Limited have decided to put down a borehole at Lower Hardres, and preparations are in hand for this work to be started early in the new year. The site selected will be between Harmansole and Street End, and negotiations are in progress for obtaining the services of the German Boring Company—at present engaged in boring operations in East Kent—to put down this bore. It has been decided to discontinue the boring at Betteshanger, which is the property of the Betteshanger Boring Company. This has now reached a depth of 2,972 ft., and the principal seam in this boring is one of 7 ft. 9 in., whilst the last seam struck was 2 ft. 7 in. in thickness. It is stated that an aggregate of 48 ft. of coal has been proved in this boring, all of which is claimed to be of excellent quality. Rumours have it that negotiations are taking place for the purchase by an influential syndicate of land in the vicinity of Sandwich on which to erect a plant for the production of tarless fuel, oil ... to the surface in the Kent coal- ... employed are those of the Tarless ... tersea, who have recently made ... coal with highly satisfactory results.

Coalmines.

The statistics relating to coalmines (Table B) have been arranged according to the principal coalfields.

The table shows that there has been a decrease of 99 in the number of coalmines at work, and an increase of 22,496 in the persons employed. The increase has been greatest in the case of the Yorkshire, Scotch, and South Wales coalfields. There is an increase of 223 in the number of females employed on the surface at coalmines, the great majority of whom are employed in Scotland and Lancashire.

\* From Part II. of the General Report on Mines and Quarries for 1912, edited by Mr. R. A. S. Redmayne, H.M. Chief Inspector of Mines.

INDIAN AND COLONIAL NOTES.

Africa.

Electric Power and By-Product Plant.—A scheme has been proposed for the erection of large electro-chemical works at Tweefontein, and formal application has been made to the Power Undertakings Board of the Transvaal. The new station, the plans for which have been prepared by Messrs. Harper Bros. and Co., will be erected on a site adjacent to the Tweefontein Colliery, and will be designed for the production of sulphate of ammonia, sulphuric acid, and such by-products as benzol, tar, and creosote. The chemical plant will consist of gas producers of the Mond type capable of dealing with 400,000 tons of coal a year, and the power plant of boilers fired by producer gas and large turbo-generator sets representing a capacity of 15,000 kw. The chemical plant is to be designed to produce 22,000 tons of sulphate of ammonia and 10,000 tons of tar and tar distillates. Shipments of the actual coal to be used have been tested in producers of the type proposed to be fitted, and the results show that a yield of 119 lb. of sulphate of ammonia can be obtained under ordinary working conditions. It is proposed to erect a high-tension transmission line 50 miles long to link up the Tweefontein Station with the big supply stations at the Rand mines and the Vaal River. Transmission will be at 80,000 volts.

Australia.

An interesting decision has just been made by the Northern (N.S.W.) Coalminers' Wages Board on the claim

of the men for payment for all small coal won by them. They asked for 1s. 6d., and the owners put in a reply asking for a review of the rates paid for the hewing of coal generally, and contending that the men were already paid for small coal in the rate which was fixed for the large coal. The Board has awarded the men in certain collieries 4½d. per ton for small coal. In giving the decision of the Board, his Honour Judge Edmunds said that the reasons given for the payment of 4½d. per ton, at the collieries mentioned, would be found not to apply to those pits where a consolidated rate was paid—namely, a rate for filling the round and small coal together. The Board would be prepared to review the matter; but the employees would have to show that the rate paid them was unreasonably low, and it was obvious that such a contention could not be supported. The award will have a currency of three years, and does not affect the Maitland mines.

The miners in the northern district of New South Wales recently passed a resolution with respect to the use of safety lamps in gassy mines:—"That after a thorough, practical trial of the C.E.A.G. electric safety lamp, by all classes of workmen in the West Wallsend district collieries, we are strongly of opinion that the time is opportune for the introduction of the flameless type of safety lamp, in lieu of the ordinary oil lamps at present in use in the gassy mines of New South Wales." They urged that a deputation be appointed to interview the Minister and officers of the Mines Department to solicit the assistance of the Government in obtaining the introduction of this lamp in practical use.

Coaling Facilities at Newcastle (N.S.W.).—Speaking at Newcastle (N.S.W.) recently, Mr. Cann, State Treasurer, referred to the work which the Government is carrying out in the harbour of Newcastle in order to provide additional and up-to-date facilities for the loading of coal. He said the Government had actually commenced this work, which, when completed, would enable them to ship 10,000,000 tons of coal per annum. The Government had under order six electric cranes for the new wharf in the basin. A new hydraulic crane is to be erected, and the erection of another McMyler hoist is contemplated.

Coaldust Investigations.—A Coaldust Committee has been appointed in New South Wales, consisting of Messrs. D. A. Robertson, Metropolitan Colliery (chairman); A. A. Atkinson, Chief Inspector of Coalmines; R. A. Harle, manager of Hebburn Colliery (Maitland); and W. Rees, miners' check inspector in the Maitland district.

Briquetting Powlett Coal.—For a long time tests have been in progress at the laboratory of the Victorian Mines Department to ascertain the suitability of coal, especially small coal and slack, from the State colliery at Wonthaggi for the manufacture of briquettes, and whether this can be done at such a cost as would make their manufacture a commercially sound proposition. A report has recently been issued by Mr. P. G. W. Bayly, chemist and assayer to the Department. He says the total cost of manufacture of the briquettes in Melbourne, including a coal charge of 7s. per ton, and freight charge of 3s. 7½d. per ton, should not exceed 15s. 3d. per ton. The cost price of good household coal (Newcastle) is about 18s. 6d. in Melbourne, and the usual selling price about 25s. Tests were made on railway locomotives, and they showed that under forced draughts the briquettes held together, and did all the work required of them. The evaporation results were lower for briquettes, thus:—Maitland screened, 9.92 lb.; Powlett screened, 9.02 lb.; Powlett briquettes, 8.48 lb. The analyses of the coals showed that the Maitland coal used was of particularly good quality, and very clean, while the Powlett sample was unusually dirty, and the briquettes also were high in ash:—Maitland, 3.80 per cent. ash; Powlett screened, 8.72 per cent. ash; Powlett briquettes, 9.37 per cent. ash. By altering the shape and size of briquettes a higher evaporation result would have been attained.

Australian Coal for Java.—It is announced, writes our Sydney correspondent, that a contract has been signed for the supply of 100,000 tons of Newcastle coal for the Javanese State Railways. The successful tenderers were the Borneo Company of London and Singapore, who have undertaken to supply the coal in specified quantities extending over a period of six months. Japan was among the unsuccessful competitors. Newcastle coal had been previously supplied, and its continuance, despite keen competition, shows the favour with which it is regarded.

Canada.

A new coalmine has been opened up at Canmore, Alberta, the owners being the Canmore Navigation and Coal Company, with a capital of £500,000. The chairman is Mr. S. K. George, of Messrs. Mann, George and Co., of 28-30, Lime-street, E.C., the other directors being Sir Thomas Holditch, Messrs. C. K. George and J. T. Phoenix. Mr. W. H. Wain is consulting engineer. Extensive bunkering facilities are being provided at Vancouver. The property covers 8,500 acres and contains 12 seams of coal. There is a tipper capable of passing 1,600 tons per day. The coal is said to have the following analysis:—Fixed carbon, 78 to 82 per cent.; volatile matter, 11 to 15 per cent.; ash, 3 to 7 per cent.; moisture, 1 per cent.; sulphur, 0.6 per cent.



## THE COAL AND IRON TRADES.

TUESDAY, DECEMBER 23.

## Scotland.—Western District.

## COAL.

The recent activity in the West of Scotland coal trade has been well maintained. All classes and qualities of coal are in strong demand the shipping department being particularly busy. The best brands of ell coal are now practically unobtainable, while secondary qualities are in eager request. Splint coal is extremely active, and is well booked to the end of the year, and prices are very firm. Navigation and steams are moving off in satisfactory quantities. Although the local demand has fallen off a little owing to several furnaces being put out of blast, the shipping demand is extremely brisk, and is likely to continue so for some time. In smalls, treble nuts are more in request, while doubles and singles are scarce and difficult to arrange for immediate delivery.

Prices f.o.b. Glasgow.

	Current prices.	Last week's prices.
Steam coal .....	13/ to 14/6	13/ to 14/6
Ell .....	13/9 to 14/	13/9 to 14/
Splint .....	13/9 to 17/	13/9 to 17/
Treble nuts .....	12/9 to 13/	13/
Double do. ....	12/3 to 12/6	12/3 to 12/6
Single do. ....	11/	10/9 to 11/

## IRON.

There has been only a small business done on the Glasgow pig iron warrant market during the week amounting to 12,000 tons, and the price remains at 50s. per ton cash. Transactions have also been recorded at 50s. 3d. one month, and 50s. 8d. three months. There has been some buying on German account, but it is difficult to believe that the iron is actually wanted for export in view of the weak reports from the continent. In the pig iron trade consumers continue to purchase only for early requirements, although it has been reported that makers have made some comparatively good deliveries of ordinary qualities. There are 73 furnaces in blast in Scotland compared with 76 in the preceding week, and 90 in the corresponding week of last year. Monkland is quoted f.a.s. at Glasgow, No. 1, 63s. 6d., No. 3, 62s.; Govan, No. 1, 62s. 6d., No. 3, 61s.; Carnbroe, No. 1, 68s. 6d., No. 3, 64s. 6d.; Clyde, No. 1, 69s. 6d., No. 3, 64s. 6d.; Gartsherrie, Summerlee, Calder, and Langloan, Nos. 1, 70s., Nos. 3, 65s.; Glengarnock, at Ardrossan, No. 1, 71s., No. 3, 66s.; Eglinton at Ardrossan or Troon, No. 1, 64s., No. 3, 63s.; Dalmellington at Ayr, No. 1, 65s. 6d., No. 3, 63s. 6d.; Shotts at Leith, No. 1, 70s., No. 3, 65s.; Carron at Grangemouth, No. 1, 71s., No. 3, 66s. per ton. Scotch hematite is quoted 63s. 6d. per ton for West of Scotland delivery. The manufacturing branches of the trade show little alteration. Galvanised and black sheet makers are, however, a little better employed, and in these branches the outlook is more hopeful. The malleable iron trade continues in a depressing condition.

## Scotland.—Eastern District.

## COAL.

In the Lothians district collieries have arranged for the disposal of their production over the remainder of the year and have closed their books.

Prices f.o.b. Leith.

	Current prices.	Last week's prices.
Best screened steam coal .....	13/ to 13/6	13/ to 13/6
Secondary qualities .....	11/9 to 12/6	11/9 to 12/6
Treble nuts .....	13/3 to 13/9	13/3 to 13/9
Double do. ....	12/3 to 12/6	12/3 to 12/6
Single do. ....	10/9 to 11/	10/9 to 11/

Collieries in the Fife district are very actively engaged clearing of their engagements before the holidays, which commence on Wednesday, the 31st inst. A fair amount still remains to be done, especially in the shipping department, but it is not anticipated that there will be any congestion this year, owing to the heavy weather delaying vessels and spreading the arrivals well over the remaining fortnight. All classes of coal are in good demand and prices of all qualities, with the exception of trebles, are firm. Collieries are well booked to the end of the year and, in some cases, well into January.

Prices f.o.b. Methil or Burntisland.

	Current prices.	Last week's prices.
Best screened navigation coal .....	17/	17/
Unscreened do. ....	15/	15/
First-class steam coal .....	13/	12/9 to 13/3
Third-class do. ....	11/	11/
Treble nuts .....	13/ to 13/3	13/ to 13/6
Double do. ....	12/	11/9 to 12/
Single do. ....	10/9	10/9

## Northumberland, Durham and Cleveland.

Newcastle-upon-Tyne.

## COAL.

The prompt coal market has been exceedingly inactive during the past week. In point of fact, there has been next to nothing doing, supplies for this month's loading only being obtainable through the rarest accidents—such as the non-arrival of due tonnage, a circumstance assisted by the strong westerly winds which have blown intermittently for the last fortnight. F.o.b. quotations for prompt shipment, therefore, are purely nominal, and show very little change on those of last week. The only alterations are as follow:—Best steams, Blyths, are weaker; Tynes, easier; smalls, Blyths, 3d. reduced; Tynes, similarly fallen; unscreened bunkers, Northumbrians, 6d. stronger; and gas coke, 1s. 3d. to 1s. 6d. reduced. January business is absorbing such

consideration as coalmen can spare from the contemplation of and arrangement for ensuing festivities, and f.o.b. quotations for that month's loading are at present as follow:—Best steams, Blyths, 13s. 9d. to 14s.; Tynes, 14s.; second, Blyths, 12s. 6d.; Tynes, 12s. 6d.; unscreened, 11s. to 12s.; smalls, Blyths, 6s. 9d.; Tynes, 6s. to 6s. 3d.; specials, 7s. to 7s. 6d.; smithies, 13s. 6d. to 13s. 9d.; gas bests, 15s. to 15s. 6d.; second, 13s. 6d.; specials, 15s. 6d.; unscreened bunkers, Durhams, 12s. 3d. to 13s. 6d.; Northumbrians, 11s. to 12s.; coking coal, 13s. to 14s.; smalls, 12s. 6d. to 13s.; households, 15s. 6d. to 16s. 6d.; coke, foundry, 21s. to 23s.; blastfurnace, 19s. to 20s.; and gas coke, 14s. 9d. to 16s. 9d. A comparison of these figures with those quoted in the appended table of nominal quotations for prompt shipment should be helpful. As to forward business, the biggest item is the contract reported to have been arranged by the Paris Gasworks for 500,000 tons of Durham gas seconds for delivery over next year on the basis of 21½ fr. per ton c.i.f. Rouen, which works out at about 12s. 3d. f.o.b. These gasworks have still a million tons of their next year's requirements to arrange for, but it is stated that they propose to postpone allotment until, at all events, after the turn of the year. The contract to supply the Portuguese Railways with 22,000 tons of good locomotive coals over next year is stated to have gone to Germany at prices considerably below those at which the coal was tendered by Durham producers. The contract for the current year is held by a Durham firm, but little perturbation at the transfer is expressed as, it is stated, the price at which the business has been done is not one which need tempt the Durham collieries, whose prospects for next year are so good relatively. With reference to the considerable contracts for local bunkers announced last week, it is stated that the business has been done on the basis of 11s. 9d. per ton f.o.b. for ordinaries, 12s. for such qualities as Priestman's, Consett and Burnhope, and 12s. 6d. for such classes as Morrison's, Marley Hill. Local producers of bunker coals anticipate some diversion of business from South Yorkshire to this district in consequence of the dispute between Hull trawler owners and the South Yorkshire collieries as to the prices of next year's supplies. It is stated that nearly 750,000 tons of coal are annually consumed by the Humber fishing industry, and that the latter is disinclined to pay the 1s. increase asked by the collieries and are considering the advisability of bunkering to a large extent at Blyth, Hartlepool and Shields, especially for vessels which go to Iceland and the White Sea. Durham gas seconds are stated to have been sold for January-February shipment at 12s. 9d. f.o.b. A considerable parcel of best unscreened Durham bunkers has been sold for next year's delivery at 12s. 6d. f.o.b. The Riga Gasworks are enquiring for 20,000 tons of Wear gas specials for April-October shipment. During last week 152,416 tons of coal and 1,998 tons of coke were despatched from Tyne Dock, a decrease of 6,456 tons of coal and an increase of 1,775 tons of coke when compared with the shipments for the corresponding week of last year. The Blyth shipments aggregated 88,173 tons of coal and coke, a decrease of 9,948 tons. The Dunston clearances amounted to 57,126 tons of coal and 3,108 tons of coke, a decrease of 5,527 tons of coal and an increase of 2,376 tons of coke.

Prices f.o.b. for prompt shipment.

	Current prices.	Last week's prices.
Steam coals:—		
Best, Blyths (D.C.B.) .....	14/6 to 15/	14/9 to 15/
Do. Tynes (Bowers, &c.) .....	14/6 to 15/	14/9 to 15/
Secondary, Blyths .....	12/6	12/6
Do. Tynes (Hastings or West Hartleys) .....	12/6 to 13/	12/6 to 13/
Unscreened .....	11/ to 12/	11/ to 12/
Small, Blyths .....	6/9	6/9 to 7/
Do. Tynes .....	6/ to 6/3	6/ to 6/6
Do. specials .....	7/5	7/6
Other sorts:—		
Smithies .....	13/6 to 14/	13/6 to 14/
Best gas coals (New Pelton or Holmside) ...	15/6	15/6
Secondary gas coals (Pelaw Main or similar)	13/6 to 14/	13/6 to 14/
Special gas coals .....	15/6 to 16/	15/6 to 16/
Unscreened bunkers, Durhams	13/3 to 14/6	13/3 to 14/6
Do. do. Northumbrians	11/ to 12/	10/6 to 11/6
Coking coals .....	13/6 to 14/	13/6 to 14/
Do. smalls .....	12/6 to 13/	12/6 to 13/
House coals .....	15/6 to 16/	15/ to 16/
Coke, foundry .....	21/ to 23/	21/ to 23/
Do. blast-furnace .....	19/ to 20/	19/ to 20/
Do. gas .....	14/9 to 16/9	16/ to 17/3

## Sunderland.

## COAL.

The exports from Sunderland last week amounted to 100,685 tons of coal and 1,680 tons of coke, as compared with 105,880 tons of coal and 830 tons of coke for the corresponding week of last year.

Prices f.o.b. Sunderland.

	Current prices.	Last week's prices.
Gas coals:—		
Special Wear gas coals ...	15/9	15/6
Secondary do. ....	14/3	14/3
House coals:—		
Best house coals .....	18/6	18/6
Ordinary do. ....	17/	17/
Other sorts:—		
Lambton screened .....	15/9	15/9
South Hetton do. ....	15/6	15/6
Lambton unscreened .....	14/	14/
South Hetton do. ....	14/	14/
Do. treble nuts .....	16/6	16/6
Coking coals unscreened...	13/6	13/6
Do. smalls .....	13/	13/3
Smithies .....	16/6	16/6
Pess and nuts .....	16/9	17/
Best bunkers .....	14/9 to 15/	14/9
Ordinary bunkers ..	14/3	14/3
Coke:—		
Foundry coke .....	22/	22/
Blast-furnace coke (dlvrd. Teesside furnaces) .....	19/6	20/
Gas coke .....	17/6	18/

ponding period of 1912, being a decrease of 5,795 tons of coal, and an increase of 850 tons of coke. Shippers having completed their arrangements over the holidays the market is quiet with exceedingly little doing, and prices nominally unaltered. The undertone, however, remains firm, and the general opinion is that present prices will be maintained throughout January, as many of the leading collieries have fairly extensive bookings for that month. Further sales of good Durham unscreened bunkers are reported, a contract for 20,000 tons having been effected at 12s. 6d. f.o.b. Tyne Dock over next year. The Paris Gasworks are stated to have contracted for a large proportion of their requirements of Durham seconds on the basis of 21½ fr., estimated to allow about 12s. 3d. f.o.b. over next year. There is very little passing in the freight market, very few orders and very few turns being available, and with tonnage showing up the market has suffered a further relapse, coasting London paying as low as 3s., with Hamburg 3s. 6d. For the Mediterranean recent fixtures include Genoa 7s. 4½d., with voyages reported July to September at 6s. 9d., Oran 5s. 10½d., Malta 6s. 3d., Naples 7s., Algiers 5s. 6d., Trieste 7s. 9d., Alexandria 7s. 3d. Baltic is on the easy side with Norrköping at 5s. 1½d., and St. Petersburg for July two cargoes at 5s. Bay is quiet, business done being Bordeaux 4s. 9d., St. Nazaire 5s. 3d., Rochefort 4s. 9d., Bayonne 5s. 6d., Oporto 8s. 6d.

## Middlesbrough-on-Tees.

## COAL.

Firmness characterises the fuel trade. With collieries well booked up, prospects are bright. Some customers complain that supplies of fuel are inadequate, and they are pressing for delivery. Gas coal is strong and consumers are now taking as much coal as is available. Best Durham gas coal cannot be bought under 15s. 6d., second kinds range from 13s. 4½d. to 14s. 6d., and special Wear gas is 16s. to 16s. 3d. There is much activity in bunker coal. Substantial enquiries are to hand from the owners of Hull trawlers, who, it is stated, are refusing to pay the high prices quoted by the South Yorkshire collieries. Ordinary Durham bunkers run from 13s. 6d. to 14s., f.o.b., best kinds are in the neighbourhood of 15s., and up to 16s. is named for specials. Household coal is in good demand at from 17s. to 18s. Coking coal is well taken up. Small run from 12s. 6d. to 13s., and coking unscreened 12s. 9d. to 14s. 3d. Coke is very scarce and dear. Local consumption is heavy, and the general market quotation for average blastfurnace kinds is 19s. delivered at Teesside works. Foundry coke for shipment varies a good deal in price, from 20s. to 24s., f.o.b. being named. Gashouse coke runs from 17s. to 18s.

## IRON.

The pig iron market is steady, but as is usual at this season of the year, there is very little business passing. Pig iron quotations are stationary. No. 3 g.m.b. Cleveland pig is 50s. 6d. f.o.b., No. 1 is 53s., No. 4 foundry 50s., No. 4 forge 49s. 9d., mottled and white iron each 49s. 3d., and mixed numbers of east coast hematite 61s. 6d.—all for early delivery. For spring delivery 6d. above these quotations is asked. There are good enquiries in the market for foreign ore, but up to the present they do not appear to have resulted in business to any extent. Dealers, however, anticipate substantial sales in the near future. Consumers are prepared to buy on the basis of 18s. 3d. ex-ship Tees for best rubio, but most sellers still quote 19s. The manufactured iron and steel industries are quiet, and prices all round are unaltered. The output this week has been somewhat curtailed by the Christmas holidays. Quotations stand:—Common iron bars, £7 10s.; best bars, £7 17s. 6d.; best best bars, £8 5s.; packing iron, £6; iron ship plates, £6 15s.; iron ship angles, £7 10s.; iron ship rivets, £8 10s.; iron girder plates, £7 5s.; steel bars (basic), £6 15s.; steel bars (Siemens), £6 15s.; steel ship plates, £6 10s.; steel ship angles, £6 2s. 6d.; steel boiler plates, £7 15s.; steel joists, £6 12s. 6d.; steel strip, £6 15s.; steel hoops, £7; cast iron columns, £7 7s. 6d.; cast iron railway chairs, £4 5s.; light iron rails, £7; heavy steel rails, £6 10s.; steel railway sleepers, £7 5s.; galvanised corrugated sheets, 24-gauge, in bundles, £11, f.o.b.—sheets less 4 per cent., railway material net at works, and all other descriptions less 2½ per cent. discount.

## South-West Lancashire.

## COAL.

At many of the pits in this district an attempt will be made to work on Friday and Saturday, playing only Christmas Day, and making a longer holiday at the new year, this being usual in Lancashire. The demand for household coal is a very fair one, some little impetus being given to it by the preparations for the approaching holidays, but it awaits suitable weather to really get on a winter basis. Bunker fuels continue active on contract account, owners being anxious to get steamers away before the holidays commence. There is not much activity in outside business, and prices are as quoted last week, namely, 13s. 3d. to 13s. 6d. for ordinary qualities to 13s. 9d. or 14s. f.o.b. for the very best grades. Rough seas during the last week have put a good many of the small coasting vessels entirely out of time, which in turn has caused much delay to wagons, but otherwise the demand for household coals for the coastwise and cross-Channel shipments keeps very satisfactory. In slacks, much the same condition of things applies as has been previously reported. The output, if anything, is slightly over the consumption, but not to any great extent.

Prices at pit (except where otherwise stated).

	Current prices.	Last week's prices.
House coal:—		
Best .....	17/	17/
Do. (f.o.b. Garston, net)	16/9 to 17/3	16/9 to 17/3
Medium .....	15/3	15/3
Do. (f.o.b. Garston, net)	15/ to 15/6	15/ to 15/6
Kitchen .....	13/	13/
Common (f.o.b. Garston, net)	13/9 to 14/6	13/9 to 14/6
Screened forge coal .....	12/6 to 13/	12/6 to 13/
Best screened steam coal (f.o.b.) .....	13/3 to 14/	13/ to 14/
Best slack .....	10/ to 10/3	10/ to 10/3
Secondary slack .....	9/3 to 9/6	9/ to 9/6
Common do. ....	8/9 to 9/	8/9 to 9/



**North Lancashire and Cheshire.****COAL.**

Due to the weather and the approaching holidays, the demand for all classes of house fuel has been good during the last few days. Furnace and shipping coal remain unchanged, the latter perhaps may be stated to have been steadier in price. Slack is in good call, but full supplies are offered, and low prices are taken for slack from outside counties. General prices are at foot.

Prices at pit (except where otherwise stated).

House coal:—	Current prices.	Last week's prices.
Best .....	17/3 to 18/	17/3 to 18/
Medium .....	16/ to 16/9	16/ to 16/9
Common .....	13/3 to 14/	13/3 to 14/
Furnace coal .....	12/6	12/6
Bunker (f.o.b. Partington) .....	14/	14/
Best slack .....	10/ to 10/6	10/ to 10/6
Common slack .....	9/ to 9/6	9/ to 9/6

**Yorkshire and Derbyshire.****Leeds.****COAL.**

Although the mildness of the weather has been all against the house coal trade, the pits in West Yorkshire have managed to work practically full time. Stocks in colliery sidings are practically non-existent except for various qualities of manufacturing fuel. The supply of empty wagons has been somewhat limited, and traffic has been delayed, but not to any greater extent than is usual at Christmas time. London merchants have taken more than average supplies of best coal, while the demand from the West Riding depots has been mainly the secondary sorts. Pit prices in the latter markets average as under:—Haigh Moor selected, 18s. to 19s.; Wallsend and London best, 17s. to 18s.; Silkstone best, 17s. to 18s.; Silkstone house, 15s. 6d. to 16s. 6d.; other qualities 14s. to 15s. 6d. Open market business in gas coal is quiet, but the whole output is being sold ex contracts, and there are no stocks of these qualities. Washed fuel is firm and somewhat scarce, but other descriptions of manufacturing fuel are plentiful. Spot lots of washed furnace coke have been sold during the past few days at 13s. per ton at the ovens, but quotations for short term contracts are still in the neighbourhood of 12s. 6d.

House coal:—	Current prices.	Last week's prices.
Prices at pit (London):		
Haigh Moor selected ...	14/6 to 15/	14/6 to 15/
Wallsend & London best	14/ to 14/6	14/ to 14/6
Silkstone best .....	14/ to 14/6	14/ to 14/6
Do. house .....	12/ to 12/9	12/ to 12/6
House nuts .....	11/6 to 12/6	11/6 to 12/6
Prices f.o.b. Hull:		
Haigh Moor best .....	17/ to 18/	17/ to 18/
Silkstone best .....	16/ to 17/	16/ to 17/
Do. house .....	14/9 to 15/9	14/6 to 15/6
Other qualities .....	14/ to 14/9	14/ to 14/9
Gas coal:—		
Prices at pit:		
Screened gas coal .....	12/ to 12/6	12/ to 12/6
Gas nuts .....	11/ to 11/3	11/ to 11/3
Unscreened gas coal ...	9/9 to 10/3	9/9 to 10/3
Other sorts:—		
Prices at pit:		
Washed nuts .....	9/9 to 10/9	10/6 to 11/
Large double-screened engine nuts .....	9/9 to 10/6	9/6 to 10/6
Small nuts .....	9/ to 9/3	9/ to 9/6
Rough unscreened engine coal .....	9/3 to 9/9	9/3 to 9/9
Best rough slacks .....	6/9 to 7/3	6/9 to 7/3
Small do. ....	6/ to 6/6	6/ to 6/6
Coking smalls .....	6/ to 6/6	6/ to 6/6
Coke:—		
Price at ovens:		
Furnace coke .....	12/ to 13/	12/3 to 12/9

**Barnsley.****COAL.**

There has been little new business attempted during the week owing to the fact that work will cease at noon to-morrow (Wednesday) and the stoppage is likely to extend over the week. There was also the prospect of delay in delivery on the railways and nothing further was attempted than the delivery of orders on hand which fairly well absorbed the output of most classes of fuel. The enquiry for large steams on export account has fallen off a little after the rush to get the shipments completed, but the tone of business is good generally and promises well for the restart of operations. On current account prices are rather easier, best hards to the extent of about 3d. per ton and secondary sorts rather more so. The whole absorbing question is of course that of the railway and trawler contracts for the ensuing year. It is felt that nothing decisive will happen until the holidays are over, and there appears to be little doubt but that the determined opposition to the demand of 1s. per ton by the buyers will be maintained. The district coalowners are, however, not unduly perturbed, though it is stated that collieries outside the South Yorkshire Steam Coal Owners' Association are angling for the traffic of the trawlers' companies. The latter know from experience how essential the quality of the fuel used is, and despite the threat to boycott the coal from the district as on a previous occasion, it is expected the contracts will be renewed in the district as heretofore. The arrears on contract supplies are sufficient to permit of delay in fixing up the renewal of their supplies. Little is heard of arrangements on export account for the coming year, and no doubt buyers will hold off until the exceptional business by way of the Black Sea ports has been disposed of. With regard to other sections of the trade, there still continues to be a fair demand for most classes of manufacturing fuel. Best washed nuts are among the main attention, and values are about 11s. 6d. per ton, with secondary sorts fully 1s. per ton. There appears to be in better request, and prices are only so. Best quality fuel is still firm, but rougher sorts are still in demand, and prices are again of a moderate level. The volume of business in house

coal continues to be large, and collieries are unable to fully meet the orders for the best class of coal, though slacks are now low of all descriptions of fuel, the demand from the West Yorkshire district having improved considerably. Values are firmly held all round. In regard to coke, there is practically no change, though the restricted make is well taken, but the depressed state of the pig iron trade in north Lincolnshire prevents the arrangement of forward business.

**Prices at pit.**

House coals:—	Current prices.	Last week's prices.
Best Silkstone .....	15/6 to 16/	15/6 to 16/
Best Barnsley softs .....	15/ to 15/3	15/ to 15/3
Secondary do. ....	12/6 to 14/	12/6 to 14/
Best house nuts .....	13/ to 14/6	13/ to 14/6
Secondary do. ....	11/ to 12/	11/ to 12/
Steam coals:—		
Best hard coals .....	12/3	12/3 to 12/6
Secondary do. ....	11/ to 11/3	11/ to 11/3
Best washed nuts .....	11/3	11/3 to 11/6
Secondary do. ....	10/3 to 10/6	10/3 to 10/6
Best slack .....	7/ to 7/3	7/ to 7/3
Rough do. ....	6/	6/
Gas coals:—		
Screened gas coals .....	12/6	12/6
Unscreened do. ....	11/ to 11/3	12/
Gas nuts .....	12/	12/
Furnace coke .....	12/ to 12/6	12/ to 12/3

**Hull.****COAL.**

Business on the Humber Coal Exchange has now settled down and is practically suspended over the holidays. Prices are therefore more or less nominal on the basis of last week's prices. Shipments from the docks during the past few days have been got away satisfactorily, and very little remains to go this side of Christmas. There is no further development to report regarding the tug-of-war between the Hull trawler owners and the South Yorkshire Coal Association, except that it is said that some Grimsby trawler owners are following suit in sending vessels to coal at the Tyne on the outward voyage to the northern fishing grounds. Local exporters who usually have committed themselves largely at the beginning of December, are also adopting a waiting policy and are expectant as to the outcome of the North Eastern Railway Company's negotiations.

**Chesterfield.****COAL.**

There is an improvement in the demand for house coal and orders are much more plentiful than they have been of late. Prices are firm and they will undoubtedly move upwards as soon as the weather becomes colder. Stocks in wagons at the collieries no longer exist. Manufacturing fuel continues in steady request and deliveries have been heavier to enable consumers to have some extra coal on hand, in anticipation of the stoppage of work at the pits, where the holidays will be of longer duration than those at the various steelworks of Sheffield and the district. Cobble and nuts for gas producers are much wanted, but the supply of this class of fuel is just now below the needs of the market. Slack for boiler firing is steadily coming into greater demand, and an improvement in prices is looked for with the turn of the year. Stocks at the collieries have been substantially reduced during the past fortnight. A brisk demand is experienced for steam coal for locomotive purposes. Contracts with the railway companies for this class of coal, which expire at the end of the year, have not yet been renewed. Collieries are firmly adhering to the prices quoted, which, up to now, the railways decline to pay. Matters have therefore come to a deadlock. It remains to be seen whether buyers or sellers are, in this instance, in the stronger position. During the past three or four weeks, the export trade has experienced a period of considerable activity, but as exporters have covered their requirements to the end of the year, business is likely to be on a reduced scale for a week or two. Little or nothing has been done yet for next year, as foreign buyers are still holding back in the expectation of lower prices. Collieries, however, are not disposed to accept contracts at any reduction from current quotations, which remain at 14s. 9d. per ton delivered at Grimsby. An active demand is experienced for washed nuts for present delivery and enquiries are numerous for this class of fuel for shipment over next season. Cobble and nuts are also in good request for near Continental ports and prices are well maintained. There is a better feeling in the coke market. The demand is improving and prices indicate a hardening tendency. Coking fuel is moving freely.

**Prices at pit.**

	Current prices.	Last week's prices.
Best house coals .....	15/6	15/6
Secondary do. ....	13/6	13/6
Cobbles .....	12/6	12/6
Nuts .....	11/6	11/6
Slack .....	8/	8/

**IRON.**

There is a slightly better demand for pig iron and a feeling prevails that the bottom has been touched, so far as prices are concerned. There is a more hopeful prospect for this branch of the iron trade for the new year. There is not much doing in finished iron and no improvement is looked for until the spring of 1914.

**Nottingham.****COAL.**

There is considerable activity in the coal trade of Nottinghamshire in view of the Christmas holiday, the spell of colder weather having the effect of improving the general position. The tone in the section for household fuel was somewhat brisk. Small merchants and a certain proportion of householders in view of the holiday made heavier purchases from the landsale depots, while some local merchants had a bit of a rush to supply the increased demand of their customers. For best and second qualities there was a fair amount of orders, and no difficulty was experienced in realising current prices. More animation characterised the steam coal branch, and the recent

improvement, particularly in regard to industrials, was fully maintained, while a fair tonnage was sent away for shipment. Slacks were in slightly better request all round. Gas coal and coke were in fairly satisfactory request.

**Prices at pithead.**

	Current prices.	Last week's prices.
Hand-picked brights .....	14/ to 14/6	14/ to 14/6
Good house coals .....	13/ to 13/6	13/ to 13/6
Secondary do. ....	11/6 to 12/3	11/6 to 12/
Best hard coals .....	11/6 to 12/	11/6 to 12/
Secondary do. ....	10/ to 11/	10/ to 11/
Slacks (best hards) .....	7/9 to 8/	7/9 to 8/
Do. (seconds) .....	6/9 to 7/3	6/9 to 7/3
Do. (soft) .....	6/6 to 7/6	6/6 to 7/6

**Leicestershire.****COAL.**

The business conditions in this district display much activity. The colder weather and the prospect of its continuance has stirred up business amongst the merchants, who are feeling the improved demand. The holidays are having the effect of stimulating requests for delivery and there is a desire to fill stocks in the merchants' hands. The collieries are very busy and the vacation will not be unduly prolonged. The prospects of business for the new year appear to be cheerful. There is no particular alteration in prices, the market being quite firm at late quotations. Local merchants generally are doing a fairly satisfactory amount of business. Whilst steam coals have continued in good request, there has been a marked improvement in household coals.

**South Staffordshire, North Worcestershire and Warwickshire.****Hednesford.****COAL.**

During the past week the coal trade of the Cannock Chase district has been satisfactory, and the collieries have been kept very busy. Orders are fairly plentiful for most qualities, and there is not much coal in stock. Most of the collieries close down to-morrow (Wednesday) for the rest of the week. The improvement in the house coal trade is well maintained, and there is not much change to report in the enquiry for fuel for manufacturing purposes.

**Birmingham.****COAL.**

The pits close down to-morrow (Wednesday), and although the owners are anxious to get the men back on Monday, work will not be in full swing till at least Wednesday of next week. The more seasonable weather has given a decided impetus to the household branch, and a busy time is anticipated after the holidays. Prices remain as under:—

**Prices at pit.**

	Current prices.	Last week's prices.
Staffordshire (including Cannock Chase):—		
House coal, best deep .....	18/6	18/6
Do. seconds deep .....	16/	16/
Do. best shallow .....	14/9	14/9
Do. seconds do. ....	14/	14/
Best hard .....	15/	15/
Forge coal .....	11/	11/
Slack .....	7/6	7/6
Warwickshire:—		
House coal, best Ryder ...	16/6	16/6
Do. hand-picked coals .....	14/	14/
Best hard spires .....	15/	15/
Forge (steam) .....	11/	11/
D.S. nuts (steam) .....	10/	10/
Small (do.) .....	8/3	8/3

**IRON.**

The Christmas holidays will be utilised at most of the works for stocktaking and carrying out necessary repairs. Apart from that the break is welcomed, inasmuch as it will give an opportunity for work to accumulate. Recently the second-class har mills have not been able to do more than four days a week. The usual weekly market was, of course, not held, and there has been practically no change in the situation. The Galvanised Sheet Association will, it is anticipated, soon get to work. A good many contracts are running, and it is not the intention of the newly organised body to interfere with prices for some months to come. The intention is rather to regulate output by placing a limit on the production of each manufacturer with a view to eliminating reckless competition. Excess of production will be penalised, and the money thus collected will be used to compensate manufacturers whose output is short of the quantity allotted to them. The quarterly meeting is being looked forward to with some degree of interest, as there are those who predict an influx of business early in the new year. Stocks at manufacturers' works are at the lowest ebb, and it is contended that extensive purchases must be made soon. Meantime, marked bars are unchanged at £9 a ton, showing a large difference of £2 a ton between quotations for marked and unmarked qualities, a fact which is urged by consumers of the standard bars as a reason for a further reduction. In other branches of the market practically no business has been done this week and the old prices stand.

**Forest of Dean.****COAL.**

The house coal collieries are busy, as usual during the last week or 10 days prior to the breaking up for the Christmas holidays. The pits will be idle from to-morrow (Wednesday) to Monday morning. Good shipments have been made the last few days, and there are comparatively few loaded wagons to be seen at the dock sidings. Railborne orders, too, have come to hand in good numbers, but order books are practically cleared to date. The steam coal pits have been more regularly employed since last writing, but generally the demand is only a moderate one.



## Prices at pithead.

	Current prices.	Last week's prices.
House coals:—		
Block .....	17/6	17/6
Forest .....	16/6	16/6
Rubble .....	16/9	16/9
Nuts .....	15/	15/
Rough slack .....	6/6	6/6
Steam coal:—		
Large .....	12/6 to 13/	12/6 to 13/
Small .....	8/6 to 9/6	8/6 to 9/6

Prices 1s. 9d. extra f.o.b. Lydney or Sharpness.

## THE LONDON COAL TRADE

TUESDAY, DECEMBER 23.

The London coal trade for the past week has been very busy. The colder weather, coupled with the probable stoppage of at least three days for the holidays, has stimulated trade, and orders have been very plentiful. Brights and nuts have had the bulk of the extra demand, but all other qualities have also felt the benefit of the improved condition of the market. Prices have remained unaltered, and, except for an occasional levelling up from the special offers quoted some few weeks back, are precisely the same as quoted in September. On Monday, some little discussion took place as to the advisability of altering public prices, but it was ultimately decided to put off the question until after the holidays, and to see what kind of weather we had when work was resumed. The depots report a fairly brisk demand for all classes of coal, and it is evident that special efforts have been forthcoming from the general public to secure a good supply of fuel to last over the Christmas time. The trolleys have been particularly busy, and factories also have largely increased their orders. The trouble in certain quarters in connection with the trolley trade is still unsettled, and the curious anomaly of selling by the hundredweight at less than by the ton is still in force. The trolley trade is principally upheld by the poorer classes, and by the large number of flats, who are either unable to take more than small quantities, or where the limited accommodation is so meagre that weekly or fortnightly deliveries are essential, so that for the trolley trade to be busy means that, should the weather continue cold, the demand at the commencement of the new year would be equally strong, whereas, where the cellar is well-filled, the probabilities are that the supply will last until nearly the end of the winter. The small nuts trade has wonderfully revived, and the extra pressure for supplies has been very marked. This, however, is not occasioning any special comment, for the short days and the foggy weather have given a strong impetus to the electric light and the gas-lighting in every direction. This is a matter, however, which will become every day less active with the commencement of the new year. The cold weather also has considerably helped to make the gas fires a feature not quite so appreciated as an ordinary coal fire in a room; so that in many districts where coal is seldom used, the smoke from the household chimneys shows that the family have once more restarted the ordinary coal fires. In the seaborne market 34 vessels are reported in the Thames for Monday's market, but none for sale. There being no market on Wednesday, the market practically closed yesterday until Monday the 29th inst. Up to Saturday, the coal trains had been fairly well maintained, and the deliveries at the various wharves and depots of the loaded wagons have been good; but the heavy passenger service and the enormous perishable goods traffic will seriously dislocate all mineral traffic arrangements during the current week. The first outside contract taken by the Kent coals is reported this week, when it is understood that a certain firm has tendered to deliver Tilmanstone slack at 17s. 3d. at Southfleet, near Chatham; but as the quantity is only 25 tons, this may mean only a sample or trial lot. Generally speaking, the collieries are clear of all stocks now, and have a fair number of orders on the books, and it is anticipated that most collieries will close down for three days, but the holiday spirit will in all probability make the whole of the following week a more or less broken one. With the present cold weather, and the large inroads into the stock at the principal London depots, it is more than probable that an early advance in prices may be anticipated. Gas coals are now at the highest in their requirements. With the turn of the new year, the London merchants begin to turn their attention to picking up the remainder of their stocks, so should the weather prove mild, a very slow trade may be expected. Seaborne prices remain the same, viz.: 21s. 6d. for best Wallsend, 20s. 6d. for seconds, 21s. for Sharnston Wallsend, and 19s. 6d. for Sharnston Main.

**Home Office Prosecution at Dewsbury.**—At the Dewsbury West Riding Police Court on Friday the Stanley Coal Company Limited; Frederick Rhodes, the agent of the company; and William Wilson, manager, were each charged with three offences in contravention of the Coal Mines Act, 1911, at the Span Bank Pit, Liversedge. Charles L. Robinson, H.M. inspector of mines, said he visited the pit on October 13, and found that in the No. 1 shaft there was no detaching or safety hook and the shaft was not fenced, while in the No. 2 shaft there was no indicator to show the position of the cage in the shafts. Witness agreed that only five men used the shaft complained of, the only work going on being to start a new seam.—Mr. Hewitt, for the defence, said the shaft was only a sinking shaft. The hook and the indicator had been ordered but had not been supplied. There certainly was a technical breach of the law, but he thought the case would be met without a conviction, the defendants to pay the costs. A fine of £10 and costs was imposed on the colliery company on the first summons, the other two being dismissed. Frederick Rhodes and William Wilson were each fined £5 and costs on the first charge, the others being dismissed.

## LABOUR AND WAGES.

## North of England.

The annual meeting of the Durham Miners' Association commenced on Saturday at the Miners' Hall, Durham. Mr. W. House, the president, was in the chair. The meeting discussed a large number of proposed alterations to rules, a great many of the resolutions sent in involving the consideration of the financial position of the association. It has been found that the sick fund is an increasing burden, and it was thought that something may be done in the direction of increasing the contributions or of decreasing the benefits.

The coalowners' reply to the requests of the Northumberland Colliery Enginemmen and Firemen's Association on the wages and hours questions has now been sent to the representatives of the men's union. A special general meeting of the men is to be held in Newcastle early in January to "consider and decide as to what further action shall be taken in connection with the owners' replies, and also on the ordinary quarterly wages questions." The owners were unable to grant the request of winding enginemmen for a basis wage of 5s., plus the current advances. In regard to the locomotive men the owners refused to go beyond their offer of September 20, 1913, namely:—"The owners will agree that the hours of main line drivers be 10 for a present wage of 6s. 5½d.; locomotive firemen's hours on main lines to be 10 for a basis of 3s. 4½d. The owners are unable to make any alteration in the hours or wages of locomotive enginemmen or firemen on branch lines." The request of firemen for an eight hours day at the same rate of wages as for 12 hours, and also to have the system of classing them as "surface labourers" discontinued, and, instead, to have their wages regulated *pro rata* with the enginemmen's, is referred to a committee for further report. The owners are unable to accede to the request of miscellaneous enginemmen for an 8 hours' day. The owners are not prepared to make any further allowance in house rent. As the enginemmen have intimated that a large proportion are in favour of abolishing the system of free house, rent, and coals, with an increase of wage in lieu thereof, the owners will be glad to discuss a scheme for such abolition.

The case of the twelve hewers employed at Chopwell No. 1 pit was mentioned at the Gateshead County Police Court last week. The case was heard on December 4, when the defendants were charged by the Consett Iron Company with having neglected to go to work on November 13, and thereby laid the pit idle without lawful excuse. The company claimed 9s. damages from each man, and this sum, with 4s. 6d. costs, was awarded by the Bench on December 4. At the request of Mr. Clark the magistrates agreed to state a case, and it will be heard in the King's Bench Division.

The Cumberland Coal Minimum Wage Board, at a meeting held on Friday at Workington, were unable to come to a decision upon the claim of the boys and youths employed on the haulage at the Ladysmith Pit, Workington, to be classed as bogie hands, and to receive the minimum wage of 3s. 9d. per shift, the minimum wage of that class. It was agreed that Sir Wm. J. Collins, the independent chairman, should take the case at a meeting in January.

At a meeting of the Cumberland Coal Trade Conciliation Board, held at Whitehaven on Friday, it was decided to invite Canon Sutton to be the neutral chairman.

## Federated Area.

The annual meeting of the Yorkshire Miners' Association opened at Barnsley, on the 18th inst., Mr. H. Smith (president) in the chair. The non-union question was dealt with, and applications were received from the South Kirkby and Newland members for permission to take a ballot. The council decided that the matter should stand over. It was agreed that Aldwarke No. 2 should be allowed to take a ballot in connection with a case of alleged victimisation, and that new branches be sanctioned for members working at Ledston Luck, Micklefield and New Barugh, near Barnsley. The council passed a resolution urging all trades unionist miners to support members of an insurance trade union, and suggesting that miners should ask to see the membership card of the agents calling at their homes so as to verify their membership; also that all new insurances should be negotiated through trades union agents. The second and third days' sittings were devoted to the alteration of rules and the discussion of questions affecting the future policy of the association.

The Lancashire and Cheshire Miners' Federation at their meeting on Saturday, in Manchester, it was reported that altogether 20,000 men had joined the union since the new movement was begun last year.

At a special meeting of the Derbyshire Undermanagers and Deputies' Institute, at Chesterfield, on Saturday, a long discussion took place on the attitude adopted by the colliery owners respecting the request of the deputies of the county for an advance of wages. The deputies' demands are (1). 1s. per day advance; (2), six days' pay per week; and (3), one week's holiday per annum, to be paid for. The reply of the Midland Coalowners' Association was that they considered deputies to be colliery officials, and that they could not "recognise" their association; but the deputies were invited to formulate any grievances they might consider themselves to be labouring under. At the meeting, reports were received from only a proportion of the deputations who were appointed to wait upon the respective colliery managements. The majority of these reports were very unsatisfactory, and there was a general feeling in favour of approaching the Derbyshire Miners' Association with a view to amalgamating with that body. Pending the receipt, however, of reports from the remaining deputations, action was deferred until the next meeting on January 3.

The council of the Derbyshire Miners' Association

have decided to hold a special council meeting on December 29, to discuss the position of the Chesterfield Parliamentary Division, and what action, if any, is to be taken under the Trade Unions Act.

## Scotland.

A meeting of the Scottish Coal Trade Conciliation Board was held on Friday at Glasgow to deal with the application by the men for an increase of 9d. per day in their wages. The demand first came before the board on November 14, but the representatives of the masters and men failed to arrive at an agreement. At a further meeting held about a fortnight later the board was again unable to effect a settlement, and following the usual practice in such circumstances it was decided to call in the services of a neutral chairman. Lord Balfour of Burleigh agreed to act in that capacity, and Friday's meeting of the board was called for the purpose of hearing parties. His lordship has decided that the miners' wages shall be advanced by 6½ per cent. on the minimum rate. This equals 3d. per shift increase, and makes the new wage 7s. 6d. per day.

## OBITUARY.

The death has occurred, at Leeds, of Mr. Mark Oldham, coal merchant, of Barnsley.

The death is announced of Mr. James Armour, managing director of the Edinburgh Collieries Company Limited. The deceased passed away in a Glasgow nursing home after a few hours' illness. For many years he was manager of the Clippens Oil Company, subsequently becoming secretary of the Lochgelly Iron and Steel Company, and on the death of Mr. Henry Mungall, last year, he took over the management of the Edinburgh Collieries Company. He was widely known throughout the coal trade in Scotland.

An inquest was held by Mr. W. J. Bradford, at Blackburn, on the 22nd inst., on Mr. Fred Shaw, joint owner and manager of the Rainsforth Colliery, Grange-lane, who was injured on November 27, and died at his residence, Wincobank, on the 19th inst. Mr. Shaw was at work in a kneeling position in the main level of the colliery waiting for a trammer to bring up a corf to be filled when, without warning, a prop which was supporting the side fell and injured his spine. The jury returned a verdict of "Accidental death."

**Wasting Assets and Income Tax.**—The Association of Chambers of Commerce has now published a full report of the proceedings when a deputation of representative commercial men met the Chairman of the Board of Inland Revenue (Sir Matthew Nathan) in private on November 25. The objects of the deputation were to secure the regularising of the allowances for depreciation on wasting assets, the consolidation of the Acts relating to income tax, and a fairer method of dealing with earned incomes of all classes. Sir Matthew Nathan, in replying to the deputation, said that with regard to those suggestions which involved legislation the Board of Inland Revenue had nothing to do. After dealing in some detail with the question of allowances for depreciation in certain cases, Sir Matthew said he thought the deputation would be satisfied if he said that the matter was a difficult one, and deserved the serious consideration of the Chancellor, and would be brought before him. With regard to the depreciation of furniture, fixtures and fittings, he suggested that things of this character would be better dealt with by the system of allowances for renewals than in any other way, and that system was well understood by traders. It worked well except in the cases of fixtures paid for out of capital, which were very rarely renewed. Possibly shaft-sinking and pithead buildings might be considered more in the nature of plant and machinery than of a wasting asset. A shaft was not wasted, nor was a pithead building. He agreed, however, that the shaft was obsolete. The difficulty was in finding what the allowance should be in fairness to the Revenue when they were dealing with past development. Whether it would be possible to deal with future shaft-sinking and similar work was a question to which they would give consideration. Turning to the question of removal expenses, Sir Matthew promised to enquire whether there was any differentiation in the method of dealing with this in different districts. He agreed with the deputation as to the justice of the claim that where machinery was run night and day the allowance for depreciation should be greater than when it was run during the day only. As to the regularisation of depreciation allowances, he pointed out that the Inland Revenue Board had already made a good start, and had agreed upon certain rates of allowances in the cases of the shipping industry, paper mills, tramways, electrical undertakings, railway wagons, printing works and gasworks, and he took it that, if the Association of Chambers of Commerce would get their trades to send representatives to settle these matters, they would add to the benefits which they had already conferred on traders in this country. Some discussion took place as to the allowances to be made on buildings which become obsolete, and it was agreed that the fairest way would be to follow the suggestion which had been acted on in ship-building and other trades, to which Sir Matthew Nathan had referred.



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*The Colliery Guardian*

AND

**Journal of the Coal and Iron Trades.**

Joint Editors—

J. V. ELSDEN, D.Sc. (Lond.), F.G.S.

HUBERT GREENWELL.

LONDON, WEDNESDAY, DECEMBER 24, 1913.

Lord Balfour of Burleigh, to whom the Scottish miners' claim for increase of wages was referred by the Coal Trade Conciliation Board, has decided that the miners' wages shall be advanced by 6½ per cent. on the minimum rate. This equals 3d. per shift increase, and makes the new wage 7s. 6d. per day. About 90,000 workmen will participate.

The Joint Committee appointed by the South Wales Coal Conciliation Board to consider the demands of the colliery banksmen for increased wages and shorter hours have failed to reach an agreement.

The Belgian House of Representatives on Tuesday adopted a Bill introduced by the Government granting to miners who have worked for 40 years, or who have been invalided, old-age pensions of 5s. 6d. a week.

We regret to announce the death of Mr. James Armour, managing director of the Edinburgh Collieries Company Limited.

Eighteen colliers were injured, seven severely, in a winding accident at Nixon's Navigation Colliery, Mountain Ash, on Tuesday evening.

Mr. R. A. S. Redmayne, H.M. Chief Inspector of Mines, has now issued Part II., dealing with labour, of his General Report on Mines and Quarries for 1912. During the year 1,262 separate fatal accidents occurred in the United Kingdom, resulting in the loss of 1,394 lives. The death-rate per 1,000 persons at all mines was 1.181, as compared with 1.193 in the preceding year. The chief source of fatal accidents again proved to be falls of ground, this class of accident accounting for no less than 44 per cent. of the total fatalities during the year. The total number of persons employed at mines and quarries in the United Kingdom during 1912 was 1,197,035, or a net increase of 17,934 compared with the previous year. Of the persons employed at mines, 895,485 worked underground and 221,663 above ground. Of the latter, 6,662 were women and girls.

The Lord Chancellor has delivered the judgment of the Judicial Committee of the Privy Council in an important appeal by the Attorney-General of the Commonwealth of Australia and members of a Royal Commission from a decision of the Australian High Court against a director and a manager of a company who had declined to give evidence before the Commission on the ground that they were to be asked to disclose trade secrets. Lord Haldane dealt at length with the Constitution of Australia, which he said was based on the principle established by the United



States, and held that the Royal Commissions Acts were *ultra vires* and void so far as they purported to enable a Royal Commission to compel answers or to order the production of documents.

By a majority of the Court of Appeal, on Friday, judgment was given in favour of the appeal of the Wrexham and Acton Collieries Limited against a decision of Judge Moss in the Wrexham County Court, in the case in which Messrs. Richards and Davies sued the company for the difference between 5s. 9d. per day, which had been paid by custom to fillers, and the minimum rate of 4s. 10d. a day as had been fixed under the Coal Mines (Minimum Wage) Act, 1912.

The shareholders of the Duffryn Rhondda Colliery Company Limited have had placed before them a proposal that the company's collieries should be leased to the Imperial Navigation Company Limited for a period of 21 years.

Yet another scheme for the reorganisation of capital is proposed, this time by the Rhymney Iron Company, who suggest the subdivision of the existing 200,000 shares of £5 into shares of £1, and the splitting of the capital into 6 per cent. preference shares and ordinary shares.

An important mining education conference took place at Cardiff on Monday, to consider a comprehensive scheme for securing the co-ordination of mining instruction throughout the South Wales coalfield. The conference was adjourned in order that the coalowners might consider the suggestion that they should join the present Mining Education Board for South Wales.

The Home Secretary has appointed Mr. R. A. S. Redmayne, Chief Inspector of Mines, to hold a formal investigation into the circumstances attending the disaster at the Universal Colliery, Senghenydd, which occurred on October 14. He has also appointed Mr. Evan Williams, president of the South Wales Coalowners' Association, and Mr. Robert Smillie, president of the Miners' Federation of Great Britain, to act as assessors at the investigation, which has been fixed to take place at Cardiff on January 2, 1914. It is announced that the total relief funds amount to £112,000. Of this, £2,646 has already been distributed.

**National Problems and Scientific Assistance.** UNDER this title a letter has been published in *The Times* over the signature of Sir JOSEPH LARMOR, the eminent secretary of the Royal Society, the object of which appears to be a plea for the recognition by the State of the assistance which might be afforded by the scientific societies in the solution of current problems of national importance.

As many of these problems are intimately connected with the coalmining industry, the occasion is opportune for a brief consideration of Sir JOSEPH LARMOR's contention that the Government by its present attitude may be missing opportunities. The two instances referred to in the letter, although obviously only selected as typical examples, are by no means of outstanding importance in comparison with many other problems affecting national prosperity and the safety of our workers. For example, although the preservation of our national monuments is a sacred duty that we owe to posterity, no one will gainsay that such problems as colliery explosions, spontaneous combustion in mines, the exploration of hidden coalfields, and many others, are more vital to the nation's welfare, and more pressing for speedy solution.

We may, in fact, distinguish two kinds of national problem, according to their greater or less urgency, and their solution may involve different treatment. We place all problems dealing with the safety of our workers upon a different plane from those in which either sentiment, as in the case of national monuments, or material prosperity, as in the case of mineral exploration, are concerned. It is the latter class of less urgent matters to which Sir JOSEPH LARMOR seems mainly to refer, although he does not apparently exclude the former. He cites as an instance an occurrence, about 1780, when a special committee of the Royal Society considered whether the lightning conductors on St. Paul's Cathedral should have blunt or pointed terminals; and he contrasts the present state of things in which the DEAN and CHAPTER have engaged an electrical expert to advise them with regard to the reorganisation of the lightning protectors, without asking the opinion either of the Royal Society or the Institution of Electrical Engineers.

Now this serves admirably as an illustration of what we believe to be the trend of modern opinion respecting scientific investigation. The Royal Society, in common with many of the other older scientific bodies, is losing authority in respect to the practical applications of science, if indeed they have not already lost it altogether. And the reasons are twofold. In the first place, the learned societies, especially in their earlier days, discouraged any tendency to deal with what we may call commercial, industrial, or even utilitarian science. In the second place, there have grown up in nearly every Government department scientific branches especially adapted to solve the practical difficulties with which they have to deal. Thus, to enumerate a few only, we have the medical advisers to the Local Government Board, the chemical and research departments of the War Office and Admiralty, the special research departments of the Home Office—to say nothing of the Government establishments at the National Physical Laboratory, the investigation department at the Imperial Institute, and the numerous scientific services, of which we may mention the Geological Survey as a type. When we add that numerous professional and other societies have also been inaugurated in recent times precisely for the purpose of dealing with applied science and the practical problems of everyday life, we see abundant reason for a change in the modern attitude towards the Royal Society and the kindred learned societies of London.

Let us pass for a moment to the particular problems with which the coalmining industry is concerned. In regard to these, the Royal Society is already taking some share, inasmuch as it has in its power the allocation of the Tyndall Research Fellowship, which was established solely for the purpose of investigating problems connected with safety in mining; but we do not think the best use is always made of the knowledge which is gained by such means. The *Philosophical Transactions* of the Royal Society and the *Proceedings* are admirably adapted to purely academic needs, but much useful knowledge is buried in these volumes in a form either inaccessible or unintelligible to the busy mining engineer. What would the majority of mining men now know of Dr. LEWELLYN's researches on miners' nystagmus, carried out by means of the Tyndall Research Fund, if he had not published of his own accord a popular work embodying his results?

We do not think the Government has missed any opportunities in deciding to carry out at Eskmeals the coaldust investigation now in progress. With regard to spontaneous combustion, two independent enquiries are being carried

out, viz., by the Departmental Committee, before whom the Royal Society has already appeared in the form of some of its eminent Fellows, and by the Coalowners' Committee, under the able conduct of Dr. HALDANE, himself a Fellow of the Royal Society. Would either of these enquiries be better or more expeditiously done by the Royal Society?

Without any desire to criticise the methods of the old and justly honoured learned societies, we cannot but think that they themselves may fairly parody the classic saying "*Tempora mutantur sed nos non mutamur in illis.*" This is not necessarily a reproach: it may even be a virtue; in any case it is an explanation.

#### Trade Fluctuations and Reserves.

THE paper read before the Royal Statistical Society, last week, by Mr. D. H. ROBERTSON, on "Trade Fluctuations," a report of which appeared in the last issue of the *Colliery Guardian*, opens up some very interesting questions. In the course of his paper Mr. ROBERTSON argued that the length of a boom and the severity of a depression in any trade depend largely on the time needed to construct and put into working order new instruments of production in response to a rise in prices; and he suggested that the "period of gestation" in the case of coal was longer than in other industries, in support citing the comparative curves of coal and iron production and values.

It is undeniable that the price of coal tends to reach both its maxima and its minima later than pig iron, and the "gestation" theory is an attractive solution. Probably the relative slowness with which coal responds to an upward general movement in prices is also due firstly to the physical and commercial difficulties experienced in limiting the sources of production—a point hinted at by Mr. ROBERTSON—and, secondly, to the fact that coal is a prime factor; the price of iron does not respond to the cost of raw materials so much as to the demands of manufacturers of secondary products. On the other hand, it may be taken as a fairly correct postulate that, in any industry, the increased facilities for production are mainly provided out of revenue; in other words, a colliery owner, knowing the nature of his business, does not embark upon fresh expenditure until he has earned the wherewithal. It thus follows that the full effects of this expansion are not felt until several years after the peak of a boom has been passed.

We are inclined to agree with Mr. D. A. THOMAS, however, that the question is greatly complicated by other factors. Thus the provision of adequate transport facilities is of prime importance to the coal trade, but railway and dock companies have generally waited until the very last moment before doing anything to satisfy demands for increased accommodation. The coal industry, again, is one that is more largely dependent than any other, with the possible exception of agriculture, upon the labour factor. This makes itself felt in many ways. Thus the effect of strikes and other stoppages is more sensible, and restrictive legislation finds immediate expression in a reduced output, whilst the power of trade unions to regulate output for the purpose of influencing prices is greater; on the other hand, the individual output has a human tendency to rise and fall conversely with prices and wages, and coupled with this is the difficulty of securing the increase of staff necessary to man new undertakings or extensions of old ones at the proper time. We believe that the dominance of the



factor really has a greater influence upon the coal market than anything else.

Turning from an examination of causes to what is, perhaps, a more interesting question, it is to be noted that Mr. THOMAS thinks that in future these periods or cycles of fluctuations will be shorter; it is probable also that the extent of variation will be less. As reasons for the first of these forecasts, Mr. THOMAS pointed to the acceleration of transport and of the means of communication. There are other factors at work. In the first place, we have artificial restrictions of output; the coal trade in this country cannot be accused of indulgence to any large extent in such machinations, which are commonly regarded by the populace as instruments of extortion; but the policy of the Rhenish-Westphalian Syndicate and other large conventions has undoubtedly been stabilising in effect; if prices have not fallen, in consequence, below a profitable level, they also have shown less readiness to rise to the famine point.

A second point is the change that has arrived in the habits of consumers. The most illuminating feature of the great strike in 1912 was the unexpected resources developed by consumers during its course. Short-lived booms have frequently been caused in the past solely by panic on the part of the public; the electrical supply companies and the gas companies are less liable to these aberrations of judgment, and, in addition, they have greater facilities for storage, both, actually in their more extended ground space and, figuratively, in their methods of purchase. In other words, the tendency on the part of consumers is to create reserves.

A somewhat similar tendency may be observed in the coal trade. Yesterday's *Times* contains a suggestive article on "Undivided Profits," in which it is pointed out that, during the past six months nearly all industrial companies have substantially increased their reserves, and the following examples, amongst others, are quoted:—

	£
Henry Briggs, Son and Co. ....	25,000
Guest, Keen and Nettlefolds .....	100,000
Walter Scott and Co. ....	36,000
Workington Company.....	30,000
Bolckow, Vaughan and Co. ....	160,000
(written off capital)	
Burnyeat, Brown and Co. ....	40,000
Dalmellington Company.....	7,000
Pearson and Knowles .....	30,000
Coltness Iron Company .....	30,000
Sheepbridge Company.....	100,000
Baldwin's .....	115,186
Horden Collieries .....	15,000
Weardale Steel, Coal and Coke Co. ...	40,000
James Nimmo and Co.....	30,000
Blaenavon Company .....	10,454

There have, beyond the above sums, been other substantial allocations to what are virtually reserves of a general or special character—e.g., by writing down profitable assets below their real value and by considerably larger amounts carried forward.

So far as the question under discussion is concerned, it is the method of employing these reserves that matters. Some companies, like the Staveley and Sheepbridge companies and John Brown and Co., have "gone trumps" on collieries, and this may be expected to increase rather than to diminish the tendency to fluctuations; but it is noteworthy that nearly the whole of the companies tabulated above are interested both in coal and iron or steel, and they have the advantage of being able to invest their undivided profits in those branches of their undertakings that give the best and quickest prospect of a profitable return. We could not take a better example than that of Messrs. Pearson and Knowles, who within recent years have, at different times, transferred the property of the Moss Hall Coal Company and established the Partington Steel-rolling Co. In some cases these investments

are more than a mere replacement of capital and, virtually, it means that the company undertakes the utilisation of surplus profits, instead of leaving this to the shareholders. The effect, as regards Consols and other so-called gilt-edge securities, is unfortunate, but we cannot but think that a sane and discriminating policy such as this must in the long run bear fruit in moderating excessive fluctuations in the price of raw materials.

#### Trade Summary.

The London coal trade for the past week has been very brisk. The colder weather and the anticipated stoppage for the Christmas holidays has materially increased the public orders. Brights and nuts are particularly busy, but all sections of the trade have benefited by the extra demand. The shortage of wagons and the dislocation of traffic on the railways are serious features just at present. Small nuts are in strong demand. Bakers' nuts are also selling freely. Steam coals and factory smalls are steady, but not strong. The demand for shipment has improved.

There is nothing doing on the Tyne, and forward business is being postponed. Prospects are good.

The demand for Lancashire house coal is fair. Bunker requirements are fairly heavy. Rather more slacks are being produced than are going out.

Business in West Yorkshire shows no conspicuous change. In South Yorkshire very little is doing. Steam coal has fallen off slightly, but the forward position is strong.

Derbyshire house coal has an upward tendency, and orders are more plentiful. Manufacturing coal continues in steady request.

The position at Cardiff is largely unaltered, but there is considerable congestion at the loading points.

The activity of the Scottish coal trade is well maintained.

#### LAW INTELLIGENCE.

##### SUPREME COURT OF JUDICATURE.

##### COURT OF APPEAL.—December 19.

Before Lords Justices VAUGHAN WILLIAMS, BUCKLEY, and KENNEDY.

##### The Minimum Wage Act and Fillers' Wages.

**Richards and Davies v. the Wrexham and Acton Collieries.**—This was an appeal by the defendants against a decision of the Divisional Court (Justices Ridley and Lush) reversing a judgment of Judge Moss in the Wrexham County Court. The plaintiffs, employed as "fillers" or "loaders" at the defendant company's collieries, brought the action to recover the difference between 5s. 9d. a day which had been paid by custom to fillers and the minimum rate of 4s. 10d. a day which had been fixed by the North Wales District Board constituted under the Coal Mines (Minimum Wage) Act, 1912. The county court judge held that there was no privity of contract between the colliery company and the fillers, and gave judgment for the defendants. This decision the divisional court reversed; hence the present appeal of the defendants, on whose behalf it was contended that the men were not employed directly by the company at all, but by a collier or contractor who employed his own labour, and to whom the men looked for payment of their wages.

Lord Justice Vaughan Williams, in giving judgment, said the balance was 4s. 4d., the difference on four days' working between 4s. 10d. and 5s. 11d. In his opinion there was no doubt on the evidence that the plaintiff was employed by the defendant company in the sense that he was engaged by the defendants through their manager and appointed to a set by the company, by whom he was liable to be dismissed or transferred. There were deductions which made the amount 5s. 9d. a day, but there was an understanding that, whatever the collier earned, the filler should have his full amount. It was important to remember that the Minimum Wage Act said that nothing should prejudice any agreement or expressed understanding made before the passing of the Act. The county court judge had evidence before him on which he could properly find that before the passing of the Minimum Wage Act there was no privity of contract between the filler and the colliery company, but that had been altered in his (his lordship's) opinion by the passing of the Minimum Wage Act. The Act itself contemplated that the company should pay the filler the minimum of 4s. 10d., and he thought that the reasonable inference to draw was that the company were liable to pay the filler, not only the 4s. 10d., but also the excess since the passing of the Act. In his opinion, the appeal should be dismissed.

Lord Justice Buckley thought that the appeal should be allowed. In his view the purpose of the Act was to define an amount to which an already existing liability should extend. There did exist certain contractual relations between the colliery owners and the filler, and he was for certain purposes under the colliery owners' control. But the question was what the nature of those contractual relations—did they involve any obligation as between

the owners and the filler to pay wages? In his lordship's opinion that question was to be answered in the negative. The respondents' contention was in effect that section 1 of the Act of 1912 was to be read as a section imposing upon the colliery owners—who before the Act had not entered into a contract to pay wages—a contract to pay, and to pay not less than the minimum wage. In his judgment that section imposed no such obligation. So far as the Act was concerned, the colliery owners were not liable. If they were not liable by virtue of the Act, were they liable on a contract outside the Act? The man might be employed directly by the company or by the charter master or other persons. It remained a question of fact which it was. To his lordship's mind the evidence on this point was all one way, and showed that the obligation to pay was the obligation of the collier. The evidence was that if the collier made no wages himself he would still have to pay the filler 5s. 9d. In his opinion, the appeal succeeded and should be allowed, and judgment entered for the defendants with costs of the action, including the costs of this appeal.

Lord Justice Kennedy agreed with Lord Justice Buckley. He did not think that section 1 of the Act could be properly construed as creating a contract for payment if none existed before. It applied only to contracts of employment which at the time of the passing of the Act included contracts for payment.

By a majority, therefore, the appeal was allowed with costs, and judgment entered for the defendants with costs.

#### THE BY-PRODUCTS TRADE.

**Tar Products.**—The market is quiet, but there is very little business of any importance passing. Benzols keep firm, but pitch is weak. Naphthas and carbolics are much about the same. Creosote unaltered. Nearest values are:—

Benzols, 90's .....	1/1 to 1/1½
Do. 50's .....	11½ to 1/
Do. 90's North .....	1/
Do. 50's North .....	1/11
Toluol .....	1/11
Carbolic acid, crude (60 per cent.).....	1/1 to 1/1½
Do. crystals (40 per cent.) .....	3½
Solvent naphtha (as in quality and package) ...	9½
Crude ditto (in bulk) .....	5
Creosote (for ordinary qualities) .....	3½
Pitch (f.o.b. east coast) .....	39/ to 40/
Do. (f.a.s. west coast) .....	39/ to 40/
Do. (f.o.b. gas companies) .....	—

[Benzols, toluol, creosote, solvent naphtha, carbolic acids, usually casks included unless otherwise stated, free on rails at makers' works or usual United Kingdom ports, net. Pitch f.o.b. net.]

**Sulphate of Ammonia.**—Things generally are dull. Not unnaturally both sections of the market are glad to take advantage of the approaching holiday season, so that there is nothing doing for forward, while current quotations are largely nominal. Closing prompt prices are:—

London (ordinary makes).....	£12/2/6
Beckton (certain terms) .....	£12/12/6
Liverpool .....	£12/17/6
Hull .....	£12/16/3
Middlesbrough .....	£12/15/0
Scotch ports.....	£13 to £13/2/6
Nitrate of soda (ordinary) per cwt. ...	10/6

[Sulphate of ammonia, f.o.b. in bags, less 2½ per cent. discount; 24 per cent. ammonia, good grey quality; allowance for refraction, nothing for excess.]

**Scottish Demurrage Case.**—The first decision on the question of demurrage, following upon the sittings of the Court of the Railway and Canal Commission in 1910, has been delivered by Sheriff-substitute Craigie in Glasgow Sheriff Court. This was in an action at the instance of the Caledonian Railway Company against Mr. Charles Ross, coal merchant, 93, Broomloan-road, Govan, Glasgow. The Sheriff found that from March 1909 to November 1912, defender had consigned to him many wagons of coal at Govan Station; that the most of these were placed by pursuers in a siding, known as No. 12, and a very small number of them in other sidings; that pursuers gave no notice of the arrival of wagons which they had placed in Siding No. 12; that it was necessary to give notice to defender as a condition of suing him for demurrage as regards these wagons; and that as they had failed to prove notice of arrival as regards wagons placed by them in other sidings, they could not insist in the action. He therefore absolved the defender, with expenses. In the course of a note, Sheriff Craigie said he was told from the Bar that such decision would determine whether the company stood in the relation of creditors for demurrage to other coal merchants than Mr. Ross. As he read finding 2 of the Order, pursuers had to show, before they could bring themselves under it in a question with a trader like defender, that they had allocated exclusively to him a siding "not being in or at a station." In his view the evidence showed that the company had not exclusively allocated to the defender any siding, and certainly not a siding which was "not in or at a station." Admittedly they reserved the right to use siding No. 12 for wagons not addressed to defender when they found it convenient to do so, and they exercised this right. What was more was that the evidence showed, he should say very clearly, that that siding was a part of Govan Station, as opposed to a siding not being in or at a station. The construction of finding 3 of the Order caused him more difficulty than that of finding 2. What did the expression "after receipt of notice" mean? His view was that "receipt of notice" was a statement of a thing, and not a mere supplying of materials from which the existence of such a thing—e.g., the arrival of wagons—might be inferred. He thought that the reasonable construction of the expression was not satisfied by a railway company, showing only that a trader like defender had knowledge of traffic addressed to him.



## THE WELSH COAL AND IRON TRADES.

TUESDAY, DECEMBER 23.

## North Wales.

## Wrexham.

## COAL.

The past week has been the busiest which has been experienced here for some considerable time past, for the collieries are being pressed to the utmost for delivery of extra supplies owing to the holiday period, and the majority of the collieries have on hand more requisitions than they can possibly fulfil before the holiday interval. Most of the pits are closing from to-morrow (Wednesday) until Monday morning, but in some cases an attempt is going to be made to reopen on Saturday. With reference to prices, there have been no great changes, and there does not appear to have been any number of new contracts settled, but immediately on resumption the question of contracts will claim serious attention from sellers and buyers, as a large number fall out for renewal on December 31. The current prices may be taken as being as below:—

## Prices at pit.

Prices at pit f.o.b. —	Current prices.	Last week's prices.
Best house coal .....	15/6 to 16/9	15/6 to 16/6
Secondary do. ....	14/6 to 15/6	14/6 to 15/3
Steam coal .....	12/6 to 13/6	12/6 to 13/
Gas coal .....	13/ to 13/9	13/ to 13/9
Bunkers .....	12/3 to 12/6	12/3 to 12/6
Nuts .....	11/ to 11/9	11/ to 11/9
Slack .....	6/6 to 8/6	6/3 to 8/6
Gas coke (at works) .....	13/4 to 15/	13/4 to 15/
Prices landsale:—		
Best house coal .....	17/6 to 19/2	17/6 to 19/2
Seconds .....	16/8 to 17/6	16/8 to 17/6
Slack .....	10/ to 12/6	10/ to 12/6

## Monmouthshire, South Wales, &amp;c.

## Newport.

## COAL.

Very little activity is being now shown in the steam coal market, the proximity of the holidays having a deadening effect upon present business. The principal sales have been small parcels to complete cargoes, every effort being now directed to endeavour to secure the despatch of steamers now in dock before Wednesday night's closing. Supplies of coal are fairly plentiful, and for prompt shipment it has been possible to get slight concessions here and there. For all deliveries after Christmas is over, however, colliery salesmen are very firm, evidently having great confidence that the recent pressure in the market will be kept up right along. Smalls share in the general firmness, bunkering sorts especially being in good demand. House coals rule unchanged, although increasing sales are in evidence. Patent fuel quotations for the present are nominal, manufacturers being fully booked for some weeks yet. Pitwood with rather better supplies to hand is a shade easier at 20s. 9d. to 21s. for good wood ex-ship. In the freight market little chartering has taken place; less tonnage is offering, and rates in consequence are inclined to stiffen.

Prices f.o.b. cash 30 days, less 2½ per cent.

Steam coals:—	Current prices.	Last week's prices.
Best Black Vein large ...	18/6 to 18/9	18/6 to 18/9
Western-valleys, ordinary	17/8 to 17/9	17/6 to 17/9
Best Eastern-valleys .....	16/9 to 17/	16/9 to 17/
Secondary do. ....	16/3 to 16/6	16/3 to 16/6
Best small coals .....	8/6 to 9/	8/9 to 9/
Secondary do. ....	8/ to 8/3	8/3 to 8/6
Inferior do. ....	7/6 to 7/9	7/6 to 8/
Screenings .....	8/9 to 9/	9/
Through coals .....	13/6 to 14/	13/6 to 14/
Best washed nuts .....	14/3 to 14/6	14/3 to 14/6
Other sorts:—		
Best house coal .....	18/ to 19/	18/ to 19/
Secondary do. ....	17/ to 18/	17/ to 18/
Patent fuel .....	19/ to 20/	19/ to 20/
Furnace coke .....	19/ to 20/	19/ to 20/
Foundry coke .....	23/ to 25/	23/ to 25/

## Cardiff.

## COAL.

There is very little change to report in the condition of the market this week. The docks are still very much congested, and the difficulty of obtaining tips is as great as ever, the consequence being that merchants who are fortunate enough to have a tip at their disposal have been able to purchase at some reduction from quoted prices, in order to get wagons cleared for work at the collieries. Although reports from the pits show that the miners are working better and outputs have been increased in proportion, the shipments last week still compared unfavourably with the corresponding week of last year. Last week the total exports from Cardiff only amounted to 359,044 tons, compared with 412,815 tons last year, or a decrease of 53,771 tons. At Newport there was an increase of 6,447 tons, at Swansea an increase of 24,591 tons, and at Port Talbot there was an improvement of 12,565 tons. There is ample tonnage in the docks, but owing to the lack of facilities there is a probability of many ships being laid up over the holidays. It is true that during the past few days there has been a certain amount of speeding up, and every effort is being made to save demurrage and get as many ships away as possible before the men cease work. As a rule the holiday at Christmas only extends to two days, but as the third day this year falls on

a Saturday it is believed that practically no work will be done until Monday in next week. In fact, some of the colliery owners maintain that it would be a mistaken policy to allow the men to go down on Saturday, inasmuch as the low percentage of output, owing to absentees, would not compensate them for the necessary standing charges. The congestion, however, has not been without its good effects, because in some quarters merchants have been able to secure really substantial concessions, and it is reported that in one case one of the best Admiralty collieries sold a cargo of first class steams at 19s. 3d. in order to release wagons, and keep the men fully employed. Such a transaction, however, must not be taken as an indication of the market. Prices are still firm, and best qualities are firmly held for 21s. with superior seconds at 20s. to 20s. 6d. Ordinary Cardiff steams are 18s. 9d. to 19s. Monmouthshires are tightly held, and quotations firmly maintained, Black Veins being 18s. 6d., western-valleys 18s., and the best of the easterns at 17s. 3d. The small coal market has been erratic. Last week there was considerable weakness in cargo qualities owing to the unusually plentiful supplies, but an improvement has since taken place, with the result that quotations are 6d. higher than they were a week ago. This firmness is likely to be maintained for some time, as it is the practice of colliery proprietors to reserve a considerable quantity of small coal for home consumption during the holiday season, and when the market reopens next week, in all probability quotations may have an even stronger tendency. Best bunkers, smalls, are now selling at 11s., ordinaries at 10s. 9d., and cargo sorts at about 8s. to 8s. 3d. In Rhondda bituminous coals there is practically no alteration, No. 3 large being 17s. 6d., through-and-through 15s. and small about 12s., although 5d. higher than the latter figure has been obtained during the last few days. No. 2 qualities are 16s., through-and-through 12s. 6d., whilst the small is offered at 8s. 3d. to 8s. 6d. The following table shows the exports of coal from the Bristol Channel to the principal foreign countries and British possessions for the 11 months of 1913, together with the increase or decrease respectively as compared with the same period in 1912:—

	Total Eleven months. 1913. Tons.	Increase. Tons.	Decrease. Tons.
Russia .....	552,111	88,534	—
Sweden .....	208,270	—	5,413
Norway .....	99,948	—	32,027
Denmark .....	31,605	—	6,309
Germany .....	279,754	53,636	—
Netherlands .....	111,817	—	28,588
Java .....	20,411	—	7,820
Other Dutch possessions in Indian Seas	17,438	7,528	—
Belgium .....	451,213	160,906	—
France .....	6,655,128	1,423,555	—
Algeria .....	693,282	203,930	—
French Somaliland .....	55,220	24,039	—
Madagascar .....	18,632	3,281	—
Bourbon (Reunion) .....	7,407	3,099	—
Portugal .....	716,574	122,024	—
Azores .....	16,638	—	15,543
Madeira .....	115,535	—	13,524
Spain .....	1,203,679	236,182	—
Canary Islands .....	637,418	—	20,250
Italy .....	5,112,780	322,538	—
Italian East Africa .....	5,301	—	20,811
Austria-Hungary .....	312,661	185,080	—
Greece .....	363,277	68,586	—
Bulgaria .....	12,855	—	6,890
Roumania .....	175,760	12,563	—
Turkey (European) .....	107,663	5,092	—
„ (Crete) .....	—	—	9,015
„ (Asiatic) .....	116,209	9,280	—
Egypt .....	1,795,243	246,562	—
Tripoli .....	3,010	—	9,197
Tunis .....	147,753	38,157	—
Morocco .....	5,702	3,702	—
China (exclusive of Hong Kong) .....	25,579	6,995	—
Japan .....	3,652	—	11,869
Cuba .....	10,337	1,990	—
Mexico .....	19,517	—	610
Peru .....	8,697	—	12,337
Chile .....	414,600	—	26,706
Brazil .....	1,482,584	229,813	—
Uruguay .....	559,468	—	94,443
Argentine Republic .....	2,853,631	290,811	—
Channel Islands .....	58,724	—	13,464
Gibraltar .....	214,928	1,493	—
Malta and Gozo .....	511,657	204,657	—
Cape of Good Hope .....	37,145	22,421	—
Mauritius and Dependencies .....	33,058	12,298	—
Aden and Dependencies .....	154,540	—	20,835
British India .....	105,752	39,225	—
Straits Settlements .....	18,450	4,816	—
Ceylon and Dependencies .....	200,739	—	10,998
Wei-hai-Wei .....	12,016	792	—
Hong Kong .....	51,303	22,187	—
Canada .....	16,650	4,936	—
Bermudas .....	7,749	—	819
British West India Islands .....	11,302	4,276	—
Falkland Islands .....	12,363	9,821	—
West Africa: British .....	91,201	11,525	—
„ French .....	142,615	55,432	—
„ Portuguese .....	201,337	—	59,476

In coke there is really no market, and what business is being done is really a matter of negotiation between buyer and seller. Nominally, quotations still remain—selected about 28s., ordinary foundry 22s. to 25s., and furnace 19s. to 20s. There has again been a heavy shipment of patent fuel, the total exports amounting to nearly 38,000 tons. Of this quantity the Crown Company despatched 14,747 tons, other local makers 4,000 tons, Swansea 15,138 tons, and Newport 4,100 tons. For delivery in the early part of the year 22s. 6d. is still quoted, and as much as 21s. for later shipments. It is stated that most of the works are well supplied with orders for the next six months, and that prices are not likely to show much fluctuation. Pitwood is plentiful, and does not command more than 21s. per ton.

Prices f.o.b. Cardiff (except where otherwise stated).

Steam coals:—	Current prices.	Last week's prices.
Best Admiralty steam coals .....	21/	21/ to 21/6
Superior seconds .....	20/ to 20/6	20/
Ordinary do. ....	18/9 to 19/	19/3 to 19/6
Best bunker smalls .....	11/	11/ to 11/3
Best ordinaries .....	10/9	10/9 to 10/10½
Cargo qualities .....	8/ to 8/3	7/9 to 8/
Inferior smalls .....	7/ to 7/6	7/ to 7/6
Best dry coals .....	19/ to 20/	19/ to 20/
Ordinary dries .....	18/ to 18/6	18/ to 18/6
Best washed nuts .....	16/6	16/6
Seconds .....	15/6	15/6
Best washed peas .....	14/6	14/3 to 14/6
Do. ....	13/6	13/9
Dock screenings .....	12/ to 12/3	12/ to 12/6
Monmouthshire—		
Black Veins .....	18/9	19/
Western-valleys .....	18/3	18/3 to 18/6
Eastern-valleys .....	17/6	17/9 to 18/
Inferior do. ....	16/6	15/9 to 16/3
Bituminous coals:—		
Best house coals (at pit)	21/	21/
Second qualities (at pit)	18/	18/
No. 3 Rhondda—		
Bituminous large .....	17/6	17/ to 17/6
Through-and-through .....	15/	15/ to 15/6
Small .....	12/ to 12/3	12/ to 12/6
No. 2 Rhondda—		
Large .....	16/	16/6
Through-and-through .....	12/6	13/6
Small .....	8/3 to 8/6	8/6 to 9/
Best patent fuel .....	22/6	22/6
Seconds .....	21/	21/
Special foundry coke .....	28/	27/ to 28/
Ordinary do. ....	22/ to 25/	22/ to 25/
Furnace coke .....	19/ to 20/	18/ to 20/
Pitwood (ex-ship) .....	21/	21/6

Coal and patent fuel quotations are for net cash in 30 days. Rhondda bituminous coals at pithead are roughly 1s. 3d. per ton less. All pithead prices are usually net. Coke is net f.o.b.

## IRON.

Although orders are coming forward more freely for tin-plates there is practically no improvement in prices, which remain from 12s. 7½d. to 12s. 9d. for Bessemer standard cokes, although it is stated that even these rates have been slightly shaded for forward business. For 14 × 18½ sizes the quotation is 13s. 1½d. to 13s. 3d., and for 10 × 20 18s. 4½d. to 18s. 6d., and at these prices it is reported that orders have been received for several hundred thousand boxes from California. It is rather significant that American makers have been holding out for better terms, and although much cutting is taking place across the water, it is evident that considerably more business is being secured by Welsh manufacturers, and the Board of Trade returns recently published show that the exports from South Wales during the past eleven months show an increase of nearly 10,000 tons compared with the corresponding period of 1911, which is taken for analytical purposes in preference to 1912 because of the national coal strike. Exports to both Canada and the States show a substantial increase, and from enquiries in the market it is probable that the volume of business done is likely to improve. The proposal to form an Association in the galvanised sheet trade for the purpose of regulating output is not looked upon with favour by merchants in this district, as it is felt that foreign competitors will reap the advantage. Business in this department keeps fairly steady, and the shipments from Swansea alone last week totalled over 2,100 tons. Prices are still on the basis of £11, although some makers are asking £11 5s. per ton. Imports of foreign plates, bars, billets and blooms are again very heavy, and amount to about £15,000 tons. The demand for Welsh products still continues fairly good, and the association prices for Siemens bars are maintained at £1 11s. 3d., with the usual discount for Bessemer qualities. It is reported, however, that these rates have been shaded to buyers outside the area of the association. Welsh pig iron is 64s. f.o.t. At a meeting of the South Wales Siemens Steelworks Conciliation Board on Saturday, claims were put forward by several grades of men for advances of wages, and although it was submitted by the employers that the present was an inopportune time to press claims on account of the depressed state of trade, it was agreed to advance the rate to barmen by ½d. per ton, and to those on day wages 1s. per day. Boiler firemen at certain works were also advanced 6d. per day. The iron ore market remains fairly firm at recent rates. Scrap metals are unchanged.

## Llanelli.

## COAL.

A holiday feeling chiefly prevails this week and very little new business has been done. Pits will be idle for three days, but outputs will be below the average for a little while. There is a very strong demand for steam and bituminous coals, and the holidays have all they can do to meet the demand. The position will, however, ease down next week, but it is hoped a stronger feeling will even then

Prices f.o.b.

Anthracite:—	Current prices.	Last week's prices.
Best malting large .....	21/ to 22/	21/ to 22/6
Secondary do. ....	19/ to 21/	19/ to 20/
Big Vein large .....	17/ to 19/	18/ to 19/
Red Vein do. ....	13/ to 14/	14/ to 15/
Machine-made cobbles .....	19/ to 21/	20/ to 21/6
German nuts .....	23/ to 25/	23/ to 24/
French do. ....	23/ to 25/	23/ to 24/
Paris do. ....	23/ to 25/	23/ to 24/
Machine-made beans .....	18/ to 22/	18/ to 22/
Do peas .....	12/6 to 13/6	12/6 to 13/6
Rubbly culm .....	5/6 to 6/	5/ to 5/6
Duff .....	4/ to 5/	4/ to 5/
Other sorts:—		
Large steam coal .....	17/ to 18/	17/ to 18/
Through-and-through .....	13/ to 14/	13/ to 13/6
Small .....	9/ to 10/	9/ to 9/6
Bituminous small coal .....	11/ to 11/6	10/6 to 11/6



The anthracite market is much the same as last week, but the colder weather is improving the demand for horticultural and stove kinds. Prices this week are:—

## Swansea.

## COAL

With the removal of the restrictions at the docks, the result of the railway strike, the trade of the port last week showed considerable improvement. Increases were shown in both the coal and patent fuel trades compared with the corresponding period last year. The shipments of coal and patent fuel totalled 114,185 tons. A capital attendance assembled on 'Change this morning, and the anthracite coal market continued very firm. There was an excellent supply of tonnage in dock, and shippers are confining their efforts in despatching steamers before the holidays. Swansea Valley and Red Vein large were firm. Machine-made nuts and cobbles of all descriptions well maintain their strong position, whilst both rubbly culm and duff were unaltered. In the steam coal market the demand was brisk, and prices were again marked up.

Prices of coal f.o.b. Swansea (cash in 30 days).

	Current prices.	Last week's prices.
Anthracite:—		
Best malting large (hand picked) (net) .....	21/6 to 24/	21/6 to 24/
Secondary do. ....	19/9 to 21/	19/9 to 21/
Big Vein large (less 2½ per cent.) .....	18/ to 19/	18/ to 19/
Red Vein large do. ....	14/6 to 16/	14/6 to 16/
Machine-made cobbles (net) .....	21/6 to 24/6	21/6 to 24/6
Paris nuts (net) .....	23/6 to 26/	23/6 to 26/
French do. do. ....	23/6 to 26/	23/6 to 26/
German do. do. ....	23/6 to 25/6	23/6 to 25/6
Beans (net) .....	16/9 to 18/9	16/9 to 18/9
Machine-made large peas (net) .....	13/6 to 14/6	13/6 to 14/6
Do. fine peas (net) .....	—	—
Rubbly culm (less 2½ p.c.)	5/6 to 5/9	5/6 to 5/9
Duff (net) .....	3/ to 3/6	3/ to 3/6
Steam coals:—		
Best large (less 2½ p.c.) ...	19/6 to 21/6	19/6 to 21/6
Seconds do. ....	14/9 to 15/9	14/9 to 15/9
Bunkers do. ....	12/9 to 14/6	12/6 to 14/
Small do. ....	7/ to 8/	7/ to 8/
Bituminous coals:—		
No. 3 Rhondda—		
Large (less 2½ p.c.) .....	17/6 to 18/	17/6 to 18/
Through-and-through (less 2½ p.c.) .....	13/9 to 14/6	13/9 to 14/6
Small (less 2½ per cent.)	10/3 to 11/3	10/3 to 11/3
Patent fuel do. ....	17/3 to 17/9	17/3 to 17/9

## IRON.

Conditions in the iron and steel trades last week were fairly good, although reports varied regarding the volume of work done. Some of the establishments appeared to be quite busy with orders of the lighter description. The tin-plate trade showed more activity, the mills being fully engaged. An improving demand has brought a better tone into the trade, and prices are showing a tendency to harden. Work at the Mannesmann Tube Depot was exceptionally good. The shipments of tin-plates last week were 65,566 boxes, receipts from works 137,301 boxes, and stocks in the dock warehouses and vans 227,450 boxes.

## Letters to the Editor.

The Editor is not responsible either for the statements made, or the opinions expressed by correspondents.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

As replies to questions are only given by way of published answers to correspondents, and not by letter, stamped addressed envelopes are not required to be sent.

## COMPULSORY REGISTRATION OF BENEFITS.

SIR,—I noticed that Mr. W. Hargreaves, in his admirable presidential address to the Midland Institute on December 9, quoted Sir John Colley's recommendations for preventing malingering. One was, "Some system of registration which shall make apparent what is the full amount of sick pay and other benefits, if any, of which the patient is in receipt."

I am sure that if anybody can devise an efficient system of this kind they would be conferring a great blessing upon all colliery proprietors and also on honest workpeople.

I cannot find any passage in the Compensation Act which entitles the owner to demand this information from his employees, and if we cannot do so it will be difficult to obtain. Can any reader of your valuable paper make a suggestion as to how such information can be obtained?

ENQUIRER.

December 23, 1913.

At the annual meeting of the Guiseley and Yeadon Coa Company on Saturday a bonus was declared of 1s. 6d. in the £ on shareholders' purchases. Mr. J. Peate, the chairman, said the average cost of coal during the year had been 12s. 11½d. per ton, compared with 11s. 5½d. in 1912, and 12s. 6d. per ton. Colliery proprietors with whom he conversed on the matter stated that they could not make these advances because of the increased cost they had to pay and the requirements of the market they had to meet.

## THE IRISH COAL TRADE.

TUESDAY, DECEMBER 23.

## Dublin.

The coal trade maintains an extraordinary amount of activity, and the merchants do not now entertain any fears of a scarcity, as large supplies continue to arrive daily in the port, although the dense fogs of the past few days have somewhat retarded the movements of coaling vessels. Extensive deliveries are being made by motor lorries and other vehicles in the city and suburbs, and in many instances police protection is being dispensed with. It is stated that the deliveries by motor lorries daily for each firm average about 32 tons, and this means of conveying the coal is increasing in favour with the local merchants. The coal traffic carried out by the Grand Canal Company, which was suspended owing to the strike, is assuming its normal state, and it is expected that business with the country districts will shortly be fully resumed. The following are about the present prices in the city, all less the usual 1s. per ton discount:—Orrell coal 32s. per ton; Arley, 31s.; Wigan, 30s.; Whitehaven, 30s.; household, 29s.; second Wigan, 28s.; Scotch coal, 27s.; coarse slack, 25s.; best range coal, 27s.; range nuts, 26s.; Orrell nuts, 28s. The coaling vessels arriving during the week were chiefly from Liverpool, Partington, Garston, Preston, Ayr, West Bank Dock, Newport, Saundersfoot, Troon, Whitehaven, Burryport, Swansea, and Birkenhead. In consequence of the strike still being unsettled, the local coal firms are filling all the vacancies in their staff with free labourers. An important conference of delegates from the County and District Councils of Tipperary and Kilkenny, and representative residents of both counties was held recently in Ballingarry, at which it was decided to form a committee for the purpose of taking steps for the development of the Slieveardagh coalmines.

## Belfast.

There is no change in the coal trade in this port, the briskness which usually makes itself manifest at this season being conspicuous by its absence, both as regards the city and inland districts. Prices of all qualities remain unchanged. Quotations in the city are:—Best Arley house coal, 27s. 6d. per ton; Hartley, 26s. 6d.; Wigan, 25s. 6d.; Orrell nuts, 26s. 6d.; Scotch house, 23s. 6d.; Orrell slack, 23s. 6d. Current prices of steam coals ex-quay:—Scotch, 16s. 6d. to 17s. 6d. per ton; navigation steam, 17s. to 18s.; Welsh steam coal, 18s. 6d. to 20s. per ton delivered. Cargoes arriving during the week were chiefly from Garston, Ayr, Point of Aire, Ardrossan, Girvan, Glasgow, Workington, Ellesmere Port, Troon, Partington and Runcorn. During recent sinking operations at Annaghone coalfields, County Tyrone, the miners tapped a 9 ft. seam of coal at a distance of 71 yards from the surface. The coal is stated to be of good quality, highly bituminous, and possesses high heating powers.

**Partnerships Dissolved.**—The *London Gazette* announces the dissolution of the following partnerships:—W. G. Slade and R. Slade, carrying on business as coal merchants, at Chippenham, under the style of Richard Slade and Co.; G. R. Taylor and G. T. Messenger, carrying on business as art metal workers, at Darwin-street, Birmingham, under the style of Taylor and Messenger.

**Finance Act Appeal.**—Mr. H. E. Mitton, an Official Referee under the Finance Act, 1910, has issued his decision in the appeal of Micklethwait v. the Commissioners of Inland Revenue, heard by him on October 16. The appeal was a test case, supported by the Royalty Owners' Association of Great Britain, to decide the power of the Commissioners to apportion the capital value fixed on the provisional valuation of minerals. Mr. St. John G. Micklethwait, who appeared for the appellant, said that Mrs. C. M. Micklethwait was the owner of 64 acres of minerals at Ackworth Moor Top, near Wakefield, Yorkshire, and by a lease of June 30, 1910, she leased two seams to the South Kirkby Collieries Limited for 60 years. The apportionment was made under section 29, but section 29 (1) and 29 (2) were primarily intended to deal with surface land, as there was no such thing as an original site value of minerals. By section 23 (2) when minerals were unleased they were to be treated as of no value unless the owner gave an estimate of their value. In this case the owner did give an estimate, and on September 6, 1911, the original total value and the capital value were fixed at £5,896 for all the minerals as on April 30, 1909, at which time none were leased. On January 13, 1912, the Commissioners claimed the right to apportion that sum between the leased and unleased minerals as follows:—£4,636 for the leased seams and £1,260 for the unleased seams. The appellant contended that there was no power to make such apportionment, and that the Act limited the apportionment to the surface of the land. For the Commissioners, Mr. F. W. Kingdon said when minerals were being worked they were to be treated as a separate parcel of land for the purpose of assessing duty, and that could not be done without apportionment. There was nothing in section 29 (2) to prevent capital value from being substituted for site value in accordance with section 23 (4). Counsel further submitted that the Referee had no jurisdiction on the ground that the appellant did not give notice of objection to the apportionment within the meaning of section 27. The Referee has decided as follows:—“(1) I find an objection was not lodged within the meaning of section 27 of the Finance Act, 1910, and I therefore find that in accordance with section 33 (1) (a) of the Act the appeal cannot lie against the apportionment. (2) If I am wrong in law as to (1), then I find that the Commissioners had the power to make the apportionment which they in fact made, and the same was correctly made in the apportionment served on the appellant on January 13, 1912. I order that the expenses incurred by the Commissioners be paid by the appellant.”

## CONTINENTAL MINING NOTES.

## Germany.

**Ruhr Coal Market.**—Although the amount of coal traffic handled is still very considerable, there can be no doubt that business continues to decline. Short time is extending and would be more widespread were it not that some pits are preferring to accumulate stocks. The situation is chiefly due to the unsatisfactory state of the iron industry, and though the large extensions at some of the ironworks have naturally led to an increased consumption of fuel, the producing capacity of the pits has kept pace with it, and in many instances even outgrown it. In these circumstances the ironworks pits are the least affected by the depression, the others suffering from the fact that they have no outlet at home for their produce. Exports are still extensive, but the increased competition makes the business comparatively unremunerative, and the demand in northern Germany is falling off, though Belgium, France and Holland are good customers. So far as individual grades of fuel are concerned, industrial coals are chiefly affected by the unfavourable situation, coking coals in particular suffering from the depressed state of the coke market. Shipments up the river have not been very large of late, though conditions have been favourable for this traffic; but little inconvenience has arisen in consequence, the demand in South Germany not being very brisk, whilst stockyards there are very full. It is reported that the export rebate on coke, which was raised to 2.50 marks per ton in October, will be lowered to 1.50 marks again when the reduced price list comes into operation on January 1.

**Mannheim Coal Prices for 1914-15.**—Open-burning bituminous coal, I./II., unscreened 186 marks, screened 198 marks per 10 tons, ex Rheinau; III., unscreened 184 marks, screened 194 marks; IV., unscreened 175 marks, screened 185 marks; bituminous nuts I., unscreened 186 marks, screened 198 marks, II., unscreened 190 marks, screened 204 marks; nuts III., unscreened 190 marks, screened 204 marks; IV., unscreened 195 marks, screened 195 marks; slack, unscreened 139 marks; fines 50/60 mm., unscreened 168 marks, 40/50 mm., unscreened 164 marks. The following prices are ex pit: flaming gas coal and large coal 142 marks, large gas coal 145 marks, through-and-through gas coal, summer price 126 marks, winter 136 marks. Coke prices, per 10 tons, ex Rheinau: foundry coke, summer 242 marks, winter 242 marks; broken Ruhr coke I., 60/90 mm., summer 260 marks, winter 270 marks; II., 40/60 mm., summer 270 marks, winter 280 marks; III., 20/40 mm., summer 220 marks, winter 230 marks; IV., 10/20 mm., summer 143 marks, winter 143 marks.

**Coal Market in Upper Silesia.**—There is no change in the situation, consumers' demands for quicker delivery still continuing, although the pits are producing to their utmost capacity. There is hardly any shortage of railway wagons, and yet the output cannot be brought into line with the demand, whilst laying up stocks is out of the question—in strong contrast to ordinary conditions at this time of year. All grades of coal are in active request, even those for industrial purposes being taken over quickly in spite of the somewhat depressed state of the iron industry. House coals are going off well, and the gas coal trade is improving normally, whilst coking coals can hardly be raised fast enough. Exports are being well maintained, and both Russian Poland and Austria-Hungary are willing to take more than can be spared. The coke market is satisfactory, the whole output of blastfurnace and foundry coke being disposed of with ease, and the demand for other kinds is sufficient to prevent any stocks being formed. The Roumanian State Railways are again coming into the market for Upper Silesian coals, direct instead of through Vienna houses, and it is stated that the Bulgarian railways intend to adopt a similar course in future.

## THE TIN-PLATE TRADE.

## Liverpool.

There is no change since our last in the general position. The enquiry is moderate, and buying is quietly steady. For the present, at all events, it looks as if the bottom has about been touched. Makers' quotations may be called:—Coke tins: I C 14 × 20 (112 sh. 108 lb.), 12s. 9d. per box; I C 28 × 20 (56 sh. 108 lb.), 13s. 1½d. to 13s. 3d. per box; I C 28 × 20 (112 sh. 216 lb.), 25s. 3d. to 25s. 9d. per box; I C 14 × 18½ (124 sh. 110 lb.), 13s. 3d. to 13s. 4½d. per box; I C 14 × 19½ (120 sh. 110 lb.), 13s. 3d. to 13s. 4½d. per box; I C 20 × 10 (225 sh. 156 lb.), 18s. 9d. per box; I C squares and odd sizes, 13s. to 13s. 1½d. basis for approved specifications. Charcoal tins are easy at 14s. 9d. and upwards, according to tinning. Blackplate is slow of sale, although £8 7s. 6d. per ton is quoted for rectangles. Coke wasters are in fair demand, and are quoted:—C W 14 × 20, 12s. 1½d. per box; C W 28 × 20, 24s. 7½d. to 24s. 9d. per box; C W 14 × 18½, 10s. 9d. per box; C W 20 × 10, 15s. per box—all f.o.b. Wales, less 4 per cent.

Mr. Addison Langhorne Steavenson, of Leconfield, Darlington, mining engineer, for many years chief engineer of Messrs. Bell Brothers Limited collieries in Northumberland and Durham, and one of the examiners of the North of England Mining Institute, who died November 7 last, aged 78 years, left estate of the gross value of £5,594 1s. 9d. of which the net personalty has been sworn at £5,311 14s. 3d.



## BOOK NOTICES.

**Cranes and Hoists: their Construction and Calculation.**

By HERMAN WILDA. Translated from the German by CHARLES SALTER. 5 in. by 7½ in.: viii. + 159 pp.; 399 ill. London: Scott, Greenwood and Son. Price 3s. 6d. net.

This is one of Messrs. Scott, Greenwood and Son's useful "Broadway" series of engineering handbooks. It contains two chapters only. The first deals at some length with the elements of lifting tackle, such as ropes, chains, drums, hooks, cranks, brakes, &c.; whilst the second is devoted to various types of cranes and hoists. It will thus be seen that the book has a very wide scope; and although the author's method is distinctly practical, more space might have been devoted to certain important points. Thus, the subject of wire ropes deserves more than the three pages allocated to it, and, although illustrations are given of some forms of eyes, there is no reference in the text to the subject of capels and sockets, which we take to be not the least important factors in the use of winches of a certain type. It is true that the author is dealing more particularly with that type of machinery in which chains are employed, and this may account for the somewhat cursory treatment given to some forms of hoisting gear. As an example, we can find no reference to hydraulic hoists. However, it would be hyperbolic to criticise the book on this account, since it is, within its actual limits, a most useful and practical little work, of distinct service to the engineer.

**Pocket Book of Useful Formulæ and Memoranda, for Civil, Mechanical and Electrical Engineers.** By Sir GUILFORD L. MOLESWORTH and H. B. MOLESWORTH. 27th edition. With an electrical supplement by W. H. MOLESWORTH. 3 in. by 5 in., viii. and 936 pp., illustrated. London: E. and F. N. Spon. Price 5s.

"Molesworth" is probably known to and used by more engineers than any other single publication in the English language. Its high reputation is well deserved, for its educative influence must have been enormous during the 50 years since the first edition appeared. The present or "jubilee" edition is thoroughly up-to-date; there is no perpetuation of worn-out formulæ, and some of the most recent developments in engineering practice are well catered for. The authors' claim that "no pains have been spared, no counsel disregarded, to render this edition worthy of the favourable reception accorded to its predecessors," can be fully substantiated by the results.

**A Dictionary of Applied Chemistry Vol. V.** By Sir EDWARD THORPE, C.B., LL.D., F.R.S., assisted by eminent contributors. Longmans, Green and Co. £2 5s. net.

This, the concluding, volume of the Dictionary of Applied Chemistry begins with a long article on sodium, and ends with a definition of the science of zymurgy. The volume treats of no subject directly concerning mining engineers, but no one of an enquiring turn of mind can fail to be interested in the article on spectrum analysis, and appreciative of its excellence. This article, by Prof. E. C. C. Baly, who has himself contributed largely to the science of spectroscopy, is particularly noteworthy for the manner in which the uses of spectrum analysis are explained. As an instance, may be mentioned the quantitative estimation, by the use of the spectroscope, of the nitrogen evolved during the decomposition of gun-cotton and nitro-glycerin.

Praise of the article on spectrum analysis exhausts our enthusiasm so far as the volume is concerned; just as Vol. II. was of value mainly for the manner in which the subject of fuel was treated.

Now that the completed work is before us—five volumes, priced at £2 5s. net per volume—it is natural to reconsider the judgment that was passed upon works of this class when the first volume came under review. In general, it was held, no man requires to have access to a collection of necessarily condensed and possibly superficial statements regarding every subject that the science of applied chemistry embraces. The expert on any one subject can obtain a treatise on that subject, if he requires it (and it is unlikely that he would have to pay over £10 for such a treatise). The student might find such a work of use when "cramming" for an examination, but he would be unwise to use it. There remains the "general reader," who is unlikely to ask for such a work from his library, and still more unlikely to buy it to adorn his shelves.

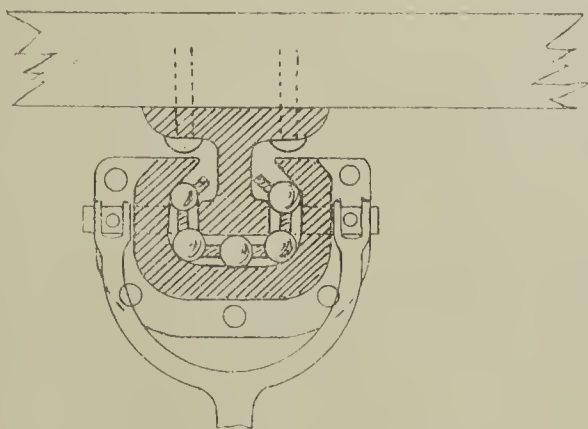
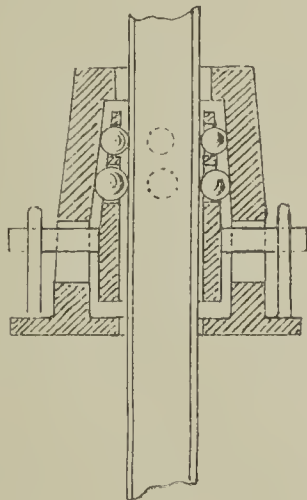
On reconsideration, much as we admire the organisation that has collected such a mass of information into such a comparatively small compass, and excellent as are many of the articles, we cannot regard this dictionary of applied chemistry as free from the objec-

tions to which all works of this class—not excepting the giant amongst them, the *Encyclopædia Britannica*—are open. When we have found it desirable to refer to the volumes since they have been in our possession, the information obtained has always had to be supplemented.

## A NEW SAFETY CATCH.

A model of a new form of safety catch was shown at the last meeting of the North of England Institute by Mr. F. W. Nunn, of Messrs. Nunn and Hanks, 2, Howe-street, Middlesbrough.

Messrs. Nunn and Hanks point out that in carrying out the invention they rely upon the guide ropes or rails to support the cage when the main or haulage rope fails, detents being attached to the cage to automatically grip the guide ropes or rails which pass through them, the construction and action of the detents being as follows:—Into an outer casing, the interior of which is tapered, is fitted, with room for telescopic movement, a hollow conical plug or externally tapered tube with a taper in the same direction as the outer casing, and mounted on cross bars projecting through slots provided in the lower and opposite parts of the outer casing. The constant tendency of this hollow conical plug or tube is to mount to its highest or extreme position in which it approaches to a surface contact with the wall of the casing, the cross bars being under the constant pressure of springs which exert themselves in this direction. In the place of springs, weighted levers may be used. Both the conical plug or tube and the casing are open at both ends for the guide rope to pass through. The grip to the guide



rope is applied by steel balls working in holes in the wall of the hollow plug or tube. The balls project through its thickness in both directions so that, when the plug is far enough telescoped into the casing, the balls are jammed hard between the outer casing and the guide rope, the jam increasing in intensity with the load on the rope, and this gripping tendency can only be prevented by holding the tapered hollow plug far enough back from the jamming position that the balls are clear of the guide rope. The whole arrangement can be made in two parts to avoid uncoupling the guide ropes. If the guide rope or rail is of small diameter, as in the case of lifts in hotels or other buildings, three balls co-operating in one tier or circle will be sufficient, but with the larger ropes used as guide ropes in connection with pit cages more balls would be required. The detents when in action prevent further movement of the cage in a downward direction, at the same time offering no resistance to the movement of the cage in the upward direction when a fresh haulage connection has been effected.

Of course, where guide rails are used instead of guide ropes, the action is the same, the conical plug being adapted to suit the form in cross section of the guide rail instead of being internally cylindrical as in the case of the guide ropes.

A screw coupling is provided so that the chains holding the levers can be adjusted should they become stretched.

## THE UTILISATION OF FUEL.

On Monday, the 15th inst., Prof. John W. Cobb, B.Sc., F.I.C., Livesey professor of coal gas and fuel industries in the University of Leeds, delivered the fifth and last lecture on "The Utilisation of Fuel" to a fairly large audience at Armstrong College, Newcastle-upon-Tyne.

He said he thought he had already made it fairly clear that high thermal efficiency was easily secured when they were working with low temperature appliances, because in normal working, the flue gases left at a low temperature after giving up most of their heat. With appliances used at moderate temperatures, it was practicable to secure a high efficiency by a rather different method, by the absorption of sensible heat left in the flue gases by means of a boiler or something of that sort. It was sometimes very advisable in cases of that sort to use induced draught.

If one wished to work a process that required a really high temperature, another set of conditions had to be faced. In the first place, the direct combustion of coal or of producer gas was not sufficient to give those very high temperatures, so long as the gas and the air used for combustion were cold. He instanced steelmaking, where cold producer-gas and cold air could not possibly give the requisite temperature. The very existence of the open hearth steel process depended upon the introduction of some other principle into the utilisation of fuel. That principle was known as regeneration. The regenerative principle consisted in the fact that a higher degree of thermal efficiency was given to the furnace and the realisation of high temperatures was rendered possible by transferring, by some means, the other part of the heat (contained in the process of combustion leaving the furnace) back again into the gas and air entering the furnace. That could be done in two ways principally. The first method was what was called "continuous regeneration" and was often distinguished by the name of "recuperation." That process, for reasons which he gave, could not be employed in furnaces which were working at the highest temperatures in industrial processes. No such recuperator had been successful in withstanding the highest temperatures, as, for instance, in a steel furnace where the maximum temperature was round about the melting point of platinum. Therefore, another system had to be brought into play, a system of regeneration by reversal which allowed higher temperatures to be worked, and did not require the same delicacy of construction.

Another principle of heat recovery was that the material which had been calcined or furnace, could itself be used to absorb the heat which was the heat of the production of combustion. The use of the regenerative recuperative system had the advantage of not requiring frequent reversal of valves, and had freedom from any minor explosions or flashes thereby rendering it possible to work more delicate processes by it. The advantage of the other system was that it was not necessary to have the same delicacy of construction, and therefore higher temperatures still could be worked and the material carried over from the furnace itself. It did not prejudice the work and destroy the regenerator itself to anything like the same extent. He pointed out that although air gave up heat without change in its composition, that was not so of producer gas and richer gases like coke oven gas.

He concluded by saying a few words as to electrical heating. A great deal of heat, he said, was lost in the first instance in converting the energy of coal into the energy of electrical current, but when they had got their electrical current, then the system of electric furnaces offered undoubted advantages for many purposes. By way of illustration, he said that, taking the case of a steel furnace, if they analysed the percentage of distribution throughout the furnace they would find, even with a modern regenerative furnace, the actual quantity of heat got from the coal into the charge of molten steel was really quite small—something in the order of 18 per cent. If they determined in the same way the fraction of the total heat of an electric current which could be obtained in molten steel, they would find it in the order of 40 per cent., so that the use of electricity for furnace work was not so ridiculously expensive, particularly for very high temperature work, as it might at first sight appear, and it offered the very great advantage that the heat could always be generated actually in the charge which it was desired to heat. He was not surprised, therefore, that the electric furnace was becoming quite a practical apparatus for special work, and particularly for very high temperature work.

Mr. Ernest F. Hooper, president of the North of England Gas Managers' Association, moved a vote of thanks to Prof. Cobb for his delightful series of lectures and, referring to the strike of municipal employees in Leeds, said he had no doubt that most of Prof. Cobb's pupils would be stoking furnaces in Leeds and that Prof. Cobb would be anxious to get back to give them a hand.

The vote of thanks was carried with acclamation and a word of acknowledgment from Prof. Cobb terminated the meeting.

Messrs. Wm. Johnson and Sons (Leeds) Limited, Castleton Foundry, Armley, Leeds, have this week been favoured with a third repeat order for stonedust grinding machine for one of the largest collieries in Lancashire.



## MINING AND OTHER NOTES.

Explosion occurred on 16th inst. at the Vulkan Mine, Newcastle, Colorado. Blackdamp, fired from the flame of a miners' candle, is said to have been the cause. The known death-roll amounts to 38, only two men out of the whole shift escaping.

Mr. Henry H. Schloesser, Labour candidate for York and standing counsel to the Labour Party, has been appointed Miners' Federation standing counsel.

Coal was reached last week at the Plenmeller Colliery, near Haltwhistle, where sinking operations have been carried on for over four years. The colliery is on the estate of Mr. E. A. Webster, of Unthank Hall. There are two circular shafts, 80 ft. apart, and of 18 ft. diameter each. The coal has been reached in No. 1 shaft at a depth of 132 fathoms. The seam, which is 2 ft. 3 in. thick, is known as the "Little Limestone," and is of good quality, being the same as that now being worked at the Blackett and South Tyne Collieries, and also formerly at the Byron Colliery, Greenhead. At a depth of 85 fathoms, a seam of 1 ft. 10 in. thick was passed, this being considered unworkable on account of the watery strata lying on top of the coal. No. 2 shaft is now at a depth of 106 fathoms, and from this shaft it is now intended to put in a 6 in. borehole to the coal seam and run the water into No. 1 shaft, from which the water will be pumped during the sinking of No. 2. The Vivian Diamond Boring Company, of Cleator Moor, have now that work in hand. The sinking contractors are Messrs. J. Johnson and Sons, of East Boldon. The shafts for the first six fathoms are brickwalled and for the next 45 fathoms are lined with metal tubing, and below that depth with 5 in. concrete blocks, filled in to 21 in. with concrete. Owing to the large quantity of water met with, the cementation process was adopted in sinking. Electric generating plant has been installed by the British Westinghouse Company, and the winding machinery will be the "Koepe" winder. The royalty of the colliery covers an area of 5,600 acres on the Unthank estate and 800 acres on Bellister estate adjoining.

A town's meeting in support of the scheme for developing the Ellenborough Colliery, with a capital of £200,000, was held recently in the Town Hall, Maryport. Mr. Brown, town clerk, Whitehaven, said it was estimated there were 20,000,000 tons of coal, which would yield an output of 300,000 tons for seventy years. The scheme estimated a yield of 30 per cent. The Mayor of Workington said the advent of the by-product coke oven had made the Cumberland collieries highly profitable. The success of the company meant that in ten years three millions of money would be spent in Maryport. The Hon. Frank Curzon supported on behalf of the royalty owners. A resolution of support was unanimously carried.

Mr. Edward Barton, chairman of the Carnforth Hematite Iron Company Limited, left estate of the gross value of £90,552, of which £72,322 is net personality.

At the Newcastle County Court last week, before his Honour Judge Greenwell, a question arose as to the jurisdiction of the court in a dispute regarding the Northumberland and Durham Miners' Permanent Relief Fund *versus* an aged miner named Matthew Stewart, as to the date at which payments from the funds should commence. The plaintiff, it was stated, had suffered a stroke, and gave notice to the local secretary at about the end of November last year. His case was that the local secretary had not forwarded the notice to headquarters until March, when the payments started. After argument, his Honour held that a special domestic tribunal was provided by the rules and the plaintiff's summons was misconceived. Judgment was for the defendant, with costs.

We understand that a report is being prepared, and will shortly be published, by an expert on the subject of harbour development, to illustrate the possibilities of Langstone as a commercial port.

Amongst the Friday evening lectures to be delivered at the Royal Institution before Easter, the following may be noted:—"Surface Combustion" by Prof. Bone (February 27); "Fluid Motions" by Lord Rayleigh (March 20); "Improvements in Long-distance Telephony" by Prof. Fleming (March 27). Two afternoon lectures will be given on February 5 and 12 by Sir Thomas Holland, the subject being "Types and Causes of Earth Crust Folds", and three lectures will be delivered on March 5, 12, and 19 respectively on "Heat and Cold" by Prof. C. T. Jenkin, of Oxford, two lectures on February 14 and 21 by Dr. J. A. Harker on "The Electric Emissivity of Matter", and six by Prof. Sir J. J. Thomson on "Recent Discoveries in Physical Science," on February 28, March 7, 14, 21, 28, and April 4.

Amongst the orders recently closed by Messrs. Ed. Beunis and Co. Limited are the following:—Messrs. the Wolverhampton Corrugated Iron Company Limited, Mersey Ironworks, Ellesmere Port: Two "Bennis" stokers and self-cleaning compressed-air furnaces (repeat order); one "Bennis" elevator for feeding coal into the hoppers of the machine-stokers. Messrs. Richard Evans and Co. Limited, On the Helens, Lanes: Two "Bennis" furnaces. Messrs. T. J. T. and Shawcross Limited. Two "Bennis" furnaces for Strangeways Hall Collieries, near Macclesfield. Messrs. J. H. and Co. "Bennis" hand-fired furnaces for Dukes Colliery (repeat order).

It was reported at the annual meeting of the Cleckheaton Technical Institute last week that the number of entries in the classes last session was 904, and in the four branch evening schools 436. The institute has been reorganised as a special centre for mining students, and the classes for certificates for gas testing, &c., under the new Coal Mines Act had been especially successful.

A local correspondent learns that early in the new year the sinking of a new Arley mine will be commenced at Lord Ellesmere's extensive Mosley Common Collieries, near Manchester. Meanwhile, new seams are being tapped and surface improvements effected at the same pits; also at his lordship's Ashton Field Collieries, Farnworth.

At the Kingston Colliery, Hyde, on the 20th inst., a deputation of the officials and workmen made a presentation to the manager, Mr. Robert W. F. Mayfield, of a beautiful smoking outfit suitably inscribed, upon his leaving the colliery to take up the general management of the Froghall Mines Limited in North Staffordshire.

At the council meeting of The British Electrical and Allied Manufacturers' Association, held on the 18th inst., the following firms were elected members of the association:—Fraser and Chalmers Limited, Johnson and Phillips Limited, Thomas Kesnor and Co. Limited, The Record Electrical Company Limited.

A meeting of the Notts and Derbyshire branch of the Association of Mining Electrical Engineers was held at the University College, Nottingham, on Saturday afternoon, December 20th. Mr. L. G. F. Routledge, of Eastwood, (president) was in the chair. In his presidential address Mr. Routledge alluded to the increasing responsibility which rested upon colliery electricians, and pointed out how important it was that they should make themselves thoroughly efficient in all branches of electrical engineering. While the responsibility of the electrician for the running and maintenance of the plant was recognised by the Government, there were many colliery electricians who even now had no, or very little, say in the lay-out and the type of plant for the running of which they were to assume responsibility. He contended that in regard to electrical plant the engineer should be more engaged in the capacity of technical adviser to the management. Two papers were subsequently discussed, one on "Testing Transformers for Colliery work" by Mr. John Bentham, member of the Yorkshire branch, and the other on "Practical Notes on Colliery Electrical Equipment" by Mr. J. Aust, member of the Lancashire branch. The chairman, Mr. E. Beadsmoore, Tibshelf, Mr. T. H. Williams, Kirkby-in-Ashfield, Mr. F. Smith, Pinxton, Mr. J. Watson, Loscoe, Mr. E. R. Hudson, Ilkeston, Mr. H. Dean, Glapwell, Mr. E. Wilbraham, Ripley, and Mr. J. T. Taylor, Swanwick, contributed to the discussion. Mr. Frank Hancock, lecturer on mining at the Nottingham University College, was elected as a member, and Mr. S. Barke, Norbriggs, Chesterfield, as a student member.

The *Gas World* states that the Marseilles Gas Company is putting up tanks of a capacity of 140,000 cubic feet, for storage of coal under water. These are being constructed in reinforced concrete.

The Manor Powis Coal Company, which was formed a few years ago to work the mining field on the north side of the River Forth between Stirling and Alloa, have now, it is reported, sunk through all their seams in their area near Craigmill, Causewayhead. The Bannockburn main seam has been found to be an excellent hard, anthracite coal, which is found only in Scotland in the Stirling and Lasmahagow districts. Screening and washing plant to treat an output of 1,200 tons per day will forthwith be installed.

A further meeting of all England ironmasters to consider the formation of a new association for price maintenance and output control in the galvanised iron trade was held on Friday. It was reported that a large number, including Lancashire, the Midlands, the north of the country, and South Wales, had given in their adhesion, and it was resolved to carry the scheme through. The new combine will allot a certain production to each works, and any excess manufacture will be subject to monetary penalties, which will be pooled. A fixed price control is not to be attempted.

The report of the delegates appointed by the Board of Trade to the Sixth Congress of the International Association for Testing Materials has been issued as a White Paper. The association is a voluntary association founded in 1884 by Prof. Bauschinger, of Munich, who created the first State laboratory for testing materials. It is supported by the subscriptions of its members and subventions from several Continental Governments and from railway and industrial corporations. The report states that on the question of international specifications there is a general consent that, provided it is possible to agree on the adoption of international specifications for iron and steel, certain advantages would result. But the British delegates think that the association is not a body sufficiently representative of engineers and manufacturers to be entrusted with the drafting of international specifications, for although many manufacturers are members they do not take an active part in the congresses.

Mr. Frederick Mills, managing director of the Ebbw Vale Company, has joined the board of the Newport-Abercarn Black Vein Steam Coal Company Limited.

The quarterly meeting of the committee of management of the North Staffordshire Miners' Permanent Relief Society, was held last week. During the quarter ended September 30, the number of members who had received accident pay was 477; no fatal accidents had occurred during the quarter; two children had gone off the fund, leaving 102 widows, 79 children, and four guardians in receipt of benefits. Income: Members' entrance fees, £8 5s.; contributions, £819 10s. 2½d.; cards, 18s. 10d.; interest on investments, £132 14s. 9½d.; income-tax refunded, £47 5s. 10d.; total, £1,008 14s. 7½d. Expenditure: Accident pay, £859 12s. 10d.; widows and children, £250 8s.; grants in settlement of claims, £30; total, £940 0s. 1½d. Capital, £24,974 16s. 6d.; membership, 4,322.

Mr. Walter W. Storr, it is stated, will retire from his position as general superintendent of Bolckow, Vaughan and Co. Limited, on January 1 next, and has been elected to a seat on the board.

## SPONTANEOUS COMBUSTION IN COALMINES.

## A Digest of Evidence before the Committee.

(Continued from page 1289.)

Mr. F. G. MEACHEM.

Mr. FREDERICK G. MEACHEM gave evidence on June 10, 1913, in regard to South Staffordshire. He said the Hamstead Colliery was most liable to spontaneous combustion. He first of all spoke on the subject of fires in thick coal stalls. The first occasion of which witness could find any mention of spontaneous combustion was in an old record—Dud Dudley's book. He says, "which sulphurous small coal and crowded moist slack heats naturally and kindles in the middle of those great heaps and often sets the coal-pit on fire." That is practically the case to-day. These fires have been known for 300 years. For the sake of convenience, witness divided the factors causing combustion into the following heads:—firstly, mechanical action, which is either caused by weight or pressure on the seam, or the weight of the heap of slack itself; secondly, chemical action, with or without pyrites, and there are a lot of seams in which no pyrites is found. In the brazzils, for instance, there is very little pyrites, and that will fire very quickly. The brazzils occupy about the middle in the thick coal. Then the roof and the top slipper are beautiful coal, and very free from pyrites, yet they had fires in that coal. There are zones in the thick seam which do contain a considerable amount of pyrites. The lower seams and the benches are full of it, and the stone coal is full, too. There is no thick coal working in South Staffordshire where spontaneous combustion does not occur.

## GREATER DEPTH OF WORKING.

Witness said the chemical action with or without pyrites, the main cause in all cases—absorption of oxygen and the raising of the temperature—was a question that a chemist could deal with better than he could. Then they had to take into consideration the natural heat of the mine itself and the depth of the mine, which had some effect. Most of their mines, until quite recently, have all been shallow, but they have had no fires in the gate roads. They must take crushing and heat together; the old coalfield runs down to 200 yards. Witness's brother has been there for 30 years, and he never had a fire in the fast road. Now they go down to 420 ft. at Sandwell and 620 ft. at Hamstead, and may go along steadily for five or six years and then suddenly they begin to have a fire here and a fire there, where the workings are hundreds of yards away. That is owing to the pressure taking effect, and also there is an increase of temperature of 1 deg. for every 100 ft., so that at the 600 ft. and the 1,800 ft. depths there is a big increase in the temperature itself.

## INDICATIONS OF FIRING.

Witness next dealt with the signs of fire. As soon as ever the ribs begin to break and the slack falls from the top they always get the first sign of fire in the back of an opening. When it begins to settle, the fine slack breaks from the top. They invariably find their fires at the foot of the pillars in the stalls. Under present conditions they keep those open as long as they can get back to them. The next thing noticed is the sweating, the drops of water on the roof of the opening beginning to drop. It is the moisture condensing on the roof. Then the next thing is the smell. They get the fire stink within a day after the sweating. Before the sweating, the stalls increase a little in temperature, but it cannot be detected. It would be interesting if they could possibly get to a rib and show the heating up of the rib.

## OLD AND MODERN METHODS OF WORKING THE THICK COAL.

Witness said the fires a hundred years ago must have occurred more frequently than they do now—for this reason, that when they can get hold of one of these old pits they can fetch out as much coal from one of them as they can out of a maiden pit, and in a number of mines there is coal which has been cut still up. Witness added that even in cases where they had had fire that had been actually blazing, it had not gone into the solid coal more than 4 in. He next put in a plan, 100 years old, which showed that there was only one road, and that the return was covered by means of airheads. That system had some little utility owing to the fact that although the ventilation was limited, only having a single shaft in the colliery and trumpeting, so that the place could not really be kept cool enough by reason of the insufficient ventilation, the gas always fled to the top, and so was carried away in the airheads. It is



nearly always in the openings in the thick coal that men are burned, through slight explosions. Had that been a fiery coal it never could have been worked under ordinary conditions. For these reasons the top heads, in their way, answered the purpose for which they were intended. But the amount of ventilation was necessarily very restricted and altogether inadequate properly to cool the workings; the heat thus steadily accumulated and the panel was speedily on fire. The common practice was to shut down the pit for a short time and then reopen. In the present method of working the thick coal, either in shallow or deep mines, the pit is divided into districts: each district having its own intake and return air. A thick coal pit, producing 500 tons a day, was a very great thing in the Black Country, because there were so many mines which were not more than 100 yards deep where they put down a pair of shafts only; 500 tons a day was very good in those cases, but at these greater depths they have to get the greatest output they can in order to make it pay. The greatest output witness had ever had was 7,000 tons a week from one shaft. They hoped to recover the ribs in a second or third working. In a shallow working they can work them a third and even a fourth time. They called it pickings, and witness said he had a lot of trouble now with these picking pits. In the Black Country there are these pickings only a few yards deep under the highways, and sewers and pipes, and so on. Men pay 5s. or 10s. a week, and for 100 years Wednesbury fields has been at work, and still is to-day, the people paying 10s. a week for these coal pickings. The ribs are about eight yards wide. He was hoping to get out similar ribs in the deep pit, although the experiment has never been made; but in the Sandwell Park Colliery, at 420 ft., it has been tried, and Mr. Hughes had informed witness that it is successful. In this case the floor comes up, principally. Witness said he should do his best to put his roads in the gob. As a rule, the royalty was on a tonnage basis, but the new coalfields were principally on footage, approximately, £12 10s. to £25, and half the coal left.

Witness said the whole of the slack must come out, because of the danger of fire. In the old days they used to use this slack to stand upon when cutting the coal, but they had to teach the younger colliers to work on ladders and planks. Another thing is to have as little blasting as possible; they hardly allow, in cutting back the big ribs, a pound of powder. Men who are sending out 30 tons a day will not use 5 lb. of powder; the blasting breaks the coal into fine dust.

#### REDUCTION OF OXYGEN.

Witness said that as soon as ever they had the sweat or the stink they did not make any fuss about it, but would "in with the dam," whatever state the work might be in. They let it stand for about a month, and can then go into that place again, but they must be very quick; they cut out the coal and load it up day and night, and by that means saved thousands of tons of coal per year. Experience showed that if they could by any means reduce the oxygen down to about 16 per cent. the whole thing stopped. Dr. Haldane had found that at 16 per cent. activity ceased.

Witness said they had never known a fire occur in the New Mine, although it is 12 ft. in thickness.

In reply to a question, witness said they had a very small percentage of moisture in their coal.

#### FIRES IN GATE ROADS.

Witness next dealt with fires in gate roads; that, he said, has been the greatest trouble in all the thick coal seams which are being worked now at great depths. Where the coal lies at depths from the surface down to a couple of hundred yards, fires in gate roads are never known. The practice had been throughout South Staffordshire to have the roads a chain apart; it has been found to be safe, and millions of acres have been worked. That was increased to a chain and a-half, and then ultimately to two chains. That was when they began working within 120 yards of the roads and got a creep and a swinging over of all the pillars, thus causing a pressure on the roads. In the case of the high pillar, however, which is 600 yards across, there are no workings within 700 or 800 yards, and that is on fire to-day, within 60 yards of the pit bottom. So that the movement is not altogether due to the extraction of the coal. A deep pit is liable to earth bursts and bumps. These, witness thought, were due to relieving the tension that causes bumps, because that was always their trouble. The mere fact of driving the roads through relieves the tension and causes a bump. It was not due to gas under pressure. In one case witness kept boreholes in front of the roads 12, 14, or 15 yards, and it bumped just as badly.

#### CONCRETE ROADS.

Witness said he had made no attempt to concrete those roads. Mr. Hughes at Baggeridge has put in concrete roads, but not in the thick coal. He has gone down to the whistone. In one case witness drove both those roads with brick brattices, so as to have an intake and a return, and carried them 400 yards in the next experiment. They had never had a fire in a single road, but fires take place independent of the connection between the intake and the return. They had that in the stables; they simply drove those stables away, to give the horses all the fresh air possible, and that was a single road with the air coming in and going out there, and they had fires, and had to take them out and put brick cogs in. The nearest road would be 70 or 80 yards away, and then it was simply a gate road. Oxygen was being absorbed in the cracks, and so it was being fed. Where there was a break in the coal it began to heat, and the barometer rises and falls. They would sometimes get a falling barometer which would bring the smoke down before they knew absolutely that there was any heat. Witness said they had had fires where they had driven without bolt-holes 200 or 300 yards, and they have had fires besides those roads in the interval between two bolt holes, where it was impossible

to get from one airway to the other. He attributed that entirely to the shattered state of the road.

#### THE TEMPERATURE AT HAMSTEAD.

Sir Arthur Markham referred to the ascertainment of temperature made by witness and Dr. Haldane, who arrived at the conclusion that the natural temperature of the coal at Hamstead was 66°. Witness said they went about 9 ft. into the side and used a maximum and minimum thermometer. They left behind a thermometer which was there for about two years, because the pit was closed in 1896, and when they got that thermometer out they got the same results as they had been getting regularly. That was in a stall. The borehole was put in within a month, or two months probably, of the opening of the face. The depth was over 2,000 ft. Witness did not know that the figures had been questioned by Dr. Harger on the ground that the method adopted of taking the temperatures was erroneous, and that the natural heat of the mine would make it about 90 degs. The thermometer which they got out later on was in working order. There is another remarkable thing with regard to the pit; when the cry was given of "Pit on fire!" it was drink time, and every man jumped and ran, dropping whatever food he had in his hand, and all that bread and bacon and meat, and so on, and everything else that they dropped when they ran, when they opened the pit afterwards they found was as fresh as the day when it was left, showing how quickly the absorption had taken place, denuding the atmosphere of its oxygen and leaving the non-active nitrogen there, which had absolutely no action on that food.

#### A NEW AND SUCCESSFUL METHOD OF WORKING.

Witness next spoke of the construction of dam used at Hamstead. He said first they have a dirt vie, and then a sand dam, and then brick to keep it up. In November and December 1896 a conference was held. They put before the directors then the seriousness of the situation at this colliery, and told them that at some time or other it must be lost. The result of that conference was that they had water pipes extending further into the mine. The result of that was that where they had breaks in the sides of the roads, they could take a little hose in and play on the fire, and they were generally successful. They had 200 or 300 fires in a year in that mine. The pipes were extended 1,000 or 1,200 yards from the pit mouth. Then they removed all the wood cogs, which were very important, because the practice with regard to thick coal for hundreds of years had been to put in these wood cogs. Those they could not remove they filled in with sand and cased them with iron sheets. There was the matter of the safety of the mine, and they put in iron doors. Wherever they thought there was a possibility of a road getting on fire, they cut the roads round at the back, so that if there were a fire on one side, they could close the iron doors and the men could travel on the other side. Then comes the important point; the following recommendation was made: "We have seriously considered the position with regard to the frequently recurring fires on the sides of the gate roads, and the possibility of one occurring of such magnitude and in such proximity to the inset as to imperil the safety of the latter. Whilst believing that such a calamity may be prevented by constant vigilance and watchfulness, we cannot shut our eyes to the fact that such an emergency is quite possible, and might close the entire concern for a period of three years at least. We are of opinion, therefore, that it would be wise to prepare for this possible calamity by fixing the iron doors already recommended. We further recommend that the small shaft be sunk about 17 yards deeper, and the new main road commenced in or about the whistone 642 yards from the surface, and 19 yards below thick coal. The said main road and counterhead to be driven to such a point as will enable the existing north-east and south-east roads to thick coal to be readily connected with it by 'drop' pits, and so secure absolute immunity from fire in main roads or inset, as well as ensure the probable recovery of the whole of the developed coal in the estate." When the fire of 1898 occurred, that was the scheme which was prepared, but instead of coming under the coal they went over the top of it. The proposition was to drive the roads about 19 yards below the coal. Now, they come to about 18 yards above it. They came above and drove it into the brooch coal, about 3 ft. thick. Then they have opened out about 4,000 yards of road, and they have never had a fire from that day in the roads, all the trouble now being in the stalls. Baggeridge have taken warning by the experience at Hamstead, and have driven underneath the coal.

#### UNRECLAIMED TIMBER.

Witness said that in the thick coal openings they did not fear a fire. The ribs are cut off, and as soon as there is a fire a dam is put in. Witness said they left very little timber behind. In the stalls the cost would not be over 2d. per ton. In the gate roads it would average about 6d. They fetched it out and made sleepers and that kind of thing from broken timber, and the waste was sold as chips. If it is broken, it is buried by reason of the coal being on it and left, but witness did not think that was a source of fire. Out of 200 fires, they would not have the timber on fire in two. If they got their timber on fire they were lost. Sir Arthur Markham said that in the Doncaster district they had never found a fire, as far as he knew, without a prop having been left.

Witness said that in the case of an outbreak of fire he invariably withdrew all the men in a district, no matter what was the consequence to the output. From wherever the air had to travel upward with fire in the upcast he withdrew the men, or where other districts had to feed into it. He would take that step as soon as he began to put the dams in—as soon as ever they had a fire stink.

#### THE ABSENCE OF COALDUST.

Witness said they got no gas and very little coaldust. If he were asked to send 20 lb. of coaldust off the timbers of that pit, he did not think he could collect it. Sir Arthur Markham suggested that it would be a wise precaution to stonedust a haulage road within 50 or 100 yards of a fire, but witness did not think in a thick coal-pit that it would help. They had coaldust, but they had not the ventilation, as in the South Wales coalpits, where one could see the coaldust in the air itself. In a big stall the air-current was almost imperceptible, and the coaldust did not travel out of the stalls. Sir Arthur Markham said the first thing they did now was, at the moment there was any smell, to stonedust all the roads at or near the place of the fire, and all the roads contiguous. Witness said all their roads were very dusty from fireclay.

Witness said it was his opinion that at the first sign of gob stink there was produced an atmosphere that was a non-supporter, and that prevented the fire affecting the coal to a great extent. But he had never seen a case in either Hamstead, Sandwell, or any of those pits that he had had to do with where he had gone back into one of the stalls where there had been actual flame. That applied all through South Staffordshire. He had seen cases, especially in the Hilltop district, where they had had the timber standing, and it was just one mass of charcoal, and he had never seen the coal at the back of that timber burned more than  $\frac{1}{2}$  in. in, and then the shafts had had to be filled up. The pit at West Bromwich was filled up to put the fire out, and when it was reopened the coal was not burnt.

#### HYDRAULIC STOWAGE.

Witness said he had not considered the possibility of the application of the hydraulic stowage system in the thick coal. The great difficulty would be that they could not leave the water behind; they would be unable to get it stowed 24 ft. high. Mr. Rhodes thought that if there was one place where hydraulic stowing would be easily applicable it would be this, because of the little panels. Witness admitted that he was speaking quite without experience.

#### THE USE OF RESCUE APPLIANCES FOR RECOVERY WORK.

Witness said that in the recovery of property he disagreed with the use of rescue appliances unless they were near the base. He would not allow a man to go such a distance that there was more than 100 yards between one bolt hole and another, where the ventilation would be restored and the man could get to his apparatus. There a man could come up to him and go on again.

Witness said that in the case of strikes, or when they were going to play, they seal the workings up, putting in a temporary dam. If the place did stand a gob fire would occur. If the coal was one which was liable to fire he should bar up the intake and leave two returns. For 50 years in the Oldhill district the pits were sealed every Saturday night.

In answer to Sir Arthur Markham, witness agreed that ventilation should be ascensional if possible. In answer to further questions, witness said that they all applied to thin seams, and his experience in these matters had been confined to pits with which he had been professionally connected, but not as manager, and this experience had led him to the following conclusions:—Firstly, that when a breakdown occurs in a working face, the under-manager is usually very anxious to restore the ventilation as speedily as possible, and also not to get his output reduced, he then often has a small block of coal cut off, and in most cases this block of coal is the seat of the fire; secondly, he said that when slack is a drug in the market it is often thrown in the waste; and, thirdly, as regards insufficient packing or cogs, these should be made wide alongside the gate roads and only sufficient on the face to keep the ventilation close, allowing the roof in other parts to break down and close itself as quickly as possible. With regard to prevention, so far as his limited experience goes, he considers that a pillar should never be left under any circumstances, that no slack should be thrown into waste, that all timber should be drawn, and that all seams should be driven out either to the boundary or to the boundary of a panel to be marked off, leaving a rib all around such panel and damming off at regular intervals, still using the above precautions. They should not leave any timber behind.

Witness said he had had experience in the thick coal of working without leaving the pillars. He had worked it for a long time taking the top coal off first, and they had always lost the bottom coal because it always fired. Out of the 24 ft. they took about 7 ft., and lost the whole of the bottom coal. He considered that the retreating method of working was best.

#### STOWAGE MATERIAL.

Mr. Meachem said they had plenty of material near the mine for hydraulic stowage. It consisted principally of shale that had weathered down and would work very well; it was not full of stones and that sort of rubbish, and was stuff that would run very nicely, and they had a lot of sand all round that country. He measured 70 ft. at one quarry. Within a quarter of a mile of the Hamstead Colliery there was a gravel hole which would supply as much as they got out. In addition there were 20,000 or 30,000 tons of burnt siliceous material near the mine. Some of the pits were a bricky material, and some heaps never fired. In any case, there was a large amount of sand gravel, and burnt tipping stuff available in South Staffordshire, which might be got at a reasonable price.

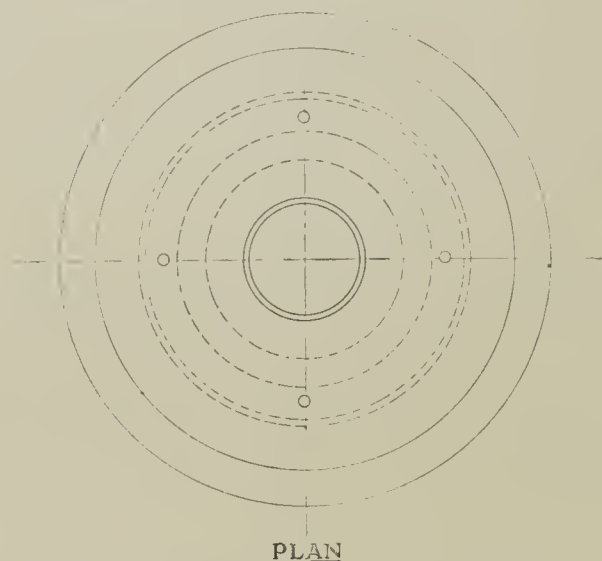
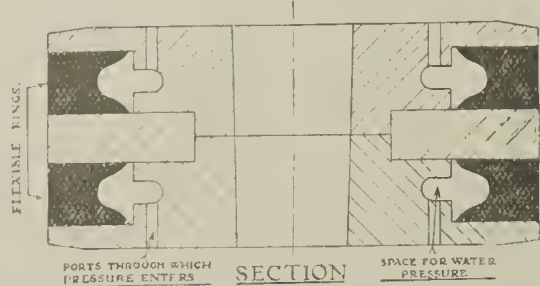
Witness added that they were not put to the cost of a penny for the gob fires, but the gate road fires cost £70,000 in one year. The reason why the question of stowage was worthy of consideration was that they would then get out more coal, and instead of perhaps getting 50 per cent. would get 100 per cent. of the coal out

(To be continued.)



## THE "N.P." PUMP BUCKET.

The object of the "N.P." pump bucket, which is illustrated in the accompanying photograph, is to meet the demand for a piston capable of withstanding high temperatures and to reduce slip. It will be seen that ports are drilled in the top and bottom junks so as to admit pressure to expand the patent flexible rings which form the main feature of the invention. These rings



are each made in one continuous piece and of a tough, frictionless composition which will withstand temperatures up to 300 degs. Fahr. The flexible lips, under pressure, expand between the junks and intermediate ring and so prevent leakages. The rings expand as they wear and exert a uniform pressure all round the liner. The appliance is made by the "N.P." Pump Bucket Company, 11, Queen Victoria-street, E.C.

## NOTES FROM SOUTH WALES.

[FROM OUR OWN CORRESPONDENT.]

**Important Conference on Mining Education: Coal-owners and Public Authorities in Consultation—Senghenydd Explosion Enquiry: Names of Nominees—Deadlock re Banksmen's Demands—Ballot of Miners upon Political Fund—Effect upon Colliery Rate Burdens—Proof of Rapid Developments in Western Glamorgan—"Mad Friday" Fancies—Another Finance Scheme for Duffryn-Rhondda—Newport's Trade Progress and Favourable Prospects.**

The conference held in Cardiff, on Monday, was probably the most important in the annals of the coal trade, because it foreshadows a vast combination, with practically unlimited funds, for the constitution of a great organisation in mining instruction; and it marks that union of practical men with public authorities which is the essential requisite of technical efficiency. The Lord Mayor of Cardiff (Dr. Robinson) had summoned the parties; and there were present representatives of each county in the coalfield, the larger borough and other educational authorities, the University College, the coalowners' School of Mines (which has the financial support of nearly a score of the larger companies), the Miners' Federation, &c.

Mr. Hugh M. Ingledew, secretary of the School of Mines, had sent out draft proposals, the object being to link together the whole of the authorities and others directly interested, in order that mining instruction should be co-related and that the curricula of the different organisations should be co-ordinated, and overlapping be thus avoided. The bodies to be represented should, it was suggested, unite in working a common scheme, those taking part being:—

County Councils of Glamorgan, Monmouth, Brecon, Carmarthen, Cardiff, Swansea, Newport, Merthyr, Rhondda.  
University College of South Wales.  
School of Mines (supported by coalowners).  
Coalowners' Association.  
Miners' Federation.  
South Wales Institute of Engineers.  
Colliery Officials' Association.  
Councils of Aberdare, Abertillery, Barry, Carmarthen, Ebbw Vale, Llanelli, Neath, Mountain Ash, Pontypridd, &c.  
The Home Office and the Board of Education would also be represented.

An interesting discussion took place, different expressions, yet with an apparent general agreement upon the fundamental idea. Sir Clifford Williams, Mr. Griffiths, Mr. Joseph Shaw, Mr. H. Williams, &c. (Board of Education), and others

being the speakers. Ultimately it was decided to adjourn the conference so that consideration might be given to a suggestion that the old-established mining education board for South Wales should be supported by the coalowners for the attainment of their object.

The Home Office has decided that the enquiry into the causes and circumstances of the Senghenydd disaster shall be conducted by the Chief Inspector of Mines (Prof. Redmayne)\*; and that with him shall be associated a representative coalowner and a representative trades unionist—though, of course, the official announcement is not worded in this form. Mr. Evan Williams, chairman of the Coalowners Association, is one nominee; and the other is Mr. Robert Smillie, president of the Miners' Federation of Great Britain. Mr. Williams is the eldest son of Mr. Williams who founded the well-known Llangennech firm; and he has been associated with his father in the management of the Morlais Colliery. He has rendered conspicuous service on the Conciliation Board; and is a member of the Board of Examiners under the Coal Mines Act. Mr. Smillie, in addition to his practical and trade union experience, has been a member of the Royal Commission to enquire into the cause of accidents in mines, and he is a member of the Board conducting examinations for colliery managers.

Banksmen's demands were further considered in a joint committee of the Conciliation Board which met in Cardiff on Saturday. Only the wages question as it affected Naval, Penallta, and Celynen collieries then came up; and, notwithstanding lengthy discussion, no agreement was arrived at, and the parties separated without making any arrangements for a future meeting. According to the official report:—"The committee have agreed to the hours to be worked and the duties to be performed by banksmen, subject to a satisfactory settlement being arrived at with regard to wages."

That the wage-rate is the crucial matter was made clear a few hours later, in a mass meeting of banksmen which also took place in Cardiff. Reports were presented to this meeting concerning the proceedings at the joint committee, and it was stated that matters had reached a deadlock. The chairman said that the owners were taking the wages demands separately, and not dealing with them collectively, as the men desired. The men seek to establish uniform conditions—an eight-hour day, with a standard wage of 5s., plus percentages. As evidencing the anomalies that exist, one speaker said that he was earning on tonnage rate twice as much as his day colleague, who was paid on time. After prolonged discussion, it was decided to send a deputation to the Federation executive, with the request that a conference of the coalfield should be summoned to have the banksmen's case presented; the ultimate object being that notices be tendered by the banksmen unless their demands are conceded.

As though there were not already sufficient causes of disagreement in the coalfield, a new one makes itself manifest in the protest of Abertridwr colliers against a supposed intention to collect rents at the colliery office. In all probability the supposition will prove to be without foundation; for the houses are not owned by the company but by outside organisations known as building clubs. The matter would not call for notice here were it not that the usual threat to cease work accompanies the protest against any such design as is attributed. A circular issued by the men is distinctly caustic:—"If they can collect rent, then why should not the packman, grocer, butcher, and the publican have the same privilege as the house landlord? And then we should doubtless be having the maternity nurse and the undertaker!"

South Wales steelworkers are to have a material advance in wages, as agreed at a meeting of the Steelworkers' Conciliation Board, held in Swansea, on Saturday. Mr. Eccles (Briton Ferry) presided, and in the absence of Mr. J. Hodges, M.P., through illness, Messrs. T. Griffiths and Wakefield represented the miners' union. The joint sitting was a long one, claims being made for wage advances in five sections. Separate meetings afterwards took place; and on resumption of the joint meeting, it was ultimately agreed that barrers now receiving 4s. per ton should be advanced 1s. at reversing mills—except at Llanelli Works, where conditions are different; barrers on day rates to be advanced 1s. per day. Boiler firemen at certain works will be advanced 6d. per day. Some other claims were referred to the district council, with a view to tabulation, so as to secure uniformity.

It has to be noted, as indicating the general growth of business in South Wales and the consequent demand for greater railway facilities, that Mr. Potter, the general manager, with other officials of the Great Western Railway Company, paid a visit to Swansea on Friday. Their special object was to deal with the requirement of such changes as will avoid congestion at the docks, and it is understood that their enquiries and investigation had regard also to the need for improved passenger service and the building of a new passenger station.

According to the notices now circulated locally among the miners, the rules governing the political fund will enable the Federation to expend the money upon—

Expenses of a candidate for Parliament or any public office;

The holding of meetings, distribution of literature, &c.;

In maintaining a member of Parliament, or any person holding a public office;

Upon registration of electors.

It is stated that "public office" means membership of local councils, boards of guardians, &c.

The question of political action through the Miners' Federation, with application of the funds to such objects, is provoking much fresh discussion, which has been intensified by concerted action (through the clubs of one political party) to systematise the application for and use of exemption forms. It is, however, a matter that goes much farther than partisan operation, for the arguments used in connection with the ballot of the members (which the statute makes necessary) show that local administration, no less than Parliamentary representation, is designed; and therefore the question of increased rating, perhaps to a large amount, arises. Just now the one point as to exemptions is being keenly debated; but from the standpoint of colliery costs this is quite a minor matter, for a general adoption of the idea, involving large additions of direct Labour nominees to the local councils, will inevitably be followed by material addition to the rates.

Already the increase of rates, even under existing conditions, is a serious consideration; and this is the case, although the powers of the local administrative bodies are not fully taken advantage of. What will be the position when they are entirely utilised? Loans under the Small Dwellings Act, free libraries with reading rooms, museums, parks (with football and other playgrounds), bands in the parks, education developments of still more costly character (and here has to be noted the unwillingness of the Federation to join in the School of Mines' scheme, their desire being for public control), housing under the town-planning law with its higher cost of lay-out, gymnasiums, baths and wash-houses—these indicate only some of the directions in which extra outlay will be incurred—outlay to be borne chiefly by collieries, because scarcely any other industry exists over large areas of South Wales.

These facts have their bearing upon the request that the employers should refuse to engage non-union men, the request amounting to a demand that this intended political and administrative action—so costly to the industry as such—should be made more determinedly effective by the very class upon whom the cost would be imposed!

The matter is mentioned, not in antagonism to any proposed change or in adverse criticism of future developments—still less in opposition to possible improvements that ameliorate living conditions in mining communities, but solely to emphasise the fact that the ballot taken has far-reaching effect in many directions, and that it is not merely a domestic question of the union.

One of the popular weekly periodicals has occasioned much amusement and some little indignation by a purely imaginary statement as to how colliery managers in South Wales secure large outputs. The writer of the article is full of the highest quality of the fiction dealer—a vivid imagination combined with literary skill. According to him, "Mad Friday is well known among the miners of South Wales. This means that on Fridays the management supply drink to the underground hauliers to beat records in the output of coal. Any workman insistent upon proper preventing measures, the application of which will temporarily interfere with the stream of loaded trams can look out for victimisation." Just precisely what is meant by "proper preventing measures" can be explained only by the richly-endowed fictionist, who would at the same time explain, perhaps, the special virtue of "Mad Friday" drink upon hauliers alone, unless the hewers were similarly spurred to cut coal enough for filling those trams.

In answer to solemn questions put by a local journalist concerning "Mad Friday" and its embellishments, Mr. T. Richards, M.P., secretary of the Federation, stated that he had never previously come across the terms, nor was he acquainted with any practice of supplying drink to hauliers in the way described. But then Mr. Richards has had only about 40 years' experience, half the time working underground and the other half as a miners' representative. Moreover, he may be merely a man of hard fact, sadly lacking in qualities of imagination.

Among the incidental proofs of coalfield development, circumstances of Western Glamorgan may be noted. Since the County Council took over the schools 10 years ago, they have erected in the western district alone more than 40 new permanent schools, at a cost of £180,000; and four additional schools are now under consideration—for Clydach, Ystalyfera, Gwaun-cae-gurwen, and Fairgwaith.

In connection with an endeavour to avoid sale of the Duffryn-Rhondda collieries, now in the hands of a receiver for the debenture holders and advertised to be put up for auction, a scheme for 21 years' lease has been proposed. The property would be taken by the Imperial Navigation Company at a rental of £10,500 per annum (sufficient to provide for interest on the debentures), with option of purchase at £205,000. Mr. D. A. Thomas, who holds £20,000 third debentures on the collieries, is a principal holder in the Imperial Navigation Company, the capital of which will be increased to enable this scheme to be carried through; and the Duffryn Rhondda proprietors are invited to join in raising this new capital. Trade debts, amounting to £7,000, would (it is proposed) be met by the offer of preference shares.

Cardiff Chamber of Commerce have approved the new form of Italian c.i.f. coal contracts, the committee having amended the war clause, as suggested at an earlier meeting of the Chamber.



This action of the Merthyr Committee in regard to assessments develops rapidly; and one fact not generally understood has made itself apparent in the discussion which is now proceeding. Few persons have been aware that there is no legal sanction for rating collieries upon a tonnage basis, although, of course, some have in mind the Denaby Main case, wherein the principle was established that collieries can be legally rated only upon the same conditions as other property—namely, the letting value. Rating upon tonnage is a matter of agreement, based upon an understanding which in Merthyr Union is about half a century old. The point also taken as to substitution of the imperial ton of 2,240 lb. for the long ton of 2,520 lb. does not exhaust that matter, for these two units of calculation do not stand alone. There are other tons—of 2,640 lb. and 2,880 lb.—these particular units having relation to conditions inserted in the leases, and being applicable to the payment of royalties. The Poor Law Union adopted, for the sake of convenience, these units, which were established originally as between coalworkers and landowners.

In Pontypridd agreement, now suggested for adoption at Merthyr, the "long" ton prevails. Beyond this, the general idea is, as far as possible, to remove in the Merthyr Union those inequalities of existing assessments which prevail, arising from age of the pits, difficulties of working, distance from the seaboard, &c., and make things more equal, and therefore more equitable.

It is recognised as necessary to call in an expert who would be qualified to deal with the peculiar circumstances governing each case. At present the average assessment may be taken at 6½d. to 8d. per ton for large, but the cost of production varies so much that the average will not give a true idea as to any particular colliery. Fifty years ago the general average, it is said, ranged about 11d. per ton for large and small through-and-through, and much higher for large alone. Since then a later valuation has set it at 8d. for large and 5d. for small, whilst a still more recent valuation puts the general average figures at 6½d. for large and 3d. for small.

Under the Pontypridd system the coal actually consumed at the collieries is not taken into account; and when that agreement was drawn up it was provided (as already stated) that, with large steam fetching less than 12s. per ton f.o.b. at Cardiff, the rates of assessment would be, approximately, 8d. per ton on large; but that when the f.o.b. price at Cardiff exceeded 12s., 5 per cent. should be added for each 1s. until a maximum of 15 per cent. was reached.

The union clerk at Pontypridd is furnished every half year with a certificate stating the percentage which should be added to the rate per ton at which the various collieries are assessed. Part of the agreement in Pontypridd Union provides for arbitration in case of dispute, this having been arranged in order to save the expense of an appeal to quarter sessions. The Pontypridd agreement is terminable by 12 months' notice from either side, ending June 30 in any year. There are 18 colliery companies concerned in this agreement, and it is placed upon record that it was entered into as being in the public interest, and the best method of avoiding frequent, troublesome, and expensive enquiries.

Newport (which at the moment is all agog in anticipation of a settlement of the Mannesmann Tube Company's enquiry, with its ultimate employment of two or three thousand men) is the scene of Messrs. Lysaght's great galvanised sheet works, where many hundreds are at present engaged. Messrs. Lysaght's firm is one that established works on the seaboard, and has had a remarkable range of prosperity.

Indeed, in recent years the galvanising trade in South Wales has experienced striking success, sharing more than proportionately in the great prosperity of the whole country in this particular industry. Whereas in the first 11 months of 1912 the exports of galvanised sheets totalled less than 600,000 tons (this being a large increase over the preceding year), the 11 months of 1913 exceeded 700,000 tons, the actual increase being no less than 101,772 tons. It will have been noted that efforts are on foot for reviving the Galvanised-sheet Makers' Association, and that the prospects of success are favourable.

The statistical position in regard to tin-plates, which is essentially a South Wales industry, is also highly satisfactory, particularly in its demonstration of improvement in the American and Canadian trade. Exports for the 11 months total 522,773 tons—an increase of 9,492 tons over the corresponding period in 1911. Last year is eliminated, because of the disturbance occasioned by the coal strike, which interfered very seriously with the tin-plate production, and was, in fact, largely responsible for the opportunity, which American makers promptly seized, of introducing their products into the Canadian market. Exports to the United States in the 11 months of 1911 were 13,633 tons, falling in a similar period of 1912 to 1,828 tons; but during the current year the total has risen to 16,687 tons. Canada also shows material advance; but Welsh makers have not yet regained the ground that they lost during the coal strike. During the 11 months of 1911 exports to Canada were 11,658 tons; in the corresponding period of 1912, 6,386 tons; and in 1913, 9,494 tons. There is every reason to believe that the home trade also has been singularly prosperous; so that the year 1913 will prove on the whole very satisfactory.

The Abertillery Pitch and Benzol Company Limited have acquired a site at Pontnewydd for the erection of new works. The manufactures will include benzol, pitch, and other kindred products.

## COAL, IRON AND ENGINEERING COMPANIES.

**Anglo-Westphalian Kent Coalfield Limited.**—The report for the 12 months ended October 31 last states that since the last annual meeting the board has been reconstituted, Sir John Lister Kaye, Bart., having retired, and Mr. Joseph Shaw, K.C., and Mr. Fred. L. Davis joined the directorate. Active steps have been taken throughout the year to consolidate the company's area by taking up options and by the purchase outright of freeholds and minerals. Believing it to be in the best interests of the company to arrange for the immediate development and equipment of a colliery to work the company's first area, the directors agreed to a company being formed, with a capital of £230,000, of which £120,000 has been subscribed and is available for working capital and general purposes; 12,000 shares have also been issued fully paid for underwriting commission, and 6,000 fully-paid shares to the Agency Assets Company Limited for services rendered. There remain 62,000 shares to be issued for cash. The payment to be made to this company for the area sold to the colliery company is £30,000 in fully-paid shares, in addition an improved dead-rent of £500 per annum, merging into a royalty of 1d. per ton on the whole output of the colliery, the reimbursement is certain events of a sum not exceeding £250, already paid by this company, and the option to subscribe at par for 20,666 shares out of the 62,000 referred to.

**Askern Coal and Iron Company Limited.**—An issue will shortly be made of £150,000 6 per cent. convertible debenture stock in the above company. The company was incorporated in 1910, and has acquired leases of certain seams of coal under an area of about 7,000 acres and the freehold of 38 acres of surface land at Askern, near Doncaster.

**Arncliffe Coal Company Limited.**—A final dividend of 8s. per share, or 5 per cent., making 10 per cent. free of income-tax, for the year ended September 30 last.

**Avery (W. and T.) Limited.**—Interim dividend for the six months ended September 30 last at the rate of 5 per cent. per annum on the ordinary shares, free of income-tax.

**Breyten Collieries Company Limited.**—Interim dividend of 10 per cent. (2s. per share), amounting to £9,000, has been declared for the period ending December 31, 1913, payable on January 29.

**Burnyeat, Brown, and Co. Limited.**—The directors have declared an interim dividend of 1s. 6d. per share on the ordinary shares, free of income-tax.

**Duffryn Rhondda Colliery Company Limited.**—Shareholders in the above company have received circulars containing particulars of a scheme under which it is proposed, with the sanction of the Court and the debenture holders, to lease the company's undertaking for a period of 21 years, with the option to purchase at any time during that period at the price of £205,000. The leasing company will be the Imperial Navigation Coal Company Limited, registered in 1900 with a capital of £10,000 in ordinary shares, of which £340 has been subscribed, and of which company Mr. D. A. Thomas is a shareholder and director. Up to the present it has not embarked on the business which it is authorised to carry on, but its capital has been recently increased to £100,000, divided into 1,000 ordinary shares of £10 each, 80,000 ordinary shares of £1 each, and 10,000 6 per cent. preference shares of £1 each; £50,000 of the new capital has already been promised, but a further sum of £25,000 is deemed requisite, and it is hoped that the shareholders will subscribe the greater part of this amount. Steps are being taken to convert the existing 1,000 ordinary shares of £10 each into 10,000 ordinary shares of £1 each. The preference shares will be issued to the extent of £7,000 in satisfaction of the trade debts owing by the Duffryn Rhondda Colliery Company Limited. The ordinary shares are available for subscription. The following amounts have already been promised:—Mr. D. A. Thomas, £10,000; Mr. Maurice Deacon, Mr. Rose Richards and others, £10,000; Messrs. Lysberg Limited and friends, £20,000; the directors of the Duffryn Rhondda Colliery Company Limited, £10,000—a total of £50,000. The annual rent of the lease will be £10,500, thus covering the interest on the first, second and third mortgage debentures and administration expenses. Mr. D. A. Thomas, the holder of the third mortgage debentures issue of £20,000, will, in addition to the subscription of £10,000 capital, exchange £10,000 of that holding for 10,000 fully-paid ordinary shares in the Imperial Navigation Coal Company Limited. There are certain preferential charges, such as rents and royalties payable to the original lessors, payments to wagon companies and the costs of the proceedings in court of the debenture holders, which will have to be provided for. These, amounting to about £25,000, will be paid by the Imperial Navigation Company in consideration of the lease and transfer to them of all wagons, stores and other assets of the Duffryn Rhondda Company. To satisfy existing creditors, about £7,000, it is proposed to offer them in purchase of their debts 6 per cent. preference shares in the Imperial Navigation Company of an equivalent nominal amount. A circular has been issued to the first debenture holders giving particulars of the present situation, and stating that the court sanctioned the borrowing by the receiver and manager of two sums of £3,000 and £15,000 respectively, making in all £18,000. This money has been borrowed on the condition that it is a first charge on the property secured by the first debentures and that it is repaid in priority. To enable the receiver and manager to continue the colliery as a going concern until the sale it is necessary to apply to the court for leave to borrow a further sum of at least £5,000. The circular asks for the sanction of the first debenture holders.

**Firbeck Main Collieries Limited.**—This company has been registered, with a capital of £450,001, in £1 shares (450,000 ordinary and one management share), to acquire from the Wallingwells Boring Company Limited certain leases and agreements in connection with the disposal of the Barnsley or Top Hard seam of coal and other minerals under certain lands in Nottingham and York; and to carry on the business of colliery proprietors and coalowners, &c. Minimum cash subscription, £300,000. First directors include: A. Farquhar, Harworth, near Darlington; and A. Wightman, 14, George-street, Sheffield. Remuneration, £1,200 per annum, divisible.

**Glencoe (Natal) Collieries Limited.**—A dividend of 2½ per cent. (6d. per share) for the half-year ending 31st instant.

**Lochgelly Iron and Coal Company Limited.**—An interim dividend of 10s. per share, or 5 per cent., less tax, on the ordinary shares.

**Manchester Oil-Coal Syndicate Limited.**—This private company has been registered, with a capital of £5,000 in £10 shares, to acquire control of the Maryvale Colliery, situate at Maryvale, Victoria, Australia, and to carry on the business indicated in the title. Registered office: 5, Norfolk-street, Manchester.

**Manor Powis Coal Company Limited.**—After providing £450 for depreciation, writing off brokers' commission shares, £171, and carrying £100 to royalty reserve account, there is a profit of £863, to which falls to be added £863 brought forward. The directors recommend a dividend of 6 per cent. on the preference shares, carrying forward £4,633.

**Pekin Syndicate Limited.**—The report for the year ended June 30 last states that the receipts during the year amounted to £51,369. The balance carried to profit and loss account is £17,815, which, with the amount brought in, brings the total net credit balance up to £458,258. The directors propose that this should be dealt with in the same manner as last year and carried forward. Considering the troublous times through which China has been passing, the directors consider that good progress has been made by the company in developing its mines in Honan, especially as operations were greatly retarded and production reduced owing to a heavy inrush of water in the workings at Nos. 4 and 5 pits, whilst later there was also an inrush of water at pit No. 2. The result was that in June last coal was being obtained from No. 6 pit only. The outputs for recent years have been: 1910-11, 428,936 tons; 1911-12, 470,138 tons; 1912-13, 402,451 tons. There is an increase in the value of the properties in China, especially of those in Hankow and Pukow. The exploitation of the mines is still in its development stage, so that the expenditure at the mines this year, which after deducting receipts in respect of coal sales, leaves a balance of £27,036, has been charged to development. Some £15,000 was spent on the unwatering of pits Nos. 2 and 4. A new pair of shafts is being sunk within the Yellow permit in the vicinity of Ma-chien, in order to work coal from the same seam as from Nos. 1 and 6 pits. Coal has been proved by a borehole at a depth of 280 ft., and is 15 ft. thick, and the first shaft is down 226 ft. A few shallow shafts are being sunk by native methods in the Yellow permit, and are expected to give an additional output. The directors are taking steps to establish another colliery in a part of the Red permit where the coal seam appears easily accessible.

**Rodman (A. F.) and Co. Limited.**—This private company company has been registered, with a capital of £7,500 in £1 shares, to carry on the business of coal exporters and agents, &c. Managing director, Alexander Finlay Rodman, Melsonby, Marine-road, Hornsea. Qualification, £50.

**Transvaal Coal Trust Company Limited.**—The directors have declared an interim dividend of 7½ per cent. (1s. 6d. per share).

**United National Collieries Limited.**—Interim dividend of 6d. per share on the ordinary shares, free of income-tax.

The *London Gazette* announces that at the expiration of three months the following companies will, unless cause to the contrary be shown, be struck off the register and dissolved:—Llan Coal Company Limited, Welsh Anthracite Collieries and Roumanian Asphalt Company Limited.

**Imperial College of Science.**—The governors of the Imperial College of Science and Technology have constituted two new chairs of chemistry and appointed Dr. Jocelyn Field Thorpe, Ph.D., D.Sc., F.R.S., to be professor of organic chemistry, and Dr. James C. Philip, M.A., Ph.D., D.Sc., to be professor of physical chemistry.

**Grimsby Coal Exports.**—The exports of coal from Grimsby during the week ended Friday, 19th inst., according to the official returns, totalled 24,270 tons in the foreign trade, and 640 tons coastal, as compared with 27,159 and 790 tons respectively during the corresponding week last year. Shipments:—Foreign: Antwerp, 694 tons; Christiania, 656; Diep, 847; Drammen, 1,507; Esbjerg, 415; Gefle, 4,164; Gothenburg, 335; Halmstad, 1,344; Hamburg, 924; Kallundborg, 1,319; Landsrona, 3,181; Malmö, 2,074; Randers, 467; Rotterdam, 251; Skive, 1,018; Stockholm, 2,193; Varberg, 1,266; and Ystad, 1,615. Coastal: To London, 102; Teignmouth, 290; and Whitstable, 258.

**Appointment of Checkweighman.**—At Wigan County Police Court last week, Mr. C. W. Eames, the general manager of the Maypole Colliery, Abram, was summoned by Mr. Seth Blackledge, a checkweighman, through the Miners' Federation of Great Britain, for that proper facilities were not afforded to him as checkweighman at the No. 1 pit as required by Act of Parliament. Mr. S. Pope, for the prosecution, urged that the colliery was one mine, and that the accommodation provided was in accordance with the Act. It was also asserted that Blackledge had not been appointed by those entitled, according to Act of Parliament, to make the appointment. Mr. Pope added that up to August, 1903, when the explosion occurred at the Maypole Colliery, there were two weighing machines and two checkweighmen, one for each pit that was drawing coal, and there were separate officials. On May 29, Mr. Eames, the general manager, wrote to Mr. S. Walsh, M.P., miners' agent, stating that they could not accept the appointment of two checkweighmen. Negotiations followed, and some kind of an enquiry was held at the pit, at which his Majesty's inspector presided. The Secretary of State had given his written consent to enable these proceedings to be taken. Mr. S. Walsh, M.P., miners' agent for the district, gave evidence as to Blackledge's election as checkweighman. He said there were two methods of appointment, and he admitted that in his declaration he omitted to set out the names of those voting as required. The case was dismissed with costs. It is understood another ballot of the men will be taken, and then a fresh summons will be issued.



# THE COLLIERY GUARDIAN

## MONTHLY LIST OF RECENT COAL LITERATURE

The following is a list of abbreviations used below:—

Adv. Chapt. Min. Res. U.S. = Advance Chapter on the Mineral Resources of the United States.  
Ann. Belg. = Annales des Mines de Belgique.  
Ann. Mines = Annales des Mines.  
Berg- Hüttenmänn. Rdsch. = Berg- und Hüttenmännische Rundschau.  
Bergb. = Bergbau.  
Bl. Diam. = Black Diamond.  
Braunk. = Braunkohle.  
Canad. Engin. = Canadian Engineer.  
Canad. Min. Jl. = Canadian Mining Journal.  
Chem. Eng. Wks. Chem. = Chemical Engineer and Works Chemist.  
Coal and Coke Op. = Coal and Coke Operator.  
Colliery Eng. = Colliery Engineer.  
Colliery Guard. = Colliery Guardian.  
El. Kraftbetr. = Elektrische Kraftbetriebe und Bahnen.  
Engin. Contr. = Engineering Contractor.

Engin. Min. Jl. = Engineering and Mining Journal.  
Eng. Rec. = Engineering Record.  
Ind. Engin. Digest = Industrial Engineering and Engineering Digest.  
Iron Tr. Rev. = Iron Trade Review.  
Kohle Erz = Kohle und Erz.  
Metallurg. Chem. Engin. = Metallurgical and Chemical Engineering.  
Mex. Min. Jl. = Mexican Mining Journal.  
Midland Inst. Min. Engin. = Midland Institute of Mining, Civil and Mechanical Engineers.  
Min. Eng. World = Mining Engineering World.  
Min. Inst. Scotland = Mining Institute of Scotland.  
Min. Scient. Press = Mining and Scientific Press.  
N. E. Coast Inst. Engin. Shipbuilders = North-east Coast Institution of Engineers and Shipbuilders.  
N. of Eng. Inst. Min. Eng. = North of England Institute of Mining and Mechanical Engineers.  
Oesterr. Z. Berg- Hüttenwes. = Oesterreichische Zeitschrift für Berg- und Hüttenwesen.

Proc. Color. Sci. Soc. = Proceedings of the Colorado Scientific Society.  
Rev. Métallurgie = Revue de Métallurgie.  
Rev. Univ. Min. Met. = Revue Universelle des Mines et de la Métallurgie.  
Royal Stat. Soc. = Royal Statistical Society.  
S. Afric. Min. Jl. = South African Mining Journal.  
S. Staffs. Inst. Min. Engin. = South Staffordshire and Warwickshire Institute of Mining Engineers.  
Techn. Bl. = Technische Blätter.  
U.S. Bur. of Mines = United States Bureau of Mines.  
Z. Berg- Hütten Salinenwes. = Zeitschrift für das Berg- Hütten- und Salinenwesen im Preussischen Staate.  
Z. Dampfkessel-Betr. = Zeitschrift für Dampfkessel- und Maschinenbetrieb.  
Z. Oberschles. Berg- Hütten- Ver. = Zeitschrift des Oberschlesischen Berg- und Hüttenmännischen Vereins.  
\*\* We shall be glad to obtain for readers, where possible, copies of the papers referred to at the prices named, which are inclusive of postage.

### I.—General.

The Production of Coal in 1912. E. W. Parker. "Adv. Chapt. Min. Res. U.S.," 219 p.; ill.  
Statistics of the Belgian Coal Industry in 1912. (Statistiques des Industries Extractives, &c., en Belgique pour l'Année 1912.) "Ann. Belg.," vol. 18, 4, p. 1229-1255.  
International Statistics of Invalid Insurance. (La Statistique Internationale de l'Assurance contre l'Invalidité.) M. Bellon. "Ann. Mines," ser. 11, 4, 10, p. 225-69.  
Germany's Mining and Mineral Wealth. (Deutschlands Bergbau- und Bodenschätze.) Willert. "Bergb.," vol. 26, 33, p. 1529-31.  
Cost of Mining as Related to Output. R. C. Jones. "Colliery Eng.," vol. 34, 3, p. 158-61. 2s. 6d.  
Coalmining in South Africa. "Colliery Guard.," vol. 106, 2763, p. 1217. 6d.  
Fluctuations in the Coal Trade. D. H. Robertson. "Colliery Guard.," vol. 106, 2764, p. 1269. (From paper read before Royal Stat. Soc.) 6d.  
The American Coal Trade. "Colliery Guard.," vol. 106, 2763, p. 1225. 6d.

### II.—Education.

Mine Managers' Examinations. "Colliery Guard.," vol. 106, 2762, p. 1163; 2763, p. 1233. 1s.

### III.—Geology.

The Elster-Luppe Brown Coal District. (Das Elster-auegebiet.) Soehle. "Braunk.," vol. 12, 20, p. 308-11; 21, p. 323-31; 23, p. 399-405; 24, p. 415-21; 26, p. 451-4. 12s. 6d.  
The Coalfields of British India. "Coal Age," vol. 4, 16, p. 570-2; ill. 1s. 3d.  
Sydney Coalfields. G. A. Young. "Canad. Min. Jl.," vol. 34, 20, p. 651-2. 1s. 6d.  
The Quartz Sand Beds in the Cover Rock of the Forst-Triebl Brown Coal Basin. (Die Quarzsandeinlagerungen im Haengenden des Forst-Triebl Muldenzuges.) W. Boetticher. "Braunk.," vol. 12, 30, p. 515-7; 2 ill. (Theory of origin.) 2s. 6d.  
The Lower Zechstein Formation in the Lower Rhineland. (Beitrag zur Kenntnis des unteren Zechsteines im Niederrheingebiet.) Kukuk. "Glückauf," vol. 49, 26, p. 1005-8; 2 tab. 2s. 6d.  
The Belgian Coal Deposits. (Les Gisements Houillers de la Belgique.) A. Renier. "Ann. Belg.," vol. 18, 3, p. 755-8; 4 pl.  
Geological Sketch of the Saar District. (Geologische Skizze im Saarrevier.) Willert. "Bergb.," vol. 26, 29, p. 465-9; ill. 2s. 6d.  
Two Geological Sections Through the Centre and Borinage Coalfields, Belgium. (Deux Coupes dans les Bassins du Centre et du Borinage.) Delbronek. "Ann. Belg.," vol. 18, 3, p. 1013-18. (Two charts with explanatory description.)  
Borings and Prospecting Work in the Southern Portion of the Hainaut Coalfield. (Les Sondages et Travaux de Recherche dans la partie Meridionale du Bassin Houllier du Hainaut.) "Ann. Belg.," vol. 3, p. 935-1012; 18, 4, p. 1219-23. (Record of the Amercoeur boring. Details of borings at Talmioulx, Nalnines and Long-Bois.)

### IV.—Mine Surveying.

Complete Mine Maps. "Colliery Eng.," 1913, p. 91.  
Husband. "Colliery Guard.," vol. 106, 2762, p. 1163. (From a paper read before Midland Inst. Min. Eng.)

Self-registering Plum-bob for Mine Surveying. (Das Selbstschreibende Anschlusspendel.) F. Kohler. "Oesterr. Z. Berg- Hütten Wes.," vol. 61, 46, p. 655-7; ill. 2s. 6d.

### V.—Mining Technology.

Mechanics of Mining. R. T. Strohm. "Colliery Eng.," vol. 34, 3, p. 184-6. 2s. 6d.

### VI.—Working of Minerals.

Pneumatic Hammer Picks for Coal-cutting at the Carnelle Pit. (L'emploi des Marteaux-pics à air Comprimé pour l'Abatage du Charbon au Siège de Carnelle du Charbonnage d'Ormont à Chatelet.) Bertizux. "Ann. Belg.," vol. 18, 4, p. 1134-9; ill. (Flottmann and Eclair picks used. Working costs.)  
Pneumatic Pick-quick Coal-cutter at No. 1 Pit, Chatelet Colliery. (Sur l'Essai d'une Haveuse Pick-quick avec Moteur à Air Comprimé au Siège No. 1 du Charbonnage du Boubier, à Chatelet.) Pieters. "Ann. Belg.," vol. 18, 4, p. 1136-9; ill.  
Electric Pick-quick Coal-cutter at the Havier Colliery, Gilly. (L'Essai d'une Haveuse Pick-quick, avec Moteur Electrique, au Siège St. Havier du Charbonnage de Noel-Sart-Culpart à Gilly. Gillet. "Ann. Belg.," vol. 18, 4, p. 1121-6; 3 ill.  
The Rossitz-Zbeschau-Oslawan Coalfield. (Das Rossitz-Zbeschau-Oslawaner Steinkohlenrevier.) L. Zelnicek. "Oesterr. Z. Berg- Hütten Wes.," vol. 56, 37, p. 516; 39, p. 547; 7 ill. 2s. 6d.  
Coalmining and Coal-washing in Belgium. L. D. Ford. "Colliery Guard.," vol. 106, 2764, p. 1269. (Abst. paper read before N. of Eng. Inst. Min. Eng.) 6d.  
Difficulties in Brown Coal Mining. (Ueber allerlei Schwierigkeiten beim Braunkohlenbergbau.) F. Mueller. "Braunk.," vol. 12, 22, p. 365-377; 8 ill. 2s. 6d.  
Mining Plant of the Petros Coal Company. A. W. Evans. "Colliery Eng.," vol. 34, 3, p. 151-2; 2 fig. (Specially refers to operation of the gravity plane and use of a five-car rotary dump.) 2s. 6d.  
Mining in Holland. (Der Bergbau in Holland.) P. Martell. "Bergb.," vol. 26, 30, p. 481-2. 2s. 6d.

### VII.—Boring, Shaft Sinking, and Tunnelling.

Safety Locks for Shaft Gates. "Coal Age," vol. 4, 16, p. 597; ill. 1s. 3d.  
Safety Gates for Shafts. "Colliery Eng.," vol. 34, 3, p. 162-3; ill. 2s. 6d.  
Shafts: Their Sizes, Costs and Capacities. "S. Afric. Min. Jl.," vol. 23, 1151, p. 166. 1s.  
Underground Boring at the Courcelles-Nord Colliery. (Sondage Intérieur aux Charbonnages de Courcelle-Nord.) Thonnart. "Ann. Belg.," vol. 18, 4, p. 1114-6; 2 ill.  
Recent Development in Rock-drill Design and Construction. "Engin. Contr.," vol. 40, 15, p. 399-400. 1s. 6d.  
Shaft-sinking according to the Kind-Chaudron Method in the Clausthal Mining District. (Das Schachtabteufen nach dem Verfahren von Kind-Chaudron im Oberbergamtsbezirk Clausthal.) Albrecht. "Z. Berg. Hütten Salinenwes.," vol. 61, 2, p. 223; ill. 2s. 6d.  
Sinking New Pits at Cuesmes. (Note sur le Fonçage des Nouveaux Puits de l'Heribus du Levant de Flénu à Cuesmes.) Guerin. "Ann. Belg.," vol. 18, 3, p. 835-62. (Sinking by the freezing process.)  
Improvements in Cementing Methods. (Neuerungen auf dem Gebiete des Zementierverfahrens.) J. Kalbhenn. "Bergb.," vol. 26, 32, p. 513-7; ill. 2s. 6d.

The Rossitz-Zbeschau-Oslawan Coal District. (Das Rossitz-Zbeschau-Oslawan Kohlenrevier.) L. Zelnicek. "Oesterr. Z. Berg-Hütten Wes.," vol. 61, 47, p. 680-3; ill. (Use of concrete in shaft lining.) 2s. 6d.

### VIII.—Explosives, Blasting.

The Analysis of Black Powder and Dynamite. W. O. Snelling and C. G. Storm. "Chem. Eng. Wks. Chem.," vol. 3, 30, p. 300-2.  
Explosives for Mining Work. (Sprengstoffe fuer Grubenarbeiten.) "Kali Erz Kohle," 1913, p. 955. 2s. 6d.  
Shotfiring and Watering Systems in Utah Mines. J. E. Ambrose. "Coal Age," vol. 4, 15, p. 536-7; ill. 1s. 3d.  
New Permitted Explosives. "Colliery Guard.," vol. 106, 2763, p. 1214. 6d.

### IX.—Timbering, Packing, &c.

The Removal of Sludge in Hydraulic Stowing. (Die Beseitigung der Schlämme beim Spülversatz.) Th. Steen. "Kohle Erz.," 1913, p. 918; ill. 2s. 6d.  
Influence of Mining Operations on Buildings, Public and Particularly Tramway Plants; also Precautionary Measures for Minimising Dangers. (Einwirkung des Bergbaues auf Gebaende, oeffentliche und besonders Strassenbahnanlagen, sowie Massnahmen zur Minderung der Schaeden.) Nolden. "El. Kraftbetr.," vol. 11, 28, p. 573-9; ill. 2s. 6d.  
Hydraulic Goaf Packing at the St. Nicolas Pit, Montegnée. (Le Remblayage Hydraulique au Siège Saint-Nicolas des Charbonnages Espérance et Bonne Fortune, Montegnée.) A. France. "Ann. Belg.," vol. 18, 4, p. 1065-91.  
German Timbering Methods. "Coal Age," vol. 4, 16, p. 580; ill. 1s. 3d.  
Relining Hamilton No. 2 Shaft. "Engin. Min. Jl.," vol. 96, 15, p. 680-3; ill. 1s. 6d.  
A Large Concrete-Lined Shaft. "Coal Age," vol. 4, 16, p. 579; ill. 1s. 3d.  
Recent Improvements in Concrete Lining of Shafts. (Neues ueber Schachtauskleidung durch Beton.) F. Fammler. "Kohle Erz.," 1913, 31, p. 769-72. 2s. 6d.

### XI.—Winding and Haulage.

The Henry Automatic Banking Device. (Decagement Automatique Système Henry.) O. Ledouble. "Ann. Belg.," vol. 18, 3, p. 817-23; 3 ill. (Device used at the Masse et Diarbois Colliery.)  
Comparison between Benzine and Compressed Air Locomotives for Mine Haulage. (Etude Comparative entre la Locomotive à Benzine et la Locomotive à Air Comprimé.) L. Dehez. "Ann. Belg.," vol. 18, 3, p. 863-7.  
Comparative Cost of Hauling by Benzine Locomotives and Horses Underground. (Prix de Revient du Transport de la Tonne Kilométrique par Locomotive à Benzine ou par Chevaux.) O. Ledouble. "Ann. Belg.," vol. 18, 3, p. 829-31. (At the Monceau-Fontaine-Martin et Marchienne collieries the cost of underground horse haulage is 0.234 fr. per ton-kilom., and that of locomotive haulage 0.182 fr.)  
Compressed-air Mine Haulage. W. Z. Price. "Colliery Eng.," vol. 34, 3, p. 142-5; ill. 2s. 6d.  
Animal Haulage in Mines. B. S. Randolph. "Colliery Eng.," vol. 34, 3, p. 139-42; ill. 2s. 6d.  
Briart Cage Loading Device at No. 2 Pit, Piéton Colliery. (Installation de Balances Briart aux Charbonnages de Mariemont et de Bascoup.) Molinghen. "Ann. Belg.," vol. 18, 4, p. 1102-7; 2 ill.]



Rope Safety at Winding Plants. (Seilsicherheit bei der Schachtförderung.) F. Baumann. "Kohle Erz," 1913, 85, p. 881-98; ill. 2s. 6d.

Cost of Haulage with Benzine Locomotives. (Transport par Locomotives à Benzine. Prix de Revient.) V. Lechat. "Ann. Belg.," vol. 18, 4, p. 1174-6.

Durez Overwinding Appliance. (Evite-molettes F. Durez.) O. Ledouble. "Ann. Belg.," vol. 18, 3, p. 823-6; 1 ill. (Device used at the Marcinelle-Nord Colliery.)

Pneumatic Conveyors for Brown Coal. (Pneumatische Braunkohlenförderlage.) Schörrig. "Braunk.," vol. 12, 26, p. 447-451; 6 ill. 2s. 6d.

Converging Cage Guides for Preventing Overwinding. (Etude Critique des Guides Rapprochés Placés comme Evite-molette.) N. Dessard. "Ann. Belg.," vol. 18, 3, p. 729-53; 9 ill. (Use with flat-hemp rope and bobbin drums.)

The Electric Mining Locomotive. G. M. Kennedy. "Coal Age," vol. 4, 16, p. 577-8. 1s. 3d.

Electric Haulage Locomotive. (Elektrische Abraumlokomotive.) "Umland Spec. Ed.," vol. 4, 29, p. 25-6; ill. (Weight 44 tons, two continuous-current motors of 100-125-horse power.) 2s. 6d.

Practical Mule Haulage. A. E. Thompson. "Colliery Eng.," vol. 34, 3, p. 166-7. 2s. 6d.

Electrical Winding Equipment for the Rand. "Colliery Guard.," vol. 106, 2762, p. 1173. 6d.

The Safety of Winding Ropes. "Colliery Guard.," vol. 106, 2762, p. 1159 and 2763; p. 1229. (Preliminary report of the Prussian Winding-rope Commission.) 1s.

The Employment of Jig Conveyors in Working Thick Seams. (Die Verwendung von Rollenrutschen beim Abbau mächtiger Flöze.) Tomaszewski. "Glückauf," vol. 49, 35, p. 1399-1401. 2s. 6d.

Mechanical Conveying in Coalmining in the Dortmund Mining District. (Die mechanische Abbauförderung beim Steinkohlenbergbau im Oberbergamtsbezirk Dortmund.) Pommer. "Z. Berg. Hüttenwes.," vol. 61, 2, p. 254; ill. 2s. 6d.

Various Types of Cage Landing Platforms. (Die verschiedenen Ausbildungen der Förderkorbanchlussbühnen.) Wintermeyer. "Bergb.," 1913, p. 561; ill. 2s. 6d.

Various Forms of Diagonal Working with Jig Conveyors in the Rhenish-Westphalian Coalfields. (Einige Arten von diagonalem Schüttelrutschenabbau im rheinisch-westfälischen Steinkohlenbezirk.) K. A. Weber. "Glückauf," vol. 49, 40, p. 1639-45; ill. 2s. 6d.

Field Test of the Electric Locomotive. L. V. Newton. "Colliery Eng.," vol. 34, 3, p. 157-8. 2s. 6d.

Mine Tracks. "Colliery Eng.," vol. 34, 3, p. 152-3. 2s. 6d.

#### XII.—Signalling.

The Reineke Telephone for Cage and Mine Use. (Die Förderkorb- und Grubentelephonie Reineke.) O. Ohnesorge. "Bergb.," 1913, p. 555; ill. 2s. 6d.

Mine Telephony. H. Rost. "Mex. Min. J.," 1913, p. 430. 1s. 6d.

Electric Signalling Installation at the Perrier Colliery. (Signalisation Electrique au Siège No. 6 (Perrier) des Charbonnages du Nord de Charleroi.) Vrancken. "Ann. Belg.," vol. 18, 4, p. 1116-9; ill.

Devices for Signalling in Moving Cages. (Installation dans les Puits de Mines de Signaux pouvant être Manœuvrés des Cages en Mouvement.) T. Kersten. "Ann. Belg.," vol. 18, 3, p. 697-728; 16 pl.

Electric Shaft Signalling Device. (Signalisation Electrique.) Dandois. "Ann. Belg.," vol. 18, 3, p. 826-8; ill. (Device used at the Masse and Diarbois Colliery.)

#### XIII.—Lighting.

The Lighting of Mines. W. Seddon. "Coal and Coke Op.," 1913, p. 535. 1s. 3d.

Use of Miners' Safety Lamps. J. W. Paul. "Min. Scient. Press.," vol. 107, 16, p. 619; ill. 1s. 6d.

The Effect of Increased Atmospheric Pressure on the Height of the Gas Cap. G. A. Lodge. "Colliery Guard.," vol. 106, 2764, p. 1272. (Paper read before Midland Inst. Min. Engin.) 6d.

#### XIV.—Ventilation.

A New Type of Colliery Fan. "Coal Age," vol. 4, 16, p. 580; ill. 1s. 3d.

The Leskole Speed and Volume Recorders. "Colliery Guard.," vol. 106, 2762, p. 1160; 7 fig. 6d.

#### XV.—Mine Gases, Testing.

Apparatus for the Determination of Carbon Dioxide and Oxygen in Mine Air. D. Burns. "Colliery Guard.," vol. 106, 2764, p. 1286. (Paper read before Min. Inst. Scotland.) 6d.

#### XVI.—Coaldust.

State Testing Station for Firedamp, Coaldust, &c., Brüx, Bohemia. (Die staatliche Versuchsanstalt für Schlagwetter, Kohlenstaub, Brandgase usw. in Brüx.) K. Stauch. "Oesterr. Z. Berg- Hüttenwes.," vol. 56, 36, p. 511; 38, p. 537; 5 ill. 5s.

Equipment for the Removal of Dust in Coal Separation. (Entstäubungsanlagen in Steinkohlen-Separationen.) "Kohle Erz," 1913, p. 922; ill. 2s. 6d.

Investigation of Roof Shaledust, with Reference to its Adaptability as a Detergent in Coaldust Explosions. R. C. Hills. "Proc. Color. Sci. Soc.," vol. 10, p. 265-78; ill.

External Tamping with Uninflammable Dust. (Le Bourrage Extérieur en Poussières Incombustibles.) V. Watteyne and E. Lemaire. "Ann. Belg.," vol. 18, 3, p. 781-16; ill.

Analysis of the Official Reports on Firedamp Accidents in French Mines, 1904-1911. (Analyse des Rapports Officiels sur les Accidents de Grison Survenus en France pendant les Années 1904 à 1911.) Defline. "Ann. Mine.," ser. 11, vol. 4, No. 8, p. 89-148.

Coaldust Explosion Test, U.S. Bur. of Mines. G. S. Rice and L. M. Jones. "Min. Eng. World.," 1913, p. 701; ill. 1s. 3d.

Coaldust Experiments in the Rossitz District Experimental Gallery. (Versuche mit Kohlenstaub im Versuchsstollen des Rossitzer Steinkohlenreviers.) Dr. Czaplinski and Bergrat Jicinsky. "Oesterr. Z. Berg- Hüttenwes.," vol. 61, 43, p. 609-11; 4 ill., 4 pl.; 44, p. 623-8; 45, p. 643-7; 47, p. 671-6; 2 ill. 10s.

Coaldust Experiments in the United States. G. S. Rice, L. M. Jones, J. K. Clement and W. L. Egy. "Colliery Guard.," vol. 106, 2762, p. 1154; 11 fig. (From Bull. 56, U.S. Bureau of Mines.) 6d.

The Griffin Mills for Grinding Stonedust. "Colliery Guard.," vol. 106, 2764, p. 1272; 3 ill. 6d.

A Laboratory Study of the Inflammability of Coaldust. J. C. W. Frazer, E. J. Hoffmann and L. A. Scholl, jun. "Colliery Guard.," vol. 106, 2763, p. 1215; 2 fig. (From Bull. 50, U.S. Bureau of Mines.) 6d.

Explosions in Mines: the Influence of Incombustible Dusts in Preventing the Inflammation of Coaldust. "Colliery Guard.," vol. 106, 2761, p. 1101; 11 fig. (Fifth Report of the Explosions in Mines Committee.) 6d.

American Mining and Coaldust Treatment. Ashworth, Verner, Rice, Taffanel and others. "Colliery Guard.," vol. 106, 2764, p. 1266. (Discussion before N. of Eng. Inst. Min. Engin. on paper by Samuel Dean.) 6d.

Analysis of Altofts Shale. "Colliery Guard.," vol. 106, 2762, p. 1161. 6d.

#### XVII.—Explosions

Localising Coaldust Explosions. "Min. Scient. Press.," vol. 107, 16, p. 618. 1s. 4d.

Safety Provision of Victor-American Fuel Company. F. W. Whiteside. "Coal Age," vol. 4, 15, p. 528-30; ill. 1s. 3d.

Experimental Explosion at Bruceton Mine. "Coal Age," vol. 4, 15, p. 534-5; ill. (Details of the explosion and conclusions reached by Messrs. Rice and Jones. They believe the cars were thrown into the mine by detonation and not by unbalanced atmospheric pressure resulting from a vacuum formed at the face after the explosion.) 1s. 3d.

#### XVIII.—Mine Fires.

Spontaneous Combustion in Coalmines. "Colliery Guard.," vol. 106, 2761, p. 1120; 2762, p. 1121; 2763, p. 1230; 2764, p. 1287. (A Digest of Evidence before Departmental Committee (continued): A. M. Henshaw, G. P. Hyslop, J. R. L. Allott, R. V. Wheeler, A. Daniels, G. Poole, P. P. Bedson.) 2s.

The Influence of Inert Gases on Inflammable Gaseous Mixtures. J. K. Clement. "Colliery Guard.," vol. 106, 2762, p. 1157; 1 fig. (From Techn. Paper 43, U.S. Bureau of Mines.) 6d.

#### XIX.—Rescue and Ambulance

Improvements in Oxygen Rescue Apparatus with Circulation. (Ueber einige Neuerungen bei Sauerstoff-Rettungsapparaten mit Zirkulation.) J. Popper. "Kohlenint.," 1913, p. 233; ill. 2s. 6d.

First Aid in Coalmine Accidents. (Erste Hilfe bei Katastrophen in Kohlengruben.) W. Heym. "Kali Erz Kohle," 1913, p. 843. 2s. 6d.

First Aid and Rescue Work in Mines. (Erste Hilfsleistung und Rettungsdienst in den Minen.) Dr. Stassen. "Oesterr. Z. Berg- Hüttenwes.," vol. 61, 44, p. 634. 2s. 6d.

Breathing Apparatus in Rescue Work in Austrian Mining. (Die Atmungsapparate im Rettungswesen beim oesterreichischen Bergbau.) W. Pokorny. "Oesterr. Z. Berg- Hüttenwes.," vol. 56, 37, p. 526, 39, p. 552. 5s.

Working in Irrespirable Gases in Brown Coal Mines. (Arbeiten in unatembaren Wettern. Wiederbeleben und Warmlampen auf Braunkohlenwerken.) G. Klein. "Braunk.," vol. 12, 22, p. 377-80. 2s. 6d.

Organisation for Rescue Work in the Brüx District, and Central Rescue Station at the Julius State Colliery, Bohemia. (Die Organisation des Grubenrettungsdienstes bei der k.k. Bergdirektion Brüx in Nordwestboehmen und die Zentral-Rettungsstation am k.k. Schachte Julius III.) S. Ryba. "Oesterr. Z. Berg- Hüttenwes.," vol. 56, 36, p. 510, 38, p. 534; 6 ill.; 43, p. 614-8; 2 ill.

Improvements in Oxygen Apparatus. Grahn. "Colliery Guard.," vol. 106, 2761, p. 1117; 3 fig. (From a paper read at the International Lifesaving Congress, Vienna.) 6d.

Injectors in Oxygen Apparatus. Forstmann. "Colliery Guard.," vol. 106, 2761, p. 1118; 2 fig. (From a paper read at the International Lifesaving Congress, Vienna.) 6d.

#### XX.—Drainage, Pumping, &c.

The Unwatering of Lignite Deposits by Flat Borings. (Die Entwässerung der Braunkohlenlagerstätten durch Flachbohrungen.) Sonntag. "Techn. Bl.," 1913, p. 281 and p. 349; ill.

Air Chambers for Borehole Pumps. W. H. Booth. "Power User," vol. 8, 92, p. 318-20; 1 fig. 1s.

Draining Brown-coal Deposits and Cover Rock by Boreholes. (Die Entwässerung des Braunkohlengelirges durch Bohrlöcher.) R. Schmidt. "Braunk.," vol. 12, 31, p. 536-8. 2s. 6d.

A New Acid-proof Mine Pump. "Coal Age," vol. 4, 16, p. 575; ill. 1s. 3d.

Rotary Pumps for Shaft Sinking and Drainage Purposes. (Kreispumpen für Zwecke des Abteufens und des Sumpfens von Schächten.) E. Blau. "Kohle Erz," 1913, 42, p. 2009-12. 2s. 6d.

Thirty Years' Experience with Pumping Machinery. J. Brindley. "Colliery Guard.," vol. 106, 2764, p. 1286. (Abst. paper read before S. Staffs. Inst. Min. Engin.) 6d.

Notes on Electric Pumps. S. S. Walker. "Engin. Min. J.," vol. 96, 16, p. 723.

The Rossitz-Zbeschau-Oslawan Coal District. (Das Rossitz-Zbeschau-Oslawaner Steinkohlenrevier.) L. Zelniczek. "Oesterr. Z. Berg- Hüttenwes.," vol. 61, 43, p. 618-20; 45, p. 648-50. (Pumping Plant at Kukla shaft.) 5s.

Centrifugal Pumps. A. T. Thorne. "Colliery Guard.," vol. 106, 2763, p. 1213; 3 fig. (Paper read before N.E. Coast Inst. Engin. Shipbuilders' (graduates' section). 6d.

#### XXI.—Preparation.

Coal Washing and Classifying Plant at St. Louis Pit, Flenu. (Charbonnage de Produits à Flenu. Triagelavoir du puits No. 12.) Niederau. "Ann. Belg.," vol. 18, 4, p. 1163-8; 1 pl. (Coppée system.)

Beer Coalwashing Plant at the Tilleur Pit. (Charbonnage du Horloz. Installation d'un Lavoir à Charbons.) Fourmarier. "Ann. Belg.," vol. 18, 4, p. 1149-54; ill.

#### XXII.—Briquettes.

New Equipment and Plant at Brown Coal Works in the Breslau District. (Neure Betriebseinrichtung und Betriebsanlagen auf den Braunkohlenwerken des Oberbergamtsbezirkes Breslau.) Bergrat Illner. "Braunkohle," vol. 12, 22, p. 339-65; 32 ill. (Steam diggers, haulage appliances, pumps, settling tanks, ventilation, briquetting, steam-raising plant.) 2s. 6d.

#### XXIII.—Coke Ovens.

By-Product Coking Plant at Strepy Colliery. (Charbonnage de Strepy et Thieu à Strepy. Installation de Fours à Coke à Recupération.) Piette. "Ann. Belg.," vol. 18, 4, p. 1096-1100. (Mont-Cenis plant.)

Recent Improvements in the Manufacture of Coke. (Nouveaux Perfectionnements dans la Fabrication du Coke.) H. Thiry. "Rev. Métallurgie, 1913," p. 811; ill. 6s.

The Production of Sulphate of Ammonia by Means of the Sulphur Contained in Coke-Oven Gases. (Ueber die Gewinnung von Ammoniumsulfat mit Hilfe des in den Kokereigasen enthaltenen Schwefels.) J. Reichel. "Bergb.," vol. 26, 31, p. 498. 2s. 6d.

On Coke-Oven Door Packing Devices. (Ueber Koksofen-türen und deren Abdichtung.) B. Alexander Katz. "Bergb.," vol. 26, 40, p. 657-9. 2s. 6d.

The Recovery of Benzol from Coke-Oven Gas. "Colliery Guard.," vol. 106, 2762, p. 1158; 3 ill. (The Koppers Process.) 6d.

The Use of Sulphate as a Fertiliser. "Colliery Guard.," vol. 106, 2762, p. 1171. 6d.

#### XXIV.—Fuels, Testing, &c

Liquid, Solid and Gaseous Fuels for Power Production. "Canad. Engin.," vol. 25, 16, p. 580-2. 1s. 6d.

On Sampling and the Preparation of Samples, Especially in Regard to Coal Testing. (Über Probenehmen und Vorbereiten von Proben und die Beziehungen zum Betrieb, besonders fuer Kohlen.) O. Binder. "Z. Dampfkessel. Betr.," vol. 36, 43, p. 524-7.

Fuel Analyses: A Significant Tendency. "Colliery Guard.," vol. 106, 2763, p. 1225. 6d.

A Study of the Oxidation of Coal and of the Process of Combustion. H. C. Porter. "Metallurg.-Chem. Engin.," vol. 11, 10, p. 543. 2s. 6d.

#### XXV.—Steam Engines and Boilers.

The Exhaust Steam Plant at the Oskar shaft of the Witkowitz Collieries. (Die Abdampfungsanlage auf dem Oskarschacht der Witkowitz Steinkohlen-gruben.) H. Hillefeld. "Z. Oberschles. Berg-Hütten Ver.," vol. 52, 9, p. 363-9; ill. 2s. 6d.

The Utilisation of Low-grade Fuels for Steam Boilers. (Die Verwertung minderwertiger gasarmer Brennstoffe fuer Dampfkesselbetriebe.) O. Neger. "Z. Dampfkessel. Betr.," vol. 36, 32, p. 387-9; 33, p. 400-1, 35, p. 425-8; ill. 7s. 6d.

Brown Coal Briquettes for Central Heating Boilers. (Braunkohlenbriketts fuer Zentralheizungskessel. Weilandt. "Z. Dampfkessel. Betr.," vol. 36, 34, p. 411-4; ill. 2s. 6d.

#### XXVI.—Compressed Air.

Recent Mining Piston Compressors. K. Beneke. "Techn. Bl.," 1913, p. 373; ill. 2s.

#### XXVII.—Electricity.

Governing Triphase Motors. (Réglage Economique de la Marche des Moteurs Triphase.) A. Monet. "Rev. Univ. Min. Met.," vol. 4, 1, p. 23-42.

Electrical Accidents in Industrial Works in Upper Silesia during 1912-13. (Unfälle durch Elektrizität auf den ober-schlesischen Industriewerken im Jahre 1912-13.) W. Vogel. "Berg- Hüttenmann. Rdsch.," vol. 10-2, p. 15-21.

Safeguarding the Use of Electricity in Mines. H. H. Clark. "Electrician," vol. 72, 1850, p. 143-5. 1s. 6d.

Application of Electricity in Mining at Maehrisch-Ostrau. (Die Anwendung der Elektrizität im Bergwesen Maehrisch-Ostrau.) J. Havlicek. "El. Kraftbetr.," vol. 11, 28, p. 579-81. 2s. 6d.

The Use of Electric Power in Mining Operations. S. Rice. "Iron Tr. Rev.," vol. 53, 13, p. 545-9; 6 ill. 1s. 6d.

#### XXVIII.—Surface Transport.

Locomotive Coaling Plant. (Lokomotiv-Bekohlungs-Anlage.) Schilhan. "Organ.," vol. 50, 19, p. 348-9; ill. 2s. 6d.

Coal-handling Plants for Panama. "Eng. Rec.," vol. 68, 16, p. 428. 1s.

Coal and Ash Handling in a Large Industrial Plant. "Ind. Engin. Digest," vol. 13, 10, p. 174. 4 fig.

Coal Shipping on the Great Lakes. "Coal Age," vol. 4, 15, p. 531-3; ill. 1s. 3d.



## XXIX.—Sanitation, Diseases, &amp;c.

tion of Pit Ponies. "Colliery Eng.," vol. 34, 1913, ill. 2s. 6d.  
 Progress in Mining Hygiene. (Neuere Fortschritte in der Hygiene des Bergbaues.) W. Hanauer. "Oesterr. Z. Berg- Hüttenwes.," vol. 56, 34, p. 471-3. 2s. 6d.  
 Septic Tank Closets at Angleur Steel Works. (Acidères d'Angleur. Installation de Cabinets d'Aisance à Fosses Septiques.) A. Delree. "Ann. Belg.," vol. 18, 4, p. 1155-8; 2 ill.  
 Sanitation in Alabama Mining Villages. D. E. Woodbridge. "Bl. Diam.," 1913, p. 15; ill. 1s. 6d.

## XXX.—Mining Laws, Royalties.

Revision of the United States Mining Law. Winchell, Goodale and Requa. "Min. Scient. Press," vol. 107, 15, p. 571-4. 1s. 6d.  
 The Delimitation of Mining Concessions Extending over a Given Length of Seam or Lode. (Ueber die Begrenzung von Längenfeldern.) A. Arndt. "Glückauf," vol. 49, 38, p. 1559-63; 39, p. 1610-15. 5s.  
 The Leasing of Mineral Lands. W. Griffith. "Colliery Eng.," vol. 34, 3, p. 167-9. 2s. 6d.  
 The Workmen's Insurance Law in the Russian Mining Industry. (Die Arbeiterversicherungsgesetze in der russischen Montanindustrie.) P. Martell. "Bergb.," vol. 26, 38, p. 626-8. 2s. 6d.  
 The Minimum Wage Act. "Colliery Guard.," vol. 106, 2762, p. 1169. 6d.

## CONTRACTS OPEN FOR COAL AND COKE.

For Contracts Advertised in this issue received too late for inclusion in this column, see LEADER and LAST WHITE pages

## Abstracts of Contracts Open.

DURBAN (SOUTH AFRICA), JANUARY 7.—*Gas Electric Plant*.—Gas electric plant for that town. Specification obtained at the office of the borough electrical engineer, Municipal-buildings, Durban, on deposit of £1 1s. (returnable).

GLIN (IRELAND), DECEMBER 29.—About 100 tons of best 4 ft. Wigan, Whitehaven, or Orrel coals, screened and free from slack, for the board of management. A sum of £5 (returnable) must be lodged with the clerk with each tender. Endorsed tenders to Mr. John Conway, clerk to Board.

KILLARNEY, JANUARY 3.—About 400 tons of best house coal, at per ton, for the Guardians. Sealed tenders to Mr. P. Carey, clerk of Union, Boardroom, Workhouse, Killarney.

LONDON, JANUARY 1.—Coal and coke for the Wandsworth Borough Council. Forms at the Council House, East Hill, Wandsworth, S.W.

NEWPORT (MON.), DECEMBER 29.—House coal, steam coal and coke, for the Corporation. Forms from the Borough Engineer, Town Hall, Newport.

OXFORD, DECEMBER 31.—Best Moira screened cobbles, for the Corporation. Sealed tenders, endorsed "Tender for Coal," to Mr. R. Bacon, town clerk, Oxford.

The date given is the latest upon which tenders can be received.

## CONTRACTS OPEN FOR ENGINEERING, IRON AND STEEL WORK, &amp;c.

ADELAIDE (AUSTRALIA), JANUARY 6.—*Steel Rails, &c.*—Supply of 1,559 tons of 41 lb. steel rails and 18 tons of steel fishplates. Specifications from the Supply and Tender Board Office, Adelaide, South Australia, at a cost of £1.

ANTWERP, JANUARY 26.—*Cranes*.—Tenders are invited by the Municipal authorities of the above city for six electric cranes for the Bassin-Canal extension.\*

BARGOED, JANUARY 5.—*Hauling and Laying Steel Mains*.—For hauling and laying about 1,860 yards of steel mains, for the Bedwellty Urban District Council (Gas Department), and about 5,136 yards of steel mains for the Water Department. Specification, Mr. Dan H. Price, engineer and surveyor to the council, Aberbargoed, upon payment of £2 2s. (returnable).

BRISBANE (AUSTRALIA), JANUARY 6.—*Steel Rails, &c.*—Tenders are invited by the Queensland Government for the supply and delivery of 1,012 tons of steel rails, 10,120 pairs of fishplates, 20,800 bolts and nuts, and 218,000 dogspikes, for the Babinda Central Sugar Mill.\*

BRISTOL.—*Well Sinking*.—For sinking a well, 6 ft. inside diameter, 20 ft. to 30 ft. deep. Particulars on application to works manager, Bristol Wagon and Carriage Works Company Limited, Lawrence Hill, Bristol.

CARLISLE, DECEMBER 31.—*Turbo-alternators*.—For the Corporation:—Two 1,250-kw. high-pressure turbo-alternators ("Impulse" type turbines); two sets of surface condensing plant for above turbo-alternators; two 600-kw. rotary converters; high-tension switchgear. Specification upon payment of a deposit of two guineas (returnable) from Mr. Fredk. W. Purse, Electricity Offices, Victoria Viaduct, Carlisle.

DARLINGTON, JANUARY 7.—*Coal Store Roof*.—Steel coal store roof, railway gantries, inspection chambers, &c., at the gasworks, for the Corporation. Specification on application to Mr. Frank P. Tarratt, gasworks engineer, at the Gasworks, on payment of £2 2s. (returnable).

GLEN (ORANGE FREE STATE, SOUTH AFRICA), JANUARY 7.—*Pumping Plant*.—Complete pumping plant required in connection with the irrigation scheme at Glen, Orange Free State.\*

LITHGOW (AUSTRALIA), JANUARY 12.—*Iron and Steel*.—Tenders are invited by the Commonwealth Department of Defence for the supply of iron and steel for the manufacture of rifles at Lithgow, New South Wales, during the period ended June 30, 1916. Specification from the manager, Small Arms Factory, Lithgow, New South Wales.\*

OTTAWA (CANADA), FEBRUARY 3.—*Steel Pipes*.—About 42 miles of welded steel pipe, 54 in. internal diameter; about 32 miles of welded steel pipe, 58 in. internal diameter; about 12 miles of welded steel pipe, 51 in. internal diameter.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

diameter, for the Corporation. Forms and specification from Sir Alex. Binnie, Son, and Deacon, St. Stephen's House, Victoria Embankment, London, S.W.

PRETORIA (SOUTH AFRICA), JANUARY 7.—*Pumping Plant*.—Tenders are invited by the Union Tender Board for the supply and erection of a pumping plant at Glen, Orange Free State. Specifications obtainable from the Director of Irrigation, P.O. Box 399, Pretoria, on deposit of the sum of £2 (returnable).

SHEFFIELD, JANUARY 6.—*Gas Mains*.—Supply of 30 in., 24 in. and 20 in. diameter steel gas mains for the Grimesthorpe Works, for the directors of the Sheffield United Gaslight Company. Specification upon application to the engineer, Mr. J. W. Morrison, at the company's offices, Commercial-street, Sheffield.

SOFIA (BULGARIA), JANUARY 2.—*Wagons*.—Tenders are invited by the Bulgarian Directorate-General of Railways and Ports for the supply of 200 coal wagons of 20 metric tons capacity each. Specifications from the General Direction der Eisenbahnen und Häfen, Sofia, on payment of 30 fr. (24s.)\*

STAVANGER (NORWAY), JANUARY 11.—*Gasometer*.—Tenders are invited by the Stavanger Gasworks for a gasometer of 12,000 cubic metres capacity. Tenders to "Gasværkets Kontor," Stavanger.\*

TORONTO (CANADA), JANUARY 20.—*Filtration Plant, &c.*—The Toronto City Council invites tenders for the installation of a complete mechanical filtration plant, boilers, steam turbo-generator plant, and all accessories, at Toronto Island.\*

WARRINGTON, JANUARY 7.—*Steel Pipes*.—For weldless steel pipes for feeding boilers, for the Electricity and Tramways Committee of the Corporation. Specification on payment of 1 guinea (returnable) from Mr. F. V. L. Mathias, M.I.E.E., borough electrical and tramways engineer, Howley, Warrington.

\* Specifications, particulars, &c., may be seen at the Commercial Intelligence Branch of the Board of Trade, 73, Basinghall-street, E.C.

## THE FREIGHT MARKET.

In view of the advent of the Christmas holidays, the volume of outward chartering has only been very thin this week. At the north-east coast Mediterranean rates are depressed, Algiers having been done at 5s. 6d. from the Tyne, the lowest rate recorded for that port for a long time. The coast has been very quiet, with London quoted at from 3s. 1½d. to 3s. 3d. and Hamburg at 3s. 6d. The Bay is worth only 4s. 9d. to Bordeaux. The Baltic remains at 6s. to Reval. At South Wales, there has been some difficulty in arranging loading turns. With tonnage offered rather sparingly, however, rates are not much weaker, excepting for the River Plate and Las Palmas, in which directions very low figures have been accepted. The Mediterranean is easier. The coasting and shorter trades are quiet, with rates difficult to maintain. At the Clyde, business is dull at easy figures. The Humber is quiet, with a superabundant supply of tonnage and few orders; therefore, weaker rates. Homewards, the Black Sea is inactive and tending downward. America is fairly steady, but with little doing. The River Plate is dull, and rates are inclined to cheapen. The East Indies are quiet. The rice ports are steady. Australia is unaltered. Rates from most other directions favour shippers.

Tyne to Alexandria, 5,000, 7s. 3d., 500; 4,000, 7s. 9d., 500; Ancona, 4,000, 8s. 1½d., 500; Algiers, 2,100, 5s. 6d., 600, January 5; Bordeaux, 2,000, 4s. 9d., from Dunston; 3,200, 4s. 9d., from Dunston; Bas-Indre, 5s. 6d.; Bayonne, 2,200, 5s. 6d.; Couronne, 1,700, 5s. 1½d., 300; Fredrikshald, 850, 4s. 9d.; Genoa, 15,000, 6s. 9d., contract over July-September; 7s., December; Hamburg, 1,300, 3s. 6d., from Dunston; 1,600, 3s. 6d.; Malta, 3,750, 6s. 3d., December; Naples, 5,000, 7s., 700, from Dunston; Oran, 2,100, 5s. 10½d.; Oporto, 1,000, 8s. 6d.; St. Nazaire, 2,700, 5s. 3d., Trignac terms, from Dunston; Savona, 7s., December.

Cardiff to Algiers, 762½ fr., December; 2,800; 7s., January 1; 2,800, 8½ fr.; Bordeaux, 3,200, 5½ fr.; 3,600, 5½ fr., 500; 1,800, 6 fr., 406, December 30; Bari, 2,800, 8s., 500, December 29, reported; Brest, 2,000, 4s. 3d.; Barcelona, 1,200, 8s.; 3,000, 8s., December 29; 3,400, 7s. 7½d., December 27; Constantinople, 3,200, 7s. 9d.; Campana, 12s. 9d., January; Civita Vecchia, 2,500, 8s., end December; Corunna, 2,300, 5s. 6d.; Djibouti, 10s., January; Dieppe, 1,500, 4s. 3d.; 2,300, 4s. 9d.; Ergasteria, 3,000, 8s.; Genoa, 5,500, 7s. 1½d.; 3,200, 7s. 6d.; 5,100, 7s. 3d., December 30; 4,600, 7s. 6d., January 3; 2,800, 7s. 6d., January 13; 5,200, 7s. 1½d., December 30; 5,000, 7s. 6d.; Gibraltar, 1,500, 6s. 6d.; Granville, 800, 4s. 9d., December 28; Havre, 2,000, 4s., end December; 1,900, 4s. 6d.; Honfleur, 1,000, 4s. 6d.; Islands, 2,400, 7s. 3d.; 4,800, 7s., December 29; Las Palmas, 2,400, 7s. 3d.; 4,300, 7s., December 29; La Pallice, 2,300, 5½ fr.; Lisbon, 2,600, 5s. 3d., 500; 2,200, 5s. 3d.; Madeira, 2,400, 7s. 3d.; Morlaix, 550, 5s. 9d., early January; Nantes, 1,450, 5½ fr., 500, December 27; Piræus, 4,600, 7s. 3d., December 29; Pembroke, 700, 3s.; Port Said, 5,550, 7s., January 1; 500, 0.7s., December 29; River Plate, 4,500, 12s. 9d., January 7; 6,000, 12s. 9d., early January; 4,700, 12s. 9d., Dec.; Rio de Janeiro, 4,500, pt.; Rosario, 13s. 3d., January; Rouen, 1,550, 5s. 3d.; St. Malo, 1,400, 4s. 9d.; Savona, 5,100, 7s. 3d., December 30; Torre Annunziata, 2,500, 8s.; Tunis, 3,300, 9½ fr. and 10½ fr., January 10; 1,500, 9½ fr. and 10½ fr.; Teneriffe, 4,200, 6s. 9d.; 2,400, 7s. 3d.; Tangier, 1,000, 16 fr.; Venice, 3,600, 9s., 400; Villa Constitution, 12s. 9d., January; Vigo, 2,100, 5s. 9d., January 1.

Hartlepool to Venice, 4,000, 8s. 9d.; Riga, 1,600, 5s. 6d.; Bordeaux, 2,700, 4s. 9d.; 2,100, 4s. 9d.

Wear to Bordeaux, 3,000, 4s. 9d.; Rochefort, 1,800, 4s. 9d.; Oporto, 1,300, 8s. 6d., 250.

Swansea to Genoa, 1,400, 8s. 3d. coal, 9s. fuel; Savona, 1,400, 8s. 3d. coal, 9s. fuel; Spezzia, 1,400, 8s. 3d. coal, 9s. fuel; Nice, 1,500, 8s. 10½d.; Barcelona, 2,000, 8s.; Rouen, 3,100, 5s.; 1,800, 5s.; 1,200, 5s. 6d.; Sables, 1,450, 6½ fr.; La Rochelle, 1,400, 6 fr.; Dieppe, 1,000, 5s.; 650, 5s. 3d.; 800, 5s. 6d.; Rochefort, 1,900, 5½ fr.; Belfast, 350, 4s. 3d.; Marseilles, 2,100, 9 fr., January 1-15; Havre, 1,280, 4s. 9d.; Cherbourg, 500, 6s. and 6s. 6d.

Llanelli to Calais, 1,700, 4s. 9d.; Lisbon, 1,000, 7s., 200, early January.

Glasgow to Genoa, 3,300, 7s.; Savona, 3,300, 7s.; Leghorn, 3,300, 7s.

Fife port to Nice, 1,750, 7s.; Cannes, 1,750, 7s.; Sonderburg, 1,500, 5s.; Bruges, 1,800, 3s. 10½d.

Newport to Algiers, 2,700, 7-8½ fr.; Marseilles, 2,100, 9 fr.; 5,400, 8½ fr.; Bahia Blanca, 13s., early January; Gibraltar, 1,500, 6s. 6d., December 30; Tobillao, 2,000, 5s. 3d.; Bilbao, 2,000, 5s. 3d., 300, December; Bona, 1,500-2,000, 10 fr., fuel.

Hamburg to copper port, sail, 17s., coke.

Port Talbot to Sables, 1,450, 6½ fr.; Nantes, 1,450, 5½ fr.

Immingham to Brest, 750, 6s. 3d.

Bo'ness to Rouen, 1,600, 4s. 10½d.

Boston to Bordeaux, 1,500, 5s.

Blyth to Stolpemunde, 1,200, 5s. 3d.; Christiansand, 1,200, 4s. 6d.

Partington to Reval, 2,400, 4s. 9d.

Hull to Reval, 1,150, 5s. 6d.; 2,600, 5s. 3d.; Bona, 1,250, p.t.; Bordeaux, 2,800, 4s. 10½d.

Grangemouth to Buenos Ayres, about 13s. 6d., December.

Newport River to Bona, 2,000, 10 fr., fuel.

Rotterdam to Bordeaux, 3,800, 6s. 6d.; Constantinople, 3,700, 7s. 6d.; Genoa, 4,600, 6s. 9d.

Homeward charters: Rangoon, 6,000, Continent, p.p., 23s. 9d., no reduction, clean rice, February 1-15; Burmah, 8,000-9,000, United Kingdom-Continent, 23s. 9d., o.c., January-February; 23s. 9d., Adriatic, January-February;

Calcutta, 2,853 net, New Zealand, 17s., coal, December-January; 2,274 net, Bombay, Rs. 5-8, option, Kurrachee, Rs. 5-12, December 22; 2,274 net, Bombay or Kurrachee, Rs. 6, January; 2,789 net, Rs. 6, January; Kohsichang, 2,443 net, Weser 24s. 9d., Hamburg 25s. 9d., clean rice; 25s. for 4,000 tons rice; London and Liverpool, January-February;

Kurrachee, 5,500, Antwerp or Rotterdam, 14s. 9d., Havre 15s. 6d., Havre and Antwerp 16s. 3d., January; 2,127 net, Antwerp, 15s., January; Poti, 5,400, Middlesbrough, 9s. 3d., December; Sulina, 6,100, L.H.A.R.; Leith, Liverpool or Glasgow, 7s.; Hamburg 7s. 6d., with 3d. less barley, option up to 2,000 tons oats 1s. 6d. extra, ppt.; 4,000, 10 per cent., 7s. 9d. n.c. or any, 8s. 3d. Hamburg, December-January;

Odessa, 5,000, Antwerp or Rotterdam, 7s.; with 3d. less barley up to half cargo, 400 tons oilcake 1s. 6d. extra, spot; Varna or Bourgas, 3,400, 8s. 3d. n.c. or any, 8s. 9d. Hamburg, December-January; Alexandria, 3,000, 10 per cent.; United Kingdom-Continent; 8s. 6d. f.o.; 7s. 6d. direct port, 7s.; Bristol Channel, January; Benisaf, 4,100, Middlesbrough, 7s. 6d., f.t., December; Carthage, 4,400, Middlesbrough, 5s. 9d., ppt.; Porman, 4,900, West Hartlepool, 6s., ppt.; Hornillo Bay, 4,500, Cardiff, 4s. 7½d., ppt.; Bilbao, 2,600, Glasgow, 4s. 6d., ppt.; 3,000, Newport, 4s. 6d., ppt.; 2,200, 4s. 3d., ppt.; 4,000, Rotterdam, 4s. 3d., ppt.; 3,300, 4s., ppt.; 2,900, Middlesbrough, 4s. 7½d., ppt.; 2,900, Stockton, 4s. 9d., ppt.; 3,300, Cardiff, 3s. 9d., ppt.; New York, 28,500 qrs. max., Lisbon, 2s. 9d., December-January; 3,506 net, South Africa, eight ports, 26s. 9d., January; 29,000 qrs., 10 per cent., Genoa or Marseilles, 2s. 10½d., January; Pensacola, 1,375 stds., Alexandria, 100s., option one port West Italy and Alexandria, 102s. 6d., February-March; nitrate ports, 2,436 net, United Kingdom-Continent, 24s., January; United Kingdom-Continent or United States, 24s., February; 24s. 10½d., October-November, re-let; New York, sail, 11½ dols., Rosario; Philadelphia, 3s. 1½d., two ports Mediterranean; San Lorenzo, 13s. 6d., United Kingdom-Continent, o.c., seed 1s. extra, option Santa Fé 1s. more, days, January 1; 5,500, 10 per cent., 13s. o.c., less 6d., seed 6d. extra, option Colastine 1s. extra, end December; 4,100, 10 per cent., 13s. 6d. o.c., less 6d., January 1-15; 13s. 6d. o.c., half-seed 6d. and balance 1s. extra, option Santa Fé loading 1s. 6d. extra, days, December 25; 4,500, 10 per cent., 15s. 6d. o.c., less 6d., February 1-28; Kustendje, Novorossisk or Theodosia, 3,600, 10 per cent., 8s. n.c. or any, 8s. 6d. Hamburg, December; Carthage or Porman, 4,000, Middlesbrough, 5s. 9d., January; Rivasdesella, 1,600, Maryport, 6s. 6d., ppt.; Vivero, 4s. 10½d., Immingham, ppt.; Gulf, 1,825 net, River Plate, 110s., January; 2,000 net, Havre, 35s., cotton, January; 2,480 net, United Kingdom-Continent, two ports to two, 36s. 3d., January; 2,036 net, Denmark, 13s. one port, 13s. 3d. two ports, 13s. 6d. three, 13s. 9d. four, January; 4,500, 13s. 6d. one port, 13s. 9d. two ports, 14s. three ports, 14s. 3d. four ports, January; 1,776 net, 31s. 3d., United Kingdom-Continent, Form O, January; Australia, 6,800, 10 per cent., United Kingdom-Continent, 30s. 6d., February; 7,400, 30s. 6d., February; Saigon, 6,000, basis 26s. 6d. Hamburg, rice meal, January; Bombay, 4,117 net, Hull and/or Antwerp, 17s. 9d. one port, 18s. 3d. both ports, on d.w., January; 6,000, 10 per cent., United Kingdom-Continent, two p.p. on d.w., January; 5,000-6,000, 18s. one p.p., 18s. 6d. two p.p., on d.w., April; Japan, 2,764 net, Bombay, 9s. 9d., January-February; Novorossisk, 3,400, Denmark, basis 11s. 6d., oil coke; December-January; Melbourne, sail, about 25s. 6d., United Kingdom-Continent; West Australia, 5,600, United Kingdom-Continent, 29s., February; 4,000 loads, London or Liverpool, 47s. 9d., March-April; Santander, 1,400, Britonferry, 4s. 10½d., ppt.; 2,400, Rotterdam, 4s. 6d., spot; 1,800, 5s. 3d., ppt.; Passages, 2,600, Rotterdam, 4s. 7½d., ppt.; Bougie, 3,500, Middlesbrough, 5s. 5d., January; Buenos Ayres or La Plata, 5,500, 10 per cent., United Kingdom-Continent, p.p., 14s., oats, no reduction direct, January 15-31; Bahia Blanca, 7,700, 10 per cent., United Kingdom-Continent, p.p., 14s. for 2,000 tons wheat, 16s. balance oats, no reduction direct, January; Bulgaria, 6,400, Antwerp or Rotterdam, 6s. 9d. one port, 6s. 10½d. two ports, 7s. 3d. three ports loading, ppt.; Danube, 5,100, Rotterdam, 8s. 3d., Hamburg 8s. 9d., with 500 tons flour 3s. extra and 500 tons oats 2s. extra, in case of ice to complete at Sulina at 1s. 6d. less, ppt., Portland, Or., sail, 29s. 6d. wheat, 30s. 6d. wheat-barley, United Kingdom-Continent, February; time charter, States and West Indies trade, £900, one round trip, delivery and re-delivery North of Hatteras; time charter, Eastern trade, about 4s. 1½d., 12 months, delivery Java, re-delivery East or United Kingdom-Continent; 8s., one trip, delivery Hamburg, re-delivery Calcutta; South Australia, Melbourne or Geelong, 30s. 6d., United Kingdom-Continent; Nicolaieff, Novorossisk or Theodosia, 3,400 max., Bergen-Christianiana range, 9s. 9d. one port, 10s. two ports, 10s. 3d. three ports, January; South Australia, Melbourne or Geelong, 5,300, United Kingdom-Continent, 30s., option Cape 27s. 6d., February-March; Vladivostok, 3,773 net, United Kingdom-Continent, 26s., spot; Adelaide, sail, 23s. 9d., United Kingdom-Continent, January; Gulf timber port, sail, 14 dols., River Plate; time charter, trans-Pacific trade, about 5s. 3d., one trip, delivery Portland (Or.), re-delivery Japan, China or East; time charter, trans-Atlantic trade, 3s. 7½d., one round trip, delivery Rotterdam, re-delivery U. K.-Continent, via States, spot; New York, 21½ c., four ports Australia, option New Zealand 24½ c., end January.



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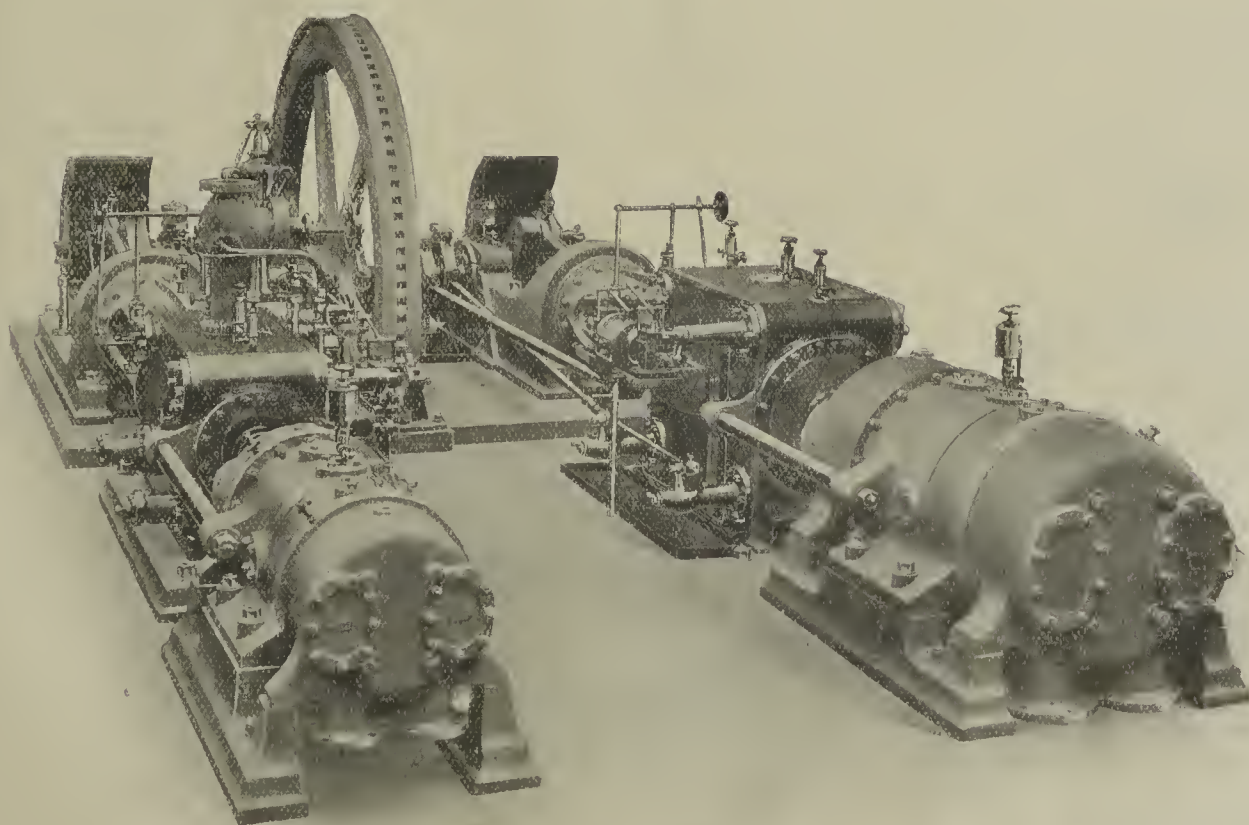
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now fitted to all our Air Compressing and Blowing Engines have the minimum of inertia and there is an ample port opening with an exceptionally low lift. Special grinding and tempering of the valves ensure fluid tightness, and they endure for a prolonged period of active life when working in conjunction with our Patent Valve Guard of resilient form.

The Patent Disc Valves can be fitted to existing installations with much advantage, having been supplied, or on order for engines indicating over 100,000 Horse Power during the past five years.

AIR Compressors driven by power other than steam, should be supplied with  
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**I**T provides that gradual variation of load which is especially essential where electricity is the motive power. The device is applicable to both single and two-stage compressing engines.



Pair Compound Corliss Steam Two-Stage Air Compressing Engines with Patent Disc Valves.







# THE NEW GENERAL REGULATIONS.

General Regulations have now been issued by the Home Secretary, under section 86 of the Coal Mines Act, 1911, and are contained in an Order (No. 748) dated July 10, 1913. The Regulations come into force on September 15, 1913. The full text is given below:—

## PART I.—General.

(1.) It shall be the duty of the manager and under-manager to carry out and to the best of their ability enforce the provisions of every Order in force under the Act regulating the supply, use and storage of explosives, and it shall be the duty of all persons employed in or about the mine to comply with the provisions of the said Orders.

(2.) Every notice required by the regulations of the mine to be posted up shall be posted up in some conspicuous place where it may be conveniently read or seen by the persons affected, and so often as it becomes defaced, obliterated or destroyed, shall be renewed with all reasonable despatch.

(3.) No person shall enter the cage until authorised to do so by the onsetter or banksman, as the case may be; or leave the cage until it shall have stopped at the landing-place, and persons while waiting at the top or bottom of the shaft or any entrance into the shaft or while in the cage shall behave in an orderly manner and shall obey the directions of the banksman or onsetter, as the case may be, and shall not impede the banksman or onsetter in the discharge of his duties.

The banksman or onsetter as the case may be shall not when persons are being raised or lowered signal the cage away until the gates or other rigid fences with which the cage is provided are in position, and no person other than an official or person authorised in writing by the manager to give signals shall while riding in the cage interfere with the gates or fences.

(4.) Subject to any directions that may be given by any official of the mine, no workman shall, except so far as may be necessary for the purpose of getting to and from his work or in case of emergency or other justifiable cause necessarily connected with his employment, go into any part of the mine other than that part in which he works, or travel to or from his work by any road other than the proper travelling road.

(5.) Every workman engaged at the face, or in stone-work, or in timbering shall carefully examine his working place before commencing work and before recommencing work after the firing of a shot, and after any interruption of work during the shift. Where several persons are working together and one of them is in charge, the examinations required by this regulation shall be made by the man in charge.

(6.) Where the work of erecting the supports of the roof and sides of working places is done by the workmen employed therein, it shall be the duty of the workmen to carry out the requirements of Section 50 of the Act, and to comply with the directions contained in the notice required by that Section.

(7.) If any person shall cause, or become aware of, any obstruction in or interference with the ventilation, or of any stagnation or impurity in the air, of any part of the mine, or of any dangerous defect in any part of the roof or sides, or of any other source of danger, he shall, if it falls within the scope of his duties to remedy such obstruction, interference, stagnation, impurity, defect, or other source of danger, immediately proceed to take the steps necessary for the purpose, and if not he shall immediately inform the manager, under-manager, fireman, examiner or deputy, or other official, and shall, if he is working at the place where the danger exists, cease all work at that place.

(8.) If a sufficient supply of material for supporting the roof and sides of any working place is not available at the place appointed by the Act, the workman shall withdraw from the working place and report the circumstance to the fireman, examiner or deputy or other official, and a note of the report shall be entered by the person to whom it is made in the report for the day, if any, which he may be required to make.

(9.) No person shall, without authority, pass beyond any fence or danger signal or open any locked door.

(10.) No person shall deface or remove any notice which may be set up, or any marks which may be made in any part of the workings for the guidance of the workmen or for any other proper purpose connected with the working of the mine.

(11.) No person shall brush or waft out gas.

(12.) No person shall allow any burning wick or part of a wick or other burning material to lie about in the mine, and every workman on leaving his working place shall take his light or lights with him.

(13.) Every person using a safety lamp shall examine the same externally, and assure himself that it is locked and in good order before entering the mine, and shall from time to time while in the mine examine the lamp to see that it is in safe working order; and he shall, when he has completed his shift, return the lamp to the lamproom. If the lamp is injured while in his possession, he shall at once carefully extinguish the light.

(14.) No person shall place a safety lamp on its bottom unless it is necessary to do so for the safe performance of any particular work or unless authorised by the manager; and in all cases whilst a person is at work it shall be placed at least two feet from the swing of the pick, hammer or other tool.

(15.) Should any person find himself in the presence of inflammable gas, he shall not throw away his lamp nor attempt to blow it out, but shall shelter it, hold

the lamp near the floor, avoid jerking it, and take it steadily into fresh air. If the gas fires in the lamp where he cannot take it into fresh air, he shall smother out the light or extinguish it in water.

(16.) No person shall when trying or examining for the presence of gas with a safety lamp, raise the lamp higher than may be necessary to allow the presence of gas to be detected.

(17.) Every workman working at the face shall to the best of his power carry on his work so as at all times to leave a free passage for the air current. He shall also to the best of his power leave his working place at the end of his shift in such condition as to allow of work being safely resumed therein; and if he finds it impossible to do so he shall fence it off and report the fact as soon as possible to the fireman, examiner or deputy, or other official.

(18.) Every person having occasion to pass through any door or canvas screen or flap shall carefully close the same.

(19.) No person shall sleep whilst below ground in the mine or whilst in charge of any winding, hauling, ventilating, or signalling machinery or apparatus, or boilers.

(20.) No unauthorised person shall work or interfere with any signalling apparatus in or about the mine.

(21.)—(a) The onsetter at any entrance into a shaft which is provided with a fence not worked by the cage or cages, shall not begin to remove the fence until either the cage is stopped at the entrance or it has reached such a position in the shaft that by the time the fence is removed the cage will be opposite the entrance, and shall close the fence immediately he has signalled the cage away, and shall not permit any other person to remove the fence while he is on duty.

(b) Reasonable protection against things falling down the shaft shall be provided for persons engaged in loading or unloading cages.

(22.) No person shall attempt to go on or across the uncovered space of the shaft bottom, except for the purpose of working in the shaft bottom, and no person shall be allowed to work in such space unless the cages are stopped.

(23.) Trains run for the conveyance of workmen, whether above or below ground and whether on the premises of a mine or on a line or siding to which Section 111 of the Act applies, shall be under the entire control of a person appointed to accompany and have charge of the train, and no person shall attempt to get into or out of the train when in motion nor ride upon the footboard, if any, or upon the buffers or couplings, nor refuse to comply with the directions of the person in charge, nor in any way obstruct or interfere with such person in the discharge of his duties, and any person failing to comply with this regulation shall be reported by the person in charge to the manager or under-manager.

(24.) Every person having charge of a horse, pony, mule or donkey shall drive it carefully and shall observe any directions that may be given to him by the horse keeper or by the official under whose direction he works.

(25.)—(a) No person below ground shall ride upon any animal, nor, except by permission of the manager or under-manager, upon any tram, tub or other contrivance drawn by a horse or other animal.

(b) No person shall ride on any haulage rope.

(26.) No person when taking a tub by hand down an incline of which the gradient exceeds one in twelve shall go in front of the tub; and in every case where the conditions are such that a person cannot control the tub by hand from behind, he shall not take the tub down unless some contrivance is provided to enable him to control the tub.

(27.) No person shall be in or about the mine in a state of intoxication, or, without permission of the manager, take or bring any intoxicating liquor on or in the mine, and no person shall throw any stone or other missile, or fight or behave in a violent manner, in or about the mine.

(28.) No person employed in or about the mine shall negligently or wilfully do anything likely to endanger life or limb in the mine, or negligently or wilfully omit to do anything necessary for the safety of the mine or of the persons employed therein.

(29.) Every workman receiving in or about the mine any personal injury caused by an explosion of gas or dust or any explosive or by electricity or overwinding or any other special cause specified by an Order under Section 80 (1) (iii) of the Act, or any personal injury causing him to absent himself from his work, shall as soon as possible report the same to one of the officials, and if required by the official shall forthwith proceed to the appointed place for First Aid treatment.

(30.) The manager shall appoint a competent person or persons to keep a correct record of the number of persons going below ground and returning from below ground daily, and if required by the manager every person shall immediately before going below ground and after returning from below ground record his presence in accordance with a system approved by the inspector of the division.

(31.) The manager shall cause to be posted up at the pit head where it may be conveniently seen by the persons employed a sketch plan of the mine showing the main roads, the means of egress from each part of the mine to the surface, and the telephone stations underground, and so often as the same becomes defaced, obliterated or destroyed shall cause it to be renewed with all reasonable despatch.

(32.) Where by the Act or Regulations of the mine any duty is imposed upon or authority given to any fireman, examiner or deputy, that duty in cases of emergency may be fulfilled or that authority exercised by and at the discretion of any official his superior at the mine and duly qualified to perform such duties.

(33.) Every person before engaging any helper, drawer or other assistant shall acquaint the manager under manager (if any) or any other official of the mine superior to the firemen, examiners or deputies, and obtain his sanction.

(34.) Every official of the mine shall carry out the duties assigned to him by the manager, and shall carry out and enforce those provisions of the Act and of the Regulations and Orders made thereunder which relate to the matters in respect of which such duties have been so assigned.

## The Manager.

(35.) The manager shall appoint in writing to be officials of the mine such number of competent persons as will be sufficient to secure a thorough supervision of all the operations in or about the mine and the enforcement of the requirements of the Act and of the Regulations and Orders made thereunder. He shall assign their duties to the several officials of the mine, and shall to the best of his power see that each official understands and carries out and enforces those provisions of the Act and of the Regulations and Orders made thereunder which relate to the matters in respect of which duties are assigned to him.

(36.) He shall give attention to and cause to be carefully investigated, any representations or complaints that may be made to him as to any matter affecting the safety or health of persons in or about the mine.

(37.) He shall appoint the stations required by Section 63 and the lamp stations, if any, in pursuance of Section 34 (1) (iii) of the Act, and cause their positions to be indicated by notices constructed of durable material.

(38.) He shall see that a sufficient supply of proper materials and appliances for the purpose of carrying out the provisions of the Act and ensuring the safety of the mine and persons employed therein is always provided, and, if he be not the owner or agent of the mine, he shall report in writing to the owner or agent when anything is required for the aforesaid purpose that is not within the scope of his authority to order.

(39.) He shall determine and state in a notice which shall be kept posted up at the pit head the number of persons to be allowed to ride in a cage at one time, or, when a cage has more than one deck, on each deck of the cage. When men are being raised from the pit bottom, if more than one deck is used, the top deck shall be loaded with men first, but this shall not apply when the decks are simultaneously loaded or when a balanced platform is used for loading the cages.

(40.) If no under-manager has been appointed for the mine, the manager shall carry out the duties imposed by these Regulations on the under-manager.

## The Under-manager.

(41.) It shall be the duty of the under-manager, as well as of the manager, to enforce to the best of his power the provisions of the Act and of the Regulations and Orders made thereunder, and he shall give (subject to the control of the manager) such directions as may be necessary to ensure compliance with those provisions and to secure the safety of the mine and the safety and health and proper discipline of the persons employed therein.

(42.) He shall give attention to and cause to be carefully investigated, any representations or complaints that may be made to him as to any matter affecting the safety or health of persons in or about the mine.

(43.) He shall, unless an official between himself and the firemen, examiners or deputies has been appointed, make arrangements for their meeting him daily for the purpose of conferring on matters connected with their duties; and shall also make arrangements to meet the other underground officials daily for the like purpose.

(44.) He shall to the best of his power see that all necessary materials and appliances are sent into the districts as required, and he shall report at once to the manager any deficiency in the supply of such materials and appliances.

(45.) He shall from time to time carefully examine all travelable parts of the mine whether frequented by workmen or not.

## Officials other than the Manager and Under-Manager and the Firemen, Examiners or Deputies.

(46.) Every person appointed by the manager to be an official of the mine shall to the best of his power see that the persons under his charge understand and attend to their respective duties.

(47.) When any person is appointed to be an underground official of the mine superior to the firemen, examiners or deputies but inferior to the manager or under-manager, he shall be a person of not less than twenty-three years of age holding either a second class certificate of competency or a fireman's certificate under the Act. He must also have had at least three years' practical experience underground in a mine.

(48.) When any person is appointed to be an underground official of the mine superior to the fireman, examiner or deputy, but inferior to the manager and the under-manager:—



He shall confer daily during his shift with the firemen, examiners or deputies and other officials of the mine or that part of the mine in respect of which he is appointed, on matters connected with the state of the mine or that part of the mine, and if the mine is worked by a succession of shifts he shall not leave the mine without communicating with the person succeeding him, if any, and shall give him such information as may be necessary for the safety of the mine and of the persons employed therein.

- (b) He shall examine daily the reports of the firemen, examiners or deputies under his charge, and see that they are properly recorded.

#### *Firemen, Examiners, and Deputies.*

The following regulations shall not apply to shafts in the course of being sunk.

(49.) Each fireman, examiner or deputy shall in the district of the mine assigned to him carry out in a thorough manner all his statutory duties. He shall to the best of his power see that the workmen under his charge understand and carry out their respective duties under the Act and Regulations and Orders made thereunder and any directions with a view to safety which may be given to them.

(50.) The examination which the fireman, examiner or deputy is required to make before the workmen enter the district, shall be commenced and completed within the two hours immediately preceding the commencement of work in the district. On the completion of the inspection he shall proceed to the appointed station where he shall either meet the workmen and instruct them as to their places of work and as to any special precautions necessary to be observed by them, or report to the incoming fireman all information necessary to enable the latter to do so.

Where safety lamps are required to be used, a competent person shall externally examine the safety lamp of every workman before passing the station and see that it is in safe working order and securely locked, before permitting him to go beyond such station.

A fireman, examiner or deputy shall check the number of workmen under his charge, and shall record the number in his report.

(51.) Where in any place danger from gas or any other cause is found by him he shall fence off all the approaches to the place so that it cannot be inadvertently entered, and shall mark the place by a danger signal.

(52.) If the mine is worked by a succession of shifts he shall not leave the mine without conferring with the fireman, examiner or deputy succeeding him, and shall give him such information as may be necessary for the safety of his district and of the persons employed therein.

(53.) If any case of damage to a safety lamp in his district is reported to him or comes to his notice, he shall ascertain and record in his report the cause and nature of the damage.

(54.) He shall see that all doors, stoppings, brattice and fences in his district are maintained in good order.

(55.) Where brattice or air pipes are required by the manager or under-manager to be used for the ventilation of the working places the fireman, examiner or deputy shall see that they are kept sufficiently advanced to ensure that an adequate amount of air reaches the working faces.

(56.) He shall from time to time during his shift examine for gas at the ripping or brushing, and also at the edges of the gob, goaf or waste, and shall observe the condition of the roof in the gob, goaf or waste, so far as it can be seen from the edges thereof.

(57.) He shall see that every ventilation door is so fixed and maintained that it will fall to and close automatically, and shall also to the best of his power see that no such door is fastened, or propped, back on its hinges.

(58.) If he finds any of the ropes, chains, signals, brakes, jig wheels and posts, or other apparatus in actual use in his district, to be in an unsafe condition, he shall stop the use of the same.

(59.) He shall report as soon as may be to a superior official all accidents, dangerous occurrences or defects which may come to his knowledge.

(60.) Where one of the two ways affording means of egress from the district to the surface, provided in accordance with section 36, sub-section 3, of the Act, is not ordinarily used for travelling he shall travel at least once in very quarter the whole of such way, in order to make himself thoroughly acquainted with the same.

(61.) At the termination of work of a shift in a district the fireman, examiner or deputy who is in charge of the district before he himself leaves the district, or other competent person appointed by the manager or under-manager for the purpose, shall ascertain that all unnecessary lights are extinguished, that all main doors are closed and that the ventilation is taking its proper course. This requirement, so far as it refers to doors and ventilation, shall not apply where the shift is succeeded by another shift so that work is carried on without any interval in the district, nor shall it apply so far as it refers to lights where the shift is succeeded by another shift which is timed to enter the district within 15 minutes of the preceding shift leaving.

(62.) He shall have power to send out of the mine any workman under his charge infringing or attempting to infringe any provision of the Act or Regulations or Orders made thereunder or failing to carry out any direction given him with regard to safety, and shall report in writing any such infringement or attempted infringement or failure to the manager or under-manager at the end of his shift.

#### *Winding Enginemen.*

For the purpose of the following regulations, cage includes kibble.

(63.) Every winding engineman (unless some other person is specially appointed for the purpose) shall, at the commencement of or during his shift, carefully examine the external parts of the winding apparatus, the ropes upon the drum, the brake, the bell and the indicator showing the

position of the cage in the shaft, and the automatic contrivance, if any, for preventing overwinding. If any defect likely to affect the proper working of the engine is discovered then or at any other time, he shall not commence or continue winding until the matter has been reported to the manager, or under-manager, or to the official under whose direction he works, and he shall not resume winding until instructed to do so by the manager, under-manager or official as aforesaid.

(64.) Unless some other person is specially appointed for the purpose, he shall during his shift keep the engine and apparatus connected therewith under his charge properly cleaned and oiled.

(65.) He shall on no pretext leave the handles whilst the engine is in motion, or when anyone is in the cage.

(66.) Should a signal be given indistinctly, or should he have any doubt about a signal, he shall on no account set his engine in motion until a fully understood signal is received.

(67.) Before raising or lowering any person after any cessation of winding exceeding two hours, he shall run the cage or cages at least once between the shaft top and the lowest drawing level in order to ascertain whether everything is in order, and if any defect is discovered likely to affect the proper working of the winding apparatus he shall not commence winding until the matter has been reported to the manager or under-manager, or to the official under whose direction he works, and he is instructed to do so by the manager, under-manager or official as aforesaid.

(68.) He shall not allow any unauthorised person to be in the engine house, nor shall he, without the written permission of the manager or of the official under whose direction he works, allow anyone to work the engine. He shall in no circumstances permit anyone, except with the authority in writing of the manager, to work the engine while persons are being raised or lowered in the shaft.

#### *Persons in Charge of Ventilating Machines.*

The following regulations shall not apply to any auxiliary fan placed underground, which does not contribute to the general ventilation of the mine or of any ventilating district of the mine.

(69.) The owner, agent or manager shall cause to be provided in connection with every ventilating fan driven by mechanical power a water gauge and either an automatic indicator registering the number of revolutions of the fan or an automatic indicator registering the water gauge.

(70.) The person in charge of any ventilating machinery driven by mechanical power shall keep the machinery running at the speed ordered by the manager or under-manager, and shall examine the machinery and observe the indicators at intervals which in the case of mines in which safety lamps are required by the Act or the regulations of the mine to be used shall be of not more than half an hour or such longer time as may be approved by the inspector of the division and in the case of other mines shall be of not more than two hours.

(71.) He shall immediately report to the official under whose direction he works any damage to, or defect or derangement in, the machinery.

(72.) He shall from time to time observe the ventilating pressure as indicated by the water gauge, and where an automatic indicator registering the water gauge is not in use, he shall at the end of each period of two hours enter in a book to be provided by the manager the number of revolutions of the fan and the pressure shown by the water gauge at the end of the period.

(73.) In the event of a stoppage of the machinery or of any unusual variation of the water gauge he shall at once inform the official under whose direction he works.

#### *The Boiler Minder.*

(74.) The person appointed to attend to any boiler shall from time to time throughout the day examine the boiler, feed-apparatus, safety valves, and other fittings, and dampers, and see that they are in good working order; and shall at once report to the official under whose direction he works any defect or derangement in the same.

(75.) He shall not, except with the authority of the official under whose direction he works, alter or permit anyone to alter the weight on any safety valve, and only weights made for the purpose shall be used on any safety valve.

(76.) He shall maintain the water in each boiler as nearly as practicable at the proper working level, but if it becomes too low, he shall at once lower the dampers, and damp down the fire and if necessary draw the same, and report the circumstance to the official under whose direction he works. He shall also see that the pressure of steam fixed by the manager is on no account exceeded.

### **PART II.**

#### *Air Measurements. [Section 29, Subsection 2.]*

(77.) The points at which the quantity of air shall be measured in pursuance of Sub-section 2 of Section 29 of the Act shall be as follows:—

- In the main intake airways of every seam as near as practicable to the downcast shaft;
- In every split as near as practicable to the point at which the split commences, and
- In each ventilating district at or as near as practicable to a point 100 yards back from the first working place at the working face which the air enters.

#### *Use of Electric Lamps other than Locked Safety Lamps.*

##### *[Section 32.]*

(78.) In any mine or part of a mine in which safety lamps are required to be used, electric lamps, if enclosed in air-tight fittings and having the lamp globes hermetically sealed, may, subject to the provisions of the Act and any Regulations made thereunder as to the use of electricity in mines, be used within the following limits:—

- On main intake airways and haulage roads ventilated by intake air up to within 300 yards of the first working place at the working face which the air enters.
- On main return airways within 300 yards of the bottom of the upcast shaft if that shaft is regularly used for the purpose of winding persons or minerals but not within 300 yards of the last working place at the working face which the air leaves.

#### *Character of Winding Apparatus, &c. [Section 40 (1).]*

(79.) In every mine which is not a small mine the apparatus for raising and lowering persons to or from the surface, hereinafter called the winding apparatus, in any shaft which is more than 150 feet in depth, shall be worked by mechanical power.

(80.) Winding apparatus worked by mechanical power:—

- shall be so designed, constructed and maintained that, with the power provided, the raising and lowering of persons can be carried out with ease, regularity and safety;
- if installed after the date on which these regulations come into force, shall have the drum shafts, if 10 inches or more in diameter, bored longitudinally at the centre;
- shall be firmly connected to a rigid foundation so as to prevent any material movement of the apparatus as a whole.

(81.) Where winding apparatus is worked by other than mechanical power it shall be efficiently constructed and maintained, and provided with a locking device or brake sufficient in itself to hold the load in the shaft at any point.

(82.) All cage chains in general use shall be annealed once at least in every six months and detaching hooks shall be cleaned and refitted once in every three months.

#### *Capping of Winding and Hauling Ropes.*

##### *[Sections 40 (5) and 46.]*

(83.) No mode or type of capping shall be used which fails to withstand a strain:

- in the case of a winding rope, of at least seven times the weight of the maximum load carried at any time by the capel;
- in the case of a hauling rope, of at least 60 per cent. of the breaking strain of the rope.

(84.) A competent person appointed in writing by the Manager, shall, whenever a winding rope is capped or recapped, superintend the work, and see that it is properly carried out.

(85.) In no case shall the capel of a round winding rope be attached to the rope by the use of rivets passing through the rope.

(86.) In those forms of capping in which the wires at the end of the rope are bent back on the rope itself to form a cone, wedges of a soft metal or wedges formed by the lapping of soft wire shall be placed between the rope and that portion which is bent back. This regulation shall not apply to hauling ropes if mineral only is hauled or if the gradient is less than 45 degrees.

(87.) If white metal is used in the capping of ropes, the composition of the white metal shall be such that its melting point is under 750 degrees Fahr.

(88.) Where white metal is used in the capping of ropes the untwisted wires shall be thoroughly cleaned, and, before the white metal is poured into the socket the latter shall be heated or warmed.

#### *Exemptions from the Provision requiring Two Main Intake Airways. [Section 42 (1).]*

(89.) The provision in Section 42, sub-section (1), of the Act requiring two main intake airways shall not apply:

- To any seam the coal of which is so liable to spontaneous combustion that the provision of a second main intake airway in such seam would increase the risk of fire.
- To any seam where, owing to the character of the strata or the nature of the pressure, the cost of making or maintaining two main intake airways in that seam might be so great as to prevent the seam being worked at a profit.
- To any part of a seam where the mineral field leased or owned is not of sufficient width to allow the distances required by the regulations of the mine to be maintained between the roads in such part.
- To mines of stratified ironstone in the Cleveland District, to mines of oil shale, or to mines in any other district as respects which the Secretary of State is satisfied that similar conditions prevail.
- To any mine in which the number of persons employed below ground does not at any one time exceed one hundred.
- To any seam which is naturally wet throughout.

If any question arises as to whether any of the foregoing exemptions applies to a mine or seam, that question shall be determined in the manner provided by the Act for settling disputes.

(90.) The distance from the downcast shaft within which the two main intake airways shall not be required to be provided shall be the distance between the shaft and the edge of the shaft pillars. In the case of an inclined shaft or level entrance not driven in the coal seam the distance shall be the distance between the point where the shaft or entrance strikes the seam and the edge of the pillar left to support the shaft or entrance. In the case of an inclined shaft or level entrance driven in the coal seam, the distance shall be two hundred yards from the mouth of the shaft or entrance.

#### *Construction of Stoppings. [Section 42 (3).]*

(91.)—(a) All stoppings between main intake and main return airways shall either:

- be constructed of tight stone, dirt, sand or rubbish packing at least five yards thick; or



(ii) be constructed of tight stone, dirt, sand or rubbish packing at least three yards thick, and have the end of the packing nearest the intake airway faced with a wall of masonry, brickwork or concrete not less than 9 inches thick, the face of which shall be covered with a coating of mortar so as to prevent leakage of air.

(b) The space between the face of the stopping and the roadway shall be kept clear.

(c) This regulation shall apply only to mines in which coal is worked, and shall not apply to any mine in South Staffordshire which is liable to spontaneous combustion in the un-worked coal.

#### Signalling (except in sinking pits). [Section 53.]

##### Winding.

(92.) The following signals shall be used at all times in connection with winding in shafts:—

(a) For winding persons:—

(1) When a person is about to descend the banksman shall signal to the onsetter	3
Before the person enters the cage the onsetter shall signal to the banksman and to the winding engineman	3
When the person is in the cage and ready to descend the banksman shall signal to the winding engineman	2
(2) When a person is about to ascend the onsetter shall signal to the banksman and to the winding engineman	3
Before the person enters the cage the banksman shall signal to the onsetter	3
When the person is in the cage and ready to ascend the onsetter shall signal to the banksman and to the winding engineman	1

(b) For winding otherwise than with persons:—

To raise up	1
To stop when in motion	1
To lower down	2
To raise steadily	4
To lower steadily	5

(93.) The Manager shall, in the case of a mine where there are entrances into the workings from the shaft at different levels, prescribe the signals to be used to indicate the level to which the cage is to be sent, and in respect of movements of the cage between one level and another level, and shall fix any other signals that may be required.

(94.) A notice shall be posted in the engine house, and at the pit head, and at each entrance into the workings from the shaft, containing the foregoing signals and the signals fixed by the Manager in pursuance of the preceding Regulation.

(95.) In connection with every winding engine there shall be provided an appliance which shall automatically indicate in a visible manner to the winding engineman (in addition to the ordinary signal) the nature of the signal until the signal is complied with.

(96.) No person other than the banksman or onsetter shall give any signal unless he is an official of the mine or is authorised in writing by the Manager to give signals.

(97.) The foregoing regulations 92 to 95 shall not come into operation until 1st July, 1914.

##### Hauling.

(98.) The following signals shall be used in all mines in connection with underground haulage worked by gravity or mechanical power:—

(a) Direct or Main Rope Haulage:—

To stop	1
To lower	2
To wind up	3

(b) Haulage (other than endless rope or chain haulage) on self acting inclines:—

To stop	1
To lower	2
When persons are about to travel up or down the incline	4
This signal shall be acknowledged by signalling	4

(c) Main-and-tail rope haulage:—

To stop	1
To haul inbye	2
To haul outbye	3
To slack out tail-rope	4
To tighten tail-rope	5
To slack out main-rope	6
To tighten main-rope	7

(d) Endless-rope (or endless-chain) haulage:—

To commence hauling	2
To stop hauling	1

(99.) When persons are about to be conveyed inbye or outbye, each of the signals required by the foregoing regulations to be given when a set or train of tubs is about to be hauled inbye or outbye, as the case may be, shall be preceded by a cautionary signal of 8.

(100.) The Manager shall, in the case of a mine where there are several districts, prescribe the additional signals to be used to indicate the districts; and shall fix any other signals that may be required.

(101.) A notice shall be posted in the hauling engine house and at each signalling station, containing the system of haulage signals in use at such engine house or signalling station.

(102.) The foregoing regulations 98 to 101 shall not come into operation until 1st July, 1914.

#### Telephones. [Section 54.]

(103.) Where in any mine not being a small mine the distance of the main haulage from the shaft exceeds 1,000 yards, efficient means of telephonic communication shall be provided and maintained between the end of the main haulage and the pit-bottom and the surface.

This Regulation shall not apply to mines of stratified ironstone in the Cleveland District, or to mines in any other district as respects which the Secretary of State is satisfied that similar conditions prevail.

#### Barometer and Hygrometer. [Section 71.]

(104.) Every person on whom responsible duties are imposed with respect to the ventilation underground, and who is required to make a daily report in a book to be kept at the mine for the purpose shall, immediately before going into the mine and after coming out of the mine, read the barometer required to be placed near the entrance to the mine. This Regulation shall not apply to mines of stratified ironstone in the Cleveland District or to mines in any other district as respects which the Secretary of State is satisfied that similar conditions prevail.

(105.) Each hygrometer placed belowground in pursuance of the Act shall be read by a responsible official of the mine once every weekday if in the main intake airway and once every week if in the main return airway. This regulation shall apply only to mines in which coal is worked.

#### Sanitary Conveniences. [Section 76.]

(106.) A sufficient supply of suitable sanitary conveniences shall be provided:—

(a) On the surface, in or adjacent to the winding engine house, and at other suitable places convenient for the persons employed. Where females are employed on the surface, separate conveniences shall be provided for their use.

(b) Belowground, at or near the pit bottom, and at suitable positions along the main roads. This provision shall not apply to a shaft in the course of being sunk.

(107.) Every sanitary convenience belowground shall have a portable receptacle constructed of metal, and provided with a metal cover.

(108.) A sufficient supply of disinfectant, or dry coal dust, or other suitable material for covering the faeces shall be constantly provided in a suitable receptacle at every convenience belowground and at conveniences (other than water-closets) on the surface.

(109.)—(a) Every sanitary convenience on the surface shall be under cover and so partitioned off as to secure privacy, and, if for the use of females, shall have a proper door and inside fastening.

(b) Where females are employed the conveniences for each sex shall be so placed or so screened that the interior shall not be visible, even when the door of any convenience is open, from any place where persons of the other sex have to work or pass, and if the conveniences for one sex adjoin those for the other sex the approaches shall be separate.

(110.) Every sanitary convenience shall be kept in a cleanly and sanitary condition, and in good repair, and the receptacles of all conveniences belowground shall be emptied and cleaned not less frequently than once in every seven days and oftener if necessary. The receptacles shall be emptied at the surface unless satisfactory arrangements are made for disposing of the contents of the gob, goaf or waste or for their destruction in a furnace.

(111.) No person shall relieve his bowels on the surface or on any roadway belowground, except in one of the conveniences provided in accordance with the foregoing Regulations.

(112.) No person shall soil or render unfit for use in any way any convenience or sanitary utensil or appliance provided in accordance with these Regulations, and every person relieving himself belowground shall cover the faeces with disinfectant, or dry coal dust or other suitable material.

#### Storage and Use of Candles and Paraffin Wax.

(113.) Candles and paraffin wax shall not be stored in the mine belowground, except in pursuance of a written exemption by the inspector of the division, which exemption may be at any time withdrawn.

Where candles are taken belowground in proper metal boxes, each of which contains not more than one pound weight of candles, and not more than one box for each man is taken belowground, the keeping of such boxes in the working places or at a district station during a working shift shall not be deemed to be storage within the meaning of this regulation.

(114.) Where candles are stored in the mine belowground in pursuance of an exemption as aforesaid, the following conditions shall be observed:—

(a) The quantity stored on any day shall not exceed the supply reasonably required for that day;

(b) Until required for use, they shall be kept in a box or boxes constructed of fireproof material and placed in a recess in the strata, which recess, if made in the coal, shall be lined with fireproof material. Each box shall be in the sole charge of a person specially appointed for the purpose in writing by the Manager, and shall be kept securely locked. No person other than a person so appointed shall in any way interfere with any such box.

(115.)—(a) All candles used in the mine belowground shall be placed in a metal holder, which shall be of such design that when fixed to a prop the flame of the candle cannot set fire to the wood.

This regulation shall not apply to candles:—

(1) When being carried;

(2) When used under the direct supervision of the person using the same.

(116.) Candles looped or strung together shall in no circumstances be burned off belowground.

#### PART III.—Electricity [Section 60.]

[Part III contains the rules relating to the use of electricity at mines, and have already appeared in the *Colliery Guardian* (as originally issued in the form of rules), see *Colliery Guardian*, February 17, 1911, and March 1, 1912. The regulations are numbered 117 to 137, and contain sundry verbal alterations. Sub-section (e) of the original Rule 18, now sub-section (c) of Regulation 135 reads "all safety lamps when relighted shall be examined before being issued." The old sub-section (c) and (d) relating specifically to the electric relighting of safety lamps being omitted. The first sub-section of the original Rule 19, now Regulation 136 has now been altered so as to prohibit electric haulage on the overhead trolley system in all mines in which coal is worked.]

#### PART IV.—Rescue and Ambulance. [Section 85.]

##### (a) Rescue.

(138.) The following Regulations shall apply to all mines in which coal is worked, provided, however, that the Secretary of State may, if he thinks fit, exempt from the Regulations any mine at which the total number of underground employees is less than 100 if the mine is so situated that in the opinion of the Secretary of State the organisation of a Central Rescue Station from which it could be served, is impracticable.

(139.) No person, unless authorised by the manager or official appointed by the manager for the purpose, or, in the absence of the manager or such official, by the principal official of the mine present at the surface, shall be allowed to enter a mine after an explosion of fire-damp or coal-dust, or after the occurrence of a fire, for the purpose of engaging in rescue work.

(140.)—(a) There shall be organised and maintained at every mine, as soon as is reasonably practicable, competent rescue brigades on the following scale:—

Where the number of underground employees is 250 or less	1 brigade
Where the number of underground employees is more than 250 but not more than 700	2 brigades
Where the number of underground employees is more than 700 but not more than 1,000	3 brigades
Where the number of underground employees is more than 1,000	4 brigades

But the owner, agent or manager of a mine, at which the total number of underground employees is less than 100, shall be deemed to have complied with this provision if he has acquired the privilege of calling for a brigade from a Central Rescue Station.

A group of mines belonging to the same owner, of which all the shafts or exits for the time being in use in working the mines lie within a circle having a radius of two miles shall, for the purpose of ascertaining the number of brigades required, be treated as one mine.

(b) A rescue brigade shall consist of not less than five persons employed at the mine, carefully selected on account of their knowledge of underground work, coolness and powers of endurance, and certified to be medically fit, a majority of whom shall be trained in First Aid and shall hold a Certificate of the St. John Ambulance Association or the St. Andrew's Association or other Society or body approved by the Secretary of State.

(c) There shall be selected from the ranks of each rescue brigade one person or leader who shall act as captain of the brigade.

(d) A brigade shall not be deemed competent unless (i) it undergoes a course of training approved by the Secretary of State; (ii) after the preliminary course of training it undergoes in every quarter at least one day's practice with breathing apparatus which practice shall at least twice in the year take place at the mine; (iii) the members of the brigade shall have received instruction in the reading of mine plans, in the use and construction of breathing apparatus, in the properties and detection of poisonous or inflammable gases, and in the various appliances used in connection with mine rescues and recovery work.

(e) Arrangements shall be made at every mine for summoning members of rescue brigades immediately their services are required.

(141.) If it can clearly be proved that the necessary number of persons employed underground at a mine will not consent to form a brigade or brigades, or having offered their services fail to be trained or maintain their training, the owner, agent or manager of the mine shall not be liable to any penalty provided first that he has endeavoured to the best of his ability to constitute the requisite brigade or brigades, and has afforded every opportunity to the persons employed at the mine to undergo the necessary training, and secondly that he has made a *bona fide* attempt to arrange for the supply from a Central Rescue Station of such rescue brigades as he is unable to provide at his mine.

(142.)—(a) There shall be provided and maintained at every mine suits of portable breathing apparatus in the proportion of two suits to each brigade required by Regulation 140 (a). The apparatus must be capable of enabling the wearer to remain for at least one hour in an irrespirable atmosphere, and must be kept ready for immediate use. The apparatus must be housed in suitable receptacles in a dry and cool room.

The owner, agent or manager of a mine shall be deemed to have complied with this requirement if he has acquired the privilege of calling for such of these appliances as he may not possess from a Central Rescue Station, always provided that the Central Rescue Station is situated within a radius of 10 miles from the mine and is in telephonic communication with the mine.

(b) There shall be kept at every mine tracings of the workings of the mine up to a date not more than three months previously, showing the ventilation and all principal doors, stoppings and air crossings, regulators and telephone stations, and distinguishing the intake air by a different colour from the return air, which tracings shall be in a suitable form for use by the brigades.

(c) There shall also be provided and maintained at every mine which maintains a rescue brigade or brigades:—

- Two or more small birds or mice for testing for carbon monoxide.
- Two electric hand-lamps for each brigade, ready for immediate use and capable of giving light for at least four hours.
- One oxygen reviving apparatus.
- A safety lamp for each member of the rescue brigades for testing for fire-damp.
- An ambulance box provided by the St. John Ambulance Association or similar box, together with antiseptic solution and fresh drinking water.

(143.) There shall be kept and maintained in every Central Rescue Station not less than 15 complete suits of breathing apparatus, with means of supplying sufficient oxygen or liquid air to enable such apparatus to



ntly used for two days, and of charging such ; and

- 9 electric hand-lamps;
- 1 oxygen reviving apparatus;

An ambulance box or boxes, provided by the St. John Ambulance Association, or similar boxes, together with antiseptic solution and fresh drinking water;

Cages of birds.

A motor car shall be kept in constant readiness.

(144.) Every Central Rescue Station shall be placed under the immediate control of a competent person conversant with the use of the appliances.

(145.) There shall be adopted at every mine by the owner, agent or manager such Rules for the conduct and guidance of persons employed in rescue work in or about the mine as may appear best calculated for the carrying out of rescue operations, and the rescue brigade or brigades, if any, maintained at the mine shall be thoroughly instructed in such rules.

(146.) "Central Rescue Station" means a station established to serve several collieries.

(b) *Ambulance.*

(147.) In every mine there shall be provided and kept in good condition and ready for immediate use at a convenient spot in the district of each fireman, examiner or deputy, and also in the office at the mine or other convenient place on the surface:—

- (a) A suitably constructed stretcher.
- (b) A box containing a sufficient supply of suitable splints and bandages, adhesive plaster, boric vaseline, cotton wool and tincture of iodine or other suitable antiseptic solution.

Adjoining districts may for the purpose of this Regulation be treated as one district, if the total number of persons employed in those districts at any one time does not exceed 50.

The foregoing requirements shall not apply to any mine, seam or district the conditions of which are so damp as to make it impossible to keep the appliances aforesaid in a good state.

In case of dispute between the manager and the workmen as to the possibility of keeping ambulance appliances in a good state, the matter shall be referred to the inspector of the division, who shall have power to decide the dispute.

The manager or other qualified official appointed by him shall personally inspect the appliances so provided, at least once in every month, and satisfy himself that they are in conformity with the above requirements.

(148.) In every mine, not being a small mine, the manager shall arrange, if possible, that there shall be at least one man trained in first aid and holding a certificate of the St. John Ambulance Association, the St. Andrew's Association or other Society or body approved by the Secretary of State, in the district of each fireman, examiner or deputy at any time when twenty persons or more are being employed in the district. If less than twenty persons are employed in each district the manager shall arrange if possible that there shall be below ground during each shift at least one man so trained and having the certificate as aforesaid. This regulation shall not come into force until 1st April, 1914.

(149.) There shall be provided and kept in good condition at every mine a suitably constructed ambulance carriage. This requirement shall not apply:—

- (a) To any mine at which the total number of employees is less than 100, if the mine is so situated that in the opinion of the Secretary of State it cannot be served from a central rescue station, hospital, or other place, or by an arrangement with other mines for the joint provision of a carriage as hereinafter provided and if the mine is exempted by the Secretary of State.
- (b) To any mine at which the total number of employees is less than 500, if the owner, agent or manager has acquired the privilege of obtaining the use of such a conveyance when required from a central rescue station, hospital or other place, distant not more than ten miles from the mine, and in telephonic communication with the mine.

(c) To any mine at which the total number of employees is 500 or more, if the owner, agent or manager has acquired the privilege of obtaining the use of a suitably constructed motor ambulance carriage when required from a central rescue station, hospital or other place distant not more than 10 miles from the mine, and in telephonic communication with the mine and the inspector of the division is satisfied that the arrangements are such as to ensure the prompt attendance of the carriage at the mine.

A group of mines belonging to the same owner or to owners who have entered into an arrangement for the joint provision of an ambulance carriage shall for the purpose of this regulation be treated as one mine, if all the shafts or exits for the time being in use in working the mines lie within a circle having a radius of not more than two miles, or where a motor ambulance carriage is provided in constant readiness and facilities exist at each mine for summoning the carriage by telephone, five miles.

PART V.—*Surface Lines and Sidings.*

[For the full text of the regulations as originally issued in the form of special rules, see *Colliery Guardian*, May 26, 1911. The regulations are numbered 150 to 171.]

PART VI.—*Additional Regulations for Sinking*

For the purpose of the regulations, kibble includes kettle, hoppit, tub, bowk, barrel or cage.

(172.) In addition to the daily examination required by Section 66 of the Act, the master sinker, or a competent person appointed for the purpose by the manager, shall once at least in every twenty-four hours examine thoroughly the state of the shaft and the state of all gear by which cradles, platforms, or pumps are slung in the shaft or by which persons or material are raised or lowered.

(173.)—(a) The manager shall fix by a notice which shall be kept posted at the top of the shaft in a prominent position the number of persons who may ride in the kibble at one time, and the banksman or chargeman as the case may be shall not allow any person to ride in excess of that number.

(b) No person shall ride on or against a full kibble or on the edge of a kibble.

(174.) No engine worked by mechanical power other than a fixed engine shall be used for lowering and raising persons and material in the shaft.

(175.) Every cradle or platform used in the shaft shall be constructed with a grid or other suitable contrivance, when necessary to secure the efficient ventilation of the whole of the shaft.

(176.) Every cradle or platform on which men work in the shaft shall be so protected as to prevent any one falling off.

(177.) While men are at work on any cradle or platform in the shaft the following precautions shall be strictly observed:—

- (a) The cradle or platform shall be secured to the sides of the shaft in order to prevent its swinging.
- (b) The flap over the kibble hole shall be securely fastened.
- (c) If the cradle or platform is constructed of two or more pieces hinged, the pieces shall be securely bolted together.
- (d) The cradle or platform shall not be moved except by the express direction of the manager, master-sinker or chargeman.

(178.) If the work is carried on during the night the surface at the shaft top shall be efficiently lighted.

(179.) The competent person appointed under Section 14 of the Act shall during his shift have entire charge of the operations in the shaft bottom, subject, however, to the directions of the master-sinker or of the manager of the mine, and is hereinafter referred to as the chargeman.

(180.) The examination required to be made by the chargeman before the commencement of work shall be made immediately before the descent of the shift.

(181.) The chargeman shall as part of his examination before the commencement of work, or if work is carried on without any interval by a succession of shifts, then as part of his examinations during his shift, examine carefully the sides of the shaft, take off any loose stones,

and otherwise satisfy himself that the shaft is in a safe condition for men to work at the bottom. When men are engaged in walling or tubbing the shaft a similar examination shall be made by a competent person appointed by the manager.

(182.) The chargeman shall be the last man to ride at the end of the shift, and, if his shift is succeeded immediately by another shift, he shall not leave the bottom of the shaft until after the descent of the chargeman of the next shift.

(183.) When stone, coal or debris or gear, tools or materials are being sent to the surface the chargeman shall see:—

- (a) that the kibble is properly loaded;
- (b) that no stones, coal or debris are packed above the level of the top of the kibble;
- (c) that gear, tools or materials are put into an empty kibble, and, if they project above the level of the top of the kibble, are securely fastened to the bow or chains of the kibble before the kibble is sent away;
- (d) that the kibble before being sent away from the bottom is put into line with the pulleys and carefully steadied, and that the bottom and sides are free from adhering stones and dirt.

(184.) No person shall be allowed to descend after any cessation of work in the shaft caused by the withdrawal of the workmen for shot firing or other purposes until the chargeman, accompanied if necessary by not more than two other persons, has descended and examined the shaft and found it to be safe in all respects. If inflammable gas has been found or is likely to be found in the shaft the examination shall be made with a locked safety lamp of a type which will indicate the presence of such gas.

(185.) The winding engineman shall not work the winding engine when men are in the shaft except in pursuance of a signal received from the banksman or chargeman.

(186.) When lowering the kibble the winding engineman shall stop it when it has reached a point three fathoms above the bottom of the shaft or above any cradle or platform upon which the kibble is to alight and shall wait the signal from the chargeman to let it down. When raising the kibble he shall stop the engine as soon as the kibble has been raised four feet from the bottom, in order that the chargeman may see that the rope is steadied, and shall not again move his engine until he has received the signal from the banksman or chargeman.

(187.) When gear, tools or materials are being lowered the banksman shall see (a) that the kibble is properly loaded (b) that no loose material is packed above the level of the top of the kibble, and (c) that gear or tools are put into an empty kibble, and if they project above the level of the top are securely fastened to the bow or chains of the kibble, and (d) that timber and other bulky articles are safely slung.

(188.) The banksman shall at all times keep the shaft top and landing edge free from loose material.

(189.) The following signals shall be used:—

To raise up ... ..	1
To lower down ... ..	2
To stop when in motion ... ..	1
When men are to ride a preliminary signal of ... ..	3

The manager shall fix such other signals as may be required.

This Regulation shall not apply to any shaft in course of being sunk at the date of this Regulation coming into force.

(190.) No person other than the banksman or chargeman shall give any signal unless he is an official of the mine or is authorised in writing by the manager to give signals.

PART VII.—*Repeal.*

All special rules in force at any mine under any Act repealed by the Coal Mines Act, 1911, at the time when these Regulations come into force are hereby revoked, but the revocation shall not affect any penalty incurred in respect of an offence committed against any such special rule or any legal proceeding or remedy in respect of any such penalty and any such legal proceeding may be instituted or continued and any such penalty may be imposed as if the special rule had not been revoked.



Supplement to *THE COLLIERY GUARDIAN*, September 12, 1913.

# COAL MINES INSPECTION

= 1912. =



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COAL MINES INSPECTION IN 1912.

INTRODUCTION.

As in former years, this supplement to the *Colliery Guardian* gives abstracts from the annual reports of H.M. divisional inspectors of mines. It is necessary to repeat that the abridgments given deal purely with the returns under the Coal Mines Act, 1911, which, to adopt the official designation, comprise all mines of coal, stratified ironstone, shale and fireclay, including works above ground where minerals are prepared for use or sale by screening, washing, &c. The statistics relating to workings under the jurisdiction of the Metalliferous Mines and Quarries Acts are consequently not included. This being the first comprehensive return under the Coal Mines Act of 1911, several new features will be noted. For the guidance of the reader, these are dealt with in some detail in the leading columns of the current issue of the *Colliery Guardian*. It may here be observed, however, that the returns as to output of coal now eliminate the quantities of dirt sorted out, which in some cases in the past have been included, thus to an extent invalidating comparisons with previous years. Other new features are the more definite returns of the value of the minerals produced, the returns of animals used below ground, and the horse-power of electricity installed at the mines. In conclusion, it may be added that, notwithstanding that the Newcastle and Durham districts have now been reconstituted as a single division, separate reports have been issued, as in the past, for these districts.

I.—Scotland District.

Mr. W. Walker, in his report on the Scotland division, states that during the year every mine has been inspected underground at least once, and some have had as many as 19 inspections. Jointly, the members of the inspectorate staff in the division made 2,796 inspections at mines and quarries, of which 1,475 were underground. *Persons Employed.*—The total number of persons employed in and about the coalmines, under the Coal Mines Acts, during the year was 143,302, being an increase of 4,925, as compared with 1911. Underground there was an increase of 3,758, and on the surface of 1,167—1,052 females and 115 males, as compared with the previous year. Below ground there was an increase in the following counties, Argyll 17, Ayr 383, Dumbarton 35, Dumfries 137, Fife 1,225, Haddington 276, Inverness 13, Lanark 1,606, Linlithgow 26, Renfrew 128, Stirling 26 and Sutherland 3, but there were decreases in Clackmannan 57, Edinburgh 38 and Kinross 22. Above ground, Ayr had an increase of 295, Dumbarton 17, Dumfries 18, Edinburgh 210, Fife 33, Haddington 34, Inverness 4, Kinross 1, Lanark 584, Renfrew 10, Stirling 86 and Sutherland 1, but there was a decrease of 21 in Clackmannan and 105 in Linlithgow, so that the net increase of surface workers was 1,167.

County.	Mines at work.	Persons employed.				
		Below ground.	Above ground.		Below and above ground.	
			Males.	Males.		Fe- males.
Argyll, Dumfries, In- verness, Kinross, Peebles and Suther- land .....	9...	1,267...	268...	26...	1,561	
Ayr.....	89...	12,425...	2,676...	42...	15,143	
Clackmannan.....	6...	938...	325...	1...	1,264	
Dumbarton.....	12...	1,748...	470...	32...	2,250	
Edinburgh.....	27...	8,771...	2,138...	80...	10,989	
Fife.....	55...	23,679...	3,948...	1,026...	28,653	
Haddington.....	11...	2,758...	564...	14...	3,336	
Lanark.....	216...	46,661...	9,982...	1,287...	57,930	
Linlithgow.....	38...	8,290...	1,698...	246...	10,234	
Renfrew.....	9...	1,054...	241...	—	1,295	
Stirling.....	48...	8,367...	2,092...	188...	10,647	
Totals in 1912 .....	520...	115,958...	24,402...	2,942...	143,302	
Totals in 1911 .....	518...	112,200...	23,350...	2,827...	138,377	

*Output of Mineral.*—The total output for the year was 41,247,230 tons as compared with 46,548,384 tons in 1911, or a decrease of 2,301,154. The output of coal was 39,518,629, or a decrease of 2,199,534 tons. A number of owners who have in previous years returned the actual weight sent out of the pit before screening or sorting, have this year, in accordance with instructions, returned the net weight of the mineral after screening or sorting. It is estimated by these owners that the amount of dirt thus excluded (which would have been included in previous years) was 513,564 tons. The increases and decreases of the various minerals raised and also for counties are given in the following table:—

County.	Coal.		Fireclay.	Iron-stone.	Oil shale.	Other minerals.	Total.		+ Increase or — decrease in output as compared with previous year.
	Tons.	Value. £	Tons.	Tons.	Tons.	Tons.	Tons.	Value. £	Tons.
Argyll, Dumfries, Inverness, Kinross, Peebles and Sutherland	524,607	170,231*	—	—	—†	—	524,607	170,231	+ 29,433
Ayr	3,935,949	1,579,406	73,131	216,663	—	668	4,226,411	1,687,074	— 332,792
Clackmannan	343,123	167,289	3,664	—	—	—	346,787	168,351	— 72,020
Dumbarton	483,747	252,000	36,275	16,706	—	2,781	539,509	268,727	— 64,010
Edinburgh	3,064,887	1,161,513	2,910	27,986	718,934	5,380	3,820,097	1,170,341†	+ 36,288
Fife	8,435,516	3,458,254	28,578	1,265	—	56,405	8,521,764	3,463,701	— 627,348
Haddington	1,050,686	381,393	9,131	—	—	6,753	1,066,570	382,590	+ 21,745
Lanark	16,624,363	7,318,098	273,611	107,263	80,574	29,908	17,115,719	7,424,836‡	— 933,172
Linlithgow	2,038,121	789,239	43,810	22,489	2,385,318	51,251	4,540,989	1,567,661§	— 43,239
Renfrew	186,559	74,942	24,337	138,082	—	104,646	453,624	144,389	— 17,726
Stirling	2,831,071	1,251,300	183,498	39,517	—	37,067	3,091,153	1,323,85	— 298,313
Total in 1912...	39,518,629	16,603,665	678,945	569,971	3,184,826	294,859	44,247,230	17,770,986	— 2,301,154
Total in 1911...	41,718,163	14,178,310	751,953	686,039	3,116,803	275,126	46,548,384	—	—

\* Value of coal from Kinross included in Fife. † The quantity of oil shale from Sutherland is included in Lanark and the value in Linlithgow. ‡ Excluding the value of oil shale, which is included in Linlithgow. § Including the value of oil shale from Edinburgh, Lanark and Sutherland.

The average output of mineral per person employed below ground was 382 tons, at Ayr 340 tons, Edinburgh 435 tons, Fife 359 tons, Haddington 386 tons, Lanark 366 tons, Linlithgow 547 tons, Stirling 369 tons. The average per person employed below and above ground was 309 tons. There is an increase of 95 in the number of coal-cutting machines at work, and of 771,824 tons in the quantity of mineral obtained by them compared with the previous year to record. The total quantity of mineral obtained by coal-cutters was 7,742,470 tons, and of this 6,357,103 tons were obtained by 593 machines driven by electricity, and 1,385,367 tons by 178, the motive power of which was compressed air. Compared with 1911 there is an increase in the number of machines driven by electricity of 92, and in the quantity obtained by them of 643,712 tons, and in the number of machines driven by compressed air and tons cut by them of 3 and 128,112 respectively. The machines were distributed as follows:—Ayr 46, Clackmannan 6, Dumbarton 1, Dumfries 5, Edinburgh 33, Fife 143, Haddington 16, Lanark 407, Linlithgow 36, Renfrew 4, and Stirling 74. The number of conveyors at work at the coal face (101) is 19 more than in the previous year. *Accidents.*—During the year 162 separate fatal accidents occurred in and about the mines under the Coal Mines Act, causing 171 deaths, a decrease of 24 in

Place and cause.	Fatal accidents.		Non-fatal accidents reported to inspector.*		All non-fatal accidents dis- bing for more than 7 days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.	Separate accidents.	Persons injured.
Explosions of firedamp or coaldust	7...	11...	61...	74...	49...	58
Falls in mine	76...	80...	289...	297...	4,971...	4,987
Shaft accidents	16...	16...	17...	18...	83...	83
Miscellaneous underground	39...	40...	272...	292...	8,527...	8,543
Total underground	138...	147...	639...	681...	13,630...	13,671
On surface	24...	24...	112...	119...	1,314...	1,319
Gross total in 1912	162...	171...	751...	800...	14,944...	14,990
Total in 1911	186...	194...	774...	855...	16,727...	16,798

\* Includes (a) accidents causing fracture of head or limb, or dislocation of limb, or any other serious personal injury; (b) accidents caused by explosion of gas or dust, or any explosive, or by electricity, or by overwinding, and causing any personal injury whatever. † Including those injured by accidents which proved fatal to their companions.

COAL-CUTTING MACHINES.

Description.	Number driven by		Statute tons cut by			
	Elec- tricity.	Compressed air.	Electricity.		Compressed air.	
			Coal.	Other minerals.	Coal.	Other minerals.
Disc	392	142	Tons. 4,552,885	Tons. 23,232	Tons. 1,287,273	Tons. 4,000
Bar	177	5	1,618,146	18,390	40,425	—
Chain	12	1	90,044	—	260	—
Percussive	9	29	27,146	—	52,191	450
Rotary heading	3	1	—	27,260	768	—
Totals	593	178	6,288,221	68,882	1,880,917	4,450

the number of accidents and of 23 in the number of lives lost as compared with the year 1911. The fact that the majority of the mines were idle for about six weeks, owing to the national strike, accounts for some of the decrease, but it is probable that if full time had been worked there still would have been a decrease in both accidents and deaths to record. There were eight accidents which caused the loss of more than one life; three were caused by explosions of firedamp, four by falls of ground, and one by a runaway hutch on a haulage road. The loss of life, as compared with 1911, in explosions is four less; falls of roof and sides seven more; deaths from shaft accidents are nine less; miscellaneous underground 19 less; and on the surface, two more. One person was killed by electric shock, and nine were injured by the same number of accidents from the same cause. The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

The death-rates from accidents per 1,000 persons employed during the year were (a) below ground 1.27, (b) above ground 0.87, and (c) below and above ground 1.19. The figures for the preceding year were (a) 1.53, (b) 0.84, and (c) 1.40. Per 1,000,000 tons raised, the death-rate was 3.87, as compared with 4.17 in 1911. In Ayr the death-rate per 1,000 persons employed was 0.34, and in Linlithgow 0.10 higher than in the previous year, but all the other counties showed a marked reduction in this respect. Eleven deaths resulted from seven accidents, and 74 persons were injured from explosions of firedamp. Although there is a decrease of six in the number of fatal accidents and four in the number of deaths, and 34 in the number of persons injured as compared with 1911, the number of accidents under this head is too great, and, if adequate precautions were taken both by officials and workmen, is capable of much greater reduction.



use of safety lamps at present is not popular with the owners or the persons employed, and a possible argument is used against their use, and, particularly, that other classes of accidents will be increased. It is often urged that the weight of the electric safety lamps is excessive, but it is pointed out that this should not prevent their being used, as it is probable experience gained from practical use will remedy this defect.

An accident of a somewhat unusual character occurred at Cobbinshaw oil shale mine, belonging to Messrs. the Tarbrax Oil Company Limited, on January 25, causing the death of a fireman and repairer. A probable cause of the explosion was that as the stopping was being completed a safety lamp had been placed on the top or inside of it, and the gas burning in the lamp flashed through the gauze and ignited the gas on the outside. The practice of bottling up gas to get rid of it, as was being done in this case, is not a good one, as it is liable to cause difficult situations in future. The proper course in this instance would have been to fill the mine or drift up from the face with stone or other material, and then to have put a strong stopping in front of it all. The stopping was eventually completed by firemen using electric portable lamps. If this precaution had been adopted at first, the accident probably would not have occurred.

A fireman was killed by an explosion of firedamp at Newbattle Colliery, belonging to Messrs. Lothian Coal Company Limited, on February 4. The deceased appears to have lost his light by entering an accumulation of gas, and as firedamp had not been found previously in the section, he apparently thought he had knocked it out, and struck a match to relight it and thus caused the explosion. An accident occurred at Littlemill Colliery, belonging to Messrs. the Coylton Coal Company, on May 7, and caused the death of a drawer and injury to his father, a miner. If the brattice had been closer to the face, it was 30 ft. back, or if the miner had examined for gas back along the road as well as at the coal face, he would have detected the gas and prevented the accident. An explosion occurred at No. 1 pit, Newton Colliery, belonging to Messrs. James Dunlop and Co. Limited, on May 11, by which two men were killed and one injured. If the men at the face had remained where they were at work they would have been safe, but in their anxiety to get, as they thought, into a safe place, they ran into danger. The gas, which came from the waste close by the lye, owing in some measure to the falling barometer, was ignited in the vicinity of the stable, open lamps were found close to it and the pony was burned; there was little violence as there was no coaldust, the place being wet and muddy. The accident was due to the fireman and deceased taking naked lights into a part of the mine in which safety lamps were necessary. An accident occurred at East Parkhead Colliery, belonging to Messrs. Wilsons' and Clyde Coal Company Limited, on July 8, causing the death of a Polish miner on the following day. There appears to be little doubt that the deceased lost his light in some manner, probably by the gas extinguishing it, and instead of taking his lamp to the lamp station to be relighted, he attempted to relight it at the face by unscrewing the bottom and striking a match. Three brushers were fatally and another seriously injured in the main coalseam at Bardykes Colliery, belonging to Messrs. the Summerlee Iron Company Limited on October 15 by an explosion of firedamp. It has been suggested that the cause of this explosion was some illegal use of an open light, but, although it is difficult to state definitely what the cause was, Mr. Walker's opinion is that the gas was probably ignited by a shot, owing to the shot-firer failing to detect a small quantity of gas in the roof between the break in the roof where it was found after the explosion occurred. An explosion of gas occurred in the Barracks shale seam of Rosshill mine, belonging to Messrs. Dalmeny Oil Company Limited, on December 14, causing fatal injuries to a fireman. This accident was entirely due to the use of naked lights. There is a great temptation for firemen to use naked lights—as is shown by this occurrence—the risk of serious explosions.

Thirty-three notices were also received during the year of cases of ignition of gas where no persons were injured—the same number as in 1911; 28 being caused by naked lights, three by shot-firing, and two by defective lamps.

Seventy-six accidents caused 80 deaths from falls of roof and sides. In 1911 there were 72 fatal accidents and 73 deaths, so that, notwithstanding the fact that the mines were idle for about six weeks during the general strike compared with the previous year, there is an increase of four accidents and seven deaths. In 1911, 57 persons were killed by falls at the face, and in the year under notice the number was 56; the increase is due to falls on roads and in shafts. Twenty persons were killed on roads and four in shafts, as compared with 16 on the former and none in the latter during 1911. The increase on roads is to some extent due to the pits standing during the strike, and the stone becoming ragged and broken owing to the roads not having been regularly repaired and pressure being thrown on to them by the working faces being at a standstill.

One of the falls from sides of shafts occurred when two men were repairing the wood lining of the shaft owing to the barring or wood of a part 73 fathoms above them giving way. It was found afterwards to be decayed and rotten, although to an external examination it appeared to be fairly sound, and had been reported as in good condition by those whose duty it was to make the weekly inspection of the shaft in question; and another occurred by some bricks in the lining of the shaft falling from the surface, which had been unusually heavy rainfall, falling down the top of the cage, in which a fireman and another were waiting to be raised to the top. The condition of some of the old shafts, the

sides of which are supported by timber, is one calling for the prompt attention of the owners and managers. A more thorough examination is required than the ordinary weekly one to ascertain the condition of the wood lining. Often it is decayed and quite incapable of supporting the sides; several recent instances have occurred where the timbering has given way due to this cause, and Mr. Walker thinks that in the case of all shafts more than 20 years old not lined with brick or stone, or where the natural strata shows no defect, adequate means should be taken, either by boring holes through it or in other ways, to ascertain the condition of the timber.

As in former years, some of the accidents are due to temporary supports not being set. Now that the Coal Mines Act requires firemen to devote the whole of their time to matters affecting safety, this is one of the points to which they should devote their special attention. Another source of accident is the carrying of the brushing, even in thick seams, right up to the coal face. The brushing face should be left at least 5 yards back from the face, and the buildings or packs carried in advance of them so as to support the roof above it. Some rule should be drawn up by the management, for the guidance of the firemen and workmen, dealing with the minimum distance the lip of the brushing and the packs or buildings are to be from the coal face, and the adequate support of the roof with a view to rendering the work at the roadheads safer. Flat or corrugated iron bars have been used in a few instances with good results.

One accident emphasises, in driving through broken and unbroken ground, the importance of tying timbers together by "dogs" or notches, and also the sets together by nailed straps or stringers of wood or long iron dogs. The timber, although the cavity from which stone fell was 27 ft. by 22 ft. by 12 ft., was not broken, but reeled out by the roof, suddenly weighting on to it. In addition to the obligation on firemen to see one another when changing shifts in such places as these, it is important that the men working in them should also meet and inform each other of the condition of the place and explain any difficulties that have arisen during the shift. In this case the deceased were working their first shift in the place.

Sixteen persons were killed by the same number of accidents in shafts during the year, as against 25 by 22 accidents in 1911. This is a marked improvement, and shows that greater care has been exercised in and about shafts. At least 11 accidents were due, however, to want of care, and should not have occurred.

An accident occurred at the Lochgelly Colliery (Nellie Pit), belonging to Messrs. the Lochgelly Iron and Coal Company Limited, on November 23, by which a pitwright lost his life. The accident occurred on a Saturday evening. Deceased and two other men were engaged in fixing a girder for the new keps. A scaffold had been erected for them to stand on over one side of the shaft about 18½ ft. above low scaffold or surface level. Simultaneously four joiners were at work in the winding engine-house removing the casing round the drum in order to make room for the new overwinding gear. As one of the electric incandescent lamps in the engine-house did not appear to be burning satisfactorily the engine driver procured a new one, which he gave to one of the joiners to change. The joiner did not take the precaution to cut off the current before changing the lamp, and owing probably to some defect in the lamp a heavy short was produced which blew the fuses and extinguished all the lamps in the engine-house. The winding engineman went to the power-house, about 50 yards away, for fresh fuses, and the joiners scrambled out of the engine-house in the dark. At this moment those at the pithead noticed with alarm that the cage, the top of which was about 18 ft. below the temporary scaffold just mentioned, began to creep slowly upwards. They signalled and shouted to the engineman, but unfortunately he was out of his house. The cage continued to rise and took up the scaffold with it until a girder was reached which arrested its further progress. It is impossible to say with absolute certainty what made the engine start away after it had been standing for more than two and a-half hours. Mr. Walker is of opinion, however, that the joiners in leaving the engine-house threw over the reversing lever. The enquiry into the reason of the cage starting away in the wrong direction elicited a point of general interest worthy of the attention of those having charge of winding engine construction. The engine is fitted with trip valves, which close automatically when the reversing lever passes a point about 9 in. from the end of its maximum travel. To open them again the engineman has to bring the lever practically to the horizontal. If he takes it past the horizontal, however, the engine starts away in the opposite direction, unless the brake is on, and is sufficiently powerful. The accident also draws attention to the danger of changing electric lamps with the current on. The engineman in leaving his engine-house was guilty of a breach of the Special Rules. The enquiry elicited the fact that there was no other light than the electric light provided in the engine-house. This is a place to which the spirit if not the letter of Electrical Special Rule 5 (a) applies. Mr. Walker strongly urges on those having the oversight of shaft work the necessity of providing wider planking, with hand and foot rails.

There were 39 accidents from miscellaneous causes underground, resulting in the deaths of 40 persons, as compared with 57 accidents and 59 deaths in the previous year, or a decrease of 18 accidents and 19 deaths. This is a gratifying improvement. There was an increase of four in the number of deaths caused by explosives, a decrease of three caused by suffocation by natural gases, of 11 under the head of haulage, of three by electricity, two by machinery, and of four by sundry causes.

Eight fatal accidents from explosives causing the

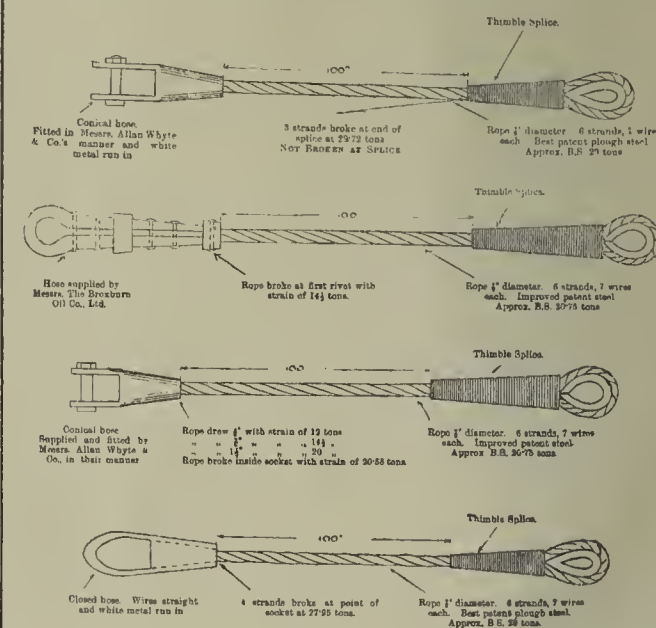
same number of deaths and 68 accidents injuring 75 persons occurred during the year, as compared with four fatal accidents and deaths and 82 non-fatal accidents and 94 persons injured during the previous year. The number of accidents which are caused by frozen explosives during cold weather is disappointing.

Twenty-three haulage accidents caused 24 deaths; this is a decrease of 12 accidents and 11 deaths as compared with the previous year. Three of the accidents resulting in the same number of deaths were due to ropes and chains breaking, and 20 accidents coming under the head of run over or crushed by tubs or trams caused the death of 21 persons, as against two accidents and deaths from the former and 20 accidents and deaths from the latter cause in the year 1911. Thirteen persons, however, were killed by the same number of accidents in the previous year by other haulage accidents, whereas during the year under notice no fatal accidents from this cause were reported.

Only one person was killed by electric shock during the year. This is a record for the Scotland division, and reflects great credit on all whose duty it was to supervise the electric plant at the mines. When the extent to which electricity is used in and about the mines, under the Coal Mines Act in Scotland, is remembered (according to the return for the year aggregates more than 90,000-horse power), and that it is utilised for so many different purposes, the result is very satisfactory. It is, Mr. Walker thinks, to some extent due to the good work which is being and has been done by the Association of Mining Electrical Engineers in Scotland, and which has resulted in a better class of colliery electricians, from all points of view, being employed at the majority of the mines. These officials, as a rule, take an intelligent interest in the installations under their charge, with the result that the supervision is more careful than was the case in former years. Nine accidents caused injuries to the same number of persons, and any one of them might easily have resulted in a fatal accident. An analysis shows that three were due to abraded cables in circumstances in which it is reasonable to say that a metallic covering in each case would have prevented the abrasions. Other three were due to failure of insulation of trailing cables. Trailing cables do not always receive the care they require, nor the close periodical examination which is imposed by Electricity Special Rule 14 (i.). The remaining three accidents were due in a greater or less degree to casual and careless methods of working.

One accident by machinery causing the death of one person occurred during the year. This is a decrease of two accidents and deaths as compared with the previous year. It occurred at Skellyton Colliery, belonging to Messrs. The Darnagill Coal Company Limited, on October 9, and caused the death of a roadman, who was assisting to release the bar of a coal-cutting machine which had become fast in the holing, and while the bar was in motion it suddenly sprang out from under the coal and caught him.

The number of fatal accidents and deaths on the surface was 24, or two more than in 1911. Eleven were caused by machinery, nine occurred on railways or tramways, and four were due to miscellaneous causes.



FIGS. 1 TO 4.

Eighty-nine notices under the heading of dangerous occurrences were received during the year—33 were ignitions of firedamp, two were fires on the surface, 15 were fires underground, 28 were breakages of ropes, chains or other gear used for lowering and raising persons, nine were cases of overwinding, and two were inrushes of water. One of the occurrences was due to a rope drawing from a hose or capping of the riveted type, and on taking up the matter with the agent of the mine at which it occurred, Mr. Walker suggested to him that he should have a hose of this type tested along with caps of the solid type filled with white metal, and he readily agreed to do so. He was present on two occasions when the tests were made at Lloyd's Testing Works, Glasgow. On the first, a hose of the riveted type was tested along with one prepared by Messrs. Allan Whyte and Co. Limited, ropemakers, Rutherglen. The latter was of the solid type filled with white metal, but the ends of the wires were tucked in and a spike driven into the centre of the rope before the white metal was inserted. Although the results of the tests were better than those obtained with the riveted type of hose, Mr. Walker suggested a further test should be made with a solid hose filled with white metal, but with the wires simply spread out inside the cap. Further tests were therefore made with the three types.



Sketches are given of the three types of hose, and also the results of the tests.

**Prosecutions.**—Of the prosecutions of workmen, in all 123 convictions were obtained out of the 136 cases taken; 108 persons were fined, the total penalties amounting to £79 19s. 6d. Fourteen persons were admonished and one imprisoned for 30 days; the charges were withdrawn in seven cases, in three cases they were found not proven and three persons were found not guilty.

**Coal Mines Act, 1911.**—The work necessary to comply with the provisions of this Act, which came into force on July 1, 1912, especially at the older pits, has been enormous. At many mines it has been carried out as speedily as possible, but at the majority there still remains much to be done. The owners have been handicapped by being unable to obtain delivery of the necessary material, such as iron bars, plates, fans, &c., from the makers, owing to the demand being so large, partly due to legislation and partly to trade in all departments being so brisk. Shortage of labour has also added to the difficulties in this respect.

As to the new provisions relating to firemen, deputies and examiners, Mr. Walker has received three applications for exemptions from the requirement that the fireman, &c., should devote his whole time to his statutory duties, and in one instance granted it. It was a case of a mine with small sections employing a small number of men, separated by long lengths of low road, and it appeared to be more desirable to have a fireman in each section, and to allow him to do other work than his statutory duties rather than that much of his time should be taken up travelling the roads on which no workmen are employed. Several cases of where it was alleged the fireman was unable to make adequately the necessary inspections within the legal period have been reported or come to notice, and either additional firemen have been appointed or the district has been made smaller, in some cases by removing the meeting station further in-by, and in others by reorganising the districts.

Up to and including December 31, 330 examinations for firemen's certificates were held by the approved authorities—the Heriot Watt College, Edinburgh, and the Royal Technical College, Glasgow—in various parts of the division. In some instances there was reason to call attention to the requirements of the Home Office Regulations for the conduct of these examinations, which were not being complied with. The irregularities have been caused by the examiners not having had previous experience of examinations, and, therefore, not realising that it was important that the candidates should do the work themselves, and that the examination only related to the heads set out in the memorandum issued by the Secretary of State.

The number of candidates examined by the two approved authorities who passed was 5,855, while 99 failed at Edinburgh and 234 at Glasgow. The number of certificated firemen at the end of the year 5,855.

Several of the owners are of opinion that the new provisions do not require the search of workmen for matches and other prohibited articles to be made daily before each commencement of work. Mr. Walker has, however, informed them that this is required in all mines in which safety lamps are used; and this is being done, so far as he is aware, at the mines where it is necessary. The system of selecting workmen to be searched is the following:—

(a) In the case of a shift the number to be selected daily shall be at least 10 per cent. of the total number of persons forming the shift.

(b) The order in which the men are selected shall be constantly varied, so that a man going down the pit will not be able to tell whether he is likely to be searched or not.

(c) There shall be a surprise general search (i.e., a search of all the persons in the shift) once at least in every quarter.

(d) Every person not forming part of a shift shall be searched on each occasion on which he goes down the pit.

The number of samples of mine air taken by the inspectorate from July 1 to December 31 last has been 396. While in many cases the results of the analyses have shown that the standard of ventilation is satisfactory, in others the percentages of firedamp and carbon dioxide have either been on the border line or exceeded those allowed by sections 29 to 31 of the Act. The results of the analyses have been found most useful, and have, in several instances, been the cause of owners increasing the quantity of air in mines and also the number of splits. At many collieries the system of ventilation was to ventilate too large a number of working places with the same column of air, and as the roads had not been laid out with a view to any other system the necessary work in order to obtain more splits will take some time to accomplish.

Generally speaking, the provisions of the new explosives Order are being complied with. Complaints have been received, especially from the owners of oil shale mines, that some of its requirements, such as bringing to the surface of the mine any surplus explosives at the end of the shift, is likely to cause more danger than will be prevented by them. These questions have been the subject of a deputation, and are being investigated at the present time by the chief inspector of mines. In naked light mines detonators have been issued to persons other than those legally entitled to be in possession of them, and in some mines that one man in every squad or gang carried them. This was not the intention of the Order. In many cases the authorised persons have issued detonators to miners either at the commencement of the shift or as they passed through the working places. This is a contravention of Section 1 (e) (ii) of the Order. Objections have also been raised to the use of squibs having been made illegal.

Up to and including December 31 last 134 manager's

certificates were endorsed, and 144 certificates were given under the Order, dated February 27, 1912.

The regulations in Schedule III. to the Act have, as a rule, been complied with. There have been cases where difference of opinion has arisen as to their interpretation. In one of them it was alleged the requirement that all stables shall be separated from any road used for travelling or haulage of minerals was complied with by simply running a fence behind the stalls, although the stables were situated alongside a travelling and haulage road. It is not, in Mr. Walker's opinion, a sufficient means of separation, the object being to obtain such isolation as will secure adequate rest for the horses and ponies. In many mines, prior to the new requirements coming into force, men and haulage passed within a few feet of the horses when standing in the stalls. In the great majority of cases walls of brick or other substantial material, where they did not exist before, have been built to separate the animals from the haulage and travelling roads, and to carry out the requirements of Regulation No. 3 of the schedule in the spirit in which it was intended. The requirement that all stables shall be continuously and thoroughly ventilated with intake air is in some mines difficult to comply with, owing to the downcast and upcast shafts being a considerable distance from each other, the stables being scattered over a large area of the underground workings and the ventilation being carried round from one section to another, but by changing the ventilation, removing the stables, or by means of devices, such as placing a tube or pipe in the upcast shaft for the purpose of conveying air from the surface, for the ventilation of the stables near the upcast shaft, the difficulty is being gradually overcome. In some cases it has entailed the driving of long roads sometimes in hard strata, and the completion of these roads has taken a considerable time. The provision of a guard for the eyes of the animals has caused some difficulty; at first nearly all the owners adopted wire guards, but these in practice have not proved satisfactory, owing to the wires becoming broken and being liable to penetrate the eyes, and in many cases the horses objected strongly to them. It has been found that the best form of guard is a thick protection of leather above the eyes, and this is being adopted. On August 13, 1912, Mr. Archibald Baird, M.R.C.V.S., was appointed as consulting veterinary surgeon to the Mines Department in the division, and on January 24, 1913, Mr. Andrew McArthur as inspector of horses. The latter's reports, so far, show that the horses, generally speaking, are in good condition and well treated. There have been one or two cases where in some ways the stables required altering or improving.

Of the 5,304 horses in the division 45 died from injury and 89 from disease, 130 required to be destroyed in consequence of injury and 52 in consequence of disease, while, exclusive cases set out above, 244 cases of injury and seven cases of ill-treatment were reported.

In a few instances, since the passing of the 1911 Act, inspections have been made, both of the underground workings and of the places where fatal accidents have occurred, but this is by means general.

Since the new Act came into force, 33 explosions of firedamp have occurred, and caused the death of one, and injury to 35 persons. In each case either an application was made by the owners or management for an exemption to the use of safety lamps, or they were adopted forthwith. Twenty-five applications for exemption were received during the year under notice, and exemption was granted by the Secretary of State in eight cases, in seven the application was refused, and it became necessary for the seam to be worked with safety lamps, and the remaining 10 were under consideration at the termination of the year. Where exemptions were granted certain conditions were attached to them, such as the adoption and enforcement of the additional rules for the prevention of ignitions of small quantities of inflammable gas at mines worked with naked lights, and that firemen should not carry or be in possession of any lamp other than a locked safety lamp.

At the great majority of the mines the owners and workmen have mutually agreed on the question of weekly pays, and the wages of the persons employed are, or shortly will be, paid once a week instead of fortnightly or longer intervals.

**Explosives Used.**—There is a decrease of 290,223 lb. of explosives used, and of 174,963 in the number of shots fired as compared with the previous year. The average quantity of explosives used per shot is 11.2 oz., and the total quantity of mineral raised and explosives used gives an average of 4.43 tons per shot. The estimated number of missed shots from the figures given in the annual returns is as follows:—By electric firing, 1,476 out of 1,439,433 shots; by fuse, 6,019 out of 7,571,191 shots; by squibs, 1,018 out of 746,054 shots; total 8,513. These figures can only be estimated and often only guessed, as there was no statutory obligation to keep a record of the missed shots before the new Mines Act came into force on July 1 last. In future more reliance will be able to be placed on the accuracy of the figures given in the returns, but where the miners and others fire their own shots it is not an easy matter to obtain accurate records of the shots which miss fire even where the management are desirous of doing so.

**Safety Lamps.**—There is an increase of 1,660 in the number of safety lamps used compared with the preceding year, the total number being 34,758, classified according to method of locking as follows:—Lead rivets, 10,623; magnetic, 9,146; screws, 14,490; other, 499. The kind of illuminant was as follows:—Colza or colza and petroleum, 7,482; petroleum, 7,557; volatile spirit, 19,049; electricity, 286; other illuminant, 384. Of the total, 20,162 were lit by opening; 10,710 by electricity; and 3,886 by internal igniters.

**Electricity in Mines.**—Electricity was used at 290 mines, of which 121 were in Lanarkshire. The aggregate

horse-power was as follows:—Surface: Winding, 1,666; ventilation, 2,363½; haulage, 2,527; coal-washing or screening, 5,513; miscellaneous, 6,944½; total, 19,011. Underground: Haulage, 22,813½; pumping, 36,143½; portable machinery, 17,367; miscellaneous, 3,018½; total, 79,343.

**Coal Mines (Eight Hours) Act, 1908.**—The Act has worked fairly satisfactorily during the year. Numerous complaints have been received, chiefly from the persons appointed in section 2 (2) for the purposes of checking the times of lowering and raising the shifts of workmen, that men were being kept longer underground than the period specified in the Act. It was often found on investigation that the overtime worked was for purposes mentioned in section 1 (2), and the detention was legal, and in others that the management were straining the meaning of this subsection to make it cover cases, which it was not the intention of the Legislature to include. This was particularly so at one colliery, at which those responsible for the management contended that they were entitled to start a shift of men on Sunday night at 10 o'clock and to bring the same shift in again at 3 o'clock on Monday afternoon to meet "danger or apprehended danger." After a long and patient hearing the Sheriff decided that the danger or apprehended danger to come under the sub-section must be due to some unforeseen or abnormal circumstances, and not such as occurred in the ordinary working of the mine, and could therefore be foreseen, and imposed a penalty of 10s. in the case of the managing director and 5s. in that of the manager. Notice of appeal was given against the judgment, and appeal was heard on March 7, 1913, by the Court of Appeal, when it was dismissed, with £7 7s. expenses.

Mr. Walker also refers to a judgment by the Court of Appeal in the case of *Roger v. Stevenson* (procurator-fiscal), in regard to the keeping of a register. This judgment makes section 1 (3) and (4) of the Act unnecessary, and also undermines the whole principle of the Act. It has always been understood that a shift of men was to be lowered and raised within periods fixed by the manager and approved by the inspector, but the decision that so long as not more than eight hours in the case of ordinary workmen and nine and a-half hours in that of firemen, deputies, &c., elapses between the last man of the shift descending and the first man ascending there is no contravention of the provisions of the Act, is contrary to the preconceived ideas of the requirements of the statute.

**Board of Examinations.**—An examination was held by the old board and examiners in Edinburgh on May 2 and 3, when 267 candidates presented themselves for examination, viz., 156 for first class, of whom 62 passed and obtained certificates, and 111 for second class, of whom 64 satisfied the examiners.

**Rescue Stations.**—Fife and Clackmannan are the only counties in which the requirements of the Rescue and Aid Order are being complied with. In Ayrshire the building of a central rescue station has been commenced and is nearly completed, but the necessary portable breathing apparatus has not been procured. In the Lothians the owners have, after considering the matter, come to the conclusion that smoke helmets installed at the collieries comply with the Order, and have informed Mr. Walker that this is their opinion and that such apparatus has been installed, at the Elphinstone collieries, near Tranent. A committee, representing the owners in Dumbartonshire, Lanarkshire, part of Linlithgowshire and Stirlingshire, after considering the question and making experiments with smoke helmets, met Mr. Walker who informed them that he was of opinion that the Home Secretary would not be able to agree that smoke helmets were "portable breathing apparatus" within the meaning of the Order, and, personally, though he thought they were excellent within certain limits, he was unable to agree that they would meet all the cases which might arise after an explosion or underground fire and that, therefore, portable breathing apparatus of one or other of the well-known types, which were installed in other parts of the United Kingdom, should be installed.

Mr. Walker gives a descriptive sketch of a device for preventing runaway hutchers or tubs running to the bottom of inclines in use at Mary pit, Lochore Colliery, belonging to Messrs. the Fife Coal Company Limited. The device consists of a 6 in. H-steel girder of such a length as will reach across the width of a double set of rails, two strong pitchpine beams faced with iron to reduce friction and prevent undue wear, and pulleys, chain lever and balancing weight under the lever. The weight of the girder is slightly more than that of the lever and the balancing weight under it, which ensures the block being in the "on" position at all times except when the attendant is depressing the lever. When the full rake of hutchers is running in the ordinary way to the bottom of the incline, the attendant, by depressing the lever, lifts the block to such a height that the tubs run underneath it, and when they have passed it he releases the lever, and the block falls to the "on" position and protects the persons at the bottom while the tubs are being uncoupled, or a rake of empty tubs is being attached; but if a runaway occurs, the lever is not raised, and the tubs are caught by the block. In ascending, the empty tubs pass under a projecting steel plate fixed to the block and slightly curved at the outer end, and by this means the block is raised a sufficient height to allow of their passing under it; but as soon as they clear it, the block automatically falls down again and protects the bottom of the incline from runaway tubs both on the empty and full roads.

The keeping the bottom of the working, ventilating or pumping shafts securely fenced, as required by the subsection of the Act, has raised a question as to whether it is necessary to have the fences of such a character that they securely fence the entrance to the shaft at all times when the cage is not at that level in



It is contended by many owners and managers that it is not necessary to have the fences in position when the coal is being raised, as this comes under the last part of the subsection—viz., "this shall not be taken to forbid the temporary removal of the fence for the purpose of repairs or other operations if

hand. One of the best devices he has seen is a gate raised or lowered by the cage.

A sinking of interest, in that it was commenced on a site 4 ft. below low water at neap tides and 24 ft. below high water at spring tides, by the Carriden Coal Company has been in progress during the year about one-

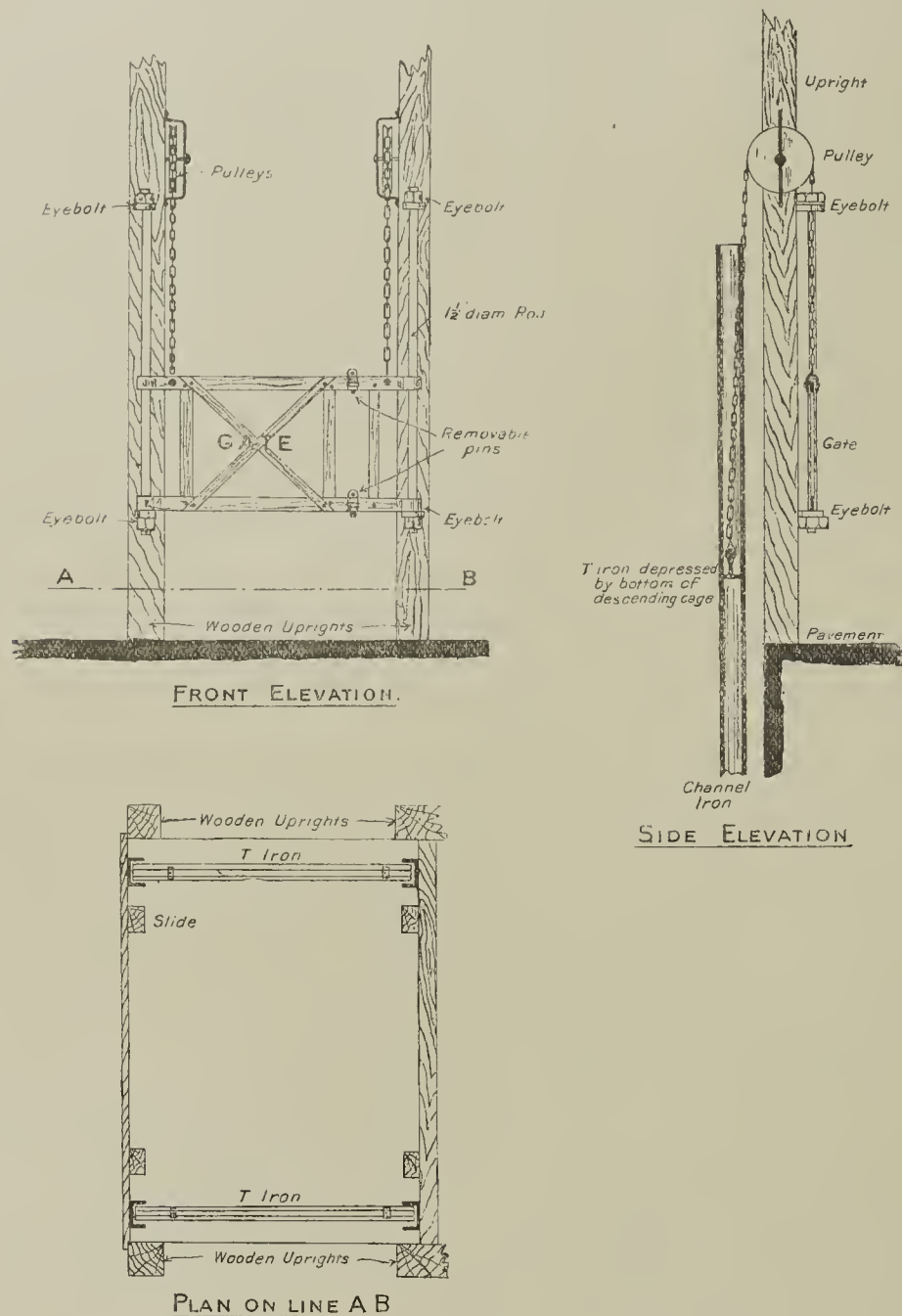


FIG. 5.—AUTOMATIC GATE FOR BOTTOM OF MINE SHAFT.

The following is a section of the strata sunk through already:—

	Ft.	Yds.	Ft.	in.
Mud.....	14	4	2	0
Sand mixed with mud.....	6	6	2	0
Clean sand with flags of sandstone on top.....	5	8	1	0
Dark sand and gravel.....	2	9	0	0
Dark sandy clay and gravel.....	2	9	2	0
Light sandy clay (water practically sealed off here).....	31	20	0	0
Strong clay with boulders near top.....	15	25	0	0
Strong clay.....	10	23	1	0
Strong clay.....	8	31	0	0
Strong clay, lower edge finely laminated.....	4	32	1	0
Sand, very fine and dry.....	1½	32	2	6
Extra hard boulder clay.....	18	33	2	6
Rockhead, faikey blaes.....				

Bores show that the following workable seams may be expected: Parrot, Six-feet, Main Coal, and Smithy. The latter is the lowest seam worked in the district, and it is expected to reach it at a depth of 75 fathoms. Before sinking was commenced, a coffer dam was constructed. It was not attempted to make this watertight, but the object was to secure still water. Piles of Oregon pine, 12 in. square, about 55 ft. long, and with iron shoe were driven about 25 ft. into the mud, outside a 27 ft. square. An outer row of piles was driven 9 ft. from the first on three sides. The double rows were braced as shown. Three rows of four piles each were then laid longitudinally as shown. Inside these rows 12 in. by 4 in. pine timbers were driven skin to skin. Long baulks were then laid across the top of the cofferdam, and the position of the shaft carefully marked off on them. There are eight segments to each ring of the cylinder, and each was suspended from a baulk by a set of wire rope blocks, and bolted together. Views are given of the bottom ring, showing the cutting edge. The thickness of metal for all rings is 2 in., and the castings were made by British Hydraulic Engineering Company, Whiteinch, Glasgow. The other rings were of the same dimensions as the bottom one, except that the lower part of the bottom ring is widened out ½ in. by increasing the thickness of metal ½ in., as shown, to diminish skin friction; also the cutting edge is replaced on the other rings by a flange with stays, as the upper edge of the plate shown. The flanges are all carefully machined, and the plates were so carefully made as to be interchangeable, no marking being necessary. The form of joint is shown in the drawings. The flanges were simply wiped with red lead, and bolted together, no packing being used. The bolts are 1½ in. diameter, and 7 in. long, the holes in the plates being 1 7/16 in. The ends of these holes were shaped to receive a lead washer of the shape shown, a W.I. washer being used outside the lead one. The edges of the flanges were also chamfered off as shown, so that a caulking of lead wool could be inserted if the joints leaked. Each ring of this cylinder weighed 11 tons 14 cwt. without bolts and washers. Twenty-five feet of tubing was put on before the mud was reached on August 17. Four more rings were put on, the cylinder sinking by its own weight, and then a

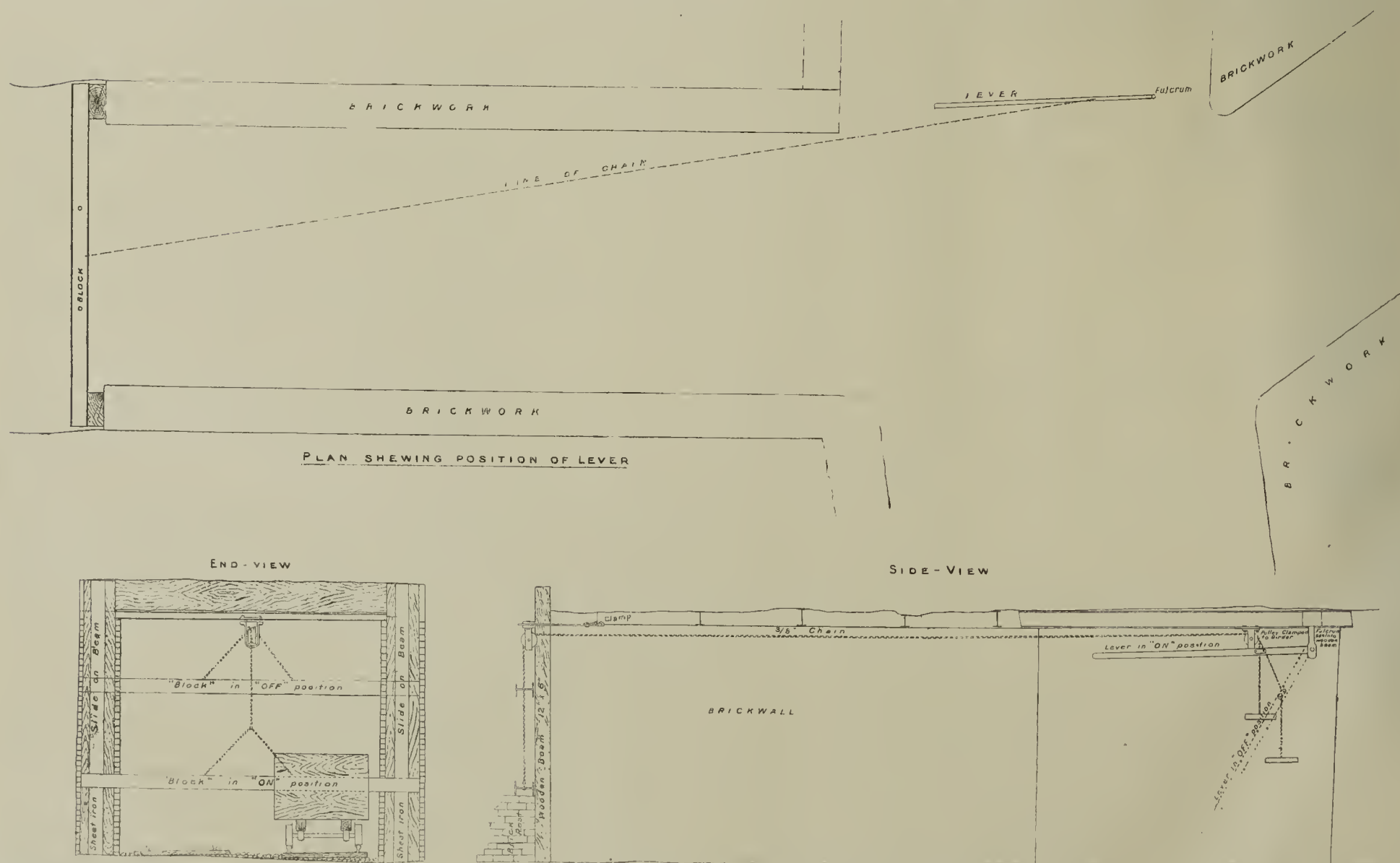


FIG. 6.—RUNAWAY STOP BLOCK IN USE AT THE MARY PIT, LOCHORE.

proper precautions are used." Mr. Walker does not think it is necessary to have the fences in position when the coal is being raised, as this comes under the last part of the subsection—viz., "this shall not be taken to forbid the temporary removal of the fence for the purpose of repairs or other operations if

half mile to the east of Bo'ness Docks on the south side of the Firth of Forth, to win coal underlying the Firth belonging to the Crown. The coal in the adjoining properties has already been leased, and the necessitated the shafts being placed below low watermark.

commencement was made to fill dirt on August 22. As soon as this was attempted the cylinder suddenly sank 7 ft. 9 in., but fortunately did not go under water. A collar fixed near the top of the cofferdam helped to preserve vertically. On August 31 the cylinder stuck in the 5 ft. of sandstone given at 8 yards 1 ft., probably



resting on some of the flagstones, which could be felt by an iron bar when pushed under the edge of the cylinder from the pit bottom. All available segments were placed on the cylinder and failed to move it, although the weight was probably between 40 and 50 tons. It was then decided to bore a hole in the bottom of the pit, and put into it a charge of gelignite with the object of turning the flags on end. This was successful, and all went well until October 11, when the cylinder was in the 8 ft. of strong clay at 31 yards, and the next ring to the bottom began to crack and buckle. This extended to the ring above, and to the bottom ring, and the form of the cracks are shown in elevation herewith, and the form the shaft took in plan in the same figure. The cutting ring was 2 ft. in advance of the pit bottom when the cracking began. There were no blowers at the time, but some had been met with previously, and were probably the cause of the mischief. Square frames were put in each 2 ft. 6 in. for about five

lining. These only succeeded in forcing it down 1 ft., however, and as the ground was firm, sinking was proceeded with in the ordinary way. Four rings of tubing were built up on the top of the cutting ring, and four rings underhung from it. There was a good deal of trouble in underhanging the first ring, but this was surmounted by a special arrangement of chain and screw. When the rockhead was reached, a bed was prepared, and the sides shorn back so that the thickness of brickwork would be 2 ft. 6 in. This was carried up about 7 ft., and underpinned the tubing as shown. The bricks used are shaped common bricks, and are laid in a mortar of one part of sand and one of cement. The shaft is about 15 in. out of plumb, but this shaft is to be the air shaft, and it is hoped that the experience gained will enable the 19-ft. diameter winding shaft to be sunk plumb, and without mishap. From experience gained the bottom seven rings of the cylinder for the new shaft will be thicker, and the metal through-

*Output of Mineral.*—Table A on next page shows the quantity and value of mineral raised. The output of mineral raised per person employed below ground was 282 tons, viz.:—Cumberland, 269 tons; Durham (North), 286 tons; Northumberland, 280 tons. The output per person employed below and above ground was 228 tons, the respective totals in 1911 being 315 tons and 256 tons. The low average for 1912, compared with 1911, is due to the loss of output caused by the national strike and to the fact that there were no strikes during 1911. It is estimated by these owners that the amount of dirt excluded (which would have been included in previous years) was 608,055 tons. Below are given particulars of the coal-cutting machines in use:—

Description.	Number driven by		Statute tons cut by	
	Elec- tricity.	Com- pressed air.	Elec- tricity.	Com- pressed air.
Disc .....	24	37	260,297	297,015
Bar .....	12	—	183,705	—
Chain .....	14	—	130,326	—
Percussive .....	—	267	—	875,243*
Rotary heading .....	1	—	377	—
Total .....	51	304	574,705	1,170,890*

\* Including 1,368 tons of fireclay.

The number of mines using the above machines is 53. At the coal face 37 conveyors were employed.

*Accidents.*—One hundred and fourteen fatal accidents resulted in 116 deaths, all being single fatalities except one case of a fall of ground and another case of premature explosion of a shot, causing the loss of two lives in each case. Of the fatal accidents, 11 causing 12 deaths occurred in Cumberland; 55 causing 55 deaths occurred in Durham (North); and 48 causing 49 deaths occurred in Northumberland. The death-rate from accidents per 1,000 persons employed during the year 1912 is as follows:—(1) Below ground, 0.96; (2) above ground, 0.86; (3) below and above ground, 0.94.

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents.		Non-fatal accidents reported to inspector.*		All non-fatal accidents disabling for more than 7 days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.†	Separate accidents.	Persons injured.
Explosions of firedamp or coaldust .....	—	—	7	10	5	7
Falls in mine .....	45	46	118	118	5,803	5,823
Shaft accidents .....	10	20	6	21	98	113
Miscellaneous underground .....	39	40	191	198	11,302	11,315
Total underground .....	94	96	322	347	17,208	17,258
On surface .....	20	20	46	46	969	971
Gross total in 1912 .....	114	116	368	393	18,177	18,229
Total in 1911 .....	116	122	366	358	19,637	19,664

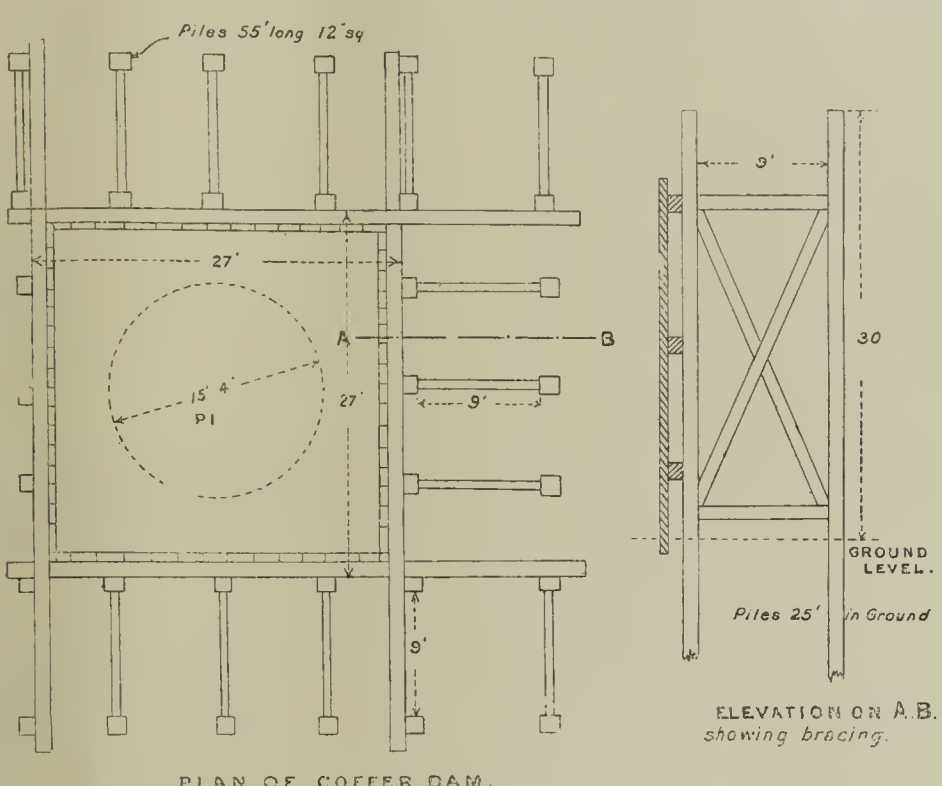
\* and † See footnotes to table on page iii.

As to the accidents from explosions of firedamp or coaldust, in all these cases except one the ignitions occurred at mines which are considered non-fier, and where naked lights are used throughout. The other case occurred at a colliery where safety lamps are used, and was supposed to have been caused by a putter going past a fence into a place where there was gas and lighting a cigarette. There were two cases of ignition of firedamp reported causing no injury. One was caused by a candle in a naked light pit, and the other was caused by a shot of samsonite in a safety-lamp pit.

There were 45 fatal accidents from falls of roof and side during the year, involving the loss of 46 lives. Compared with last year this is a reduction of 13 accidents and 16 in the number of lives lost.

In connection with the working of shafts there were 10 accidents involving the loss of 10 lives. This is an increase of two accidents and two deaths compared with the figures for last year under this head.

Of the five fatalities arising out of the use of explosives, one was due to returning to the face of a stone drift rising about 1 in 2 to 1 in 3 before the fumes of four shots, which had been fired simultaneously, had dispersed. The blood of the deceased was examined by spectroscope, and gave positive evidence of CO poisoning. The man who recovered said they waited 25 minutes after firing before returning to the face. There was about 4 lb. altogether of explosive fired. The canvas brattice was 15 yards back. The explosive used was samsonite, and was fired by fuse and detonator. Another accident with explosives resulted in a double fatality. A manhole was being made in a new drift, and eight parallel holes had been drilled and charged with samsonite in a width of 6 ft. 3 in. The deputy coupled the three centre holes in parallel and fired them. He then returned with a drifter to couple up the other holes, after first uncoupling the battery, and when they were close to the manhole another of the shots exploded and killed them both; this occurred about three minutes after the first shots were fired. On examination it was found that seven of the eight holes had been fired, and it is surmised that when the three centre holes were fired, other three also exploded at the same time, owing to the close proximity of the holes. How the seventh hole came to explode is difficult to determine. There is no doubt the holes were too near together, and it would have been better if only those holes had been charged that were to be fired with the first application of the battery, and to have left the charging of the other holes till the first holes had been fired. One fatality was caused, it is surmised, by the collier lighting the squib too near to the powder in the squib. One fatality was



FIGS. 7 TO 12.—METHOD OF SHAFT-SINKING BELOW LOW WATER MARK AT BO'NESS.

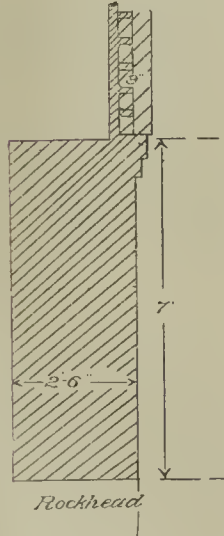


FIG. 13.

or six rings up to support the shaft, and it was decided to narrow in the shaft, and fresh tubing was ordered with all speed for a cylinder 11 ft. 6 in. inside diameter, and 12 ft. 6 in. outside diameter. This tubing was the same pattern and thickness as for the first cylinder, except that there were two vertical strengthening ribs. Meanwhile a start was made with an 18 in. brick lining on the top of the timber frames, which left the shaft in that part 12 ft. finished. When the new tubing arrived it was built up at the bottom of the shaft inside the first cylinder, and an attempt was made to force it down by two 60-ton hydraulic jacks working against the bottom of the brick

out will contain more hematite in order to make it tougher. An effort also will be made to keep the cutting edge further in advance of the pit bottom, as in this shaft all the trouble has been when the pit bottom has approached too near the cutting edge. Probably the debris will be excavated with a drag, and the shaft always kept full of water, so that the pressure within and without may be more equalised. The sinking has all been done with a steam crane, and it is hoped that the debris from the sinking will be sufficient to fill up this space between the pitheads and the land. The water has never caused any great difficulty, and has generally been dealt with by filling with buckets into the sinking kibble—occasionally a special barrel with bottom valve has been used.

II.—Newcastle District.

Mr. J. B. Atkinson, in his report on the Newcastle Mines Inspection District, states that at least one underground inspection has been made at all the mines; many of the large mines have been visited underground on several occasions.

*Persons Employed.*—The following table shows the number of persons employed:—

County.	Mines at work.	Persons employed.			Below and above ground.
		Below ground.	Above ground.	Below and above ground.	
		Males.	Males.	Fe. males.	
Cumberland .....	39	8,125	2,169	448	10,742
Durham (North) .....	78	43,357	9,729	40	53,126
Northumberland .....	129	48,458	10,835	20	59,313
Total in 1912 .....	216	99,940	22,733	508	123,181
Total in 1911 .....	244	98,765	22,539	478	121,782



TABLE A.

County	Coal, including small or slack.		Fireclay.	Ganister	Clay, shale, &c.	Total.	
	Amount.	Value.	Amount.	Amount.	Amount.	Amount.	Value.
	Tons.	£	Tons.	Tons.	Tons.	Tons.	£
Cumberland	2,133,563	959,256	35,526	478	12,609	2,182,176	969,746
Durham (North)	12,319,494	5,746,538	88,131	—	—	12,407,625	5,755,017
Northumberland	13,381,641	6,098,712	168,728	—	12,416	13,562,785	6,117,267
Totals	27,834,698	12,804,506	292,385	478	25,025	28,152,586	12,842,030

due to the shot-firer deputing his duty to a stoneman (the deceased). Two shots were to be fired. The shot-firer fired one and then permitted or sent the stoneman back to couple the cable to the other shot, and owing to a misunderstanding the shot-firer fired the second shot before the deceased had taken shelter.

Of the underground haulage accidents, which accounted for 22 deaths and injuries to 101 men, two persons were killed and two injured while illegally riding, and three injured by going in front instead of behind tubs while moving them by hand on inclined roads. The fatal haulage accidents compare unfavourably with last year, there being three more accidents resulting in the death of three more persons. All these fatal accidents were investigated and the inquests attended, and many of the non-fatal accidents were also investigated.

There were two fatal accidents underground due to electricity during the year, causing two deaths. At Hartford Colliery some alterations were being made by the British Westinghouse Company to the main switch handles at the pit bottom. It was a Saturday afternoon; one of the Westinghouse Company's fitters was at work on the job along with the colliery electrician. The current was three-phase (2,750 volts), and was not cut off at the time at bank; the electrician had, however, attempted to get communication by telephone to bank to get the current cut off, but without success; they could not get the cage at the time, and so they decided to proceed. The deceased, who was a skilled electrician, went down the pit later in the afternoon to examine the alterations made; there were no lights; no one appears to have told him that the current was on, and in all probability he assumed that the current was off and the apparatus dead. This was a reasonable assumption for him to make. He received a shock whilst trying the working of the switch, and died without recovering consciousness, although he was pulled off at once and artificial respiration resorted to. At Chopwell Colliery, on May 3, a fatal electric shock accident occurred at a coal conveyer switch. By instructions legal proceedings were taken against the manager for an infringement of Rule 8 (a) of the recently established electricity rules, which requires that "All metallic sheaths, switch and fuse covers, &c., shall be earthed by connection to an earthing system at the surface of the mine." The case was heard before the Gateshead magistrates. The facts were admitted by the defence; they, however, claimed that as the coal conveyor was in use before June 1, 1911, the exemption Rule 20 (b) applied, and that that exemption during its continuance holds free from the necessity of any earth connection all apparatus which was not required to be earthed by the (recently superseded) 1905 code of rules, that is to say, all portable apparatus. The magistrates accepted this view, and dismissed the case. The magistrates were asked to state a case, and on appeal it was again dismissed, and the magistrates' decision upheld. The conveyor switch has, however, since been connected to earth.

One fatal accident from an irruption of water, resulting in one death, was reported during the year. At Dean Moor Colliery, on June 8, a shaft had been sunk on the dip side of some old workings which were waterlogged and a level stonedrift was driven from the shaft towards the old water level where it was known there was about 34 ft. head of water. The seam dipped towards the shaft about 1 in 9. Boreholes were not kept in advance of the face of the drift in accordance with General Rule 13 Coal Mines Regulation Act, 1887, and in consequence the drift holed into the old level and there was an inrush of water which drowned one of the two men working at the face. Legal proceedings were taken against the manager for breach of General Rule 13 Coal Mines Act, 1887, and he was convicted but was let off on payment of costs.

The total of fatal accidents underground is seven less than last year, and there were 10 less deaths.

There were five more fatal accidents on the surface this year than last, resulting in four more deaths. A fatal case of electric shock occurred on the surface at Mickley Colliery, on December 30, to a young man 20 years of age in charge of an electric haulage engine. The motor was 10-horse power, D.C. current, 450 volts. There was an open-type metallic starter with no-volt release mounted on a pillar about 3 ft. behind the motor, and an enclosed double-pole switch with fuses. He was putting the clutch into gear ready for starting the full sett. He was seen with his left hand on the clutch lever and his right extended towards the starter which was behind him, and was looking out of the window of the engine-room when he fell backwards. His right hand probably came in contact with a live part of the starter.

There were 24 dangerous occurrences underground during the year, as follows:—Eleven cases of broken winding gear, included in which were two broken ropes and one broken detaching hook, four cases of overwinding, three underground fires of a minor character due to the use of naked lights, two ignitions of firedamp, two irruptions of water, two damaged cage guides. There was a fire at the top of the upcast shaft at St. Andrew's Colliery, on February 24, both

cages fell to the bottom, and the fan was damaged. The fire was discovered about 10 a.m., and in half-an-hour it was under control. There were about 470 men in the pit at the time, and they were brought out by the downcast shaft. The cause of the outbreak was unknown.

*Prosecutions.*—Legal proceedings were taken in two cases against managers, and there were 50 prosecutions by owners against workmen.

*Coal Mines Act, 1911.*—This Act, and the orders arising therefrom, together with the National Health Insurance Act and the Minimum Wage Act, all coming into force about the same time, together with the intrusion of the national strike, has imposed a great strain on colliery officials, and has no doubt prevented to some extent the fulfilment, within the statutory time, of many of the obligations imposed by the Mines Act.

The requirements of section 14 (2), whereby a deputy has to devote his whole time to his statutory duties set forth in section 14 (1), do not apply to the counties of Northumberland and Durham, but they do apply to Cumberland; there have not, however, been any applications for exemption under section 14 (2) (c), and the work is proceeding as heretofore. No cases have arisen under section 14 (3). Where the districts assigned to deputies have been too large to enable them to make the two inspections during a shift, they have been reduced in size and more deputies have been appointed.

Examinations for firemen's certificates have been held at three centres in the Durham (North) portion of the district, and at three centres in Cumberland and 14 centres in Northumberland, and the arrangements made by the approved authorities for conducting the examinations have generally been satisfactory.

The following are particulars of the number of candidates who have passed the examination in this district:—In Northumberland certificates were granted to 4,638 men, and 185 failed, in Cumberland 512 gained certificates and 14 failed. The particulars for Durham (North) have not been kept in such detail as in other parts of the district, the figures available to the end of February 1913 being: Certificates granted, 958; failed, 28, the total figures for the county of Durham to this date being—8,664 and 429. The figures do not represent the number of deputies in the district who have obtained the certificate, because some of them may be employed in the Durham district, and have been examined in this district, and *vice versa*.

Up to the end of the year no uniform scheme of searching had been established, but a number of collieries have schemes, some of which have been provisionally approved, pending the introduction of a uniform scheme of search for the whole district.

The number of air samples taken and analysed to the end of the year was 183. These were all in intake airways, except a few taken in other parts of the mine for special purposes. The general result of these showed that the amount of inflammable gas was less than that allowed by the Act. Little preparation had been made at the end of the year towards providing adequate means for reversing the air-current in accordance with section 31 (3) of the Act, and extensions of time have been granted in a few cases.

The Explosives Order is being carried out as regards safety-lamp pits, but in some naked light collieries where large quantities of explosives are being used difficulty has been experienced in providing sufficient accommodation near the pit for the convenient distribution of the explosive amongst the men. In Northumberland the greater portion of the mines were worked with naked lights, and squibs were still largely used pending the recommendation of the squib committee.

Ninety-eight managers' certificates have been endorsed, and 64 certificates have been given prescribing the qualifications of surveyors.

The regulations in the Third Schedule to the Act are being carried out. A considerable number of blind horses have been removed from the pits. The use of eye guards is general throughout the district. There are many different patterns in use, very few of which are satisfactory. Considerable trouble has been and is being taken by the management to obtain an efficient type. The report book is kept up in a more or less efficient manner. This is due to many of the horsekeepers not being accustomed to writing. The number of horsekeepers has been largely increased to comply with the Act.

There were 12,639 horses in use; 200 died from injury and 131 from disease, 194 were destroyed in consequence of injury and 357 in consequence of disease or old age, the further cases of injury and ill-treatment reported numbering 1,104 and 18 respectively.

The prescribed books are used now generally throughout the district. The entries are very often not made in a satisfactory manner, the information given being too scant. This applies particularly to the firemen's reports, which are similar to what obtained before the Act came into force, and are often a repetition of stereotyped phrases.

Three exemptions were granted under section 40 (3) of the Act with regard to the use of guides in shafts in

course of being sunk. One application was made for exemption under section 32 (1) (b) by the owners of a small mine using naked lights where an ignition of firedamp had caused injury to one person, and this was granted. With regard to the new provisions in section 16, as to inspection on behalf of the men, no advantage has been taken of this by the men over and above what they have been doing in the past. It has been, and still is, the custom at collieries in Northumberland and Durham for local inspectors to be appointed, and they exercise their privilege of enquiring into all fatal and serious accidents, on which they invariably report, and also in inspecting the whole of the mine once a quarter, a report being made of each inspection. This practice has not been altered in any way.

There were five cases during the year which necessitated the introduction of safety lamps. In one of these an exemption was granted.

Only one case came to Mr. Atkinson's knowledge during the year, in which the second outlet from a district was blocked, the working of the district was in consequence stopped and the men withdrawn.

Exemptions were granted under section 40 (3) at three pits in the course of being sunk. There is one case arising under section 40 (6) at a new shaft.

Section 40 (7) has been complied with, but the rigid fences provided do not in some cases appear to afford sufficient protection. In most of the mines gates have been provided.

There is one case under section 40 (11) at a large colliery where the practice for many years past has been to ride men in the ordinary coal tubs pushed into the cages. The practice will very shortly be discontinued, and all the men will be wound at a new shaft which has been equipped with the most modern winding appliances.

Most of the mines in Northumberland and Durham are provided with separate travelling roads. The roads are kept clear of pieces of coal, as provided in section 47 of the Act. The trouble provided against under this latter section is largely caused by topping up and using open-ended tubs. In this district, however, tubs are seldom filled up above the top, and there are no open-ended tubs.

The cleaning of the roads from coaldust is being complied with, and in some cases stonedust is being applied.

Provisions are being made for storing highly inflammable material where used underground, and fire-extinguishing apparatus is provided in many cases; but there is room for considerable improvement in what has already been done in this respect.

Prior to the passing of the Act, the wages in Northumberland and Durham were paid fortnightly; but now, with the exception of one or two cases, the whole of the mines have weekly payments. No trouble occurred in making the change, with the exception of one or two disputes as to balloting.

*Explosives Used.*—The total quantity of explosives used was 4,933,579 lb. The estimated number of shots fired was: by electricity, 3,161,658; by fuse, 635,742; by squibs, 5,802,496—total, 9,599,896. The misfire shots reported were: by electricity, 2,081; by fuse, 584; otherwise, 640—total, 3,305.

*Safety Lamps.*—The total number of safety lamps in use was 61,841, classified as follows:—With one gauze, 19,931; with two gauzes, 40,388; not stated, 1,522; shielded, 59,845; unshielded, 474; not stated, 1,522. Method of locking: lead rivet, 22,187; magnetic, 19,034; screw, 18,706; other, 1,914. Kind of illuminant: colza or colza and petroleum, 55,208; petroleum, 1,717; volatile spirit, 1,376; electricity, 1,528; other illuminant, 2,012. Method of lighting: By electricity, 25,594; by internal igniters, 1,062; by opening, 35,185.

*Electricity in Mines.*—Electricity was in use at 111 mines, the following being a summary of horse-power:—Surface—Winding, 3,159; ventilation, 4,402½; haulage, 2,333; coal washing or screening, 3,318; miscellaneous, 5,511; total, 18,723½. Underground—Haulage, 11,361½; pumping, 13,128½; portable machinery, 1,627½; miscellaneous, 2,309½; total, 28,427.

*Eight Hours Act.*—This Act is working satisfactorily; but the substitution of three shifts for two at 15 of the large mines in Northumberland and at most of the mines in the Durham portion of the district when the Act came into force still causes a considerable amount of dissatisfaction amongst the men.

*Rescue and Aid Order.*—There are three central rescue stations in the district. One at Elswick completely equipped with fire engine, liquid air plant, and body of trained men always ready. Another station is being built at Ashington, and is approaching completion. Another is to be built at Brigham, in Cumberland.

### III.—Durham District.

Mr. Nicholson, in his report on the Durham district, states that the total number of inspections made at coal and metalliferous mines was 1,375, of which number 821 were also underground inspections. At least one underground inspection was made during the year at every coalmine, and at 45 of the larger mines six or more underground inspections were made.

*Persons Employed.*—The following table, A, gives the number of mines at work and the number of persons of various ages employed in and about mines under the Coal Mines Act during the year 1912.

As is usually the case there is a slight increase in the total number of persons employed, the increase, however, being confined to the coalmines of South Durham. There were four fewer mines at work than in the previous year. In the coalmines in South Durham there is an increase of 541 in the number of persons employed underground and an increase of 421 in the number employed above ground. In the ironstone mines of Cleveland there is a decrease of 332 in the number of persons employed below ground, and of 62 in the



TABLE A.

County.	Mines at work.	Persons employed.			Below and above ground.
		Below ground.	Above ground.		
		Males.	Males.	Females.	
Durham, South	214	84,193	22,275	30	106,498
Westmorland	1	8	2	—	10
Yorkshire, North Riding (coal)	6	17	4	—	21
Yorkshire, Cleveland (ironstone)	27	7,099	1,789	—	8,888
Total in 1912	248	91,317	24,076	30	115,417
Total in 1911	252	91,100	23,718	22	114,850

number employed on the surface. Thirty females were employed in cleaning offices, as telephone attendants, and other light domestic work in connection with the coalmines, as against 22 in the previous year.

show a slight reduction, 32 persons being killed, against 35 in 1911—haulage accidents, as usual, being responsible for about one-third of the deaths. The 25 surface fatalities were divided amongst the separate headings exactly as in the previous year, with the addition of another death by machinery. The total number of non-fatal accidents reported was 446, causing injuries to 463 persons, and of this number three were injured by accidents which proved fatal to one of their companions. Compared with the previous year there is only a reduction of 12 in the number of non-fatal accidents, so that but for the six weeks' strike this number would no doubt have been increased by 20 or 30, thus giving an increase on the previous year. Taking the monthly average of deaths and injuries to persons, the strike in the early part of the year no doubt prevented the loss of 12 to 15 lives and injuries to 30 or 40 persons in this district alone.

Under the heading of shaft accidents there were four fatalities, causing four deaths, or one more than in the previous year. The first fatality occurred on the second day of the year at a small mine belonging to Messrs. Summersons Limited, near Cockfield, the deceased being employed as a putter and onsetter at a mid-working only 6 fathoms from the surface and 11 fathoms above the bottom of the shaft. The shaft was a small one and there was only one cage in it. Although warned twice by his brother, who was the deputy in charge, not to set any coals on until he returned from the main coal or bottom seam, for some unaccountable reason the deceased person appears to have pushed a full tub out towards the shaft, and as the cage was not set at that level he fell down to the bottom seam with the full tub. No gate or fence was provided at the inset to the shaft, the management having purposely made the gradient a slight rise in the direction of the shaft. As a breach of General Rule 19, section 49, of the Coal Mines Regulation Act, 1887, had been committed, proceedings against the management were taken.

There were 32 fatal miscellaneous underground accidents causing 32 deaths, a reduction of three compared with the previous year. One was due to explosives, 21 were haulage accidents, or seven less than in 1911. One death was caused by electricity, two by machinery and the remaining seven are included as sundries. There were also 201 non-fatal accidents causing injuries to 209 persons, a marked reduction on the previous year, but almost the same as in 1910. Exactly half of the non-fatal accidents from explosives were due to persons being struck by coals and stones projected by shots, and in the majority of cases were the result of not taking proper shelter. Nine of the non-fatal accidents occurred in the ironstone mines, where the use of gun-powder is practically universal and the men fire their own shots. In spite of the stringent regulations against unramming shots which have failed to explode there were four accidents causing injuries to five persons.

Fourteen persons, or four less than in the previous year, were killed while engaged in haulage operation. Four were killed while walking inbye or outbye, or two less than last year. There is also a considerable reduction in the number of non-fatal accidents as compared with the previous year, and out of a total of 121 accidents 99 were injured while employed in haulage operations. Of the 21 fatalities 16 were caused by persons being run over or crushed by trams or tubs, most of the deaths being in connection with mechanical and horse haulage. Many of the haulage fatalities would not have occurred but for some breach of regulations or want of ordinary precaution.

There was only one accident due to electricity underground, and this caused the death of a siding attendant at Spa Wood Ironstone Mine in Cleveland. The deceased was on his way inbye when he stopped to speak to another siding attendant, and as the electric lights at once went out, the latter thought the deceased had switched them off in fun, as had previously happened. The deceased was presently found lying insensible on his back with one of the lighting cables broken in his hand. His oil lamp was standing burning close at hand. It is not known what the deceased was doing, as the lighting wires were over six feet from the floor. The pressure was 250 volts alternating. One wire was broken, and on the other there was no insulation for a length of 1½ inches. The deceased was got clear and efficient artificial respiration resorted to, but without success in spite of continuous efforts for two hours.

There were two deaths in connection with the use of machinery, one being caused by the revolving bar of a coal-cutter, and the other by the machinery of a self-acting incline.

Under the heading of sundries, as compared with the previous year, there is an increase of two in the number of deaths, and a decrease of nine in the number of persons injured. Three out of the seven fatal accidents were said to be due to strains incurred while lifting a tub or stone; two were due to blows on the head by props. In most of the cases death ensued some time afterwards.

There were 25 separate fatal accidents on the surface, or one more than in the previous year, and strange to say the number of deaths under each heading is exactly the same in both years with the exception of the addition of one death under the sub-heading of machinery. Of the seven deaths caused by machinery, six were caused by some portion of the deceased person's clothing being caught by revolving shafting. In one case the machinery was being adjusted whilst in motion, and in another the person was improperly climbing up from one floor of a coal washer to the floor above instead of using the staircase provided for the purpose. There were nine fatalities on surface railways causing nine deaths. Fifteen persons were also injured. Of the foregoing, one fatality and one non-fatal accident occurred in ironstone mines, and the remainder in connection with the coalmines in South Durham. There was one fatal accident caused by electricity. It was of a very simple character and would not have happened if ordinary precautions had been observed by the deceased. It occurred at Bowden Close Colliery, belonging to Messrs. Pease and Partners Limited. An electrician was sent to fit an adaptor and portable lamp to a lamp-holder. He knew the current was on and he had frequently done similar work. After attaching a length of flexible cable to an adaptor, he placed the latter into a lamp-holder, and was afterwards found with the bare end of the flexible cable in his hand. All efforts to restore him were unsuccessful. The pressure was 250 volts, between one phase and neutral. There were 42 fatalities due to miscellaneous causes resulting in 42 deaths and 41 non-fatal accidents causing injuries to 42 persons. All the fatal accidents were of a simple nature. Three deaths were due to persons falling from

County.	Coal.		Fireclay.	Ironstone.	Other minerals.	Total.	
	Tons.	Value (£).	Tons.	Tons.	Tons.	Tons.	Value (£).
Durham, South	25,570,910	11,408,323	192,875	—	36,940	25,800,725	11,435,895
Westmorland	—	—	—	—	—	1,347	673
Yorkshire, North Riding	2,294	938	—	—	—	2,294	938
Yorkshire, Cleveland	—	—	—	5,118,187	—	5,118,187	1,200,349
Total in 1912	2,574,551	11,409,934	192,875	5,118,187	36,940	30,922,553	12,637,855
Total in 1911	27,909,200	—	189,002	6,003,957	50,645	34,152,804	—

*Output of Mineral.*—As was to be expected owing to the national strike, the output of coal and nearly all other minerals shows a large decrease. If allowance for the six weeks' strike be made, the year under review would show the regular increase in production. The total decrease in output of all minerals compared with the previous year is 3,230,251 tons; of this amount coal is responsible for 2,334,649 tons, ironstone 885,770 tons, barytes 4,228 tons, clay and shale 8,391 tons, and whinstone 176 tons, while fireclay and ganister show increases of 3,873 and 90 tons respectively.

The quantity of mineral raised per person employed below ground was: at coalmines, 306 tons; at ironstone mines, 721 tons; at all mines under the Coal Mines Acts, 388 tons; and below and above ground, 242 tons, 575 tons, and 267 tons respectively. Compared with the figures for the previous year, there is a large decrease all round in the output per person employed. In coalmines this amounts to 25 tons per man on the total workers and 30 tons on the underground workers. In the ironstone mines the corresponding decrease is 72 tons and 77 tons respectively. It is estimated by the owners that the amount of dirt excluded (which would have been included in previous years) was 418,507 tons. Owing to the method adopted in arriving at the number of persons ordinarily employed for the information required in filling up this portion of the annual returns, the results obtained by dividing the output by the number of persons employed do not afford figures of comparative value. No allowance is made for the decrease in production due to the strike, whereas approximately the same number of persons employed is returned as if the mines had worked regularly throughout the year without interference of labour troubles.

There were 149 coal-cutting machines in use during the year at 36 separate mines, 59 being driven by electricity and 90 by compressed air. Compared with the previous year this is an increase of 11. The total quantity of coal cut was 923,716 tons, the increase of 38,367 tons being almost entirely due to coal cut by machines worked electrically. A start has been made in the district to use machines driven by low-pressure electricity of 220 volts, and the method adopted is now working very well at Messrs. Bolckow, Vaughan and Co.'s collieries. The number of conveyors in use at the coal face shows a large reduction, only 20 being in operation, as compared with 34 in 1911.

Description.	Number driven by		Statute tons cut by	
	Elec- tricity.	Com- pressed air.	Elec- tricity.	Compressed air.
Disc	23	16	256,332	146,836
Bar	20	12	181,475	123,518
Chain	14	4	48,578	1,604
Percussive	2	57	2,470	162,832*
Rotary heading	—	1	—	71
Total in 1912	59	90	488,855	434,861*
Total in 1911	55	83	453,071	432,278†

\* Not including 4,632 tons of fireclay. † Not including 669 tons of fireclay.

The number of mines using machines was 36, as against 25 in 1911.

*Accidents.*—There was again an absence of any serious mining calamity during the year, not more than one person having been killed in any single accident. Owing to the confusion caused by the six weeks' strike, a comparison with previous years is rendered difficult; but the year 1912 will certainly rank as one of the lightest years as regards loss of life. There were 98 fatal accidents causing 98 deaths, as compared with 120 fatal accidents and 121 deaths in 1911. Out of a total of 98 deaths, 25 occurred on the surface, or one more than in the previous year. Contrary to usual expectations, fatalities for some time after the resumption of work consequent on the strike were rather fewer than usual. Ninety deaths out of the total of 98 were at coal mines in South Durham, a decrease of 13; while in Cleveland there were only eight deaths, as compared with 18 in 1911, which was a very unfortunate year for the ironstone mines. Two deaths were due to explosions of gas in the coalmines. Thirty-five persons were killed by falls of ground, as against 59 in 1911 and 52 in 1910—a very welcome reduction. Shaft accidents were responsible for four deaths, or one more than in the previous year. Miscellaneous underground accidents

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents.		Non-fatal accidents reported to inspector.*		All non-fatal accidents disabling for more than 7 days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.†	Separate accidents.	Persons injured.
Explosions of firedamp or coaldust	2	2	2	3	2	2
Falls in mine	35	35	175	181	6,398	6,430
Shaft accidents	4	4	5	5	114	116
Miscellaneous underground	32	32	201	209	13,067	13,076
Total underground	73	73	383	398	19,581	19,624
On surface	25	25	63	65	1,186	1,192
Gross total in 1912	98	98	446	463	20,767	20,816
Total in 1911	120	121	529	551	22,389	22,419

\* and † See footnotes to table p. iii.

The death-rates from accidents per 1,000 persons employed below ground were:—Coalmines, 0.783; ironstone mines, 0.986; all mines under the Coal Mines Acts, 0.799. All mines in 1911, 1.064. Per 1,000 employed above ground the rate was 1.037, as against 1.011, and below and above ground 0.849, as against 1.053.

Two lives were lost by explosions of firedamp. Neither of the explosions was of an extensive nature, and coaldust played no part, both mines being extremely wet, and if ordinary care had been taken the explosions would not have occurred. The first explosion took place on January 6, at Hunwick Colliery, owned by Messrs. Bolckow, Vaughan and Co. Limited, and caused the death of a helper-up and serious personal injury to a putter. The workings were extremely wet and the roof treacherous, and acting under pressure from the workmen the management very foolishly agreed to the lamps being taken out again and naked lights were introduced, and at the time of the accident candles were in use. The explosion was no doubt caused by firedamp tailing back out of a rise bord which was not working and was fenced off, and coming in contact with the deceased lad's naked light. The explosion took place after a sudden decrease in atmospheric pressure, the barometer having fallen ½ in. in the preceding 12 hours. Reverting to the use of naked lights after gas had been seen on several successive dates and before a second outlet was formed was an extremely weak and reprehensible proceeding on the part of the management, more especially as the ventilation of the few working places was entirely dependent on a range of 9 in. air pipes for a length of 180 yards. The second fatality due to an explosion of firedamp occurred at Westholme Colliery where workings were being opened out in a seam in the carboniferous limestone series. Apparently the examiner, contrary to express orders, neglected to use the safety lamp provided. He had foolishly gone into the workings with a naked light, thus causing an explosion of firedamp where there was a slight accumulation of gas at the face of a rise working which had just passed through some troubled ground. In addition to the foregoing there were two non-fatal accidents due to the explosion of firedamp caused in both cases by naked lights.

One of the most gratifying features in this year's report is the very material reduction in the number of lives lost by falls of roof and side. The total number of deaths from this cause is 35, of which 29 were due to falls of roof and six to falls of side. In 1911 and 1910 the deaths were 59 and 52 respectively, or about 60 per cent. of the total underground fatalities, whereas for the year under review the percentage is about 48. This large reduction in the total deaths is, no doubt, due in a great measure to the fact that, owing to the strike, there was six weeks' less work, and therefore less opportunity for accident. Of the 35 fatalities due to falls, 32 occurred in the coalmines of South Durham and three in the Cleveland ironstone mines. There were 175 non-fatal accidents due to falls, causing injuries to 181 persons, or four less than the previous year.



of 3 to 14 feet. Two persons died from tetanus and light scratches.

There were 23 dangerous occurrences reported during the year, divided under the following headings:—Explosions of gas or coaldust, 3; underground fires, 6; breakages of winding rope, chain, or other gear, 12; overwinding, 2. By far the most important and alarming dangerous occurrence was an explosion of coaldust or firedamp and coaldust at Auckland Park Colliery. It occurred about 2 a.m. on Sunday morning, October 27, the damage being practically confined to the workings in the Harvey seam. It was a very remarkable circumstance, and at the same time a most fortunate one, that no one was in this seam at the time of the explosion, and the few persons who were at work in the other seams were got out without experiencing any ill effects. The damage to the haulage and intake roadways was very considerable, some falls being over 100 yards in length. Up to the present the cause of the explosion has not been ascertained, although the point of origin, as indicated by the evidence of the direction of force, is fairly well defined. A full report of the explosion by the Chief Inspector of Mines and Mr. Nicholson is in course of preparation.

**Prosecutions.**—The total number of prosecutions of workmen by owners was 75, or less than half the number in 1911. Seventy-one cases resulted in convictions, two were dismissed, and in the remaining two prosecutions the defendants were bound over with costs. The total amount inflicted in fines was £35 10s. 6d., with £29 17s. costs. Compared with the previous year there is a reduction of £39 7s. 6d. in fines and £31 18s. 6d. in costs.

**Coal Mines Act, 1911.**—The coming into operation of the Coal Mines Act, 1911, involved a very considerable increase in the amount and character of the responsibility on the part of all persons connected with the coalmining industry, but naturally by far the largest portion of this added responsibility has to be borne by those who are in a legal sense accountable for the safety of the persons employed, and the proper working and development of the mines under their charge. Owing to the cessation of work on account of the six weeks' national strike, a large amount of time and money had to be expended in restoring the roadways and workings to a safe condition, thus delaying work which was in progress at the commencement of the strike, with a view to complying with the altered conditions required by the new Coal Mines Act.

With respect to the duties of deputies, no applications were received for exemption from the requirement that they should devote their whole time to their statutory duties. The only portion of the district in which such applications might be necessary is in the Cleveland ironstone mines, the coalmines in Durham being specially exempted in the Act. Two cases were dealt with during the year in which the size of the district assigned to deputies was reduced, additional deputies being employed. Two or more inspections are made during each shift, and no working place remains unexamined for a period exceeding five hours.

The approved authorities in this district for the examination and granting of deputies' certificates were the education committees of the Durham County Council, and the North Riding of Yorkshire County Council. As the Education Committee of the Durham County Council conducted the examinations for the whole of the county, part of which is in the Durham Inspection District and the remaining portion in the Newcastle Inspection District, it is not possible to separate the candidates at the various centres and apportion them to their respective districts. There were 10 examinations centres, and out of a total number of 9,093 candidates who presented themselves for examination, 8,664 were granted certificates, and 429 failed. In the North Riding the numbers were as follow:—491 candidates obtained the full certificate. Among existing deputies 291 obtained certificates for gas testing and hearing, and 104 hearing certificates only. Fifty-two candidates failed. At some mines hewers, stonemen and putters received instruction and obtained certificates. Nearly all the larger firms have installed gas testing apparatus on their own premises.

The searching of workmen has been carried out at a few pits for some years, but not in a very thorough manner. A proper system is gradually being introduced. Many managers appear to have overlooked the fact that to comply with the Act a daily search is necessary. Mr. Nicholson has endeavoured to obtain a uniform system throughout the district on the following lines:—

(a) In the case of a shift, the number to be selected daily shall be at least 10 per cent. of the total number of persons forming the shift.

(b) The order in which the men are selected shall be varied daily.

(c) There shall be a general surprise search of all the persons forming the shift once at least in every quarter.

(d) Every person not forming part of a shift to be searched on each occasion on which he goes underground.

(e) Where mixed lights are used, the search to be made at the point immediately after the persons using safety lamps have separated from those using naked lights.

At many collieries arrangements are being made, or have been completed, to increase the volume of air passing through the mine, by erecting fans of a more modern type. This is frequently done in connection with new arrangements which are being carried out for the reversal of the air. At some mines where furnace ventilation is in use, it is intended to erect fans instead, and also to remove the furnace. Up to the end of the year, 1,000 of these were taken and submitted to Leeds tests. The highest percentages of

marsh gas and carbon dioxide found by analysis was 0.82 per cent. and 0.98 per cent. respectively. From these figures it will be seen that the state of the ventilation as shown by the analysis of the air in the main returns is well above the standard required by the Act.

The requirements of the new Explosives Order have on the whole been fairly well carried out. The chief difficulties have been the continued use of squibs in naked light pits, and the reluctance on the part of the workmen to bring out of the mine the surplus amount of explosive remaining unused at the end of the shift. Suitable storage for the surplus explosives has now been provided at practically all mines.

The certificates of 71 colliery managers have been endorsed with a surveyor's certificate, and, in addition, 86 certificates have been issued in accordance with the terms of the Order issued by the Secretary of State.

The district continues to have a good reputation for the care and treatment of the horses and ponies employed, cases of cruelty being conspicuous by their absence. As a rule, at groups of collieries, independent veterinary surgeons make regular reports at stated intervals, quite independent of the colliery veterinary. The various requirements under Schedule iii. are, on the whole, duly carried out, but there have been a few cases where the animals have not been provided with food and water during working hours. It has been rather a difficult problem to decide as to the most suitable eye-guard, and several firms, after trying wire guards, have given them up and replaced them by leather ones. In the case of the former, there is a danger of the wires becoming damaged and broken, and in time the wire might penetrate the eye.

Taking all mines, 12,645 horses were in use underground; 188 died from injury and 147 from disease, 155 were destroyed by reason of injury, and 241 in consequence of disease. In addition, there were 528 cases of injury and 19 of ill-treatment reported.

As the workmen in this district availed themselves of the privileges of General Rule 38 of the Coal Mines Act, 1887, probably more than in any other district, there has not been any appreciable increase in the number of such inspections. In coalmines, the total number of inspections made was 415, divided among 62 mines. In the ironstone mines, 56 separate inspections were made at 14 mines.

At several large collieries where furnace ventilation has been in use, mechanical ventilators are being erected or arranged for, and where such is the case they are being adapted for the reversal of the air-current. At mines where reversal is compulsory, about 35 per cent. have completed the necessary arrangements for reversal. About 60 per cent. of the alterations or additions necessary for the same are in progress.

There have been four cases where safety lamps were introduced consequent on explosions of firedamp.

A great variety of cage gates have been adopted, usually to suit the idea of the local engineer. Some were rather too light and of flimsy construction. In several cases the gates have been removed and replaced by rigid bars to act as a fence.

The alterations and additions of extra refuge holes, in order to comply with section 44, have necessitated a very considerable expenditure both in time and money. All the collieries have the work well in hand, but probably at hardly any collieries have all the refuge holes been finished.

Attention has been drawn to cases where shafts forming the second outlet were not provided with guides in accordance with section 40 (3), some doubt being at first expressed as to whether such a shaft when minerals were not raised was a working shaft. At several mines where winding engines used for raising or lowering persons were situated in the same house as other engines or machinery, substantial partitions have been erected. No exemptions have been given.

A great deal has been done towards preventing the accumulation of coaldust, but much remains to be done. The cleaning up is now done in a more systematic manner and a record kept. At some mines steps have been taken to box in the downcast shaft up to the level of the heapstead, thus preventing a considerable amount of dust from the screens descending the downcast shaft with the air-current. Watering by means of pipes is still resorted to, and the use of sprays has increased both for maintaining wet zones, and also for damping the coals in the full tubs as the sets leave the landings. At one coalmine a dust-collecting plant is being erected for dealing with the dust on the screens. In addition to the above preventatives, there is a large increase in the number of mines in which fluedust or other non-inflammable dust is being applied to the sides and timber of the haulage roads.

At the majority of mines in Cleveland and Durham brick-lined cavities fitted with iron doors have been made for the storage of grease, oil and canvas brattice cloth, and others are in course of construction. Some doubt has arisen as to what constituted storage, but Mr. Nicholson thinks it is evident that storage takes place if more grease or other inflammable material is kept below ground in larger quantity than suffices for the day's use. One barrel of grease which has been opened is probably more dangerous than two unopened ones, so that in all cases he has regarded a single barrel as storage.

Prior to July 1912 the payment of wages in this district was made fortnightly, and the weekly payment introduced by the Act has at many collieries necessitated the erection of additional buildings and an increase in bill clerks. Payment is usually made on the Friday in one week and on the Saturday in the alternate week.

**Explosives Used.**—In all, 3,821,772 lb. of explosive were used and the estimated number of shots fired, 7,161,395, are classified as follows: By electricity, 3,101,078; by fuse, 376,254; by squibs, 3,684,063. There were 9,301 misfire shots—by electricity, 3,170; by fuse, 737; otherwise, 5,394.

**Safety Lamps.**—There were 67,351 safety lamps in use and the following are additional details:—Number of gauges: one, 33,980; two, 29,798; not stated, 3,573. Whether shielded or not: shielded, 63,733; unshielded, 45; not stated, 3,573. Method of lighting: lead rivet, 26,320; magnetic, 30,745; screw, 10,249; other, 37. Kind of illuminant: colza or colza and petroleum, 53,376; petroleum, 7,519; volatile spirit, 2,371; electricity, 3,577; other illuminant, 508. The figures show an increase of 3,205 in the total number of lamps in use as compared with the previous year. Of this increase, 2,356 lamps were locked by means of lead rivets and 1,203 by magnetic locks. There is also an increase of 1,504 in the number of electric lamps in use. There were 37,826 lamps in which the method of lighting was by electricity, an increase of 3,095. Internal lighters were used in 2,683 lamps, and 26,842 were lighted by the ordinary method of opening.

**Electricity in Mines.**—Electricity was in use at 145 mines, the following being a summary of horsepower:—Surface: winding, 2,149; ventilation, 6,224; haulage, 3,748; coal washing or screening, 6,080; miscellaneous, 9,409—total, 27,610. Underground: haulage, 15,918; pumping, 17,988; portable machinery, 1,550; miscellaneous, 700—total, 36,156.

**Coal Mines Regulation Act, 1908 (Eight Hours Act).**—The general working of the Act is being better understood, and there are fewer cases of overtime. The registers are also entered up in a more regular manner, but at some mines there is still room for improvement.

**Rescue Stations.**—The Central Rescue Station at Elswick continues to do good work, and is kept at a high state of efficiency. Central stations on the same comprehensive lines are in course of erection at Houghton-le-Spring and Crook. The buildings are well advanced, and liquid-air machinery and motors are all ordered, as well as fire engines and motor cars. When these two stations are completed, every coalmine in the true coal measure area will be within a 10 miles radius of one of the above stations.

**Ambulance.**—Fifty teams entered for the divisional competition, but of this number only 38 actually competed at the various centres, or four more than in the previous year. The final competition for the "Bain" challenge shield, cups and medals took place on March 30, in the Town Hall, Durham. Seven teams took part in the final, which resulted in the Sacriston team winning by three marks, Seaham being second. At present the only difficulty standing in the way of establishing a junior competition is that of finance. It would be a fitting tribute and a source of much gratification to Mr. Bain, who has done so much, and continues to work so assiduously for the cause of ambulance in the district, if a slight increase in financial support could be obtained from mineowners and those interested in mines generally, and thus enable a junior competition to become an established fact.

#### IV.—Yorkshire and North Midland District.

Mr. Thomas H. Mottram, in his report on the Yorkshire and North Midland Division for 1912, states that the development of the South Yorkshire coalfield in the neighbourhood of Doncaster is still proceeding. At Rossington,  $3\frac{1}{2}$  miles S.E. of Doncaster, the Rossington Main Colliery Company Limited, who have secured mineral rights over a large area, cut the first sod for a new sinking in June last. At Askern sinkings coal was reached in September by the Askern Coal and Iron



FIG. 14.—SKETCH MAP OF YORKSHIRE AND NORTH MIDLAND DIVISION.

Company Limited, who are making extensive preparations for dealing with a large output. The Bullcroft Main Colliery Company Limited have decided to sink another pit to the Barnsley bed three or four miles east of their present colliery, and the Manvers Main Collieries are now sinking in the neighbourhood of Barnborough. Here and there in different parts of the locality the difficulty of water and running sand has produced a



slight check at some of the pits now being sunk, but this delay can only be looked upon as of a temporary character, for suitable steps are already in progress to combat the difficulty. Meantime some of the leviathan enterprises where coal has been won are still forging ahead, and their continued development must swell the output of the future, and tend to increase the importance of the division already great as a coal-producing centre.

Owing to the many changes and the sudden nature of the accident which caused the loss of three members of the staff, there was naturally some disorganisation in the work and correspondence of the division, and some time elapsed before a considerable part of it could be overtaken. On the top of this there has been a very large increase in the amount of correspondence consequent upon the administration of the New Mines Act, necessitating the assistance of a whole-time secretary in addition to a typist in the Divisional Office in Doncaster. All the mines were, however, inspected, and many of the quarries were visited during the year.

**Persons Employed.**—The total number of persons under different ages employed in and about the coal-mines was 246,503, being an increase of 8,639 in two years, or an increase of 5,221 as compared with the year 1911. This increase was made up of 3,341 underground workers and 1,880 surface workers. Of the total increase no less than 93 per cent. took place in Yorkshire, about 5 per cent. in Derbyshire, and less than 2 per cent. in Nottingham. Of the total persons employed, 152,814, or 62 per cent., were in Yorkshire (West and East Ridings), 54,166, or 22 per cent., in Derbyshire, and 39,456, or 16 per cent., in Nottingham. The persons employed in this division number 22 per cent. of the whole number employed in the United Kingdom.

**Output of Mineral.**—The total output of minerals from mines working under the Coal Mines Acts was

County.	Mines at work.	Persons employed.			
		Below ground. Males.	Above ground.		Below and above ground.
			Males.	Females.	
Derby	155	43,776	10,388	2	54,166
Lincoln	1	67	—	—	67
Notts	57	31,791	7,665	—	39,456
Yorks	417	119,918	32,879	17	152,814
Total in 1912	630	195,552	50,932	19	246,503
Total in 1911	678	192,211	49,071	—	241,282

1. Roland Cook. Fatally Injured
2. E. Froggatt. ditto.
3. T. Cook. Injured
4. J. Purdy. Fatally Injured
5. J. Widdowson. Injured
6. T. Pinnock. ditto
7. E. England. ditto
8. A. Taylor. Uninjured

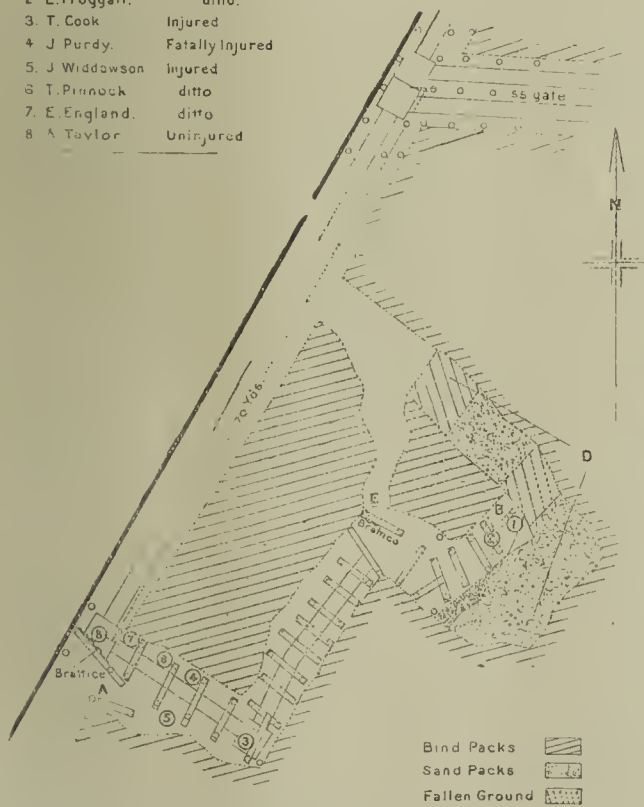


FIG. 15.—BENTLEY COLLIERY EXPLOSION: PLAN OF WORKINGS.

65,389,563 tons, of which no less than 64,881,937 consisted of coal, 92,756 of ironstone, the remainder, 414,870 tons, being fireclay, alum shale, iron pyrites, clay and shale and ganister. Compared with 1911 there was a decrease of 2,140,876 tons, entirely attributable to the strike, which commenced at the end of February and was general throughout the country for a period of about six weeks.\* As the output of the division averaged fully 1,200,000 tons per week during the 46 working weeks, the loss of output occasioned by the strike may be estimated, after making due allowance for an abnormally busy time following the exhaustion of stocks, at about 4,000,000 tons.

It seems most probable that the output of the division will now continue to increase for some time to come, in view of the developments which are still going on in the neighbourhood of Doncaster and Mansfield. Mr. Mottram's predecessor, the late Mr. Pickering, in his report for 1911 mentioned that all the new collieries were being designed for outputs exceeding 1,000,000 tons a year, and that 11 separate colliery companies were then producing 1,000,000 and over. There are now 18 companies with a yearly output ranging from 1,000,000 to 2,366,000 tons.

The following table shows the quantity and value of mineral raised. It is estimated by owners that the

\* Of the total quantity of coal won during the year, 35 per cent. came from the seam variously known as the Warren House, the Barnsley and the Top Hard.

QUANTITY AND VALUE OF MINERAL RAISED.

County	Coal.		Fireclay.	Iron-stone.	Clay and shale.	Other minerals.	Total.	
	Tons.	Value. £	Tons.	Tons.	Tons.	Tons.	Tons.	Value. £
Derby	15,468,880	5,899,685	26,168	99	—	2,784	15,497,931	5,906,254
Lincoln	—	—	—	60,826	—	—	60,826	*
Notts	11,122,832	4,241,499	2,292	—	—	307	11,125,431	4,242,196
Yorks	38,290,215	15,917,824	262,842	31,831	760	119,717	38,705,375	16,062,227†
Total in 1912	64,881,937	26,059,008	291,302	92,756	760	122,808	65,389,563	26,210,617
Total in 1911	66,976,877	—	340,542	93,827	—	119,193	67,530,439	—

\* Included in Yorks.

† Including value of Lincoln ironstone.

amount of dirt excluded (which would have been included in previous years) was 275,173 tons.

The output per person employed was—(a) below ground, 334 tons; (b) above and below ground, 265 tons. The figures for 1911 were 351 tons and 280 tons respectively. In the output of mineral per person employed above and below ground, the county of Derby was again the highest with 284 tons; Nottingham next with 282 tons, Yorkshire coming last with 253 tons. The figures for 1911 were: Derby 302, Nottingham 295, and Yorkshire 267 respectively. This shows the output per person employed in Derby was 18 tons less, in Nottingham 13 tons less, and in Yorkshire 14 tons less.

The figures giving the output for last year are naturally abnormally low owing to the serious labour trouble in the spring, and are of little use beyond showing what effect the strike had upon the average output for each person employed.

Further progress was made in machine cutting during the year. The table given below shows that 6,187,301 (?) tons of mineral were won by machinery, or an increase of 564,659 tons as compared with the preceding year. The number of coal-cutting machines at work increased from 511 to 601, and machines were in use at 135 mines. The value of conveyors is being gradually recognised, as they increased from 45 to 51.

Description.	Number driven by		Statute tons cut by	
	Elec-tricity.	Com-pressed air.	Elec-tricity. Coal.	Compressed air. Coal.
Disc	143	168	1,516,608	2,205,074
Bar	63	45	676,755	662,700
Chain	84	20	852,564	164,639
Percussive	—	78	—	106,081*
Rotary heading	—	—	—	—
Total in 1912	290	311	3,045,927	3,138,494*
Total in 1911	268	243	3,020,222	2,603,032

\* Not including 18,000 tons of ganister and 10,820 tons of fireclay.

TABLE A.

Place and cause.	Fatal accidents.		Non-fatal accidents reported to inspector.*		All non-fatal accidents disabling for more than 7 days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.†	Separate accidents.	Persons injured.
Explosions of firedamp or coaldust	3	94	6	18	4	18
Falls in mine	117	119	529	523	12,134	12,177
Shaft accidents	9	9	22	54	225	249
Miscellaneous underground	62	62	592	538	19,693	19,708
Total underground	191	284	1,138	1,191	32,056	32,152
On surface	34	34	181	186	2,904	2,907
Gross total in 1912	225	318	1,321	1,379	34,960	35,059
Total in 1911	230	240	1,517	1,546	38,751	38,822

\* and † See footnotes to table on p. iii.

An explosion of firedamp occurred at Bentley Colliery, near Doncaster, at 8 p.m. on February 2, and resulted in the loss of three lives and injury to four persons. A gob fire was discovered in the Barnsley seam on the 15th of the previous month between a gate and a cross gate, and probably within a distance of 15 yards from the coal face. Efforts had been and were being made to reach the fire and dig it out by scourgings driven back from the face into the waste. At the time of the accident a scouring, consisting of a roadway 22 yards in length, about 8 ft. wide by 4 ft. to 4 ft. 6 in. high, was being driven from the coal face into the heated area. This roadway is shown on the plan from A to B, and the figures 1 to 8 inclusive show the position of the eight men employed at the mouth and inside the scouring when the explosion occurred. This scouring had been

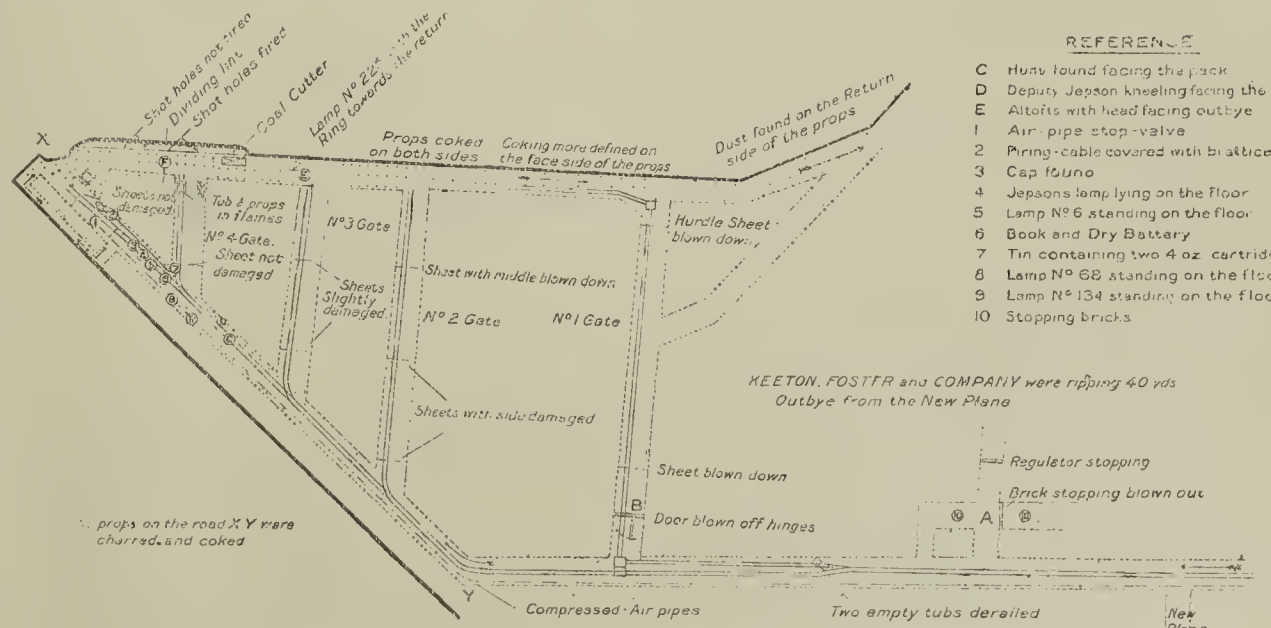


FIG. 16.—PLAN OF WORKINGS AT BARNSELEY MAIN COLLIERY.

**Accidents.**—Compared with the previous year, there was an increase of 78 in the number of lives lost, and a decrease of 169 in the number of persons injured.

The death-rates per 1,000 persons employed were as under:—Below ground, 1.45 (in preceding year 1.09); above ground, 0.66 (in preceding year 0.61); above and below ground, 1.29 (in preceding year 0.99). Illustrated in another way, one out of 681 persons employed below ground; one out of every 1,491 employed on the surface, and one out of every 775 employed in and above the mines lost his life by accident. The county death-rates from all accidents per 1,000 persons employed above and below ground were:—Derbyshire, 0.86 (in preceding year 0.94); Nottingham, 0.61 (in preceding year 0.58); Yorkshire, 1.62 (in preceding year 1.12); Lincolnshire, nil (in preceding year nil).

Compared with the previous year, deaths from explosions show an increase of 91 (88 of which were due to the Cadeby disaster), deaths by falls in the mine a decrease of two; deaths by shaft accidents a decrease of 10, deaths by surface accidents an increase of four. Last year, unfortunately, produced the highest death-rate recorded.

Table A is a summary of fatal and non-fatal accidents, classified according to place and cause.

The year has been a most unfortunate one as regards loss of life by explosions of firedamp, no less than 94 lives having been lost, as compared with three during the previous year.

preceded by another one, D, and the two had met as shown on the plan. There was a hole at the far end of the gob where the men had been working. It pierced through the pack to a cavity, and the hole was half a yard in diameter. The opinion formed by England, an injured deputy, was that some gas, liberated by a fall in the waste, ignited at the fire. The hole referred to was made at the beginning of the shift which started six hours before the accident. With regard to the ventilation of the scouring, the nearest intake air was 12 to 14 yards from where the men were working. Some air had been going in by another scouring which he thought was completely stopped up. (See point E on the sketch.) He agreed there must have been some air in sufficient quantity to have caused combustion, and that it might have gone in by the main scouring. Another deputy named William Chambers, who visited the place soon after the explosion, and remained there for half an hour, stopping up the hole referred to by Ernest England, with sand, said that the hole was about four feet from the floor and communicated with another goaf, and his idea also was that a fall must have occurred in the cavity beyond the hole and brought down gas. Mr. J. R. R. W. n's opinion, after visiting the place and hearing the evidence, was that the old scouring E on the plan was not truly made up but allowed a fair current of air to circulate and go over the pack to the seat of heating. It seems that gob fires had previously been very troublesome in



and had usually occurred at the edge of the pillar. The one being fought at the time of the explosion, however, existed, as previously stated, in a goaf in a longwall working. It had been in existence for several weeks and was fought in the usual way, that is to say, by driving headings into the goaf, removing the hot shale or coal and packing with sand. There was no evidence that gas was ignited in any other way than by coming in contact with live fire, and that there was sufficient air present in the vicinity to induce an explosion goes without saying. The explosion demonstrates the risk involved in fighting a fire in a fiery mine.

At 4.45 a.m. on July 6 an explosion, causing the loss of three lives, occurred at Barnsley Main Colliery in a machine wall in the Haigh Moor or Ardsley seam, which is 2 ft. 10 in. thick. A compressed air coal-cutting machine was at work on a face 100 yards long, some three-quarters of a mile from the shafts. There was apparently a deficiency of air pressure, and at about 3 a.m. the deputy, Walter Jepson, sent one of the three machinemen to the surface to ascertain why the air pressure was so low. Before going, this man, Thomas Moore, informed the deputy that he had drilled four short holes in the face of the coal, which was undercut about four feet. The deputy then withdrew two sprags opposite No. 4 gate (see plan) quite near to the machine, and after asking Moore where the stemming was, said he would fire a shot. During the course of these investigations, Mr. Wilson came to the conclusion, after careful examination of the coked dust and uncoked dust on the face props, that the origin of the explosion was at a certain point on the face marked F on the plan which he termed a "dividing line." The whole of the undermined coal was resting upon the pavement and opposite No. 4 gate; the coal was broken as though a shot had been fired, though no signs of shotholes were to be seen. By July 8, however, a portion of the coal had fallen off the face, and revealed a shothole immediately upon the "dividing line" and 17 ft. away from another hole now visible immediately opposite No. 4 gate. The removal of the coal at the face disclosed behind the original face, and for some yards in length, a slippery break in the roof from which the gas would doubtless issue. On the day of the explosion and following day, Mr. Wilson detected  $1\frac{1}{2}$  per cent. of firedamp along the coal face. The explosive used was monobel powder, fired by No. 6 detonators, and the evidence of the storekeeper, and of the quantity of explosive used elsewhere and still remaining in the canister, proved that two shots must have been fired upon the machine face on the night of the explosion. The fact of the coal-cutting machine being found running can be explained in the light of Moore's evidence, that it had worked intermittently for lack of pressure, and the chargeman, Hunt, had not troubled to shut the valve each time it stopped. The valve was found open after the accident.

Mr. Wilson concluded that the machine had been cutting coal and had been making dust; a fracture in the roof had given off firedamp; the second shot had little to do, and, producing flame, ignited the gas, as well as the dust left in suspension after the first shot. The deceased deputy committed the following breaches of Explosives Order of May 21, 1912, viz.:—The direction of the shotholes was not "marked on the roof or other convenient place"; he did not see that all persons took proper shelter before firing; he was using, unknown to the management, a small dry battery igniter; it is unlikely that he examined the place and all contiguous accessible places before firing the shot.

The management endeavoured to convince the coroner's jury that the machine wheel of the coal-cutter had encountered some pyrites, and, through emitting sparks, ignited some coaldust. The jury were of the opinion that the second shot was the cause of the explosion. It is sometimes held that coaldust at the working face is not fine enough to intensify a gas explosion, but in this case there can be no doubt that it played a very considerable part. As shown on plan, sufficient force developed to displace brick stoppings at a distance of 160 yards from the shot. The deputy is reported to have had instructions from the manager to remove dust before shot-firing, and to have been supplied with a brush for the purpose. There is no evidence to show whether the brush was used or not, but in any case it is clear that whatever steps were taken they proved inefficient to render the dust within the area of shot-firing harmless.

The most serious disaster was that which occurred on July 9, at Cadeby Main Colliery, Conisborough, Yorkshire, belonging to the Denaby and Cadeby Main Collieries Limited, by which no less than 88 persons were killed, including Mr. W. H. Pickering, H.M. divisional inspector of mines, Mr. H. R. Hewitt, H.M. senior inspector of mines, and Mr. G. Y. Tickle, H.M. junior inspector of mines. This disaster formed the subject of a Home Office enquiry, held in Doncaster by Mr. R. A. S. Redmayne, C.B., M.Sc., H.M. Chief Inspector of Mines, by whom a special report was subsequently made to the Secretary of State.\*

There were six non-fatal accidents from explosions of firedamp, which caused injury to 11 persons.

The deaths from falls show a decrease of two, and there was also a decrease of 92 in the number of non-fatal accidents reported to the inspector from this cause. Of the 119 persons killed by falls during the year, 66 were at the working face, 13 were on roads while repairing or enlarging, five on roads while otherwise working or passing, and one in a shaft—the whole representing about 42 per cent. of the total fatalities underground. According to counties, there

were 22 deaths by falls in Derbyshire, equal to 44.7 per cent. of the total underground in that county; 17 deaths by falls in Nottingham, equal to 70.8 per cent. of the total underground in that county; 80 deaths by falls in Yorkshire, equal to 32.38 per cent. of the total underground in that county. The loss of 88 persons in the Cadeby Colliery disaster makes the percentage of deaths by falls in Yorkshire abnormally low as compared with the total number of deaths from all causes in that county.

Two of the accidents, which occurred at Sherwood Colliery, in Notts, and at Tinsley Park Colliery, in Yorkshire, were double fatalities. At Sherwood a main road was being widened in order to comply with section 43 (3) (a) of the Coal Mines Act, the intention being to provide a 3 ft. space between two parallel lines of rails where tubs are coupled and clipped on 50 yards from the pit bottom. The work of widening the road had been proceeding about two and a-half weeks, and it was said that eight new bars, each 13 ft. in length, had been set in place of 10 ft. girders taken out. The accompanying sketch shows the manner in which the timber was fixed up before the accident and reset after-

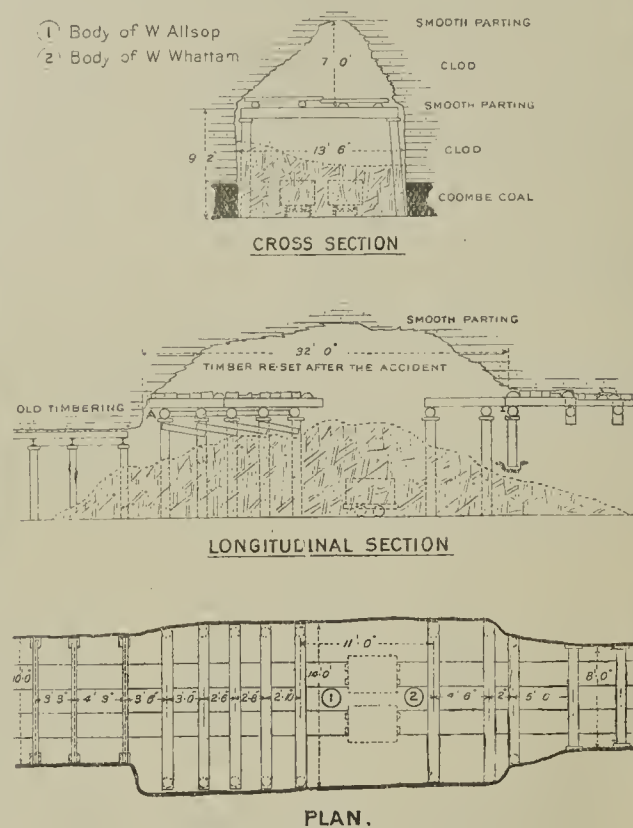


FIG. 17.—SKETCHES ILLUSTRATING FALL OF ROOF AT SHERWOOD COLLIERY.

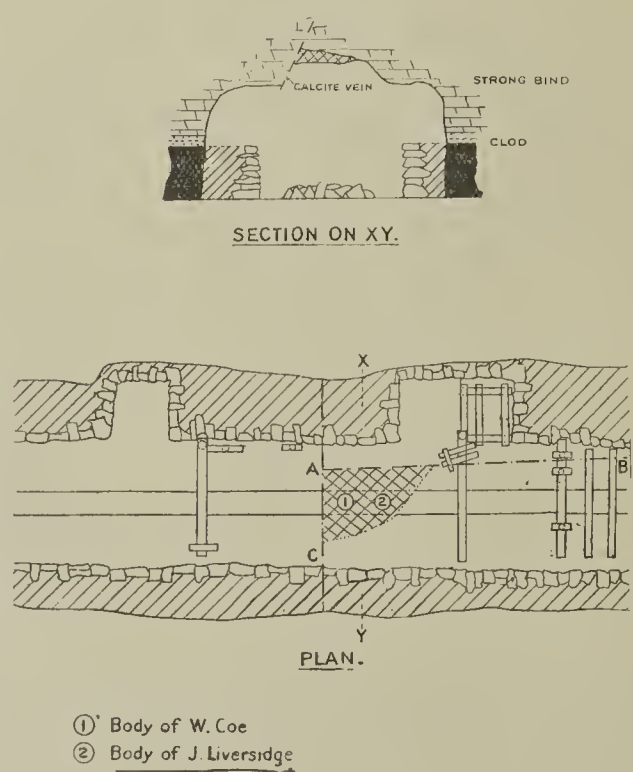


FIG. 18.—SKETCHES ILLUSTRATING FALL OF ROOF AT TINSLEY PARK COLLIERY.

wards, the same wood, with the exception of one bar which was broken, having been again used for the purpose. An old break was discernible, parallel and close to the left-hand side of the road, and this probably caused the accident. The fact that only one of the timber bars was broken, rather points to the collapse of the timbering as having been due to the manner of tying the bars together rather than to want of strength in the timber itself. Struts at A (see fig. 17) would certainly have steadied the new bars.

The double fatality at Tinsley Park occurred in an engine plane dipping 1 in 5 to 1 in 9 in the Barnsley seam, 750 yards from the pit bottom. When the two men concerned were on their way to the pit bottom at the termination of their shift a fall of roof occurred, killing one on the spot and fatally injuring the other. The road was visited by a deputy 20 minutes before the accident, and he appears to have seen nothing wrong. The roof consisted of binds, and collapsed between supports 21 feet apart. The road is said to have been in existence 35 years. Two thin calcite veins, marked

A B and A C, existed as shown on plan, and the fall was, no doubt, due to weathering brought on by the process of time.

Of the 66 fatal accidents by falls at the face the records show that not more than half-a-dozen could be attributed to neglect of the timbering rules. Ten occurred while miners were taking down coal, four while preparing to set timber, 11 while drawing or knocking out timber, the majority of the rest being due to miscellaneous causes, such as slips in the roof, bumps, &c. Although the lives lost in falls were two less than in 1911, this division can lay no claim to any real improvement, for the reason that for six weeks the pits were practically devoid of workers owing to the strike in the early part of the year, and in considering the figures for 1912 this fact should be borne in mind. With a view to enforcing the rules with regard to timbering, 12 workers were prosecuted by owners for failing to set sprags, 11 for not propping in accordance with the rules, and two for not using timber-drawing appliances. Whilst it is unfortunately necessary to prosecute workmen in some instances in order to enforce the rules, there are other points in connection with falls of roof which have an important bearing on the question and should not be lost sight of. For instance, the specified distance apart which the roof supports are to be set and advanced should be reconsidered by the management from time to time, along with any alteration in the character of the roof in any part of the mine. Any lessening of the distance that may be found necessary should not only be published in the statutory notice posted up at the surface, but the men should be thoroughly and persistently impressed by the deputies as to the necessity for setting such supports without delay, securely and discreetly. The compulsory use of bars systematically set under roofs known to contain "slips" would prevent many accidents. It falls to be recorded that, although 6,184,421 tons, or 9.53 per cent., of the output of coal was produced during the year by coal-cutting machines, only one death occurred by falls at the coal face where machines were in use, and this speaks volumes for the comparatively safe conditions produced where the coal face is kept straight and moved regularly, and the timbering is systematically done. With a view to securing the attention of the miners to the propping rules, a clear notice printed on linen has been posted up just outside the gate in every working place at Wharmcliffe Silkstone Colliery. This step should certainly bring home to all workers what the requirements and responsibilities are.

During the year there was a marked improvement in the number of deaths in connection with the working of shafts. Nine persons were killed and 54 injured, as compared with 19 deaths and injury to 31 persons during the previous year.

The fatal accidents under the heading of "miscellaneous underground" numbered 62, involving the loss of 62 lives, as against 67 in the preceding year. One death was from explosives, one from electricity, 47 from haulage, two from suffocation, one from machinery, and 10 from sundry causes.

During the year 47 lives were lost from haulage accidents, as compared with 58 during the preceding year; 39 of the accidents occurred to persons actually engaged in haulage operations, 4 to persons walking to and from their working places, and four were miscellaneous. Of these fatalities, no less than 16 happened to boys between the ages of 14 and 16. Three persons were killed and 13 injured while illegally riding, and one person was killed and 8 injured by going in front instead of behind tubs, while moving them by hand on inclined roads.

There were two fatal accidents due to electricity, one on the surface of Silverwood Colliery, owned by the Dalton Main Collieries Limited, the other underground at the Wharmcliffe Silkstone Colliery Company's pit near Barnsley. In the Silverwood case, which occurred in the coke stamper house connected with a battery of Simon-Carves by-product ovens, the deceased's occupation was that of coke oven labourer, and amongst other duties he had to "set the ram" right for entering the coke into the coking chamber. He had nothing to do with the mechanical parts. The stamper, worked by a  $7\frac{1}{2}$ -horse power motor taking 550 volts alternating current, when travelling 30 ft. backwards and forwards, took its power from three bare wires. When the traverser and coke box were in one position there was a 3 ft. 6 in. gap between the movable building and the coke-oven wall, and on the top of the coke ovens there was a substantial two-railed iron fence. It seems that, after asking an attendant if the coke was nearly ready, a fact which he could have seen for himself, the deceased, in order to get from the top of the coke ovens into the stamping-house, climbed over the iron fence referred to, stepped over the 3 ft. 6 in. gap, and while getting on to the floor of the stamping-house came in contact with live wires and was electrocuted. The fatality at Wharmcliffe Silkstone Colliery occurred to a youth named Henry Gillies on June 20, near an electrically driven coal-cutter in a machine face in the Lidgett seam of coal. The system of supply was 500 to 550 volts D.C. The current for this machine was taken from a distribution board underground, a voltmeter on which registered only 400 volts, due probably to the running of a haulage motor on the same circuit. The gate-end switch was enclosed, and beyond was a metal box having a movable cover containing two open switches, one on each pole. From there the conductors entered a plug connector to receive one end of the trailing cable, which was two core, leather covered, and 80 yards in length. The attachment to the coal-cutter was by means of a plug connector similar in design to the one at the other end of the trailing cable. The coal-cutter, the frame of which was not earthed, was of the bar type driven by a 25-horse power D.C. compound-wound motor, taking about 48 amperes at 400 volts. It

\* Mr. R. A. S. Redmayne, C.B., to the Secretary of State, and circumstances attending the disaster at Cadeby Main Colliery on July 9, 1913.)



seems that the deceased's duty was to clean out the "holings" behind the machine. When kneeling on the damp floor he made contact with the machine haulage rope, which proved to be live, and was electrocuted. Mr. Robert Nelson, H.M. electrical inspector of mines, expressed the opinion that the accident was primarily caused by bad contact between the live parts of the connector and the contacts for the latter at the coal-cutter. In cases of bad contact an electric arc is formed, and Mr. Nelson thought that such an arc, spreading to the side of the machine, had made the whole machine frame "live," and that the youth, Gillies, received the fatal shock from the haulage rope, which was, of course, in electrical contact with the machine. The question arose as to why the coal-cutter machine was not earthed properly. There appears to have been ample time to allow of the new regulation being complied with, for there was already an earth wire laid at the gate-end, and this could have been easily extended to the machine frame. In addition to the above-named fatalities there were 10 non-fatal accidents, causing injury to 11 persons, as compared with no fatalities, and 14 accidents, and injuries to 14 persons during the previous year.

Of the eight non-fatal accidents by electricity, five, occasioning injury to six persons, occurred on the surface, and five, causing injury to five persons, underground. Of the five surface accidents, four happened to electricians or persons in charge of apparatus. Two of the underground ones were caused by persons making contact with defective cables, another being due to a worker accidentally falling with his hand on to terminals while a controller case was open for the purpose of examination.

One person was killed and one person was injured by accidents from machinery underground.

The fatal accidents on the surface numbered 34, involving 34 deaths, or an increase of four as compared with the previous year; six were caused by machinery, six on railways in connection with moving wagons, one by electricity, and 15 by miscellaneous causes.

There were 104 dangerous occurrences reported to the inspector under section 5 of the Notice of Accident Act, 1906. These occurrences were as follow: Ignition of gas or coaldust, 6; underground fires, 47; breakage of winding ropes, chains or other gear by which men are raised or lowered, 25; overwinding while men are being raised or lowered, 18; inrush of water from old workings, nil; miscellaneous causes, 8. Three of the ignitions of gas occurred in mines where naked lights were used; the other two were in safety lamp pits, one being caused by a gob fire, the other through the taking of a candle, contrary to rules, down a sinking pit. Of the underground fires, which include cases of gob-stink, 44 were due to spontaneous combustion, one to electricity, one to blasting, and one to the dropping of a piece of lighted candle on to some holing sprags lying together at the working face. The one classed under electricity was more due to the presence of inflammable material in a motor house than to the actual use of electricity. Four winding ropes broke; one had been in use only a year, another one year and 10 months, another two years and eight months, while the fourth had lasted five years and seven months. None of the overwinds call for special remark, as in most cases safety appliances were in use in the form of detaching hooks and speed controllers.

Three serious outbursts of gas were reported during the year. One of these occurred at Barrow Colliery, near Barnsley, where similar occurrences have previously occurred, in the Silkstone seam, usually termed by the colliery company the New Silkstone, in order to distinguish between the Silkstone belonging to No. 2 pit and to No. 1 pit. About 1.15 p.m. November 6 a blower of gas came off so quickly that the whole of the lamps on the outbye side were put out and the men had to go home in the dark; and in many instances without clothes. In addition to this 15 men, who were making their way to the shaft bottom from other districts, had their lamps put out, and had to come out in the dark. The quantity of air reported to be passing round the district in which the blower occurred was 25,541 cubic feet, which met with a further quantity of air amounting to 26,200, making a total of 51,741 cubic feet per minute. In spite of this a cap 1 in. in height could be got on a safety lamp at the bottom of the upcast pit 2,802 yards from the point of issue. This continued about four hours, when it began to decrease, and five and a-half hours later the cap indicated about 2 per cent., and continued for some weeks, causing the workings in that part of the pit to be thrown idle. When an investigation could be made, a heavy crush was found extending over the faces and across 10 gates, apparently a weight break cutting along the faces without, however, carrying very far back into the roadways. When Mr. Mottram visited the workings on November 11 some of the places were full of gas, and there was still 2 per cent. (lamp test) of firedamp in the air-current near the upcast pit. Another of the outbursts occurred in the same seam at Rob Royd Colliery, also in the Barnsley district, and extinguished 19 lamps out of a total number of 62, belonging to that number of colliers and trammers employed in the district. Three hours later the manager found the return air-current, usually from 22,000 to 22,500 cubic feet per minute, carrying 3 per cent. (lamp test) of firedamp. As in the case of Barrow Colliery, former outbursts have occurred at this colliery from the floor, but in the instance under review the gas came from the roof. The third outburst occurred in the Barnsley seam of Manvers Main Colliery. It was not so extensive as the others, but was sufficient to extinguish a number of safety lamps. Had there been a defective lamp in any of the three cases referred to, the result would have been too disastrous to contemplate.

**Prosecutions.**—In four instances legal proceedings were taken against owners, agents, or managers. These involved 19 charges; five resulted in convictions, 10 were withdrawn, and four were dismissed. The cases of prosecution of workmen by owners and managers for

breaches of regulations were 331, as against 393. Convictions were obtained in 315 cases, and 16 were dismissed. As compared with the previous year there is a decrease of 62 in the number of cases, and of £9 1s. 9d. in the amount of fines. As compared with the previous year there was practically no diminution in the offences with regard to want of care while using safety lamps, and no less than six cases out of 36 came from Cadeby Main Colliery alone. There was an increase of eight charges in regard to the offence of taking matches, &c., into the mine. Of the 35 persons convicted for not attending to the timbering, five men were charged and found guilty of not withdrawing timber from the waste in mines liable to gob fires.

**Coal Mines Act, 1911.**—As to the new provisions relating to firemen, deputies and examiners, no applications were received during the year for exemption from the requirement that the fireman should devote his whole time to his statutory duties. No steps, other than enquiries, have been necessary to ensure that section 14 (3), which limits the size of a district over which the fireman has statutory control, is being carried out. The regulation has so far been well observed. The arrangements made by the approved authorities in this division have, on the whole, been satisfactory; the totals for the division, under the different headings, are as follow: full certificate, 3,180; air measurements and hearing only, 13; certificates for gas testing and hearing only (existing firemen), 4,112; certificates as to hearing only (existing firemen employed in non-gassy mines), 67; candidates who failed, 439. With regard to the failures, many of them were re-examined, some a second and third time, and passed; but there are no available figures to show how many of the candidates who were examined originally are still unqualified.

The systematic searching of workmen for matches and other prohibited articles in accordance with section 35 (2) has not, in a number of cases, been put into operation as expeditiously as one could wish. While many managers have most willingly instituted a system of selection, some owners interpreted section 35 as not requiring a daily search, however small the number of workmen selected might be. Moreover, they contended that a daily search would lead to considerable irritation amongst the men, and in mines where there was only a small amount of inflammable gas such stringent provisions were unnecessary. There have been no complaints from men where daily search has been in operation for some months; and so far as mines in which there is little inflammable gas are concerned, the ignition of only a small quantity might, in the presence of coaldust, produce disastrous results. Mr. Mottram has, therefore, informed those owners who have so read the Act that the Act requires a search to be made each day, and that he cannot approve of any system of selection which does not operate daily, and that the following system will meet with his approval:—

(a) In the case of a shift, the number to be selected daily shall be at least 10 per cent. of the total number of persons forming the shift.

(b) The order in which men are selected shall be constantly varied, so that a man going down the pit will not be able to tell whether he is likely to be searched or not.

(c) There shall be a surprise general search (*i.e.*, a search of all persons in the shift) once at least every quarter.

(d) Every person not forming part of a shift shall be searched on each occasion on which he goes down the pit.

In one or two cases managers have described the searching of officials as objectionable, and consider it a practice to which they ought not to be subjected. On the other hand, others have welcomed the search as being an excellent check to prevent lucifer matches being taken into the mine.

The sampling of air was not begun until after the necessary apparatus was received and the vacancies caused in the staff by the Cadeby disaster had been filled. Thereafter, until the end of the year, only about 200 samples of air were procured, but the work is now progressing more briskly. In a few cases where the stipulated percentages were found to be exceeded, or where the state of ventilation was shown by the analyses to be defective, attention was drawn to the matter either by the inspector who took the samples or by myself, and steps were taken by the management to improve matters.

The new Explosives Order is being observed, though there have been numerous complaints that the stringency of its provisions delayed (1) the necessary ripping of main roads, (2) the making of additional manholes, because blasting operations in large mines can only now be done in main haulage roads and main intake airways during the week-end, which is the only time when the limit of 10 persons, in addition to those engaged in firing shots, is not exceeded. The amendment in the Order of October 15, 1912, gave some relief as regards the ripping in roadways, but only to those mines, few in number, where mechanical power is used for the purpose of hauling mineral from the face.

In accordance with the Order issued in March, holders of a first-class certificate as mine manager got their certificate endorsed in all cases where satisfactory evidence was produced of at least two years' practical experience in the surveying of mines. There were 191 certificates endorsed in the division during the year. In addition to these endorsements, 164 surveyors' certificates (which might be termed certificates of service) were issued to surveyors who were employed as mine surveyors at the time of the passing of the Act (December 16, 1911).

It has been found so far that in the majority of pits the ponies are well cared for, both as regards wholesome feeding, housing and general comfort. The inspectors have, however, in several instances, had to direct attention to such cases as (1) badly fitting harness, (2) pony

working in an unfit condition through harness galls or abrasions, (3) boys riding on ladders or shafts when pony ascending incline with load, (4) stables not ventilated with intake air, not partitioned off, and properly drained, (5) every horsekeeper not signing daily report, (6) employment of blind pony, (7) indications of harness rubbing roof, showing roads to be of inadequate height. In some cases, if more attention were given to the fitting of the harness there would be fewer harness galls or abrasions and ponies rendered unfit for work. In one instance, the repairs of the harness were found to be let by contract, and at that pit the condition of the harness was unsatisfactory. On the whole, the regulations in Schedule iii. are being observed, and special attention will be directed to those pits where any irregularities are discovered in order to see that the cause of complaint is removed, and that such places are, as near as possible, brought into line with those where ideal conditions prevail. Allegations have been made that ponies are sometimes overworked. In some pits it is not an uncommon occurrence for ponies to be worked eight and 10 shifts of eight hours each per week, but as to whether this entails cruelty, much depends on the conditions under which the work is done, for temperature, weight of load, inclination and length of roads travelled, are all factors to be considered. Under favourable conditions, ponies well fed and looked after, even though working a double shift, with an interval of half-an-hour between the shifts, are to be found looking fat and well. The total number of horses in use underground was 17,063; 520 died from injury and 221 from disease; 441 were destroyed in consequence of injury and 497 in consequence of disease (117 by reason of old age or of being worn out); in addition 2,702 cases of injury and 139 cases of ill-treatment were reported.

The prescribed report books are used in most, but not all, mines. At some small mines there was delay in obtaining a supply, and at some others books are being supplied containing all the prescribed information, but not exactly in the prescribed form. The reports in some respects appear to be fairly well kept, but the firemen's reports as a rule are not as they should be. It has been realised at many collieries that such reports as are prescribed by section 64 (3) stipulate that "a full and accurate report specifying whether or not, and where, if any, noxious or inflammable gas was found" must be made, and that this entails reporting the lesser percentages than 2½ per cent. of inflammable gas when found. This has been pointed out at many collieries, as, however small the cap, the fireman should report it. The reports on the state of roadways with regard to coaldust were in many cases found to be unsatisfactory in respect that they did not agree with the actual conditions existing in the mine. Attention is being constantly drawn to the matter and general improvement is now being found.

The new provisions in section 16 as to inspection on behalf of the men do not so far appear to have caused any increase in the number of inspections. In 1911 38 notices of inspections were received, and in 1912 33. It should be pointed out, however, that in 1912 the pits were idle close on two months, and that each inspection made extended as a rule over several days, and the numbers given represent the collieries inspected. It is probable that the numerous inspections now being made by the inspectors of mines may cause fewer inspections on behalf of the men than formerly was the case.

The requirements as to a plan of the ventilation are generally being complied with. The smaller collieries, as a rule, were behind, but attention is being given to the matter.

There has been considerable delay at some collieries with regard to the provision of means for reversing the air current, required by the Act to have been installed by January 1 last, and at 80 mines no means have yet been provided. Steps have been taken to remind the owners of the requirements of the Act, and many of them have informed Mr. Mottram that the matter is under consideration with a view to complying as soon as possible, while others complain of their inability to get delivery of new fans now on order.

There has been no case in which the use of locked safety lamps has been required under section 32 (1) (b) of the Act. The provisions of section 34 as to the examination of safety lamps are being very well carried out, but a record of the men to whom the several lamps are given out has been found wanting at some collieries. In such cases the officials' explanation was that no prescribed book in which to keep the record had been issued. Section 36 of the Act does not stipulate that a book of prescribed form must be used, but simply states that a record shall be kept. It would, no doubt, be more convenient to keep the record in a book, and this is being already done at most collieries.

As regards section 40 (3), (4), (6), (7), (8), (9), (10), (11), with reference to the question of winding apparatus. Dealing with the subsections in the order given, (3) requiring the use of guides in working shafts above 50 yards in depth, and over 100 yards in the case of sinking pits, is being carried out. (4) With reference to keps. These are provided at the surface, and where formerly in use at intermediate landings they have been taken out. At one colliery a running platform, which automatically falls away from the shaft in which the cage hangs free, was substituted for keps at an intermediate landing. (6) Requiring the winding engine used for lowering and raising persons to be completely separated by a substantial partition from every other engine. No case (excepting two or three in which applications for exemption have been received and are now under consideration) has been brought to notice where this regulation is not being complied with. (7) Catches to prevent tubs falling out of the cage, and rigid hand-bars for use of persons while riding have been provided. These appliances, however, were in use practically in all cases in this division before



et came into force, but compliance with the pro- requiring the closing in of the cage at two sides been somewhat slow on account of difficulties encountered in deciding upon the most suitable form to adopt for the particular cage in use. The gates vary considerably in design, but those in common use are given in the following illustrations:—

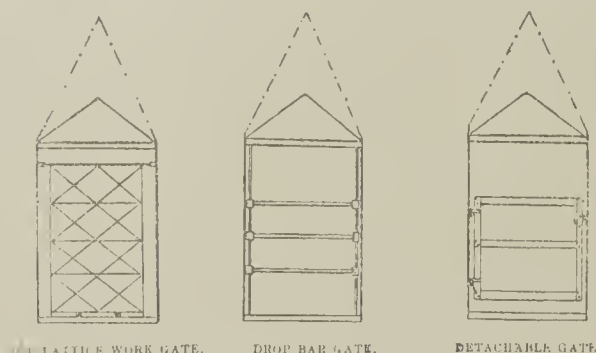


FIG. 19.

(8) Rods are seldom used in this division for the purpose of connecting the cage to the winding rope, and, where used, springs are provided. (9), (10), and (11) complied with.

In many pits the refuge holes required by section 44 have been provided. In others, however, where haulage roads are long, and where a considerable amount of blasting requires to be done in hard rock, operations have been retarded by the Explosives in Coal Mines Order, the time for doing such work being limited to week-ends, when less than 10 men, in addition to those employed in blasting operations, are present in the mine. This section has entailed a considerable amount of work in a good number of mines, as in addition to the construction of numerous entirely new manholes many of the existing holes have had to be deepened and many have required to be changed from one side of the road to the other.

With reference to steps taken by owners in this division, with a view to the prevention of accumulations of coal dust by section 62 (3). These vary at different collieries, and may be enumerated as follows:—(a) Sweeping up of old accumulations and removing the same from the mine—in many cases the dust is afterwards used as fuel for firing the boilers; (b) construction of dust tubs having tight sides and bottom; (c) dust collection appliances to prevent dust descending the shaft where the screening arrangements are close to the pit top; (d) stonedusting with shale and flue dust; (e) watering the roadways; (f) application of calcium chloride, "non-flam," &c. In a good many mines sweeping up the dust has been vigorously adopted, but in others little has been really systematically done. Consequently there is much room for improvement in this respect, though the clearing away of dry dust should not be done when blasting operations are in progress. In old and extensive mines where, previous to the passing of the new Act, little had been done towards dealing with the dust, the clearing of roadways has proved rather a big business. In some of these cases whole-hearted measures have been taken, while in others there has been delay and want of system in carrying on the operations; and, where roads have been fairly well cleared, some managers have failed to realise that the roads are still quite unsafe unless systematically watered or stone dusted. Following the circular issued by the Home Office on October 3 last, more attention has been paid to the question of stonedusting main roads. At about 30 collieries this method of treatment is being practised by the creation of zones in some places and by more liberal treatment in others, but with a few exceptions the owners are apparently slow to provide the necessary machines for the preparation of dust suitable for the purpose, consequently the treatment of the roads falls far short of the system in vogue at Messrs. Pope and Pearson's collieries at Altofts, where Dr. Garforth has for a considerable time now practised an ideal method of stonedust treatment at a very small cost.

No action has been necessary in this division with regard to the weekly payment of wages, as wages appear to have been paid weekly for a considerable time.

**Explosives Used.**—No less than 43 different kinds of explosives are used in the coalmines of this division. Of these 37 are permitted explosives. The total quantity of explosives used was 1,609,100 lb., being an increase of 61,913 lb. as compared with the preceding year. The estimated number of shots fired was 3,379,517, being a decrease of 128,815. The number of missed shots was 6,476, showing that there was one missed fire in 522 shots. Of the estimated number of shots fired, there were fired by electricity, 2,936,238; by fuse, 442,066; by squibs, 1,213; total, 3,379,517. Of the missed shots, 4,999 were fired by electricity, 1,428 by fuse, and 49 by squibs.

**Safety Lamps.**—The total number of safety lamps in use was 218,993, being an increase of 7,637, as compared with the preceding year. It will be noticed that the number of portable electric lamps now in use is 4,608, as compared with 922 in 1911 and 69 in 1910. The following are details:—Method of locking—lead rivet, 140,753; magnetic, 58,924; screw, 19,253; other, 63. Kind of illuminant—colza or colza and petroleum, 18,911; volatile spirit, 30,413; other illuminant, 23,453.

**Mines.**—Electricity was in use at 317 mines. The following shows a summary of aggregate Surface—winding, 657; ventilation,

3,947½; haulage, 2,088; coal-washing or screening, 16,836; miscellaneous, 18,729; total, 42,257½. Underground—haulage, 24,132; pumping, 11,880; portable machinery, 7,250; miscellaneous, 2,353; total, 45,615.

**Eight Hours Act.**—On the whole the Act has been complied with. There have, however, been casual complaints about cases in which (1) men working on Friday afternoon repairing shift have returned to work on Saturday morning, not to avoid Sunday labour, but to gain a full week's work without working on a Saturday afternoon, when workmen as a rule wish to take a holiday; (2) men being kept in the pit longer than the specified time to facilitate the work of coal-cutting by machinery. As to (1), this matter has been remedied when the attention of the manager has been drawn to the fact that the employment of such men on a Saturday morning was a violation of the 1908 Act. With regard to (2), the answer arising out of a question on this point, recently put by Mr. Hancock, M.P., in the House of Commons, is quoted as a guide to managers of pits where coal-cutting machines are employed.

**Rescue and Aid.**—The central rescue stations in this division are at Tankersley, Altofts and Wath in Yorkshire, and Mansfield in Nottinghamshire. Others are being built at Rotherham and Wakefield, while a third new one is expected to be ready at Brierley, near Barnsley, within six months. The proposal to erect one in Doncaster has assumed a practical form. The various colliery companies in the district have decided upon a plan. A site has been selected, and the station, within a mile of the town, is to be built on quite up-to-date principles. Sub-stations are also projected for Chesterfield and Ilkeston in Derbyshire, in order to bring the whole of the mines in the division within a radius of 10 miles from a central rescue station. At Mansfield, where the Meco apparatus is in use, a trial is to be given to the Aerolith or liquid-air apparatus. A liquid-air plant will be installed and 15 sets of apparatus provided, so that a comparative test can be made, under the same conditions, of compressed oxygen and liquid air. Upon this test the equipment of the projected sub-stations at Chesterfield and Ilkeston will depend to a large extent, and this may delay somewhat the completion of them. Good work continues to be done by the Yorkshire Collieries Ambulance League. Life-saving certificates were granted to three colliery employees who had been instrumental in saving life at colliery accidents by rendering first aid. In addition, 14 certificates of merit were granted in cases where meritorious first-aid had been rendered. Towards the end of the year a new association was formed in Yorkshire, bearing the name of the Dinnington and District Ambulance Association, to serve Manton, Shireoaks, Kiveton Park, Waleswood, Thurncroft, and Maltby collieries. The great value of ambulance corps, a number of which are maintained at some of the colliery centres, was amply demonstrated by the assistance rendered at the time of the Cadeby disaster by the Denaby Main Ambulance Corps of the St. John Ambulance Brigade.

#### V.—Manchester and Ireland District.

Mr. Gerrard, in his report on the North and East Lancashire and Ireland district, states that the production of coal (10,416,174 tons) for comparison with previous years may have 131,096 tons added, this representing the estimated quantity of dirt picked out in the screens. Six firms estimated the quantity of dirt picked out. Of greater moment, however, than this was the total stoppage for six weeks in March and April. The comparative difference is 482,424 tons less than in the previous year. The quantity which might be debited to the stoppage (1½ million tons) would be somewhat reduced if deductions were made for the acceleration prior to and following the stoppage. The value of the coal raised at the pit's mouth was 9s. 8½d. per ton, being 9'79d. per ton more than in the previous year. But the values are not comparable; various deductions and additions have been made, to comply with the directions given on the forms for the annual return now made by every owner.

**Persons Employed.**—The following table shows the number of persons employed:—

County.	Persons employed.					Above and below ground.
	No. of mines.	Below Above ground.			Fe-	
		ground.	ground.			
			Males.	Males.		
<i>N. and E. Lancashire ...</i>	214 ...	39,113...	10,413...	866...	50,392	
<i>Ireland.</i>						
Antrim.....	1 ...	7...	1...	— ...	8	
Kilkenny.....	7 ...	396...	122...	— ...	518	
Leitrim.....	2 ...	14...	3...	— ...	17	
Queen's Co. ....	2 ...	67...	45 ...	— ...	112	
Roscommon .....	3 ..	93...	7...	— ...	100	
Sligo.....	1 ...	3 ...	1...	— ...	4	
Tipperary .....	4 ...	54...	22 ...	— ...	76	
Tyrone.....	1 ...	18...	9 ...	— ...	27	
Totals (Ireland)...	21 ...	652 ..	210...	— ...	862	

**Output of Mineral.**—The following shows the output of mineral in North and East Lancashire:—

Mineral.	Quantity (statute tons).	Value at the mine per ton.	Total value.
Coal	10,416,174	9 8½	4,039,295
Fireclay	109,974	3 8½	20,426
Brick shale	24,829	2 6	3,104
Iron pyrites	421	5 7½	119
Sandstone	360	2 0	36
Totals	10,551,758	—	5,062,980

The output per person employed below ground was 269'77 statute tons, above and below ground 209'39 statute tons. The quantity of coal raised was 604,521 tons less than in the previous year, net quantity. The value is 9'79d. per ton more.

The following table shows the quantity of coal cut by machinery:—

Description.	Number driven by		Statute tons cut by	
	Electricity.	Compressed air.	Electricity.	Compressed air.
Lancashire.				
Disc—Diamond	—	21	—	—
Gillott and Copley	—	15	—	—
Bar—Pick-quick	5	6	—	—
Chain—Hopkinson	3	2	—	—
Percussive—Siskol	—	89	—	—
Hardy	—	17	—	—
Totals	8	150	64,200	477,827

Ireland.  
Bar—Pick-quick 1 — 350 —  
At 42 mines coal-cutting machines used. Six coal face conveyors were in use.

The output of mineral in Ireland was as under:—

	Coal.		Fireclay.	
	Statute tons.	Value. £.	Statute tons.	Value. £.
Antrim	900	—	—	—
Kilkenny	49,028*	—	—	—
Leitrim	4,200	—	—	—
Queen's	15,012*	—	—	—
Roscommon	11,968	—	—	—
Sligo	150	—	—	—
Tipperary	8,540*	—	—	—
Tyrone	500	—	4,800	780
Totals	90,307	50,359	4,800	780

\* Anthracite, 72,589 tons, value £41,553.

The total quantity of coal was 90,307 tons, of which 72,589 tons were anthracite—an increase, compared with the previous year, of 5,623 tons. The output per person employed below ground was 145 tons, per person employed above and below ground 110'3 tons.

**Accidents.**—In North and East Lancashire there were 51 fatal accidents, causing the death of 52 persons. Of this number, 48 accidents occurred underground, causing 49 deaths; three fatal accidents occurred on the surface, causing three deaths. In the previous year there were 52 fatal accidents, causing the death of 54 persons. Briefly noticing the fatalities, there occurred; from an ignition of firedamp and air one accident, causing one death; from falls of side eight accidents, causing eight deaths; from falls of roof 21 accidents, causing 22 deaths; within shafts, one accident, causing one death. From miscellaneous causes underground there were 17 accidents, causing 17 deaths; of these two accidents were by explosives, 15 were in haulage, five from ropes or chains breaking, nine were run over or crushed by trams and tubs; one by haulage rope. On the surface, by machinery one death, one on a tramway, one from falling on pit bank. In Ireland there was no fatality.

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents.		Non-fatal accidents reported to inspector.*		All non-fatal accidents disabling for more than 7 days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.	Separate accidents.	Persons injured.
N. & E. Lancashire.						
Explosions of firedamp or coal dust	1	1	0	1	1	1
Falls in mine	29	30	83	85	2,546	2,548
Shaft accidents	1	1	4	4	39	40
Miscellaneous underground	17	17	102	105	4,668	4,678
Total underground	48	49	189	195	7,254	7,267
On surface	3	3	35	35	541	542
Gross total in 1912	51	52	224	230	7,795	7,809
Total in 1911	52	54	214	226	9,151	9,163
Ireland.						
Falls in mine	—	—	3	3	26	26
Shaft accidents	—	—	—	—	1	1
Miscellaneous underground	—	—	2	3	25	26
Total underground	—	—	5	6	52	53
On surface	—	—	—	—	8	8
Gross total in 1912	—	—	5	6	60	61
Total in 1911	1	1	3	5	27	28

\* and † See notes to table on page iii.

The death rate from accidents per 1,000 persons employed in Lancashire was:—Below ground, 1'252; above ground, 0'266; below and above ground, 1'031. The death rate in Lancashire per million tons raised was for underground workers 4'643; under and above ground, 4'928. The number of tons of mineral raised per death underground was 215,342; above and below ground, 202,918. The number of persons employed underground per life lost was 798; number employed above ground per life lost above ground was 3,760; number employed above and below ground per life lost was 969.

The following shows the hours of the shift in which the accidents happened:—In the first hour, eight fatal, 28 non-fatal; in the second hour, four fatal, 33 non-fatal; in the third hour, four fatal, 36 non-fatal; in the fourth hour, seven fatal, 33 non-fatal; in the fifth hour, six fatal, 25 non-fatal; in the sixth hour, nine fatal, 35 non-fatal; in the seventh hour, five fatal, 21 non-fatal; in the eighth hour, eight fatal, 14 non-fatal. The hour of shift in which the greater number of accidents reported is seen from the above to be the sixth hour.

The one fatal ignition occurred at Ladyshore Colliery, near Bolton, on February 26, about 1 p.m., and caused the death on the following day of James Fletcher, 37, fireman. Deceased opened his lamp to get it lit, having



lost his light whilst endeavouring to remove firedamp in a narrow heading in the Two-yard seam. The gas was so mixed with air that probably the force was not very great, and there was no coaldust, so the lives of a number of persons in the immediate neighbourhood were spared. The Wolf lamp was one of the old type, phosphorus paste tape.

Eight fatalities resulted from falls of side, three less than in the previous year. Five of these occurred in the working place, from the coal face; the other three occurred in roadways. In seven cases there were either no sprags, or an insufficient number, or else the sprags having been taken out, and the coal not having fallen, further undermining was being done without first resetting the sprags. Twenty-one accidents occurred from falls of roof, causing 22 deaths, three deaths less than in the previous year. Fifteen occurred in working places; seven on roadways whilst repairing. In five cases props were being knocked out, using a short hammer; the men had not the chance to get away, being so near to the disturbed prop. In four cases the falls were from pot holes, in six cases from pronounced slips or breaks.

On the surface three accidents occurred, causing three deaths. One accident was in connection with machinery. Another fatality occurred on a surface tramway: Following on a sharp frost, the endless chain drew the tubs very slowly. The deceased rode in an empty tub, putting salt on the rails; in a blinding snowstorm blowing in his face, he probably lowered his head and failed to see a bridge crossing the tramway, and was crushed against the bridge. Under the Notice of Accidents Act the following dangerous occurrences were reported:—One ignition of gas by a bobbinit shot in a tunnel at Jubilee Colliery; eight occurrences in connection with winding in shafts, ropes, &c.; and two fires. Twelve cases of nystagmus came under notice.

*Prosecutions.*—There were no prosecutions by the inspector. The prosecution of workmen by owners numbered 37, 11 owners taking proceedings for breach of rules.

*Coal Mines Act, 1911.*—The following observations refer to the conditions existing up to the end of the year 1912; since that date considerable progress has been made in providing the required appliances, &c.

In regard to the new provisions relating to firemen, deputies and examiners, except in one or two isolated cases, where there was difficulty owing to the long distance to be travelled to a single place, these provisions have been observed. Up to December no applications for exemptions were received. Except in these instances, no case has come under notice of a district being too large to prevent a fireman making his inspections in a thorough manner. Generally the arrangements made by the approved authorities in the district have been satisfactory. Various questions have arisen, e.g., the test by smoke to ascertain the amount of air in an air current, the having to work out the measurements and not merely to measure, &c.

Certificates were granted to 2,098 men in North and East Lancashire, 301 failing. In Ireland, 43 candidates passed and one failed.

The system of selecting workmen to be searched which has been approved is:—

- (a) In the case of a shift the number to be selected daily shall be at least 10 per cent. of the total number of persons forming the shift.
- (b) The order in which the men are selected shall be constantly varied, so that a man going down the pit will not be able to tell whether he is likely to be searched or not.
- (c) There shall be a surprise general search (i.e., a search of all the persons in the shift) once at least in every quarter.
- (d) Every person not forming part of a shift shall be searched on each occasion on which he goes down the pit.

Quite a number of new mechanical ventilators have been and are being erected; 232 air samples were taken; every safety lamp mine has been sampled. The results show the mines are well ventilated. As regards methane, the following percentages were found, all in return air after leaving working places:—1.03, 1.32, 1.1, 1.05, 1.16, 1.0, 1.19, 1.67, 1.19, 2.67. As regards carbon dioxide, all in the return after leaving working places:—0.27, 0.25, 0.28, 0.24, 0.26, 0.25, 0.27, 0.38, 0.25, 0.27, 0.28, 0.36, 0.68, 0.70, 0.26, 0.62, 0.53. As regards oxygen, none below 19, very few below 20.

The general observance of the new Explosives Order came late in the year. In some mines compulsion has been necessary to get the men to bring their unused explosives to the surface. By the end of the year, Mr. Gerrard thinks, the Order was fully observed.

The number of first-class certificates of competency endorsed for surveying was 81; the number of persons practising surveying in mines to whom surveyors' certificates were granted, 74.

Only one case of ill-treatment came under notice in the year 1912. In North and East Lancashire the average number throughout the year of animals working underground was 286; the number having died from injury by accident, 3; from disease, 6; the number requiring to be destroyed in consequence of injury, 6; in consequence of disease, 2; the number of cases of injury reported to the manager, 10, exclusive of the cases of death by accident and the number requiring to be destroyed in consequence of injury. In Ireland—co. Kilkenny—16 horses were employed underground, but this number is much reduced at the present time from the flooding of the mine. One animal died from disease, and one had to be destroyed in consequence of old age.

The use of prescribed books for reporting is very general; the reports in the firemen's books are full and detailed. It would be greatly appreciated if, for small mines, smaller report books could be supplied.

A number of applications were made for exemptions under the Rescue and Aid Order up to December 31, 1912. Two applications were granted and two refused.

As to inspection on behalf of the men, at the mines of the Hulton Colliery Company and the Wigan Coal and Iron Company regular inspections are made; this is an innovation at the latter. There are also several mines in which occasional inspections have been made.

No cases have occurred in which safety lamps have had to be required; in all the mines where they are required they are used.

Wages are paid weekly throughout the district.

*Explosives Used.*—The total quantity of permitted explosives used during the year was 429,163 lb., which is less than the previous year by 15,696 lb. The estimated

Complaints are very general that suitable labour is unobtainable, and Mr. Wilson is assured from all quarters that a reasonable output is not being maintained owing to the large number of workers who daily absent themselves from the mines; 25 per cent. to 30 per cent. of absentees is very common.

*Output of Minerals.*—The total output of minerals under the Coal Mines Act was 15,992,874 tons, of which 15,894,156 tons was coal and the remainder 98,718 fireclay and other minerals. Taking counties, West Lancashire decreased 2.2 per cent., Cheshire 11.3 per cent., Denbigh 4.9 per cent., and Flint 7.8 per cent. It is estimated by the owners in West Lancashire that the amount of dirt excluded, which would have been included in previous years, was 43,000 tons.

County.	Coal.		Fireclay.	Ironstone.	Other Minerals.	Total.	
	Tons.	Value (£.)	Tons.	Tons.	Tons.	Tons.	Value (£.)
Cheshire .....	270,844	118,576	19,669	—	—	290,513	121,899
Denbighshire .....	2,547,378	1,135,400	29,846	—	3,400	2,580,624	1,142,724
Flintshire .....	703,371	310,100	5,890	—	30	709,291	311,155
Lancashire, West .....	12,372,563	5,529,856	33,671	—	6,212	12,412,446	5,533,867
Total in 1912 .....	15,894,156	7,093,932	89,076	—	9,642	15,992,874	7,109,645
Total in 1911 .....	16,402,349	—	94,172	341	1,872	16,498,734	—

total number of shots with permitted explosives was 1,033,299, which is 9,077 more than in the previous year. The number of shots with permitted explosives is 87.88 per cent. of the total number. The estimated number of shots electrically fired, 1,018,000, is 3,074 more than in the previous year, and is 98.52 per cent. of the total number. The total quantity of non-permitted explosives used during the year, 71,336 lb., is 11,252 lb. less than in the previous year. The estimated number of shots of non-permitted explosives, 142,473, is 25,253 less than in the previous year. The total number of shots, permitted and non-permitted, was 1,175,772. It has been estimated that in North and East Lancashire 734 shots fired electrically missed fire; and of those fired by fuse, 434. In Ireland 15 shots fired by fuse are estimated to have missed fire. Mr. Gerrard has no hesitation in saying that many more missed fire, as the accounts are not carefully kept. The average percentage is 0.134. At one colliery where gunpowder is largely used there were 41,140 shots, of which 240 were missed fires = 0.583 per cent. At the Hulton Collieries the hydraulic cartridge is successfully operated; last year it was used in 6,112 shots.

*Safety Lamps.*—The number of safety lamps in use was 49,945, subdivided as follows:—Method of locking, lead rivet, 41,103; magnetic, 5,411; screw, 204; padlock, 227; kind of illuminant—colza or colza and petroleum, 31,946; petroleum, 2,878; volatile spirit, 8,729; electricity, 373; other illuminant, 3,019. The number of lamps lighted by electricity was 9,247; by tape igniters, 3,096 (Wolf lamps); by ordinary means, 34,602.

*Electricity in Mines.*—Electricity was used in 72 mines in Lancashire and one mine in Ireland. The following shows the aggregate of horse-power:—Surface: Winding, 110; ventilation, 830; haulage, 246; coal-washing or screening, 1,167; miscellaneous, 2,052½; total, 4,405½. Underground: Haulage, 2,666; pumping, 3,097¾; portable machinery, 234; miscellaneous, 437; total, 6,434¾.

*Rescue Stations.*—The Central station at Howe Bridge, Atherton, built by the Lancashire and Cheshire coal-owners for the training of men in the use of breathing apparatus, has now trained 793 men, approximately 159 teams. Of these there are 236 fourth-year men, 271 third-year men, 286 second-year men. Several substations are to be erected in various parts of the county, in addition to the provision of admirable premises at the mines for practice.

VI.—Liverpool and North Wales District.

Mr. J. R. R. Wilson, in his report on the Liverpool and North Wales district, states that the output of coal decreased during the year to the extent of 508,193 tons; this was entirely due to the trade dispute in the early part of the year, when the mines were idle for six weeks. The whole of the mines in the district were inspected underground during the year, many of the coalmines being frequently visited. All the important quarries have been inspected and the larger ones visited several times at regular intervals. Altogether 882 inspections were made at coalmines, 577 of these being underground inspections. Of metalliferous mines, 230 underground inspections and 77 surface inspections were made; 894 visits were made to quarries.

*Persons Employed.*—The total number of persons employed in and about the mines under the Coal Mines Act was 71,057, being an increase of 828 as compared with 1911. Underground the increase was 596, being accounted for by increased activity in the counties of Lancaster (West) and Denbigh, from which the bulk of the output in this district is raised. There was again a slight decrease in the number of persons employed in Cheshire and Flintshire. Above ground the increase was 232, being entirely in Lancaster (West) and Denbigh.

County.	Mines at work.	Persons employed			Below and above ground.
		Below ground.		Above ground.	
		Males.	Females.	Males.	
Cheshire .....	15	831	250	—	1,081
Denbighshire .....	29	10,154	2,171	4	12,329
Flintshire .....	16	2,730	640	—	3,370
Lancashire, West .....	149	43,258	9,217	1,802	54,277
Total in 1912 .....	209	56,973	12,278	1,806	71,057
Total in 1911 .....	219	56,377	12,064	1,788	70,229

The total value of the coal raised in this inspection district was £7,093,932, which is equal to 8s. 11d. per ton, being an increase of 7d. per ton upon the estimate for the previous year.

The average quantity of mineral raised during the year per person employed below ground was 281 tons, while the average quantity produced per person employed above and below ground was 225 tons, as compared with 292 tons and 238 tons respectively for the year 1911. The mineral raised per person employed below ground in each county is as follows:—Cheshire, 351 tons; Denbighshire, 254 tons; Flintshire, 259 tons; Lancashire (West), 287 tons.

The number of coal-cutting machines in use has again increased. There were 148 at work in 1912, being an increase of seven worked by electricity and three worked by compressed air, as compared with the figures for the year 1911. The output from all the machines was 1,270,645 tons, or an increase of nearly a quarter of a million tons on the previous year.

Description.	Number driven by		Statute tons cut by	
	Electricity.	Compressed air.	Electricity.	Compressed air.
Disc .....	7	62	79,341	670,777
Bar .....	12	14	131,581	247,861
Chain .....	4	—	38,877	—
Percussive .....	1	48	1,500	100,708
Rotary heading .....	—	—	—	—
Totals .....	24	124	251,299	1,019,346

There were five coal face conveyors in use.

*Accidents.*—During the year notice was received of 383 accidents. Of these 87 were fatal accidents, involving a loss of 93 lives, as compared with 75 accidents and 7 deaths during the preceding year. The non-fatal accidents, which caused injury to 305 persons, numbered 296, as compared with 428 persons injured by 387 accidents in 1911.

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents.	Non-fatal accidents reported to inspector.*	All non-fatal accidents disabling for more than 7 days.
	Separate accidents. Deaths.	Separate accidents. Persons injured.†	Separate accidents. Persons injured.

Explosions of firedamp or coaldust .....	51	128	131	4,136	4,154
Falls in mine .....	2	5	11	27	33
Shaft accidents .....	19	20	114	6,457	6,462
Miscellaneous underground .....	72	78	247	10,620	10,649
On surface .....	15	15	49	941	943

Gross total in 1912 .....	87	296	305	11,561	11,592
Total in 1911 .....	75	428	428	13,204	13,265

\* and † See footnotes to table on p. iii.

The death rates per 1,000 persons employed were as under:—Below ground, 1.36 (in preceding year, 1.26); above ground, 1.06 (0.64); above and below ground, 1.30 (1.11). The county death rates from all accidents per 1,000 persons employed above and below ground were:—Cheshire, 0.92 (in preceding year, 1.89); Denbighshire, 0.64 (1.41); Flintshire, 2.07 (0.86); Lancashire, West, 1.41 (1.04); for whole district, 1.30 (1.11). The record, unfortunately, is worse than that for 1911, particularly in the case of Flintshire. The total number of persons employed in this county was, however, only 3,370, so that a slight increase in the number of fatalities very seriously affects the percentage ratio.

The number of deaths from falls, compared with the previous year, has increased from 42 to 56. The number of persons injured, on the other hand, is less by 29 than that reported to the inspector during the year 1911. Of the persons killed by falls during the year, 24 were working at the coal face, 25 were employed repairing or enlarging roads, and seven were otherwise working or passing on roads; the whole representing 74 per cent. of the total fatalities underground. West Lancashire has even exceeded this figure, and the percentage reached 84. The most serious accident from falls in this county caused the death of three men, two of them



ing firemen. Several men were engaged enlarging a way to form an underground fan-engine house, and unfortunately they exposed a very large area of roof. While preparing to set timber a large fall of stone, measuring some 12 ft. by 10 ft. by 6 in. to 10 in. thick, occurred, killing three men and injuring a fourth. In exposing such a large area of roof the fireman in charge (who was killed) is said to have acted contrary to instructions received from the management. Many of the accidents were due to "slips," and several can be attributed to neglecting to set proper supports. Again and again attention is drawn to the opinion that a more liberal use of bars rather than single props would considerably reduce the death-rate.

There was one fatality by explosives, and this happened to a chageman and shotfirer. Deceased had fired three shots in a stone drift, and apparently only two of them exploded. He was drilling another hole, and accidentally bored into the charge and exploded the miss-fired charge; when he was found, the compressed air percussive drill was upon the pavement, but still working. Seven men were injured by the use of explosives, and in each case as the result of being struck by pieces either of stone or coal.

Four firemen met their deaths by deliberately going into vitiated air.

There is fortunately a reduction in the number of persons killed by haulage accidents; last year the fatalities were 12, as compared with 20 in 1911. The non-fatal accidents reported to the inspector also show a satisfactory reduction, being 76 as compared with 105 in 1911. Two were injured while illegally riding, and three persons were injured by going in front instead of behind tubs while moving them by hand on inclined roads.

The fatal accidents upon the surface are treble those of the previous year, though the number of deaths is only one more than double; 15 persons were killed, as compared with five accidents and seven deaths during 1911.

Fifteen dangerous occurrences were reported under section 5 of the Notice of Accidents Act, 1906, and were as follow:—Underground fires 5, breakage of winding ropes, chains, or other gear by which men are raised or lowered 9, overwinding while men were being raised or lowered 1. Of the underground fires, three were due to spontaneous combustion, and whilst inspecting on the return airway side of one of these fires, two firemen lost their lives through being overcome by fumes from the fire; one was due to a coke fire in a bucket igniting some brattice cloth, and the remaining one was probably caused by part of an unexploded cartridge remaining in a shothole.

One failure of a winding rope is included among the breakages; in another case the drum shaft broke while men were being raised in a furnace shaft, and a number of men in the cage were held in the shaft for four hours before they could be raised by a hoppit—water being meanwhile passed down in bottles.

*Prosecutions.*—It is difficult to assign a reason why the number of prosecutions should vary so enormously from year to year. In 1910 the number was 19, in 1911 it reached 75, and in 1912 it was down again to 25. The fines inflicted in these 25 cases amounted to £19 12s. 6d. and the costs to £9 12s. More than half of the offences were connected with the contravention of the provisions about matches and smoking.

*Coal Mines Act, 1911.*—In the Liverpool and North Wales District every endeavour seems to have been made to carry out the provisions of the Act. At one large colliery Mr. Wilson was informed that over £5,000 had been spent up to the end of the year in order to comply with the new provisions. The section defining the size of refuge holes has been found peculiarly onerous at many places. At one up-to-date colliery where the refuge holes were already within the stipulated distance apart, the generous dimensions, which were looked upon with pride by the officials, necessitated an expenditure of £600, because reducing the width quite altered the distances between them. The requirements of the Act weigh heaviest upon those mines with the least perfect organisation.

In this district the new provisions relating to firemen, &c., have made very little difference, as, at most of the mines, the districts were already of such a size that proper attention could be given to them and, moreover, the officials confine themselves to their proper duties. It is now a pleasure to meet in the pits men who, in testing for firedamp, are prepared to argue about differences of volume between one and two per cent. Examinations for firemen's and shotlighters' certificates were held at Wigan, St. Helens, and Ashton-in-Makerfield in Lancashire, and at Wrexham, Mold, and Holywell in North Wales. The following shows the results of the examinations for firemen's and shotlighters' certificates:—Passed in gas testing, hearing, air measurement, 1,518; air measurement and hearing, 13; gas testing and hearing, 1,504; hearing only, 7; number of persons who failed, 261.

The power of searching for matches and other prohibited articles was, until the coming into force of the Act of 1911, only allowed by special rule. In Lancashire a special rule not only existed, but was in active operation, and at a large number of collieries a daily, though somewhat perfunctory, search was made of everyone who descended the mine. At the whole of the mines in the district a daily systematic search of at least 10 per cent. of the persons descending upon each shift is now being carried out. In addition, all persons who descend between shifts are examined, and a general search of everybody employed underground is carried out every month. The method varies. At a few collieries workmen are searched upon the surface before entering the cage, but at most of the mines the search is done in the pit bottom, and usually a load is examined at one time. That the

searching is necessary has been abundantly proved by the number of pipes and matches found since the system came into operation. Men will continue to smoke on the way to their work, and it would reduce the risk of these forbidden articles being taken into the mine if each person were allowed to deposit his smoking equipment in the lamp-room upon the number represented by his safety lamp.

The new provisions in the Mines Act as to the employment of boys, girls and women were not being strictly carried out in several instances, many managers being under the impression that as the hours of surface labour were now so short a full half-hour for breakfast was not absolutely necessary.

The new provisions respecting ventilation, though not so stringent as those under the German mining regulations, now clearly define when the ventilation is adequate for the purposes of working. It is a matter for congratulation that in only one mine in this inspection district has as much as one quarter per cent. of firedamp been found in a main intake airway 100 yards back from the working face. In the return airways, too, the quantity of firedamp and carbon dioxide, found by analysis of samples taken, has in no case been abnormal. Altogether over 400 samples of air have been taken. The provisions of the Act as regards sampling have had the very useful effect of causing managers also to sample and analyse the air of their mines, and in this way to find where leakages, in many senses of the word, were occurring.

As regards the provisions requiring means to be provided for reversing the air current wherever necessary in this district either means have been provided, or the work necessary to carry out the requirements is in actual operation. At by far the larger number of mines the fan casing has been altered so that the fan, while continuing to revolve in the same direction, will draw in fresh air at the centre, and eject it from the periphery over the casing into the upcast shaft. At one or two mines, by means of a second drift, the air can be exhausted from the downcast shaft. In other cases steam jets have been placed in the downcast shaft, and wherever this has been done the experiment has been tried, usually at a week-end, of reversing the ventilating current. The results have been very varied, and exceedingly interesting. As a rule, the air current was reversed almost immediately, and officials were able to inspect the working faces without any difficulty. In one or two cases the working places were fouled by firedamp from the goaves. The quantities of air obtained varied from 25 per cent. to 75 per cent. of the normal amount. The whole of these experiments, whatever the means of reversal, are very valuable as showing what would happen under the varied conditions when the necessity arises for reversing the air current. It has been suggested that reversing the air current would tend to dislodge the fine dust accumulated in the roads, and so carry it away towards the shaft. Mr. Wilson has made careful enquiries about this, and in no case has the alteration of the direction of the air had the slightest effect upon the dust.

Under the Order made on February 27, 1912, 55 managers' certificates of competency have been endorsed to the effect that the holders have had at least two years' practical experience of surveying, and 72 certificates have been granted to surveyors who were employed in that capacity at the time of the passing of the Coal Mines Act.

There appears to be every disposition to carry out the provisions of the new Explosives Order in their entirety. Small storehouses for holding the surplus of explosives have been built near the entrance to the mine at a large number of collieries, and much more care is taken about clearing away coaldust before firing shots. The Order has somewhat retarded the provision of new refuge holes. The requirements, however, are being observed, and the number of shots fired in main roads has sensibly diminished.

The new regulations in Schedule III. of the Act are being observed, but as comparatively few horses are employed in the district it has not been necessary to engage many additional horsekeepers. As a whole the horses are well cared for, and in nearly all cases the stabling is as it should be. There has been considerable delay in the provision of eye guards, as managers found it difficult to select a guard which was at the same time efficient and without danger to the horse. In the district 1,579 horses were used; 12 died from injury and 10 from disease; 25 were destroyed in consequence of injury and 23 in consequence of disease (seven in consequence of old age); in addition, there were reported 94 cases of injury and two cases of ill-treatment.

No case has arisen during the past year where it has been necessary to enforce the use of safety lamps, but the number of mines where naked lights are in use is very small.

With regard to the examination of safety lamps, the lampman makes the first examination, and he also keeps a record of the names of the persons to whom the lamps are delivered. At most of the collieries a tally bearing

a number—not necessarily that of the lamp—is given with the lamp, and this tally is left in some cases in charge of the banksman, and at others in charge of the official or onsetter, who examines the lamp at the pit bottom. There is a lack in the district of some good system of thoroughly checking the men into and out of the mines. The systems that are in use would hardly bear the strain of a sudden emergency.

The provision as to accumulations of coaldust has been met in a variety of ways, depending very largely upon the way the coaldust danger appeals to the manager. There is no doubt that the danger is now recognised, and it is rare to find accumulations of dust upon the pavement of the roadways. Usually the dust is filled into tubs and sent out of the mine, and at many collieries a careful account is kept of how many tubs are filled in this way. Water sprays are in use at some of the collieries belonging to the large firms. Stonedust has been applied to the roads in the mines of a few of the more progressive proprietors, and at two collieries elaborate arrangements are installed for exhausting the dust from the screens. At a few places sprinklers are fixed to play water upon the screens; at others, water is used at the tipplers. The great danger arising from the finest dust descending the downcast shaft and being carried considerable distances inbye is not recognised so thoroughly as it ought to be. Boarding up one or two sides of the shaft would often tend to very largely reduce the quantity of dust getting into the mine, and whenever Mr. Wilson has suggested this remedy the proposal has been readily accepted and carried out. At one or two of the larger mines, water sprinklers have been fixed in the downcast near the shaft top, and the dust then falls to the bottom and is periodically cleaned up.

*Explosives Used.*—In all, 1,132,601 lb. of explosives were used, and the estimated number of shots fired, 3,394,085, are subdivided as follows:—By electricity, 3,339,641; by fuse, 54,444; by squibs, *nil*. Of the miss-fired shots, 3,135 were fired with electricity, and 174 with fuse.

*Safety Lamps.*—The number of safety lamps in use was 66,817. Of these, 23,495 were equipped with single gauze and 43,118 with double gauzes; 60,003 were shielded and 6,610 unshielded; 55,960 were locked with lead rivet (20 with screw also), 10,258 by magnet, 83 by screw, and 576 by other means. The illuminant used was in the case of 49,220 lamps colza or colza and petroleum, 8,674 petroleum, 1,906 volatile spirit, 204 electricity, and 6,813 other illuminant; 21,325 were lighted by electricity, 858 by internal igniters, and 44,634 by opening.

*Electricity in Mines.*—Electricity was in use at 82 mines, the aggregate horse-power being as follows:—Surface. Winding, 25; ventilation, 1,111½; haulage, 255; coal washing or screening, 1,304; miscellaneous, 1,309; total, 4,004½. Underground: haulage, 5,686; pumping, 4,132½; portable machinery, 409; miscellaneous, 820½; total, 11,048.

*Rescue Stations.*—The position in the district as regards rescue stations is much as it was. Howe Bridge central station is the only one actually in use, but the Wrexham station is well-nigh completed and should be ready for work in a few months' time. Sub-stations are arranged for at Denton, St. Helens, and Skelmersdale, and when these are erected all the collieries will be within reach of one or the other.

#### VII.—South Wales Division.

Dr. W. N. Atkinson, in his report on the South Wales Division, states that during the year 1,728 official visits to mines were made by the inspectors, 1,493 of which included underground inspections, and 462 visits were made to quarries. Clerical and office work require constant attention and was considerably increased by the requirements of the new Mines Act, and the additional number of inspectors.

*Persons employed.*—The first table shows the number of mines worked, and the number of persons employed under the Coal Mines Act.

County.	Mines at work.	Persons employed.				Below and above ground.
		Below ground.	Above ground.	Males.	Females.	
Brecon	25	2,042	600	7	—	3,549
Carmarthen	71	9,539	2,501	—	—	12,040
Glamorgan	398	129,311	22,375	90	—	151,776
Monmouth	122	49,450	8,208	60	—	57,718
Pembroke	6	339	108	5	—	452

Total in 1912	622	191,581	33,792	162	—	225,535
Total in 1911	649	188,349	32,383	155	—	220,887

The figures show a total increase over the preceding year of 4,648 persons employed, which is equivalent to 2.1 per cent.

*Output of Mineral.*—The next table shows the output of minerals from mines under the Coal Mines Act:—

County.	Coal.		Fireclay.	Iron-stone.	Clay and shale.	Other minerals.	Total.	
	Tons.	Value. £	Tons.	Tons.	Tons.	Tons.	Tons.	Value. £
Brecon	736,221	425,955	91	—	—	—	736,312	425,969
Carmarthen	2,217,927	1,246,227	11,028	—	—	—	2,228,955	1,249,457
Glamorgan	33,727,100	19,071,058	68,885	9,207	751	6,099	33,812,042	19,086,823
Monmouth	13,391,742	7,113,999	77,368	11,052	2,410	828	13,483,400	7,135,368
Pembroke	43,274	33,804	—	—	—	—	43,274	33,804
Total in 1912	50,116,264	27,891,043	157,372	20,259	3,161	6,927*	50,303,983	27,931,421
Total in 1911	50,209,727	—	131,744	17,505	6,560	1,300	50,356,776	—

\* Including 728 tons of Ganister.



The figures show a decrease of minerals raised, from the preceding year, of 52,793 tons, equivalent to about 1 per cent. It is estimated by these owners that the amount of dirt excluded (which would have been included in previous years) was 151,659 tons.

Of coal classed as anthracite the output was 4,353,010 tons, being an increase of 360,247 tons.

The output of mineral per person employed below ground was 262.5 tons; above and below ground 223.0 tons.

The following table shows the number of coal-cutting machines:—

Description.	Number driven by		Statute tons cut by	
	Elec- tricity.	Com- pressed air.	Elec- tricity. Coal.	Compressed air. Coal.
Disc .....	7	6	55,861	26,505
Bar .....	37	34	252,377	211,677
Chain .....	4	1	27,117	300
Percussive .....	2	21	866	17,896
Rotary heading .....	—	2	—	430
	50	64	335,721	256,808

The above machines were used in 45 mines. The figures show an increase of one coal-cutter, but a decrease of 130,952 tons of minerals cut from the preceding year. There was an increase of four conveyors, the total being 47.

**Accidents.**—The total number of accidents reported was 1,376, of which 293 accidents caused the deaths of 306 persons; one of these fatal accidents (with one death) occurred in 1911, the death resulting after the statistics for that year were closed. The total number of persons injured by reported accidents was 1,147. There was no accident causing large loss of life. One fatal accident resulted in five deaths, one in four deaths, one in three deaths, and four fatal accidents resulted each in two deaths, the remainder were all single fatalities.

The death rates were as follow:—Per 1,000 persons employed above ground 1.060, below ground 1.409, above and below ground 1.356.

The following is a summary of fatal and non-fatal accidents, classified according to place and cause:—

Place and cause.	Fatal accidents.		Non-fatal accidents reported to inspector.*		All non-fatal accidents disabling for more than 7 days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.†	Separate accidents.	Persons injured.
Explosions of firedamp or coaldust .....	4...	13...	24...	56...	24...	48
Falls in mine .....	141	142...	479...	485...	12,414	12,464
Shaft accidents .....	20...	21...	18...	27...	166...	171
Miscellaneous underground .....	93...	94...	415...	430...	13,506	13,532
Total underground..	258...	270...	937...	998...	26,110	26,215
On surface.....	35...	36...	150...	153...	2,309	2,311
Gross total in 1912...	293...	306...	1,087...	1,151...	28,419	28,526
Total in 1911.....	302...	313...	1,082...	1,170...	31,273	31,406

\* and † See notes to table on p. iii.

Twenty-eight explosions or ignitions of firedamp, resulting in 13 deaths and injuries to 56 persons, were reported during the year, being an increase of three accidents, eight deaths, and 22 persons injured over the preceding year.

At the Bedwas Colliery, Mon., on March 27, at 11.30 a.m., an explosion of firedamp occurred by which 12 men were burnt, from the effects of which three of them subsequently died. The colliery was a new one, opening out in the Black Vein, at a depth of nearly 800 yards, and the workings were of very limited extent and were all narrow drivages. The main east level on which the explosion occurred was driven for a distance of 140 yards from the North pit, which was the upcast shaft. The ventilation was natural, assisted by a small fan driven by compressed air placed at the bottom of the North pit. At the time of the explosion this fan

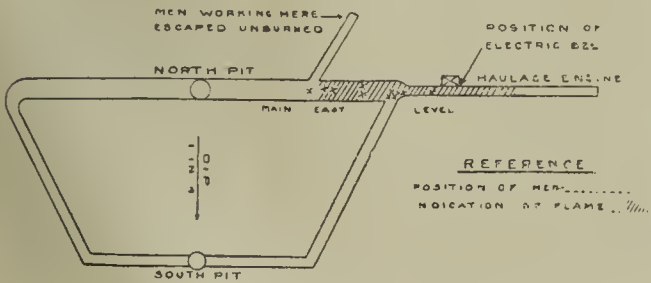


FIG. 20.—PLAN OF WORKINGS AT BEDWAS COLLIERY.

was only used for ventilating a rise heading, turned off the east level at a distance of 35 yards from the shaft, and outside the area affected by the explosion. The inner portion of the east level, for a distance of 68 yards, was ventilated by compressed air conveyed in a range of 1 in. pipes. A small haulage engine also worked by compressed air conveyed in a separate range of pipes, was fixed by the side of the east level at a distance of 54 yards from the face. About 7.15 a.m. four shots for blowing down the roof had been fired on the east level, about 15 yards out-by of the haulage engine, and both ranges of air pipes were broken by the rock blown down. This disabled the haulage engine and destroyed the ventilation of the inner portion of the level. While the work of repairing the pipes was in progress, firedamp accumulated at the face of the level and gradually worked back to the haulage engine. The

manager was on the spot and was one of those injured by the explosion. Immediately before the explosion an electric signal bell at the engine was heard to ring, and one of the injured men said he was looking towards the bell at the moment and saw a flash of flame, after which he was burnt and could remember no more. The ringing of the bell was not intentional, and was probably caused by the signalling wires being accidentally brought in contact with each other, by men who were preparing places for doors further out on the level. No great force was developed by the explosion, but indications of flame could be traced for a distance of about 70 yards along the level, 20 yards in-by, and 50 yards out-by from the electric bell. The level was rather damp and was practically free from coaldust. The electric bell, of trembler type, was worked by an induction coil and a battery of eight Lécclanché cells placed near the bell. The battery produced current at 11½ volts pressure when tested after the accident. It was afterwards proved experimentally that sparks from this bell when rung by a current at 11½ volts would ignite an explosive mixture of lighting gas and air, and the mixture was also fired by sparks from signalling wires produced by a current of only 4 volts pressure. Dr. Atkinson believes this explosion at Bedwas Colliery to be the first recorded case of a colliery explosion caused by sparks from signalling apparatus, and it is curious that another (non-fatal) explosion due to the same cause occurred at another colliery later in the year. It has become the practice recently to carry the electric signals nearer to the working faces than was formerly done, this increasing the probability of firedamp coming in contact with the bells or wires. The new electrical special rule No. 15, requiring extra precautions where gas is likely to occur, partly meets the danger, and should be strictly observed in fiery mines.

On April 17, about 6.5 a.m., an explosion of firedamp, which caused the loss of four lives and more or less serious injuries to four others, occurred at the Trane pit, Gilfach Goch, belonging to the Britannic Merthyr Coal Company Limited. The shaft is 15 ft. in diameter, and was sunk to a depth of 332 yards about 25 years ago and then abandoned. The present company acquired the property and commenced to deepen the shaft in July 1911. It was completed to a depth of 462 yards in March 1912. Another shaft 20 ft. in diameter, called the Llewellyn Pit was being sunk, and was down 115 yards. It had passed through the No. 3 Rhondda seam,

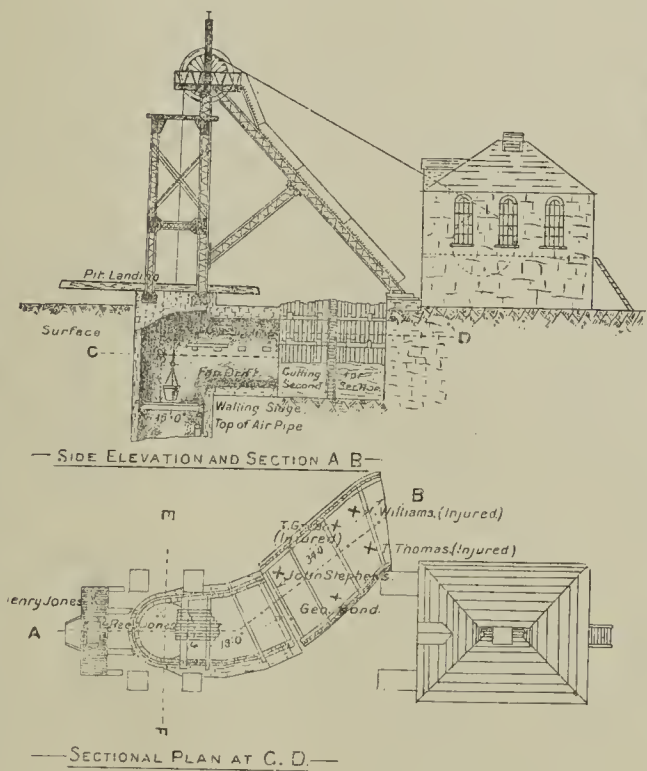


FIG. 21.—PITHEAD ARRANGEMENTS AT TRANE COLLIERY.

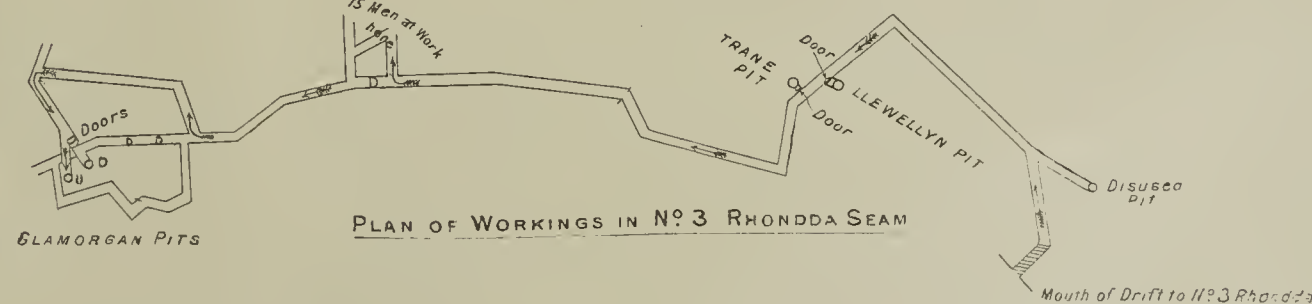


FIG. 22.—PLAN OF WORKINGS IN NO. 3 RHONDDA SEAM, TRANE COLLIERY.

where a connection was made from the Trane pit to an old level in that seam, by which there was also a connection with the surface by an old drift, and to the Gilfach Goch pits of the Glamorgan Coal Company. At the inset of the Trane pit to this road a door was fixed opening towards the level, and at the Llewellyn pit inset there was also a door. When sinking was in progress at the Trane pit, the shaft was ventilated by a fan on the surface, forcing air down a column of 24 in. pipes, which proved sufficient to dilute the small blowers met with. The amount of firedamp given off by the seams and strata was not excessive. About the end of March a scaffold, which had been used during the lining of the shaft as a walling stage, was fixed in the shaft 32 ft. below the surface landing stage, for the purpose of forming a fan drift; it was supported by 12 iron bolts let into the shaft walling. The scaffold

was circular in form, leaving a space of 2 in. between the sides of the shaft, and there was also a space of 1 in. to 1½ in. wide between the two halves of the scaffold along its diameter. These apertures around the edge of and across the scaffold would in the ordinary course be more or less completely blocked up by debris caused by the work carried on on the scaffold for a fortnight before the explosion. No examinations or tests for gas below the scaffold appeared to have been made. The scaffold was 2 or 3 feet below the bottom of the fan drift, the first length of arching for which was finished. When the scaffold was fixed, the ventilating pipes were disconnected at a joint 3 or 4 feet below the scaffold. On the day before, before the explosion work was suspended at 5.30 p.m., and no one appears to have been on the scaffold afterwards, until immediately before the explosion, which occurred a few minutes after a bowk containing seven men had been lowered on to the scaffold. The explosion completely demolished the scaffold and killed four and injured three of the men on it, and a man on the pit landing was also injured. Considerable damage was also caused about the pit top. It was said that three or four separate explosions were heard, the last report being the most violent. The explosion appears to have been due to the ignition of an explosive atmosphere under the scaffold, probably by a match lighted for smoking by one of the men.

It cannot be doubted that when the air pipes were disconnected below the scaffold, and the shaft for all practical purposes sealed near the mouth by a staging or scaffold, that firedamp issuing from the seams and strata in the shaft gradually accumulated until it rendered the air under the scaffold inflammable and explosive. The management, however, held that the portion of the shaft between the scaffold and the connection at the No. 3 Rhondda inset, a depth of 45 yards from the surface, was ventilated by a leakage of air up the shaft from the adit level. Considering, however, that the air passing along the No. 3 Rhondda level was drawn by a fan to the upcast shaft at Gilfach Goch, it is difficult to understand why any of it should go up the Trane pit, even if there had been no door at the inset, and no scaffold in the shaft. The effect of the fan would rather have been to draw air down the Trane pit. The management also advanced a theory that firedamp had accumulated in the column of air pipes, the bottom of which were in water, and that this gas was ignited by a match or cigarette falling through the scaffold, and that the flame passed down the pipes and ignited an explosive mixture filling the shaft below the No. 3 Rhondda seam. Why the gas should come up the pipes only is difficult to understand. The only other way by which an explosive mixture below the No. 3 Rhondda seam could have been ignited would require the transmission of some means of ignition from the scaffold to a point in the shaft more than 35 yards below, which also appears improbable.

Proceedings were taken against the agent, assistant agent, and manager for a breach of section 49, rule 1, of the Coal Mines Regulation Act, 1887, in not ventilating the Trane pit shaft. Mr. Kenshole, on behalf of the agent and manager, argued that the scaffold upon which the men worked was the only working place in this shaft, and this being in the open air, was properly ventilated. In addition he called evidence to prove that down to the No. 3 Rhondda seam there could have been no firedamp in an explosive condition in view of the leakage of air up the shaft, and that fire of some kind was dropped down the shaft 30 yards and ignited the explosive mixture. The stipendiary, in giving his decision, stated "that the ventilation was adequate from the No. 3 seam up to the scaffold upon which the men were working," and dismissed the cases with costs.

On May 18 (Saturday), about 1.40 p.m., an explosion of firedamp occurred in the North sinking shaft of Markham Colliery, causing the death of five persons, four of whom were on the surface, and injuries to two others, one of whom was also on the surface. Firedamp was not known to be present in the shaft, and none had been reported throughout the sinking, but since the explosion there has been considerable trouble with gas in the shafts at Markham Colliery. When the

explosion occurred, a violent blast came up the shaft which demolished the runner and an adjacent cabin, and did considerable damage to the iron lattice headgear. The body of one of the victims on the surface was hurled 60 or 70 yards away, and was much mutilated, another was blown 40 yards away, one was blown into the headgear, and one fell down the shaft. The means by which the firedamp was ignited can only be surmised. A spent match was found on the floor of the lodge-room, and this appears the most probable cause. The only other possible means of ignition would be an electric spark. The only lights in the shaft were the electric cluster hanging out of reach above the scaffold, and the Fors portable battery, with flexible cable and hand lamp, on the scaffold. There was a weak point about this apparatus, in that the cable was attached to the battery by simply pushing three plugs into receiving holes, and



if these plugs were accidentally pulled out a spark would be produced. It was stated, however, that the battery was not run down at the time of the explosion.

September 21, at midnight, a trammer was so badly injured by an explosion of firedamp, ignited by a match, that he died on November 15 from septic pneumonia. Three colliers were also burned. The explosion occurred at a longwall face, when a squeeze occurred which formed a crack in the roof from which the gas exuded.

At Bargoed Steam Coal Colliery, Monmouthshire, on February 22, at 9.45 a.m., three colliers were burnt by an ignition of firedamp, caused apparently by a defective safety lamp. Firedamp had accumulated at the face of a level in the Yard seam at a longwall face, and in a hole on the side of the level; the ventilating arrangements at the time being insufficient to remove the gas. The flame of the explosion appeared to have travelled about 15 yards along the face. Locked lamps of the Clanny type were in use, and one of the lamps, hanging on a post 9 or 10 feet from the face, was found to be defective, owing to the absence of a rivet for fastening the bottom of the gauze to a metal ring, leaving a hole  $\frac{7}{16}$  in. in diameter. This rivet was one of three, and one of the others was so loose that it was easily pushed out. Fortunately the locality of the explosion was wet or damp, or the result of the explosion might have been much more serious. Rivets do not appear to be a trustworthy method of securing the gauzes of safety lamps. This is the second explosion Dr. Atkinson has known to be caused by such rivets dropping out.\*

At Caepontbren Colliery, Carmarthen, on November 1, four men were burnt by firedamp ignited by an electric spark from signalling apparatus. The accident occurred on the main slant 110 yards from the bottom, in disturbed ground, where there had been a general squeeze and recent repairs. Gas had not been previously reported at the place, but a considerable issue was found there after the accident. There was no naked light in the vicinity. The men who were burned were all within 6 yards of each other; one of them, a mechanic, was testing the signalling apparatus, just after a journey of trams had been lowered to the place, and when he joined the wires the gas was ignited. The bell and battery were within a few feet of the place. The signals were worked by two batteries, one of 16 L  clanch   cells in the engine-house, and the other of 12 cells near the bell. This was the second case of ignition of firedamp by signalling apparatus in the division during the year, and, so far as Dr. Atkinson believes, they are the only cases on record.

At Gwaunclawdd Abercrave Colliery, Brecon, on November 12, at 2 p.m., four men were burned by an explosion of firedamp caused by the firing of a shot of bobbinit. The shot was fired in anthracite coal at a longwall face, and was said to consist of  $\frac{1}{2}$  lb. bobbinit in a hole 3 ft. 6 in. long. There is no doubt there was gas above the shot when it was fired, and the flame produced communicated with more gas in a hole in the roof 18 yards distant, to which point three of the men had retired for the firing of the shot.

By falls of ground there were 141 fatal accidents and 142 deaths; 479 reported non-fatal accidents, causing injuries to 485 persons. Six of the persons killed and 24 of those injured were boys under 16 years of age. The loss of life by falls was 19 less than in the preceding year. In several mines the maximum distance for timbering has been reduced during the year.

Twenty fatal shaft accidents caused 21 deaths, and 19 non-fatal accidents resulted in injuries to 27 persons. Several of these accidents might have been prevented by fences at the bottom of shafts. A fatal accident, causing the deaths of two men, occurred at Llanover Colliery, Mon., on April 7, owing to the breakage of the rope while they were being wound up the shaft. When the cage was about half way up the shaft the engineman found he was unable to work the throttle valve so as to reduce speed, and he applied the brakes and reversed the engine and brought it to a standstill. The result of this appears to have been that the cage continued to travel upwards for some distance in the wire rope guides, and in falling back it broke the rope. The cause of the failure of the throttle valve was found to be that two pieces of brass broken off an emergency stop valve had got into the throttle valve and prevented it closing. Two fatal accidents were caused by the failure of bars or gates on the ends of cages; in both cases the appliances were of imperfect construction, inasmuch as they became released by upward pressure.

By explosives there were four fatal accidents and four deaths; 23 non-fatal accidents and 30 persons injured.

At Hetty pit, Great Western Colliery, Glamorgan, on January 22, two men were suffocated by firedamp, and several other men had narrow escapes. About three months before the accident a large fall of roof had occurred on the main intake airway of the "fault" district of the Four-feet seam, where the road was driven in the solid through a patch of barren ground, at a point about 270 yards from the face of a longwall district. The fall rendered the road impassable, but the ventilation continued to pass over it to the amount of about 14,000 cubic feet per minute. During the repairs, further falls occurred, and some thousands of tons of fallen strata were removed, and a large cavity existed above the artificially formed roof of the repaired road. No firedamp had been reported before the accident. The force of the air blasts driven out by falls at the time of the accident was such as to blow down a door 50 yards from the fall. A large amount of firedamp was evidently forced out by these falls, whether pre-existing in the cavity or coming off with the falls it is not possible to say, as it might be either or both. The gas was carried with the air current round the workings, and a number of men were rendered unconscious while attempting to escape, and had to be carried out. Many safety lamps

were extinguished, but some continued burning. It is fortunate that the safety lamps were all in good order and withstood the gas, as otherwise there would certainly have been a disastrous explosion, reinforced by coaldust. The occurrence is a forcible example of the danger of allowing any considerable unventilated cavity to exist about the roof of roadways in fiery mines.

An unfortunate accident by which Mr. Ernest W. Painter, the superintendent and instructor of the Swansea Rescue Station, lost his life, occurred at Cae Duke Colliery (Glam.) on October 27. The breathing apparatus worn by Painter was sent for examination to Dr. John Cadman, Professor of Mining at Birmingham University. Dr. Cadman discovered that there were two small punctures in the bottom of the absorbent cartridge, apparently produced by some sharp instrument or nail; one about  $\frac{1}{16}$  in. square and the other circular and  $\frac{3}{32}$  in. in diameter. He also found that the action of the injector used in the apparatus was such as to cause the outside atmosphere to be sucked in through these holes, and there is little doubt that this inhalation of air containing carbon monoxide was the cause of Painter's death.

In underground haulage there were 79 fatal accidents with 79 deaths; 267 reported non-fatal accidents and 275 injured. The figures show an increase over the preceding year of five deaths, but a decrease of 32 persons injured. Six riders were killed during the first half of the year, and three haulage men replacing riders in the second half. The new regulation prohibiting riding on journeys where the speed exceeds 3 miles per hour, has caused inconvenience in many cases; but Dr. Atkinson has no doubt it will result in the saving of several lives every year. The work of a rider in South Wales was probably the most dangerous of underground occupations.

There were two non-fatal accidents, causing injury to two persons by electricity underground. At Albion Colliery (Glam.) on May 24, an electrician received a shock while replacing the terminals of the controller of a hauling engine, and was only resuscitated after 20 minutes' artificial respiration by ambulance men. He said he had cut the current off, and it was supposed it might have been put on again by a man working near the switchbox. The current was of 440 volts pressure. At Britannia Colliery, on July 1, a pumpman was slightly burned by a flash caused by a fault on the starter transformer of a pump motor working at 3,000 volts.

By machinery underground there were three fatal accidents, causing three deaths, and 20 non-fatal accidents, injuring 20 persons. Two of the fatalities were caused by the attendants of electric pumps, which were properly fenced, being crushed by the cranks; in neither case could it be ascertained how they came to be in the positions in which they were found. The third fatality was caused by a shackler at the pit bottom stepping into an opening at the side of a "creeper."

On the surface at mines, including railways, tramways and sidings, there were 35 fatal accidents and 36 deaths, 146 non-fatal accidents and 149 persons injured. By machinery there were seven fatal accidents and seven deaths, 20 non-fatal accidents and 20 persons injured. In one of these fatal cases the accident was due to a removal of the fencing of the screening apparatus, and resulted in a prosecution and conviction. Three cases were due to oiling or cleaning machinery in motion. On surface railways or tramways there were 16 fatal accidents, causing 17 deaths, and 47 non-fatal accidents, causing injury to 48 men.

There were one fatal and eight non-fatal accidents by electricity, with one death and eight persons injured. The fatal accident occurred at Gellibir Colliery on December 4, when an electrician received a fatal shock while disconnecting the cable from the generator from a cable on a drum used for lowering a pump in the mine. He had either neglected to cut the current off, or, having done so, it had been switched on again by some person. The earthing of the cable was also defective. The voltage was 550, three-phase.

Notices were received of 50 dangerous occurrences from which no personal injury resulted, as follow:—Ignitions of gas or coaldust, 4; underground fires, 12; breakages of rope, chain or other gear by which men are raised or lowered, 31; overwinding while men were being raised or lowered, 2; inrush of water, 1. Of the above ignitions of gas or coaldust, three were ignitions of firedamp by permitted explosives—one by arkite, one by bobbinit, and one by samsonite. The fourth ignition of gas was by a naked light. Of the underground fires, eight were due to spontaneous combustion, one was caused by electricity, one by an opened safety lamp at a re-lighting station, and one by friction at a haulage sheave. Six additional cases of overwinding were reported, but not (in terms of the Order) "while men were being lowered or raised," but, as five of these overwinds caused breakages of ropes or chains or other winding gear, these five are included with the breakages. In the case of three of the overwinds there were detaching hooks, and in two cases there were controllers. In one case, where there was a man in the cage, the detaching hook saved his life.

*Prosecutions.*—Proceedings were taken against the owners and officials of four collieries; proceedings were taken by owners against 258 workmen. Of the 51 prosecutions for contraventions of rules about safety lamps, 44 were for sleeping while in charge of a safety lamp.

*Coal Mines Act, 1911.*—The Act has not yet been long enough in operation to admit of the ultimate effects of many of the new requirements being observable. The provision that any of the requirements of Part II. of the Act may be varied or amended by general regulations which are not yet established also tends to delay the full observance of some of those requirements.

In a few cases where it appeared that firemen's districts were too large additional firemen have been appointed. No applications have been received for exemptions from the requirement that firemen should devote their whole time to the performance of their statutory duties.

Examinations for firemen's certificates were held by the Breconshire, Carmarthenshire, Glamorganshire and Monmouthshire Education Committees, and by the Borough Education Authorities of Merthyr Tydfil and Swansea.

The new requirements as to searching workmen are not yet in full operation. Dr. Atkinson has approved the following system:—

(a) In the case of a shift the number to be selected daily shall be at least 10 per cent. of the total number of persons forming the shift.

(b) The order in which the men are selected shall be constantly varied, so that a man going down the pit shall not be able to tell whether he is likely to be searched or not.

(c) There shall be a surprise general search (*i.e.*, a search of all the persons in the shift) once at least in every quarter.

(d) Every person not forming part of a shift shall be searched on each occasion on which he goes down the pit.

Up to the end of the year 49 samples of mine air had been taken for analyses. Fifteen of these samples were taken under section 29 (3) (purity of intake air), 20 were taken under section 30 (1) (classification of mines) and 14 under section 32 (1) (a) (use of safety lamps). As the result of the analyses of these samples no action has yet been taken.

Surplus explosives are brought out of the pits at the end of the shift so far as has been observed. This requirement has given rise to a good deal of dissatisfaction, especially at naked light mines. Shotfirers hold certificates as to ability to test for gas.

Up to December 31, 1912, certificates of 130 mine managers had been endorsed with surveyors' certificates, and 134 surveyors' certificates had been granted under the Secretary of State's Order.

The requirements of the Third Schedule of the Act are gradually being complied with.

Statistics respecting the horses employed in mines under the Coal Mines Act show that 15,930 horses were in use; of these 447 died from injury and 289 from disease, 243 were destroyed as the result of injury and 319 in consequence of disease; in addition there were reported 2,479 cases of injury and 21 cases of ill-treatment.

The use of prescribed report books is now general, and so far as has been observed they are fairly well kept, the firemen's reports containing the required particulars as to result of their examinations.

The inspections by workmen continue to be made at about the same rate as in previous years, but there are no data for comparison with previous years.

The requirements as to the reversal of the air current are being met at some mines by the construction of additional fan drifts, and the erection of doors to be opened or closed as the case requires, and at a few mines additional fans are to be erected.

*Explosives Used.*—The total quantity of explosives used was 2,035,167 lb.—1,368,372 lb. of permitted and 666,795 lb. of non-permitted explosives. It is estimated that 2,648,767 shots were fired with permitted explosives and 936,965 shots with non-permitted explosives; of the total there were fired—by electricity, 2,421,119; by fuse, 1,048,744; by squibs, 115,869. The number of miss-fire shots returned with electricity was 3,772, and with time fuse, 1,994.

*Safety Lamps.*—The number of safety lamps in use was 183,985, sub-divided as under:—Method of locking: Lead rivets, 84,869; magnetic, 88,443; screws, 1,331; pneumatic, 9,342. Kind of illuminant: Colza or colza and petroleum, 165,501; petroleum, 3,955; volatile spirit, 11,497; other illuminant, 3,032. These exclude 71 portable electric lamps and five acetylene lamps. The lamps lighted and relighted by electricity numbered 104,685; by opening, 4,856; by internal igniters, 74,520.

*Electricity in Mines.*—Electricity was in use at 286 mines, the aggregate horse-power being as follows:—Surface—winding, 16,129½; ventilation, 11,299½; haulage, 11,696; coal-washing or screening, 7,075½; miscellaneous, 24,711½; total, 70,911½. Underground—haulage, 32,733½; pumping, 43,638½; portable machinery, 926; miscellaneous, 1,183½; total, 78,481½.

*Rescue Stations.*—There are now five central rescue stations in working order in South Wales, and two others in course of formation. Ambulance classes and competitions were held as usual in various parts of the coalfield.

#### VIII.—Midland and Southern District.

Mr. Hugh Johnstone, in his report on the Midland and Southern inspection district during 1912, states that owing to the coming into operation of the Coal Mines Act, 1911, the work during the year has been specially arduous, and he has very frequently been compelled to make very serious inroads on the leisure time of the staff. During the year 2,645 visits were paid to mines, 1,978 of these being underground inspections; 1,764 quarry inspections were made and 173 inquests attended. A considerable amount of time was taken up in enquiries and conferences with various parties in connection with the new Mines Act. With the exception of some of the smaller and less important mines, many of which work intermittently, practically every mine in the district has been visited at least once during the year and an underground inspection made of the whole or part of it. Many of the larger and more important mines were visited repeatedly.

\* See Annual Report for 1900.



Five hundred and ninety-seven statutory notices of the opening, discontinuance or abandonment of mines and quarries, change of name or ownership, and appointment of managers or under-managers were received and dealt with. Mr. Johnstone once again calls attention to the unnecessary correspondence with reference to these, caused by owners and managers, especially of the smaller mines and quarries, neglecting to send these notices at the proper time, the excuse usually offered being that the matter was overlooked at the time and subsequently forgotten, or that they were of opinion that it was not necessary in the case of small mines or quarries.

*Persons Employed.*—The following table shows the number of persons employed under the Coal Mines Acts :—

County.	No. of mines at work.	Persons employed.			Below and above ground.
		Below ground.	Above ground.		
			Males.	Fe- males.	
Cheshire, part of	3	20	10	—	30
Derbyshire, South	11	3,801	983	—	4,784
Devon	1	2	1	—	3
Gloucester	51	7,006	1,512	6	8,524
Kent	7	337	443	—	780
Leicestershire	30	7,897	2,023	1	9,921
Northamptonshire	7	169	37	—	206
Salop	52	3,059	593	11	3,663
Somerset	21	5,424	1,022	2	6,448
Staffordshire, North.	80	23,918	6,437	12	30,367
Do. South.	219	20,972	7,287	77	28,336
Warwickshire	29	13,465	4,156	2	17,623
Worcester	44	1,603	506	42	2,151
Total in 1912	555	87,673	23,015	153	112,841
Total in 1911	541	85,625	24,043	175	109,843

The number of persons employed shows an increase of 2,048 underground, and 950 above ground, making a total increase of 2,998, or 2.73 per cent. In the number of mines at work during the year there has been an increase of one each in Cheshire, Gloucester, Kent, South Staffordshire and Worcester, of two in Northamptonshire and Warwickshire, and six in North Staffordshire, and a decrease of one in Somerset. Most of the new mines were small places opened during the miners' strike.

*Output of Mineral.*—The next table shows the quantity and value of mineral raised :—

County.	Coal.		Fireclay.	Ironstone.	Other minerals.	Total.	
	Tons.	Value (£).	Tons.	Tons.	Tons.	Tons.	Value (£).
Cheshire, part of	3,617	1,532	—	—	—	3,617	1,532
Derbyshire, Southern portion	1,099,047	468,905	25,567	—	17,203	1,141,817	475,995
Devon	—	—	60	—	—	60	30
Gloucestershire	1,567,701	782,450	815	—	—	1,568,516	782,552
Kent	1,099	1,099	—	—	—	1,099	1,099
Leicestershire	2,765,103	1,090,387	48,550	—	1,702	2,815,355	1,108,891
Northamptonshire	—	—	—	137,444	1,620	139,064	15,410
Salop	772,205	309,262	26,258	3,205	24,474	826,142	322,358
Somerset	1,072,356	569,523	—	—	—	1,072,356	569,523
Staffordshire, North	6,283,334	2,624,725	23,836	763,236	—	7,070,406	2,907,710
Do. South	7,413,552	2,984,187	223,628	33,247	147	7,670,574	3,049,176
Warwickshire	4,577,758	1,963,702	22,294	4,787	5,264	4,610,103	1,974,212
Worcestershire	516,090	169,721	99,982	1,166	—	617,238	191,163
Total in 1912	26,071,862	10,965,493	470,990	943,085	50,410	27,536,347	11,399,651
Total in 1911	26,774,049	—	532,760	1,085,229	62,358	28,454,396	—

\* Included with Derby.

The output for the year shows decreases of 702,187 tons of coal, 61,770 tons of fireclay, 142,144 tons of ironstone, and 11,948 tons of other minerals, chiefly marl and red clay. The total decrease of output for the district was 918,049 tons or 3.23 per cent., as against an increase of 2.39 per cent. in the number of persons employed underground.

In the output of coal alone, South Derby shows an increase of 155,484 tons, or 16.48 per cent., and Gloucestershire of 131,501 tons, or 9.16 per cent. With the exception of trifling increases in Cheshire and Kent, all the other counties show decreases, Leicester of 3.33 per cent., Shropshire of 5.27 per cent., Somerset of 7.64 per cent., North Staffordshire of 5.05 per cent., South Staffordshire of 0.23 per cent., Warwickshire of 6.45 per cent., and Worcestershire of 16.13 per cent. The decrease in Worcestershire was largely due to the stopping of two Thick-coal pits, which were not reopened after the miners' strike.

It is estimated by the owners that the amount of dirt excluded (which would have been included in previous years) was 154,945 tons.

The output of ironstone shows a decrease of 142,144 tons or 13 per cent., the decrease being chiefly in North Staffordshire.

The quantity of mineral raised per person employed below ground was 314 tons—viz. (excluding Cheshire, Devon, Kent, and Northampton):—Derbyshire (South), 299 tons; Gloucester, 224 tons; Leicester, 357 tons; Salop, 270 tons; Somerset, 198 tons; Stafford (North), 296 tons; Stafford (South), 366 tons; Warwick, 342 tons; Worcester, 385 tons. The output per person employed above and below ground was 245 tons. The quantity raised per person employed below ground shows a decrease of 5.42 per cent. Gloucestershire and Leicestershire show increases of 9.27 and 1.42 per cent. respectively; South Derbyshire shows a decrease of 5.97 per cent., Shropshire of 8.8 per cent., Somerset of 2.94 per cent., North Staffordshire of 8.36 per cent., South Staffordshire of 4.44 per cent., Warwickshire of 10.23 per cent., and Worcestershire of 12.3 per cent.

The next table gives the number of the various types of coal-cutting machines in use, their description, distribution throughout the district, motive power, and output of mineral produced :—

Description.	Number driven by		Statute tons cut by			
	Electricity.	Compressed air.	Electricity.		Compressed air.	
			Coal.	Ironstone.	Coal.	Ironstone.
Disc	27	13	310,689	—	209,968	—
Bar	18	7	117,245	81,551	61,217	2,000
Chain	13	6	227,200	16,780	70,016	—
Percussive	—	60	—	—	127,571	12,573
Rotary heading	—	3	—	—	755	—
Totals	58	89	655,134	98,331	469,527	14,573

The above machines were used at 52 mines—viz.: At seven mines in Derbyshire, two mines in Gloucestershire, four mines in Leicestershire, two mines in Shropshire, two mines in Somersetshire, 24 mines in North Staffordshire, seven mines in South Staffordshire, and four mines in Warwickshire. One coal-face conveyor was in use.

*Accidents.*—The total number of accidents reported during the year, including accidents on private branch railways, &c., was 701, a decrease of 51 as compared with the preceding year, and of 101 as compared with 1910. There was a decrease of nine in the number of fatal accidents and of 20 in the number of persons killed. The decrease in the fatalities was chiefly in explosions of firedamp and in shaft accidents. The non-fatal accidents also show a decrease of 42 in the number of accidents reported and of 75 in the number of persons injured. The decrease is doubtless to some extent accounted for by the cessation of work due to the miners' strike, but Mr. Johnstone is of opinion that this does not account for the whole. One accident due to overwinding caused two deaths.

The accidents, fatal and non-fatal, are summarised in Table A.

Of the deaths, 45 occurred in North Staffordshire, 37 in South Staffordshire, and 15 in Warwickshire.

The death-rates from accidents per 1,000 persons employed were as follow:—Above ground, 0.715 (in preceding year 0.743); below ground, 1.186 (1.448); above and below ground, 1.080 (1.293). The county death-rates from all underground accidents per 1,000 persons employed underground were :—Derby, South, 0.263 (in preceding year, 0.646); Gloucester, 0.856 (0.996); Leicester, 0.507 (0.603); Salop, 0.327 (2.015);

TABLE A.

Place and cause.	Fatal accidents.		Non-fatal accidents reported to inspector.*		All non-fatal accidents disabling for more than 7 days.	
	Separate accidents.	Deaths.	Separate accidents.	Persons injured.†	Separate accidents.	Persons injured.
Explosions of firedamp or coaldust	3	3	9	13	9	11
Falls in mine	59	59	212	218	4,562	4,576
Shaft accidents	7	8	15	38	69	89
Miscellaneous underground	34	34	250	251	7,643	7,643
Total underground	103	104	486	520	12,283	12,319
On surface	18	18	94	94	1,251	1,251
Gross total in 1912	121	122	580	614	13,534	13,570
Total in 1911	130	142	622	689	14,994	15,051

\* and † See footnotes to table on p. iii.

Somerset, 0.369 (1.578); Stafford, North, 1.588 (1.370); Stafford, South, 1.478 (1.984); Warwick, 0.965 (0.852); Worcester, 3.743 (4.790); the Black Country, 2.180 (4.042). Of the total number of deaths below ground, 56.73 per cent. were caused by falls of roof and sides.

Three fatal and nine non-fatal accidents from explosions of firedamp occurred during the year, resulting in three deaths and injuries to 13 persons. The corresponding figures for the preceding year were four fatal and 15 non-fatal accidents, causing 12 deaths and injuries to 49 persons. Only one of these accidents was aggravated by coaldust.

An accident occurred at the Norton Colliery, North Staffordshire, on Saturday, February 24, at 3.30 p.m., one man being killed and one injured. The circumstances connected with this explosion are of peculiar interest, inasmuch as, although only one fatality resulted from it, it is doubtful whether even this was directly caused by the explosion. Had it happened a few hours earlier it would probably have been the most appalling disaster which has ever occurred in North Staffordshire; and, further, it establishes what Mr. Johnstone believes is a record in recovery work carried on with the use of

self-contained breathing apparatus.\* The accompanying illustrations, figs. 23, show the portion of the workings which was chiefly affected.

Mr. Johnstone says the cause of the explosion remains more or less a matter of conjecture. In considering the probable causes, shot-firing and electricity may both be eliminated; the former because no shot-firing had been permitted in the seams during the previous 12 months, and at the moment when the explosion took place there was no one in the mine to fire a shot; and the latter because, although electrical appliances had been installed in the mine, the current for both lighting and power purposes had been entirely shut off the pit for a fortnight, pending some alterations. Ordinary naked lights may also be eliminated, as no naked lights were allowed or used in the workings, and all naked lights near the shaft bottoms had been extinguished some hours before the explosion took place. The possible causes appear, therefore, to be limited to the following: (1) lights used by the shaftmen in the upcast shaft; (2) fire caused by heat from steam pipes in the vicinity of the shaft bottom; (3) the heating of a jig wheel or of haulage pulleys by friction; (4) matches hidden or otherwise left in the mine; (5) a gob fire. Mr. Johnstone discards the first two; as to (3) he says a jig was in use on the morning of the explosion. It was situated at the head of the new jig between Nos. 3 and 4, and had only been in use for two days. The brake consisted of a malleable iron plate, pressing on the side of the cast iron wheel. It was in good condition, and had only been used to jig 86 tubs down a gradient of 1 in 3.75. The jiggers stated that when they left everything appeared to be in order, and there was no evidence of burning. It appears to be unlikely that sufficient dust could have been deposited upon it during this time to become incandescent from heat due to friction, and at the same time to have escaped the observation of the men who were using it. A very serious fire, however, attributed by the manager to this cause, occurred in Birchenwood Colliery on October 18, 1911. As to (4), matches have been actually found in the pit on some previous occasions. As to (5), the Cockshead seam is dry and dusty, and is known to be liable to fire spontaneously. In May 1907 gob-stink was discovered in the No. 2 south level section near the point marked + on plan in the immediate neighbourhood of an overlap fault, where the seam was nearly double its normal thickness and the coal was of a very friable nature. The actual seat of the heating was not exactly located, as it was inaccessible, but as pungent smoke was being given off it was decided to build off the district at once, and this was done by the erection of firedams at A, B, C and D. The district remained sealed off for a period of 13 months, and was re-opened in June 1908 by the removal of the stoppings at D. No indication of any recrudescence of the old gob-fire or of any new heating had ever been observed. It is obvious that if the old goaves were kept fully charged with extinctive gas a recrudescence of the old gob-fire would have been impossible. Any leakage, however, from the upper portion of the gob would tend to draw air up into it, and might cause fire, and as a large quantity of air was returning up the back dip (about 25,000 cubic feet at B, and 43,000 cubic feet at A) it would be exceedingly difficult to detect any ordinary leakage at these stoppings. Mr. Johnstone examined them, and also that at C after the explosion, but before the ventilation had been restored, but while there was a slight leakage of inflammable gas in the lower top corner of the stopping at A he failed to find any indications of such leakage as could materially affect the condition of the gob. There is a further possibility that the draw from the Cockshead workings might have fractured the strata (45½ yards in thickness) intervening between them and the Seven-feet workings shown on the plan. These workings had been discontinued since March 1903, and were not examined daily, but were thoroughly examined on January 5, 1912, and neither then nor at any other time before or after the explosion was gas or gob-stink found in them, although only a small split of air was circulating through them. It is to be noted that the accumulation of firedamp which was being cleared out of the workings at No. 6 jig would be carried with the air current up No. 5 jig, across to No. 4, and thence along the edge of the pillars which were being got out. The miners left off work here at about 1 p.m. on the day on which the accident occurred, and up to this time everything was reported to be in order and no indications of fire observed. At the same time it appears to be possible that fire was developing in the narrow strip above where the men had been working and on the lower margin of the fully charged goaf, that the stink from it was rising into the goaf and was therefore not detected by them, and that when the displaced firedamp reached this point it at once raised the percentage of firedamp to explosive point and the explosion resulted.

The work of recovery was successfully carried out by men wearing self-contained breathing apparatus installed at this and some neighbouring collieries, supplemented by teams of men with similar apparatus brought from the Central Rescue Station established by the North Staffordshire Colliery Owners' Association at Stoke-on-Trent. The whole operations were organised and carried out in a manner which reflected the greatest credit upon the officials and workmen alike.

An accident at the Whitfield Colliery, North Staffordshire, on Wednesday, December 11, at 12.30 p.m., by which one man was injured, although slight in itself, was accompanied with features of peculiar interest. It occurred in the Hard Mine seam, which is 5 ft. 3 in. in thickness, and has an inclination of one in four. The seam is holed in the underlying fireclay, and is worked longwall. The workings are dry, but fortunately are

\* The accident is described in a paper read before the Institution of Mining Engineers by Mr. J. R. Allott, *Colliery Guardian*, June 6, 1913, p. 1214.



from fine coaldust. The accident occurred in the South District. When opening up the longwall in this district, the working face was originally in a line nearly parallel to the roof break shown at CD on plan, and the breaks formed by the subsidence of the roof naturally assumed this direction. It was subsequently found to be advantageous to push the levels forward, and the working face then took the line shown on plan, with the result that a second series of roof breaks more or less parallel to this line were opened up. A shot-firer, Joseph Riseley, was firing a shot in the coal at the point marked + on plan. The hole was drilled about 3 in. from the top of the seam; it was about 4 ft. in length, was charged with 6 oz. of ammonite, stemmed to within a few inches of the mouth with clay brought from the surface, and fired electrically by means of a No. 7 low tension detonator. Riseley stated that he saw a flash simultaneously with, or immediately after, the firing of the shot. The flame did not travel towards him, but went with the air current in the opposite direction, burning a man named Joseph Dowley,

increase of four accidents and four deaths, and North Staffordshire an increase of five accidents and five deaths. In the Black Country taken by itself there were 10 fatal accidents causing 10 deaths, as compared with 17 accidents, causing 17 deaths, in the preceding year. Of these 10 accidents, nine causing nine deaths, occurred in the Thick or Ten-yard Coal.

Twenty-two shaft accidents were reported during the year; of these seven were fatal, causing the deaths of eight persons, and 15 were non-fatal, causing injuries to 33 persons. The corresponding figures for the preceding year were 12 fatal and 14 non-fatal accidents, resulting in 12 deaths and injuries to 23 persons. At Dover Colliery, Kent, on September 5, at 5.30 p.m., an accident from overwinding occurred by which two persons were killed and six more or less seriously injured. The shaft, which was in course of being sunk, was 18 ft. in diameter and about 355 yards in depth. The ropes were fitted with King's detaching hooks, the distance from the hook to the detaching collar, when the tank was in position for emptying, being 18 ft. 6 in.

could only be accounted for by the engineman's having momentarily forgotten himself and neglected to change the position of the lever.

Thirty-four fatal miscellaneous underground accidents, and 250 non-fatal accidents were reported during the year, resulting in 34 deaths and injuries to 251 persons. The corresponding figures for the preceding year were 34 fatal and 268 non-fatal accidents, causing 38 deaths and injuries to 276 persons.

There was one fatal accident with explosives, resulting in one death; and eight non-fatal accidents, resulting in injuries to the same number of men.

Nineteen fatal and 160 non-fatal accidents due to underground haulage operations were reported during the year, resulting in 19 deaths and injuries to 161 persons. The corresponding figures for the preceding year were 24 fatal and 178 non-fatal accidents, causing 24 deaths and injuries to 178 persons. One person was killed and two were injured while illegally riding, and one person was killed and 11 were injured by going in front instead of behind tubs while moving them by hand on inclined roads.

Two fatal and three non-fatal accidents by electricity were reported during the year, resulting in two deaths and injuries to three persons. The corresponding figures for the preceding year were one fatal and one non-fatal accident, causing one death and injury to one person. Neither of the fatal accidents should have occurred. At West Cannock Colliery, South Staffordshire, on March 2, at about 8 a.m., an accident occurred by which a man received a slight shock, and a horse, which stood about 1,500 yards further inbye, was electrocuted, but which might conceivably have had much more serious consequences. The current used was three-phase alternating, 650 volts, 50 periods per second. It was conveyed from the generator on surface to a distributing station near the shaft bottom by an armoured cable, but from this point for a distance of 920 yards the cable was unarmoured. Beyond this, for a further distance of 1,115 yards, the cable was armoured. The metallic covers, motor frames, &c., were earthed to the surface through the cable armoured where available, but for the above 920 yards the earth connection was by means of an old haulage rope,  $\frac{3}{4}$  in. diameter, laid under the rails. The armouring of the shaft cable was connected at the surface by means of a similar rope, 40 yards in length, to two copper plates buried in wet clayey ground. The connections between this rope and the earth plates had been made by copper wire lacings, and were subsequently found to be loose and therefore defective. One arm of an Ellison's three-throw switch had shorted on to the frame through a hard fibre tube on which the knife blades were mounted; the earthing rope fused at a corroded part near to which the man was standing, with his feet upon the rope and his arms resting upon the unarmoured cable, and he received a shock which caused him to fall, but he was not burnt or otherwise injured. The horse, which was standing on the rope 1,500 yards further inbye, was killed instantly. Tests had been made by the attendant in the generating house at 7 and 7.30 a.m. on the morning of the accident, but no indications of leakage were discovered. The accident emphasises the great danger attending the use as earth conductors of old wire ropes which are worn, corroded or of insufficient size, and the necessity of making all connections efficiently, to secure electrical continuity. The old ropes in this case were at once cut out and copper conductors substituted, that on the surface being properly soldered and riveted to the earth plates.

Two fatal and 12 non-fatal accidents by machinery were reported during the year, resulting in two deaths and injuries to 12 persons. During the preceding year seven non-fatal accidents occurred, causing injuries to seven persons.

Eighteen fatal and 94 non-fatal accidents on the surface were reported during the year, resulting in 18 deaths and injuries to 94 persons. The corresponding figures for the preceding year were 18 fatal and 76 non-fatal accidents, causing 18 deaths and injuries to 77 persons. Nine fatal accidents, causing nine deaths, occurred on railways, tramways or sidings. Of these two appeared to be directly due to contraventions of the siding rules, and several others might have been avoided by the exercise of proper care or caution.

During the year 117 dangerous occurrences were reported under the Notice of Accidents Act, 1906, the Coal Mines Act, 1911, and Statutory Order No. 934. Of these, 77 were underground fires; three were ignitions of firedamp by naked lights; one was a serious outburst of firedamp in a safety lamp pit which fouled the air-courses to explosive point for a considerable distance; one was the ignition of a small piece of compressed powder which a chageman had inadvertently dropped on the floor and which was lighted by a spark from the fuse of a shot; one was the ignition of oil vapour or dust inside of a compressed air receiver; one was the fusing of two unarmoured cables carrying a direct current of 220 volts owing to their having accidentally been brought into contact; four were intrusions of water; five were breakages of winding machinery; six were breakages of winding ropes or their connections; two were breakages of guide rods in shafts; two were breakages of the troughs in which haulage ropes were conveyed down the shaft, permitting the escape of these ropes and causing interference with the winding; one was an improperly adjusted overwind controller coming into operation when the descending cage was only a short distance from shaft top; 12 were overwindings, and one was a boy wandering inadvertently or otherwise into a disused working in which he had no business to be. Of the 77 underground fires, 76 were due to spontaneous combustion. Two of these occurred in Gloucestershire, two in Leicestershire, one in Shropshire, three in North Staffordshire, 56 in South Staffordshire, nine in Warwickshire and three in Worcestershire; 57 of them took

NORTON COLLIERY.  
WORKINGS IN COCKSHEAD SEAM

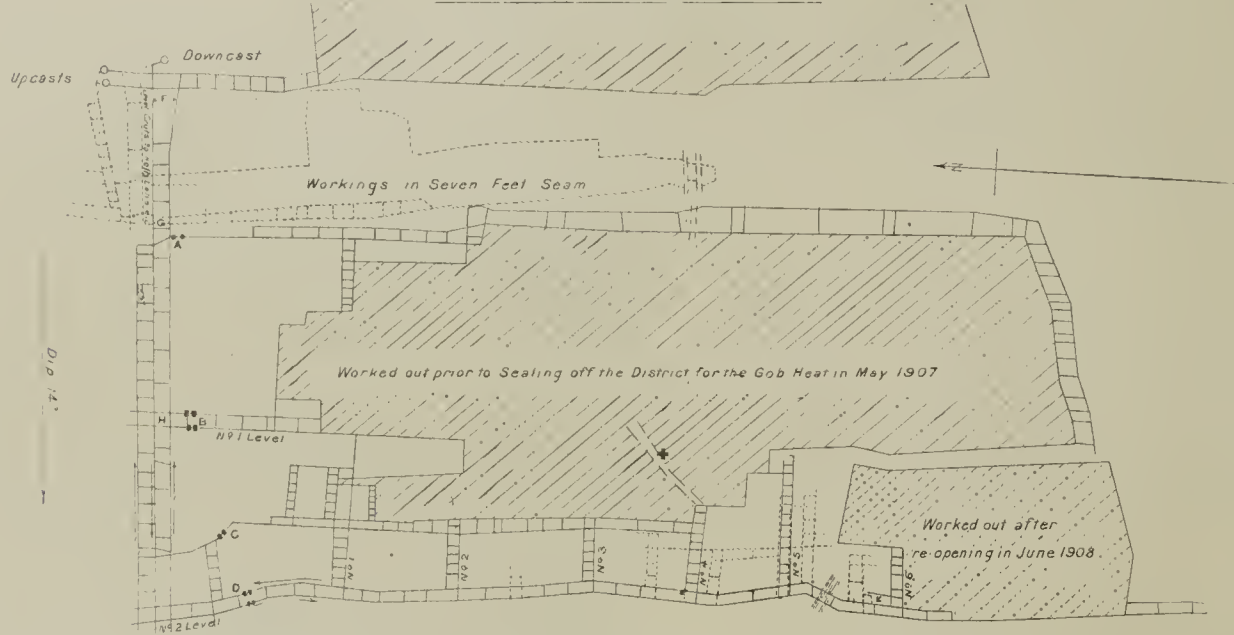
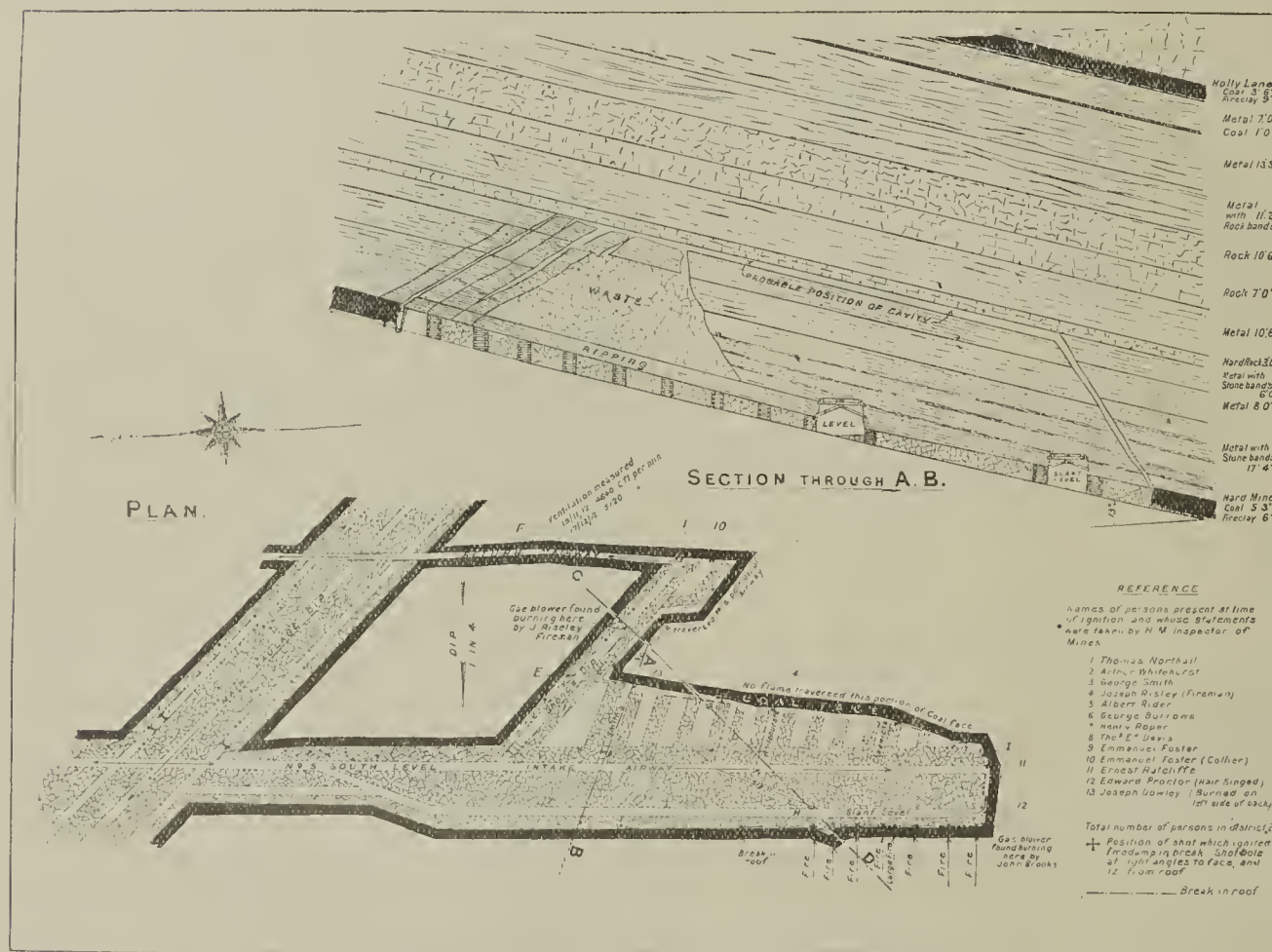


FIG. 23.—PLAN OF WORKINGS IN COCKSHEAD SEAM, NORTON COLLIERY.



FIGS. 24 AND 25.—PLAN AND SECTION OF THE NO. 5 DISTRICT HARD MINE, WHITFIELD COLLIERY.

who was at 13, a distance of 38 yards from the shot. The accident emphasises the risk attending the use of even permitted explosives in gassy mines. It probably would not have happened but for the break in the coal, but the shot-firer had no means of discovering the existence of this break before the shot was fired.

The number of accidents from falls of ground reported during the year was 271, causing the deaths of 59 persons and injury to 218 others. The corresponding figures for the preceding year were 311 accidents, causing the deaths of 62 persons and injury to 264 others. Taking the district as a whole, the figures show a decrease of two accidents and two deaths from this cause, as compared with the preceding year. Kent, Northamptonshire, and Somersetshire each show a decrease of one accident and one death, Leicestershire

two accidents and two deaths, Shropshire four accidents and four deaths, and South Staffordshire a decrease of six accidents and six deaths. Warwickshire shows an increase of one accident and three deaths, Gloucestershire an

A "Visor" speed-controller was provided, but was not in use at the time of the accident, owing, it was stated, to difficulties in regulating it on an engine winding from a sinking pit where the depth is constantly increasing. The winding engineman had brought up a tank of water and placed it in position at pit bank, when it was emptied automatically. On completing the journey he had apparently forgotten to alter the position of the reversing lever, and on receiving a signal intimating that the tank above the staging in shaft bottom had been filled, he started the engine in the wrong direction. The speed was accelerated by the weight of the water in the bottom tank and of the 2 tons of rope hanging in the shaft, and, before he could check it, the ascending hook entered the collar and the rope was detached. The momentum in the rapidly moving empty tank caused it to rise some distance before dropping back upon the tacklers, and the resulting shock fractured a swivel link immediately below the hook. The empty tank thus liberated fell to the bottom of the shaft, killing two men and injuring six others, as stated. The accident



place in the Thick coal. The remaining fire was apparently due to a heated bearing on a haulage tension bogie.

At Sneyd Colliery, North Staffordshire, on May 10, an explosion occurred in an air receiver connected with a high-speed single-cylinder double-stage air compressor, driven by an electric motor in an underground engine-room. The compressor had been running for about 15 minutes, when the safety valve on the receiver was displaced, and a shower of sparks, accompanied by a large volume of smoke, issued into the engine-room. The air pressure in the receiver was automatically regulated not to exceed 76 lb. per square inch, and the air inlet was covered with a layer of sacking to prevent or minimise the entrance of dust. The receiver had been cleaned out only three days previously, and all dust and oil removed. The lubricating oil used in the compressor had a flash-point of 403.7 degs. Fabr., open test. The temperature in the pipe between the compressor and the receiver was tested by fitting a mercury cup in the pipe, and was found to be 260 degs. Fahr.; but this, of course, affords no indication of the temperature due to the highest pressure in the compressing cylinder. The occurrence indicates the inexpediency of placing such air-compressors underground in fiery or dusty mines, or in such a position that the air supply may be contaminated with dust from screens or otherwise.

**Prosecutions.**—Forty-two prosecutions of owners, agents and managers were instituted for contraventions of the Coal Mines Regulation Acts, 1887-1908, and the General and Special Rules. Convictions were obtained in 17 cases, but in one of these under the Coal Mines Regulation Act, 1908, the conviction was subsequently quashed by the Court of Appeal. Twenty-one minor cases were withdrawn on payment of costs, chiefly on the defenders agreeing to plead guilty to the major offences with which they were charged, and four cases under the Coal Mines Regulation Act, 1908, were dismissed.

Ninety-nine prosecutions by owners against employes for contraventions of the above-named Acts and Rules and of the Coal Mines Act, 1911, and Cruelty to Animals Acts were reported. In 95 of these convictions were obtained, two were withdrawn or dismissed on payment of costs, and two were dismissed without costs.

**Coal Mines Act, 1911.**—This Act necessitated very extensive alterations in equipment and organisation at many of the collieries, involving an immense amount of work on the part of colliery owners and their staff. In many cases it was found to be impossible to carry out all the alterations required by the new Act within the prescribed time, but, generally speaking, commendable efforts have been made to do so, and doubtless in the near future the alterations and additions required by the Act will be completed.

The new provisions relating to firemen, deputies and examiners have been observed, except in a few isolated cases. In many cases the districts allotted to the firemen had to be considerably reduced, and the number of firemen employed correspondingly increased. No applications for exemption under section 14 (2) (c) were received.

The following authorities were approved of to conduct examinations for firemen's certificates in accordance with conditions laid down by the Home Office:—The Mining Department of Birmingham University for South Staffordshire, Shropshire, Worcestershire and Warwickshire; and the Education Committees of Derbyshire, Gloucestershire, Leicestershire and Stoke-on-Trent. The following shows the number of candidates who obtained firemen's certificates:—The full certificate, 1,297; certificates for air measurement and hearing only, 72; certificates for gas-testing and hearing only (existing firemen), 2,157; certificates for hearing only (existing firemen in non-gassy mines), 426; number of failures, 179. Certificated firemen are now employed at practically every mine in the district in which they are required by the Act. The provisions as to searching workmen for matches and other prohibited articles daily before each commencement of work (section 35 (2)) have not yet been fully complied with, the practice of making surprise searches at irregular intervals which was formerly in vogue having generally been continued. Up to December 31 no system of searching had been submitted for approval. This matter is now having attention, and, in answer to queries submitted by various owners and managers, Mr. Johnstone indicated that he is prepared to approve of a system of selection on the following lines:—

- (1) In the case of a shift the number to be selected daily shall be at least 10 per cent. of the total number of persons forming the shift.
- (2) The order in which the men are selected shall be constantly varied, so that a man going down the pit will not be able to tell whether he is likely to be searched or not.
- (3) There shall be a surprise general search—that is, a search of all the persons in the shift once at least in every quarter.
- (4) Every person not forming part of a shift shall be searched on each occasion on which he goes down the pit.
- (5) In a mine in which both naked lights and safety lamps are in use, the Act requires that the men using safety lamps shall be searched after or immediately before entering that part of the mine in which safety lamps are used—that is, after they have left the men who use naked lights, with a view to ensuring that the men working in the safety-lamp place have not obtained matches, &c., from the workmen using naked lights.

Prior to December 31, 268 samples of mine air had been taken for analysis, and since then 121 samples have been taken. The result of the analyses indicates that the standard of ventilation is being fairly well maintained. In a few instances it was found necessary to call attention to apparent inadequacy, and steps were at

once taken to remedy the defects. The owners of several mines which were liable to spontaneous combustion consulted Mr. Johnstone with a view to making application under section 29 (3) for exemption from the statutory standard of ventilation, but, on investigation, it was ascertained that the ventilation of the mine generally was up to the standard, and that only very exceptional places fell below it, and under these circumstances the inspector did not feel warranted in recommending that the mine should be exempted.

The new requirements with regard to surveyors have been very generally complied with. Prior to December 31, 154 managers' certificates were endorsed, and 85 certificates to existing surveyors were issued under Statutory Order No. 228. Since that date 28 managers' certificates have been endorsed and 13 certificates granted to existing surveyors who had made application prior to December 31.

The regulations in Schedule iii. as to the care and treatment of animals are being fairly well observed. In many cases a good deal of work had to be done in separating the stables from travelling or haulage roads and in ventilating them with intake air, and in some cases entirely new stables had to be constructed. Some irregularities have been discovered in the course of inspection, but have been promptly remedied on the attention of the owners or managers being called to them.

The number of horses in use underground was 6,064; 118 died from injury and 56 from disease (five from old age); 123 required to be destroyed in consequence of injury and 125 in consequence of disease (53 in consequence of old age); in addition, there were reported 712 cases of injury and 30 of ill-treatment.

## COAL MINES ACT, 1911. OFFICIAL ABSTRACTS.

Section 88 (1) (b) requires the owner, agent, or manager of every mine to supply gratis to each person employed in or about the mine a book containing the parts of the Abstract and General Regulations prescribed as affecting him, and also to supply a copy, at a price not exceeding 1d., to any such person applying for it at the pay office of the mine.

A list of the classes of persons for whom separate books are required is given below, and the official reference number, which should be quoted in ordering books, is given in each case.

	MINES AND QUARRIES FORM NO.
Officials superior to the Firemen, Examiners, and Deputies	55
Mechanical Engineers	56
Firemen, Examiners, and Deputies	57
Electricians and Assistant Electricians	58
Winding Enginemen	59
Banksmen	60
Onsetters	61
Horsekeepers and Drivers in charge of horses	62
Boiler Minders	63
Persons in charge of ventilating machines	64
Shot Firers	65
Underground Workmen in Naked Light Mines	66
Underground Workmen in Safety Lamp Mines	67
Surface Workmen	68
Persons employed in sinking operations	69
Hauling Enginemen and persons engaged in mechanical or gravity haulage operations	70

All the above books may be obtained from the COLLIERY GUARDIAN CO. LTD., 30 & 31, Farnival Street, London, E.C., at a uniform price of 1/3d. each or 3s. a hundred (postage extra).

A great deal of annoyance was caused at first owing to the prescribed forms of report books being unobtainable from the printers in sufficient quantity. This matter has now been remedied, and these books are in general use throughout the district. The reports in many instances were not sufficiently detailed, and attention has had to be called to this by the members of the staff.

The Butty system still survives to some extent in South Staffordshire, but its more objectionable features have been done away with by section 27 of the Act. At two or three of the mines in the Black Country it was found that the provisions of this section were being evaded by the firemen being paid a small sum weekly for making the statutory inspections, while the greater part, amounting nearly to the whole of the wages, was paid by the contractor. This practice has now been stopped. In one instance, the provision as to the supply of materials for the support of the roof and sides were being evaded and directly contravened, by the owner purchasing and paying for the timber and thereafter recovering this from the contractor. Steps were taken at once to secure the discontinuance of the practice.

Practically no advantage has been taken of the extended provisions in section 16 with regard to inspections on behalf of the workmen by the persons employed and appointed by themselves. Not a single inspection has been made of any mine throughout the whole division during the year.

The provisions of section 32 (3) with reference to the providing of adequate means for reversing the air current in mines in which a mechanical contrivance for ventilation is used have necessitated a very great deal

of work. The subsection only came into operation on January 1, 1913, but considerable delay in making preparation for it was caused by some dubiety of opinion amongst owners and managers as to the exact meaning of the subsection. In many cases extensive structural alterations had to be made; in others entirely new fans had to be erected, and considerable delay has occurred through owners being unable to obtain delivery of the necessary plant. The work is now well in hand, and at the time of writing effect has been given to the provisions at a large proportion of the mines in the district.

No case has arisen in which safety lamps have been required under section 32 (1) (b) since the Act came into operation, but in one case, in the Cannock Chase district, safety lamps were introduced under Special Rule 109, the provisions of which were similar.

In mines which are not entirely wet throughout, coal-dust is generally cleaned up and loaded out. In a number of cases the roads are watered more or less systematically, and in seven mines stone or flue dust is applied. There is room, however, for a very considerable extension of the latter practice, and recent investigations appear to indicate that owners will be well advised to adopt it in very many cases.

The weekly payment of wages is almost universal throughout the district, the only exceptions which have come to notice being two mines in Shropshire and several in Gloucestershire, at which the custom of paying fortnightly still obtains.

**Explosives Used.**—The quantity of explosives used amounted to 2,626,193 lb. The number of shots fired, 4,390,542, may be subdivided as follows:—By electricity, 2,069,060; by fuse, 2,092,882; by squibs, 228,600. The miss-fire shots were: with electricity, 3,171; with fuse, 3,220; otherwise, 147—total, 6,538.

**Safety Lamps.**—The number of lamps in use was 68,408. Number of gauges: one, 35,797; two, 32,530; not stated, 81. Whether shielded or not: shielded, 68,313; unshielded, 14; not stated, 81. Method of locking: lead rivet, 34,888; magnetic, 28,070; screw, 5,351; other, 99. Kind of illuminant: colza or colza and petroleum, 38,242; petroleum, 9,761; volatile spirit, 20,071; electricity, 81; other illuminant, 253.

**Electricity in Mines.**—Electricity was in use at 121 mines. The aggregate horse-power was as follows:—Surface: Winding, nil; ventilation, 715; haulage, 861½; coal washing or screening, 2,276; miscellaneous, 3,309½; total, 7,162. Underground: Haulage, 14,714½; pumping, 14,309½; portable machinery, 1,674; miscellaneous, 464½; total, 31,162½.

**Rescue Stations.**—The station at Berry Hill Colliery, Stoke, is still in operation. The equipment now consists of 21 complete sets of apparatus, with the necessary spare parts and accessories. A motor van has been added, fitted to carry 12 complete sets of apparatus, with the necessary spare parts—a charging pump, 1 cwt. of caustic soda, three oxygen cylinders, a reviving apparatus, and a brigade of six men. Prior to December 31, 232 men had been trained and passed as efficient. In addition to these, 89 men were then undergoing a course of training, and were examined and passed as efficient in January. At the time of writing, an additional 75 men are undergoing the course of training. In accordance with the general scheme applicable to the whole of the South Staffordshire and South Midlands area, a central station has been practically completed at Hednesford, available for the Cannock Chase district, the apparatus has been delivered, and an instructor trained and appointed. Thirty-four men have been trained at Birmingham University who will form instructors and captains of brigades at collieries in connection with this station. The South Staffordshire and East Worcestershire colliery owners have acquired a site near Dudley station, and the erection of the building is now in hand. Eight men have been trained at Birmingham University to act as instructors and captains in connection with this station. A central station is also in course of erection at Wilnecote, available for the collieries in North Warwickshire. It will shortly be completed, and meantime apparatus is provided at each colliery ready for immediate use. Fourteen captains and instructors for this station and the associated collieries have been trained at Birmingham University. The South Derbyshire and Leicestershire mineowners have erected a central station at Ashby-de-la-Zouch. The buildings in connection with this station have been specially designed and erected for the purpose, and are very complete. They are now ready for the formal opening, and an instructor has been appointed, apparatus obtained, and the training of the colliery brigades will commence almost immediately. The owners of the collieries in the Bristol coalfield have equipped a central station at the headquarters of the St. John Ambulance Brigade in Bristol. An instructor has been appointed and is about to commence his duties. The owners of the collieries in the Somerset coalfield have arranged to erect and equip a central station near Norton Hill Colliery. The mineowners in the Forest of Dean have now made arrangements for the erection and equipment of a central station at Parkgate, which will serve all the collieries in the Forest. In addition to these central stations, training centres have been established at Haunchwood Colliery, Warwickshire, and at the Lilleshall Collieries, Shropshire. In addition to the central stations, many of the larger collieries throughout the division have been equipped with apparatus independently, and at some of these very excellent work was done in the course of the year, notably in the recovery of Norton Colliery, after the explosion referred to, and at Exhall Colliery, Warwickshire, where an underground fire was successfully dealt with. A course of instruction, specially designed for instructors and captains of brigades, has been carried on at Birmingham University, and 75 men specially selected and drawn from the principal collieries in the division have been fully trained and examined.



**H.M. INSPECTORS OF MINES.**

We print below, through the courtesy of the Home Office, a list, corrected to June 1913, showing the present constitution of the Home Office staff. It may be observed that the Northumberland and Durham districts have now, on the retirement of Mr. J. B. Atkinson, been amalgamated, this having, of course, been contemplated from the first.

Chief Inspector of Mines: R. A. S. REDMAYNE, Esq., C.B.	} Home Office, Whitehall, London.
Electrical Inspector of Mines: ROBERT NELSON, Esq.	
Private Secretary to Chief Inspector: GRANVILLE POOLE, Esq.	
Secretary to the Board for Mining Examinations: W. W. WARE, Esq.	

[1] Inspector; [2] Senior Inspector; [3] Junior Inspector;  
[4] Sub-Inspector of Mines; [5] Sub-Inspector of Quarries;  
[6] Inspector of Horses.

**1. Scotland Division, comprising the whole of Scotland.**

- (1) W. WALKER, Esq., Tyne Lodge, Grange Loan, Edinburgh.
- (2) R. McLAREN, Esq., Drumclair House, Airdrie, near Glasgow; R. G. M. PRICHARD, Esq., Braemont, Liberton, Edinburgh.
- (3) J. MASTERTON, Esq., 72, St. Leonards Road, Ayr; A. H. STAELE, Esq., 5, Talbot Terrace, Scotstounhill, Glasgow; W. E. T. HARTLEY, Esq., 5, Pitt Terrace, Stirling; J. A. S. RITSON, Esq., 5, Marchmont Road, Edinburgh; H. J. HUMPHREYS, Esq., Canmore Street, Dunfermline.
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- (5) L. R. SOWERBY, Glasgow.
- (6) A. McARTHUR, 17, Hillside Street, Edinburgh.

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- (2) F. H. WYNNE, Esq.
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- (4) W. WAINWRIGHT, Esq., 6, Fieldhouse Terrace, Western Hill, Durham; W. BROWN, Esq., 45, Stanton Street, Westgate Road, Newcastle-on-Tyne; W. GOODIN, Esq., 11, Emerald Street, Saltburn-by-the-Sea; T. BROWN, Newcastle-on-Tyne.
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- (6) R. BAXTER, Esq., 6, Guest Road, Sheffield.

**4. Lancashire, North Wales and Ireland Division.**

(a)\* *Manchester and Ireland District, comprising part of Lancashire (namely, so much of the county as is not included in No. 2 Division and the Liverpool and North Wales District), and Ireland.*

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- (3) G. B. HARRISON, Esq., Shamrock, Worsley Road, Swinton, Manchester; F. N. SIDDALL, Esq., 18, Albert Road, Bolton.
- (4) J. DUNCAN, Esq., 123, Willows Lane, Accrington.
- (5) O. JONES, Esq.
- (6) D. MORRIS, Esq., 232, Wigan Road, Bryn, Wigan.

(b)\* *Liverpool and North Wales District, comprising South-West Lancashire, part of Chester (namely, so much of the county as is not included in No. 6 Division), Anglesey, Carnarvon, Denbigh, Flint, Merioneth, and Montgomery.*

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- (2) D. H. F. MATHEWS, Esq., Hoole, Chester; G. J. WILLIAMS, Esq., Coed Menai, Bangor.
- (3) O. R. JONES, Esq., Glan Seiont, Carnarvon; W. H. MURRAY, Esq., Cairndhu, Queen's Drive, Mossley Hill, Liverpool.

\* The amalgamation of the Manchester and Ireland and Liverpool and North Wales Districts to form the Lancashire, North Wales and Ireland Division is postponed for the present.

† Including the parishes of Hesketh-with-Beaconsall, Tarleton, Croston, Eccleston, Standish, Wigan, Winwick and Warrington, and all parishes to the west thereof.

- (4) R. W. CORLESS, Esq., 191A, Downall Green Road, Bryn, near Wigan; W. ROBERTS, Esq., Newton-le-Willows; RHYS WILLIAMS, Esq., 2, Garfield Terrace, Garth Road, Bangor.
- (5)
- (6) D. MORRIS, Esq., 232, Wigan Road, Bryn, Wigan.

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- (5) W. J. STEPHENS, Esq., 80, Brunswick Street, Canton, Cardiff.
- (6) T. L. EVANS, Esq., Westgate, Quarella Road, Bridgend, Glam.

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- (2) W. SAINT, Esq., Glentworth, Stafford; H. WALKER, Esq., Walden, Widcombe Hill, Bath.
- (3) W. H. HEPPLEWHITE, Esq., Chestnut House, Kettlebrook Road, Tamworth; J. R. FELTON, Esq., 298, Pershore Road, Birmingham; T. BOYDELL, Esq., 7, Treyew Road, Truro; P. S. LEA, Esq., 296, Pershore Road, Edgbaston, Birmingham; (one vacancy).
- (4) T. H. BULL, Esq., 172, Lower Chaplin Road, Longton, Stoke-on-Trent; H. MORGAN, Esq., 14, Castle Street, Dudley; E. ROWLEY, Esq., Bristol.
- (5) RICHARD KING, Esq., Ranelagh Road, St. Austell; T. R. REES, Esq., Birmingham.
- (6) J. EVANS, Esq., 56, Hugh Road, Small Heath, Birmingham.

\* Including the parishes of Church Lawton, Odd Rode, and Wildboarclough, and the portion of Cheshire situated on the east side of North Staffordshire Railway, from Mow Cop Station to North Rode Station, and south of the North Staffordshire Railway from North Rode Station to Rushton Station.

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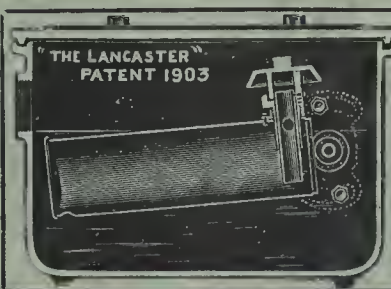
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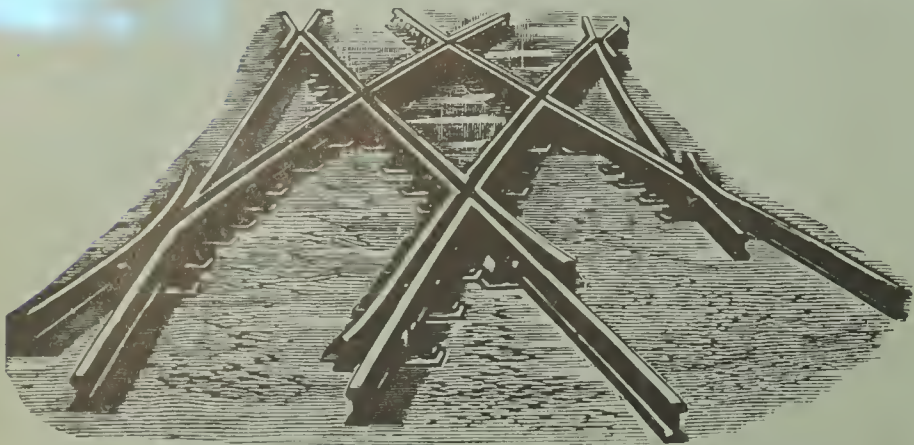


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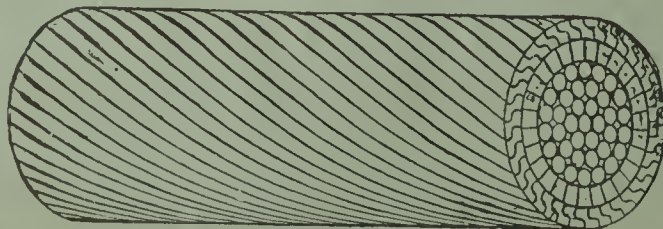
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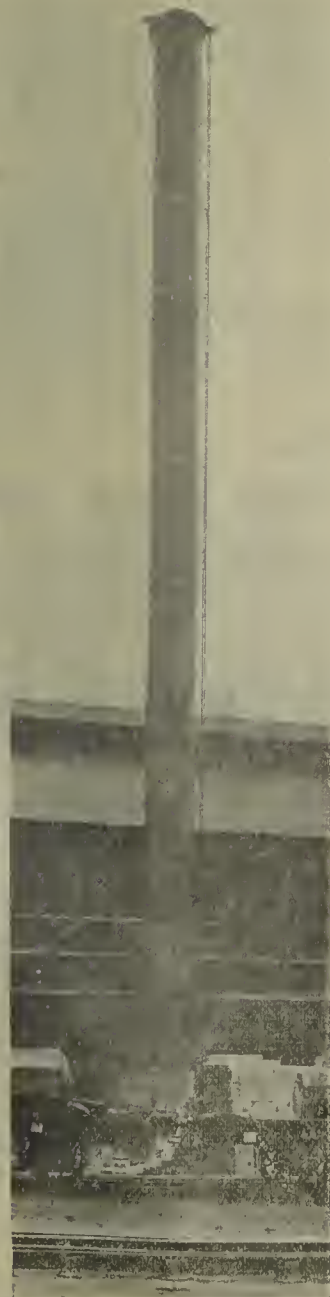
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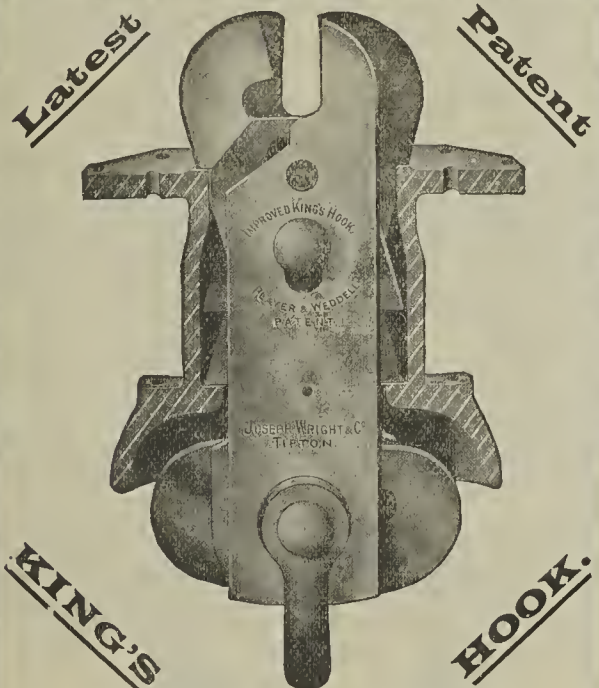
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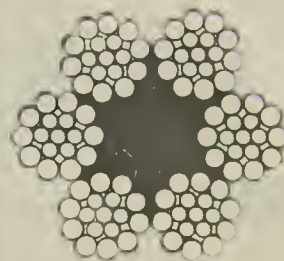
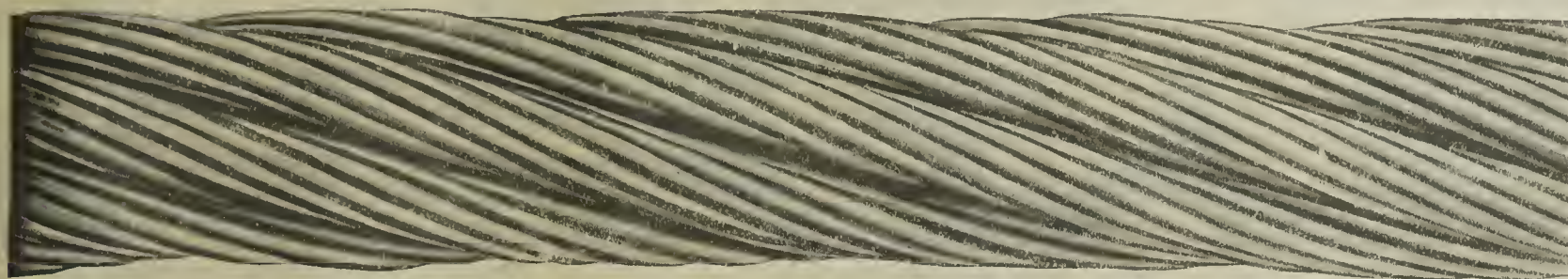
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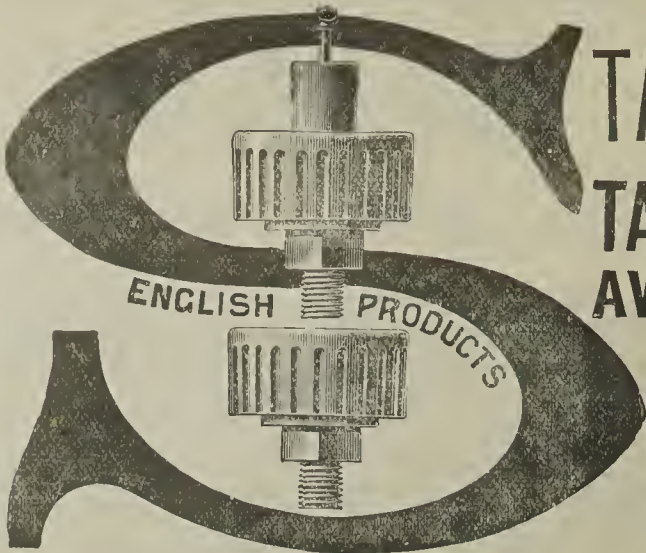
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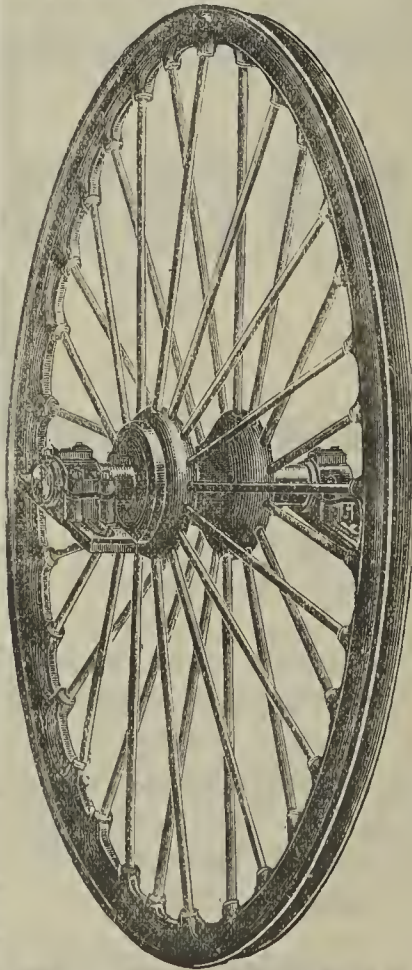
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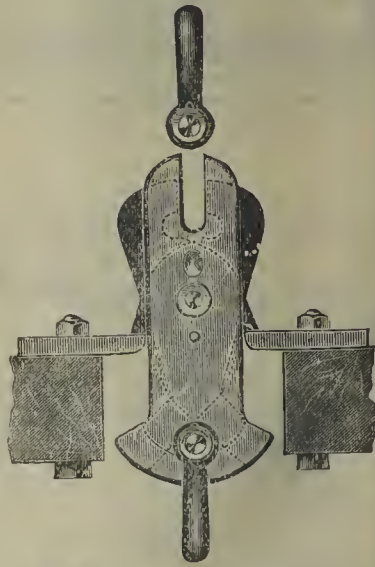
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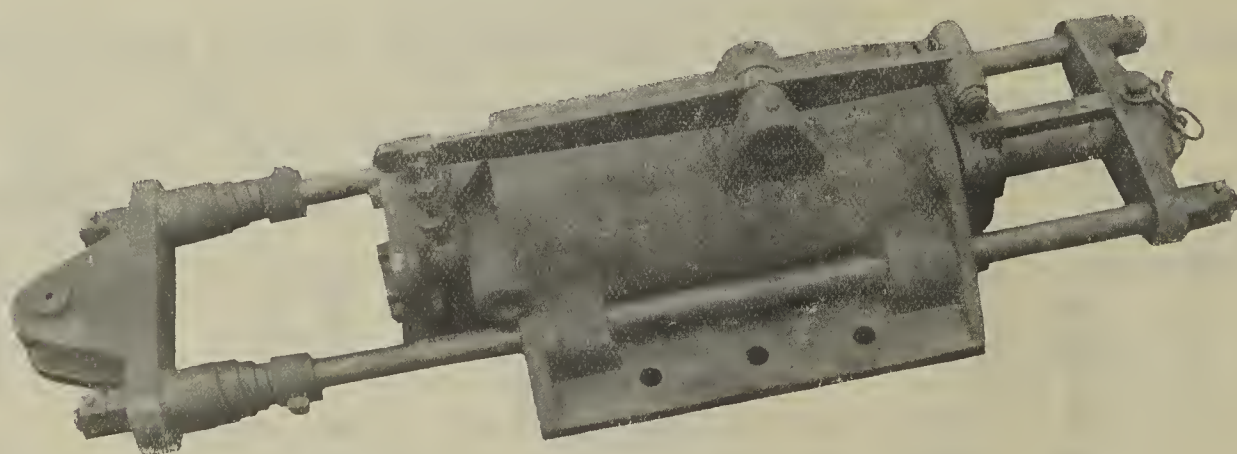
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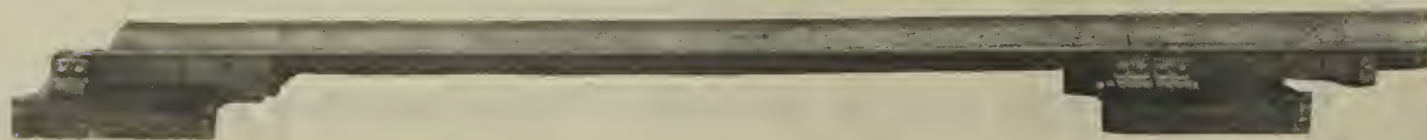
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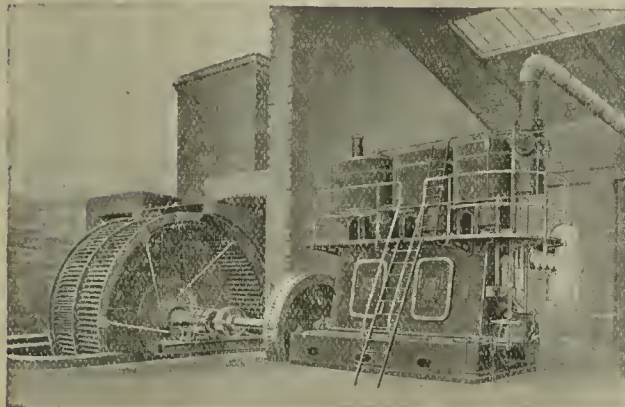


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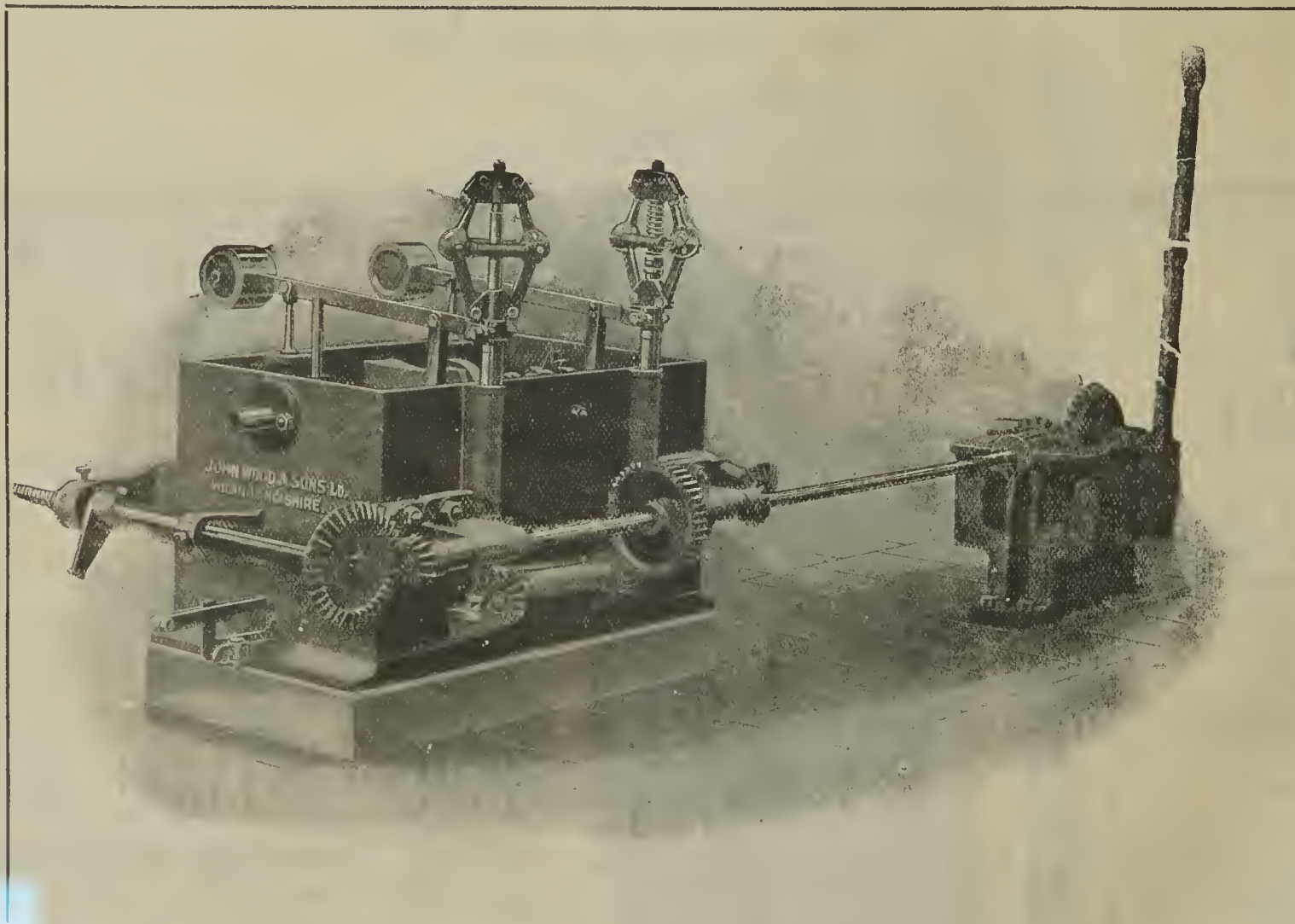
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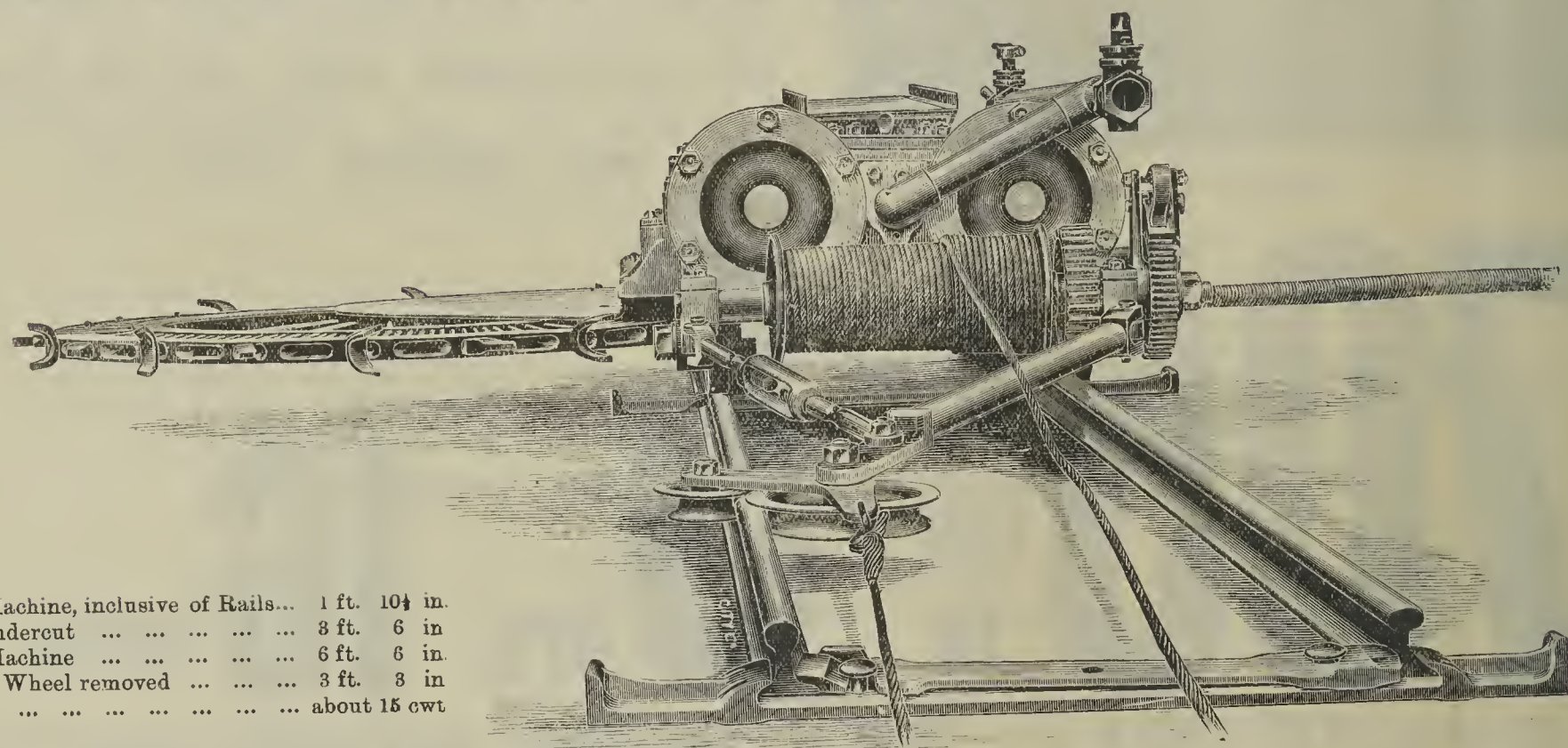


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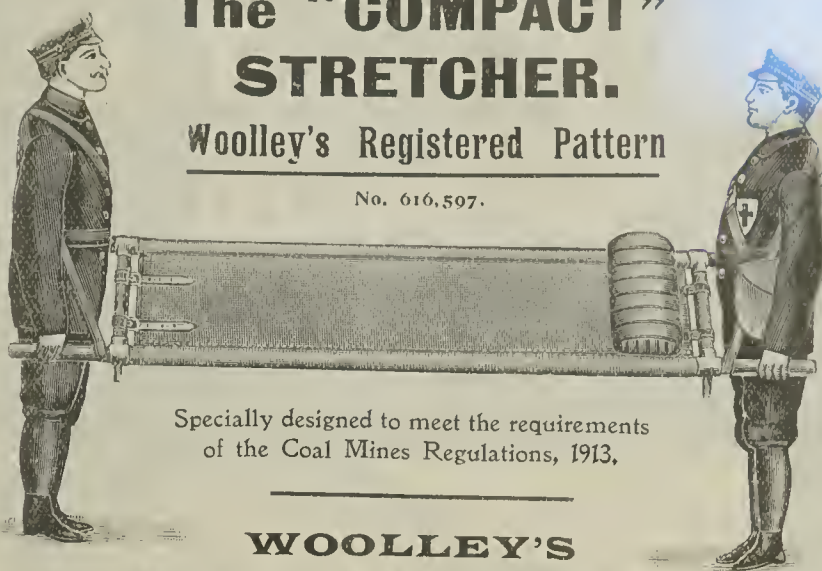
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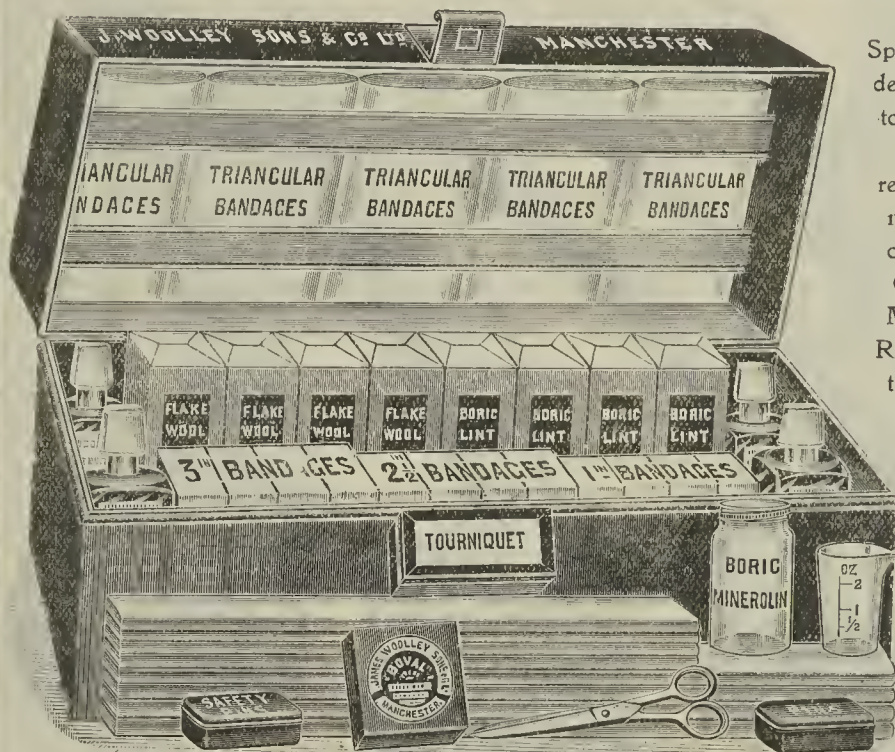
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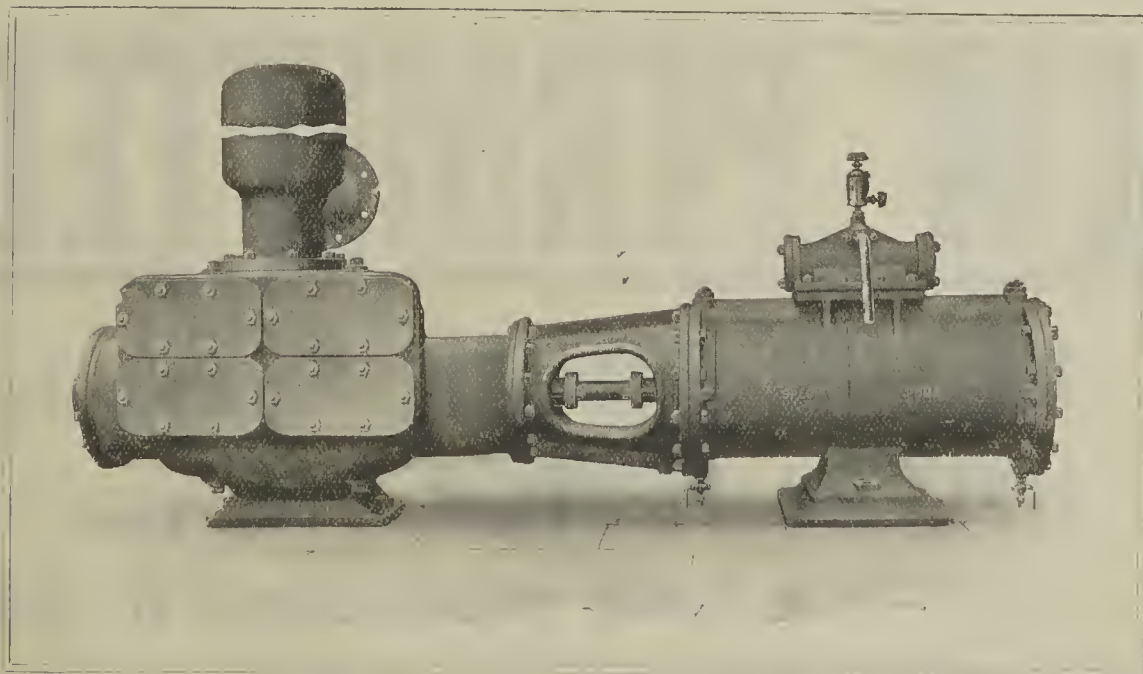
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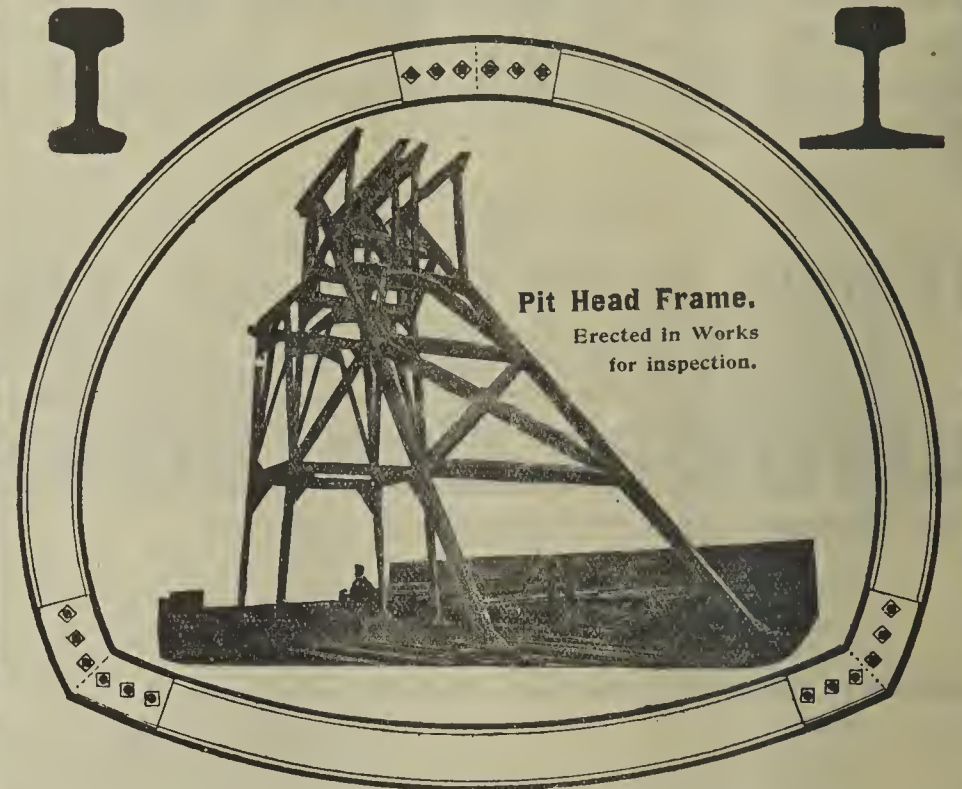
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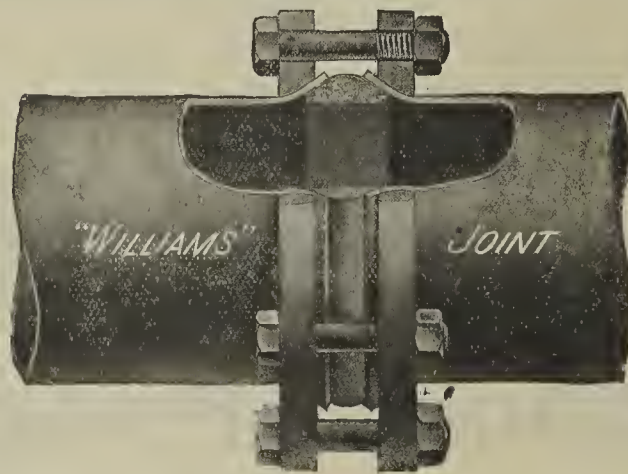
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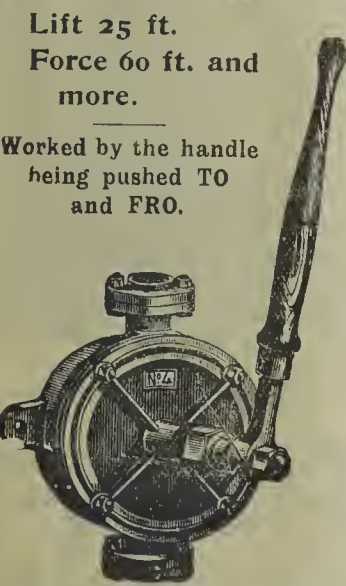
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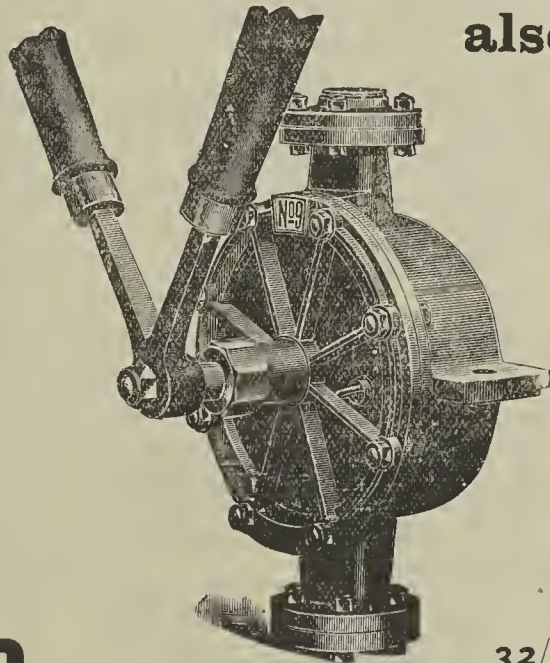
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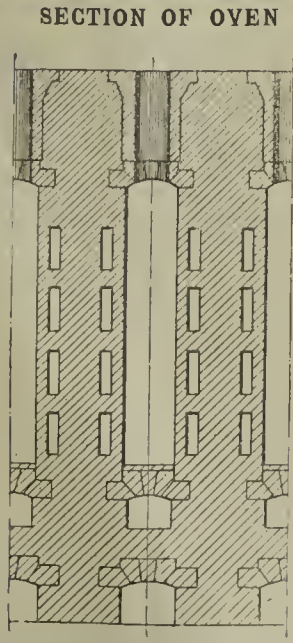


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Davis, John, and Son (Derby) Ltd., Derby  
Theedam, E. C., Ltd., Dndley  
Wakefield, C. C., & Co., Cheapside, London, E.C.

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## AIR PLANT

Daglish, Robert, and Co. Ltd., St. Helens, Lancs.

## AIR ANALYSIS APPARATUS

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Belliss and Moreom Ltd., Birmingham  
Bever, Dorling and Co. Ltd., Bradford, Yorks  
Daglish, Robert, and Co. Ltd., St. Helens, Lancashire  
Davis, John, and Son (Derby) Ltd., Derby  
Fraser & Chalmers Ltd., 3, London Wall Bldgs., E.C.  
Hardy Patent Pick Co. Ltd., Sheffield  
Harvey, G. A., & Co., Woolwich-rd., London, S.E.  
International Channelling Machines Ltd., Sheffield  
Klein, A., and Co., 38, Church-street, Sheffield  
"KSB" Manufacturing Co., 13, Waingate, Sheffield  
Llewellyn & Cubitt Ltd., Pentre, B.S.O., Glam.  
Mining Engineering Co. Ltd., (The), Sheffield  
Plowright Bros. Ltd., Chesterfield  
Pulsometer Engineering Co. Ltd., Reading  
Reavell and Co. Ltd., F. Department, Ipswich  
Robey and Co. Ltd., Globe Works, Lincoln  
Sullivan Machinery Co., 314, Salisbury House, E.C.  
United States Metallic Packing Co. Ltd., Bradford  
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Wood, John, and Sons Ltd., Brook Foundry, Wigan

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Allen, W. G., and Sons (Tipton) Ltd., Tipton  
Baker, John, and Son, Thompson-street, Bilston  
British Mannesmann Tube Co. Ltd., London Wall  
Lewis, William, and Son, Bilston  
Mining Engineering Co. Ltd., Sheffield  
Stewarts & Lloyds Ltd., Birmingham and Glasgow  
Theedam, E. C., Ltd., Dudley

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Daglish, Robert, and Co. Ltd., St. Helens, Lancs.  
"KSB" Manufacturing Co., 13, Waingate, Sheffield  
Mather and Platt Ltd., Manchester  
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Robey and Co. Ltd., Lincoln  
Wood, John, and Sons Ltd., Wigan

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Thornton, A. G., Ltd., King-st. West, Manchester

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Sheppard and Sons Ltd., Bridgend  
Simon-Carves Ltd., 20, Mount-street, Manchester  
Wood, John, and Sons Ltd., Brook Foundry, Wigan

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Youngs, Ryland-street Works, Birmingham

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Hardy Patent Pick Co. Ltd., Sheffield  
Renton, B. M., and Co., Midland Works, Sheffield  
Theedam, E. C., Ltd., Dndley  
Wright's Forge and Engineering Co. Ltd., Tipton

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Heenan and Froude Ltd., Worcester  
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Mining Engineering Co. Ltd., Sheffield

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Renton, B. M., and Co., Sheffield  
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Johnson, Wm., & Sons (Leeds) Ltd., Armley, Leeds  
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Tangyes Ltd., Cornwall Works, Birmingham  
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Renton, B. M., and Co., Midland Works, Sheffield  
Summerson, Thomas, & Sons Ltd., Darlington  
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Firth, William, Ltd., Leeds  
Hardy Patent Pick Co. Ltd., Sheffield  
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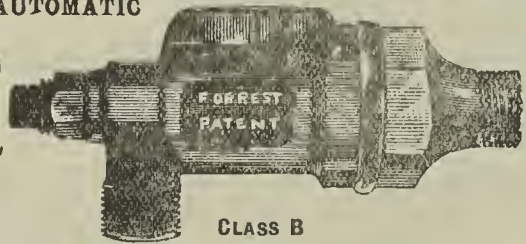
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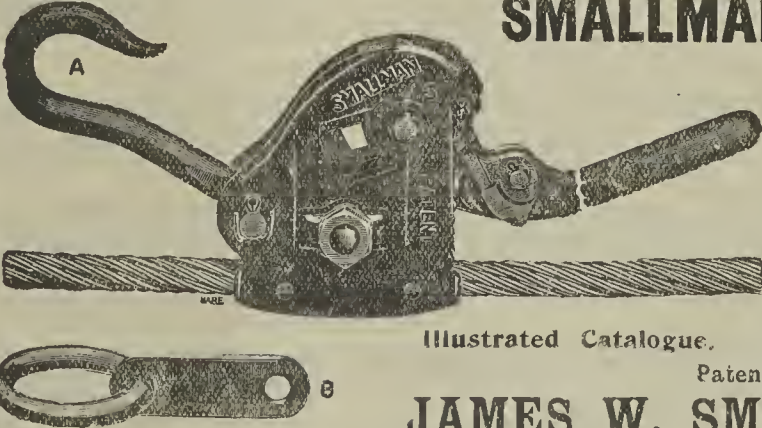
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Green and Bendling Ltd., 23, New Bridge-st., E.C.  
Lancaster and Tonge Ltd., Pendleton, Manchester  
Ormerod, Edward, Atherton, nr. Manchester  
Royles Ltd., Irlam, Manchester  
Tangyes Ltd., Cornwall Works, Birmingham  
Treasure, J. B., & Co., 8 & 12, Vanxhall-rd., Liverpool  
Trier Bros., Caxton House, Westminster, S.W.  
Wakefield, C. C., and Co., 27, Cannon-street, E.C.

**MACHINERY (SECOND-HAND)**

Bute Works Supply Co. Ltd., Cardiff  
Foot, R. G., & Co., 11, Queen Victoria-st., E.C.  
Marple & Gillott Ltd., Coronation Bldgs., Sheffield  
Phillips, C. D., Newport, Mon.  
Renton, B. M., and Co., Midland Works, Sheffield  
Stringer, John, and Son, Dept. 11, Blackburn  
Ward, Thos. W., Ltd., Albion Works, Sheffield

**MACHINE TOOLS**

Carron Co., Carron, Falkirk  
Foot, R. G., & Co., 11, Queen Victoria-street, E.C.  
Phillips, C. D., Newport, Mon.  
Stringer, John, and Son, Blackburn  
Tangyes Ltd., Cornwall Works, Birmingham

**MATHEMATICAL INSTRUMENTS**

Davis, E., 2, Aire-street, Leeds  
Davis, John, and Son (Derby) Ltd., Derby  
Harling, W. H., 47, Finsbury Pavement, London, E.C.  
Stanley, W. F., & Co. Ltd., 236, High Holborn, W.C.  
Thornton, A. G., Ltd., King-st. West, Manchester

**MECHANICAL STOKERS**

Bennis, Ed., and Co. Ltd., Little Hulton, Bolton

**METAL PERFORATORS**

Barns, W., & Son, Queensland-road, Holloway, N.  
Harvey, G. A., & Co., Woolwich-rd., London, S.E.  
Hudson, Thomas, Ltd., Coatbridge, N.B.  
Lührig Coal and Ore-dressing Appliances Ltd., 32, Victoria-street, S.W.

**METALLIC PACKING**

United States Metallic Packing Co. Ltd., Soho Works, Bradford

**METEOROLOGICAL INSTRUMENTS**

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Stanley, W. F., & Co. Ltd., 236, High Holborn, W.C.  
Thornton, A. G., Ltd., King-st. West, Manchester

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Bradley & Craven Ltd., Wakefield  
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Davis, John, and Son (Derby) Ltd., Derby  
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Thornton, A. G., Ltd., King-st. West, Manchester

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Daglish, Robert, and Co. Ltd., St. Helens, Lancs.  
Hardy Patent Pick Co. Ltd., Sheffield  
Johnson, Wm., & Sons (Leeds) Ltd., Armley, Leeds  
Klein, A., and Co., 78, Church-street, Sheffield  
Mining Appliances Co., 32, Church-st. Sheffield  
Mining Engineering Co. Ltd. (The), Sheffield  
Pulsometer Engineering Co. Ltd., Reading  
Robey and Co. Ltd., Lincoln  
Stringer, John, and Son, Dept. 11, Blackburn  
Sullivan Machinery Co., Salisbury House, London Wall, E.C.  
Sutcliffe, Richard, Horbury, near Wakefield  
Davis, John, and Son (Derby) Ltd., Derby  
Wild, M. B., and Co. Ltd., Nethells, Birmingham  
Wood, John, and Sons Ltd., Wigan  
Wright's Forge and Engineering Co. Ltd., Tipton

**MINING TOOLS**

Davis, John, and Son (Derby) Ltd., Derby  
Fell, C. A., Dronfield, near Sheffield  
Hardy Patent Pick Co. Ltd., Sheffield  
Mining Engineering Co. Ltd. (The), Sheffield  
Sullivan Machinery Co., Salisbury House, London Wall, E.C.

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British Wagon Co. Ltd., Rotherham  
Chorley Railway Wagon Co. Ltd., Chorley, Lancs.  
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King, John, and Co., 33, Boar-lane, Leeds  
Renton, B. M., and Co., Midland Works, Sheffield

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Tangyes Ltd., Cornwall Works, Birmingham  
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Fraser & Chalmers Ltd., 3, London Wall Bldgs., E.C.  
Heenan & Froude Ltd., Worcester  
Humble, Stephen, 9, Victoria-st., London, S.W.  
Leech, Goodall & Co., Hunslet, Leeds  
Nortons (Tivdale) Ltd., Tipton, Staffs.  
Robey and Co. Ltd., Lincoln  
Walker Brothers (Wigan) Ltd., Wigan  
Wood, John, and Sons Ltd., Brook Foundry, Wigan  
Wright's Forge and Engineering Co. Ltd., Tipton

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Green and Bonding Ltd., London, E.C.  
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Northern Rubber Co., The Wicker, Sheffield  
Reddaway, F., & Co. Ltd., Pendleton, Manchester  
Teale, W. E., and Co. Ltd., Swinton, Lancs.  
Theedam, E. C., Ltd., Dudley  
United States Metallic Packing Co. Ltd., Bradford  
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King, John, and Co., 33, Boar-lane, Leeds

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Hudson, Thomas, Ltd., Coatbridge, N.B.  
Norton's (Tivdale) Co. Ltd., Tipton  
Teale, W. E., and Co. Ltd., Swinton, Lancs.  
Theedam, E. C., Ltd., Dudley

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Hopkinson, J., and Co. Ltd., Huddersfield  
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Hollingdrake, Henry, & Son Ltd., Stockport  
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Lewis, Edwin, and Sons, Wolverhampton  
Pulsometer Engineering Co. Ltd., Reading  
Rensell, John, & Co. Ltd., Alma Tube Wks., Walsall  
Spencer, John, Ltd., Tube Works, Wednesbury  
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Legard and Son, Leather Merchants, Barnsley

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Lewis, Edwin, and Sons, Wolverhampton  
Renton, B. M., and Co., Midland Works, Sheffield  
Scott, Walter, Ltd., Leeds Steel Works, Leeds  
Shelton Iron, Steel & Coal Co. Ltd., Stoke-on-Trent  
Spencer, John, Ltd., Globe Tube Works, Wednesbury  
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Renton, B. M., and Co., Midland Works, Sheffield  
Summers, Thomas, and Sons Ltd., Darlington

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Thomas, Wm., Mining School, Porth, Glam.

**PRESERVATIVE (FOR PLANT)**

Wailles, Dove and Co. Ltd., Newcastle-on-Tyne

**PUBLICATIONS**

Bennett College, Regent-street, Sheffield  
Colliery Guardian Co. Ltd., 30 & 31, Furnival-st. Holborn, London, E.C.  
Griffin, Charles, and Co. Ltd., London, W.C.  
Southern, T. A., Universal Mining School, Cardiff

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Hardy Patent Pick Co. Ltd., Sheffield  
Mudford, J. H., & Sons, 55, Exchange-st., Sheffield  
Tangyes Ltd., Cornwall Works, Birmingham  
Theedam, E. C., Ltd., Dudley  
Youngs, Ryland-street Works, Birmingham

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Frost, Albert, and Co., Sheffield  
Humble, Stephen, 9, Victoria-st., London, S.W.  
Jardine, John, Deering-street, Nottingham  
Fraser, Douglas, & Sons Ltd., Westburn Foundry, Arbroath  
King, John, and Co., 33, Boar-lane, Leeds  
Llewellyn and Cubitt Ltd., Pentre, R.S.O. Glam.  
Spencer and Co. Ltd., Melksham, Wilts  
Thompson and Southwick Ltd., Tamworth  
Walker Bros. (Wigan) Ltd., Wigan  
Wood, John, & Sons Ltd., Brook Foundry, Wigan

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Daglish, Robert, and Co. Ltd., St. Helens, Lancs.  
Fraser, Douglas, & Sons Ltd., Westburn Foundry, Arbroath  
Head, Wrightson and Co. Ltd., Stockton-on-Tees  
Llewellyn & Cubitt Ltd., Pentre, R.S.O. Glam.  
Mining Appliances Co., 32, Church-st., Sheffield  
Spencer and Co. Ltd., Melksham, Wilts  
Thompson and Co., Wigan  
Thompson and Southwick Ltd., Tamworth  
Wood, John, & Sons Ltd., Brook Foundry, Wigan

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Fraser & Chalmers Ltd., 3, London Wall Bldgs., E.C.  
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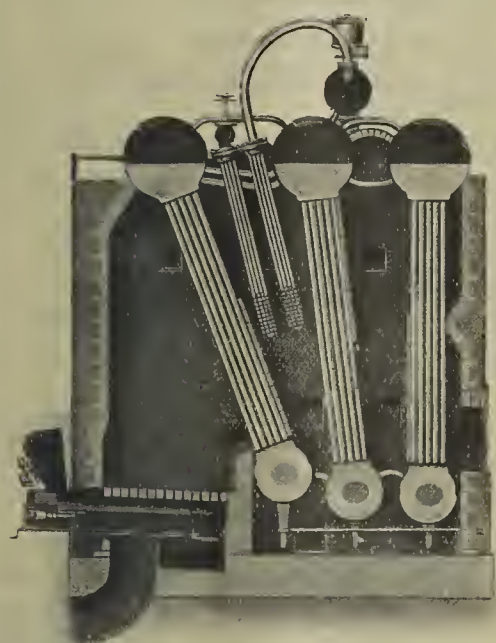
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Supplied to various Collieries all over the Country.

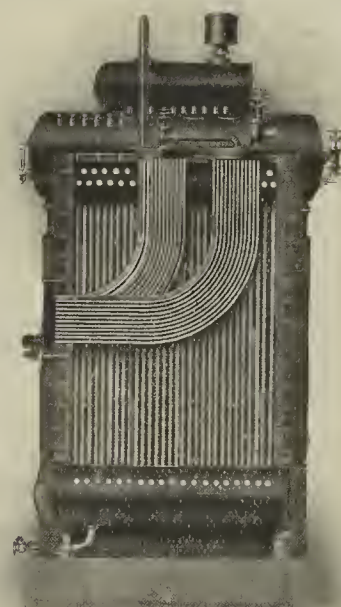
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The most accessible boiler on the market for cleaning and examination.

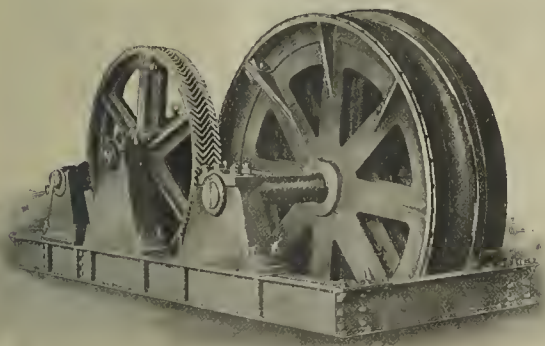
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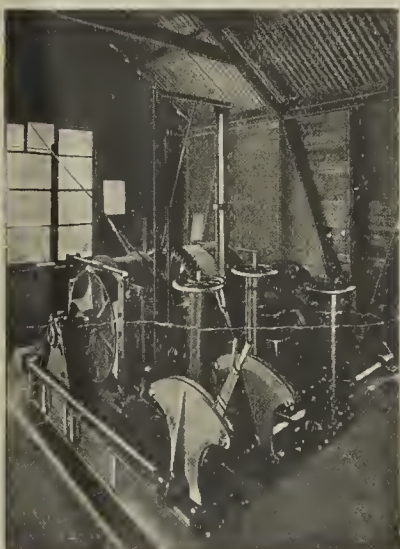
Water-tube Boiler, "Woodeson" patents, Fitted with Patent Superheater and Stoker of the Underfeed Type.



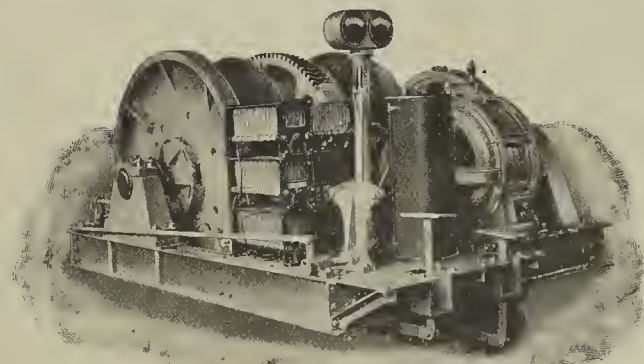
Front Sectional View of Boiler, showing Superheater in Position.



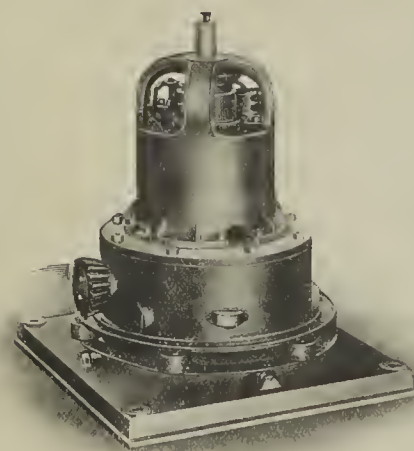
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Electric Above-ground Type Capstan, Motor & Gear with Capstan Removed.

### PUMPS "Woodeson" Patents,

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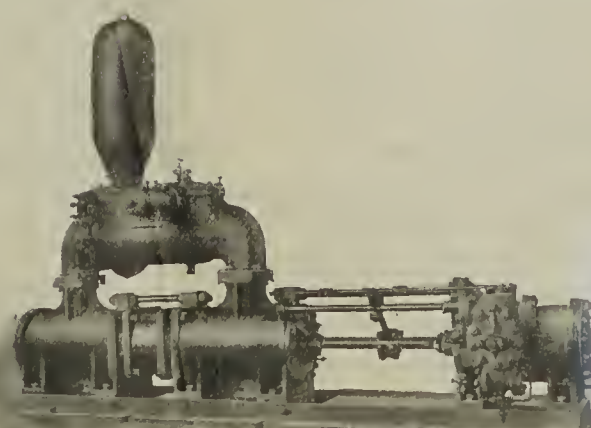
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Diamond Coal-Cutter Co., Wakefield  
Hardy Patent Pick Co. Ltd., Sheffield  
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Mining Engineering Co. Ltd. (The), Sheffield  
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Hopkinson, J., and Co. Ltd., Huddersfield  
"KSB" Manufacturing Co., 13, Waingate, Sheffield  
Lancaster and Tonge Ltd., Pendleton, Manchester  
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Boyles Ltd., Irlam, Manchester

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Sanito Co., Dudley  
Wollescote Galvanizing Co., Brierley Hill

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Theedam, E. C., Ltd., Dudley

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Hardy Patent Pick Co. Ltd., Sheffield  
Harvey, G. A., & Co., Woolwich-rd., London, S.E.  
Heenan and Froude Ltd., Worcester  
Norton's (Tividale) Ltd., Tipton  
Simon-Carves Ltd., 20, Mount-street, Manchester  
Spencer and Co. Ltd., Melksham, Wilts  
Wright's Forge and Engineering Co. Ltd., Tipton

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W.C.

Hardy Patent Pick Co. Ltd., Sheffield  
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Johnson, Wm., & Sons (Leeds) Ltd., Armley, Leeds  
Leech, Goodall & Co., Hunslet, Leeds  
Norton's (Tividale) Ltd., Tipton  
Simon-Carves Ltd., 20, Mount-street, Manchester  
Spencer and Co. Ltd., Melksham, Wilts  
Wright's Forge and Engineering Co. Ltd., Tipton

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Lancaster and Tonge Ltd., Pendleton, Manchester  
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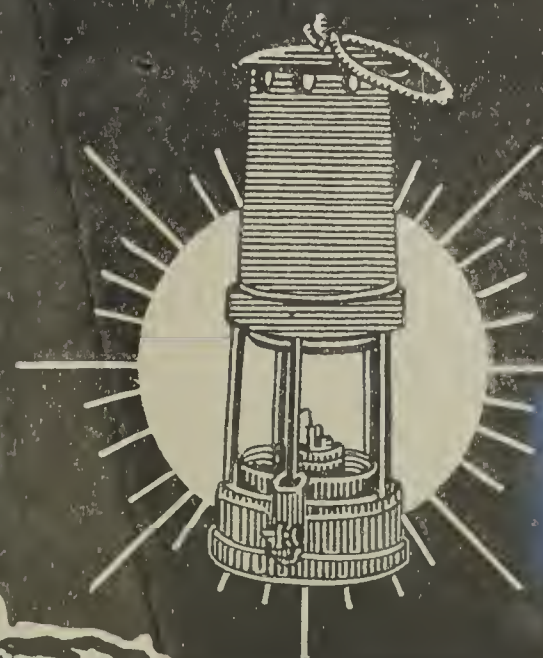
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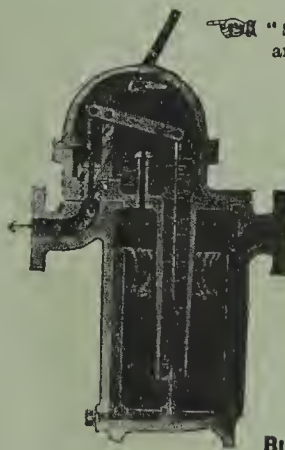
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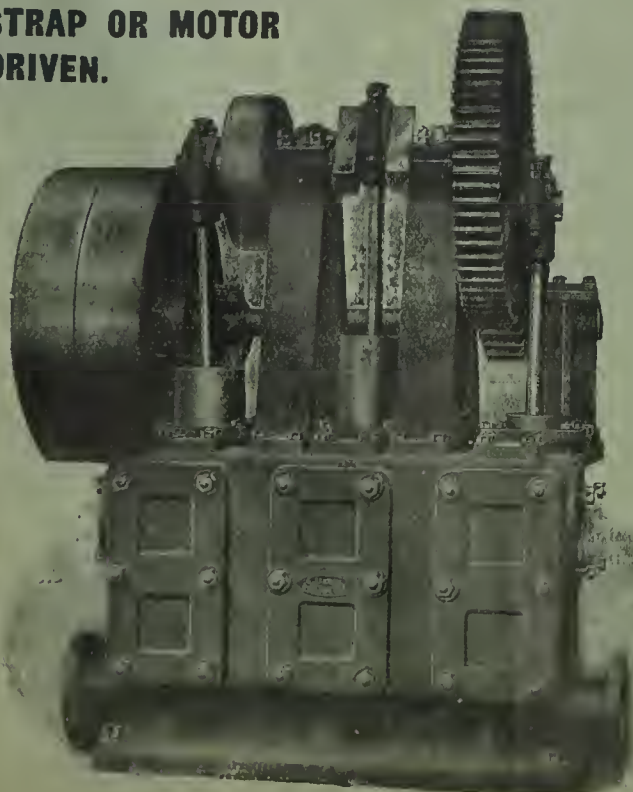
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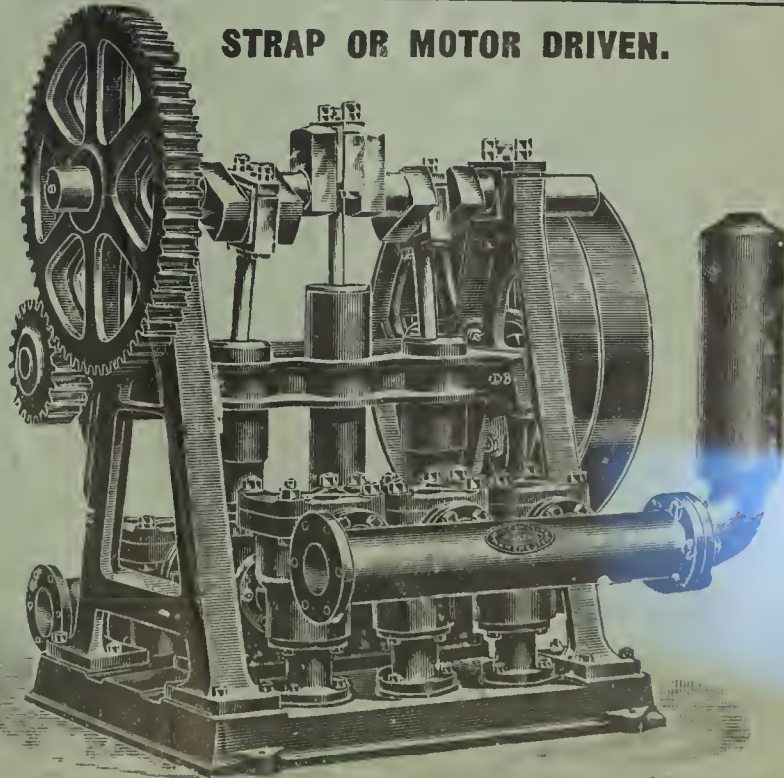


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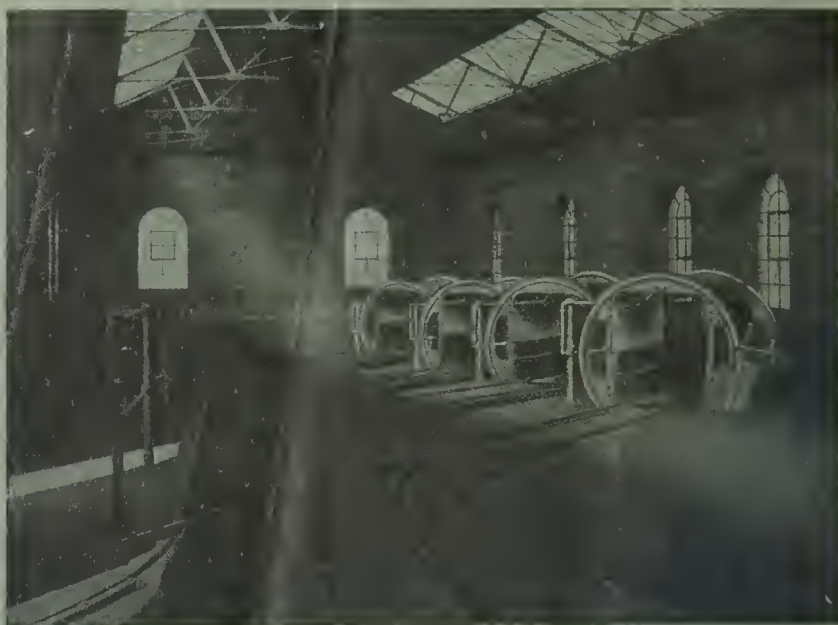


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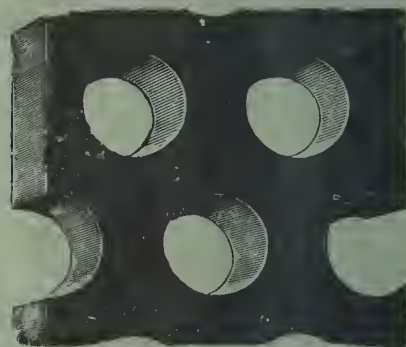
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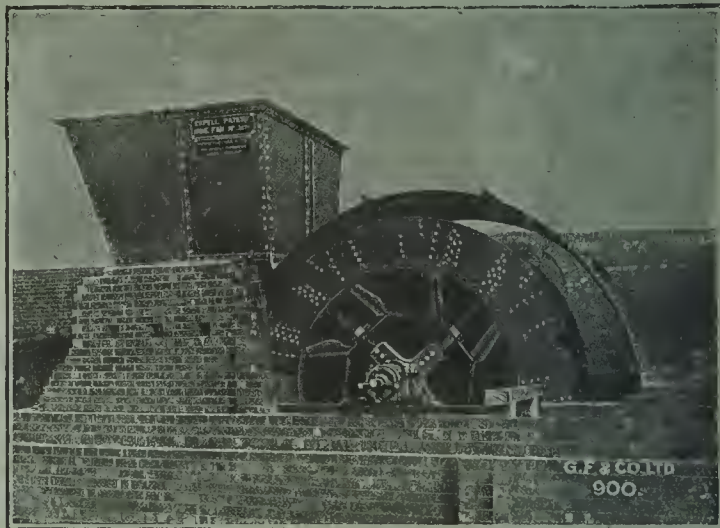
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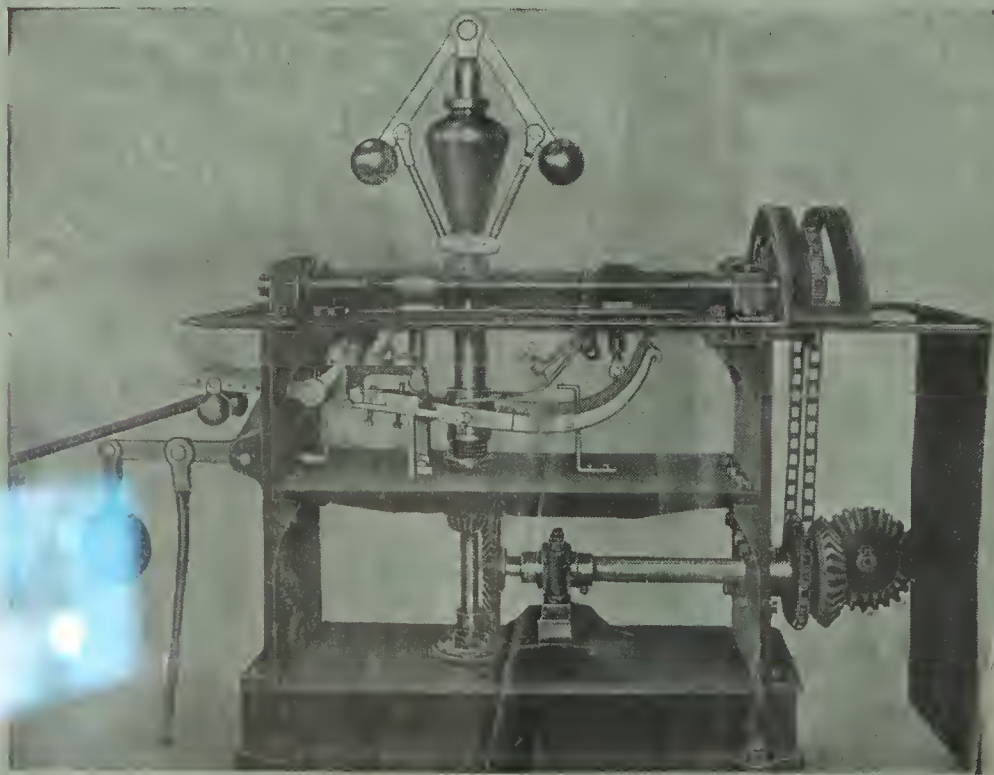
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